CLEAN AIR, ENERGY SECURITY, AND CLIMATE CHANGE: DRIVERS FOR ALTERNATE FUELS

Presentation to

2008 Statewide Clean Cities Coalition Conference

"Making Sense of Alternative Fuels and Advanced Technology"

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March 28, 2008

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PRESENTATION OUTLINE

- **Introduction**
- **Clean Air**
- **Energy Security**
- **Climate Change**
- **Current Status and Prognosis for Alternative Fuels**
- **Louisiana Perspective**
- **Some Closing Observations**
- **Questions and Discussion**

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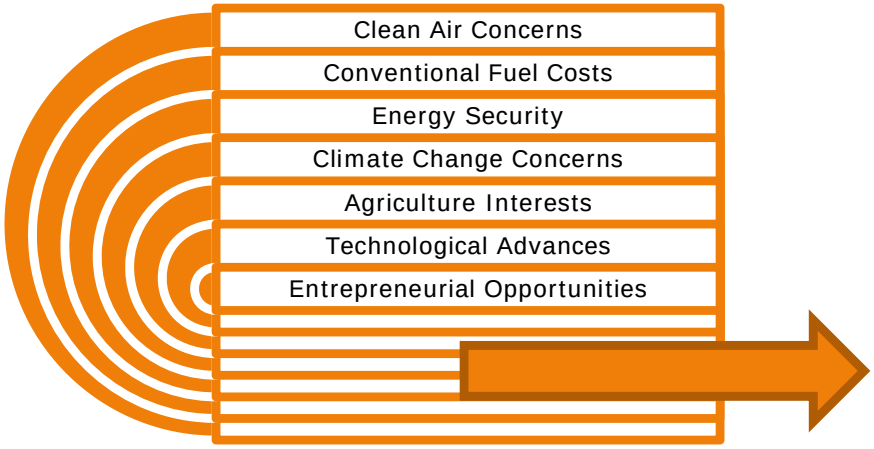
Introduction – What Are Alternative Fuels?

- **EPAct Alternative Fuels**
  - Methanol, ethanol, and other alcohols (e.g. butanol)
  - Blends of 85% or more of alcohol with gasoline
  - Natural gas and liquid fuels domestically produced from natural gas
  - Liquefied petroleum gas (propane)
  - Coal-derived liquid fuels
  - Hydrogen
  - Electricity (not hybrid electric vehicles – HEVs)
  - Biodiesel (B100)*
  - Fuels (other than alcohol) derived from biological materials
  - P-Series

Introduction – Convergence of Factors



E85 85% Ethanol www.E85Fuel.com

BIODIESEL

CNG

PROPANE

H_2

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AIR QUALITY

Clean Air Act

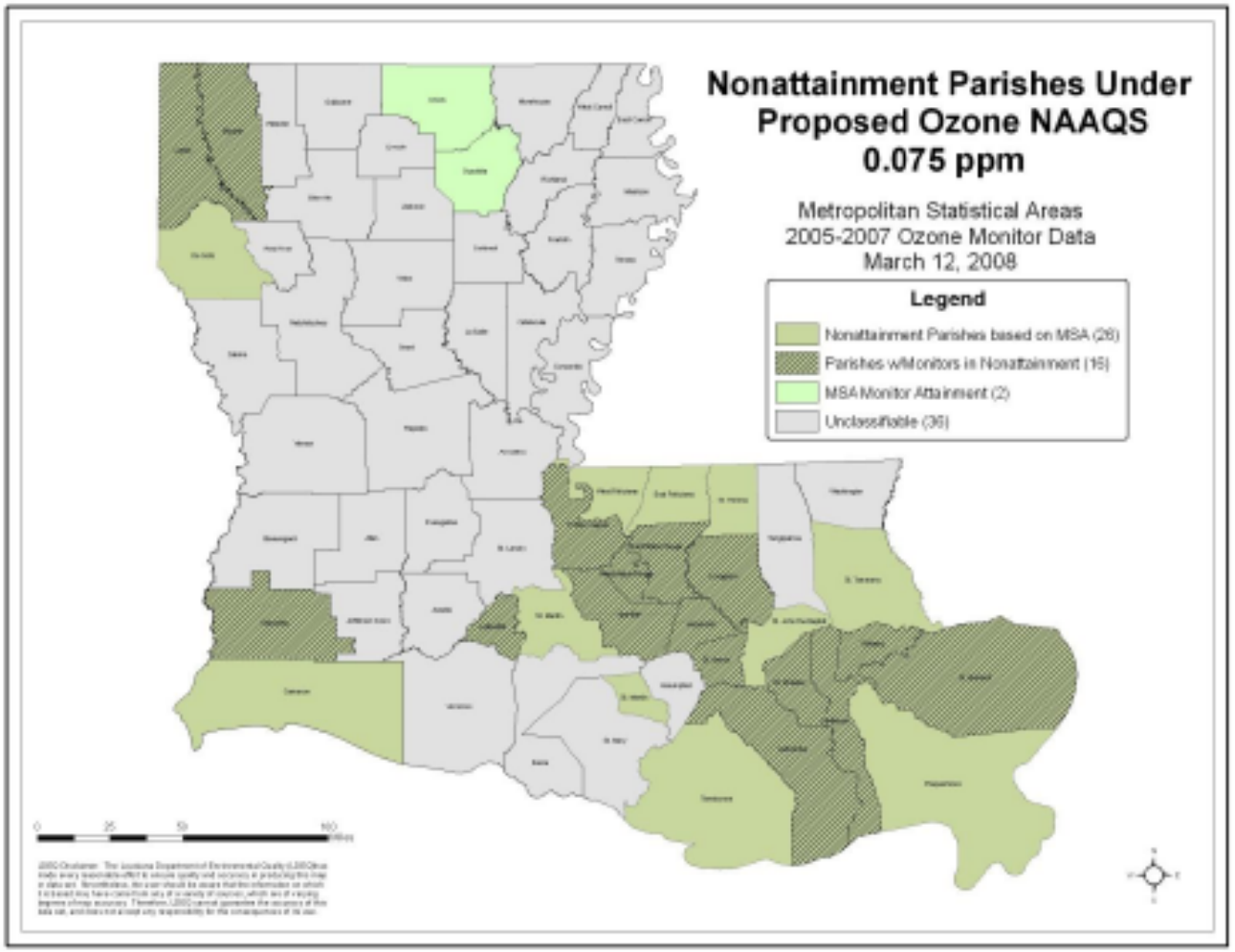
NAAQS – ozone, particulate matter, SO2
Air Toxics – urban air toxics
Mobile Sources Regulation
- •tailpipe emissions standards
- •fuels (vapor pressure, sulfur content, toxics)
- •clean diesel initiatives
- •rail, aircraft, marine emissions

EPA Boutique Fuels Experience

Mass. v EPA - Regulation of CO2 – EPA regulations limiting vehicle GHG emissions expected by end of 2008. EPA resisting "endangerment" finding.

California v EPA - Seeking waiver from EPA so state can implement GHG auto emissions limits.

AIR QUALITY



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ENERGY SECURITY

Energy Policy Act of 1992 (Epact)

- Established requirements for purchasing AFVs for federal, state, and alternative fuel provider fleets.
- Employed both voluntary and regulatory approaches for encouraging the fundamental changes necessary to building a self-sustaining alternative fuel market.
- DOE launched the Clean Cities Initiative in 1993.

Executive Order 13149, April 2000,

- Established a petroleum reduction goal of 20% by 2005 for federal agencies compared to their 1999 usage.
- Required U.S. federal fleets flex-fuel vehicles (FFVs) to operate on alternative fuels the majority of the time (51%) by 2005.

ENERGY SECURITY (Cont.)

Energy Policy Act of 2005

- Extensive list of provisions to facilitate energy research and development.
- Related to alternative fuels for transportation:
  - Required 7.5 billion gallons of biofuel (mainly ethanol) must be mixed with gasoline sold in the U.S.
  - Authorized $50 million annually over the life of the bill for a biomass grant program.
  - Financial incentives for hybrid vehicles.
  - Required U.S. Federal fleet FFVs to operate on alternative fuels 100% of the time.

Executive Order 13423: Strengthening Federal Environmental, Energy, and Transportation Management. January 2007.

- Requires Federal agencies with 20 or more vehicles in U.S. to decrease petroleum consumption by 2% per year relative to their FY2005 baseline through 2015.
- Also requires agencies to increase alternative fuel use by 10% per year relative to the previous year.
- Revoked EO 13149.

ENERGY SECURITY (Cont.)

ENERGY INDEPENDENCE AND SECURITY ACT OF 2007 (EISA)

➢Increases the supply of alternative fuel sources by setting a mandatory Renewable Fuels Standards (RFS) for fuel producers:

36 billion gallons renewable fuels by 2022
21 billion gallons cellulosic based fuels by 2022
15 billion gallon cap for ethanol from corn by 2015
1 billion gallons biomass-based diesel by 2012

➢Reduces U.S. demand for oil by setting a national fuel economy standard of 35 mpg by 2020 – which will increase fuel economy standards by 40%.

FUEL COSTS: >$100 per barrel oil and ~$4 per gallon gasoline.

ENERGY SECURITY (Cont.)

Renewable Fuel Standard Program

- Section 211(o) of the Clean Air Act, as amended by the Energy Independence and Security Act of 2007 (EISA) requires EPA to annually determine a renewable fuels standard (RFS) which is applicable to refiners, importers, and certain blenders of gasoline.

- On the basis of this standard, each obligated party determines the volume of renewable fuel that it must ensure is consumed as motor vehicle fuel.

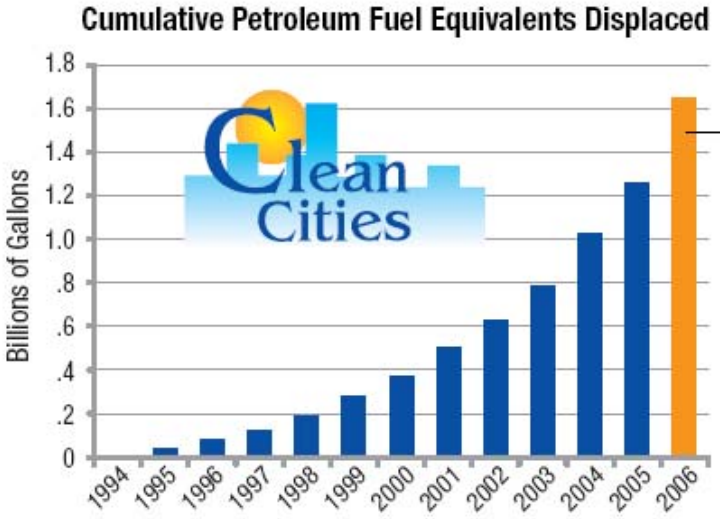
- In EPA's February 14th FR notice, the RFS was set at 7.76% for 2008.

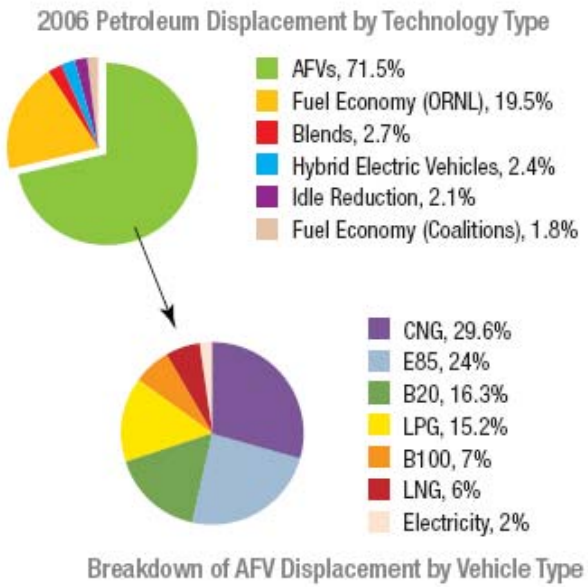
- The new mandate is intended to lead to the use of 9 billion gallons of renewable fuel in 2008. Estimates indicate it will require more than 22 million acres of corn to meet this requirement.

- EPA is struggling with how to implement the energy law mandate requiring fuel producers to ensure that biofuels emit at least 20% less greenhouse gas (GHG) emissions over their entire life cycle than conventional petroleum-based fuels in order to quality for credits under the law's renewable fuel standard.

ENERGY SECURITY (Cont.)

VOLUNTEER EFFORTS:





Automotive X Prize Purse Set at $10 Million

The Blue Skyways COLLABORATIVE
The Central Corridor of Innovation!

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CLIMATE CHANGE

No matter where you stand on the global climate change/global warming matter, we are going to see limitations/control of greenhouse gases (notably CO2). Renewable energy/fuels will be important to achieving GHG reduction goals.

Voluntary Actions

state, local governments
regional compacts
private industry

Federal Legislation

over 1000 bills in 110th congress addressing issues related to global climate change
we may see a bill passed later this year or next

All three major presidential candidates have expressed support for action on reducing GHGs.

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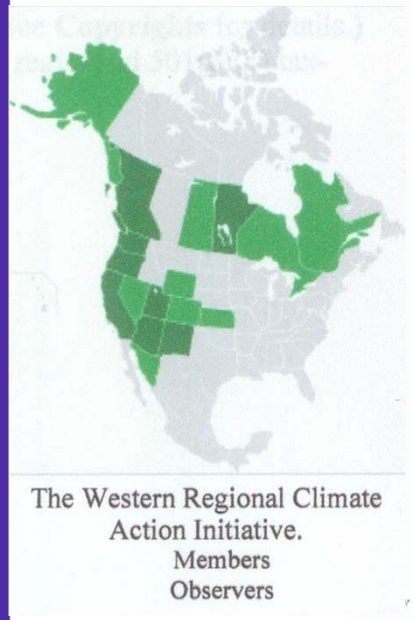
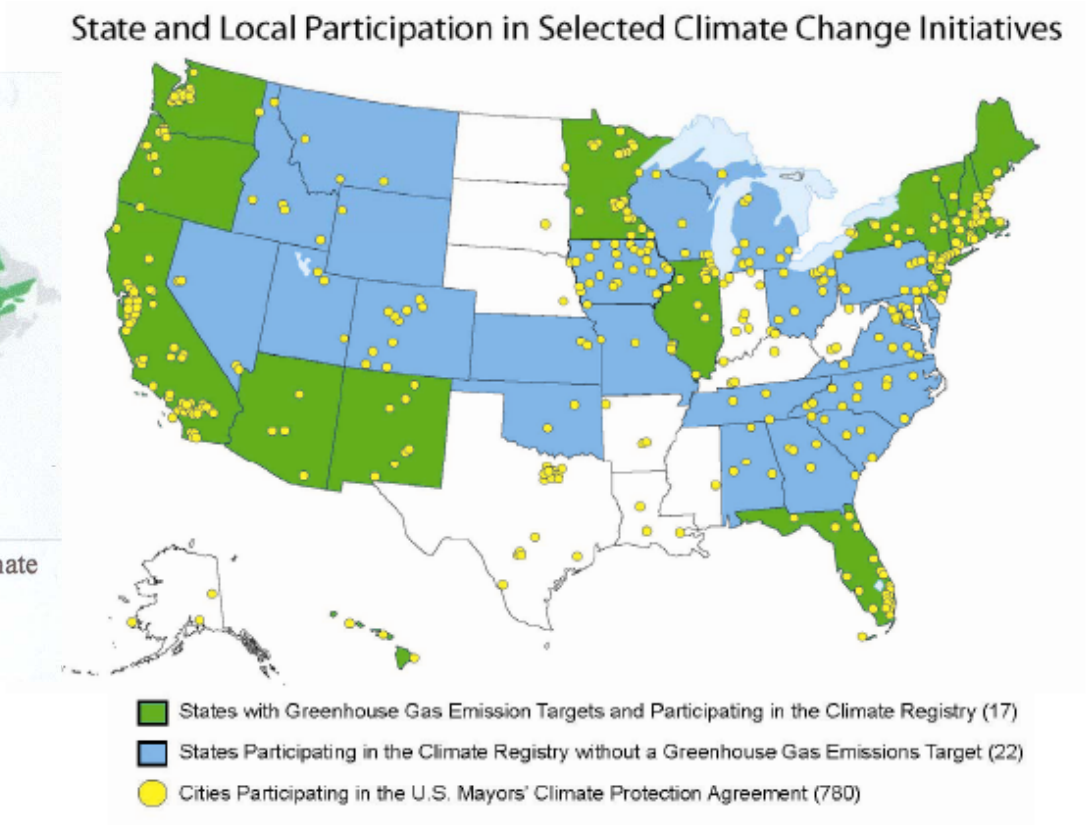
CLIMATE CHANGE





[11] Information in this figure was taken from the Climate Registry, the Pew Center on Climate Change, and the US Conference of Mayors.

RGGI

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CLIMATE CHANGE

Federal Legislation

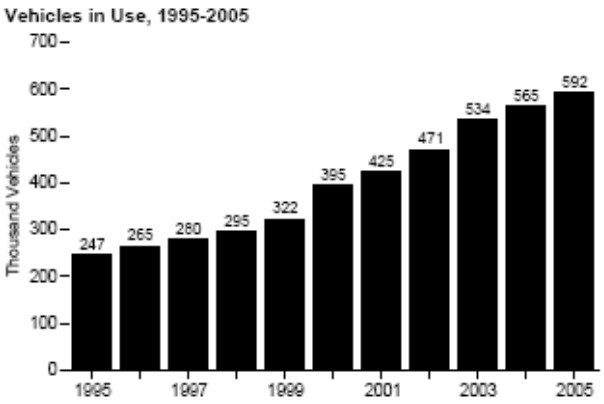
There are currently over 1000 bills in the 110th Congress that relate in some way to global climate change and proposals to curtail greenhouse gas emissions. Some of the more notable are:

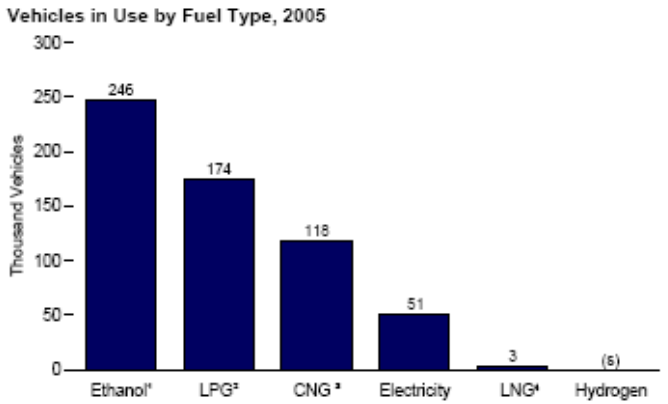
- **Lieberman-Warner Climate Security Act of 2008 (S. 2191)**
- **Bingaman-Specter Low Carbon Economy Act (S. 1766)**
- **McCain-Lieberman Climate Stewardship and Innovation Act (S. 280)**
- **Sanders-Boxer Global Warming Pollution Reduction Act (S. 309)**
- **Kerry-Snowe Global Warming Reduction Act (S. 485)**

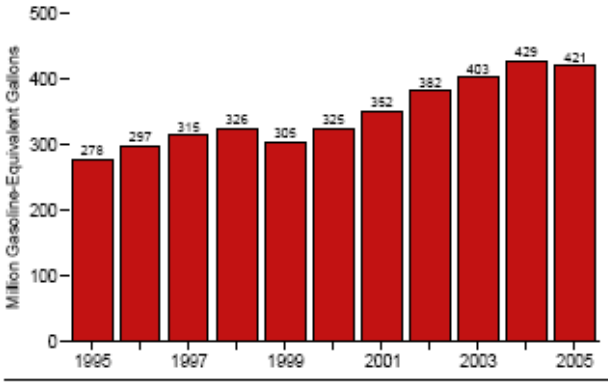
Each of these bills proposes economy-wide cap-and-trade regulatory programs for reducing U.S. greenhouse gas emissions (principally carbon dioxide –CO2). Proposed emissions reductions range from around 60 to 70 percent of 1990 or 2005 levels by 2050 following different temporal reduction tracks.

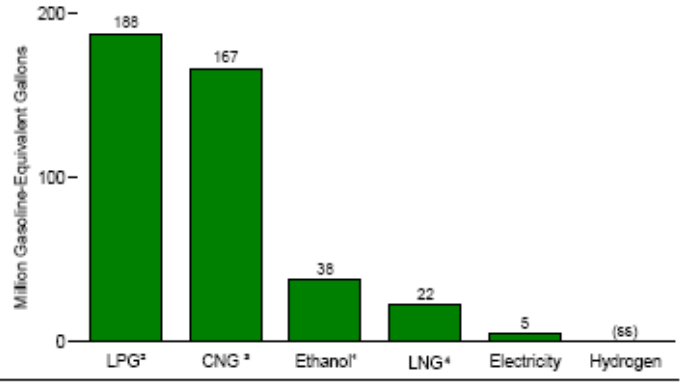
Of the bills described above, S. 2191 has progressed the furthest having passed out of committee to the Senate floor.

Current Status and Prognosis for Alternative Fuels









85 percent (E85). Includes only those E85 vehicles believed to be used as
ieled vehicles, primarily fleet-operated vehicles; excludes other vehicles with E85-
bility.
petroleum gases.
sed natural gas.

⁴ Liquefied natural gas.
(s)=Fewer than 0.5 thousand vehicles.
(ss)=Less than 0.5 million gasoline-equivalent gallons.
Note: Because vertical scales differ, graphs should not be compared.
Source: Table 10.4.

Source: Energy Information Administration / Annual Energy Review 2006

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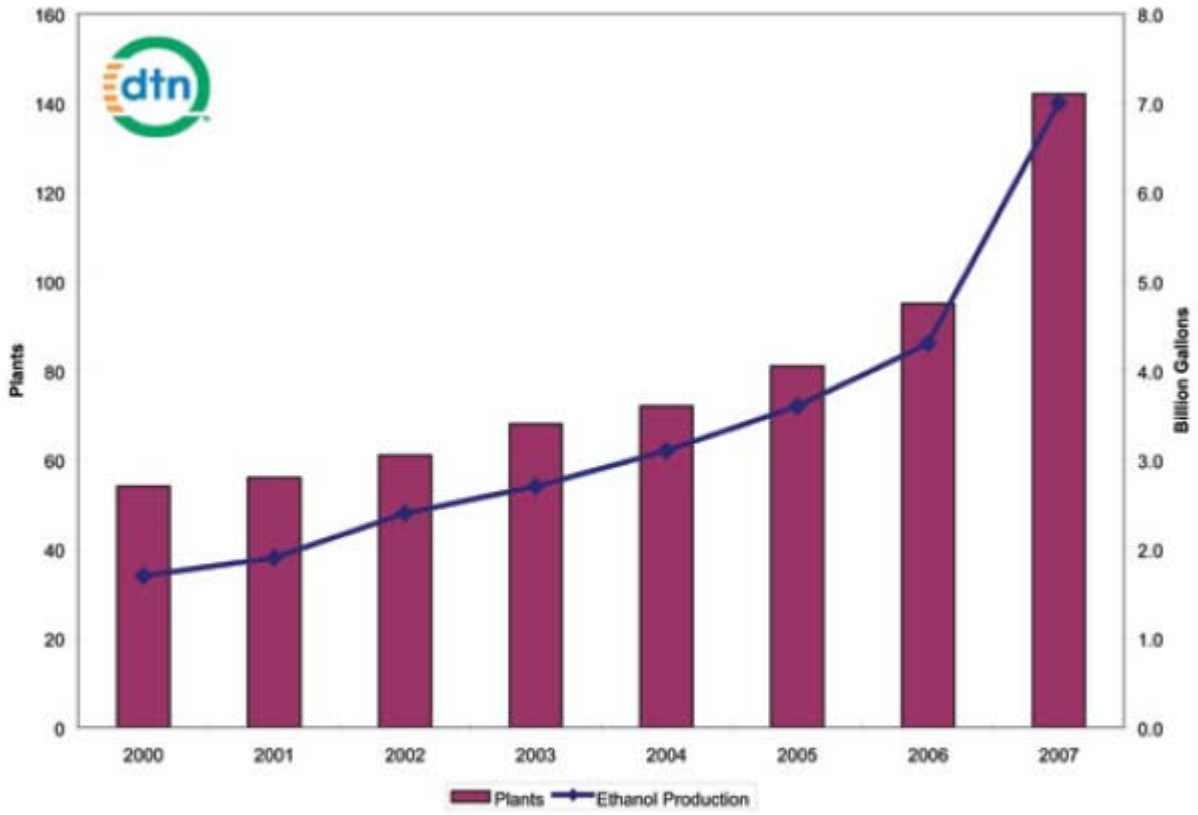
Current Status and Prognosis for Alternative Fuels



e: "Ethanol Experiences Growing Pains," Ethanol Producer Magazine; December 2007.

LOUISIANA ECONOMIC DEVELOPMENT

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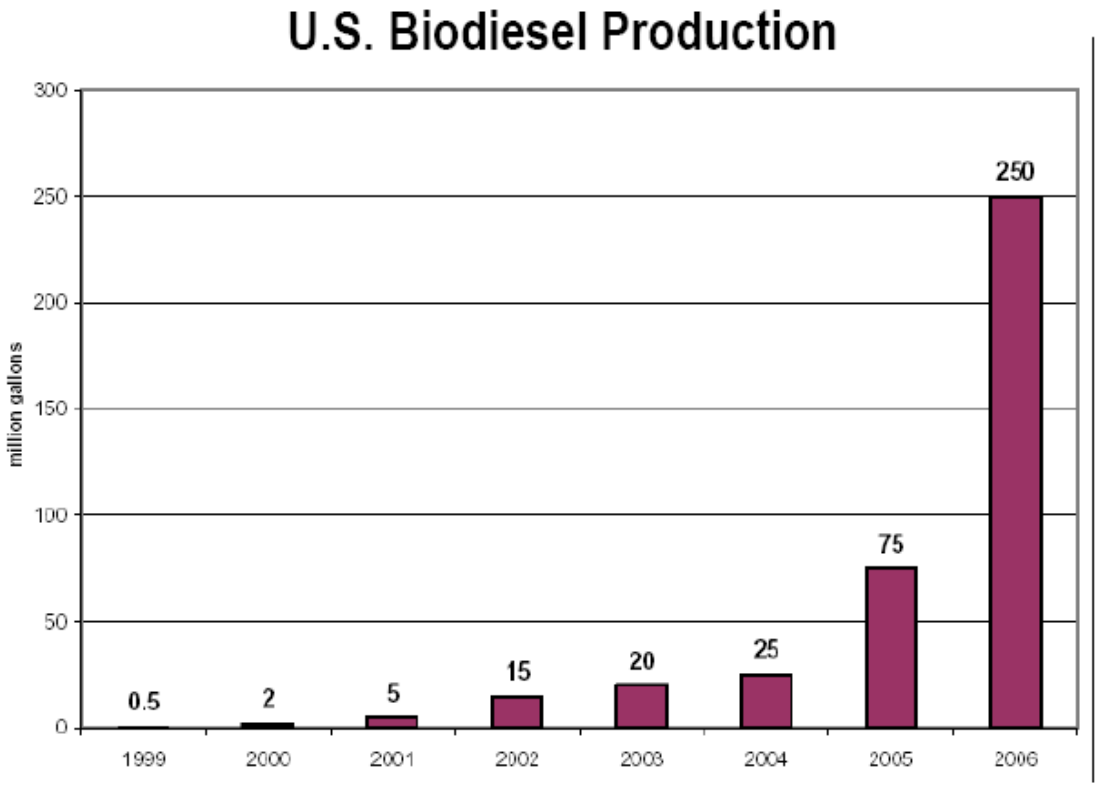
Current Status and Prognosis for Alternative Fuels



Source: National Biodiesel Board.

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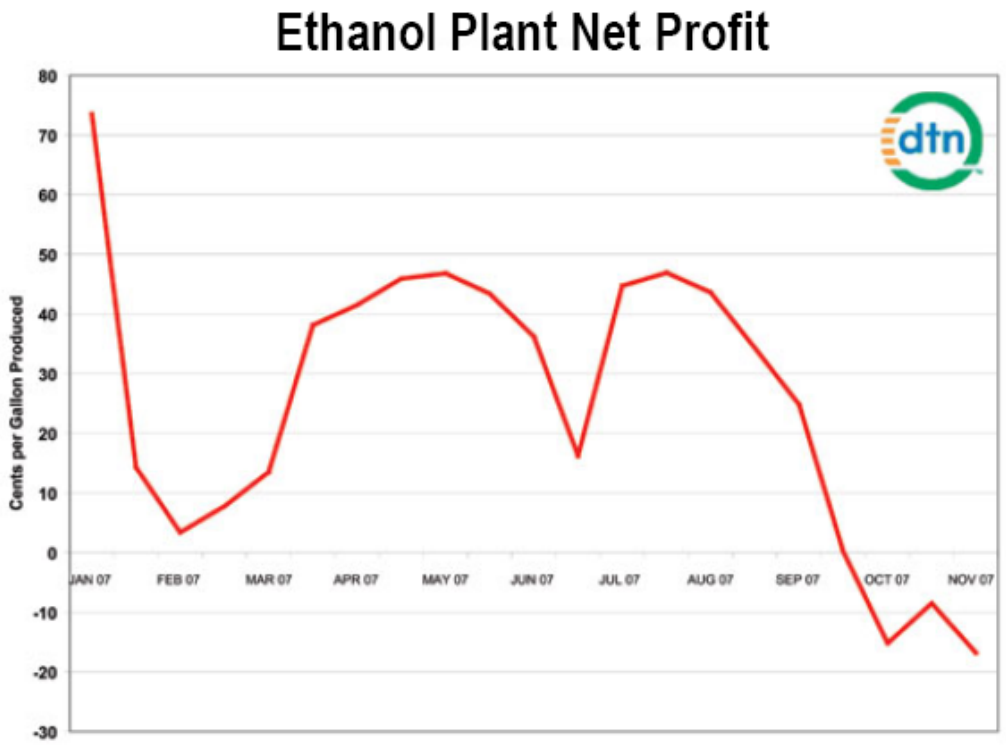
LOUISIANA ECONOMIC DEVELOPMENT

Current Status and Prognosis for Alternative Fuels



Source: "Ethanol Experiences Growing Pains," Ethanol Producer Magazine; December 2007.

LOUISIANA ECONOMIC DEVELOPMENT

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Current Status and Prognosis for Alternative Fuels

Environmental Concerns for Biofuels

Fragione, J. 2008. Land Clearing and the Biofuel Carbon Debt., *Science* online version. Planting corn on former cropland that has been idled through the Agriculture Department's Conservation Reserve Program causes a 48-year "carbon debt", while land conversions in Brazil, Indonesia, and Malaysia result in increased emissions that take from 17 to 423 years to work off through ethanol emissions savings.

Continuously-grown corn leads to heavy use of fertilizers, early return of land in conservation programs to production, and the conversion of marginal lands to high-intensity cropping. All of these bring with them well-known environmental problems associated with intensive farming: persistent pest insects and weeds, pollution of groundwater, greater irrigation demands, less wildlife diversity, and the release of more carbon dioxide. Carbon dioxide is a greenhouse gas that contributes to global climate change. Ironically, one of the touted benefits of biofuels is to help alleviate global climate change, a benefit that is considerably diluted under a high-intensity agriculture scenario. (Position statement - Ecological Society of America).

According to a recent study, increasing production of corn-based ethanol to meet alternative fuel goals may worsen the "dead zone" that plagues the Gulf of Mexico.

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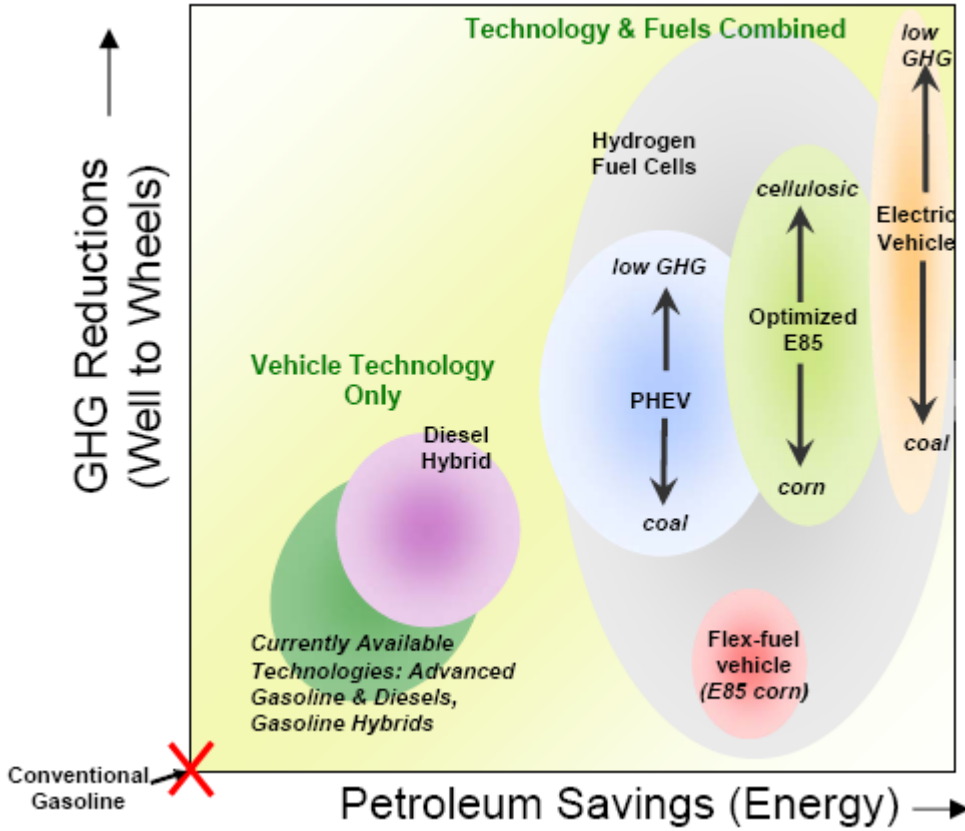
Current Status and Prognosis for Alternative Fuels



Project Better Place Denmark

Illustrative example of GHG reductions and petroleum savings for (1) various technology-only approaches and (2) combinations of vehicle technologies with alternative fuels. The reductions relative to today's conventional gasoline vehicle are shown. Note that the size and position of the bubbles are illustrative and assumptions-driven. Source: EPA

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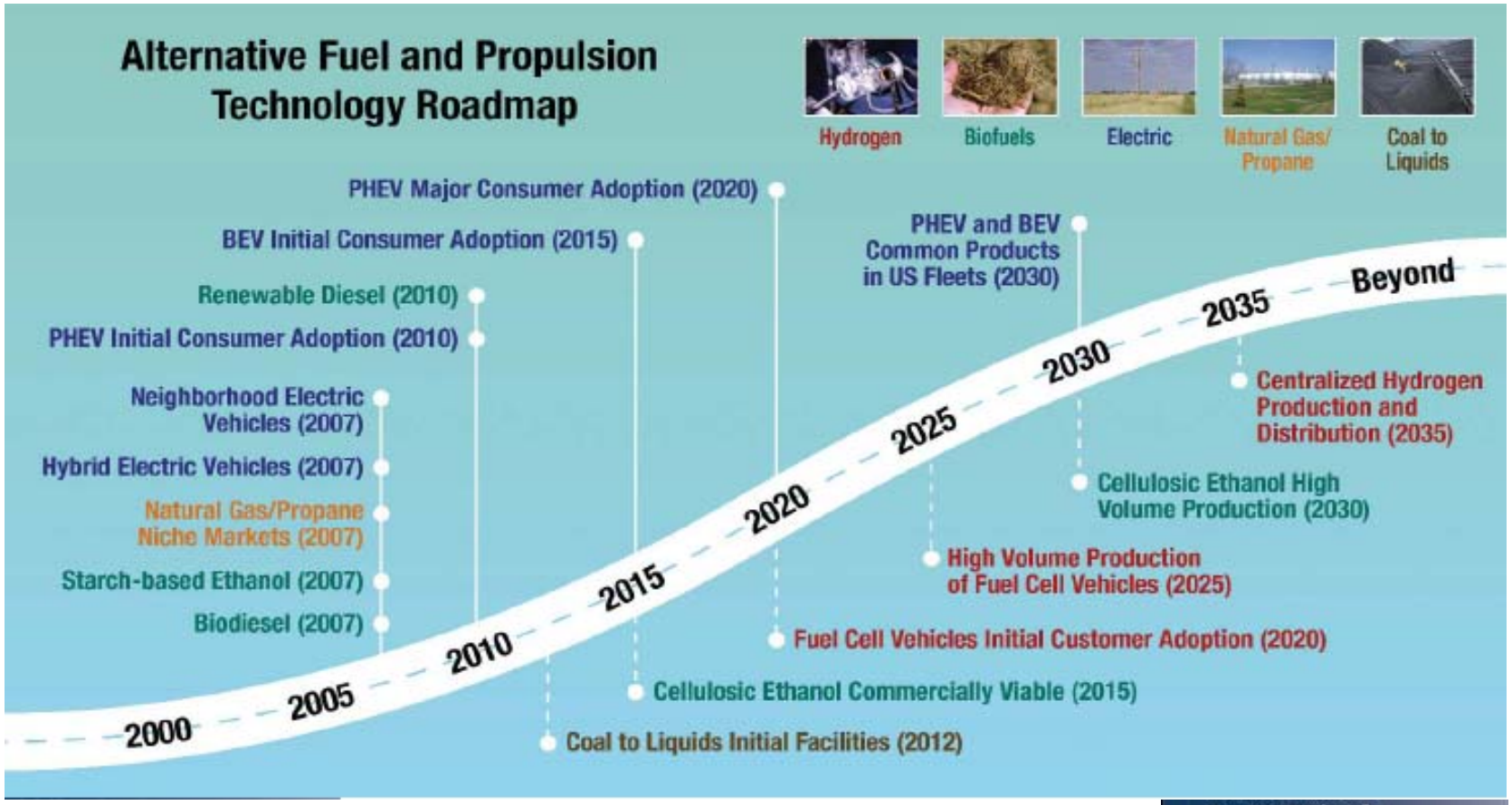
Current Status and Prognosis for Alternative Fuels



Source: National Renewable Energy Laboratory

Louisiana Perspective

The Louisiana Advantage

Competitive yields of a range of crops!

- Mild climate
- Hi solar radiation
- Plentiful rainfall
- Fertile soils
- Strong ag infrastructure

Source: Gary Breitenbech LSU AgCenter

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Louisiana Perspective

U.S. Department of Energy - Energy Efficiency and Renewable Energy
Alternative Fuels & Advanced Vehicles Data Center

Louisiana Incentives and Laws
Last Updated September 2007
Louisiana is the proud home of the Greater Baton Rouge Clean Cities Coalition (www.gbrccc.org). Coordinator contact information is listed in the Points of Contact section.
View All Louisiana Summaries

State Incentives

- Alternative Fuel Vehicle (AFV) and Refueling Infrastructure Tax Credit
- Biodiesel Equipment and Fuel Tax Exemption

State Laws and Regulations

- Alternative Fuel Vehicle (AFV) Tax
- Alternative Fuel Promotion
- Renewable Fuels Standard
- Biofuels Feedstock Requirements
- Low-Speed Vehicle Access to Roadways
- Low-Speed Vehicle Support
- Compressed Natural Gas (CNG) and Liquefied Petroleum Gas (LPG) Regulatory Authority
- Deregulation of Compressed Natural Gas (CNG) as a Motor Fuel

Utilities/Private Incentives

- Natural Gas Infrastructure Technical Assistance

Louisiana Points of Contact
View All Expired Louisiana Laws

Louisiana Perspective

Louisiana Bio-Fuels Projects

	Number	New Jobs	Investment ($)
Total Announced	5	95	274,000,000
Average Announced	-	19	54,800,000
Total "Parking Lot"	11	453	673,000,000
Average "Parking Lot"	-	41.2	61,181,818
Total Active	12	667	744,000,000
Average Active	-	55.6	62,000,000

LOUISIANA ECONOMIC DEVELOPMENT

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Louisiana Perspective

Hydrogen Infrastructure

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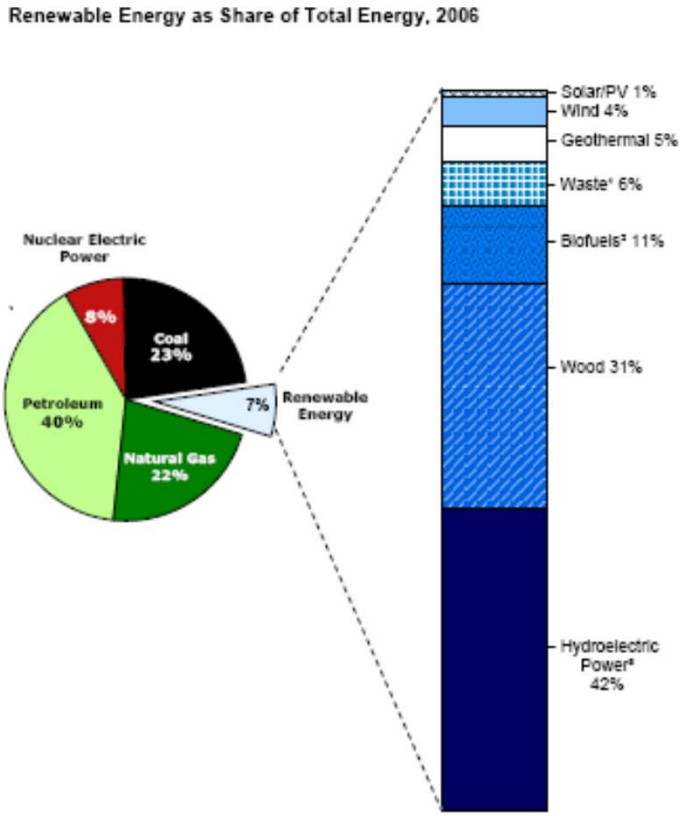
Some Closing Observations

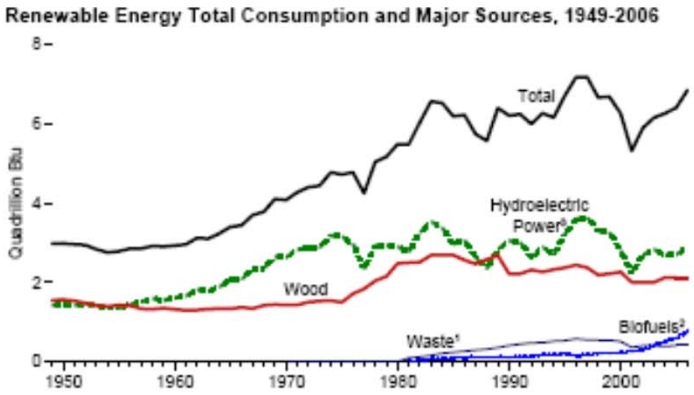
Hard Truths for the Global Energy Picture (NPC)

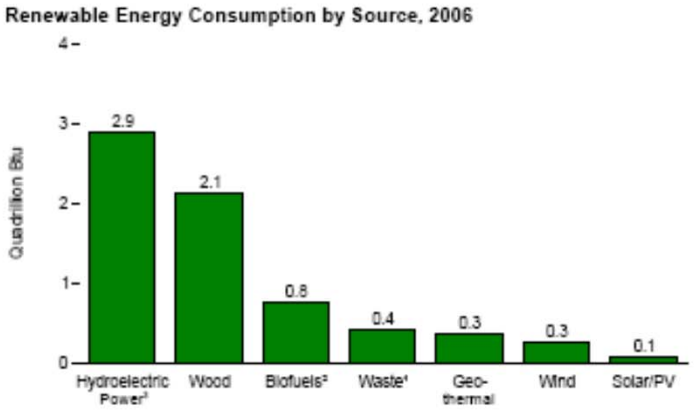
- *Demand* – Coal, oil, and natural gas will remain indispensable to meeting total projected energy demand growth.
- *Supply* – The world is not running out of energy resources, but there are accumulating risks to continuing expansion of oil and natural gas production from the conventional sources relied upon historically. These risks create significant challenges to meeting projected energy demand.
- *Energy Sources* – To mitigate these risks, expansion of all economic energy sources will be required, including coal, nuclear, biomass, other renewables, and unconventional oil and natural gas. Each of these sources faces significant challenges including safety, environmental, political, or economic hurdles, and imposes infrastructure requirements for development and delivery.
- *Energy Security* – "Energy Independence" should not be confused with strengthening energy security. The concept of energy independence is not realistic in the foreseeable future, whereas U.S. energy security can be enhanced by moderating demand, expanding and diversifying domestic energy supplies, and strengthening global energy trade and investment. There can be no U.S. energy security without global energy security.

Some Closing Observations

National Renewable Energy Consumption by Source







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Some Closing Observations

Daniel Yergin, Chairman of Cambridge Energy Research Associates, recently said the company's analysis shows that **under the best-case scenario renewables could provide up to 16 percent of the world's power and transport fuels needs by 2016 – but only with an investment of about $7 trillion over the next 25 years.**

EPA's National Advisory Council for Environmental Policy and Technology (NACEPT) – **"A generation from now, the rapid expansion of biomass and biofuel production may look unwise, or worse, unethical, if it is done in a way that leads to depleted aquifers and polluted water supplies, reduces soil quality and land productivity, high food prices and more undernourished people, and a boom-and-bust cycle of unsustainable growth that discourages further investment."**

QUESTIONS AND DISCUSSION