Building a Vibrant and Sustainable Bioeconomy in Minnesota
Vision

1. Make
   - Make Minnesota THE PLACE to build the bioeconomy.

2. Add
   - Add value to forestry, agriculture and organic waste resources.

3. Reinforce
   - Reinforce the bioeconomy as an essential part of the clean energy innovation sector.

4. Contribute
   - Contribute to economic growth and environmental and public health benefits
Priorities:

• Maintain base funding ($1.5 million per year) for MN Bioincentive Program for FY2018 through FY2021

• Support BCM member projects at the legislature to advance bioeconomy in MN

• Convene Commercialization Consortium to advance research and development of bioeconomy in MN
Historic Success – Ethanol Producer Payments

- 1994-2012: Minnesota spent over $450 million in producer payments to launch the state’s ethanol industry
- $0.20/gallon paid for production
- No upfront money
- Current ethanol industry:
  - 21 ethanol plants, 1.1 billion gallons
  - $5 billion dollar industry
Why do this?

- Make Minnesota a world-class destination for building commercial-scale advanced biofuel and renewable chemical plants
- Production incentive can be included in private financing, and will attract projects to Minnesota.
- Legitimate government role in helping to build “first-of-a-kind” facilities, for which other forms of financing do not exist.
- Protection for the state. No payment occurs until production occurs.
- State government doesn’t pick technology winners. They simply award the projects that cross the finish line.
- Minnesota has history with this approach, through the state’s ethanol producer payment.
Production Incentive Levels

**Advanced biofuels**
- $0.20/gal - cellulosic derived
- $0.10/gal - sugar/starch derived
- Total payments capped per year, available for 10 years
- Up to 6 projects (or more if projects are smaller)

**Renewable Chemicals**
- $0.03/Ib - sugar derived renewable chemical or cellulosic sugar
- $0.06/lb - cellulosic derived renewable chemical
- Total payments capped per year, available for 10 years
- Up to 6 projects (or more if projects are smaller)

**Biomass Thermal**
- $5.00/MMbtu - agricultural or forestry feedstocks
- Total payments capped per year, available for 10 years
- Up to 5 projects (or more if projects are smaller)
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<th>Type</th>
<th>Employment</th>
<th>Labor Income (millions)</th>
<th>Output (millions)</th>
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<td>Indirect</td>
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<table>
<thead>
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<th>Type</th>
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<th>Labor Income (millions)</th>
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<tr>
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<td><strong>Total</strong></td>
<td><strong>8,690</strong></td>
<td><strong>$538.2</strong></td>
<td><strong>$1,531.4</strong></td>
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Impact estimates based on University of Minnesota Extension Economic Impact Analysis
*Over 15-20 years
Recycling

FEEDSTOCK
Agriculture
Forestry
Organic Waste

BIOINDUSTRIAL PROCESSING
Fermentation
Thermochemical
Anaerobic Digestion

COMMODITY CHEMICAL
Advanced Biofuels
Renewable Chemicals
Biogas

PRODUCT DEVELOPMENT
Product Testing
Formulations
Compounding

END MARKET
Biojet Fuel
Compostable Packaging
Specialty Chemicals
Areas of Focus

**Wood:** Minnesota’s wood resources are in critical need of finding additional markets and end uses following plant shutdowns. We’ll focus on creating additional pathways for wood in the form of innovative fuels, chemicals, and materials.

**Oil seed cover crops:** Minnesota has many of the ingredients in place to build an aviation biofuels industry. We’ll work to leverage existing initiatives like the Forever Green initiative, which is working to commercialize new oil seed crops like camelina and pennycress, and the Commercial Aviation Advanced Fuels Initiative.

**Waste:** There is increasing availability of organic resources in the Twin Cities Metro area due to new policies encouraging increased organics recycling and diversion away from landfilling and waste-to-energy. We’ll focus on utilizing these resources through gasification and anaerobic digestion.

**Ethanol:** Two current market needs exist: advanced biofuels and new chemicals. We’ll focus on assisting existing ethanol plants to retrofit, which will enable them to produce a wider variety of fuels and chemicals through advanced microbiology.
Butanol production

- 2 Minnesota ethanol plants have been converted to produce bio-butanol
- Among the first recipients of the production incentive
- Significant new investment in existing facilities
Corn kernel cellulosic ethanol

- Utilize cellulose in corn kernels
- Produce additional ethanol from corn already being processing in ethanol plants
Municipal Solid Waste as Value-Added Product

New uses for waste:

- Gasification of waste to produce biofuels
- Anaerobic digestion to produce energy and fuels
New markets for wood

- Aviation biofuels, energy
- Biobased chemicals, composite materials
- Thermally-treated wood products
- Mass timber construction
New products from oils and fats

- Renewable diesel
- Soy-based road sealant
- Innovative oilseed production (camelina, pennycress)
Ways to Get Involved

**Join**
- Join Bioeconomy Coalition
  - Several committees: Policy, Membership & Finance, Commercialization Consortium

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For More Information Contact:

- Brendan Jordan, Vice President, Great Plains Institute, Facilitator of Bioeconomy Coalition of Minnesota
  - bjordan@gpisd.net or 612-278-7152