U.S Department of Agriculture

Agricultural Outlook Forum 2001

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OPPORTUNITIES FOR CO-FIRING ELECTRIC POWER GENERATION WITH WOOD OR GRASSY PLANTS

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Opportunities for Co-Firing Electric Power Generation from Wood or Grassy Plants

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Arlington, Virginia
Commitment to the Environment

- Natural Gas
- Energy Efficiency
- Combined Heat and Power Projects
- Distributed Generation
- Renewables
- Economic Sustainability
Why Biomass Co-Firing

- Green Power - Customers or Wholesale
- Renewable & Alternate Fuel Source
- Customer Retention
- Allows us to use existing facilities
- Electric Restructuring CO2 Mitigation
Biomass Progress to Date

1997
- Study to assess potential of growing Willow on our ROWs
- 4-day Co-firing test at 460 MW Michigan City Generating Station

1998
- Engineering and design of tri-firing tests at Bailly Generating Station
Biomass Progress to Date

1999
- 3-30 day tests using biomass, petroleum coke and coal
- Biomass gasification technology assessment

2000
- Biomass fuel assessment of Northern Indiana
Opportunities

- Co-firing with Coal in Existing Facilities
  - Waste Wood & Opportunity Fuels
  - Green Wood
  - Agricultural Residues - Stover, old seed corn

- Biomass Gasification w/ Nat’l Gas CTs
  - Agricultural Residues
  - Dedicated Energy Crops
  - Energy Residues
<table>
<thead>
<tr>
<th></th>
<th>HHV (BTUs/cu. ft.)</th>
<th>Cost ($/mmBtu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass</td>
<td>90,000 - 10,000</td>
<td>$0.90 – $5.00</td>
</tr>
<tr>
<td>Coal</td>
<td>500,000 – 600,000</td>
<td>$0.90 – $1.50</td>
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<tr>
<td>Nat’l Gas</td>
<td></td>
<td>$3.50 - $10.00+</td>
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</tbody>
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Issues

- Public outreach and awareness
- Incentives to encourage co-firing
- Regulatory Relief
- Biomass for electric generation should not compete with Ethanol or Chemicals
- Material Handling
- Availability