Effective Utilization of Biomass Supply Information for Sustainable Biomass Power Generation

Marvin S. Burchfield, VP
Decker Energy International
Company Overview

• Founded in 1982

• Business objective is to develop, acquire, own and manage power generating facilities that meet the needs of the electricity market by providing reliable, low-cost power with a keen sensitivity to the environment
Historical Business Approach

- **Fuels:** biomass and natural gas
- **Conservative growth strategy**
- **Marketing through contacts and existing relationships**
  - Highly Selective Project Evaluation
- **Opportunistic, market-responsive strategy**
  - Greenfield development when power markets attractive
    - Special opportunities, i.e., CT Class I renewable market
  - Acquisitions when power markets are low
    - Situations where we can add value
- **Ownership strategies**
  - Retain ownership in some projects
  - Develop/acquire, improve, and possibly sell
Company Projects

• Involvement with 15 diverse power projects
  • About 1,000 MW of generating capacity
  • Capital cost of nearly $1 billion
  • Located in 6 states
  • Fuels: biomass, natural gas, and waste materials

• Current Portfolio
  • Ownership interests in 2 biomass projects
    • 85 MW capacity
    • $150 million capital cost
    • Located in Michigan and North Carolina
  • Current development nearing construction
    • 37.5 MW Biomass, Plainfield, Connecticut
    • Expect Commercial Operations in Q4 2010
Grayling Generating Station
Grayling, Michigan

- 37 MW capacity
- $71,000,000 capital cost
- Fueled by waste wood and tire-derived fuel
- Operational in 1992
- Partners: CMS Energy and Primary Power
- PPA: Consumers Energy
-Received Powerplant Award in 1993

Southeast Regional BioFuels Policy Forum; August 25, 2009
Craven County Wood Energy
New Bern, North Carolina

- 48 MW capacity
- $82,800,000 capital cost
- Fueled by waste wood
- Operational in 1990
- Acquired 50% interest in 2004
- Partner: CMS Energy
- Power currently sold into PJM market
Plainfield Renewable Energy
Plainfield, Connecticut

- 37.5 MW advanced technology biomass plant
- Targets Connecticut Class I REC market
- Construction Start Q1 / Q2 2010
- Commercial in 2013
Biomass in the Southeast

Southern Forest Resource Assessment:

“The South, particularly the coastal plain and the piedmont, contains the most intensively managed forests in the world. This one region of the United States produces more wood products that any other single nation. Timber harvesting, tree planting, and other forest investments have increased and forest inventories have expanded as harvesting and processing technologies have changed in ways that favor southern timber.”

Published by the U.S. Forest Service; Asheville, NC; 10/02.
Biomass Feedstocks

Wood Residues
- Harvest and mill residuals
- Wood chips
- Wood waste
- Pallets
- Crate discards
- Wood yard trimmings
- Clean landfill diversions

Agricultural Residues
- Corn stover
- Rice hulls
- Cotton Gin Waste
- Sugarcane bagasse
- Animal bio-solids

Energy Crops
- Hybrid poplar
- Bamboo
- Willow
- Whole tree / Pulp chips

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Biomass Sources for Craven County Wood Energy

- WASTEWOODS
  - pallets
  - clean wood from landfills
  - hurricane debris
  - land clearing debris
  - tree trimmings
  - plywood trimmings/
    - particle board waste
  - brooder house poultry waste
  - cotton gin waste

- BARK

- MILL RESIDUALS

- CHIPS
  - sawmills
  - forest residuals
  - pre-commercial thinning

Southeast Regional BioFuels Policy Forum; August 25, 2009
Biomass Sources for Craven County Wood Energy

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CCWE Change Over Time

<table>
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<tr>
<th>Fuel Cost</th>
<th>100%</th>
<th>99%</th>
<th>101%</th>
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<th>92%</th>
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<td>Tons Consumed</td>
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Supply and Demand

• Byproduct becomes Product when demand increases
• Demand creates higher price
• Current marginal fuel stock is whole tree chips.
• Next – Pulp chips?
Supply and Demand

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• Higher demand creates higher price
• Current marginal fuel stock is whole tree chips.

Next – Pulp chips

CCWE Change in Fuel Cost Over Time

湖北省

75%
100%
125%
150%
175%
200%
225%
250%
275%
300%

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

'?'

'Traditional' Fuel Cost
Chip Cost

?
Georgia On My Mind

Quick Statistics

Total Area (Acres) ~ 37.1 million
Forest (Acres) ~ 24.8 million
Total Inventory ~ 1 billion tons
Annual Growth ~ 50 mil tons
Annual Production ~ 40 mil tons
Annual By Product / Waste ~ 3.2 – 16 mill tons

50 MW Power Plant Requires ~ 600,000 TPY

Implication

250 to 1350 Megawatt’s of Infinitely Sustainable Capacity
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Population Density Map

# of People Per Square Mile
2000 Census

- 0 - 99
- 100 - 199
- 200 - 399
- 400 - 799
- > 800

R. Harper, USDA Forest Service, FIA

Southeast Regional BioFuels
Policy Forum; August 25, 2009
At approximately 45 people/square mile, there is a 50:50 chance of practicing forestry. At 150 people/square mile, forestry approaches zero.

Compiled by R. Harper, J. McCollum USDA Forest Service, FIA
What This Means

To effectively compete in the energy business, producing sustainable energy from biomass in the presence of increasing feedstock demand, understanding and executing (both physically and financially) in the underlying commodity markets for energy (inputs and outputs) as well as navigating the constantly changing forces of policy, regulation and economics is crucial to long term viability.
Biomass Energy is Sustainable Energy
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Questions?

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