Central MN Ethanol Co-op
Little Falls, MN

Project Objectives

- Comply with air permit agreed on in the Consent Decree between CMEC, Department of Justice and the MPCA
- Evaluate technologies to reduce risk in the natural gas market and reduce exposure to the DDG'S market
- Protect shareholders investment in CMEC
Gasification

- is the process for converting a solid fuel to a fuel gas or syntheses gas under oxygen starved combustion
- separates carbon and hydrogen from ash at 1600 degrees F.
- the resulting gas is carbon monoxide, hydrogen and nitrogen

Gasification

- Combustion is complete by mixing with air from dryer exhaust
- The low Btu gas is used much like natural gas
- Wood ash is an excellent liming source to increase soil fertility

Wood as a Fuel Source

- Wood waste is being land filled
- Forestry industry needs to remove 2/3 of slash to enable a quicker and healthier regeneration of the forest. Burning is restricted.
- Tree services experience high cost of disposal of wood chips from disease, yard and storm damage clearing.
- DNR would thin their forest for healthier growth
- Saw mills sell small amounts for bedding
- CMEC evaluated wood waste, corn stover, switch grass, corn, DDG’S corn syrup, coal, or ethanol

Why Primenergy?

- Proven record of thermal oxidizers and gasification
- Their gasification provides an energy source of steam and power generation and will reduce emissions more efficiently than a thermal oxidizer
Sources Of Fuel

- Wood Waste
  - Saw Dust from saw mills in the area
  - Slash or tops and branches from the lumber industry
  - Offal or tailings from wood industry
  - Storm damage, tree trimmings and yard disposal

Secondary Fuel Source

- CMEC will apply for permission to gasify DDG’s

Third and Last Resort

- Resort back to natural gas.
  - We will have the ability to burn gas through the thermal oxidizer bypassing the gasifier or to re-fire the boilers

Other Sources

- Corn Stover
- Switch Grass
- Other Biomass

Heating Values

- Hardwood – 8561 Btu/lb on a dry matter basis
- Aspen – 8,284 Btu/lb on a dry matter basis
- DDG without syrup – 13.35% moisture 8,473 Btu/lb, 9778 Btu/lb. on a dry matter basis.
- Stover – 6215 @ 15% moisture
- Corn – 6800 @ 15% moisture
Comparative Heating Values

Btu Per Pound
- Multiply corn price per bushel by 41.9 to get equivalent DDGS price per ton
- 2.62 bushels of corn contains 1 MMBTU
- Corn at $1.75 per bushel has the same cost per MMBTU as DDGS at $73.32 per ton
- Multiply stover price by 1.3 to get equivalent DDGS price
- Stover at $50.00 per ton has the same cost per MMBTU as DDGS at $65.00 per ton

Securing Wood as Fuel
- Ten year contract
- Sliding scale that adjusts for moisture content
- Incentive is lower the moisture, the higher the value and the lower the tons needed to produce the Btu’s

Wood Usage
- Committed to 150 ton per day up to the total needs which will be dictated by the gasifier
- Estimated to be between 250 and 280 ton per day
- CMEC will apply to burn DDG

Grants
- 2 million dollar grant from the USDA
- 2 million dollar grant from XCEL Energy
Future For Ethanol Plants

- Evaluate the changes and opportunities for your ethanol plant
- Many good ideas but with high capital cost. Your forest might be corn stover, switch grass, feedlot manure or other biomass that is readily available