

State Leadership to Grow the Bioeconomy

Bio Industry Summit 2015

May 28, 2015

Fargo, ND

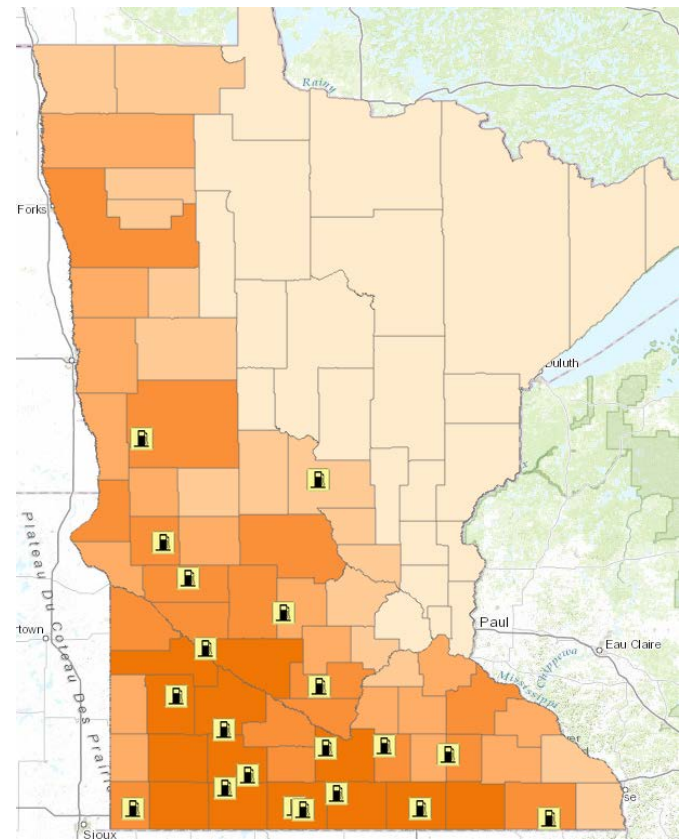
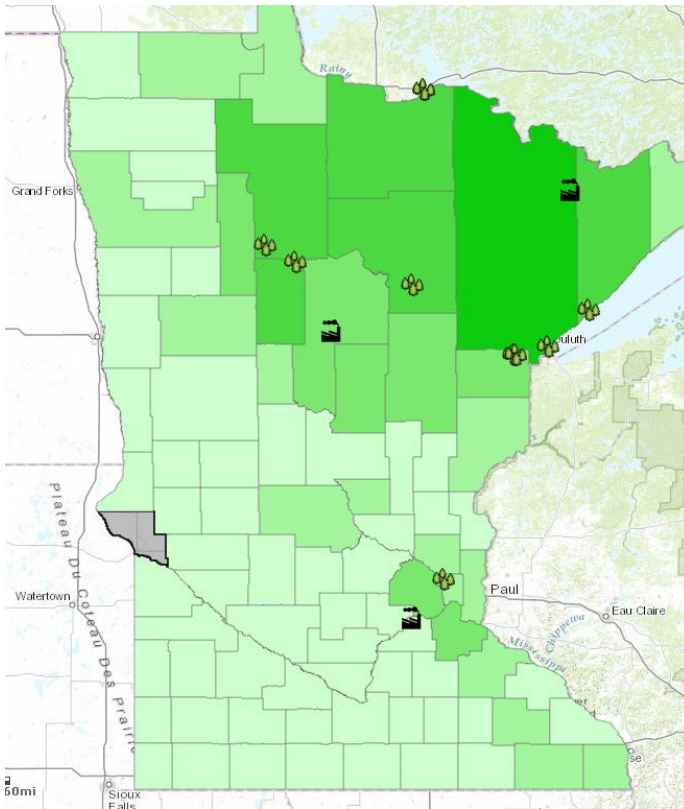
Mission of the Bioeconomy Coalition of Minnesota

Articulate and implement a Minnesota state policy and regulatory agenda to expand renewable chemical, advanced biofuel, and biomass thermal energy industries, along the entire value chain from R&D through commercial production and use.

2015 Coalition Partners

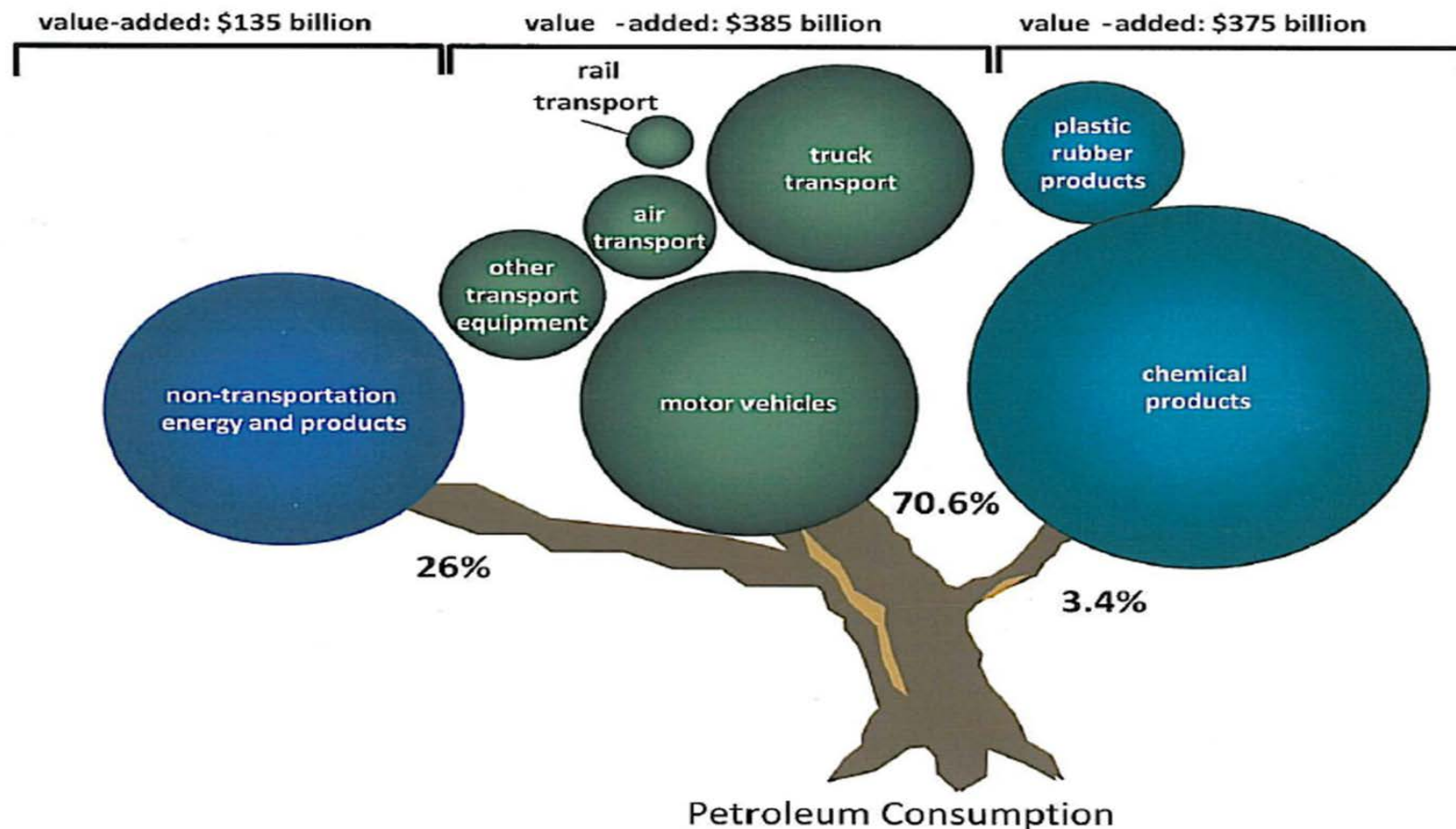


Large forestry biomass resource
and large (but declining) forest
products industry



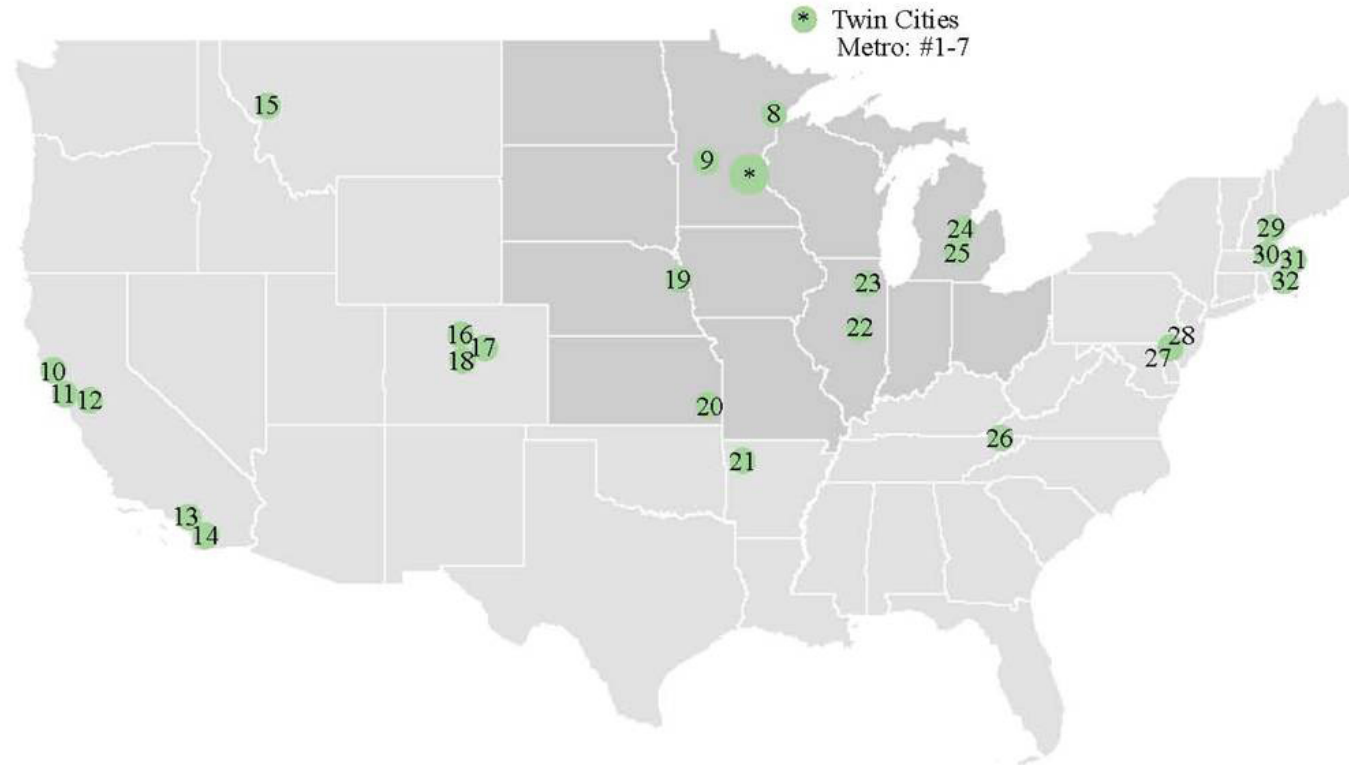
Large agricultural biomass
resource, and successful track
record in creating an ethanol
industry through effective state
policy

Renewable Chemical Value



Adapted From: Vol. 1 No. 1. Spring 2005 Industrial Biotechnology; New Scientist 2007.

Minnesota – World Leading Cluster of Biochemical Company Headquarters



1	BioAmber	MN	12	Cobalt Technologies	CA	23	Elevance	IL
2	Cargill	MN	13	Verdezyne	CA	24	Dow	MI
3	CHS	MN	14	Genomatica	CA	25	MBI	MI
4	Cortec	MN	15	Rivertop Renewables	MT	26	Eastman Chemical Company	TN
5	Entropy Solutions	MN	16	OPX Biotechnologies	CO	27	Butamax	DE
6	NatureWorks, LLC	MN	17	Gevo	CO	28	DuPont Tate & Lyle	DE
7	Segetis	MN	18	Zechem	CO	29	Itaconix	NH
8	Butrolux	MN	19	SoyGold	NE	30	Metabolix	MA
9	West Central Renewable Ammonia Development	MN	20	MCPU Polymer Engineering, LLC	KS	31	Celexion	MA
10	Syngest	CA	21	Agrol	AR	32	Myriant Corporation	MA
11	Rennovia	CA	22	ADM	IL			

Company Highlight:



- Headquarters: Golden Valley, MN
- Planned production facility: Hoyt Lakes, MN
- Renewable chemical compound: **Levulinic acid**
- Used to replace petroleum in the manufacture of:
 - Plasticizers (PVC), household & industrial cleaners



Company Highlight: GreenBiologics

- Headquarters: Gahanna, OH
- Planned production facility: Little Falls, MN
- Renewable chemical compound:
n-butanol
- Used to replace petroleum in the manufacture of:
 - Paints, coatings, adhesives, inks, cosmetics, and cleaners

Other projects

- Wood-to-sugar (and sugar-to-chemicals/fuels)
- Biomass district heating (Grand Marais, Duluth)
- Cellulosic Ethanol
- Anaerobic digestion to BioCNG
- MSW to fuels and chemicals

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

Coalition Priority – Repeat Success of Ethanol Producer Payments

- Create a production incentive program to attract commercial-scale production of renewable chemicals, advanced biofuels and biomass thermal energy

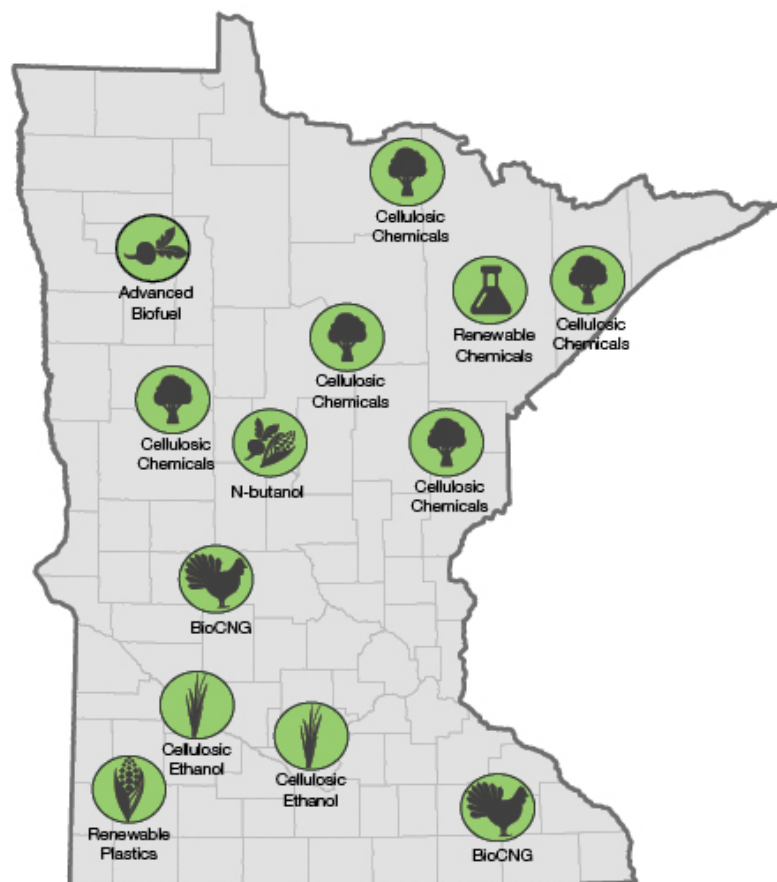
Production Incentive Levels

- 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/lb – 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)

Production Incentive Program

- 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.

Bioeconomy State Economic Contribution



Example project types and locations are hypothetical and for purposes of modeling economic impact of possible projects

A Growing Industry

14 hypothetical facilities:

- 1 x Renewable Chemicals from Sugar
- 1 x Renewable Plastics from Corn Sugar
- 2 x Cellulosic Ethanol from Ag. Residue
- 5 x Cellulosic Chemicals from Wood
- 1 x N-butanol from Corn and/or Beet Sugar
- 2 x BioCNG from Ag. and Livestock Waste
- 1 x Advanced Biofuel from Beet Sugar

\$ 23.8 million temporary annual government investment*

\$ 837.6 million permanent annual economic impact

\$ 1.5 billion temporary construction economic impact

Economic Impact

	Type	Employment	Labor Income (millions)	Output (millions)
Annual	Direct	590	\$ 36.8	\$ 470.3
	Indirect	2,150	\$ 115.8	\$ 304.0
	Induced	450	\$ 21.5	\$ 63.3
	Total	3,190	\$ 174.1	\$ 837.6
Construction	Direct	4,380	\$ 303.4	\$ 867.8
	Indirect	1,690	\$ 112.7	\$ 306.2
	Induced	2,620	\$ 122.1	\$ 357.4
	Total	8,690	\$ 538.2	\$ 1,531.4

Impact estimates based on University of Minnesota Extension Economic Impact Analysis

*Over 15-20 years

Current status

- Success – Bioeconomy Bill passed House and Senate on May 18!
- BUT – it was part of a large omnibus bill that was vetoed...
- New Agriculture and Environment Bill will be passed in a Special Session, we are optimistic the program will be unchanged.

www.mnbioeconomy.org

The screenshot shows a web browser window with the address bar displaying mnbioeconomy.org. The website header includes the logo "BIOECONOMY COALITION OF MINNESOTA" and a "CONTACT" link. The main content area features a large background image of a rural landscape at sunset. On the left, there is a navigation menu with three circular buttons labeled "POLICY", "THE COALITION", and "RESOURCES". On the right, a dark overlay box contains the heading "The Coalition" followed by a paragraph describing the coalition as a multi-sector partnership. Below this, a list of five bullet points outlines the steps the coalition believes should be taken to establish a next generation industry in Minnesota. The footer of the website shows the copyright notice "© 2013 BIOECONOMY COALITION OF MINNESOTA" and a "SITEMAP" link. The Windows taskbar at the bottom displays various open applications and the system clock showing 3:55 PM.

BIOECONOMY
COALITION OF MINNESOTA

CONTACT

POLICY

THE COALITION

RESOURCES

The Coalition

The Bioeconomy Coalition of Minnesota is a multi-sector partnership between members of the conventional and advanced biofuels industries, biobased chemicals and products companies, nonprofit organizations, environmental groups, as well as consulting, investment and legal firms. [Learn More](#) ▶

In order to establish a next generation industry in Minnesota, the coalition believes the following steps should be taken:

- Broaden Minnesota's Biofuel Mandate
- Support bioproduct pilot and demonstration projects
- Support the commercial scale up of bioproduct facilities
- Help create early markets for bioproducts
- Provide bonding for biomass heating projects

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start 6 Microsoft ... producer pay... Program for S... Bioeconomy C... Coalition meet... Microsoft Pow... Bioeconomy C... Take a screen... 3:55 PM

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