

“Investing in New Fuels and Vehicles: New Players, New Paradigms”

Session 686

Sponsored by

Committee on Transportation Energy (ADC70)

Committee on Alternative Transportation Fuels (ADC80)

CILION

fueling change.

In the Driver’s Seat: Private Sector Leadership in Bio-Fuel Innovation

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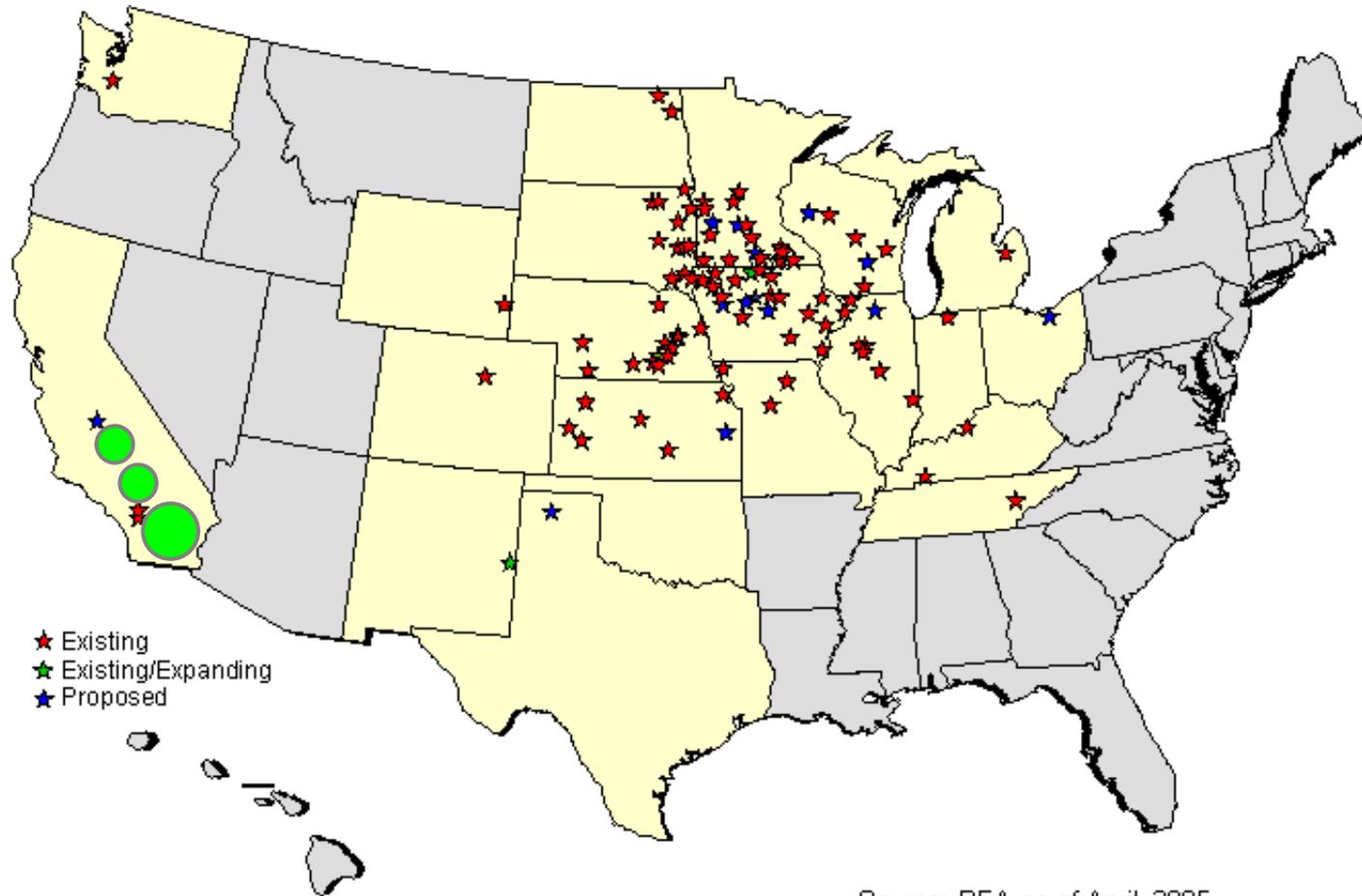


Yucaipa



Explosive Growth in Bio-Ethanol

U.S. ETHANOL MANUFACTURING LOCATIONS

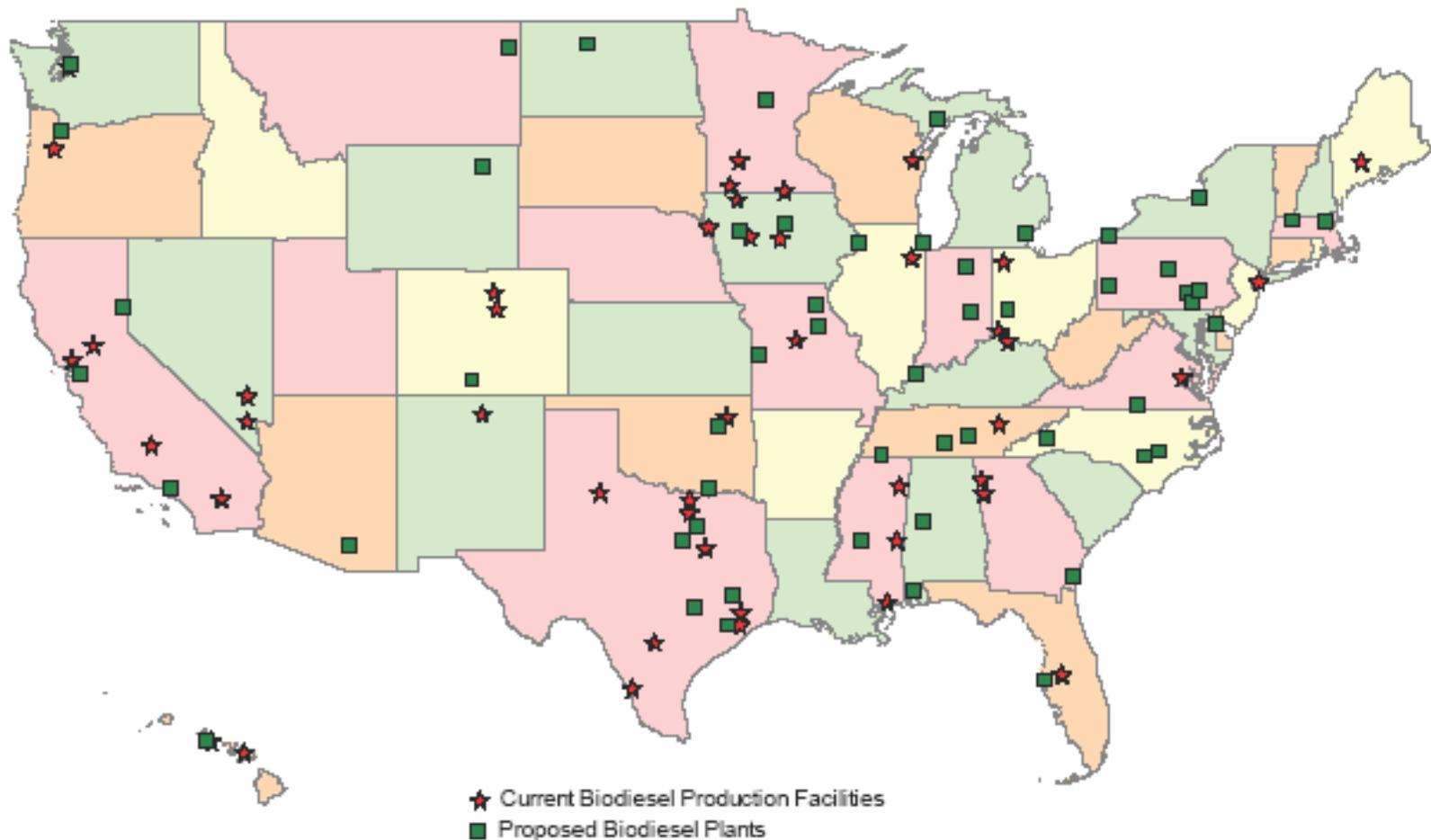


Source: RFA as of April, 2005

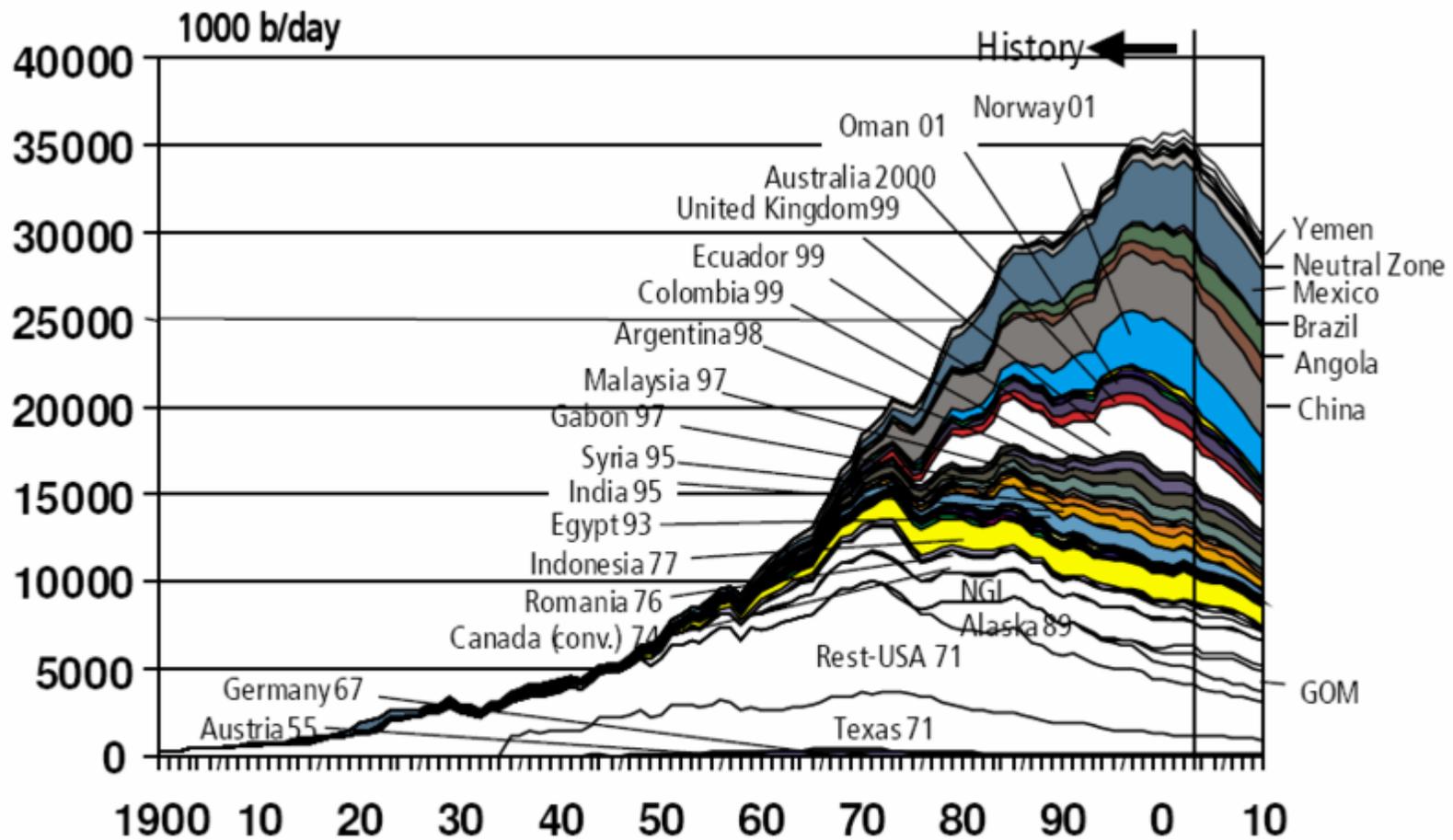
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Same Story in Biodiesel

September 2005



The Era of Abundant, Secure, Cheap Oil is Over



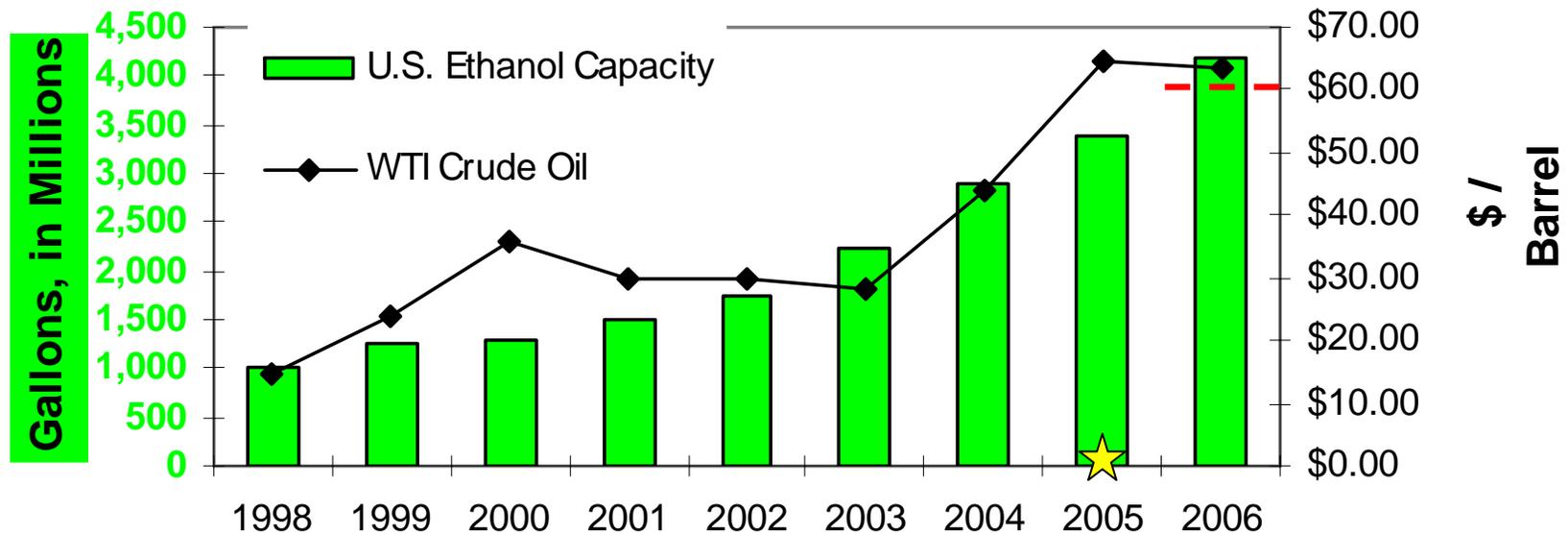
Source: Industry database, 2003 (IHS 2003)
 OGJ, 9 Feb 2004 (Jan-Nov 2003)

A New Era of Energy Pricing



Bio-Fuels are Market Driven

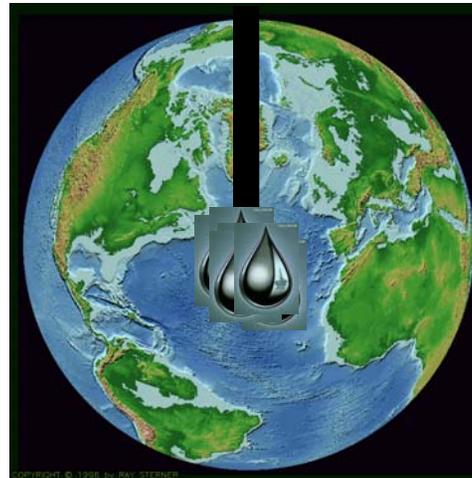
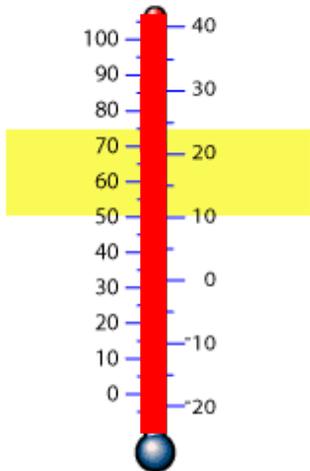
U.S. Ethanol Capacity and Crude Oil Price



★ Energy Act 2005, Creation of Renewable Fuels Standard (RFS)

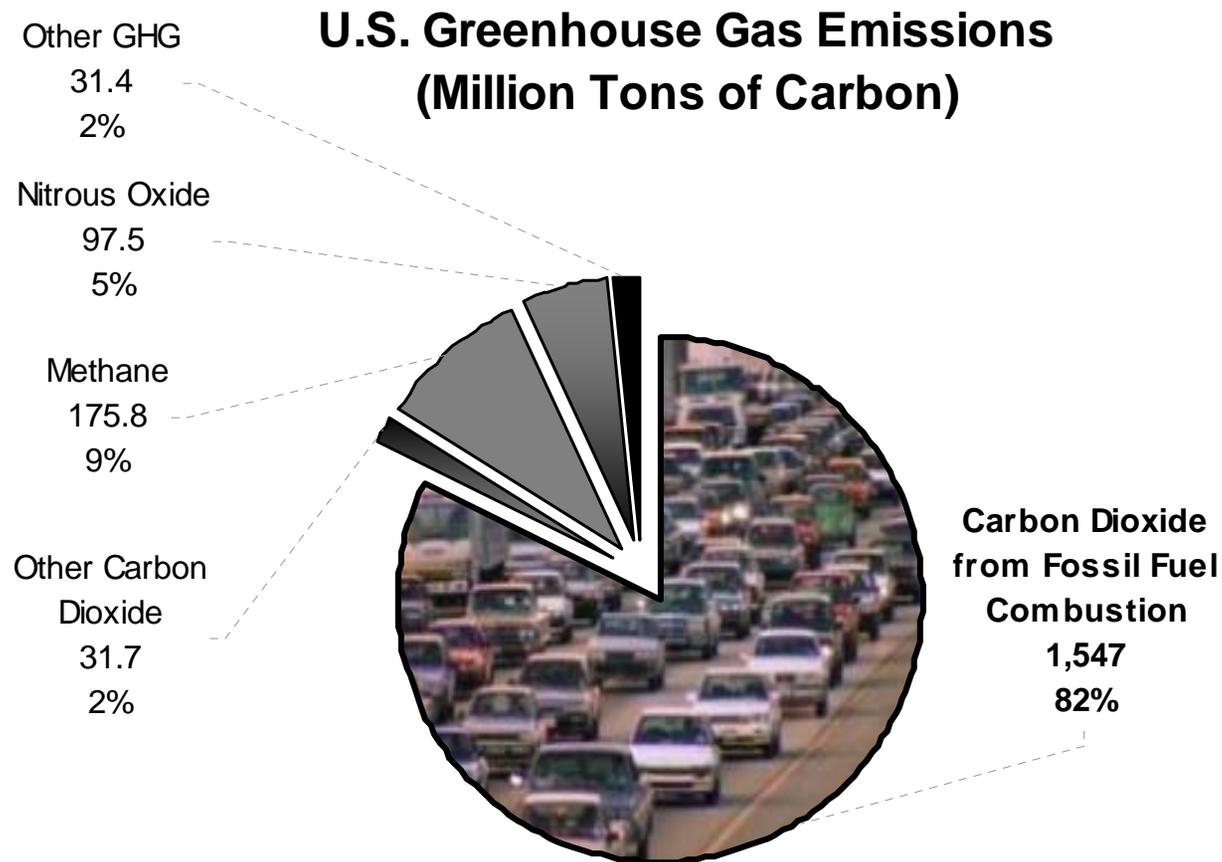
--- RFS for 2006. RFS 2012 = 7.5 Billion Gallons, will be Exceeded

Extractive Fossil Fuels are Environmentally Obsolete



Note: In this diagram, ocean levels are 23 feet higher.

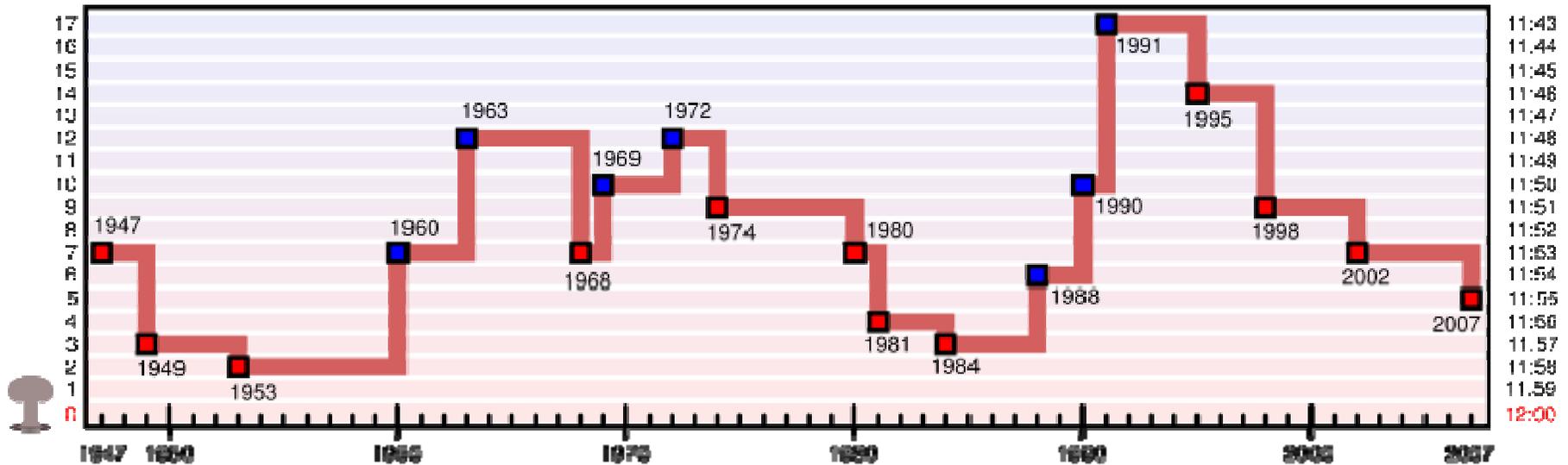
Fossil Fuel Combustion is the Major Contributor to U.S. Emissions



Source: U.S. Energy Information Agency

Board of Directors Bulletin of the Atomic Scientists University of Chicago

Doomsday Clock: Minutes to Midnight, 1947-2007



Doomsday Clock 2007

2 Minutes Closer to Midnight

"...Perils we foresee if governments and societies do not take action now to render nuclear weapons obsolete and to *prevent further climate change.*"

-Stephen Hawking, January 17, 2007

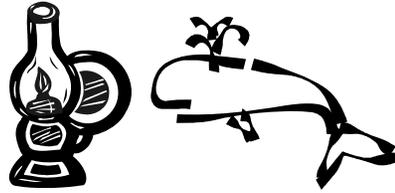
Bio-fuels are Energy Evolution

ILLUMINATION

WOOD FIRE



WHALE OIL



KEROSENE



ELECTRICITY



TRANSPORT

ANIMAL



SAIL



COAL

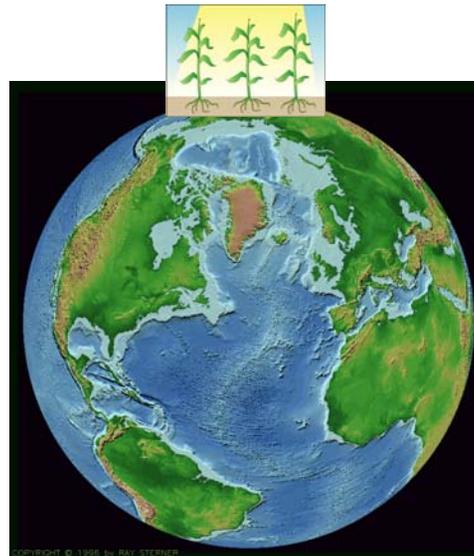
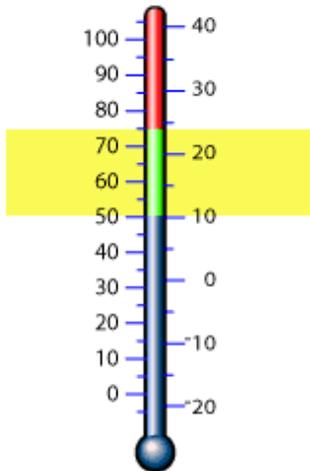


PETROLEUM

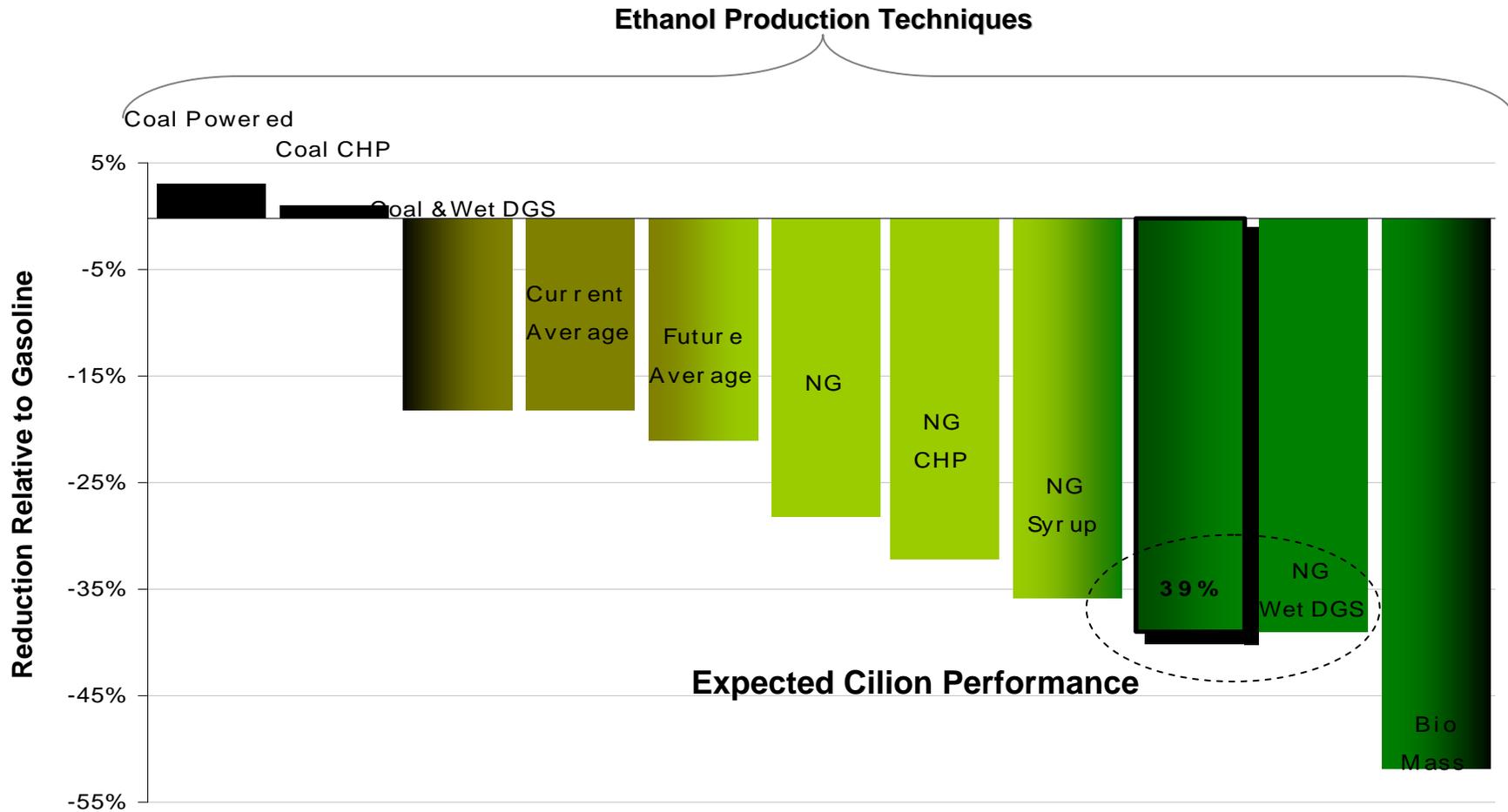


Improved Safety, Affordability, Power, and Reliability

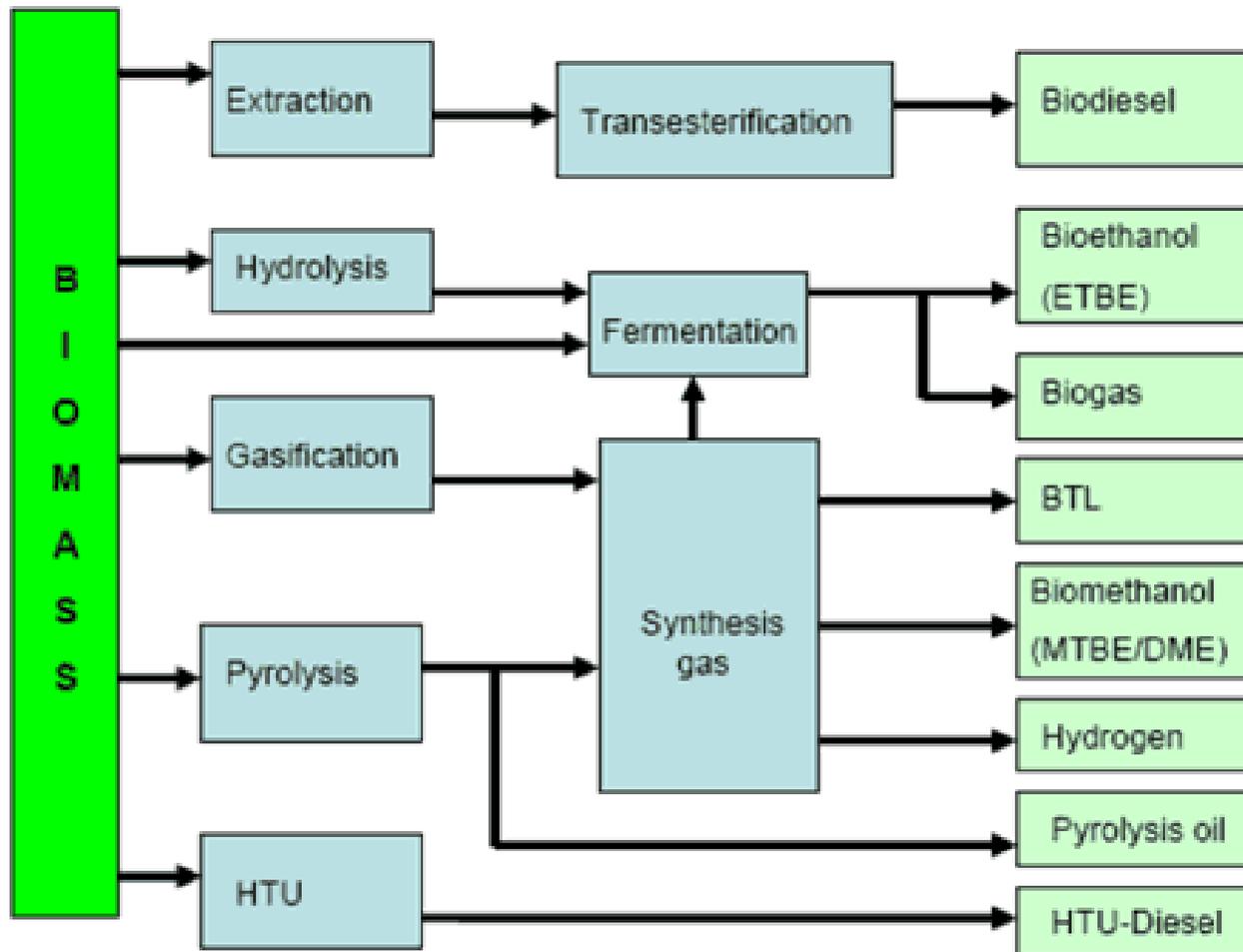
Bio-fuel: Renewable and Carbon Neutral



Ethanol Production and Green House Gases



Source: Argonne National Laboratory
 16th International Symposium on Alcohol Fuels
 Rio de Janeiro, Brazil, Nov. 27-29, 2006



- **Biomass is:**
 - **Currently 11% World Energy Supply**
 - **Potential 68% of World Energy, Renewable Organic Production**

Source: Zero Emission Resource Organization

Low Switching Cost



No Additional Cost for Flex Fuel Vehicle (unlike Hybrids)

Saab 9-5 Flex Fuel, 15% boost to E85 Fuel Efficiency on Highway

Low-Tech Solution



Off-the-Shelf Delivery Network

Proven Strategy: Brazil

The National Ethanol Program in Brazil, initiated in 1975, lowered Crude Oil imports 59%.

Brazil no longer offers subsidies to Ethanol Producers, the industry generates sustainable profit.

Ethanol, on average, costs \$0.50 less per gallon than imported gasoline.

Brazil, U.S, Latin America, Caribbean become the Saudi Arabia of Ethanol



Durable Economics

Midwest Ethanol, EBIT / Gallon

		Corn (Chicago Board of Trade, \$ / Bushel)					
		\$1.50	\$2.00	\$2.50	\$3.00	\$3.50	\$4.00
Gasoline	\$1.50	\$0.64	\$0.46	\$0.29	\$0.11	(\$0.07)	(\$0.25)
	\$2.00	\$1.14	\$0.96	\$0.79	\$0.61	\$0.43	\$0.25
	\$2.50	\$1.64	\$1.46	\$1.29	\$1.11	\$0.93	\$0.75
	\$3.00	\$2.14	\$1.96	\$1.79	\$1.61	\$1.43	\$1.25
	\$3.50	\$2.64	\$2.46	\$2.29	\$2.11	\$1.93	\$1.75
	\$4.00	\$3.14	\$2.96	\$2.79	\$2.61	\$2.43	\$2.25

Future Improvements to Cost Structure:

- + Booming R&D (Distillation, Yeast, Milling, Oil Extraction)
- + Cooperation with Biomethane and Biomass
- + Destination Model and Infrastructure Improvements
- + Genetically Modified Corn, Algae, and other Inputs

Bio Ethanol. Today's Solution for Tomorrow's Energy

