Finding Value in Water/Energy Program Partnerships

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Industrial, Agricultural & Water Programs
Customer Energy Solutions

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Our Water’s Energy Footprint

- Statewide supply / deliveries
- Local water and wastewater agencies
- End users: pumping, heating, etc

= 20% of statewide electricity
  (~30% of Therms)

PG&E Service Area

~1,000 GWh
Not PG&E supply

~1,500 GWh
<2% of PG&E load

Ag: ~5,000 GWh
Bldg: ~11,000 GWh
~20% of PG&E load
## Three Levels of Water/Energy Efficiency

<table>
<thead>
<tr>
<th>Type of measure</th>
<th>Example opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Energy savings associated with water</td>
<td>• Efficient water heater</td>
</tr>
<tr>
<td>2. Combined water and energy savings for end user</td>
<td>• Low flow showerhead</td>
</tr>
<tr>
<td>3. Water conservation only (upstream/embbeded energy)</td>
<td>• High efficiency toilet</td>
</tr>
</tbody>
</table>
Significant Local Variability

Energy intensity in East Bay Municipal Utility District territory:

Analysis from PG&E Emerging Technologies project, www.etcc-ca.org
Developing Water/Energy Programs

Strategies for successful partnerships:
- Focus on end use energy savings
- Single point of administration to improve customer experience
- Minimize duplication of marketing and technical resources to reduce costs
- Creative cost-effectiveness calculations
Cost Effectiveness Analysis

• TRC: Total Resource Cost – ratio of societal benefits to costs

\[
\text{Benefit Cost Ratio} = \frac{\text{Site Energy AC}}{\text{Equipment Cost + Program Cost}}
\]

Where:
\[
\text{Site Energy AC} = \text{Site Energy Savings} \times \text{Avoided Cost of Energy}
\]

• Increase benefit side (top) of equation
  o Quantify societal value of saved water
  o Account for embedded (upstream or downstream) energy savings

• Reduce cost side (bottom) of equation
  o Allocate equipment cost to resource type
  o Share program costs
Example: end-use energy only

Some water measures are cost-effective under existing avoided cost framework with end-use energy avoided costs alone.
Adding embedded energy could just make the same measures more cost-effective.
Example: End-uses, Energy and Water Avoided Costs

Energy and water avoided costs together may change investment decisions.
Focus on End Use Energy Savings

- PG&E portfolio addresses several areas of water/energy
- Rebates/incentives determined based on facility level energy savings (not embedded)

<table>
<thead>
<tr>
<th>EXAMPLE PRODUCTS</th>
<th>Deemed EE Products</th>
<th>Custom EE Products</th>
<th>DR and DG Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>Clothes washers</td>
<td>N/A</td>
<td>Solar water heating</td>
</tr>
<tr>
<td></td>
<td>Water heaters</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low flow showerheads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial</td>
<td>Ozone laundry</td>
<td>Waste water treatment</td>
<td>Water utility auto-DR</td>
</tr>
<tr>
<td></td>
<td>Low flow faucet aerators</td>
<td>Condensing boilers</td>
<td>Wastewater plant self gen</td>
</tr>
<tr>
<td></td>
<td>Steam Traps</td>
<td>Steam leaks</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pump VFDs</td>
<td></td>
</tr>
<tr>
<td>Industrial</td>
<td>Pipe Insulation</td>
<td></td>
<td>Pressure reduction turbines</td>
</tr>
<tr>
<td></td>
<td>Boilers and steam systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural</td>
<td>Low flow sprinkler nozzles</td>
<td>Pump Efficiency Program</td>
<td>Ag Pump auto-DR</td>
</tr>
<tr>
<td></td>
<td>Sprinkler to drip conversion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(WATER/ENERGY SAVINGS) – MAY NOT BE COMPREHENSIVE

<table>
<thead>
<tr>
<th>(WATER/ENERGY SAVINGS)</th>
<th>Electricity Savings (kWh)</th>
<th>Gas Savings (Therms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPLIANCES</td>
<td>14,073,299</td>
<td>15,238,140</td>
</tr>
<tr>
<td>BOILERS AND STEAM SYSTEMS</td>
<td>514,422</td>
<td>1,609,355</td>
</tr>
<tr>
<td>FOOD SERVICE TECHNOLOGY</td>
<td>378,918</td>
<td>616,058</td>
</tr>
<tr>
<td>INDUSTRIAL SYSTEMS</td>
<td>11,479,574</td>
<td>10,087,923</td>
</tr>
<tr>
<td>PUMPS AND FANS</td>
<td>66,467,131</td>
<td>83,359,242</td>
</tr>
<tr>
<td>Grand Total</td>
<td>92,913,344</td>
<td>110,910,718</td>
</tr>
</tbody>
</table>

95 GWh/yr (9% of portfolio)  14M Thm/yr (60% of portfolio)
Partner to Administer

Clothes washer rebate partnership –
PG&E + 29 water suppliers

- PG&E claims energy savings; agencies claim water savings
- Reduced administrative cost
- Retail partnerships
Leverage Existing Program Infrastructure

PG&E direct install programs: ESAP and MIDI

- Contractors install lighting, weatherization, showerheads, faucet aerators
- Opportunity to share leads and program resources
Technical Collaboration

California Food Service Technology Center

- Equipment rebates
- Facility audits
- Demonstrations and training events
2013-2014 Utility EE Programs

- “No regrets” pilots to further test water/energy nexus
- Scale offerings that can provide relief to drought affected customers
- CPUC staff proposal for cost effectiveness treatment

2014 Proceeding on Water/Energy Nexus

- Series of public workshops
- Development of calculators for cost effectiveness: avoided cost of water, methodology for avoided energy
- Guidance on co-funded programs
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APPENDIX SLIDES
Lots of little fish

Utilities

Water

Electricity

Urban Water Utilities

No. | Pop.
--- | ---
20 | 80

Large | Small Retail | Wholesale
Unknown | Large | Small Retail | Wholesale

Energy + Environmental Economics
The 19%

CA Statewide Annual Energy Demand Associated with Water Consumption

End-use energy input (Res, Com, Ind)

Large scale supply projects

Local water agencies

Groundwater pumping and other ag sector

Total: ~54,000 GWh/yr

* Updated by Navigant for CEC 2006 and CPUC 2009 studies