Bio Power

The City of Gresham Wastewater Treatment Plant

CEE 491
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Outline

- Overview
- Social and Economic Benefits
- Infrastructure
- Innovations
- Social/Policy Issues
- Awards
Overview

- **Location:** Gresham, Oregon
- **Born in 1952 recent addition in Nov. 2005**
- ~25 acres
- **Serves 108,000 customers**
- **Treats 20 mgd of wastewater**
- **Recycles bio-solids**
Combined Heat and Power System

- A fuel treatment system that removes moisture and contaminants (hydorgen sulfide & siloxanes) from the digester gas.

- **Caterpillar engine-generator powered on digester gas fuel to produce 395-kW.** (over 1/2 of the plant’s power)

- **A heat recovery system that produces 180°F water from the engine coolant and exhaust.**

- **A control system that allows multiple operating modes, depending on system conditions and facility loads.**
## Cost

<table>
<thead>
<tr>
<th>Service</th>
<th>Provider</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consulting Services</td>
<td>R&amp;W Engineering</td>
<td>$14,000</td>
</tr>
<tr>
<td>Design-Build Services</td>
<td>California Power Partners</td>
<td>$1,105,094</td>
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<tr>
<td>Permits &amp; Inspection</td>
<td>Gresham Building Department</td>
<td>$24,009</td>
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<td>Substation Relay Upgrade</td>
<td>Portland General Electric</td>
<td>$11,768</td>
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<tr>
<td>Internal Engr. &amp; Admin.</td>
<td>Gresham Dept. of Env. Services</td>
<td>$197,443</td>
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</table>

**TOTAL PROJECT COST**

$1,352,274

**Energy Trust Incentive**

$82,379

**BETC Pass-through**

$287,801

**NET PROJECT COST**

$982,094

**Annual Energy Savings (First-year estimate)**

$202,782

**Average Annual System Maintenance (First-year estimate)**

$36,500

**NET ANNUAL COST SAVINGS**

$166,282

Project payback without incentives: 8.1 years

Project payback with BETC and Energy Trust Incentives: 5.9 years
Cost Analysis

MAJOR EQUIPMENT COSTS

- Generation Equipment: 52%
- Fuel Treatment: 26%
- Controls & Electrical: 18%
- Heat Recovery: 4%
Social Benefits

- Co-Gen, 395kW generator
  - Turn byproduct gas to electrical power
  - 70% sustainable
- Enhances reliability
- Reduces the need for fossil fuels.
Economic Benefits

- Reduces facility energy costs
  - $208,000 annually
- Provides space heat for building
- Generates renewable power
Integrating Technologies

- Increase in gas flow = adding capacity
- Integrating 400-kW solar = high capital costs
- FOG injection = 3 x increase in methane
- Micro-hydro power = small scale turbine
Social & Policy Issues

- Public Private Partnerships
  - Veolia Water
- Fat, Oil, or Grease (FOG) Program
  - Increase Menthane Production
- Energy Independent
  - Solar Power
  - Micro-Hydro Power
Awards

- League of Oregon Cities 2006 Award of Excellence
- American Public Works Association 2006 Julian Award for Sustainability
- 2008 Public-Private Partnership Award from the National Council for Public-Private Partnerships (NCPPP)
Thank You

Sources

- Anderson, Monica. Administration #503-519-0772