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Fueling the Future:
The Role of Woody and Agriculture Biomass for Energy Workshop

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Roosevelt

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Biomass Basics

Fueling the Future:
Roosevelt, MN

2/18/09
Biomass

- Any organic matter that is available on a renewable or recurring basis........

- Stuff that grows

- Capturing the sun's energy that comes to earth and turning that energy into products
Biomass

Increasing the efficiency of that system or range of products you can derive from that energy will have great value.
Key Issues

1) What species to focus on?
2) Starch or Cellulose?
3) What technologies will be used in the future?
4) Are we ready for renewable energy?
5) What does the future hold?
Biomass

The biomass industry is in its infancy.
Starch or Cellulose?

- Starch processing much further at this time.
- Starch is ultimately food source and cellulose can add value in food production (corn stalks, switchgrass).
- Cellulose gives greater breadth of environments.
Species

Monocultures or Polycultures (mixed)
Species

- Monocultures – Corn, wheat, switchgrass, willows, poplars, etc.

- Multiple species (Polycultures) – Prairie, CRP, etc.

- Regionality
Monocultures

Corn and wheat, switchgrass, willows, poplars, etc.

Strengths
- Ease of management
- Simpler systems
- Biorefining

Weakness'
- Risk – Supply, system design
- Inputs
Polycultures

Mixed species – Prairie, CRP, etc.

Strengths
- Perenniality
- Water quality

Weakness’
- Logistics
- Biorefining
- System design to meet changing fuel type
Biorefining

- Processing materials from plants to make products.

- Biomass is young oil

- In this instance with the end product ultimately being fuel or energy.
Technologies?

Fermentation or Gasification?
Technologies?

Fermentation – Making sugars and then alcohols from plant material.

Strengths
- Further developed than gasification

Weakness
- Enzyme specific
- Access to fiber
- Contamination can be a problem
Technologies?

Gasification – heating with low oxygen to make gas (instead of burning).

Strengths
- Uses little water
- Fuel flexible
- Tolerant of contamination

Weakness’
- Technologies not as advanced as fermentation
- Clean-up issues for further processing
Technologies

Logistical issues are just as important as technologies.... harvesting, storing, transportation, preprocessing, time of growth, etc.
Are We Ready?

- Social as well as Technical Issues
- Infrastructure
- Policy
Drivers:

- Oil and natural gas prices are rising

- Fossil fuels for energy emit things into the air that would not otherwise be there.

- We import much of our energy

- Renewable energy can keep energy dollars local.
Challenges of Renewable Energy

- Dispatchability of wind and solar
- Storage – energy and biomass
- Transmission
- Technology
- Food vs Fuel
- Sustainability
- Biomass production logistics
- Short-term economic viability
Renewable Energy

If we are going to reap the potential economic, environment, and energy security benefits that are the promise of renewable energy, integrated energy systems must be developed.