INSTITUTE FOR AGRICULTURE AND TRADE POLICY

Farming the Bioeconomy
Connecting Sustainable Agriculture and the Green Economy

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Alberta, Canada
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What I will Cover Today

- Sustainable agriculture concerns and opportunities in the bioeconomy
- Examples of policy and market support for sustainable agriculture
- Recommendations for better connecting Green Building sector and sustainable farming

INSTITUTE FOR AGRICULTURE AND TRADE POLICY

IATP works at the intersection of policy and practice to ensure fair and sustainable food, farm and trade systems for all people

www.iatp.org

PEACE COFFEE
MINNEAPOLIS ★ MINNESOTA

IATP's Perspective on a Sustainable Bioeconomy

- Provides food, fuel, fiber and materials we need
- Safer products and processes
- Protects and enhances the environment and climate
- Benefits farmers, rural communities and society
- Is fair and responsive

- To spur the introduction and use of biomaterials that are sustainable from cradle to cradle;
- To advance the development and diffusion of sustainable biomaterials by creating sustainability guidelines, engaging markets, and promoting policy initiatives.

www.sustainablebiomaterials.org

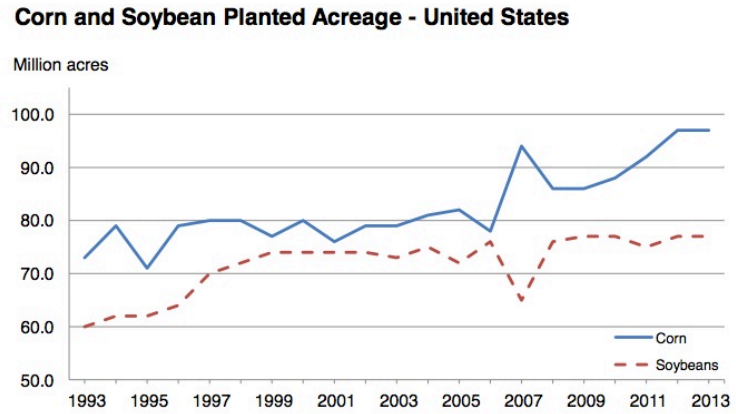
My Perspective

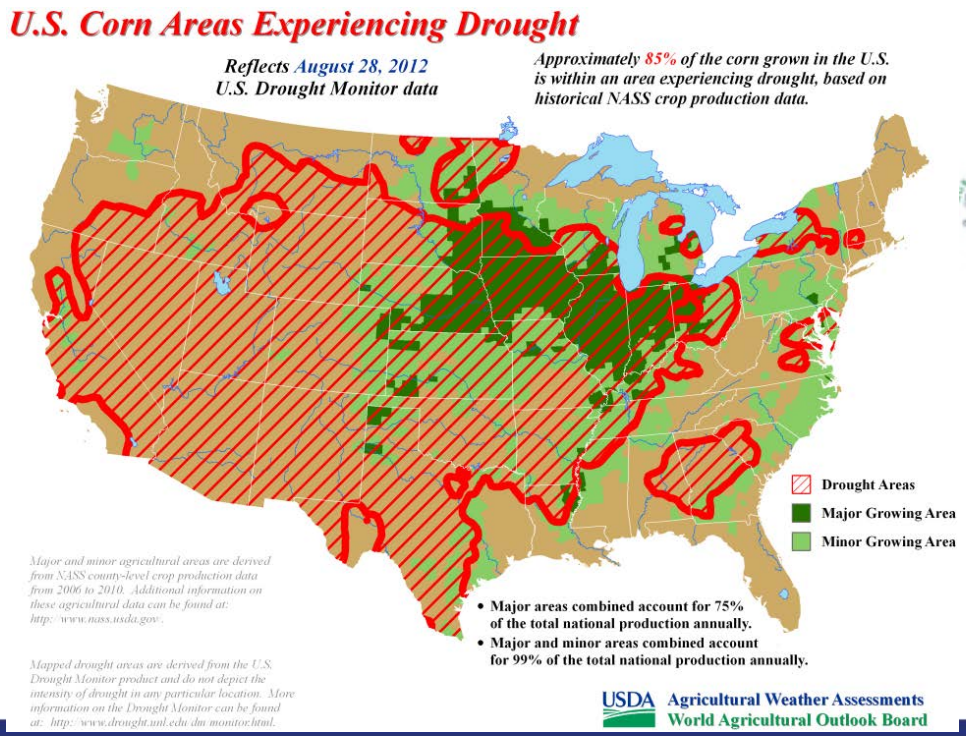
Agricultural Feedstock Concerns

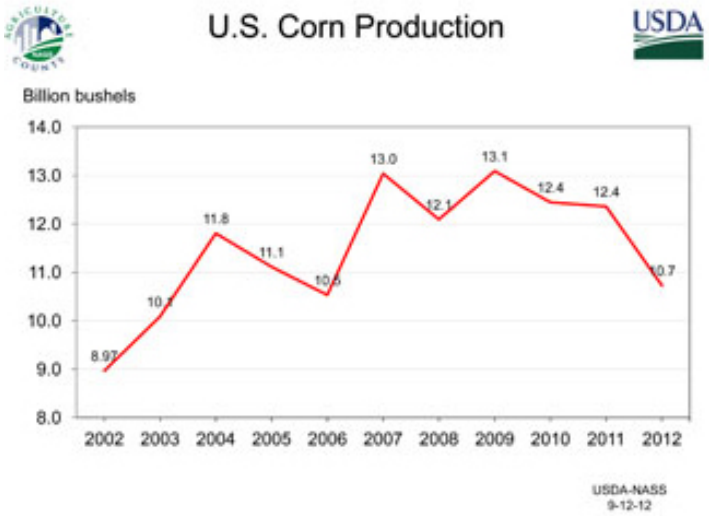
- Soil, water and air quality
- Fossil fuel and energy use
- Biodiversity and wildlife impacts
- Global warming concerns
- Farmer and farm worker safety and benefit
- Food security impacts

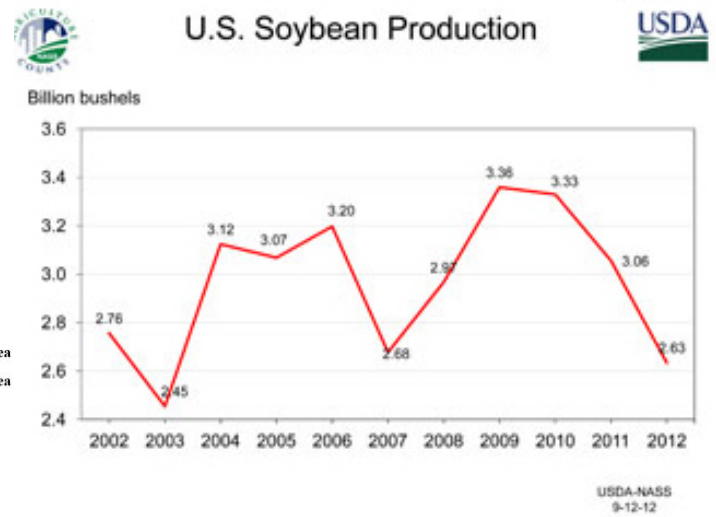
The Primary Feedstock of Today's Bioeconomy

We're *Planting* More and More…









Why Grow So Much Corn?

- Cropping decisions and farming practices are driven primarily by economics
- Agricultural economics are determined by policy and markets
- Corn has been "deeply" invested in from both perspectives and provides multiple markets & risk mitigation tools

From a Bushel of Corn…

31.5 lbs. of starch

or

33 lbs. of sweetener

or

2.8 gal. of fuel ethanol

or

22.4 lbs. of PLA fiber/polymer

plus

17.5 lbs. of distillers dried grains with solubles*

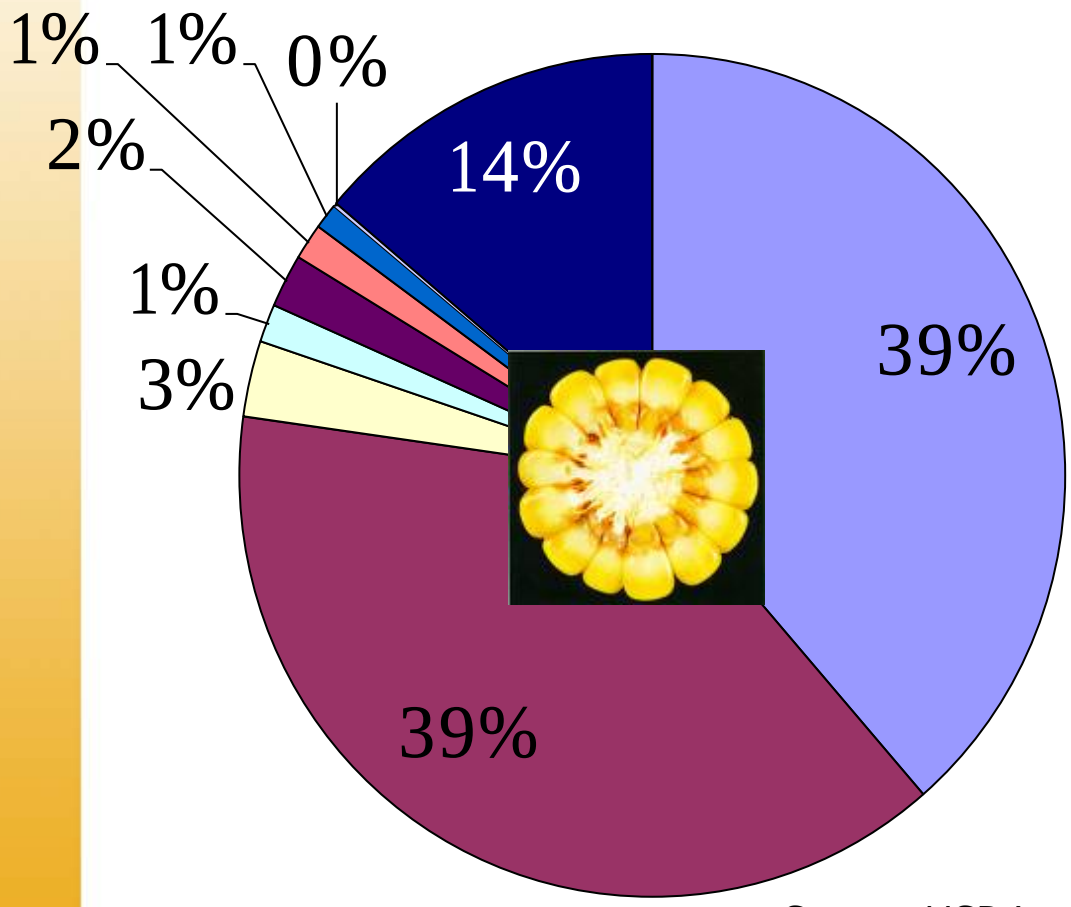
13.5 lbs. of gluten feed**

2.6 lbs. of gluten meal**

and

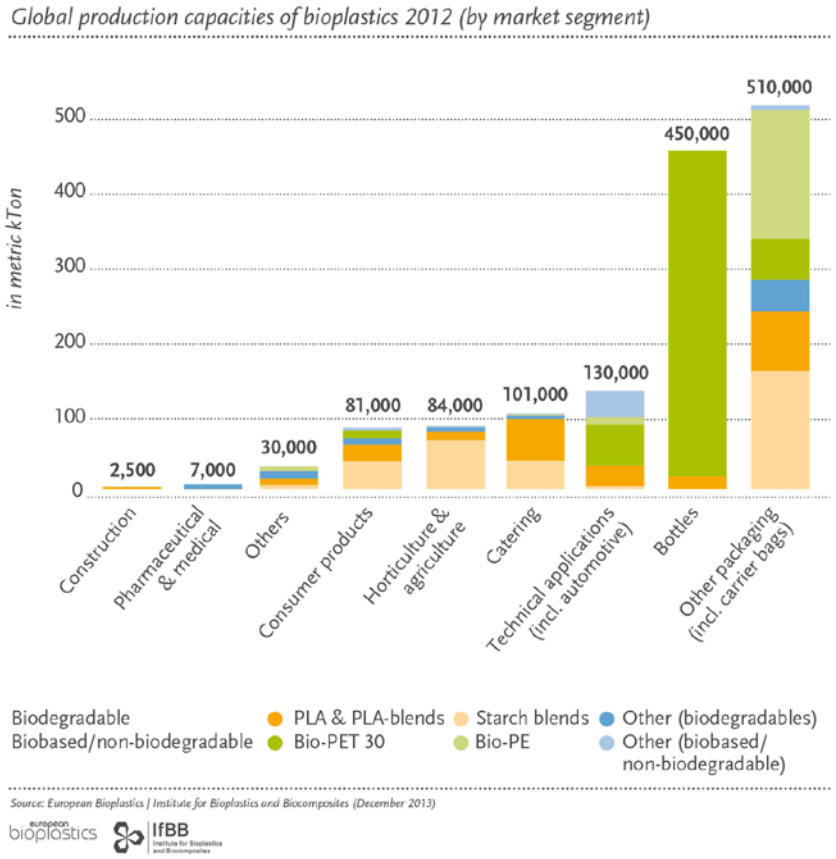
1.5 lbs. of corn oil**

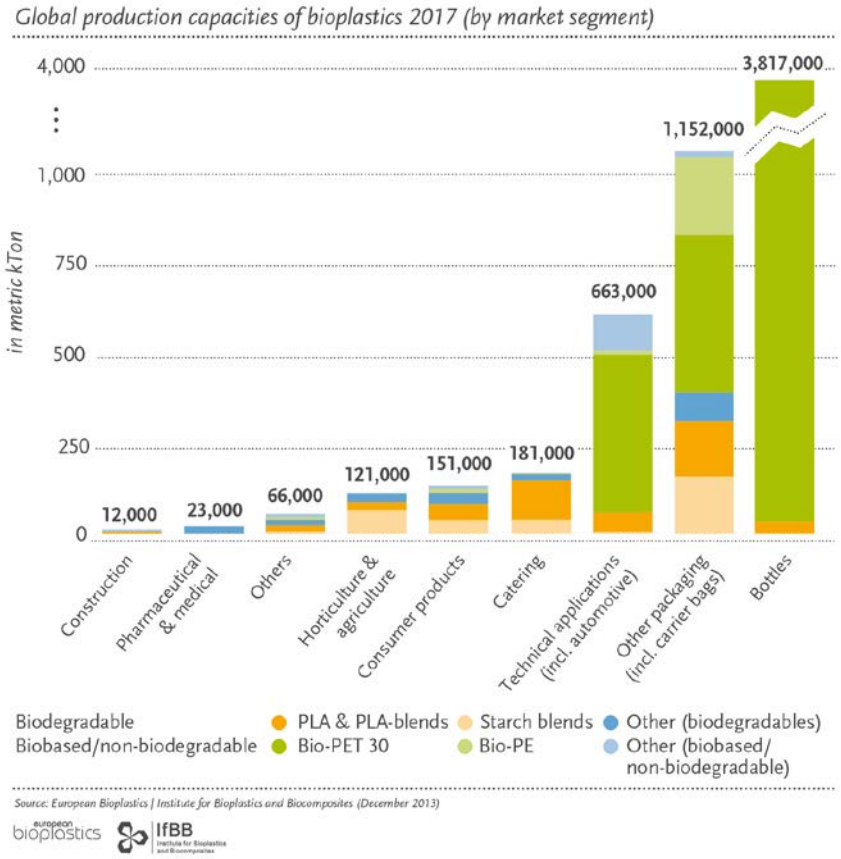
Estimated 2012-13 US Corn Uses



Source: USDA

Markets for Bioplastics are still small…





…But growing use does mean growing demand for feedstocks

Land use for bioplastics 2012 and 2017

Global land area
13.4 billion ha = 100%

Global agricultural area
5 billion ha = 37%

GLOBAL AGRICULTURAL AREA

Pasture
3.5 billion ha = 70%*

Arable land**
1.4 billion ha = 30%*

Food & Feed
1.24 billion ha = 26%*

Material use *including* → **Bioplastics**
106 million ha = 2%*
2012: 0.4 million ha < 0.01%*
2017: 1.2 million ha ≈ 0.02%*

Biofuels
53 million ha = 1%*

Source: European Bioplastics | Institute for Bioplastics and Biocomposites (December 2013) / FAO 2011

** In relation to global agricultural area*
*** Also includes approx. 1% fallow land*

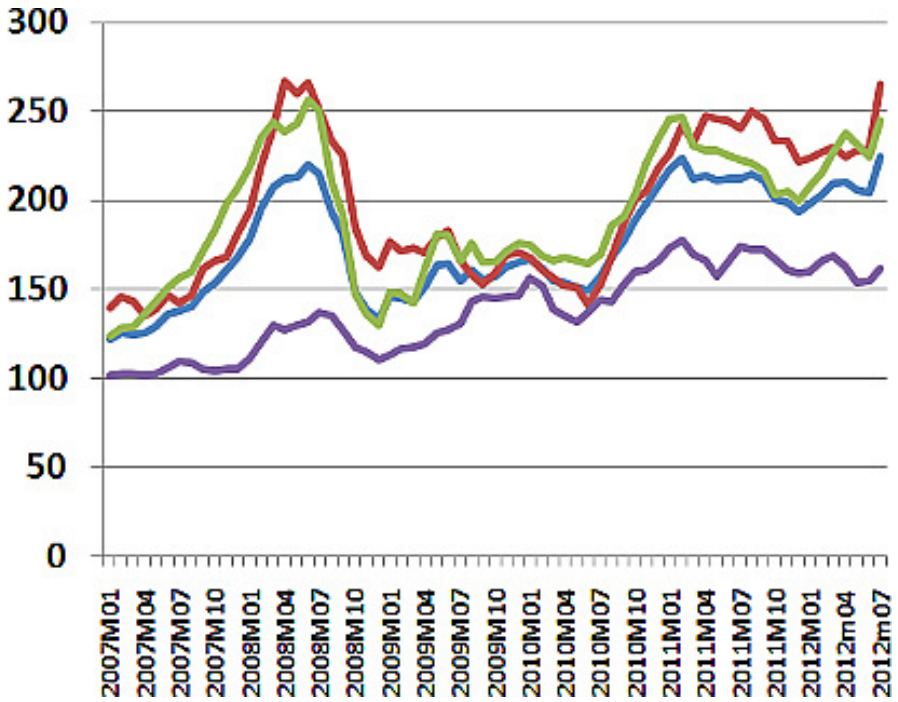
european bioplastics

IfBB Institute for Bioplastics and Biocomposites

Food Security Concerns

- Increasing demand for crops for food and bioeconomy needs makes any new "demand" felt
- Issue of "food vs. fuel/bioplastic" is generally more about land use rather than specific crops
- That may change with the drought and volatile weather…

World Bank Global Food Price Index



Source: World Bank DECPG.
Note: The Food Price Index weighs export prices of a variety of food commodities around the world in nominal U.S. dollar prices, 2005 = 100.

What We Put Into Corn…

- Average of over 120 lbs. Nitrogen fertilizer per acre (133-155 kg/ha)
- Among the highest levels of herbicide and pesticide use for conventional crops
- Irrigation water
- Proprietary hybrids

What Else is Produced

- Soil erosion and nutrient run-off and leaching
- Water, air, soil, health and biodiversity impacts of chemical and GMO use
- Greenhouse gas emissions
- Pressure on ecosystems and land uses
- Reduced rural economic benefit from agricultural production

It can be different!

Commodity crop production can be part of a sustainable farming system

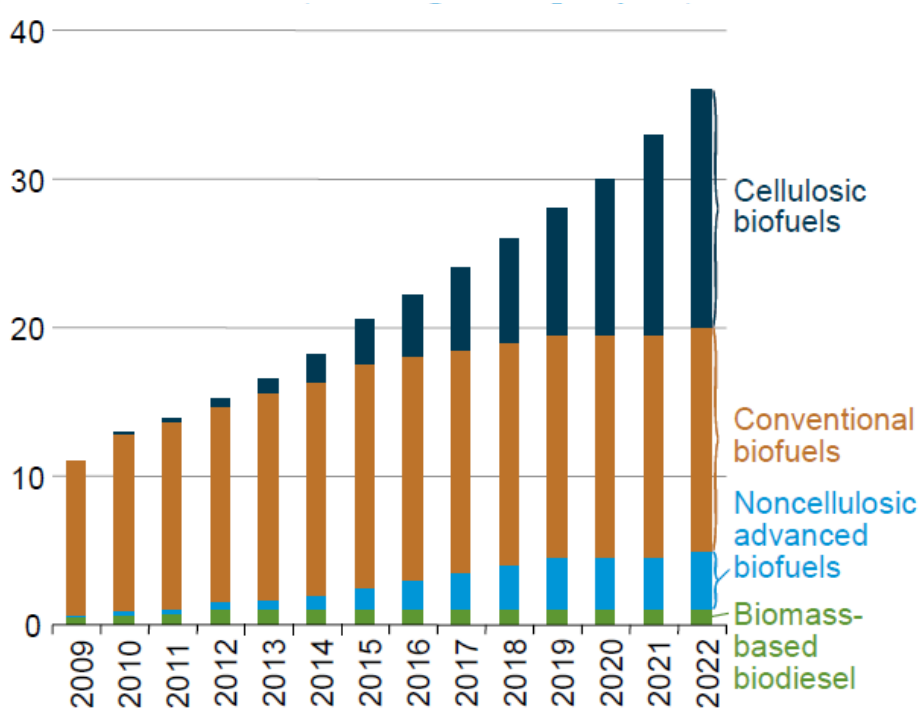
But markets and policies need to support it

Green Economy as Answer

- Focused on renewability and environmental performance
- Has high enough value to "share" throughout the supply chain
- Production and systems can support (or even supplant) other policy costs and objectives

Policy Support Examples: U.S.

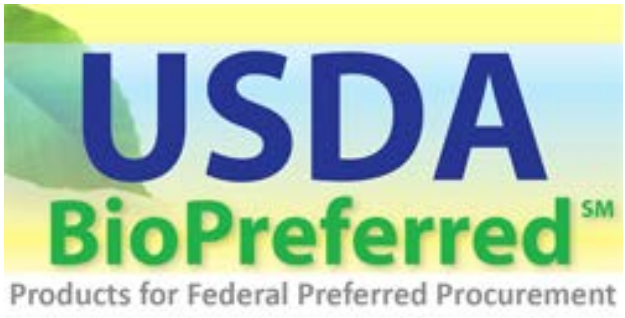
2007 Energy Independence and Security Act Renewable Fuels Standard



- Mandates increasing amount and variety of biofuel use
- Supports alternative feedstock development
- One of only U.S. policies with clear GHG criteria

Policy Support Examples: U.S.
USDA BioPreferred Program

- Created in 2002 Farm Bill
- Preferred procurement program for Federal agencies and their contractors
- Voluntary labeling program of biobased products



http://www.Biopreferred.gov

Policy Support Examples: U.S.

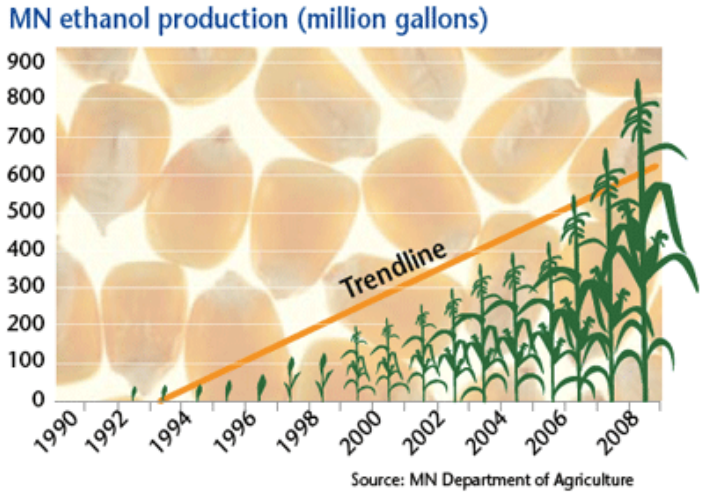
Biomass Crop Assistance Program (BCAP)

FSA BIOMASS CROP ASSISTANCE PROGRAM

- Created in 2008 U.S. Farm Bill
- Provides support to farmers to produce new feedstock crops
- Requires linkage to biorefining industry

Policy Support Examples: Minnesota

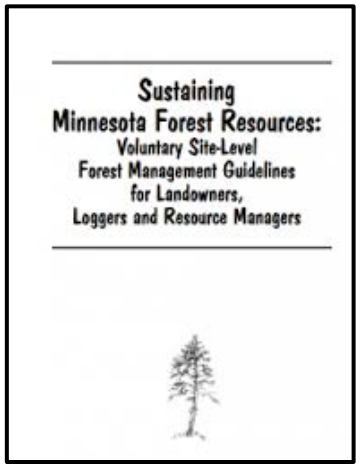
- Minnesota Model
  - Provided producer payments for in-state ethanol production
  - 1986-2013
- Bioeconomy Coalition
  - Next gen biofuels, biorefining and biomass heat producer payments
  - To be introduced in 2014 Legislative session

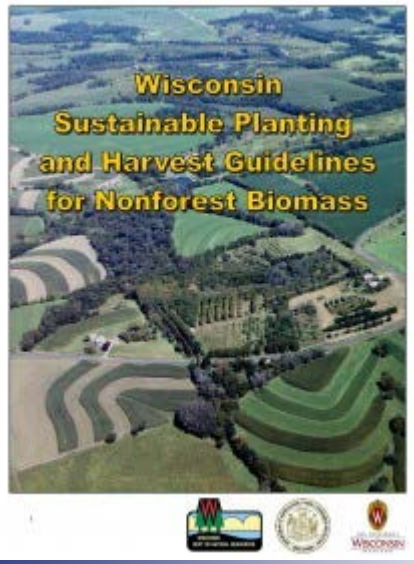


Policy Support Examples: *Minnesota and Wisconsin*

- Minnesota Biomass Harvesting Guidelines
- Minnesota Agricultural Water Quality Certification
- Wisconsin Biomass Planting &Harvest Guidelines

MINNESOTA WATER QUALITY CERTIFIED FARM





Market Support: International

- Growing number of international certification efforts around biomaterials
- Cover full lifecyle of production, including feedstocks

Market Support: U.S.

- Sustainable Biodiesel Alliance certification

- Working Landscapes Certificates

WORKING LANDSCAPES CERTIFICATE

How to address feedstock sustainability concerns when…

- Industry is emerging
- Feedstock use is relatively low
- Costs are higher than fossil fuel competitors

WORKING LANDSCAPES CERTIFICATE

www.workinglandscapes.org

- Enables bioplastic customers to support more sustainable farming and land use practices.
- Uses "offset" approach to address landscape impacts of feedstock production.
- Does not require "identity-preserve" infrastructure and additional transaction costs.

WORKING LANDSCAPES CERTIFICATE

Corn Production Criteria

www.workinglandscapes.org

- No GMO varieties
- No continuous cropping
- Soil testing and fertilization according to state criteria and test results
- No use of known human or animal carcinogenic chemicals
- Use of cover crops or at least 70% of residues left in field
- WLC Farm Plan that includes biodiversity, GHG, pollinator protection and energy criteria

WORKING LANDSCAPES CERTIFICATE

WLC Goals

- Farmers receive a higher and more stable price for sustainable production
- Expanded production of sustainable feedstocks
- Growth of markets for sustainable production
- Begin movement towards perennial biomass feedstocks

WORKING LANDSCAPES CERTIFICATE

WLCs in the market

- 2010: Stonyfield became the first major WLC buyer
- 2011: Danone Germany begins participating
- 2012: Partnership with Nebraska Farmers Union
- **Over 2000 acres of production in 2012 (equivalent to almost 1 billion yogurt cups!)**

WORKING LANDSCAPES CERTIFICATE

WLC = nonGMOplus

- Growing interest for non-GMO production
- WLC Criteria include non-GMO, but also address other core sustainability concerns
- WLC program and certification system can be developed/utilized for other crops (food and feed) and for farm rotations
- Strong connections to farmers and farm organizations interested in nonGMOplus production

Making the Shift to Biomass

Grasses, trees, and crop and forest residues are the "next generation" of feedstocks

- Higher potential environmental value
- Lower concerns about sustainability impacts (especially food security)

But markets, policies and *infrastructure* are needed

Making the Shift to Biomass

Benefits of biomass feedstocks are not guaranteed:

- If high production levels are goal, sustainability value is likely lower
  - Fertilizer use
  - Over harvesting
- Sustainable production and management systems are still required to ensure desired outcomes

Connecting to Green Building
Look to the Woods

Forest management certification required for multiple markets and policy

- FSC inclusion under LEED certification in US is biggest driver of certification/market
- Rapidly renewable/locally sourced would count
- What about ag sourced standard?

Connecting to Green Building
Look to Core Markets

Food Businesses

- What role is food in overall business LCA?
- Is it accounted for in LEED type certification?
- Example of IATP/Red Stag work
- Not easy!!

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Thank you!

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