Wisconsin Biofuels Initiatives: Growing Alternatives for Wisconsin

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Outline

- Why we are here!
- Renewable Fuels
- Biofuels Production in the State
- Ethanol Activities
- Biodiesel Activities
- Future Outlook for WI

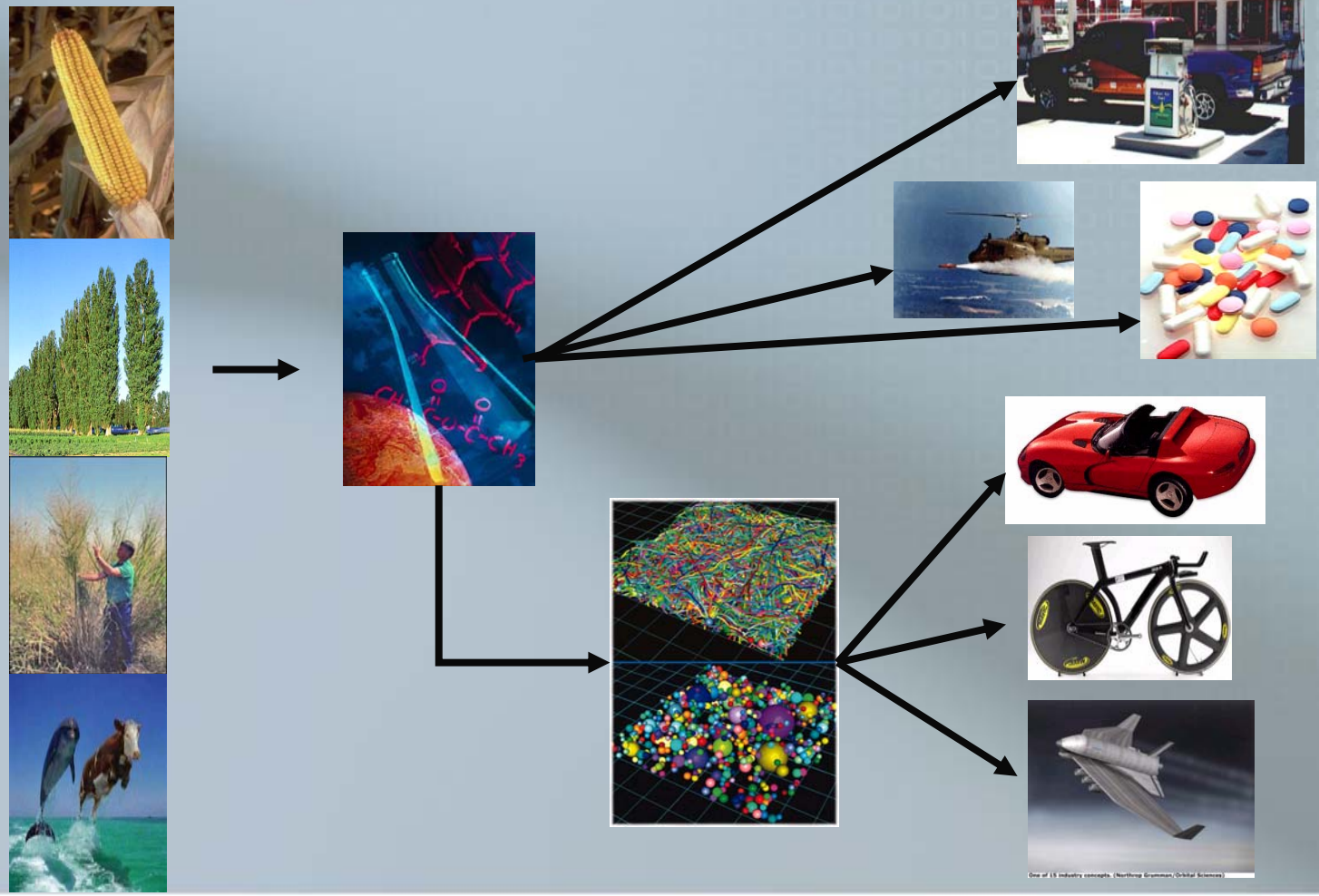
Why we are here!

WI Dependence on Fossil Fuels

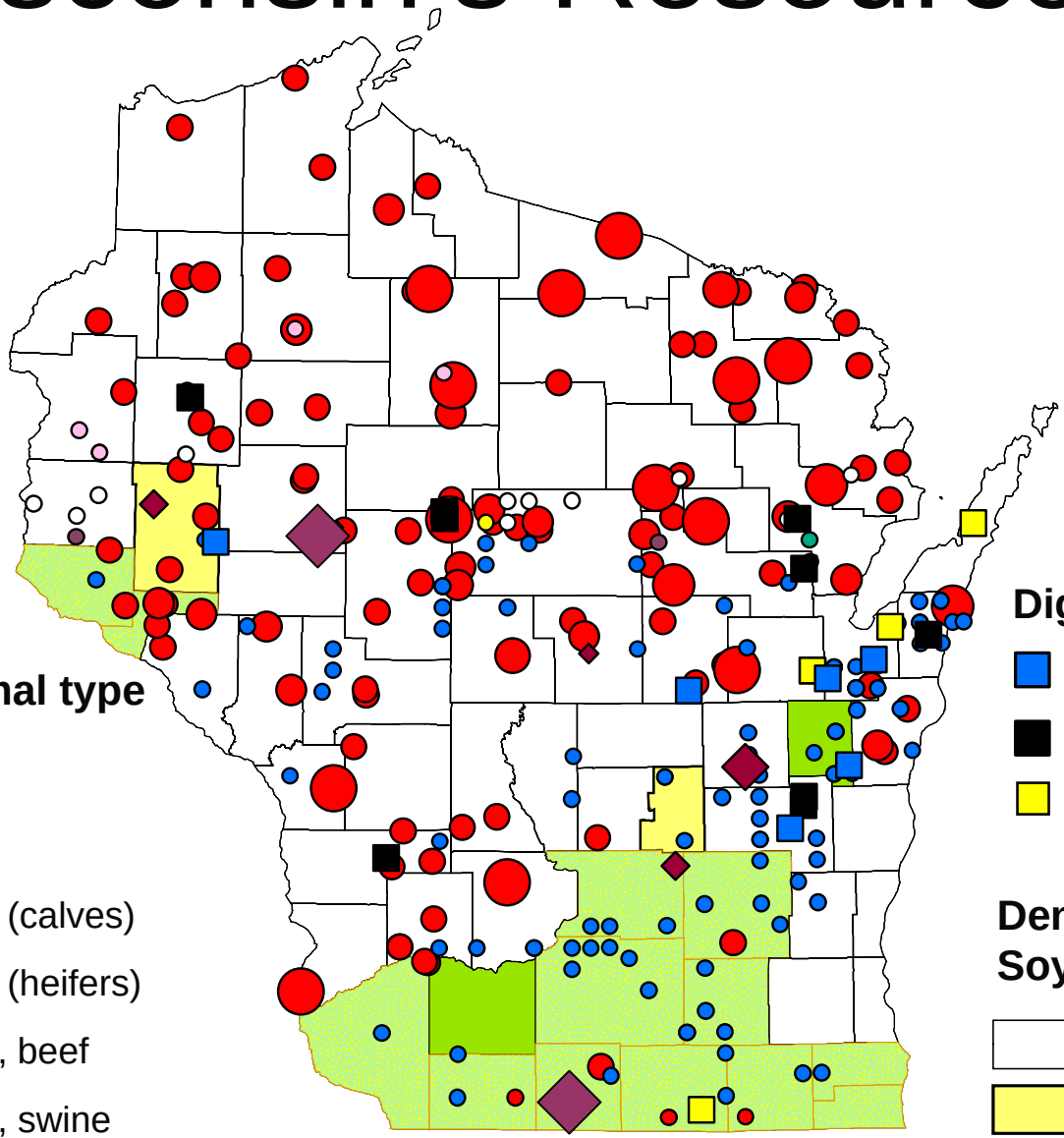
- Nearly 90% of WI's energy comes from coal, natural gas, petroleum and imported electricity
- Only 5% is from renewable sources
- 25% or our energy needs are used in transportation
  - Gasoline/Ethanol - 75%
  - Diesel - nearly 25%

Part of a Long Term Vision

- Biofuels, Biopower and Bioproducts



Wisconsin's Resources



Ethanol Producers
Production capacity
(millions of gallons)

- 0
- 1-4
- 5-40
- 41-48
- 49-52

Sawmills
Size (board feet)

- **1M-3M**
- **3M-5M**
- **5M-7M**
- **8M-10M**
- **11M+**

Digesters

- Operational
- Not operational
- Unknown status

CAFOs
By animal type

- Beef
- Dairy
- Dairy (calves)
- Dairy (heifers)
- Dairy, beef
- Dairy, swine
- Poultry
- Swine

Density of Corn and Soybean Production

- Not Top 15
- Top 15 Corn
- Top 15 Soybeans
- Top 15 Both

Alternative Fuels in the Transportation Sector

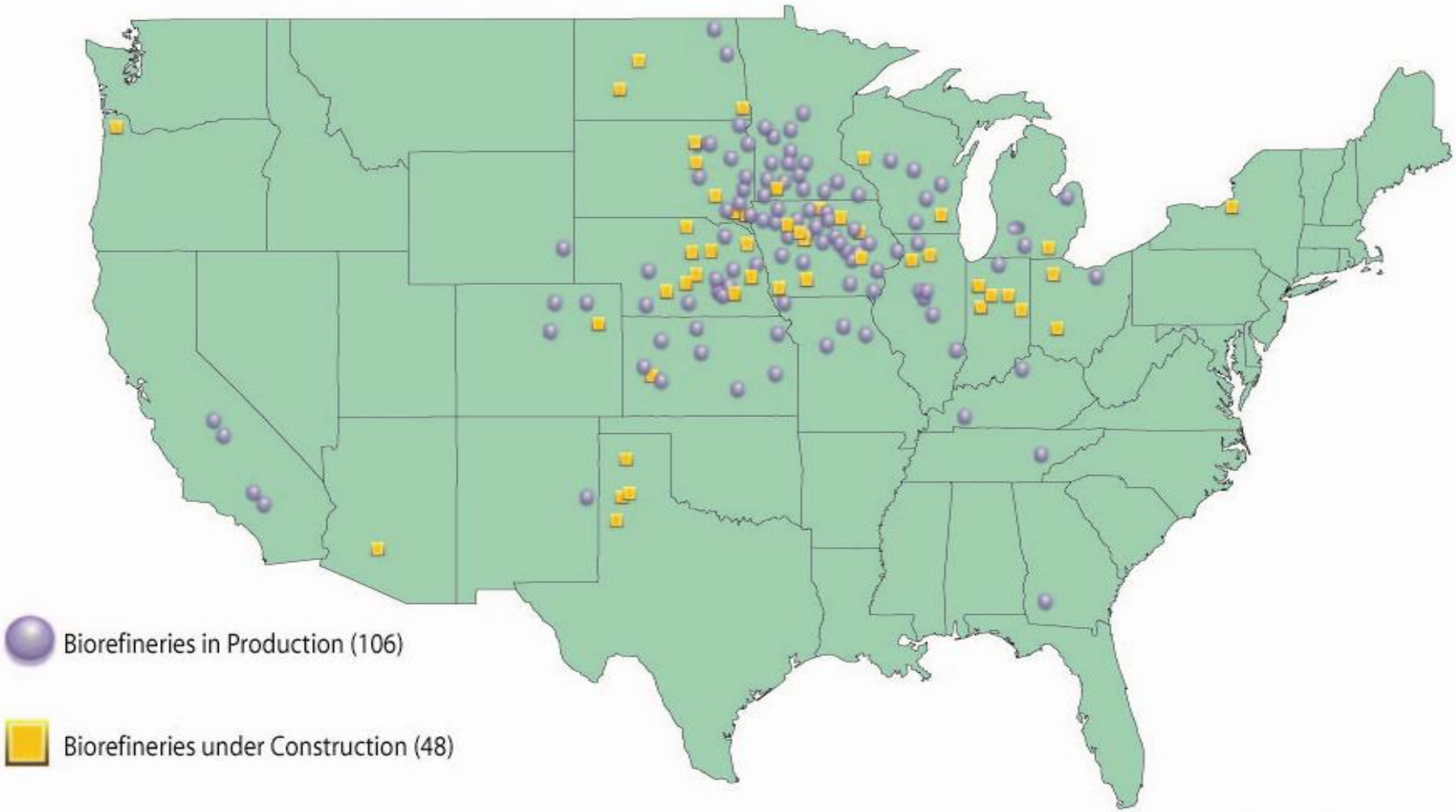
- Alternative fuels include:
  - Ethanol, Biodiesel, Natural Gas, Propane, Hydrogen, Electricity, Methanol, P-series
- Biofuels - Ethanol and Biodiesel
- Information on the other fuels is located at http://www.eere.energy.gov/afdc/

Biofuels

- A biofuel is any fuel that is derived from biomass with primary use in the transportation sector
  - Plants – corn, soybeans, switchgrass

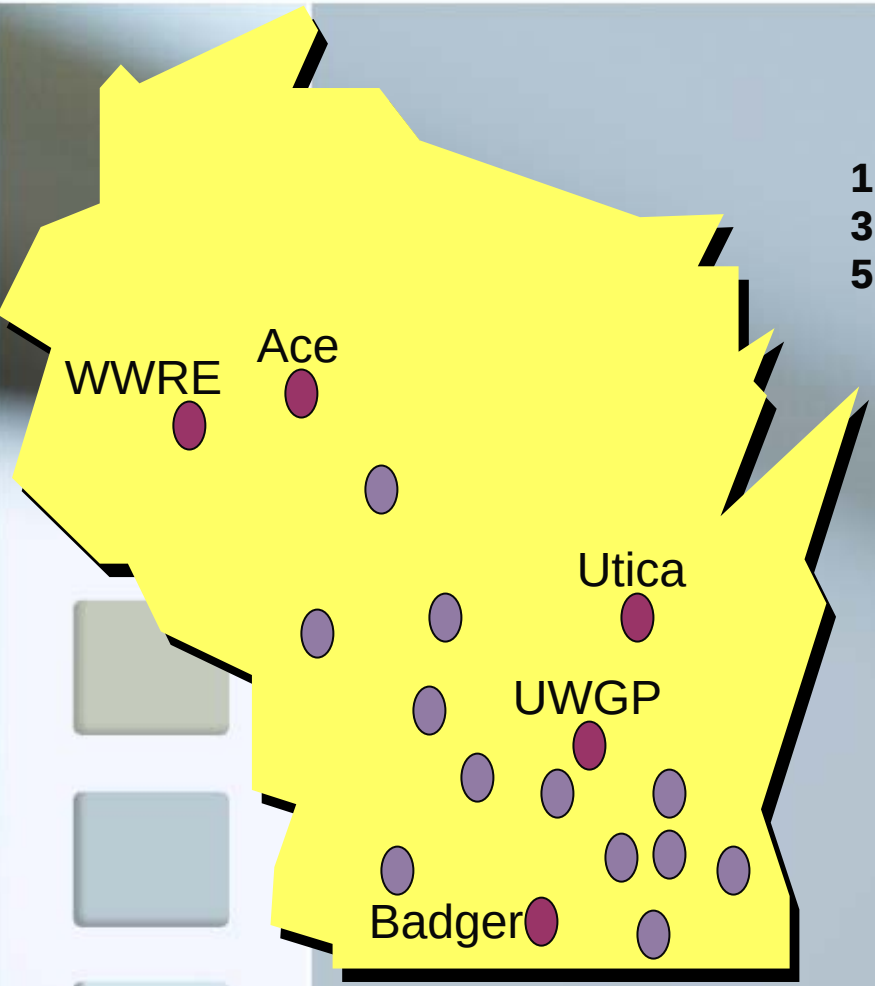
ETHANOL

U.S. Ethanol Biorefinery Locations



Source: Renewable Fuels Association

Wisconsin Ethanol Production



5 Operating Ethanol Plants

Current Production: 200+ million gallons

1) Badger Ethanol: Monroe 2) Ace Ethanol: Stanley
3) Utica Energy: Oshkosh 4) UWGP: Friesland
5) Western WI: Wheeler

3 Under Construction

Production potential: 220+ million gallons

6) United: Milton
7) Renew Energy: Jefferson
8) Castle Rock: Necedah

Proposed Ethanol Plants

Proposed Production: 430+ million gallons

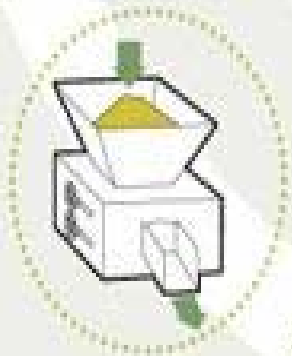
9) Reedsburg 10) Sparta 11) Belmont
12) Sharon 13) Union Grove
14) Arena 15) Wisconsin Rapids
16) Cambria

Ethanol

HOW ETHANOL IS MADE

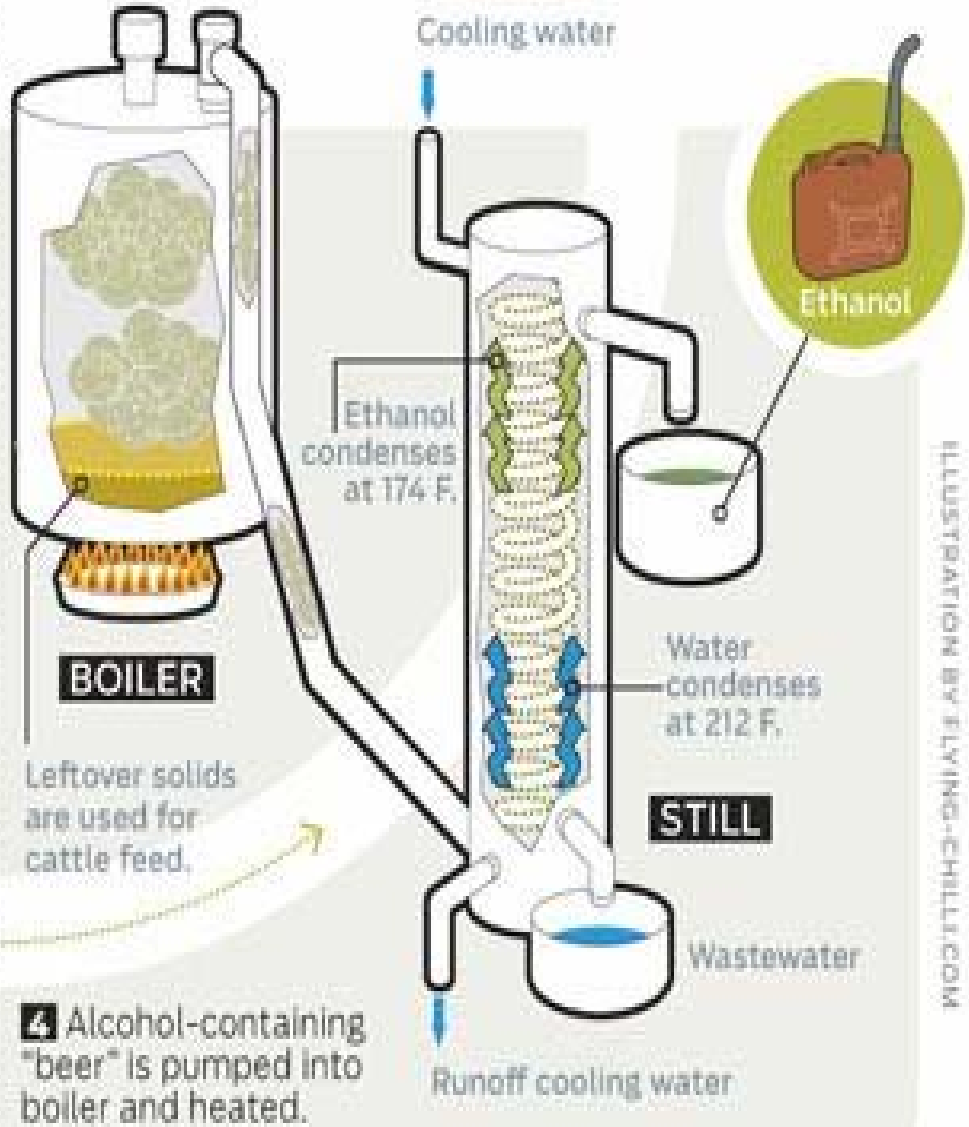
Ethanol for fuel is made with the same process that produces moonshine. Grain is crushed, fermented for several days and distilled to remove water.

1 Corn kernels are removed.



2 Kernels are then crushed in a mill.

3 Water and enzymes are added to the corn in a fermenter. Yeast is added later.



Ethanol & Corn

- 20% of Wisconsin's corn crop, or 1 out of every 5 rows of corn, is used to make ethanol.
- One bushel of Corn (56 lbs) = 2.8 gallons
- Wisconsin produces 350 million bushels of corn per year
  - Using the whole corn crop we could produce 980 million gallons of ethanol per year.
- It takes 90 million bushels of corn to produce 250 million gallons of ethanol
- Ethanol production is the third largest use of U.S. corn, utilizing a record 1.43 billion bushels of corn in 2005.
- Ethanol production does not reduce the amount of food available for human consumption.

New Feedstocks

Switchgrass, black liquor from paper industry, municipal solid waste, corn stover, whey from cheese.

New Feedstocks

Wisconsin Ag News Headline

“No Whey! Company Converts Cheese Waste into Ethanol”

Ethanol Use

- E10
  - Most of ethanol is purchased as blends of 10% ethanol and 90% gasoline
  - Can be used in all vehicles.
- E85
  - a blend of 85% ethanol and 15% gasoline.
  - Only a flexible fuel vehicle is capable of using this fuel
  - 40+ flexible fuel vehicles on the market

E85

- 55 E85 refueling stations in WI
- Growing consumer demand.
- Wisconsin's E85 use
  - 2004: 106,000 gallons
  - 2005: 787,000 gallons
  - 2006: well over 1.25 million
- $1 of regular unleaded means 12 cents stays in WI and $1 of E85 means 70 cents stays in WI

Source: Wisconsin Biofuels and Alternative Fuel Use Report

E85

- There are currently 5 million flex fuel vehicles that can use either gasoline or E85.
- Wisconsin had more than 117,500 flex fuel vehicles on the road.
- Many Wisconsin consumers are unaware they are operating alternate fueled vehicles.
- The State of Wisconsin alternative fuels fleet consists of approximately 1,700 vehicles, of those 1,600 are E85 capable FFVs.

Ethanol Challenges

- Energy ratio debate
- Less energy content
- Transportation
- Tight market
- Facilities limitations – permitting/blending
- New Technology and Feedstocks
- Environmental Impact
- Corn/feed prices

BIODIESEL

Biodiesel

- Clarification – Biodiesel, SVO, and Waste Vegetable Oil are all different!
- Waste vegetable oil is used in vehicles that are converted to use the oil!
- Straight Vegetable Oil, SVO, is generally extruded and blended with diesel or used alone
- Biodiesel goes through a process called “transesterfication” and then is blended with diesel fuel.

Biodiesel

- Pure Biodiesel (B100) or blended with petroleum diesel (B20).
- Available Feedstocks: Vegetable Oil (soy, canola, sunflower) Tallow & Fat, Waste vegetable oil
- Little or no engine modifications
- Use existing fuel distribution network
- Available now

Biodiesel Production

- 2006 Production – est. 4 million gallons
- There are three operating biodiesel plants in WI giving the state a total current production of 4 million gallons/year (MGY):
  - Renewable Alternatives, Green Bay
  - WRR Environmental Services Co, Inc, Eau Claire
  - Generation Bio, LLC, Kiel
- Sanimax Energy (construction), DeForest
- North Prairie Productions (equity), Evansville
- Proposed: Jefferson, Cashton, Butler, LaCrosse, Madison, Watertown, and Mauston, Milwaukee, Owen

Biodiesel Benefits

- Reduce air pollution and greenhouse gases
  - Substantial reduction of unburned hydrocarbons, carbon monoxide and particulate matter.
- Superior lubricity - additive
- Supports U.S. farmers
- Positive energy balance: 3.24

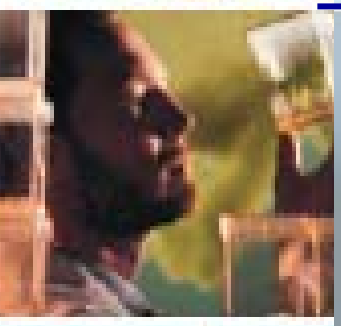
Biodiesel - Challenges

- Cold Weather Operation
- Crush Capacity- producing Feedstock to meet demand
- Emissions and Optimization

Wisconsin Biofuels Initiatives

Governor's Initiatives

- Declaration of Energy Independence
  - 25% of electricity and 25% of transportation fuel from renewable fuels by 2025.
  - Capture 10 percent of the market share for the production of renewable energy sources by 2030
  - Become leader in groundbreaking research


Energy Independence Program

- WI Energy Independence Fund
  - $50 million in low interest loans for WI businesses to expand production & use of renewable energy.
- WI Energy Independence Tax Incentives
  - Tax credits available to gas stations & vehicle fleets to invest in E85 & biodiesel—increasing availability by more than 400%.
- WI Energy Independence Grant Program
  - $20 million in grants available for companies & researchers developing new technology to increase renewable energy.

Federal Incentives

- Blenders Credit For Biodiesel (Including Agri-biodiesel) Mixtures
  - 50 cents per gallon of biodiesel ($1.00 per gallon of agri-biodiesel)
- Volumetric Ethanol Excise Tax Credit
  - Offers 52 cents per gallon of ethanol included in qualified mixture (mixture to be used as fuel)
  - Taken only by blender
- Federal Alternative Fuel Vehicle Refueling Property Credit
  - Federal income tax credit for the installation of ethanol and biodiesel fueling systems
  - Provides a 30% federal income tax credit, up to $30,000 per property
  - *http://www.irs.gov/pub/irs-pdf/f8911.pdf*

Wisconsin Strengths

- Agriculture, Food, and Forestry
- Existing Manufacturing Infrastructure
  - Food Processing
  - Paper
  - Major Manufacturers-engines/electronic systems/building material/plastics
- Emerging Ethanol and Biodiesel Industry
- World Class University
  - Plant genome
  - Engineering
  - Licensing
- Quality Workforce

Wisconsin Strategies

- Apply Technologies to Existing Industries
  - Reduce energy costs
  - Make new coproducts
  - Increase competitiveness
- Strengthen Emerging Industries to Leadership Positions
  - E.g. Ethanol, Biodiesel
- Develop “Leap Frog” Technologies
  - E.g. enzymes, hydrogen

Farm & Business Based Opportunities

- Energy Efficiency/ Waste to Energy
- Anaerobic Digesters
  - BioGas
  - Electricity
- BioFuels and BioPower
  - Current and future crops: grass & woody
- Other Renewable Energy
  - Wind, Solar, Geothermal
- Future Biochemicals and Products

QUESTIONS?

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