

Addressing the Issues of a Growing Industry

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2007 – A Short But Wild Ride

- Ethanol goes from being the hero of the 2005 EPACT to the villain.
- Organized, calculated campaign to discredit biofuels globally.
- Blistering media coverage and public scrutiny.
- Yet, new RFS increases ethanol demand by 500%!

How Did This Happen?

Factors That Drove Legislation

- Relentless increase in energy costs
- Ongoing tensions in the Mideast
- Ethanol program – one of the few success stories
 - Biofuels the centerpiece of any new legislation
- End of year politics – threat of election year wall

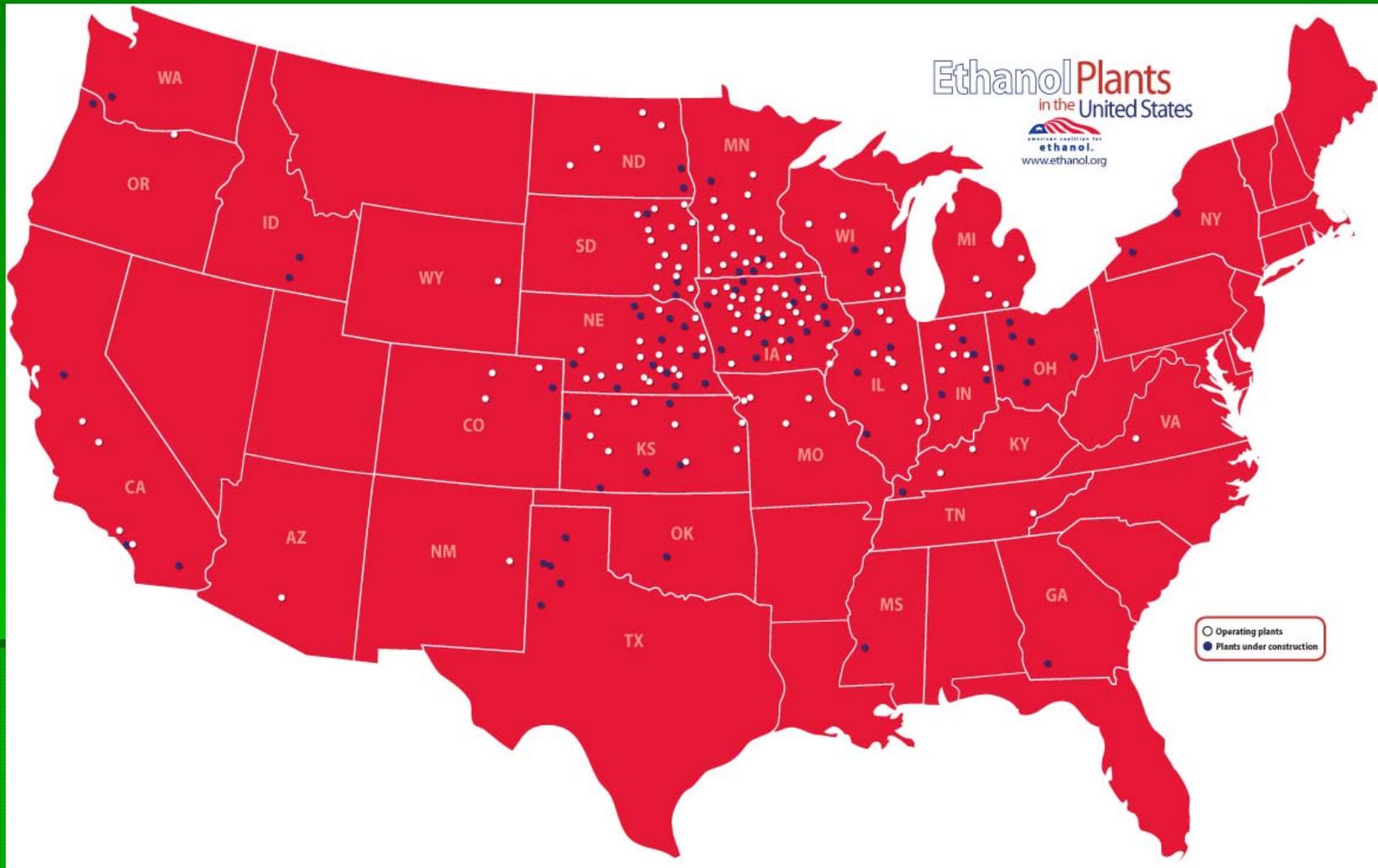
Background

- Energy Policy Act of 2005 established first RFS
 - Replaced oxygen standard
 - Required 4 BGPY increasing to 7.5 by 2012
 - Took effect as MTBE was going out, creating immediate demand of 6 BGPY

Background (Continued)

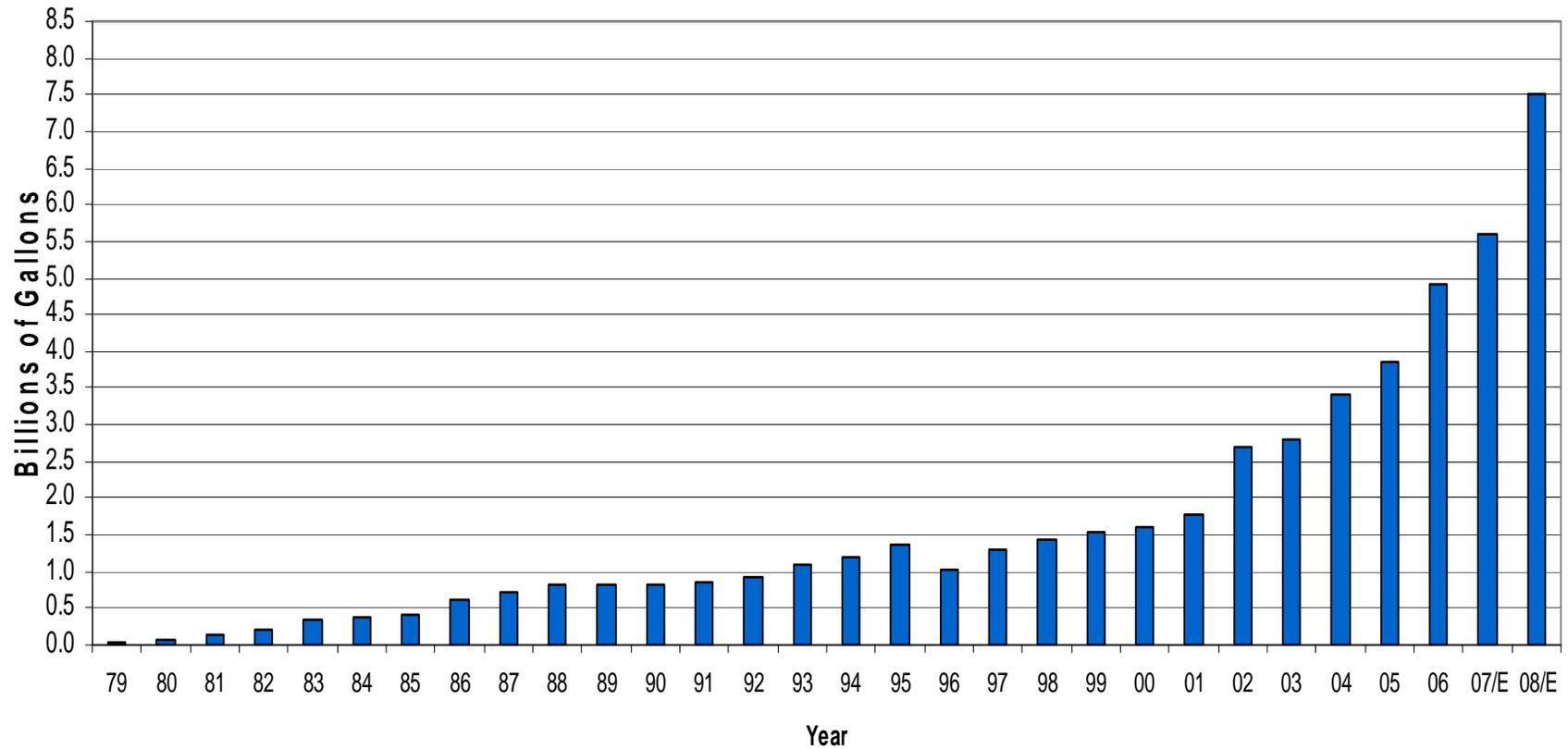
- Modern day Gold Rush
 - Cheap corn + high ethanol
 - Capital Available
 - State and local incentives
- Huge catalyst for economic development
- Incredible political support

Ethanol Capacity



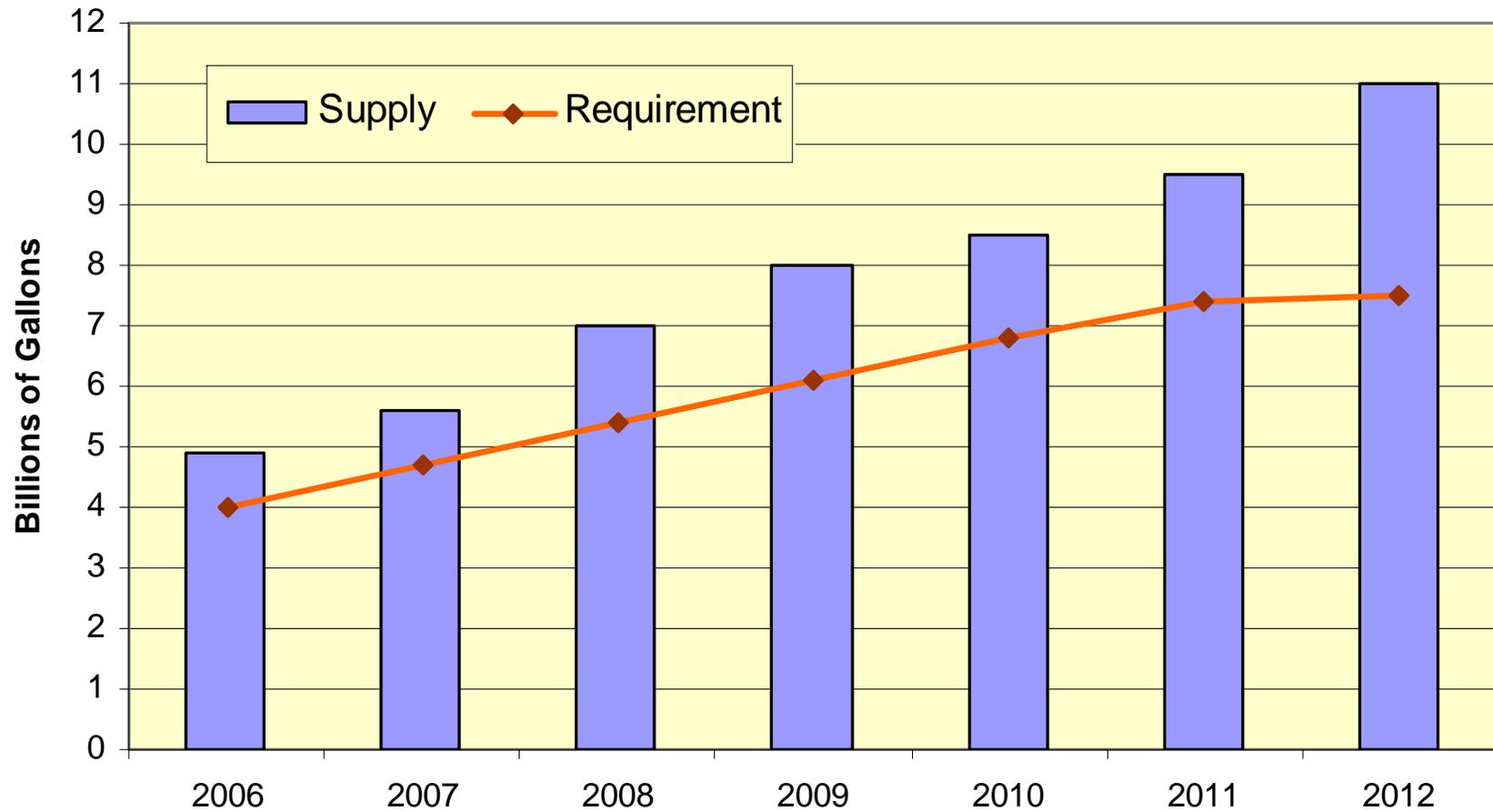
- 131 Current Plants – 7 Billion GPY
- 72 Construction/Expansion – 6 Billion GPY

U.S. Fuel Ethanol Production 1979-2008



Ethanol production estimates based on year-to-date production from U.S. EIA.

Existing/Planned Capacity Quickly Surpassed Requirement



Framework for New Legislation

- Single focus bills like an RFS are almost impossible to pass. Energy legislation has become a balloon flattening exercise that must consider:
 - Impacts on CO₂ emissions, climate change
 - Impacts on the budget/subsidy
 - Impacts on other energy
 - Impacts on food and consumer goods
 - Impacts on trade and foreign policy
- Must also address CAFE
- Alt fuel vehicles and Infrastructure
- Stationary source power/RPS
- Energy balance/lifecycle emissions

The Enemy of the Good is the Perfect

- The panacea problem
 - How much matters:
10% = 15 BGPY = \$38 billion
- The Brazil syndrome
- Accuracy in reporting and assessing
 - Bush “20 in 10” plan
 - Wild, inaccurate reports of biofuel requirement

Intense Criticism

- Oil Industry Unleashed
 - Threatened to stop refinery expansions
 - Ethanol prices grossly under value while collecting tax benefits

- Meat Industry, Other Feeders
 - Well orchestrated campaign to discredit ethanol
 - Energy Balance
 - Water
 - Subsidies
 - Food
 - Emissions – plant and vehicle

New Bill Reflects Carbon and Food Concerns

- Creates 36 BGPY RFS
- Limits corn use
- Requires new sources of ethanol
- Requires reductions in GHG emissions
- Creates E85 initiatives

Almost Didn't Get There: Failure to Communicate

	Senate	House
RFS	Yes	No
RPS	No	Yes
CAFE	Yes	No
Tax Incentives	No	Yes

New RFS Schedule

Year	Total Volume of Renewable Fuels	Advanced Biofuel Requirement	Cellulosic Requirement	(Resulting Cap on Corn ethanol)
2008	9.000			
2009	11.100	.600		10.5
2010	12.950	.950	.100	12.0
2011	13.950	1.350	.250	12.6
2012	15.200	2.000	.500	13.2
2013	16.550	2.750	1.000	13.8
2014	18.150	3.750	1.750	14.4
2015	20.500	5.500	3.000	15.0
2016	22.250	7.250	4.250	15.0
2017	24.000	9.000	5.500	15.0
2018	26.000	11.000	7.000	15.0
2019	28.000	13.000	8.500	15.0
2020	30.000	15.000	10.500	15.0
2021	33.000	18.000	13.500	15.0
2022	36.000	21.000	16.000	15.0

Advanced Renewable Fuels

- All non-corn starch based grains
 - Wheat, sorghum, barley, rye, oats
- Sugarcane crops and bagasse
- Cellulose
 - Switch grass
 - Corn Stover
 - Grain fiber/hulls
 - Straw
 - Wood
- Lignin
 - More complex structure
- Waste Feedstocks
 - Ag, MSW, Forest

New Renewable Diesel Requirements

Calendar Year	Applicable Volume of Biomass-Based Diesel (in millions of gallons)
2009	500
2010	650
2011	800
2012	1.0

Farm Bill Playing a Key role on Biofuels

Title VII Research, Title IX – Energy

- Reauthorizes the Biomass R, D & D Programs
- Cooperative programs with DOE for Biofuels, Biorefinery Development
 - Loans, Loan guarantees, grants –
 - Bio Refinery and Repowering Assistance
 - *\$422MM*
- Biomass Crop Transition Assistance
 - *\$227 MM*
- Biomass Feedstock Purchase Assistance for Advanced Biofuel
 - *\$345 MM*
- Other Assorted Programs

Tax Title Critical to Cellulosic Ethanol

- New total for cellulosic ethanol of \$1.25
 - Base VEETC plus difference (.51 + .64)
- No Small Producer cap = additional 10 cents
 - (No 15 MGPY limit, no 60 MGPY plant cap)
- Includes all “Biofuels” for credit
- Accelerated depreciation of property

Selected Companies Developing Ethanol From Lignocellulosic Feedstocks

Company/Location	Feedstocks	Technology
Abengoa (Madrid)	Corn stover, wheat straw, milo stubble, switchgrass	Enzymatic hydrolysis; fermentation; thermochemical
ALICO (La Belle, Florida)	Wood, citrus waste, urban green waste	Thermochemical: gasification; fermentation
Bioengineering Resources (Fayetteville, Arkansas)	Urban green waste, wood chips, car tires, plastics	Thermochemical: gasification; fermentation
BlueFire Ethanol (Irvine, California)	Urban trash, rice and wheat straws, wood waste	Concentrated acid hydrolysis
ClearFuels Technology (Aiea, Hawaii)	Sugarcane bagasse	Thermochemical: steam reformation (similar to gasification); modified Fischer-Tropsch
Colusa Biomass Energy (Colusa, California)	Waste rice straw, rice hulls	Enzymatic hydrolysis; fermentation
Coskata (Warrenville, Illinois)	Undisclosed	Microbial

Selected Companies Developing Ethanol From Lignocellulosic Feedstocks (Continued)

Company/Location	Feedstocks	Technology
Earthanol (Irvine, California)	Undisclosed	Undisclosed
Flambeau River Biorefinery (Park Falls, Wisconsin)	Spent pulping liquor	Alcohol sulfite cooking liquor to fractionate softwood chips; fermentation/CM
ICM, Inc. (Missouri)	Agricultural residues, such as corn fiber, corn stover, switchgrass and sorghum.	will integrate biochemical and thermochemical processing and demonstrate energy recycling within the same facility
Iogen (Ottawa, Canada)	Wheat straw, barley straw, corn stover switchgrass, rice straw	Enzymatic hydrolysis; fermentation (<i>Trichoderma reesei</i>)
Lignol Innovations (Colorado)	Wood chips, corn stover, switchgrass	Enzymatic hydrolysis; fermentation

Selected Companies Developing Ethanol From Lignocellulosic Feedstocks (Continued)

Company/Location	Feedstocks	Technology
Mascoma (Cambridge, Massachusetts)	Switchgrass, wood	Enzymatic hydrolysis; fermentation
Pacific Ethanol Inc. (Oregon)	Agricultural and forest product residues	BioGasol's proprietary conversion process
Poet (Sioux Falls, South Dakota)/DuPont (Wilmington, Delaware)	Corn fiber, corn cobs	Enzymatic hydrolysis; fermentation
Range Fuels (Georgia)	Wood residues	Thermochemical: gasification; undisclosed catalyst
Stora Enso's (Wisconsin Rapids, Wisconsin)	wood wastes	Fischer-Tropsch diesel fuel.
Verenium (Cambridge, Massachusetts)	Sugarcane bagasse, wood	Enzymatic hydrolysis; fermentation
Western Biomass Energy (Upton, Wyoming)/ KL Process Design Group (Rapid City, South Dakota)	Wood chips, wood waste	Enzymatic hydrolysis; fermentation

Where Will the Ethanol Go?

- E10 – all U.S. gasoline = 15 billion gallons

- E85

- 8 million FFVs by 2009 – 6 BGPY
- If only half use E85 – 3 BGPY
- If only half, half the time – 1.5 BGPY

- 16 million FFVs by 2012 – 12 BGPY
- If only half use E85 - – 6 BGPY
- If only half, half the time – 3 BGPY

Where Will the Ethanol Go?

- Mid-Level Blends -- E-20 - E-40
 - Plus
 - Potentially increases blend market within existing infrastructure
 - Builds on current customer base
 - Minus
 - Not approved above 10%
 - Unknowns:
 - Emissions
 - Parts compatibility
 - Refueling compatibility
 - Small engines

Where Do We Go From Here?

- Climate change/global warming remains a key issue
- Senate: Liberman – Warner
 - Cap and trade
 - Low Carbon Fuel Standard
- House: Dingell and Energy Committee
 - California Preemption issue
 - At odds with Pelosi/Boxer
- Opportunities for Ethanol
 - E85 – major CO₂ reduction
 - E10 – Additional value over RFS, octane
 - Credits to be generated from repowering

Consensus to act, disconnect on how.
Wait until next (non) election year!

Thank you!

For more information log on to

www.cleanfuelsdc.org

www.ethanolacrossamerica.net