KIUC’s Demand for Bioenergy

Hawaii Agricultural Bioenergy Workshop
10/27/06

Jeff Deren
Outline

- KIUC Today
- KIUC Moving Forward
- KIUC Tomorrow
KIUC Demand & Supply

- Peak demand of 76 MW
  - 1 MW = 1,000 homes
- Approx. 34,000 meters
- 124 MW of capacity
- Diesel/naphtha fired generation
- Purchase 7% renewable generation
- 33¢/kWh residential rate
KIUC Today

2005 Net Sales
Total 477,255 MWh

- Fossil Generation 86%
- KIUC Hydro 1%
- SWH 2%
- DSM 4%
- PPA 7%

10/27/06
Reasons for Renewable Energy

- Hedge against increasing fuel costs
- Minimize environmental impact
- Lessen dependence on foreign oil
- Comply with Renewable Portfolio Std (RPS) - 13.9% in 2005
- It’s the right thing to do!
Barriers to Renewables

- High cost ($/MWh)
- High initial capital costs
- Environmental opposition
- Social opposition (views, noise, NIMBY)
- Firm vs. non-firm capacity
Benefits of Bioenergy

- Produced locally
  - Fuel $’s stay in Hawai’i
- Utilizes existing ag. infrastructure
- Keeps Kaua’i green
- Carbon neutral emissions
- Can provide firm energy
- Easy integration of bio-oils
Renewable Energy Request For Proposals

- All renewable energy technologies
- Purchase power
  - Open to alternate forms of ownership
- Energy-only
  - Capacity vs. energy
- Received 20 proposals
# Proposals Received

<table>
<thead>
<tr>
<th>Tech</th>
<th>No.</th>
<th>MW</th>
<th>¢/kWh*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>9</td>
<td>92</td>
<td>10 - 17</td>
</tr>
<tr>
<td>Biomass</td>
<td>3</td>
<td>26</td>
<td>16 - 20</td>
</tr>
<tr>
<td>MSW</td>
<td>4</td>
<td>21.7</td>
<td>13 - 16</td>
</tr>
<tr>
<td>Photovoltaic</td>
<td>4</td>
<td>20.8</td>
<td>17 - 30</td>
</tr>
</tbody>
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**Total**  
20  
161 MW

* Lowest first year price
# Projects Selected

<table>
<thead>
<tr>
<th>Net Capacity (MW)</th>
<th>UPC Wind</th>
<th>Cleaves Biomass</th>
<th>Green Biomass</th>
<th>Barlow WTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.5 - 14</td>
<td>4.2</td>
<td>8.5</td>
<td>5.3</td>
<td></td>
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| Fuel              | Wind     | Walnut shells* | Wood chips   | Trash |
|-------------------|----------|----------------|--------------|

| Annual Generation (%) | 9% | 6% | 12% | 7% |

<table>
<thead>
<tr>
<th>Price (¢/kWh)</th>
<th>At or below our avoided cost</th>
</tr>
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<tr>
<th>In Service Date</th>
<th>July 2008</th>
<th>Dec 2008</th>
<th>June 2008</th>
<th>2010</th>
</tr>
</thead>
</table>
Green Energy Biomass Project

- **Size:** 8.5 MW
- **Pros**
  - Site control – Letter of Interest
  - Good fuel plan – existing tree farm
  - Price
  - Locally owned
  - High capacity factor
- **Status**
  - Site Lease
  - Interconnection study
  - Preliminary engineering & permitting
Cleaves Biomass Project

- Size: 4.2 MW

- Pros
  - Site control – Letter of Interest
  - Price
  - Relocation of an existing plant*
  - High capacity factor

- Status
  - Pursuing site lease
  - Finalizing technology & fuel supply
Implementation Process

- Signed Letters of Intent
- PPA Negotiations
  - Price & non-price issues
- Parallel tasks
  - Public outreach
  - Interconnection studies
  - Evaluation in Integrated Resource Plan
  - Permitting
  - Environmental studies
  - Wind studies
- HPUC & RUS Approvals
Biodiesel Pilot Program

- Why biodiesel?
  - Burns cleaner*
  - Integrates easily
  - Approved by engine manufacturer & DOH
  - Potential to produce locally

- Pilot Program
  - 7.8 MW Wartsila diesel
  - Test various % blends
  - Monitor engine emissions & performance
  - In-line blending system
KIUC Tomorrow

2010 Projected Net Sales
Total 536,000 MWh

- Fossil Generation 53.4%
- Biomass 17.5%
- Wind 9.4%
- WTE 6.6%
- Existing PPAs 6.2%
- KIUC Hydro 1.2%
- PV 0.3%
- SWH 1.4%
- DSM 3.9%

18.5 Millions gallons of oil displaced!
Summary

- KIUC is heavily dependent upon fossil fuel
  - Only 8% renewable in 2005
- Committed to lessening our dependence on fossil fuels
- Aggressively pursuing renewable energy projects
- Bioenergy is an attractive option