

Bioenergy impact on Wisconsin's Workforce Clean Cities Webinar



WISCONSIN
BIOENERGY
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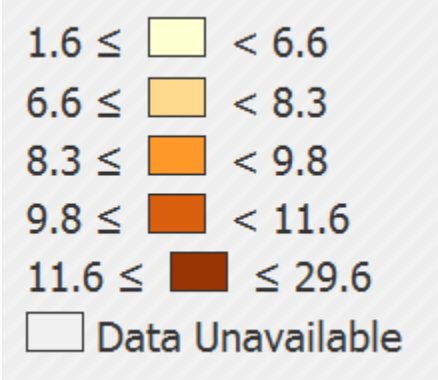
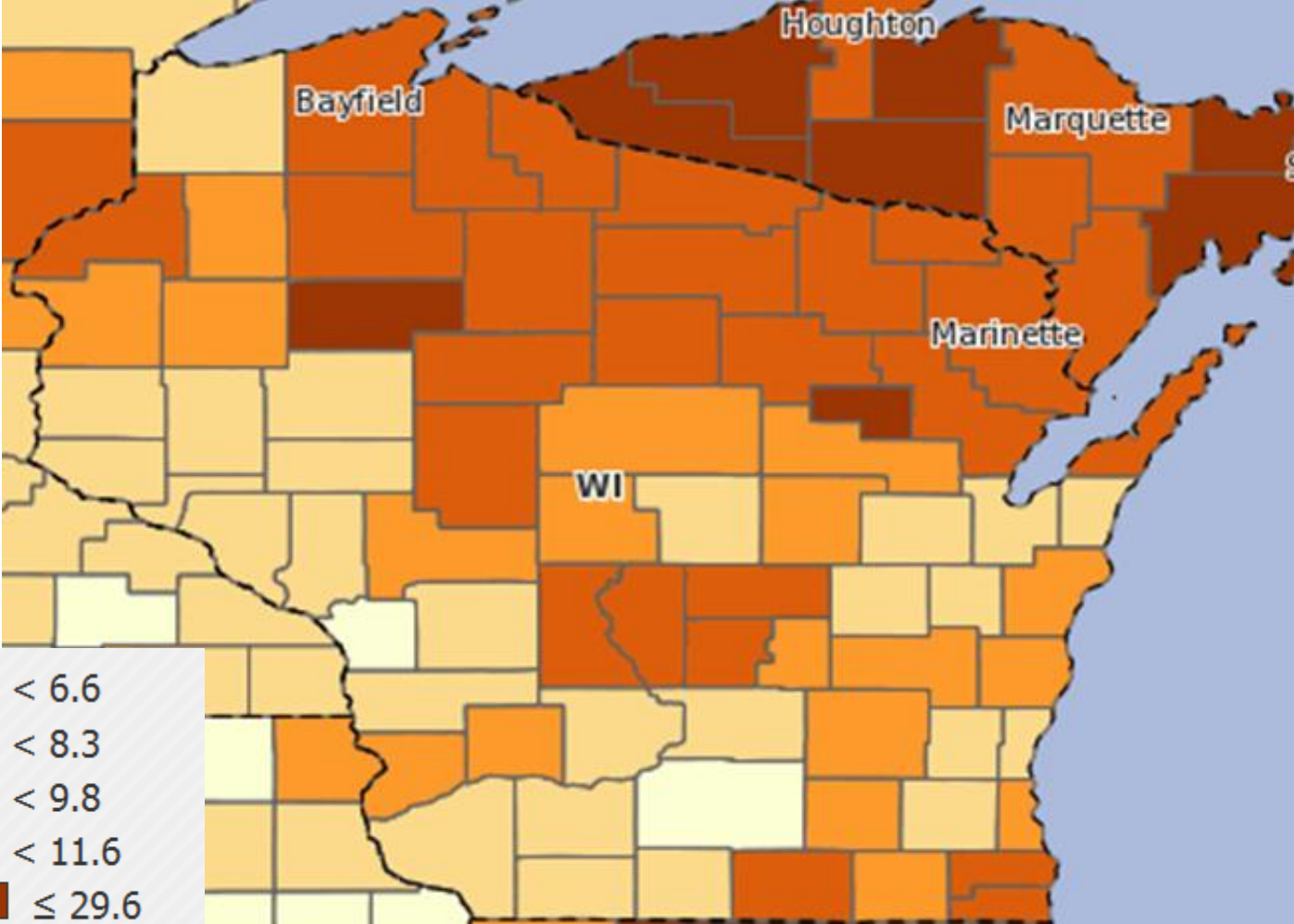
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Topics

- Wisconsin workforce
- Wisconsin bioenergy potential
- Workforce impact
- Takeaways



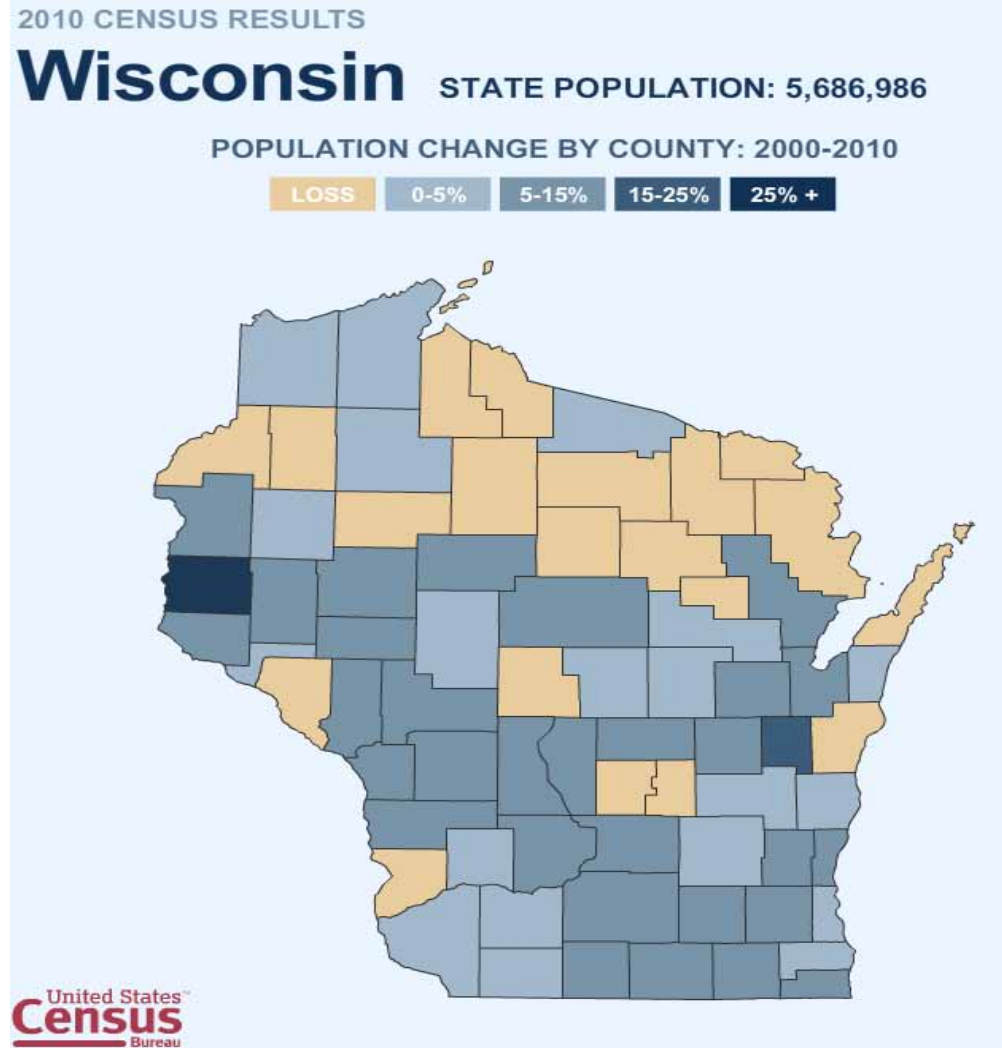
2010 Unemployment % in Wisconsin



<http://geofred.stlouisfed.org/>

2000-2010 Wisconsin Change in Population

- Loss of population follows unemployment



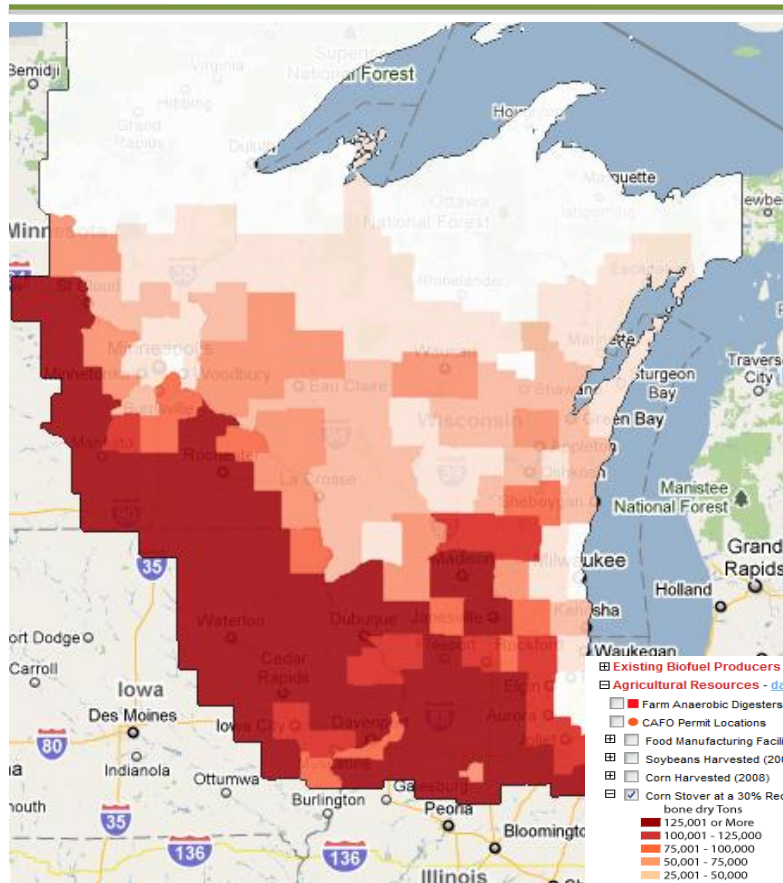
<http://www.acceity.org/2011/03/wisconsin-census-data-released/>



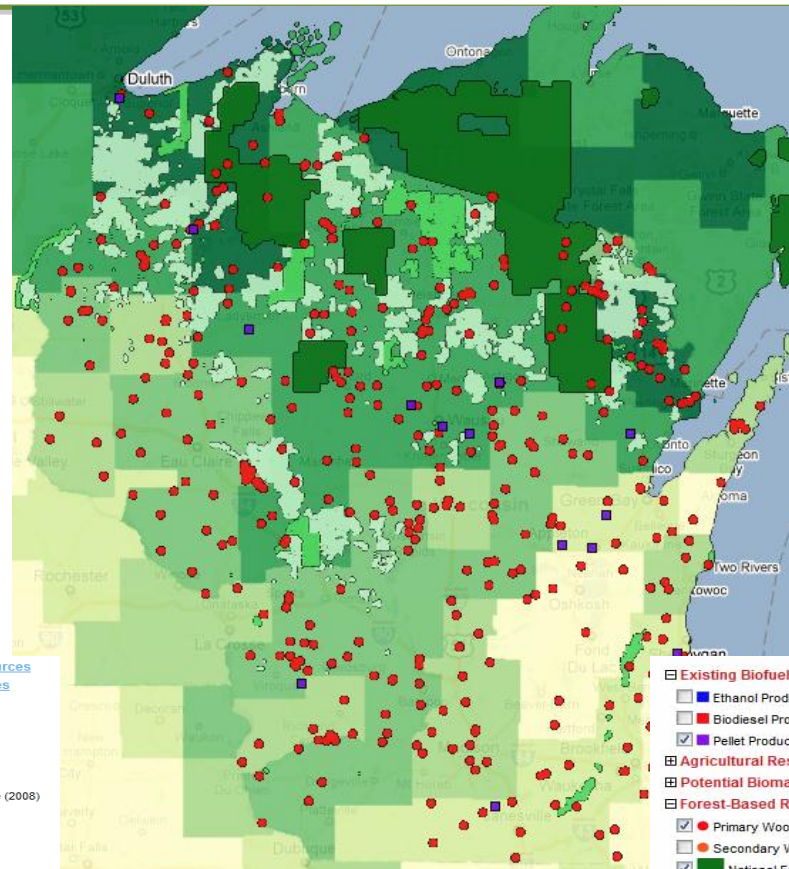
Question: Can Bioenergy be a driver for Rural Economic Development?



Wisconsin Bioenergy Potential



- Existing Biofuel Producers - [data sources](#)
- Agricultural Resources - [data sources](#)
 - Farm Anaerobic Digesters
 - CAFO Permit Locations
 - Food Manufacturing Facilities
 - Soybeans Harvested (2008)
 - Corn Harvested (2008)
 - Corn Stover at a 30% Recovery Rate (2008)
- Corn Stover at a 30% Recovery Rate (2008)
 - bone dry Tons
 - 125,001 or More
 - 100,001 - 125,000
 - 75,001 - 100,000
 - 50,001 - 75,000
 - 25,001 - 50,000
 - 1 - 25,000
 - 0 (None or Not estimated)
- Hay Harvested (2008)
- CRP Lands (2007)
- CRP Acreage - 2007 to 2020
- Potential Biomass Cropland - [data sources](#)
- Forest-Based Resources - [data sources](#)
- Environment - [data sources](#)
- Political Boundaries
- Utilities and Transportation - [data sources](#)



- Existing Biofuel Producers - [data sources](#)
 - Ethanol Producers
 - Biodiesel Producers
 - Pellet Producers
- Agricultural Resources - [data sources](#)
- Potential Biomass Cropland - [data sources](#)
- Forest-Based Resources - [data sources](#)
 - Primary Wood Users
 - Secondary Wood Users
 - National Forests
 - State Forests
 - County Forests
 - Acres of Forest Land
 - Acres
 - 640,001 or More
 - 320,001 - 640,000
 - 160,001 - 320,000
 - 80,001 - 160,000
 - 40,001 - 80,000
 - 40,000 or Less



Wisconsin Bioenergy Potential

- How much biomass?
 - Depends on a lot of things (prices, yields, sustainability considerations, etc.)
- Talk uses data from the ORNL Baseline case¹
 - Uses year 2017 and price of \$60/ton at farm/field
 - Use current USDA baseline forecast for yields, acres, and yield increase
 - Stover removal:grain is 1:1
 - Several other assumptions



¹http://www1.eere.energy.gov/biomass/billion_ton_update.html

Wisconsin Bioenergy Potential

- Estimate WI biomass resources at
 - 5,531,000 MT/yr of biomass
 - ~40% forest
 - ~60% agricultural
 - Energy basis = 77 trillion BTU/yr (assuming 7000 BTU/lb)
- Compare to 2009 WI energy use
 - Total - 1681 trillion BTU/yr
 - Petroleum - 470 trillion BTU/yr
 - Current bioenergy - 80 trillion BTU/yr



Workforce Impact

- How many jobs?
 - Depends on conversion
 - For simplicity sake – conversion into EtOH
- 5.5 million tons biomass → cellulosic EtOH
 - 442 million gals (assuming 80 gallons/ton)
 - Compare to WI corn ethanol production capacity of 509 million gals¹ (10 plants)
- 9 plants (at 50 million gallon/year/plant)
 - Average size ethanol plant
 - Each site to process ~600,000 tons/yr

¹<http://www.neo.ne.gov/statshtml/122.htm>



High Side

- We are now producing ~12.0 billion gallons of ethanol from corn.
 - Urbanchuck (2011) indicated there were **400,677** ethanol-related jobs in 2010 in the U.S.
- Assuming proportional 33 jobs / million gallons
- WI 442 million gallons would net us >14,500 new jobs
 - Believe this to be over-stated



Reasonable Estimate

- NY study¹ found that 3,616 direct and secondary jobs would be created to produce 354 million gallons of cellulosic ethanol.
- Proportioning to WI nets 4,520 direct and secondary jobs.
- Approximately 500 jobs for 9 separate areas in the state.
- Can grow with increased biomass resources.



Types of Jobs

- 4,520 direct and secondary jobs estimate
 - Direct jobs at plants – 344
 - Secondary jobs related to biomass – 3201
 - All other secondary jobs – 975
- Following similar industries, estimate less than 1/3 will professional or trades positions
- Labor needs will be driven down with technology in the future
- More complex products create more
 - High ratio of direct to secondary jobs
 - Professional or trades positions.



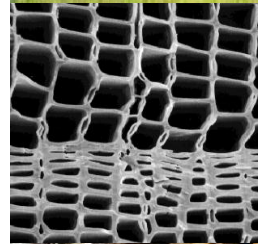
Question: Can Bioenergy be a
driver for Rural Economic
Development?

Answer: Yes and No



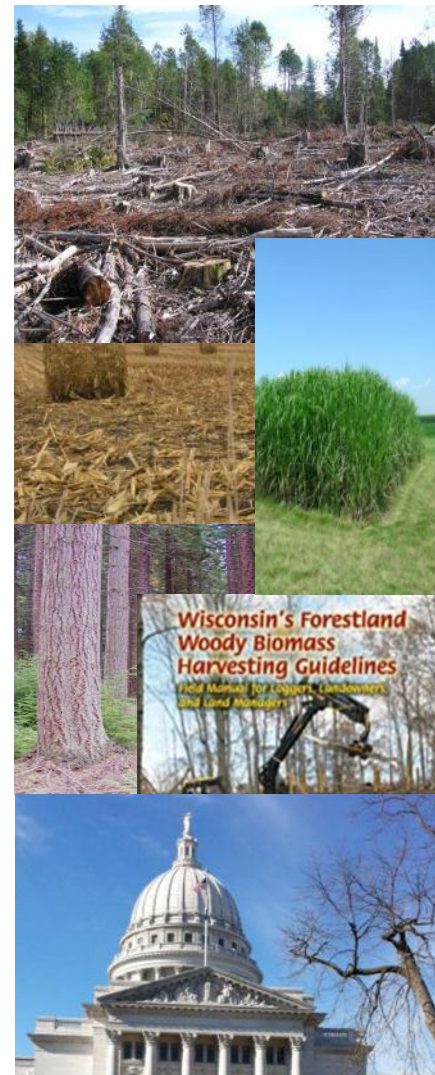
Workforce Development Takeaways

- Bioenergy in the near term will not solve
 - All of energy needs
 - Nor meet all of our economic development needs
- Growing WI Bioenergy
 - Can provide a fair number of jobs
 - Good match between biomass and rural unemployment challenges
 - Largest workforce impact will be in the biomass supply area
- Bioenergy makes sense for Wisconsin



Bioenergy Development Needs

- Development needs
 - *Education*: Continue to train workforce for a bioeconomy
 - *Policy*: Huge risk for businesses to invest with policy and commodity uncertainty
 - *Outreach*: Energy projects are political and there is competition for the resources
 - *Research*: Best practices and guidelines not in place for conversion, sustainability, management
 - *Demonstration*: More successful projects needed to lower commercialization risks



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