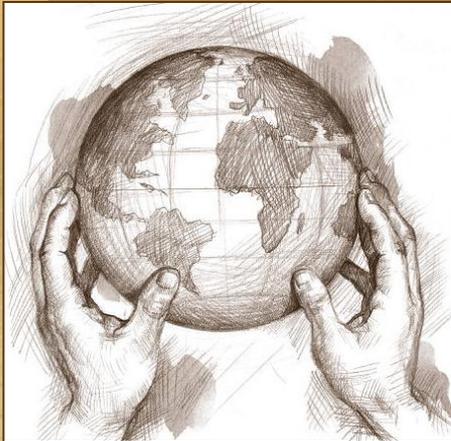


NPE Holdings, LLC

Presentation to

Commonwealth of Virginia State Assembly Energy Committee

August 15, 2011



**Turning Waste into
Energy**

The Global Energy Picture Looks Very Bleak:

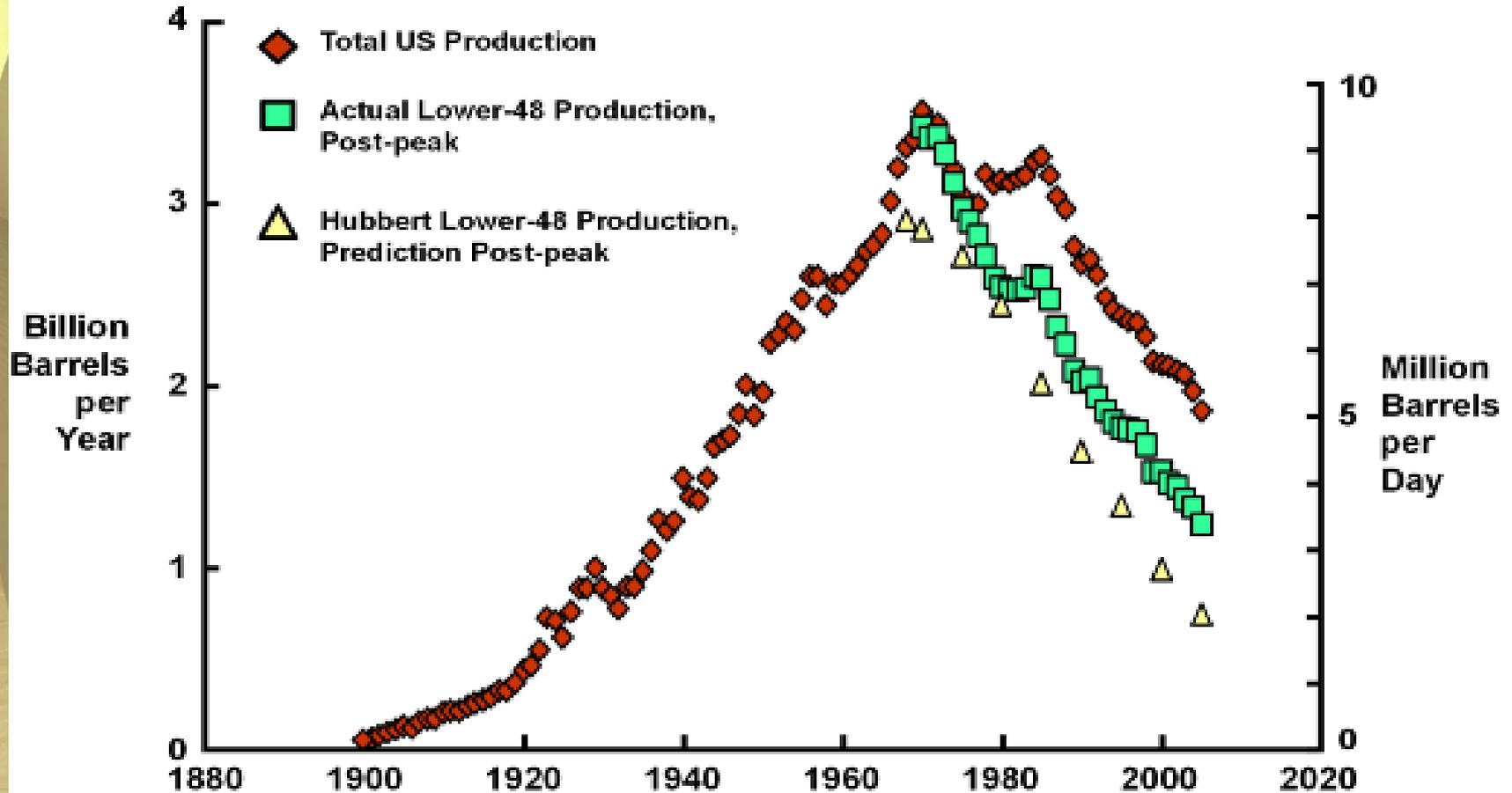


- **By most accounts, the discovery/capacity to produce oil has peaked** – IEA World Energy Outlook, 2008.
- **We are loading carbon into the atmosphere and warming the planet at an alarming rate** – Gore, et. al.
- **The United States has 2% of the world's population and consumes 25% of its petroleum.**
- **July, 2007, China became the first nation in the world to consume more barrels of oil/day than the U.S.**
- **As other nations become more affluent (which is a laudable advancement) even more pressure will be placed on oil reserves**

Hubbert Study vs. Actual Production:



United States Production, Hubbert versus Actual



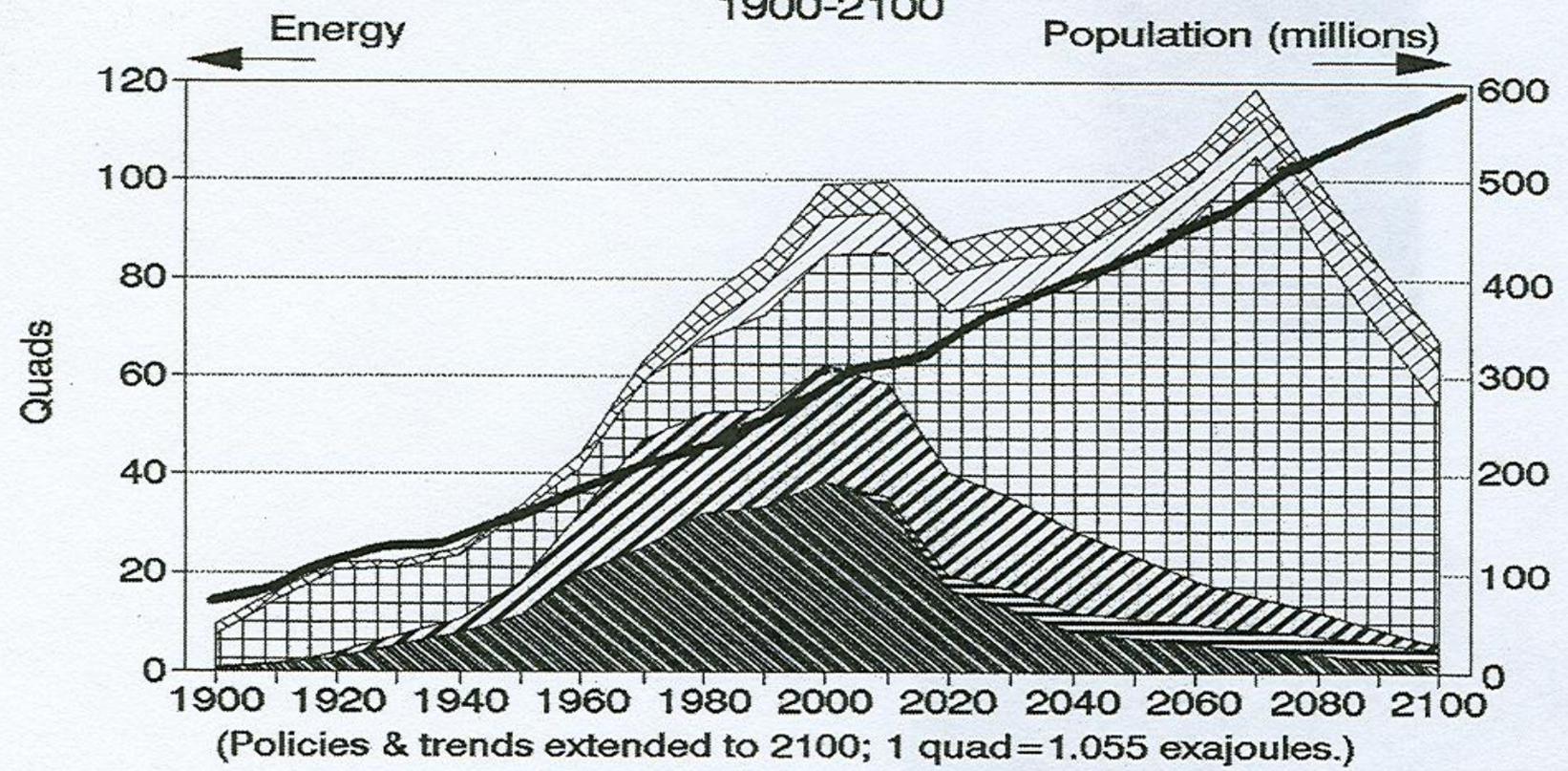
Source: Cambridge Energy Research Associates.

Available Energy by Source Over Time:



Figure 1.

U.S. Energy Use & Population 1900-2100



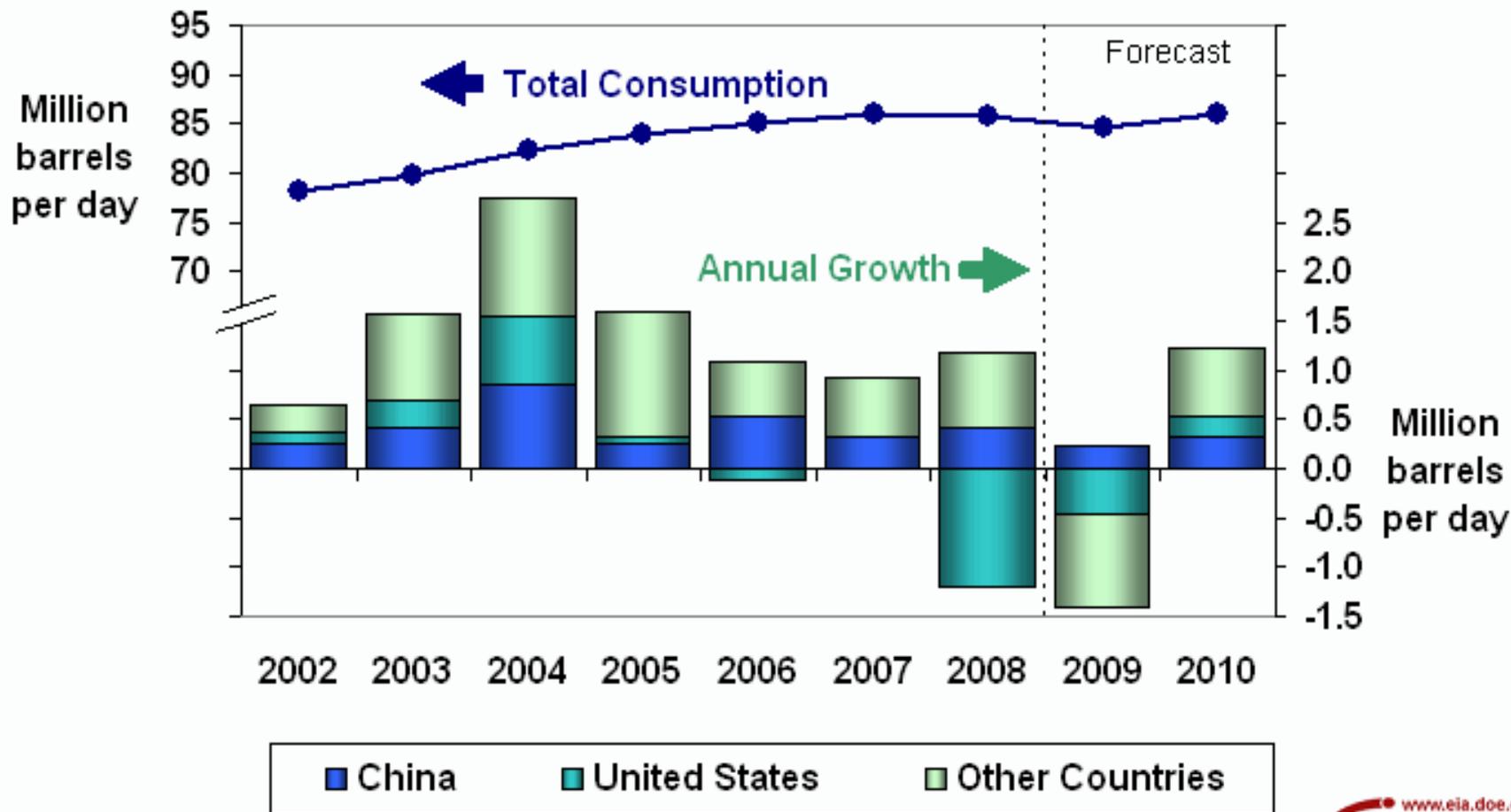
Oil	Tar Sands	Gas
Coal	Nuclear	Hydro/Biomass

Grant
8-04

The Two Global Forces in Oil Use:



World Oil Consumption



Short-Term Energy Outlook, February 2009

Where Does This Leave Us?



- “Six times the current capacity of Saudi Arabia” will be needed by 2030 “to meet demand growth AND COUNTER DECLINE” – IEA World Energy Outlook – 2008
- The optimists think there is a 60 year supply of oil remaining, the pessimists think 30 – neither give us comfort with the demand we are facing for liquid fuels
- Experts agree that liquid fuels will continue to be a cornerstone of growth and transportation on a global basis for at least the next half century
- There is only one economically practical solution at this time – continued reliance on the ingenuity of the American mind to manufacture fuels in a new way

Widely Held/Promoted Myths About Ethanol:



- **IT TAKES MORE ENERGY – to manufacture corn ethanol than is produced**
- **PRICE OF FOOD – is being driven up by corn ethanol**
- **ETHANOL IS BAD FOR ENGINES**
- **ETHANOL REDUCES MILEAGE BY 30%**

It Takes More Energy:

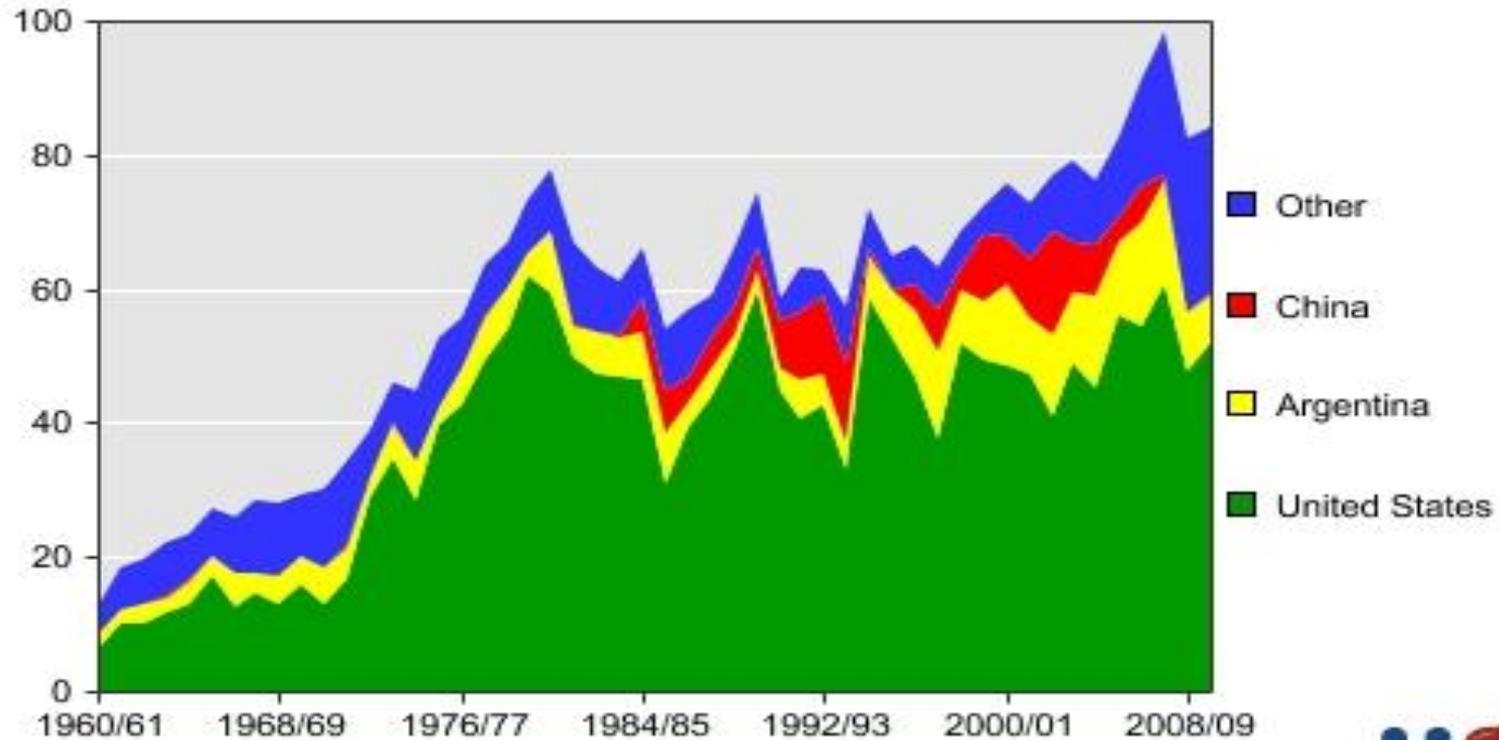


- Primary origin of contention arises from a study by faculty of UC Berkeley & Cornell
- Assumptions made in study include:
 - No crop would be planted if not for use in ethanol
 - All inputs (fuels, fertilizers, chemicals, etc.) are attributed only to ethanol as product
- More appropriate assumptions might be:
 - Crop would be planted anyway and exported
 - Inputs through harvesting are fixed regardless of ethanol & should not be attributed to ethanol



Leading world exporters of corn

Million metric tons



Source: USDA, Foreign Agricultural Service, Production, Supply, and Distribution (PS&D) Database.

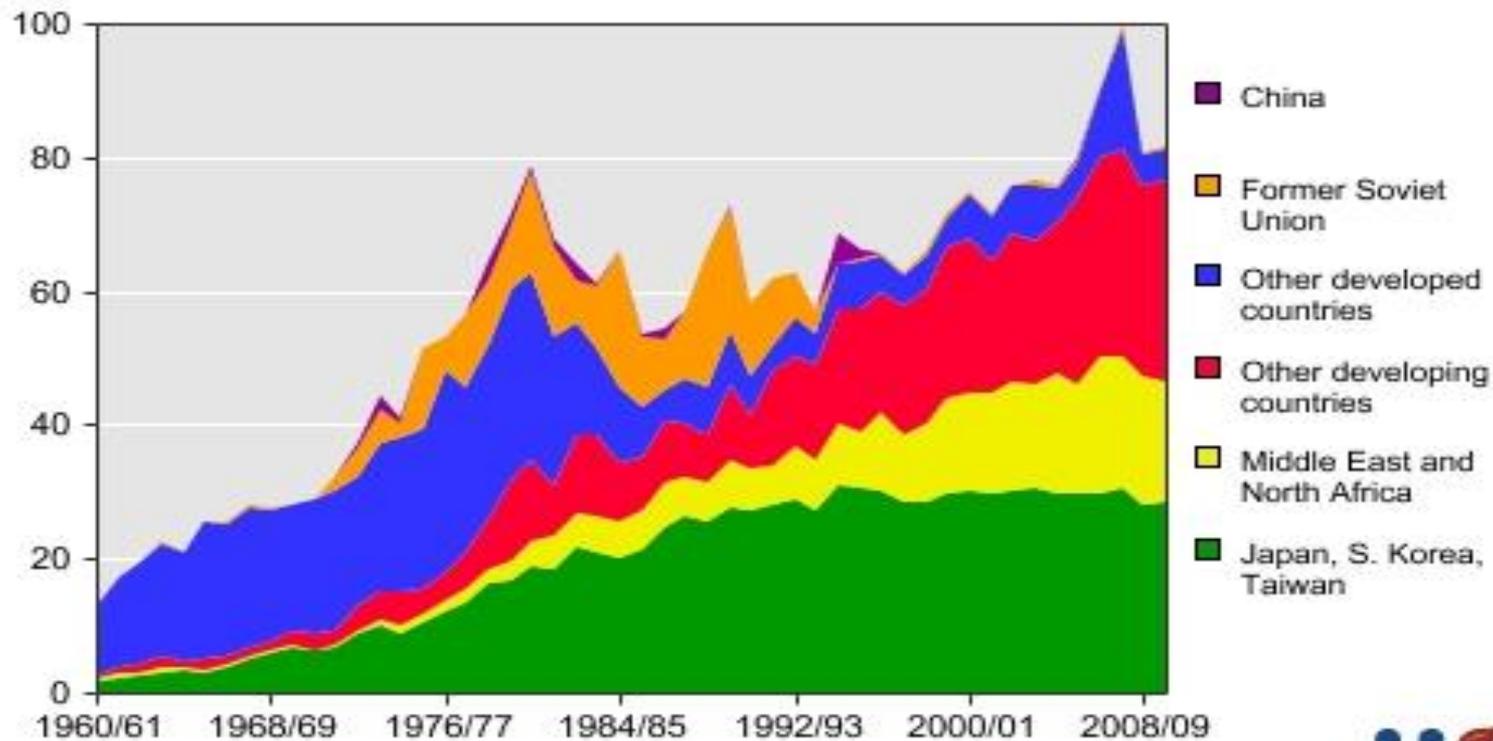
Updated: December 2009.





Leading world importers of corn

Million metric tons



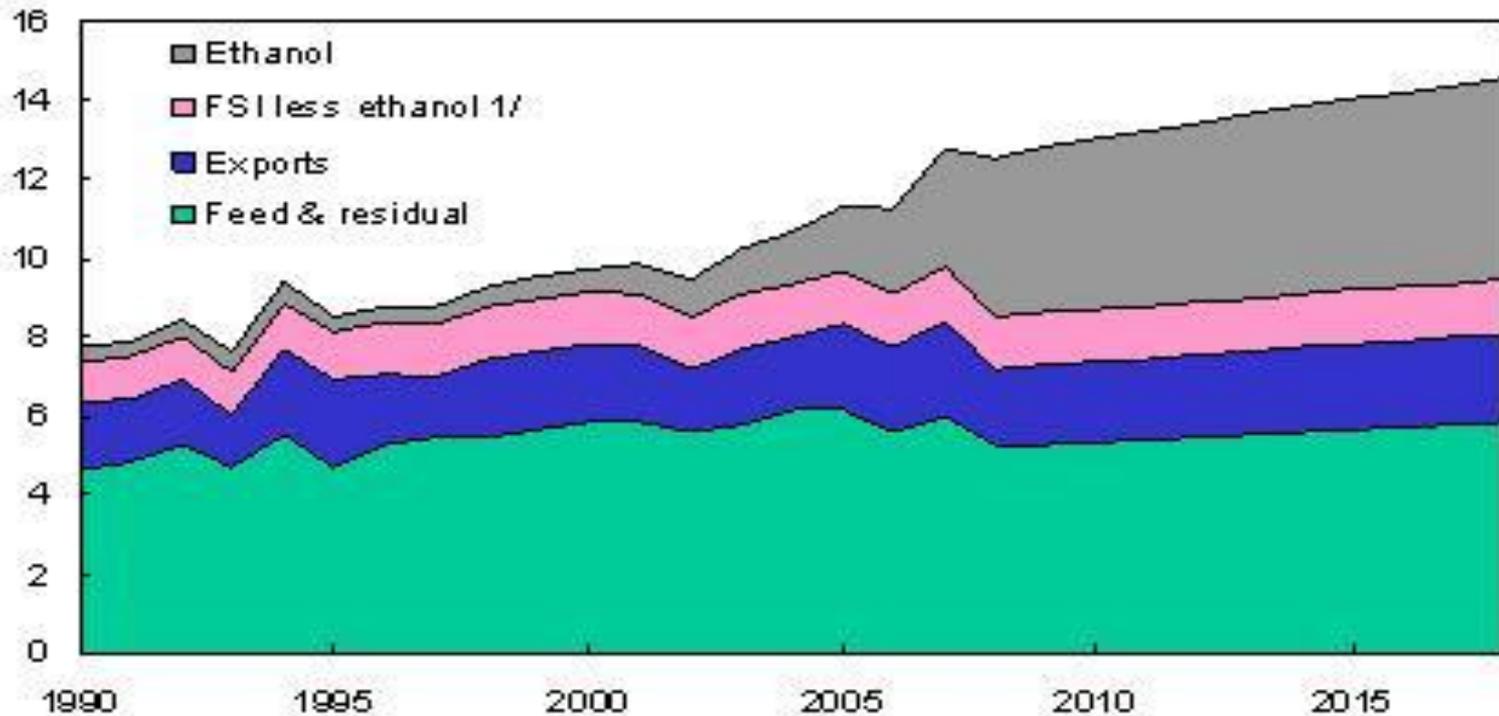
Source: USDA, Foreign Agricultural Service, Production, Supply, and Distribution (PS&D) Database.
Updated: December 2009.





U.S. corn use

Billion bushels



1/ Food, seed, and industrial use less ethanol.

Source: *USDA Agricultural Projections to 2018*, February 2009.
USDA, Economic Research Service.

Ethanol Is Bad For Engines:



- **Ethanol as a cleaning agent/solvent**
- **What enables an engine to burn ethanol:**
 - **Fuel lines**
 - **Gaskets**
- **Emission implications:**
 - **E10 reduces exhaust emission by 21%**
 - **E85 reduces exhaust emissions by 85+%**
- **Aircraft/Marine engines:**
 - **Plastics & fiberglass**
 - **Seals**
 - **Ambient air temperature**

Ethanol Reduces Mileage by 30%:



- **De-rating of engines:**

- Muscle cars of the 1960's
- Compression ratios of up to 13:1
- Gas at the pump up to 98 octane
- What happened?

- **BTU/octane content:**

- Gasoline has 30% more BTU's than ethanol
- Ethanol has 120 octane vs. 85 octane for non-reformed & 87 octane for reformed gas:

	<u>Non-Reformed</u>	<u>Reformed (RBOB)</u>
• E10	88.5 octane	90.3 octane
• E15	90.25 octane	91.95 octane
• E85	114.75 octane	115.05 octane

- **A resurrected breed of engines:**

- Indy engines for past 3 years have been 100% ethanol
- GM's Saab prototype
- Availability of E85

NPE Development & INEOS Bio Technology: The Waste Solution



Produces ethanol and electricity from carbon also called “carbonaceous feedstock” that can be sourced from:

- Green, Wood & Timber Waste.
- Bio-solids, Agricultural Residues & Animal Wastes.
- Municipal Solid Waste.
- Landfill Gas.
- Railroad Ties.
- Refinery Tars & Waste Oils.
- Plastics.

A patented microbial process ingests synthesis gas (gasified wastes) and emits ethanol.

3rd Generation Ethanol Process:



Flexible Feedstock



High Heat Gasifier



Syngas clean-up & heat recovery
Syngas (CO+H₂)



Steam for Heat & Power



BioPower



Bioreactor

Dilute Ethanol



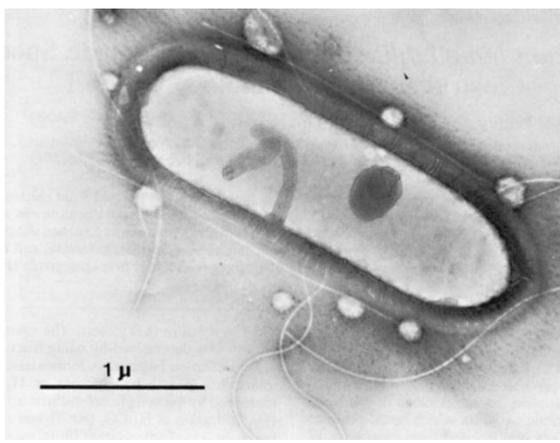
Distiller



BioEthanol



Water Recycled



1 μ

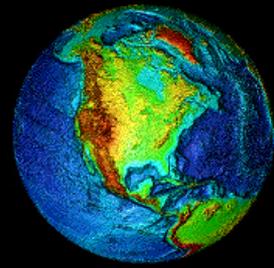


- **Hemispheric launch in Indian River County**
- **Distributed production of fuel/consumption of fuel provides a major carbon footprint reduction**
- **U. S. municipal solid waste could produce as much as 16 billion gallons/year – twice what was produced last year from 25% of our corn crop.**
- **U. S. agricultural waste could produce as much as 24 billion gallons/year – three times what was produced from corn last year.**



(Continued)

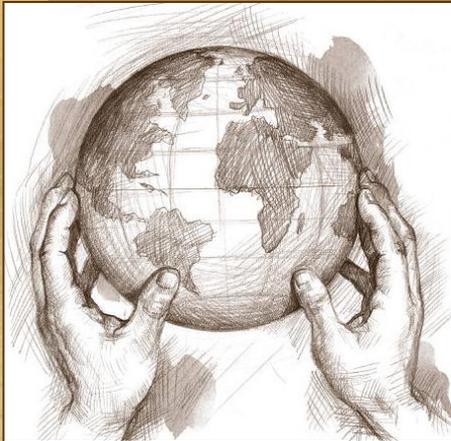
- **Every billion gallons of ethanol produced in the U.S., creates 200,000 new jobs** – Renewable Fuels Association.
- **From these two sources alone –**
 - **16 billion gallons x 200,000 jobs/billion = 3,200,000 jobs**
 - **24 billion gallons x 200,000 jobs/billion = 4,800,000 jobs**
 - **40 billion gallons = 8,000,000 jobs**
- **Summary of production impact –**
 - **8 billion (corn) + 16 billion (MSW) + 24 billion (ag. waste) = 48 billion gallons/year**
 - **48 billion gallons/year / 160 billion consumed in 2007 = 30% of U.S. fuel consumption**
 - **This could eliminate nearly 50% of the U.S. petroleum imports**



**Commonwealth of Virginia
&
New Planet Energy**

**Building an Energy Leader
in the Mid-Atlantic Region**

For a Global Community



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