Colorado Springs Utilities
Demand Side Management &
Renewable Energy Presentation
for
19th Annual SWEEP Workshop

November 21, 2013

Mark James
DSM & Renewable Energy Manager
Agenda

• Colorado Springs Utilities (CSU) Overview
• CSU’s DSM & RE Section Snapshot
• 2006-2012 Results; 2013 Goals
• 2013 DSM & RE Programs Overview
• 2014 DSM & RE Programs Preview
• New Developments - Energy Vision 2020 Goals
• Key Challenges
• Questions
Colorado Springs Utilities (CSU)

- Four service municipal utility
  - Electric, Natural Gas, Water, Wastewater Services
- ~230,000 customers; >600,000 meters
- 904 MW Peak (6/2012); 4.6 billion in kWh sales
- Home Rule Municipality
  - Regulator is Colorado Spring City Council & Colorado Springs Utilities Board
  - Not subject to CO Public Utilities Commission jurisdiction
- 1,800 employees; $1.1 billion annual budget
CSU DSM & RE Section

- CSU established energy DSM section in 2005
- DSM Section responsibilities include:
  - DSM electric demand (MW) & energy (MWh) goals
  - Renewable Energy MW & MWh goals
  - Natural gas energy (Mcf) goals
  - Colorado Renewable Energy Standard compliance
  - Colorado Springs Energy Vision 2020 goals
- Six full time employees
- Manage 32 different rebate/incentive programs
- Part of long term resource planning department
### 2006-2012 Electric DSM Results and 2013 Electric DSM Goals

<table>
<thead>
<tr>
<th>Year</th>
<th>MWh</th>
<th>MW</th>
<th>DSM Cost</th>
<th>RE Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>5,145</td>
<td>4.67</td>
<td>$953,947</td>
<td>$0</td>
<td>$953,947</td>
</tr>
<tr>
<td>2006</td>
<td>7,296</td>
<td>4.65</td>
<td>$1,753,381</td>
<td>$193,408</td>
<td>$1,946,789</td>
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<tr>
<td>2007</td>
<td>9,297</td>
<td>5.72</td>
<td>$1,522,335</td>
<td>$171,966</td>
<td>$1,694,301</td>
</tr>
<tr>
<td>2008</td>
<td>16,575</td>
<td>8.11</td>
<td>$2,250,772</td>
<td>$384,780</td>
<td>$2,635,552</td>
</tr>
<tr>
<td>2009</td>
<td>20,371</td>
<td>8.24</td>
<td>$1,900,224</td>
<td>$818,804</td>
<td>$2,719,028</td>
</tr>
<tr>
<td>2010</td>
<td>18,738</td>
<td>7.84</td>
<td>$1,956,691</td>
<td>$778,339</td>
<td>$2,735,030</td>
</tr>
<tr>
<td>2011</td>
<td>22,745</td>
<td>9.27</td>
<td>$1,943,710</td>
<td>$2,130,089</td>
<td>$4,073,799</td>
</tr>
<tr>
<td>2012</td>
<td>40,328</td>
<td>11.66</td>
<td>$2,569,235</td>
<td>$1,924,336</td>
<td>$4,493,571</td>
</tr>
<tr>
<td>2013</td>
<td>43,879</td>
<td>14.57</td>
<td>$3,348,070</td>
<td>$1,433,924</td>
<td>$4,781,994</td>
</tr>
</tbody>
</table>

Note: 2006-2008 costs include labor, benefit, incentive/rebate, administrative and marketing expenses. 2009-2013 costs include labor, benefit, incentive/rebate and administrative expenses.
# 2006 - 2012 Solar PV Rebates

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar PV Systems Installed</td>
<td>21</td>
<td>17</td>
<td>20</td>
<td>31</td>
<td>35</td>
<td>82*</td>
<td>53**</td>
</tr>
<tr>
<td>Average Cost Per Watt</td>
<td>$8.92</td>
<td>$9.03</td>
<td>$9.85</td>
<td>$9.22</td>
<td>$6.65</td>
<td>$6.85</td>
<td>$5.09</td>
</tr>
<tr>
<td>Average Cost Post Rebate Per Watt</td>
<td>$4.92</td>
<td>$5.28</td>
<td>$6.10</td>
<td>$5.54</td>
<td>$3.68</td>
<td>$4.86</td>
<td>$3.77</td>
</tr>
<tr>
<td>Total Kilowatts (kW) Installed</td>
<td>47.2</td>
<td>44.7</td>
<td>102.6</td>
<td>245.0</td>
<td>263.0</td>
<td>565.5</td>
<td>480.0</td>
</tr>
<tr>
<td>Rebate Level Per Watt</td>
<td>$4.00</td>
<td>$3.75</td>
<td>$3.75</td>
<td>$3.75</td>
<td>$3.00</td>
<td>$2.00</td>
<td>$1.80</td>
</tr>
<tr>
<td>Total Rebates Paid to Customers</td>
<td>$188,788</td>
<td>$167,453</td>
<td>$384,780</td>
<td>$818,804</td>
<td>$778,339</td>
<td>$1,131,053</td>
<td>$863,930**</td>
</tr>
</tbody>
</table>

*82 RERP installations (71 Res & 11 Bus) and 2,508 solar panels leased (503 kW) from CSG Program. CSG incentives paid were $995,676. Total solar PV rebates/incentives paid was $2,126,729.

**53 RERP installations (41 Res & 12 Bus) and 2,646 solar panels leased (937 kW) from CSG Program. CSG incentives paid were $1,008,150. Total solar PV rebates/incentives paid was $1,872,080.

The 2013 budget for the Renewable Energy Rebate Program is $613,710 and the Community Solar Garden Program budget is $750,000. Total 2013 budget for solar PV is $1,363,710.
2013 DSM & RE Programs

- 21 Electric DSM & RE Programs
- 11 Natural Gas DSM & RE Programs

Goals
- 14.57 MW
- 43,879 MWh
- 152,186 Mcf

Budget
- $6,004,420 (Electric & Natural Gas)
CSU DSM & RE Programs

- Business DSM & RE Programs
  - Bus Peak Demand Rebate
  - Bus Lighting Rebate
  - Bus Synchronous Belts & Pulleys Rebate
  - Bus Evaporative Cooling Rebate
  - Bus High Efficiency Air Conditioner Rebate
  - Bus Package Terminal Air Conditioner Rebate
  - Bus Electrically Commutated Motor Rebate
  - Bus Occupancy Sensor Rebate
  - Bus Builder Incentive Program Rebate
  - Bus Renewable Energy Rebate Program
CSU DSM & RE Programs

- Business DSM & RE Programs
  - Bus Wind Rebate
  - Bus Solar Thermal Systems Rebate
  - Bus Window Rebate
  - Bus Large Multi-Family Window Rebate
  - Commercial Air Conditioning Load Cycling Program
  - Bus CFL Promotional Program
  - CFL Exchange Program
  - Solar Leasing Program
  - Community Solar Garden Incentive
CSU DSM & RE Programs

• Residential DSM & RE Programs
  • Res Wind Rebate
  • Res Renewable Energy Rebate Program
  • Res Insulation & Air Sealing Rebate
  • Res Duct Sealing Rebate
  • Res Window Rebate
  • Res Multi-Family Window Rebate
  • Res Solar Domestic Hot Water Rebate
  • Electric Efficiency Product Promotion (CFL’s)
  • CFL Exchange Program
  • Res Air Conditioning Load Cycling Program
CSU DSM & RE Programs

- Residential DSM & RE Programs
  - Res Dishwasher Rebate
  - Res Furnace Rebate
  - Res Boiler Rebate
  - Res Showerhead Markdown
  - Home Efficiency Assistance Program
  - Community Solar Garden Incentive
CSU DSM & RE Special Projects

- Special projects:
  - Distribution Circuits Project
  - CSU Lighten the Load Conservation Project
  - Expanded Community Solar Gardens Incentive (2 MW in 2014)
  - Water Load Shifting Through Pump Scheduling Optimization
  - Volt VAR (on electric distribution system)
  - CSU Wind Purchase (~13 MW in 2013; more before 2017)
2014 DSM & RE Program Preview

• 22 Electric DSM & RE Programs
• 11 Natural Gas DSM & RE Programs
• Goals
  • 11.57 MW
  • 49,695 MWh
  • 103,280 Mcf
• Budget
  • $7,946,537 (Electric & Natural Gas)
• Increased focus on business lighting; solar gardens
Colorado Springs Energy Vision

By 2020, Colorado Springs Utilities will:

• provide 20% of its total electric energy through renewable sources*;
• provide opportunities to achieve efficiencies with the goal of reducing average electric use by 10%; and
• maintain a 20% regional cost advantage.

*Qualifying renewable sources as defined by the Colorado Renewable Energy Standard (CO RES)
Colorado Renewable Energy Standard (CO RES)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Current CO RES Municipal Compliance Percentage</td>
<td>1%</td>
<td>3%</td>
<td>6%</td>
<td>10%</td>
</tr>
<tr>
<td>CSU Energy Vision Voluntary Compliance Percentage</td>
<td>1%</td>
<td>10%</td>
<td>15%</td>
<td>20%</td>
</tr>
<tr>
<td>Current CO RES Investor Owned Utility Compliance Percentage</td>
<td>5%</td>
<td>12%</td>
<td>20%</td>
<td>30%</td>
</tr>
</tbody>
</table>

CSU is voluntarily doubling its commitment to renewable energy. CSU budgets 1% of annual compliance amount to fund customer-side distributed generation programs.
Approx. 100 MW of wind or 226 MW of solar required to meet requirement*

* Capacity Factor: Wind at 45% and Solar at 20%
Energy Vision 20% by 2020
Renewable Energy Goal

CSU’s 2012 Electric Integrated Resource Plan (EIRP) will determine what supply-side renewable energy will be added to CSU’s portfolio in the future.

Most likely biomass, wind, and/or solar
# Proposed Energy Vision 10%

## Average Energy Reduction by 2020

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental Energy Savings (MWh)</td>
<td>31,169</td>
<td>31,603</td>
<td>40,233</td>
<td>49,260</td>
<td>49,392</td>
<td>50,129</td>
<td>50,695</td>
<td>51,426</td>
<td>52,315</td>
<td>53,019</td>
</tr>
<tr>
<td>Cumulative Energy Savings (MWh)</td>
<td>31,169</td>
<td>62,751</td>
<td>102,960</td>
<td>152,196</td>
<td>201,564</td>
<td>251,666</td>
<td>302,329</td>
<td>353,721</td>
<td>405,998</td>
<td>458,975</td>
</tr>
<tr>
<td>Cumulative Demand Savings (MW)</td>
<td>7.34</td>
<td>14.04</td>
<td>22.52</td>
<td>32.91</td>
<td>43.42</td>
<td>53.95</td>
<td>64.59</td>
<td>75.39</td>
<td>86.37</td>
<td>97.49</td>
</tr>
<tr>
<td>Incremental Costs ($M)</td>
<td>2.54</td>
<td>2.93</td>
<td>4.31</td>
<td>6.23</td>
<td>7.59</td>
<td>9.33</td>
<td>11.44</td>
<td>14.06</td>
<td>14.47</td>
<td>15.90</td>
</tr>
<tr>
<td>Cumulative Costs ($M)</td>
<td>2.54</td>
<td>5.46</td>
<td>9.77</td>
<td>16.00</td>
<td>23.59</td>
<td>32.92</td>
<td>44.36</td>
<td>58.42</td>
<td>72.89</td>
<td>88.79</td>
</tr>
<tr>
<td>Incremental Reduction</td>
<td>0.69%</td>
<td>0.71%</td>
<td>0.90%</td>
<td>1.10%</td>
<td>1.10%</td>
<td>1.10%</td>
<td>1.10%</td>
<td>1.10%</td>
<td>1.10%</td>
<td>1.10%</td>
</tr>
<tr>
<td>Cumulative Reduction</td>
<td>0.69%</td>
<td>1.40%</td>
<td>2.30%</td>
<td>3.40%</td>
<td>4.50%</td>
<td>5.60%</td>
<td>6.70%</td>
<td>7.80%</td>
<td>8.90%</td>
<td>10.00%</td>
</tr>
</tbody>
</table>
# Summit Blue DSM Potential
## 10 Year Annual Average

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Energy Savings as % of Sales</th>
<th>Demand Savings as % of Peak</th>
<th>Costs as % of Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB High Case</td>
<td>0.75%</td>
<td>1.12%</td>
<td>2.08%</td>
</tr>
<tr>
<td>SB Medium Case</td>
<td>0.57%</td>
<td>0.85%</td>
<td>1.54%</td>
</tr>
<tr>
<td>CSU 2009</td>
<td>0.45%</td>
<td>1.04%</td>
<td>0.88%</td>
</tr>
<tr>
<td>CSU 2010</td>
<td>0.40%</td>
<td>0.95%</td>
<td>0.80%</td>
</tr>
<tr>
<td>CSU 2011-2020</td>
<td>1.00%</td>
<td>1.61%</td>
<td>2.45%</td>
</tr>
</tbody>
</table>
10% Reduction in Electric Use by 2020

2013 Goal: 43,879 MWh
Cost of Electric DSM & RE

2013: PV = $1,363,710  DSM = $2,874,792; incentive costs only
### Regional Cost Advantage Calculation (Example)

<table>
<thead>
<tr>
<th>Utility</th>
<th>Res kWh’s</th>
<th>Com kWh’s</th>
<th>Ind kWh’s</th>
<th>Residential Power Cost</th>
<th>Commercial Power Cost</th>
<th>Industrial Power Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSCo</td>
<td>600</td>
<td>6,000</td>
<td>400,000</td>
<td>$64.85</td>
<td>$574.03</td>
<td>$32,899.90</td>
</tr>
<tr>
<td>MVEA</td>
<td>600</td>
<td>6,000</td>
<td>400,000</td>
<td>$92.72</td>
<td>$746.91</td>
<td>$37,277.50</td>
</tr>
<tr>
<td>BHE</td>
<td>600</td>
<td>6,000</td>
<td>400,000</td>
<td>$103.66</td>
<td>$952.15</td>
<td>$45,980.51</td>
</tr>
<tr>
<td>CSU</td>
<td>600</td>
<td>6,000</td>
<td>400,000</td>
<td>$68.22</td>
<td>$496.20</td>
<td>$29,433.84</td>
</tr>
</tbody>
</table>

**PSCo, MVEA, & BHE Average Power Cost**

- $(PSCo+MVEA+BHE)/3 = \frac{261.23}{3} = 87.08$
- $(PSCo+MVEA+BHE)/3 = \frac{2,273.09}{3} = 757.70$
- $(PSCo+MVEA+BHE)/3 = \frac{116,157.91}{3} = 38,719.30$

**CSU Regional Cost Advantage**

- $(\text{CSU Cost} - \text{Average Power Cost})/\text{Average Power Cost} = \frac{-18.86}{87.08} = -21.65\%$
- $(\text{CSU Cost} - \text{Average Power Cost})/\text{Average Power Cost} = \frac{-261.50}{757.70} = -34.51\%$
- $(\text{CSU Cost} - \text{Average Power Cost})/\text{Average Power Cost} = \frac{-9,285.46}{38,719.30} = -23.98\%$

<table>
<thead>
<tr>
<th>Ratings</th>
<th>3.00</th>
<th>5.00</th>
<th>4.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Class Weighting By Sales</td>
<td>37.2%</td>
<td>37.2%</td>
<td>25.6%</td>
</tr>
<tr>
<td>Weighted Customer Class Rating</td>
<td>$(3.00 \times 37.2%) = 1.12$</td>
<td>$(5.00 \times 37.2%) = 1.86$</td>
<td>$(4.00 \times 25.6%) = 1.02$</td>
</tr>
<tr>
<td>Overall Weighted Rating (Residential+Commercial+Industrial)</td>
<td>$(1.12 + 1.86 + 1.02) = 4.00$ (4.00 after rounding to whole number)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What is Missing from the Energy Vision 2020?

Colorado Springs Energy Vision 2020 achieves the following goals by the year 2020:

- 20% regional cost advantage (electric only)
  - 1% Retail Rate Impact Limit for RE

- Achieve 20% of its total electric energy through renewable sources
  - 1% of EV Requirement from Distributed Generation Resources

- Provide opportunities to achieve efficiencies with the goal of reducing average electric use by 10%
  - Achieve a reduction of X% in demand
Key Challenges

- Increasing DSM and RE goals without new headcount
- Balancing spending on DSM versus RE
- Drake power plant (fossil fuel) decommissioning study
- Utilities Policy Advisory Committee (UPAC) assignment to recommend changes to Energy Vision 2020
  - Six new City Council members (Apr 2013)
  - DSM & RE tariff rider; 1% DG goal; MW goal; 1% RE annual rate cap
- Budget challenges
  - Scrubbers (SO2) on fossil fuel units (~$300M)
  - Southern Delivery System construction (~$1B)
- 2012 EIRP analysis - no new base load through 2032
Questions