This presentation premiered at WaterSmart Innovations

watersmartinnovations.com
Results from 3 Dipper Well Replacement Studies

OCT 5, 2017
30 Years of Partnership

- Frontier Energy partners
- PG&E

Frontier Energy operate

Food Service Technology Center own
Total Dip Well Water/Energy Use in CA

- California has 100k dip wells
- Water use from 0.25 to 1 gpm
- Some run 24/7/365
- Up to 1400 gallons per day
- CA estimated total: 75,000 AF/yr
- Lake Tahoe is 36 mi³ of water
- Dipper Wells in California consume 1 Lake Tahoe every 20 years
Replacement Technologies Monitored (so far)

Lolsberg i.ScoopShower
- Pressure switch
- Adjustable head

ConserveWell Heated Utensil Holder
- Manually replace water
- 4h timer
Case Study: Jamba Juice Emeryville

• Daily Averages:
  • Time = 12.5 hr
  • Water consumed = 167 gal
  • Flow Rate = 0.25 gpm
## Jamba Results

<table>
<thead>
<tr>
<th></th>
<th>Pre-Replacement</th>
<th>Post Replacement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average Flow Rate (gpm)</strong></td>
<td>0.25</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>Operating Time (hr)</strong></td>
<td>12.5</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Daily Water Use (gal)</strong></td>
<td>167</td>
<td>9.6</td>
</tr>
<tr>
<td><strong>Reduction in Water use</strong></td>
<td></td>
<td>94%</td>
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</tbody>
</table>
Cost Savings

If all 3 Dipper Wells were Replaced

• Total water use: 10,450 gal/y
• Total cost: $182/y
• Savings: 170,000 gal, $2,980 per year
• ROI: Less than 1 year
Black Bear Los Banos Scoop Shower Savings

• Baseline Dipper Well used 486.5 gal/day
• Scoop Shower replacement used 4.9 gal/day


## Black Bear Los Banos Results

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Continuous flow is extremely wasteful

Los Banos Dipper Well Flow Rate (gpm) 6/14

Los Banos Scoop Shower Flow Rates (gpm), 8/1
Staff operating practices had massive impact on total use!!!
Savings through Operation Standardization

- New Use per day = 5 gpm
  - Very little variation
  - Weekend use higher than weekday use
  - New water use pattern matches service demand!
- Single well changeout saved 175,000 gallons per year
BB Madera Savings – both water and energy

Hot-Water Fed Dipper Well
• Left on overnight
• Low flow rate

Replaced with ConserveWell:
• Manual dump/fill
• Staff replaced water every 4h
• Left on overnight
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<td>24</td>
</tr>
<tr>
<td>Daily Water Use (gal)</td>
<td>321</td>
<td>4</td>
</tr>
<tr>
<td>Daily Energy Use (therm)</td>
<td>2</td>
<td>0.1</td>
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<tr>
<td>Reduction in Water use</td>
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<td>97%</td>
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Point of energy use and fuel type changed
Additional Technology to be Researched

- Nemco RinseWell
- Recirculates water
- Disinfects water with Ozone
- Microbe study available
Future Field Studies necessary (and underway!)
Next Steps

• Field Evaluate Nemco RinseWell
• Field Studies at different site types
• Work with health departments to develop SOPs
• Develop utility incentives
Thanks!

fishnick.com