





Status of the Biofuels Industry in Wisconsin

WI Joint Legislative Council's Special Committee on Domestic Biofuels

August 19, 2008

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WI Office of Energy Independence

Outline

- Energy Independence Mission & Focus
- Biofuels vs. Petroleum Based Fuels
- Feedstock Production
- Biofuels Production




Energy Independence Mission

- Generate 25% of electricity and transportation fuels from renewable resources by 2025
- Capture 10% of the emerging bio industry and renewable energy market by 2030
- Become national leader in groundbreaking energy research

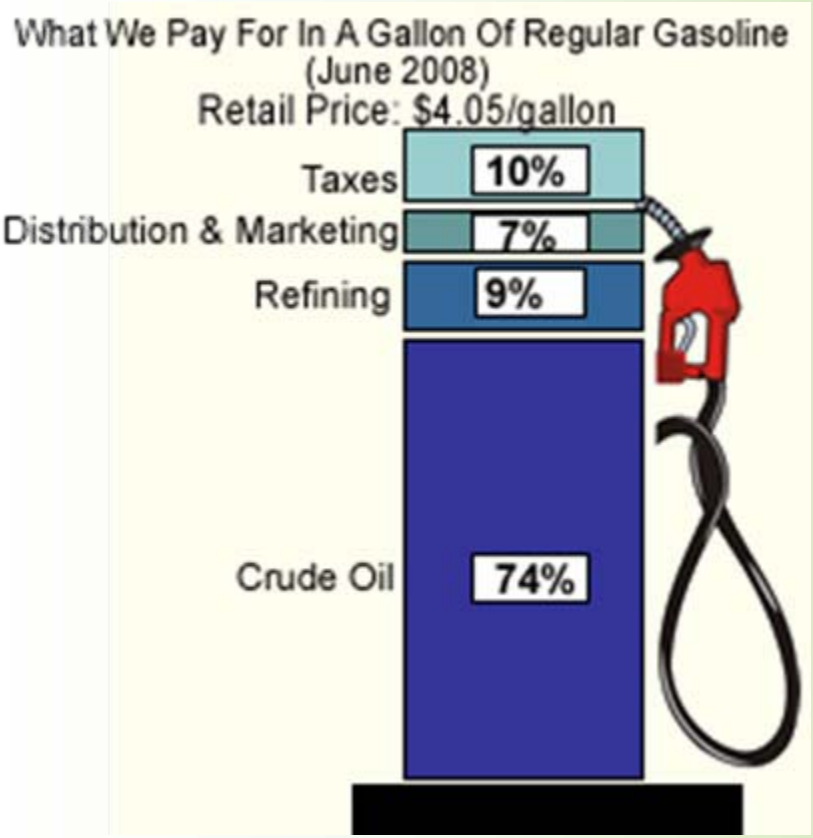


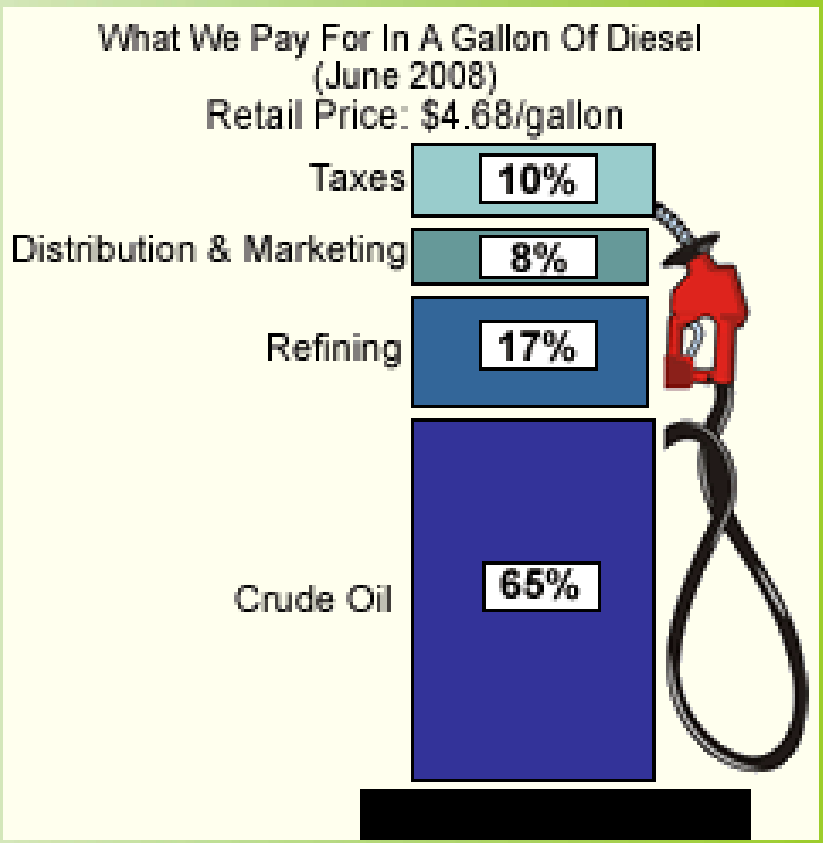

Focus

- Ensure and facilitate implementation of Governor's energy independence initiatives
- Serve as single point of contact for businesses, local units of government and NGOs pursuing bio development, energy efficiency, and energy independence
- Develop energy independence policy options for consideration by Governor
- Identify federal funding opportunities and facilitate applications for funding
- Identify barriers to implementation of Governor's energy independence initiatives
- Serve as the State Energy Office

Biofuels vs. Petroleum Based Fuels

Gasoline/Diesel Price Breakdown





*Source: Energy Information Administration

2007 US Energy Consumption

(quadrillion of BTUs)*

Petroleum	39.818
Natural Gas	23.625
Coal	22.811
Electricity Net Imports	0.106
Nuclear	8.415
Renewables[a]	6.830
Total	**101.605**

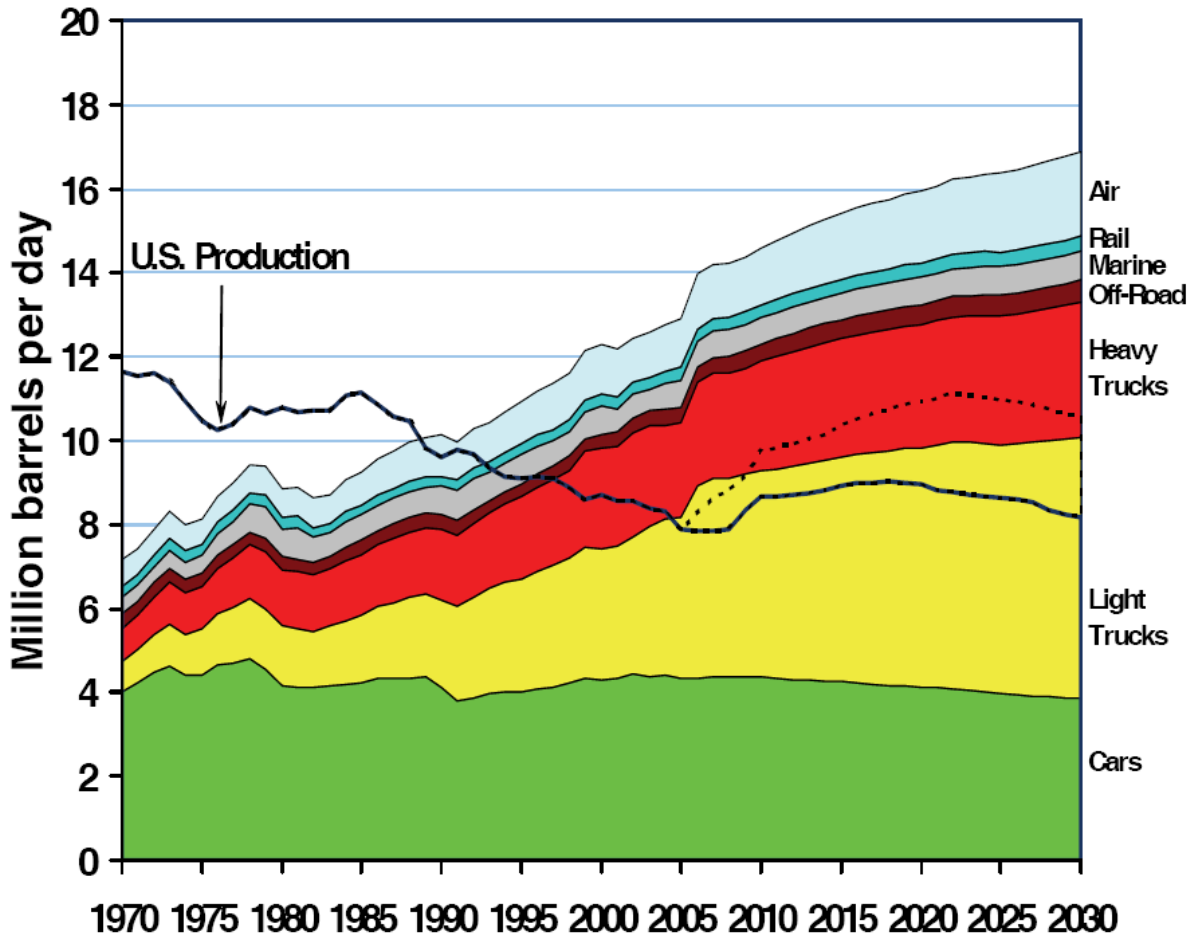
*Source: Energy Information Administration – Preliminary Estimates

[a] includes biomass (biofuels, wood to fuel), geothermal, hydroelectric, solar & wind

Note - BTU conversions vary by type of fuel (i.e. conventional fuel 125,000btu/gal)

US Petroleum Consumption in the Transportation Sector

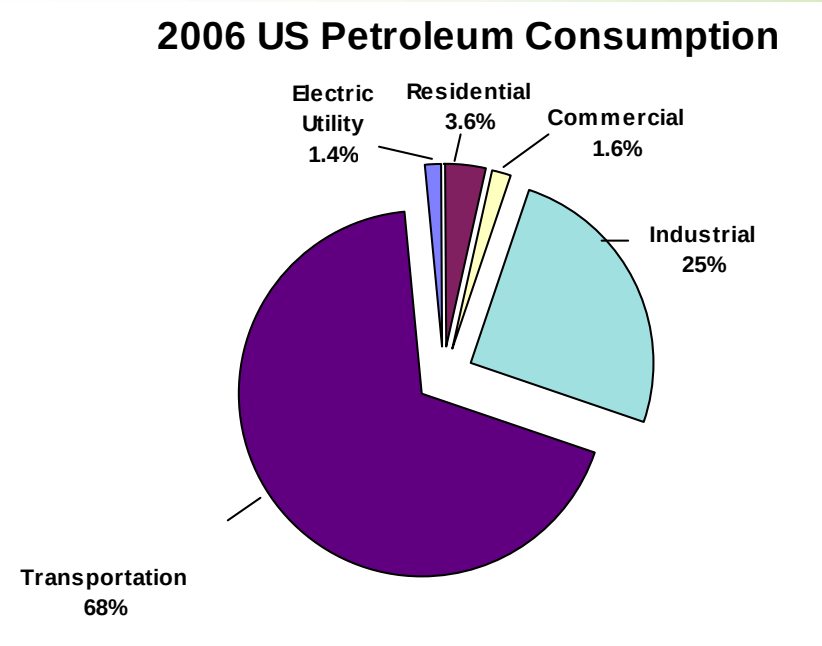
Figure 1.6. United States Petroleum Production and Consumption, 1970–2030

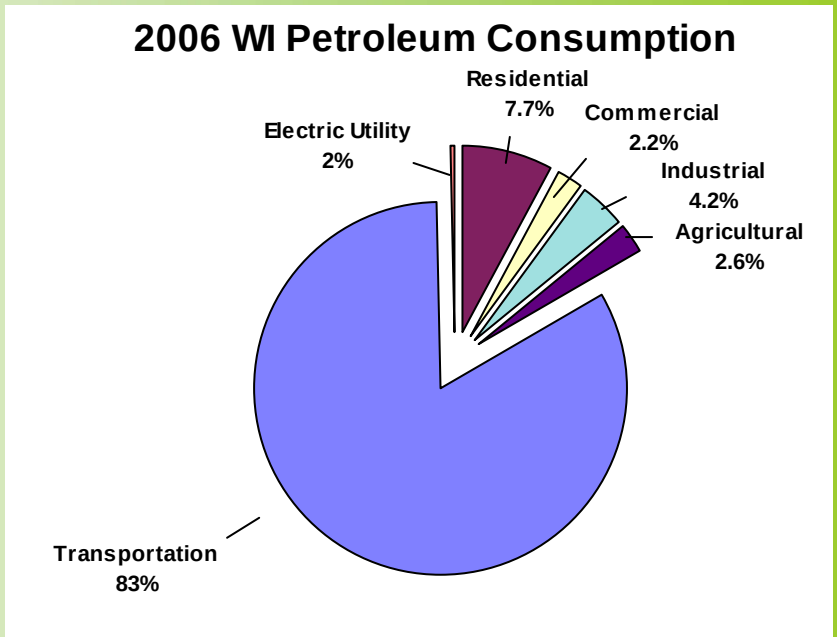


*Source: USDOE - Transportation Energy Data Book – Edition 27

US & WI Petroleum Consumption

(by Sector)





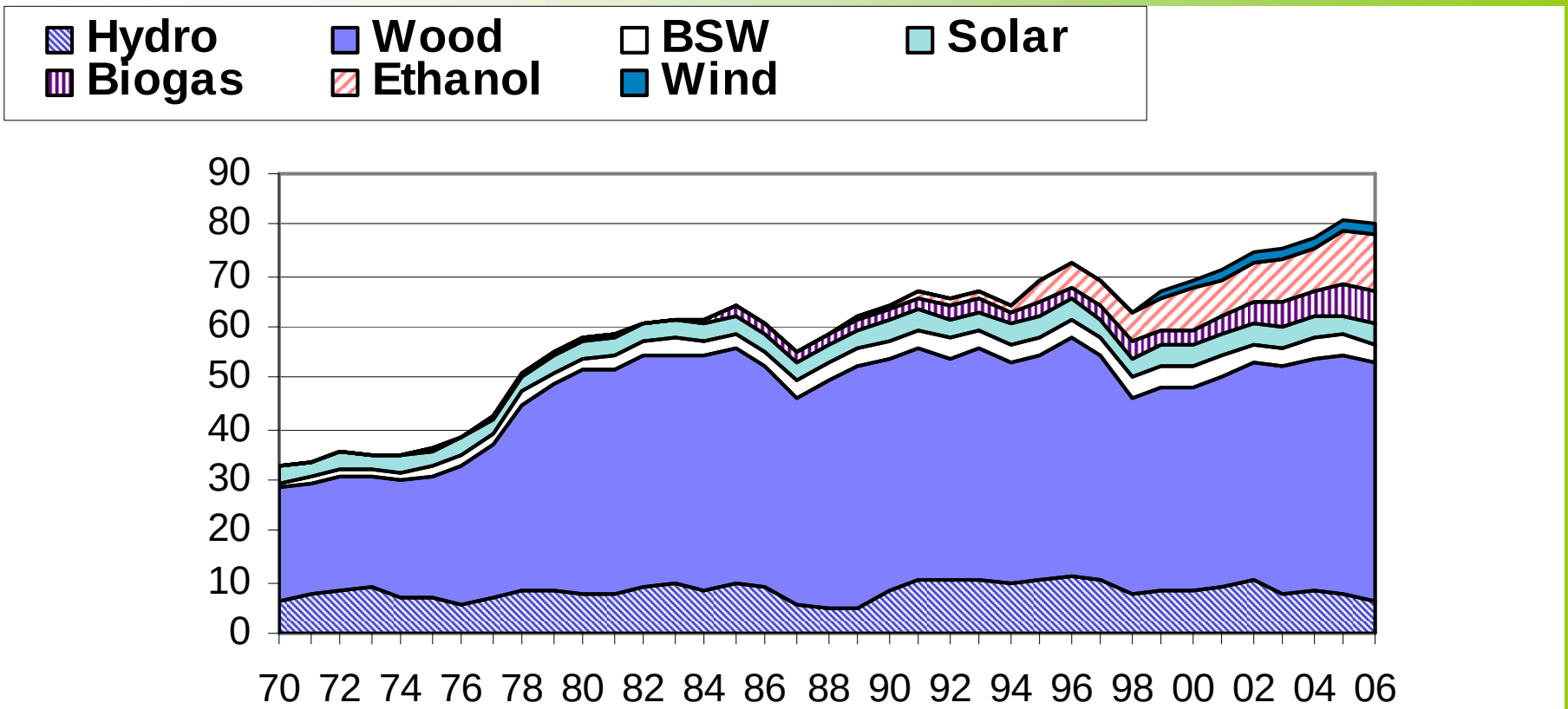
Total = 312 Billion Gallons

Total = 4.1 Billion Gallons

*Source: USDOE: Transportation Energy Data Book – Edition 27

WI Renewable Energy Use

(by Fuel Type, Trillions of BTU)



*Source: 2007 WI Energy Statistics

**BSW – Bio-Solid Waste

US Fuels Consumption in Transportation

Fuel	2006 US (Thousand Gallons/GGE)	2006 WI (Thousand Gallons/GGE)	2007 WI (Thousand Gallons/GGE)
Gasoline	140,146,000	2,390,045	2,431,345 (est.)
Diesel	44,247,000	782,534	780,385 (est.)
LPG	173,130	3,215	2,331
CNG	172,011	215	206
Biodiesel (B100)	260,606	383	809
Ethanol (E85/E10)	3,773,209	130,414	161,235

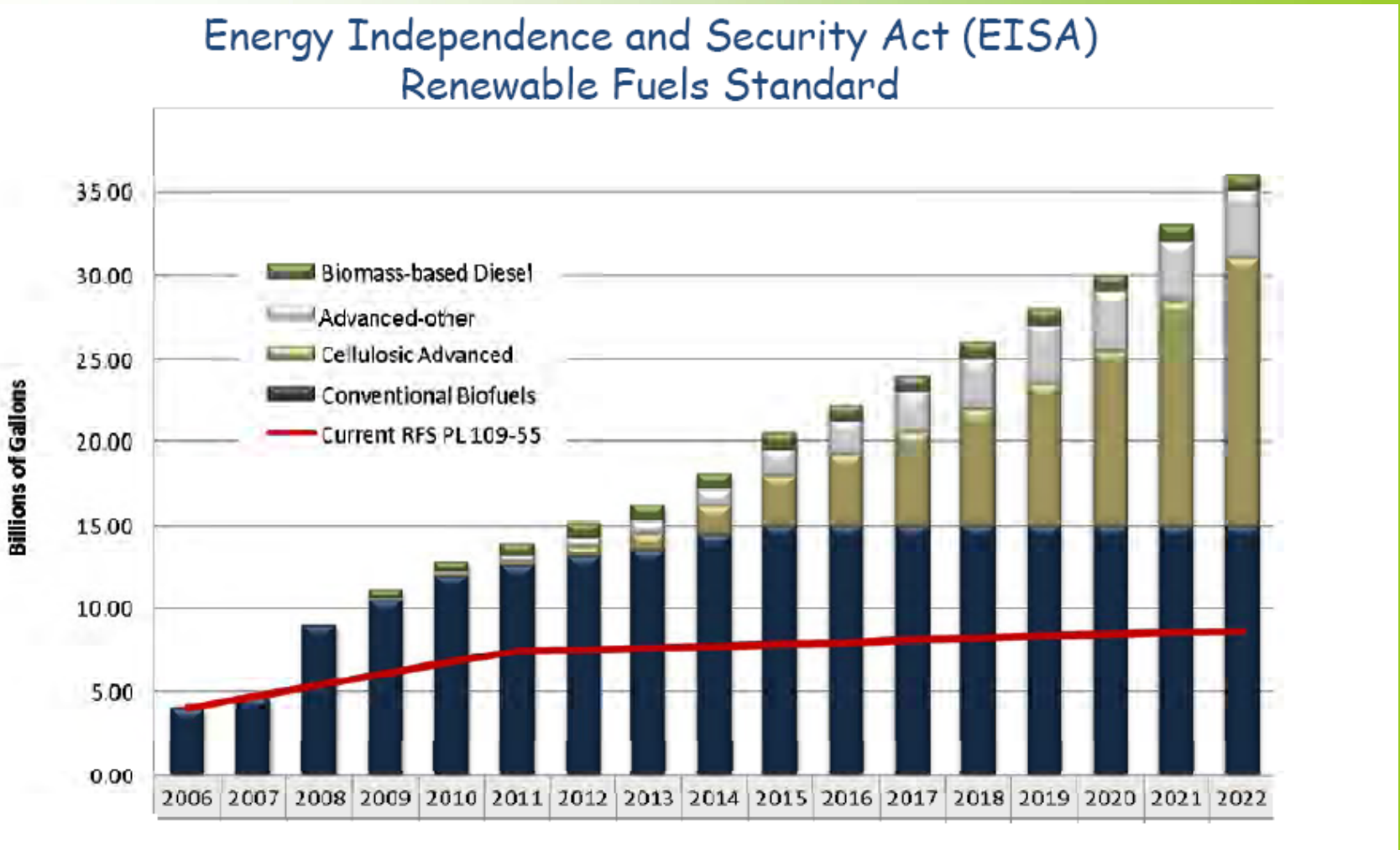
*Source: EIA & WI Alternative Fuel Use Report
** Gasoline Gallon Equivalents

Federal Biofuels Legislation

- Federal
  - Energy Independence & Security Act – RFS

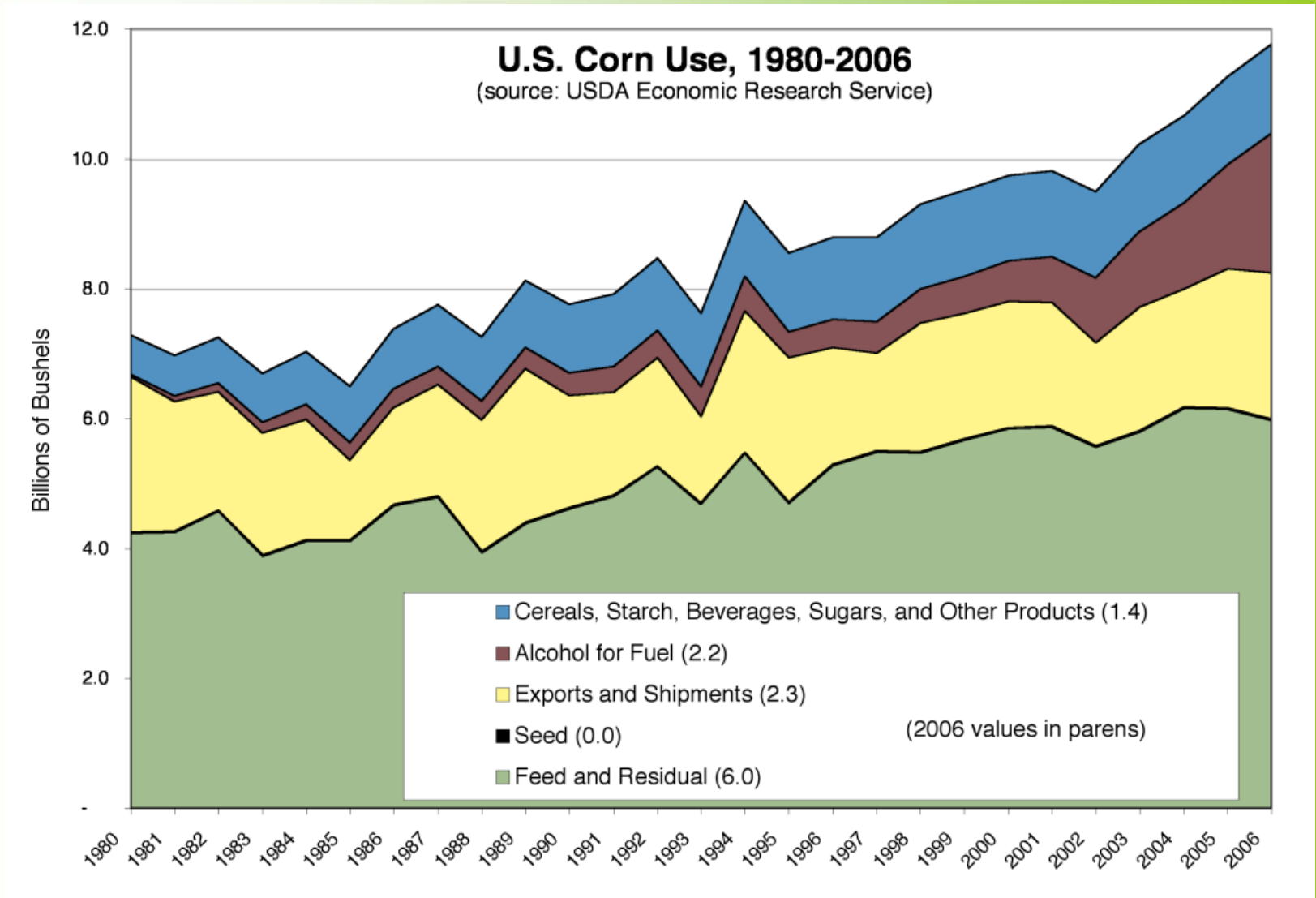
Calendar year	Applicable volume of renewable fuel (in billions of gallons):
2006	4.0
2007	4.7
2008	9.0
2009	11.1
2010	12.95
2011	13.95
2012	15.2
2013	16.55
2014	18.15
2015	20.5
2016	22.25
2017	24.0
2018	26.0
2019	28.0
2020	30.0
2021	33.0
2022	36.0

Federal Renewable Fuels Standard



Feedstock Production

US Corn Use


U.S. Corn Use, 1980-2006
(source: USDA Economic Research Service)
Billions of Bushels
12.0
10.0
8.0
6.0
4.0
2.0
-
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
Cereals, Starch, Beverages, Sugars, and Other Products (1.4)
Alcohol for Fuel (2.2)
Exports and Shipments (2.3)
Seed (0.0)
Feed and Residual (6.0)
(2006 values in parens)

WI Ethanol & Corn

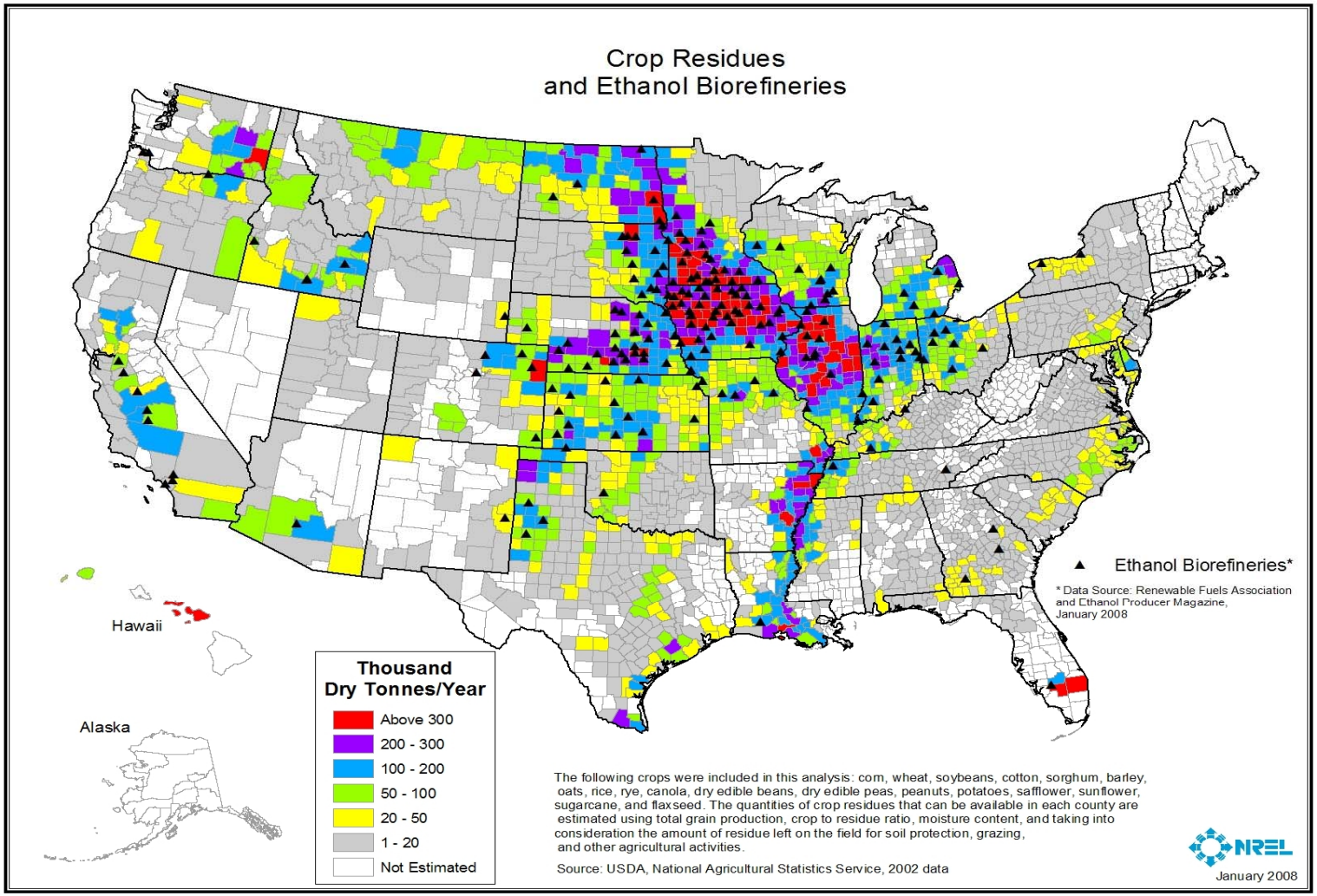
- 2007 Production
  - 442* million bushels of corn
  - ~300 million gallons of ethanol
- ~107 million bushels of WI's corn to ethanol
- ~24% of Wisconsin's corn crop (up 4 % from 2006)

***Source: National Agriculture Statistics Service**

WI Ethanol Future Feedstock Advantage

- Woody Biomass
  - Forestry & Paper industry
- Land for Grasses
  - SE WI
- Dairy Industry
  - “No Whey! Company Converts Cheese Waste into Ethanol”

Resource Availability
(For lignocellulosic ethanol)



WI Biodiesel & Soy

- 2007 Production
  - 51* million bushels of soybeans
  - ~58 million gallons of biodiesel capacity
  - not producing at capacity because of feedstock costs
    - 2007 production estimated at 7.4 million gallons
  - Need for crushing capacity and market development
  - Many plants are using multi-feedstock systems

***Source: National Agriculture Statistics Service**

Emerging Biodiesel Feedstocks

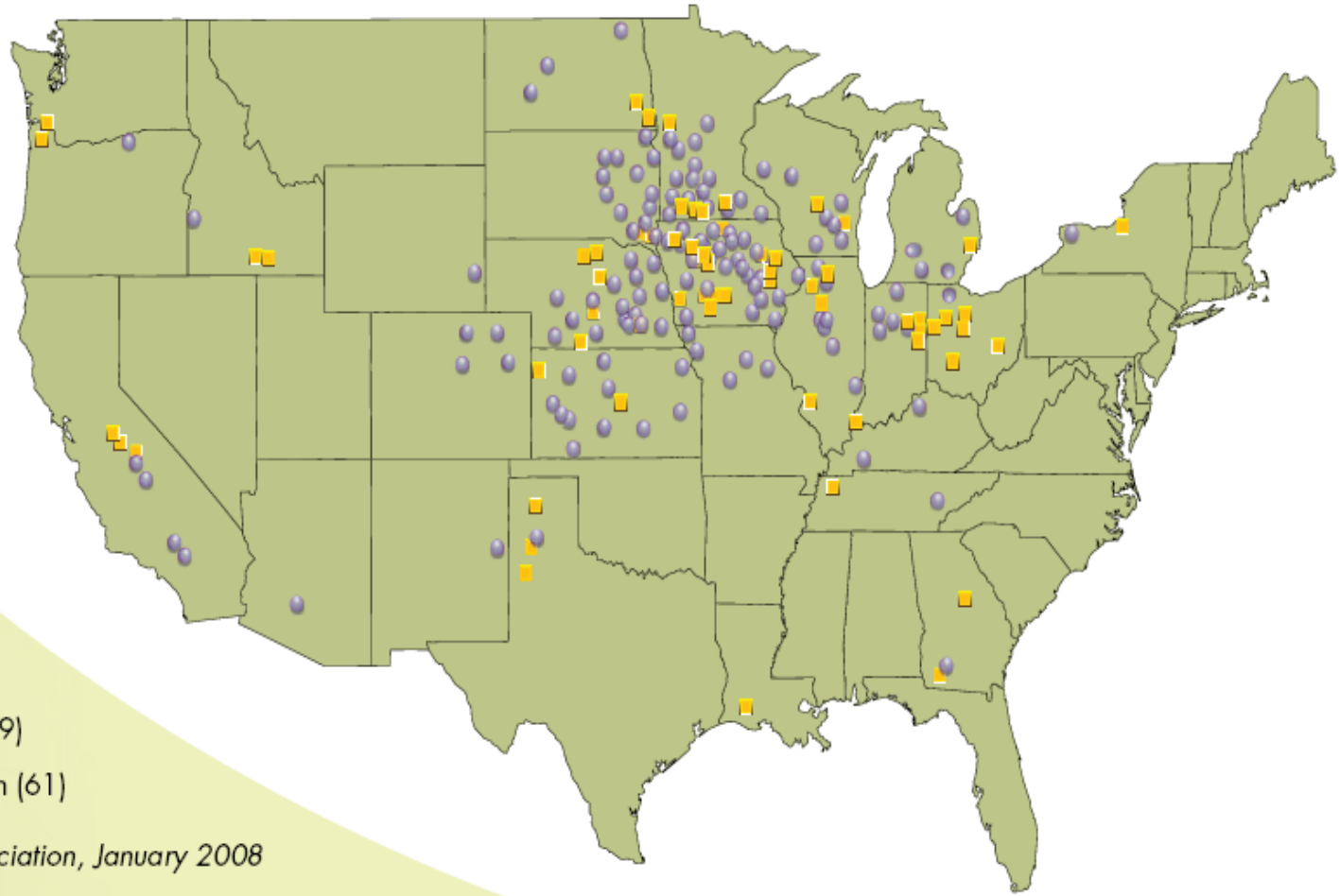
- Waste Vegetable Oil
- Rendered fats & oils
- Corn oil
- Algae

WI Biomass to Biofuels Potential

Supply	**Biomass** (Million Tons/Yr)	**Coal Equivalent** (Million Tons/Yr)
Crop Residues	4,419	3,023
Switchgrass on CRP	3,126	2,125
Forest Residues	2,011	1,367
Hybrid Poplars	2,912	1,980
Primary Mill	1,621	1,102
Secondary Mill	69	47
Urban Wood	548	372
Manure	51	12
Total Fuel Potential	**14.76**	**10.03**

Biofuels Production & Use

US Ethanol Production Facilities



Biorefineries in production (139)

Biorefineries under construction (61)

Source: Renewable Fuels Association, January 2008

US Ethanol Production Capacity

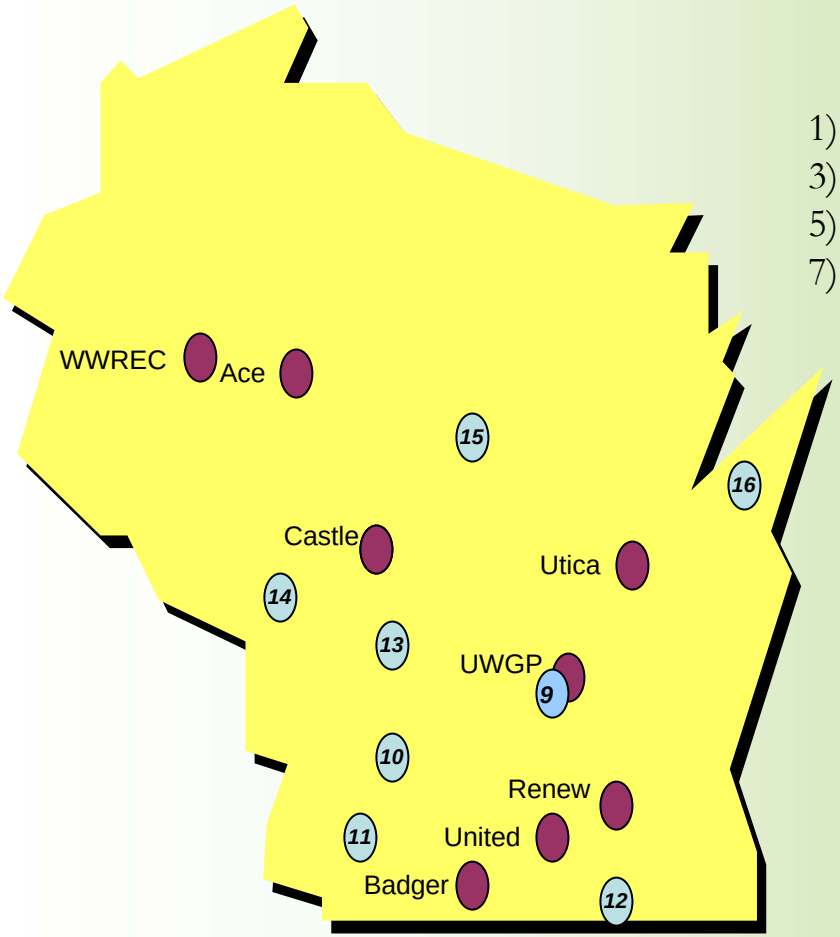
U.S. ETHANOL PRODUCTION CAPACITY BY STATE

In Millions of Gallons

	Online	Under Construction/ Expansion	Total
Iowa	2059	1435	3,494
Nebraska	1143.5	691	1,834.5
Illinois	887	254	1,141
Minnesota	619.6	457.5	1,077.1
South Dakota	683	283	966
Indiana	470	450	920
Ohio	68	470	538
Kansas	432.5	75	507.5
Wisconsin	408	90	498
Texas	100	255	355
North Dakota	123	220	343
Michigan	215	50	265
California	73	155	228
Tennessee	67	138	205
Missouri	201	0	201
New York	50	114	164
Oregon	40	108	148
Colorado	125	0	125
Georgia	0.4	120	120.4
Arizona	55	0	55
Washington	0	55	55
Kentucky	35.4	0	35.4
New Mexico	30	0	30
Wyoming	5	0	5
Louisiana	0	1.5	1.5
Total	7,888.4	5,536	13,424.4

Source: Renewable Fuels Association, January 2008

WI Ethanol Production



8 Operating Ethanol Plants

Current Production Capacity: 473 million gallons

1) Badger Ethanol - Monroe
2) Ace Ethanol - Stanley
3) Utica Energy - Oshkosh
4) UWGP - Friesland
5) WWREC – Wheeler
6) United Ethanol – Milton
7) Renew Energy – Jefferson
8) Castle Rock – Necedah

1 Under Construction

Production Potential: 50 million gallons

9) Didion – Cambria

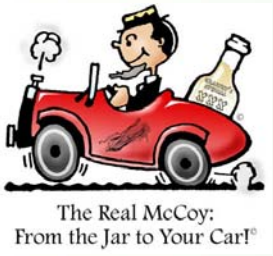
Proposed Ethanol Plants

Proposed Production: 350+ million gallons

10) Arena
11) Belmont
12) Sharon
13) Reedsburg
14) Sparta
15) Wisconsin Rapids
16) Luxembourg

Plant List

http://power.wisconsin.gov



Ethanol Use in Transportation

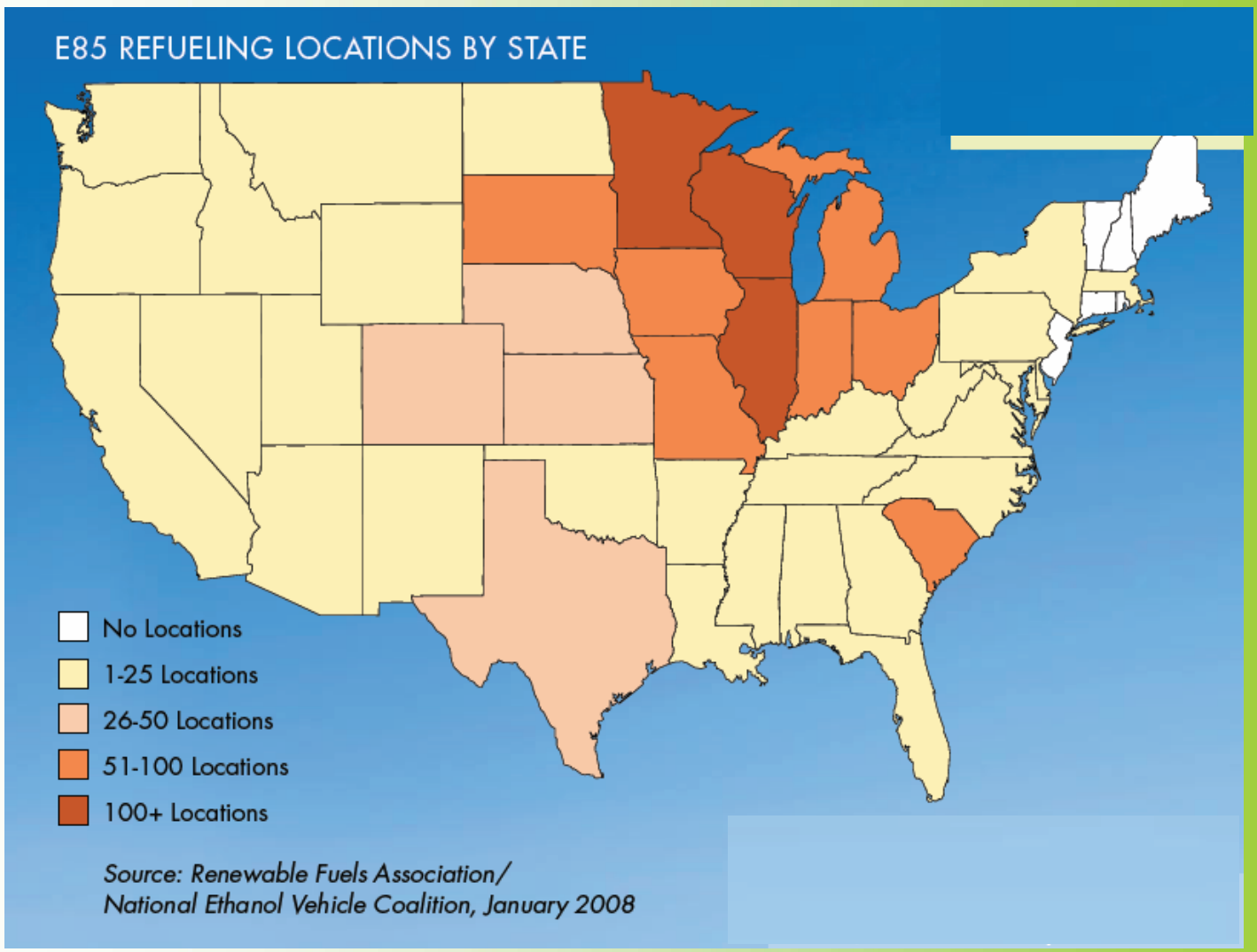
- Two Major Blends
  - E10 – a blend of 10% ethanol & 90% regular unleaded
    - Can be used in all vehicles normally fueled with regular unleaded
    - Offered at nearly 75% of gas stations in WI
  - E85 – a blend of 85% ethanol & 15% regular unleaded
    - Can only be used in a Flexible Fuel Vehicle (FFV)
    - Nearly 50 different models available (http://power.wisconsin.gov)
    - GM Products produced in Janesville, WI – Yukon, Suburban, Tahoe

E85 Vehicle Facts

- There are ~7 million FFVs on US Roadways*
- WI has 141,000 FFVs
  - 3% of national FFV count
  - 2% of all WI registered on-road vehicles
- Many Wisconsin consumers are not aware they are operating an FFV

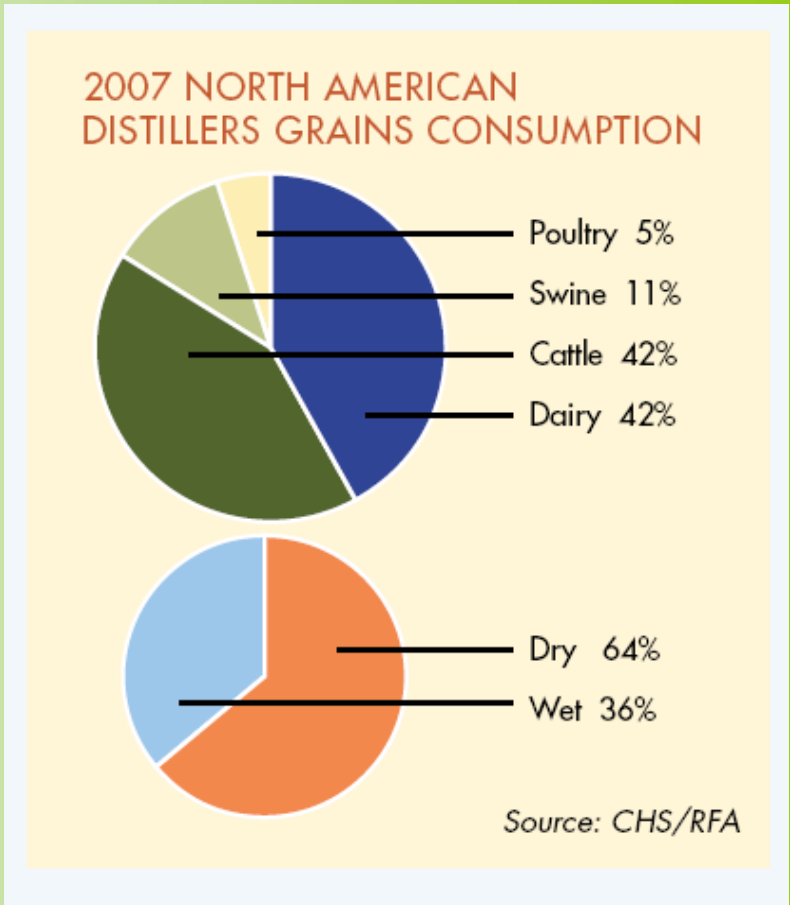
*Source – US Energy Information Administration

US E85 Refueling



Ethanol Co-Products & Primary Markets

- Pure Ethanol (200 proof) – Transportation
- Dried Distiller's Grains (DDGS) or Wet Distiller's Grain (WDGS) - Animal Feed
- Carbon Dioxide - Beverages/Dry Ice
- Syrup - Animal Feed/Energy



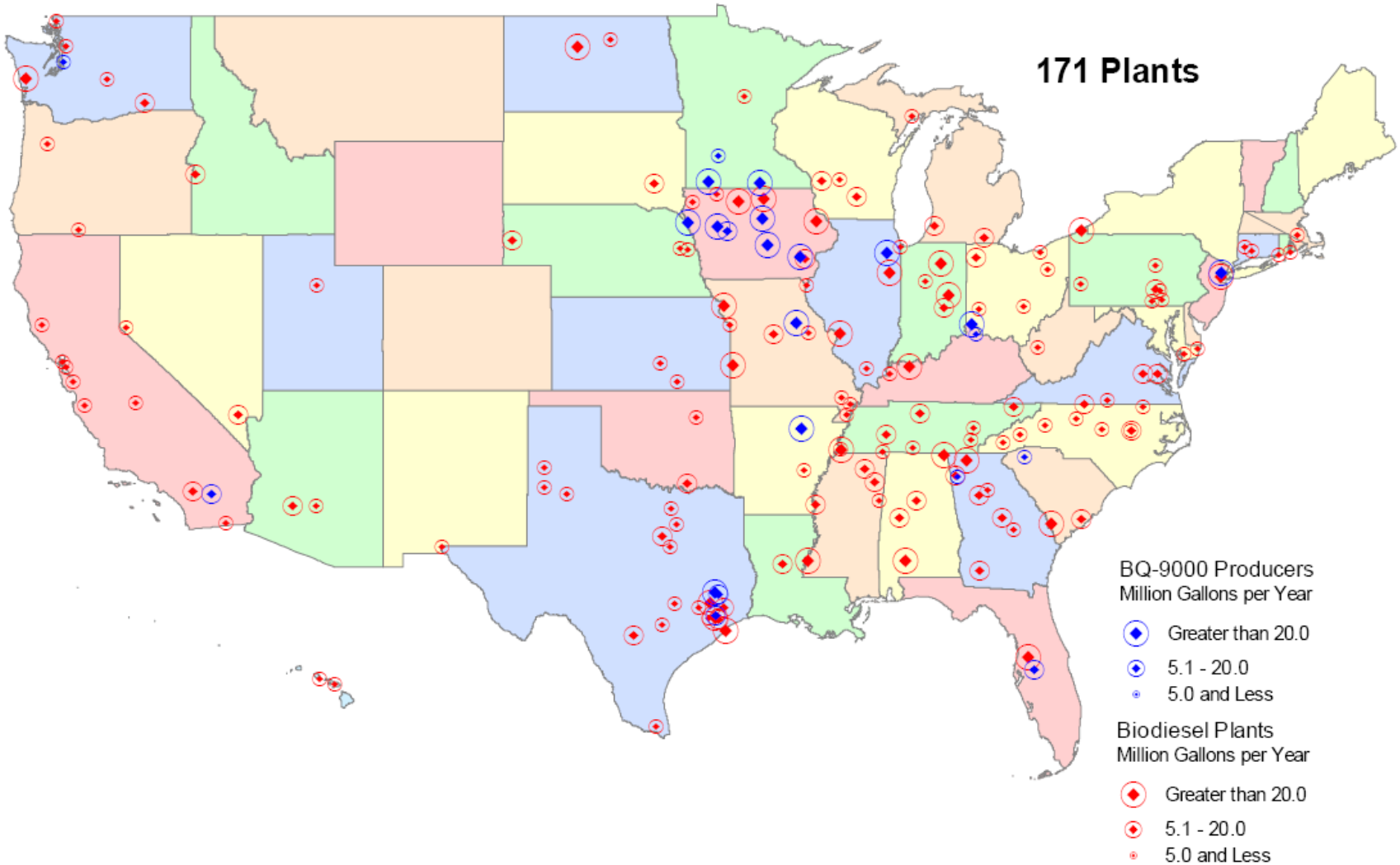
WI E85 Availability and Use

Station Lists and Brochures
http://power.wisconsin.gov

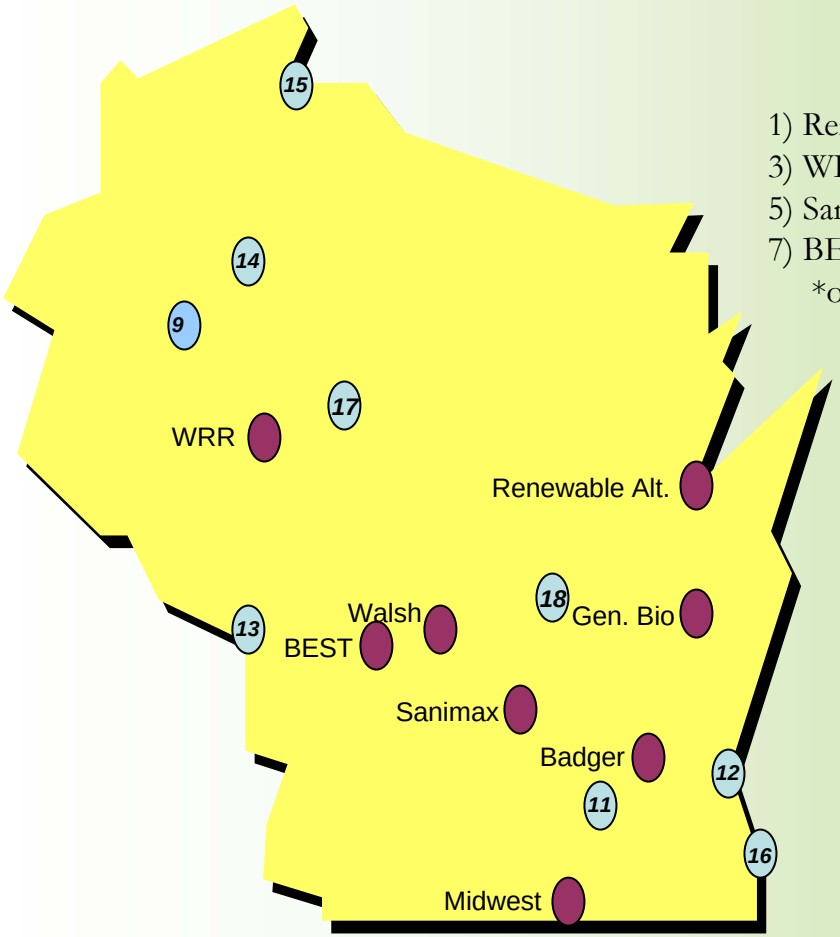
- 111 E85 refueling stations in WI
  - 105 open to the public, 1 private, 5 coming soon
- Wisconsin's E85 use*
  - 2004: 106,000 gallons
  - 2005: 787,000 gallons
  - 2006: 2.7 million gallons
  - 2007: 4.8 million gallons

*Source: Wisconsin Biofuels and Alternative Fuel Use Report

US Biodiesel Production Facilities



WI Biodiesel Production



8+ Biodiesel Plants*

Current Production Capacity: 58 million gallons

1) Renewable Alternatives – Green Bay
2) Generation Bio - Kiel
3) WRR Enviro Services – Eau Claire
4) Badger Biodiesel - Watertown
5) Sanimax Energy – DeForest
6) Walsh Biofuels - Mauston
7) BEST Biodiesel – Cashton
8) Midwest Biofuel – Clinton

*on Farm Producers

1 Under Construction

Production Potential: 3 million gallons

9) Sun Power – Cumberland

8 Proposed Plants

Proposed Production: 76+ million gallons

10) Jefferson
11) Milwaukee
12) La Crosse
13) Spooner
14) Ashland
15) Racine
16) Owen
17) Ripon

Plant List

http://power.wisconsin.gov

Biodiesel Co-Products & Primary Markets

- Biodiesel, B100 (Transportation Sector)
- Glycerin (Soaps, feed supplement)
- Methanol (Recovered,waste)

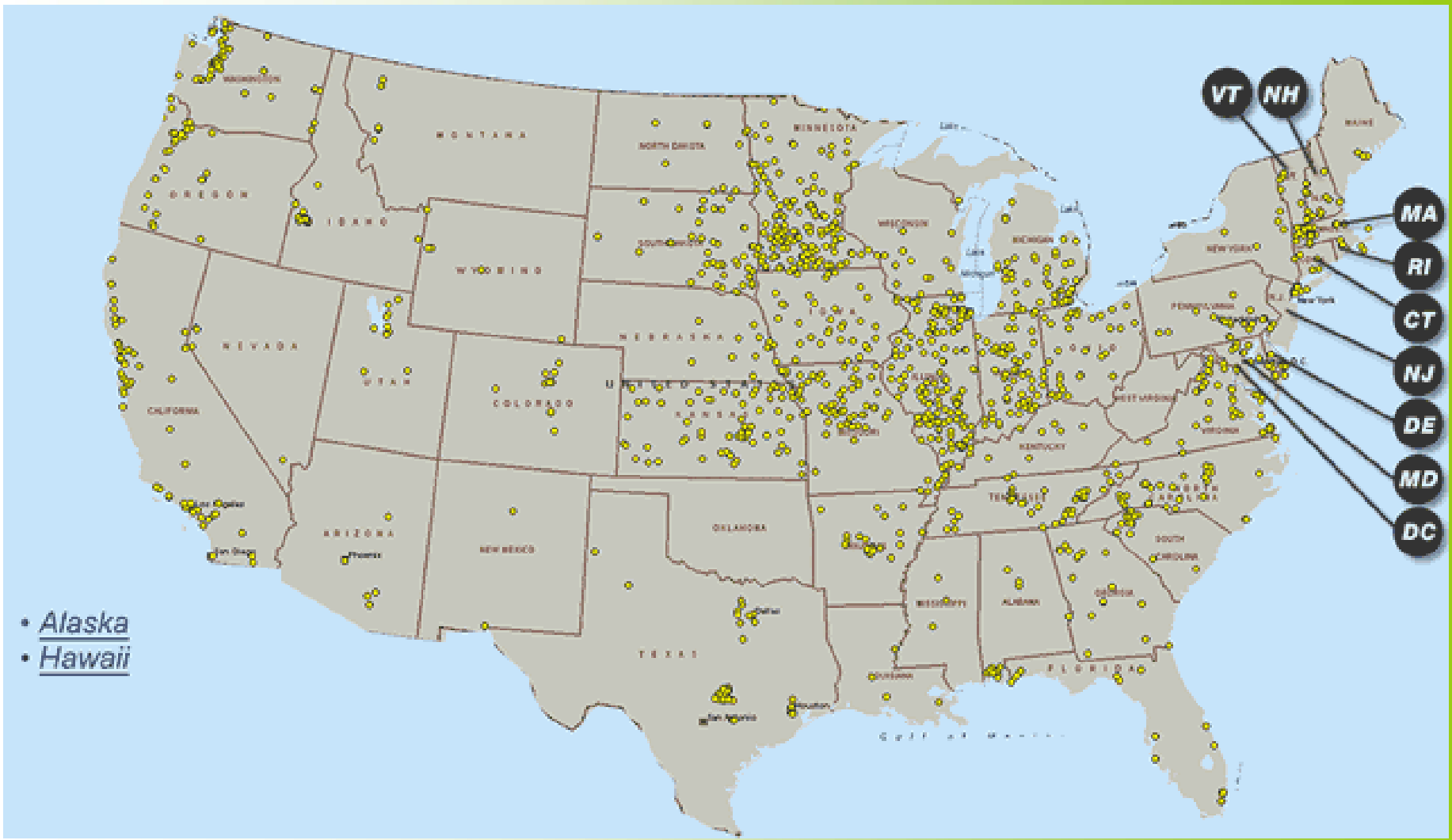
Biodiesel Use in Transportation

- Common Blends (BXX)
  - B5 – a blend of 5% biodiesel & 95% petroleum diesel
  - B20 – a blend of 20% biodiesel & 80% petroleum diesel
  - B100 – Pure biodiesel
  - All blends can go in all diesel vehicles, with little or no modifications

Biodiesel (Diesel) Vehicle Facts

- WI has over 292,000 diesel vehicles
  - 4% of all WI registered on-road vehicles
- Markets for Use
  - School buses, Public transportation, Farm operations, Corporate fleets, Construction equipment, Long-haul trucking

US Biodiesel Refueling



Biodiesel Availability and Use

- 30+ Biodiesel refueling stations in WI
- 23 Biodiesel Distributors
- Blends of B5-100 Available

Station Lists and Brochures
http://power.wisconsin.gov

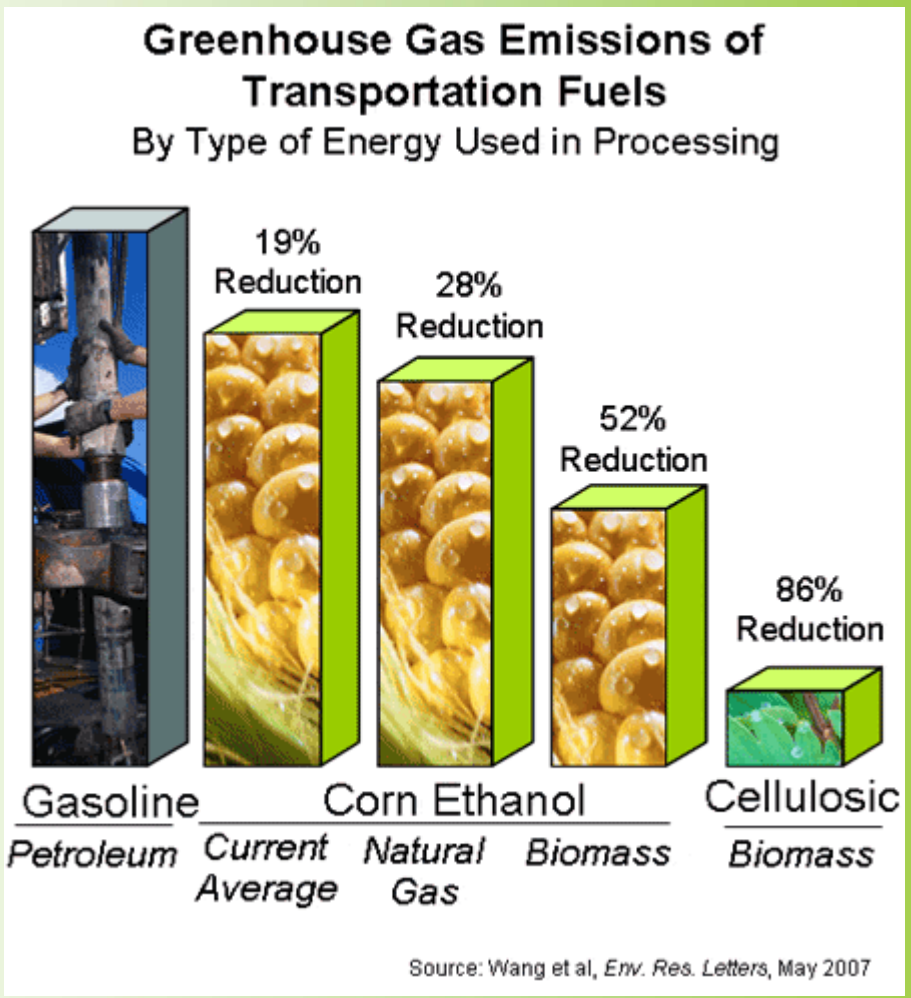




Biofuels Benefits

- Local Economic Impacts
  - Economy & Job Creation Benefits
  - Agriculture, Farmers & Rural Communities
- Energy Security & Independence
- Environment & Clean Air
  - Significantly reduce air pollution and greenhouse gases
- Superior Fuel
  - Lubricity
  - Increase Engine Performance
- Positive Energy Balance

Biofuels Benefits







Biofuels Challenges

- Sustainability/Environmental Impact
- Facilities Growth Limitations
- Integration/Funding of and Feedstocks and New Technology
- Market Forces – commodity/energy prices
- Availability to Consumer

Questions

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