City of Mesa - Steps Toward Sustainability
NW Plant Co-generation
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- Co-generation Unit installed in 2001
- Rated at 550 kW
- Original cost - $400,000
- Usage of co-gen limited by production, storage pressure regulation and operator time required
- In 8 years, only had 200 run hours
- Budget reductions, electric rate increases spur squeezing of available resources
NW Plant Co-generation

- Biogas produced at rate of 110 CFM with most being flared
- Started experimenting with extended run times in Feb 2009
- Developed run chart based on greatest return
- Chart is net saving after subtracting electrical use by gas compressor and dryer, generator maintenance costs and personnel
## Optimum Co-Gen Run Time

### Savings $/Hr at Peak Summer Rates, July & August

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Biogas Gen @ 250 kW</th>
<th>Biogas Gen @ 500 kW</th>
<th>Nat Gas Gen @ 250 kW</th>
<th>Nat Gas Gen @ 500 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off Peak</td>
<td>1.39</td>
<td>13.57</td>
<td>-20.44</td>
<td>-30.09</td>
</tr>
<tr>
<td>Shoulder</td>
<td>11.44</td>
<td>33.66</td>
<td>-10.39</td>
<td>-9.99</td>
</tr>
<tr>
<td>Peak</td>
<td>28.66</td>
<td>68.11</td>
<td>6.84</td>
<td>24.46</td>
</tr>
</tbody>
</table>

### Savings $/Hr at Winter Rates, Nov thru April

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Biogas Gen @ 250 kW</th>
<th>Biogas Gen @ 500 kW</th>
<th>Nat Gas Gen @ 250 kW</th>
<th>Nat Gas Gen @ 500 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off Peak</td>
<td>1.06</td>
<td>10.86</td>
<td>-20.76</td>
<td>-32.79</td>
</tr>
<tr>
<td>Shoulder</td>
<td>10.26</td>
<td>29.26</td>
<td>-11.56</td>
<td>-14.39</td>
</tr>
<tr>
<td>Peak</td>
<td>16.24</td>
<td>41.21</td>
<td>-5.59</td>
<td>-2.44</td>
</tr>
</tbody>
</table>
Savings

• Net savings Feb through December were $39,201
• Maximum potential savings for year = $136,000
  – With available biogas
  – Generator available when needed
  – Coordinating run time with greatest savings
Demand Response Program

- Demand Response Program is a voluntary reduction of electricity by high use customers during periods of peak demand
- Program offered by SRP and managed by EnerNOC
- Facilities can be called upon to reduce power use within the next 10 to 30 minutes with events lasting up to 4 hours
- Greenfield plant looked at total plant shutdown but cost for plant diesel power generation were prohibitive
Demand Response Program

• Looked for specific large equipment and narrowed down to blowers and centrifuges, combined 840 HP
• Went through stages of testing with increased outage periods
• Once comfortable that plant could accommodate outage, enrolled in program
• Have had two events since signing on in June
• Are now looking at enrolling the NW plant in same program
Mesa has been working with OpenCEL, a private company doing research on cell lysing for more complete digestion.

Expanded lysing experiment to create carbon source for nitrification/denitrification process and replace use of methanol.

Carbon source needed due to influence of high ammonia side stream from dewatering process.

Avg daily methanol usage was 224 gpd at avg cost of $2.27/gal

Yearly cost of $186,000

Currently, OpenCEL unit not operating and temporarily replaced with glycerine at cost of $0.20/gal
Weed Control

• 27 acres of recharge site getting overgrown with brush
• Use of plant personnel was cumbersome, needed 2 men plus back hoe for 2 weeks.
• Use of plant personnel cumbersome and bank areas difficult to reach
• Grazed goats for one year with herd varying from 10 to 40
Grazing Goats Giving
Greening a Go
Footprint