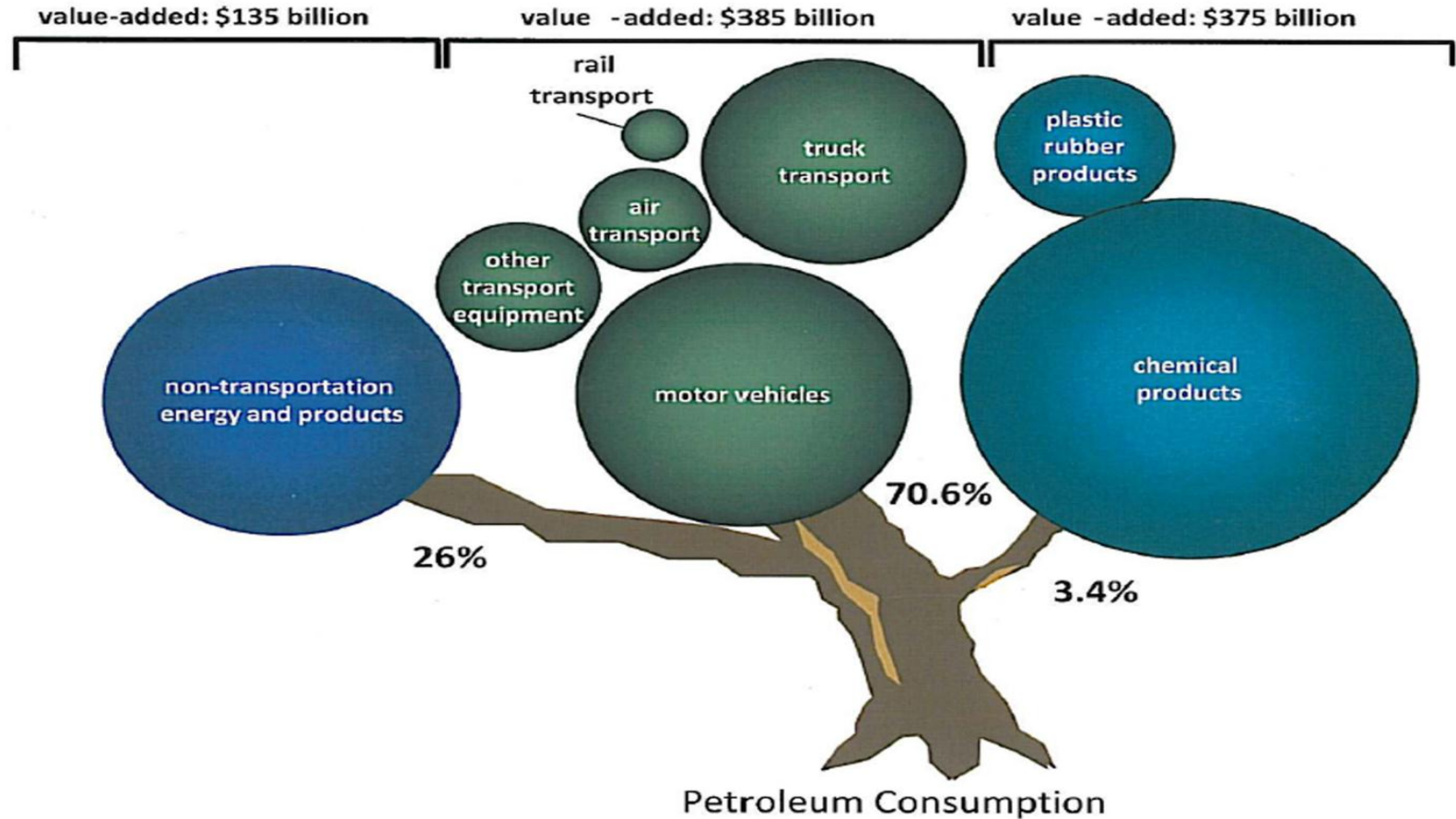


Growing the renewable chemicals and advanced biofuels cluster in MN

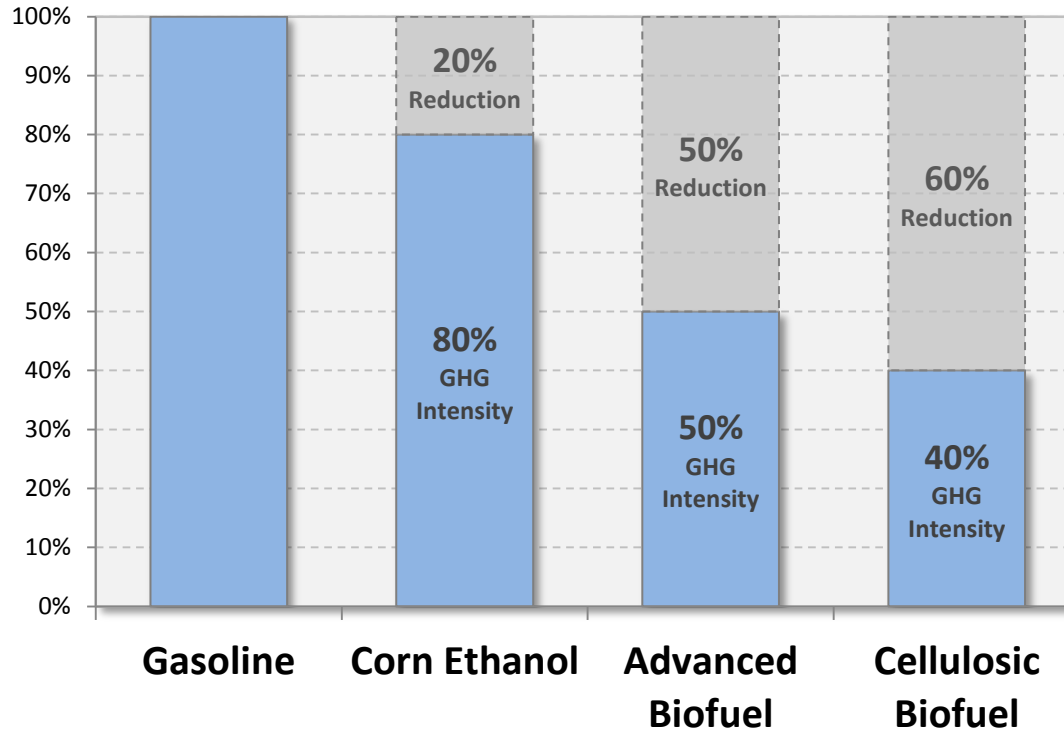
Renewable Chemical Value



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

Greenhouse Gas Reductions from Biofuels

According to existing federal policy (EPA's RFS2)



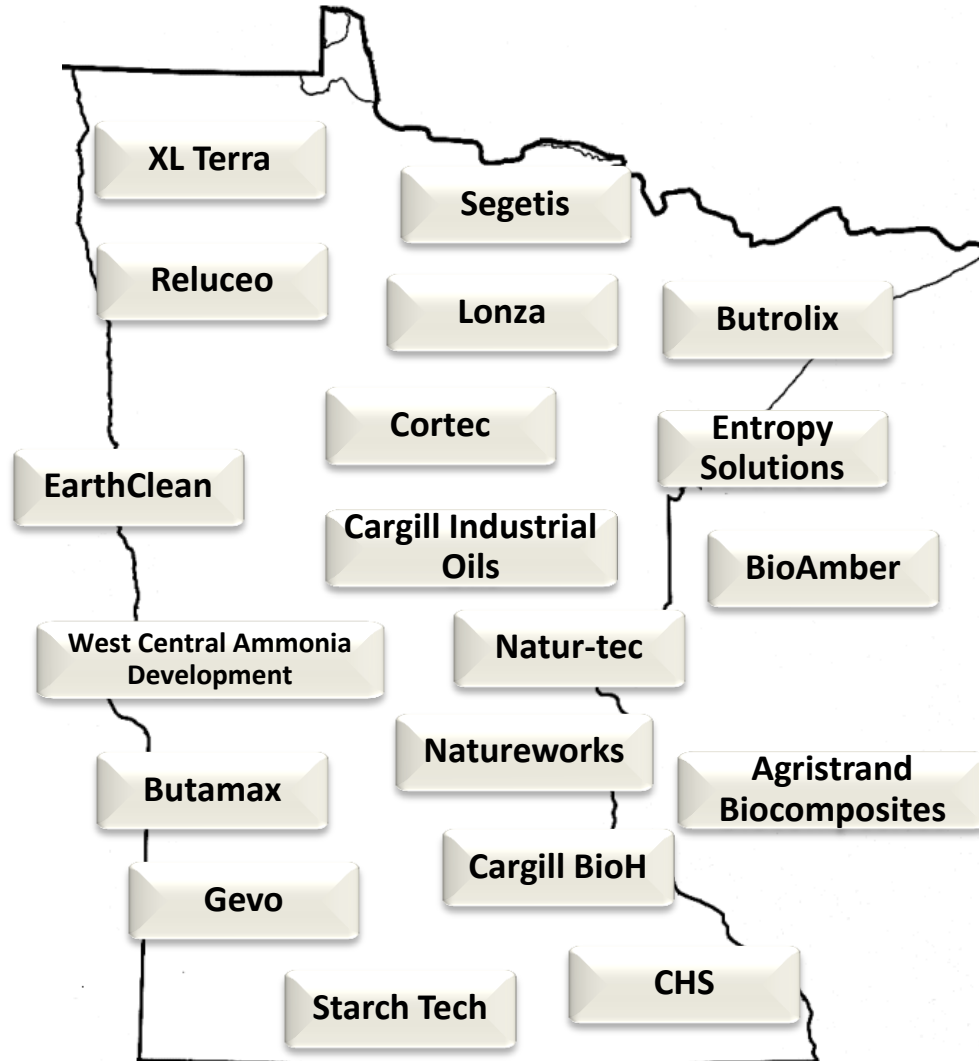
Compared to gasoline:

Corn Ethanol
20% GHG Reduction

Advanced Biofuel
50% GHG Reduction
e.g. bio-butanol

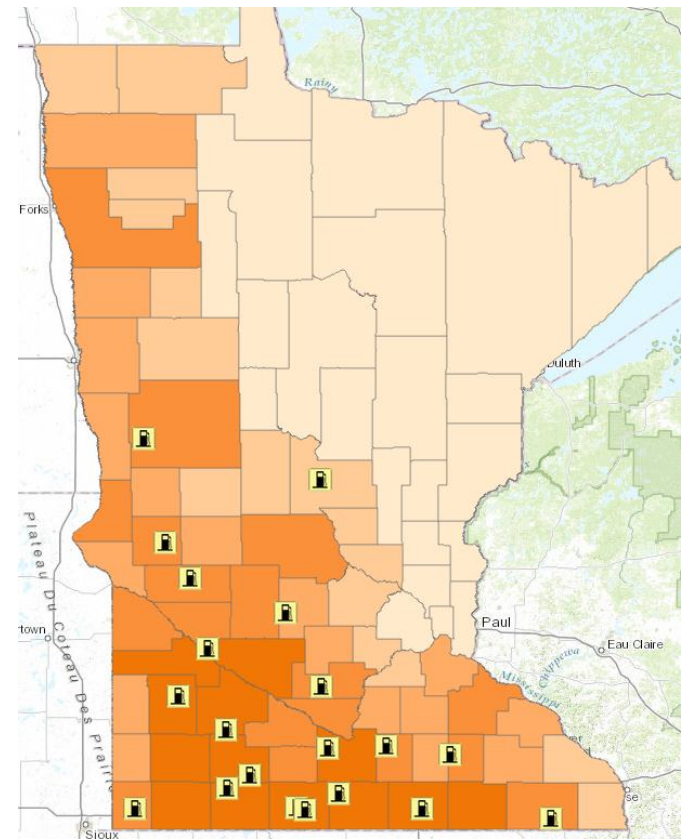
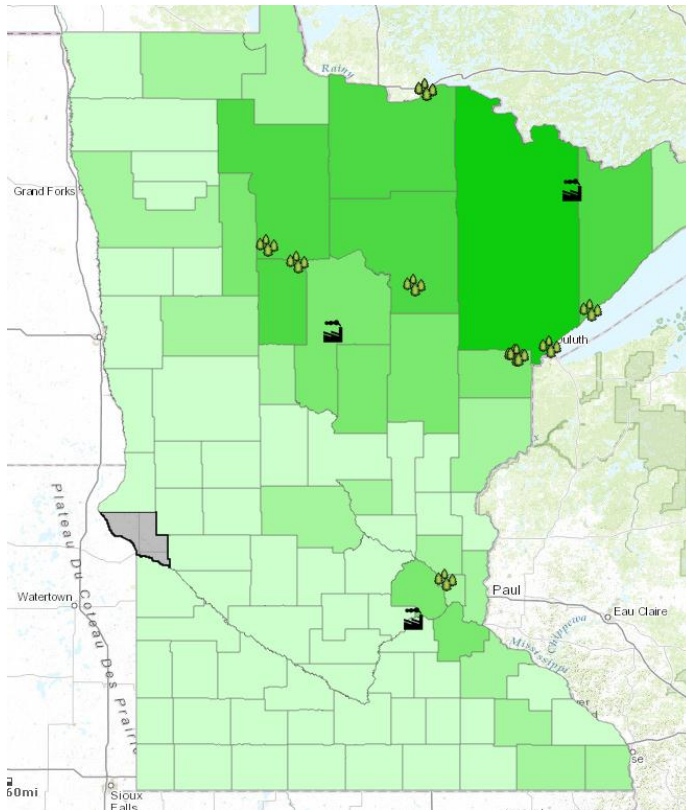
Cellulosic Biofuel
60% GHG Reduction
e.g. ethanol from
corn stover or wood

Minnesota's Biobased Chemicals Cluster



Slide courtesy of
BioIndustrial Partnership

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

Minnesota – World Leading Cluster of Biobased Chemical Company Headquarters



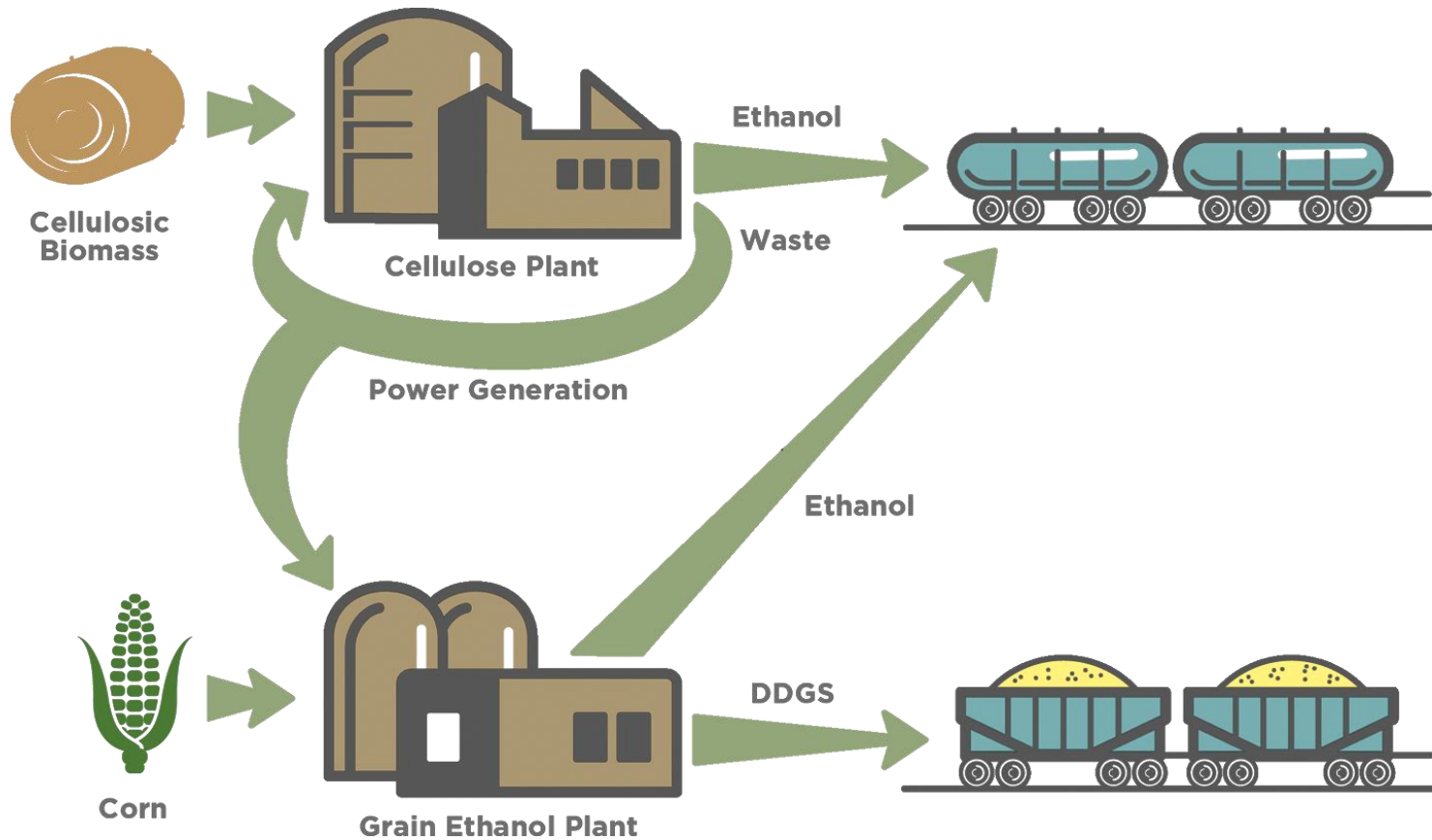
1	BioAmber	MN	12	Cobalt Technologies	CA	23	Elevance	IL
2	Cargill	MN	13	Verdezyne	CA	24	Dow	MI
3	CHS	MN	14	Genomatica	CA	25	MBI	MI
4	Cortec	MN	15	Rivertop Renewables	MT	26	Eastman Chemical Company	TN
5	Entropy Solutions	MN	16	OPX Biotechnologies	CO	27	Butamax	DE
6	NatureWorks, LLC	MN	17	Gevo	CO	28	DuPont Tate & Lyle	DE
7	Segetis	MN	18	Zechem	CO	29	Itaconix	NH
8	Butrolix	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
- Base bio-derived compound: Levulinic ketals
- Used to replace petroleum in the manufacture of:
 - Plasticizers (PVC), polyols for polyurethane materials or use in polyester thermosets or thermoplastics and cleaning solvents

POET Dsm Advanced biofuels Project liberty model





PROJECT LIBERTY STACK YARD



Iowa

Project Name	Projected Capacity million gallons per year (mgpy)	Feedstock Source	Biofuel Type	Public Funding and Source
POET Project Liberty	20	Corn stover	Cellulosic ethanol	\$14,000,000 Iowa Power Fund
Quad County Corn Processors	2	Corn kernel fiber	Cellulosic ethanol	\$150,000 IA Dept of Economic Development \$1,450,000 Iowa Power Fund
Dupont	~25	Corn stover	Cellulosic ethanol	\$9,000,000 Iowa Power Fund \$8,700,000 Tax abatement \$4,600,000 Tax credits
Fiberight	6	Municipal solid waste	Cellulosic ethanol	\$2,900,000 Iowa Power Fund
BioProcess Algae	unknown	Waste CO2 from ethanol production	Biodiesel	\$4,100,000 Grants from State of IA

Figure 6.3, Next Generation Biofuel Projects – Iowa

Mission of the Bioeconomy Coalition of Minnesota

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

Coalition Organizers



**GREAT PLAINS
INSTITUTE**

Better Energy.
Better World.



BioIndustrial
Partnership of Minnesota



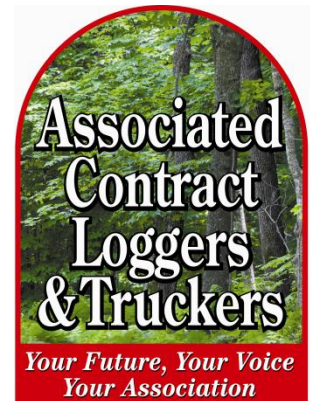
The BioBusiness Alliance
of Minnesota™



LifeScience Alley®

BIOECONOMY
COALITION OF MINNESOTA

Coalition Partners



2013 Legislative Achievements

- Biobased Chemical Funding:
 - Language added to NextGen Energy Board Statute allowing investment in biobased chemicals
 - ~\$2.5 million over 2 years
 - Planned RFP for Fall 2013
- Next Gen Biofuels:
 - Modifying MN “ethanol” mandate to be biofuel-neutral, allowing butanol and other biofuels to enter market.
 - Establishes 30% by 2025 biofuel goal
 - Taskforce to recommend incentives to commercialize advanced and cellulosic biofuels in MN

2014 Goals

- Finalize financing and break ground for at least 2 new facilities producing advanced biofuels, biobased chemicals, or cellulosic sugars.
- Create a new state program to attract commercial-scale production of biobased chemicals, advanced biofuels, cellulosic sugars, and biomass thermal energy in Minnesota, either through a producer payment or tax credit, loan guarantee, grant, bonding, or other means.
- Secure bonding funding for district heating projects
- Secure bonding funding for the Biosystems Engineering building on University of Minnesota
- Increase procurement of biobased products by the state of Minnesota