Biomass Technologies
at the
University of Minnesota Morris
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Reviewing the Decision Tree
"The picture’s pretty bleak, gentlemen. The earth's climate is changing, the mammals are taking over, and we all have brains the size of a walnut."

Gary Larson
Energy Consumption On Campus

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- **Steam**
  - Demand: 28,000 lb/hr.
  - Consumption: 1700 FLH

- **Electricity**
  - Demand: 4MWH
  - Consumption: 

- **Chilled Water**
  - Demand: 700 Tons
  - Consumption: 700 FLH
Survey of Natural Resources

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- Wood
- DDGS
- Sun Flower Husks
- Corn Stover
- Corn Screenings
Economics of Energy

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- Steam made with gas/oil
- Steam made with electricity
- Steam made with wood
- Steam made with corn stover
Economics of Energy

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- Electricity made with coal
- Electricity made with wind
- Electricity made with wood
- Electricity made with corn stover
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- Chilled water made with electricity
- Chilled water made with steam
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- Use corn stover for fuel
- Make steam
- Use steam to make chilled water
- Experiment with making electricity.
How

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- Combustion
- Gasification
Gasification

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- Near Atmospheric
- Air Blast
- Close Coupled
- Bottom Feed
- At Pressure
- Oxygen Blast
- Transportable
- Top Feed
Fuel Handling

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- Bale shape and size
- Stored on site or off
- Bale handling
- Material sized or as is
- Rams or screws
Pollution Control

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- Wet
  - Sodium-Hydroxide
  - Venturi or
  - Wet bed

- Dry
  - Electrostatic or
  - Bag
  - Charcoal
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What is Being Built

- Gasifier
  - Near atmospheric
  - Air blast
  - Close coupled
  - Step Grate (Cigar Burner)
- Baled fuel
  - Unprocessed
  - Ram fed
- Wet bed scrubber
Next Steps

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