

# **The Devil's Advocate: What if Renewable Energies are not the Solution?**

*For*

*Northeast Asian Economic Forum's  
2010 Green Energy Forum for Northeast Asia:  
Challenges in Achieving a Low-Carbon Future*

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Senior Advisor, NEAEF

March 21, 2010

"So we have a choice to make. We can **remain one of the world's leading importers of foreign oil**, or we can make the **investments that would allow us to become the world's leading exporter of renewable energy**. We can let **climate change continue to go unchecked**, or we can **help stop it**. We can let the jobs of tomorrow be created abroad, or **we can create those jobs right here in America** and lay the foundation for lasting prosperity."

-President Obama, March 19, 2009

<http://www.whitehouse.gov/issues/energy-and-environment/>

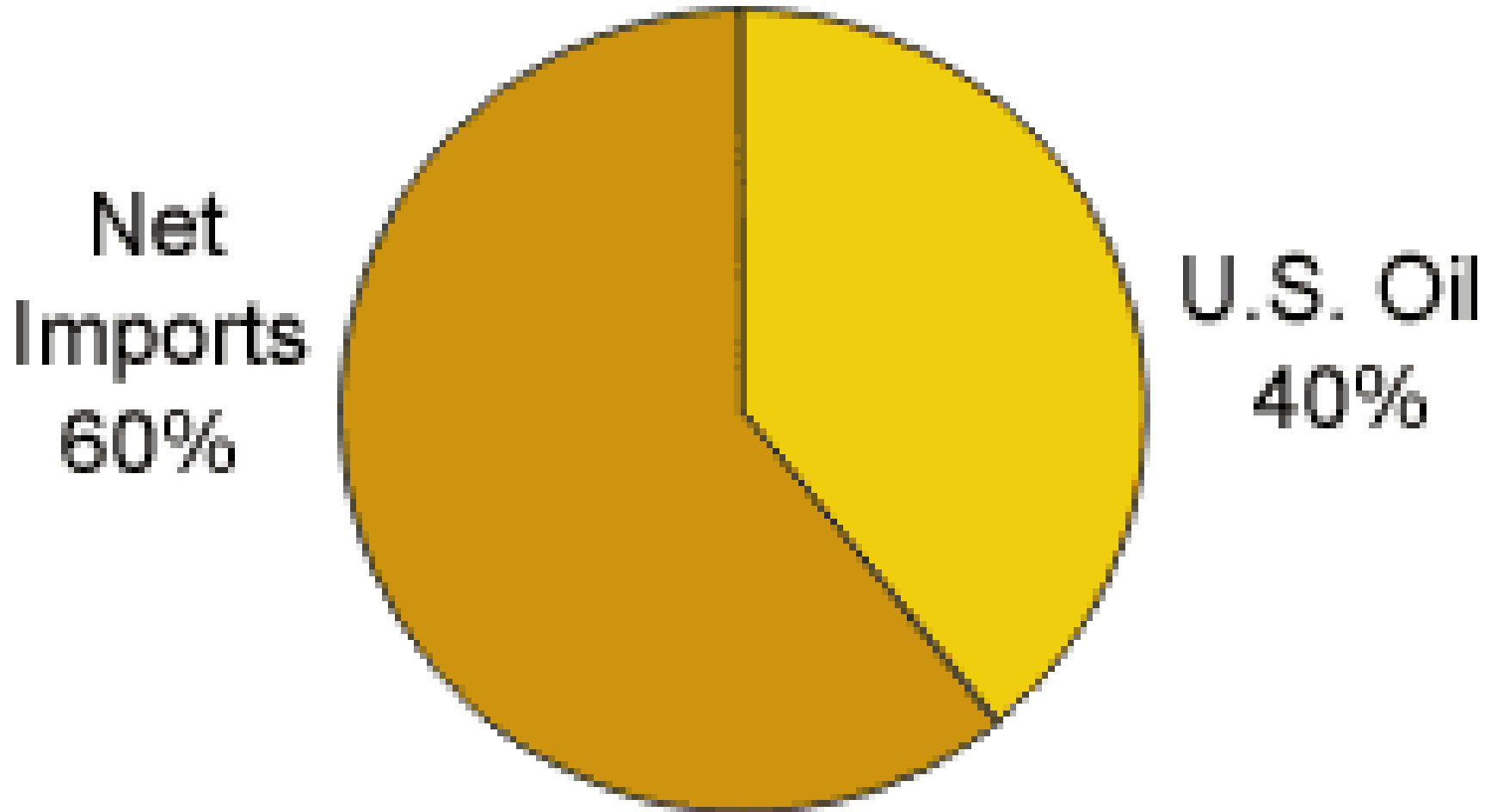


<http://neveryetmelted.com/wp-images/ObamaFingerPointing.jpg>

# US POLICY : Securing our Energy Future

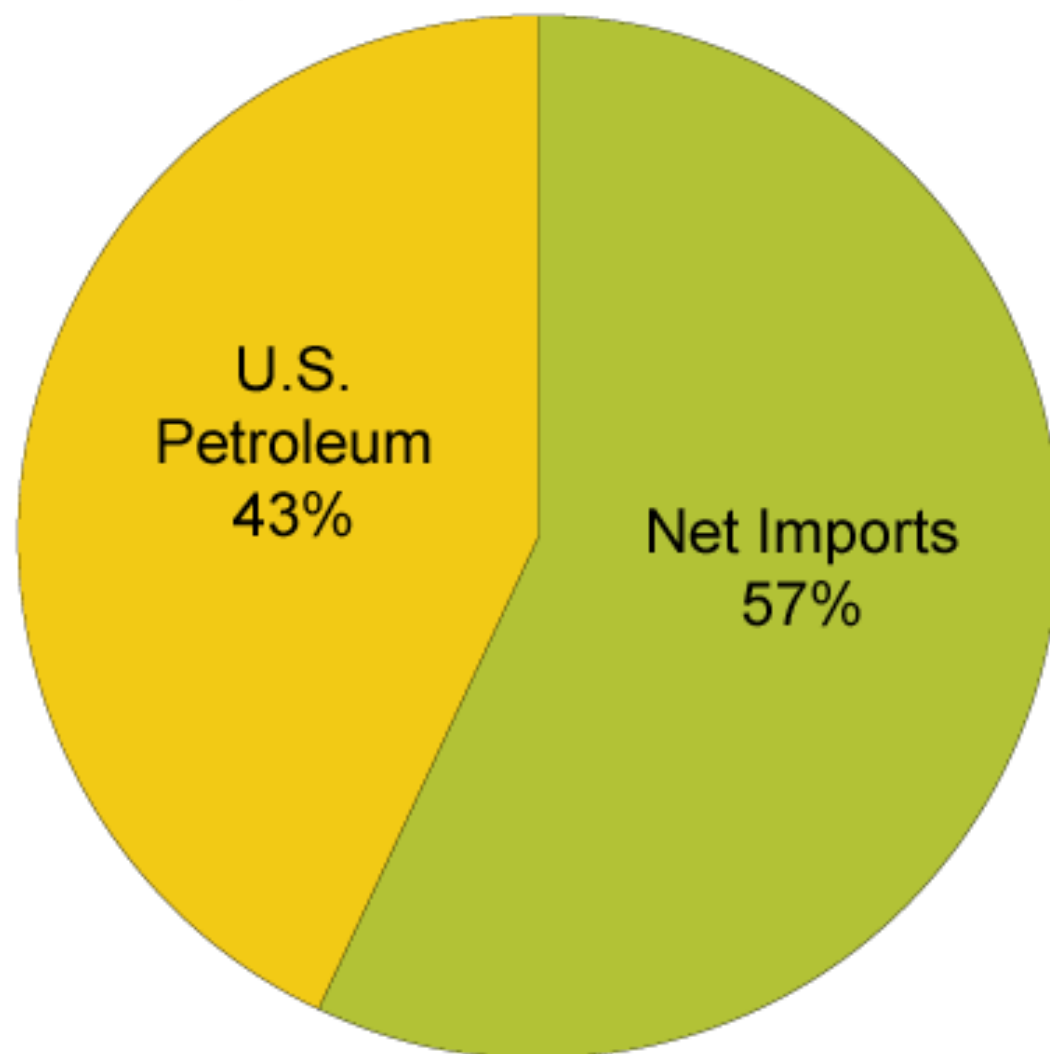
- “Our **reliance on oil** poses a threat to our **economic security**. Over the last few decades, we have watched our economy rise and fall along with the price of a barrel of oil. We must commit ourselves to an economic future in which the strength of our economy is not tied to the **unpredictability of oil markets**. We must **make the investments in clean energy sources that will curb our dependence on fossil fuels and make America energy independent.**”

# 2005 US Energy Dependence



Source: Energy Information Administration

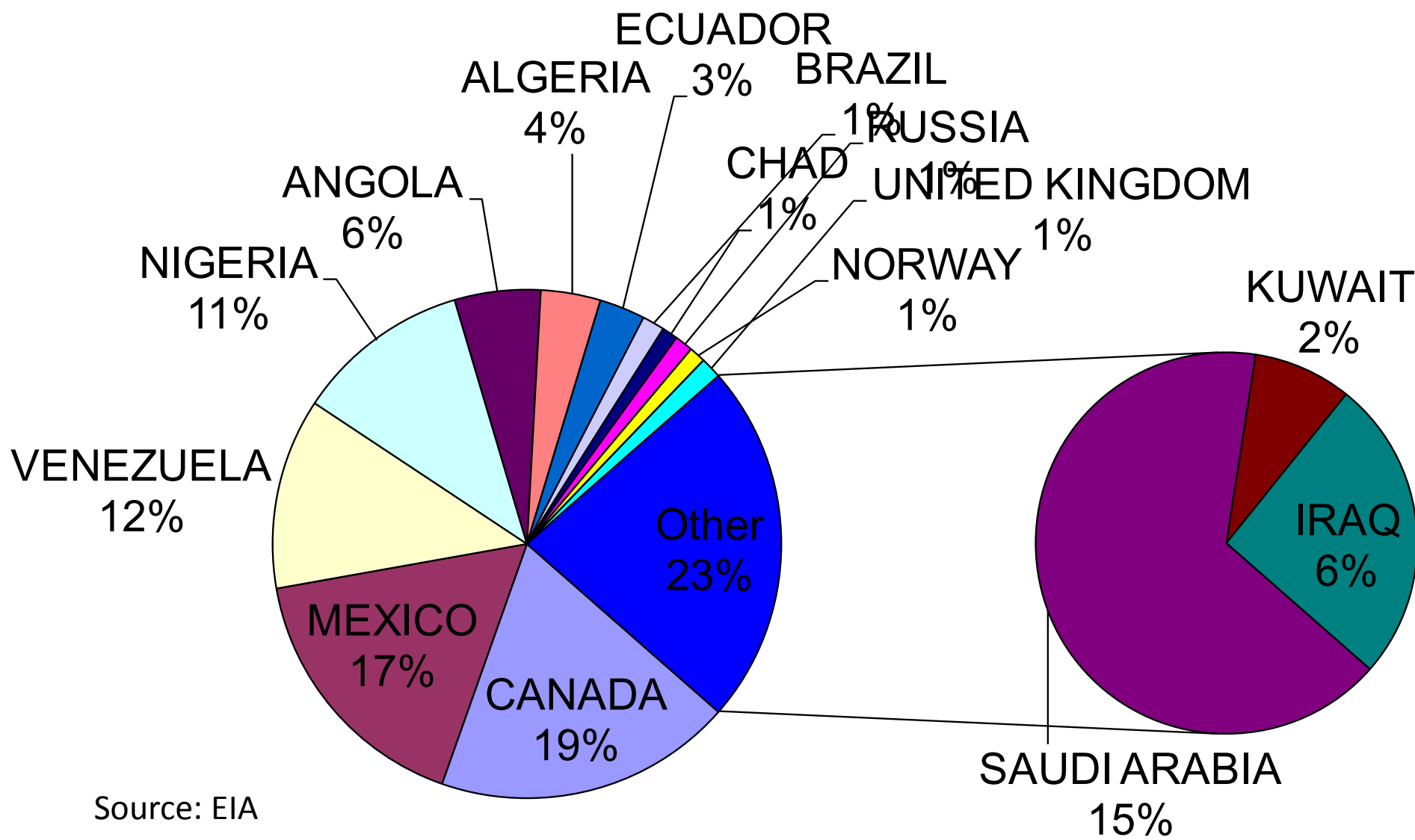
# Net Imports and Domestic Petroleum as Shares of U.S. Demand, 2008



Source: U.S. Energy Information Administration.

# 2005 US Crude Oil Imports (Top 15 Countries)

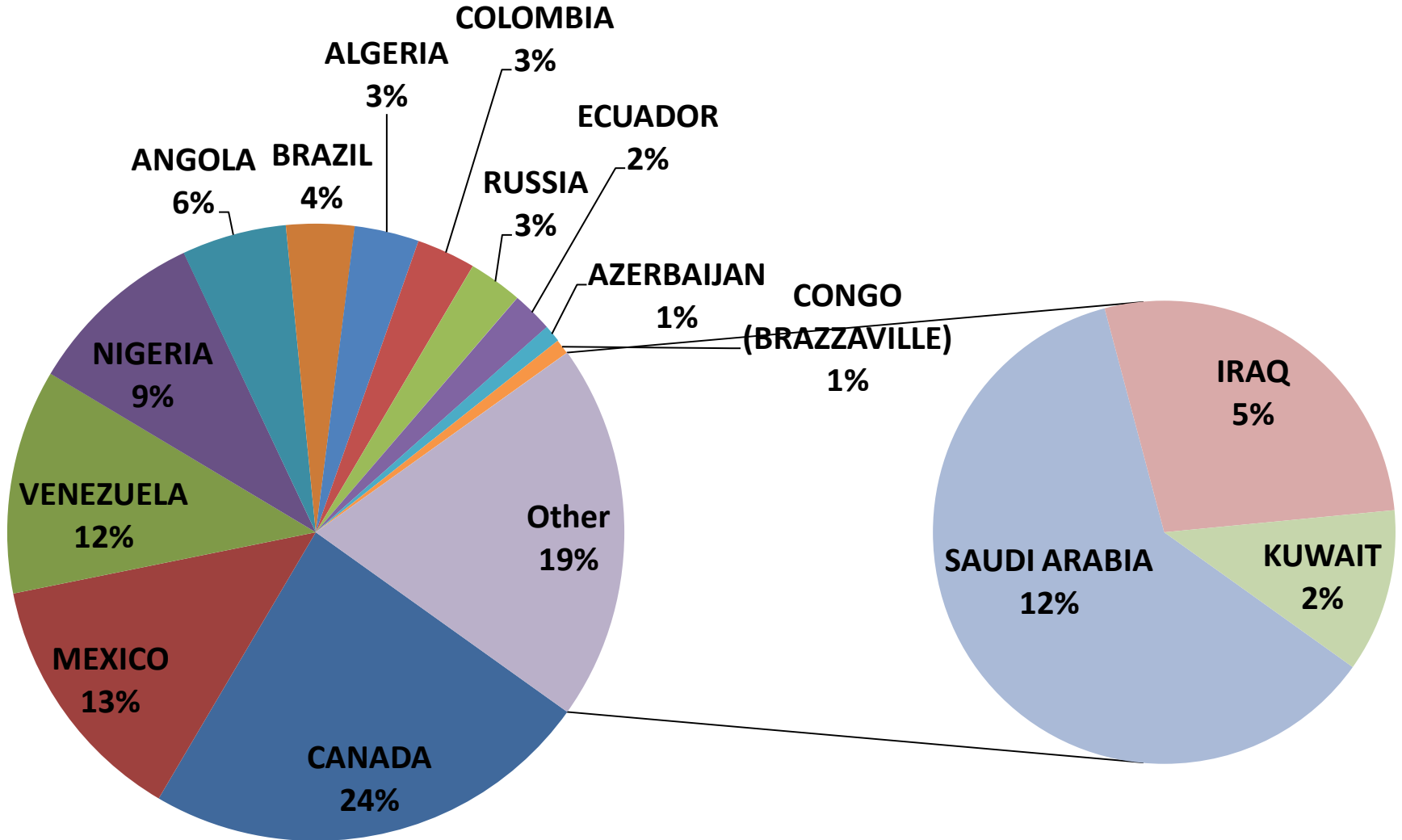
000s barrels



Source: EIA

# 2009 US Crude Oil Imports (Top 15 Countries)

000s barrels



Even if it were realistic or desirable  
to eliminate imports from  
Venezuela and Mid-East  
– what would that percentage be?

- 57 percent TIMES 31 per cent =  
18 percent
- That means the US would have to  
increase its domestic production  
2% to 4% a year over ten years!!!



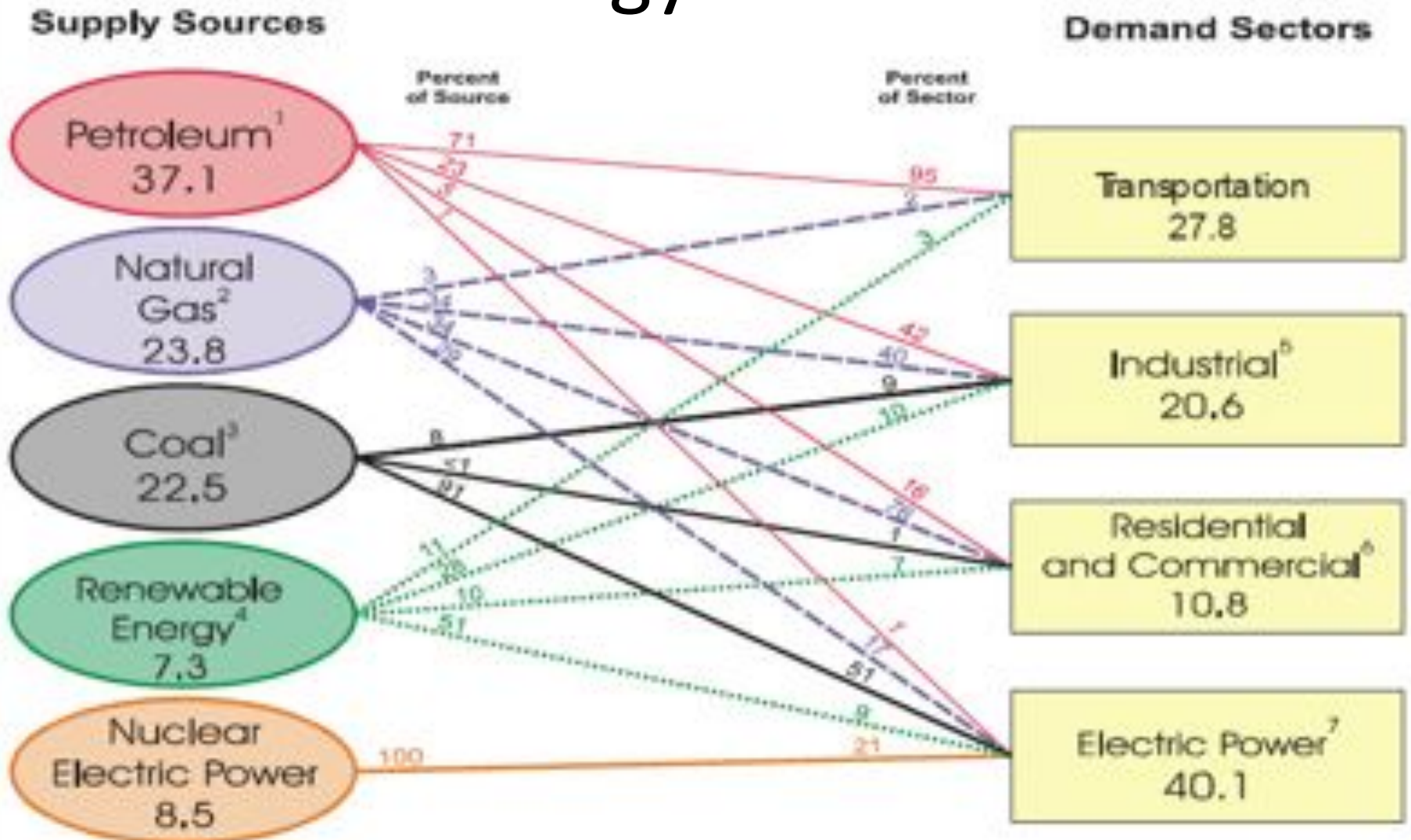
# PROBLEM FOR DEMOCRATS

## Where is the new American oil?

### Federal Offshore Leasing



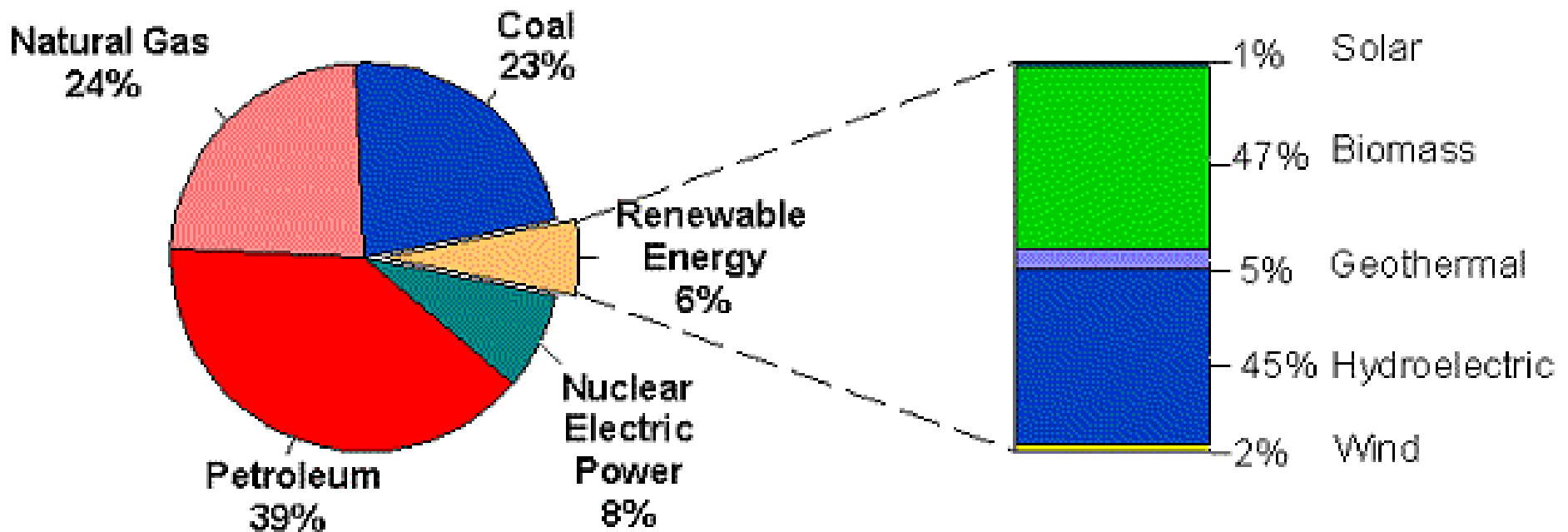
# US supply and demand energy balance



# US Energy Consumption 2002

Total = 97.551 Quadrillion Btu

Total = 5.881 Quadrillion Btu



[http://www.eia.doe.gov/cneaf/solar.renewables/page/rea\\_data/figh1.html](http://www.eia.doe.gov/cneaf/solar.renewables/page/rea_data/figh1.html)

# US Energy Consumption 2008

Total = 99.305 Quadrillion Btu

Total = 7.301 Quadrillion Btu

Petroleum  
37%

Nuclear  
Electric Power  
9%

Renewable  
Energy  
7%

Solar Energy  
1%

Hydroelectric  
34%

Geothermal Energy  
5%

Biomass  
53%

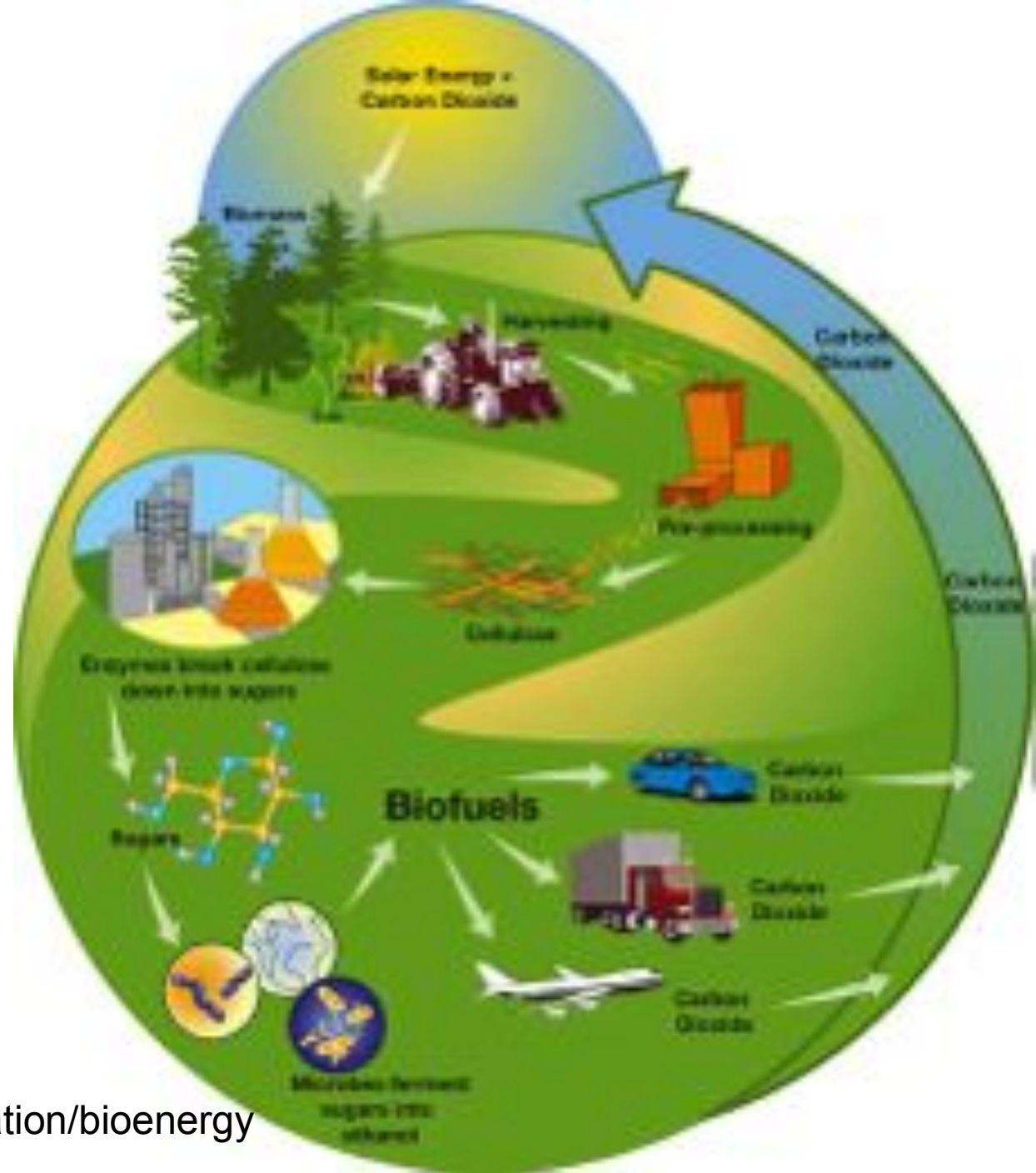
Wind Energy  
7%

Natural Gas  
24%

Coal  
23%

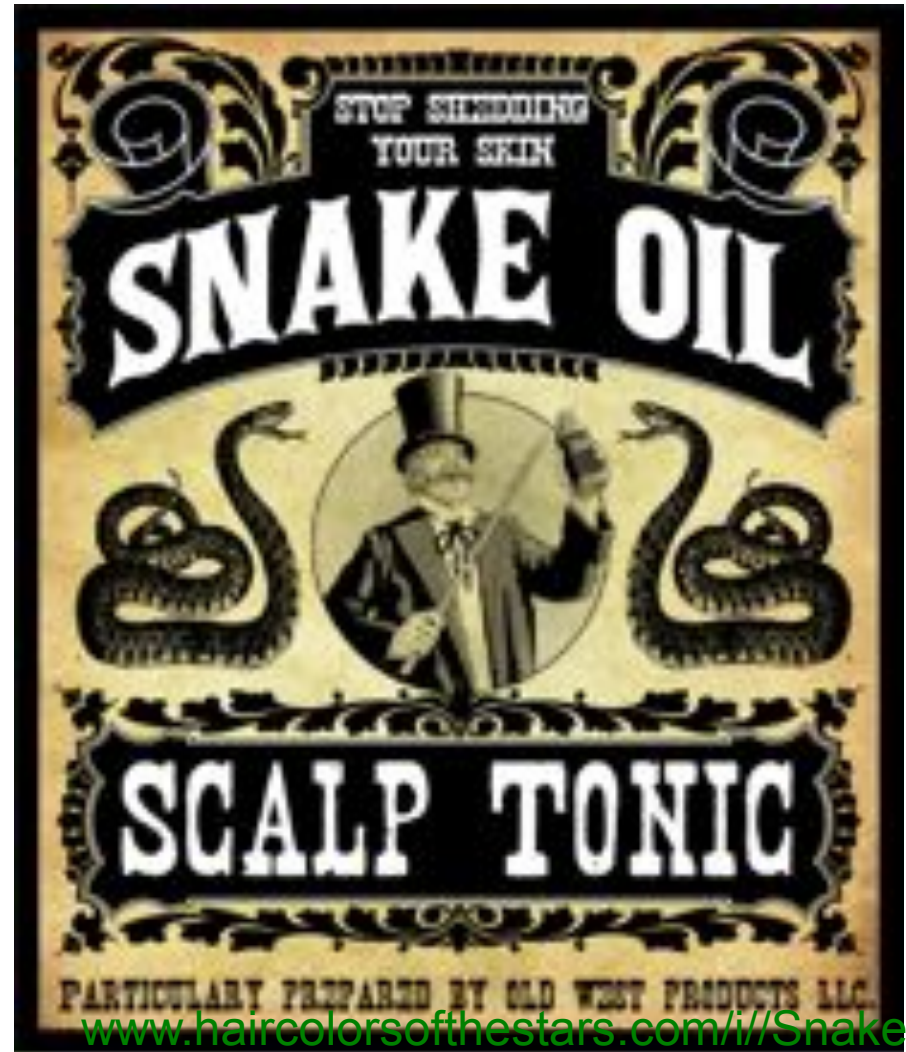


# Biofuels and the Carbon Cycle??



<http://www.jgi.doe.gov/education/bioenergy/co2cycle.jpg>

# Investment market



<http://media.photobucket.com/media/biofuels/Js/Jbakst/biofuels.jpg?o=2>

[www.haircolorsofthestars.com/i//Snake-oil.jpg](http://www.haircolorsofthestars.com/i//Snake-oil.jpg)

# Diesel fuel prices higher than regular gasoline prices since September 2004

- a break from the historical pattern of diesel fuel prices
  - High worldwide demand for diesel fuel,
  - tight global refining capacity available to meet demand
  - The transition to less polluting, lower-sulfur diesel fuels in the United States affected diesel fuel production and distribution costs.
  - The Federal excise tax for on-highway diesel fuel is 6 cents per gallon higher (at 24.4 cents/gallon) than gasoline tax.

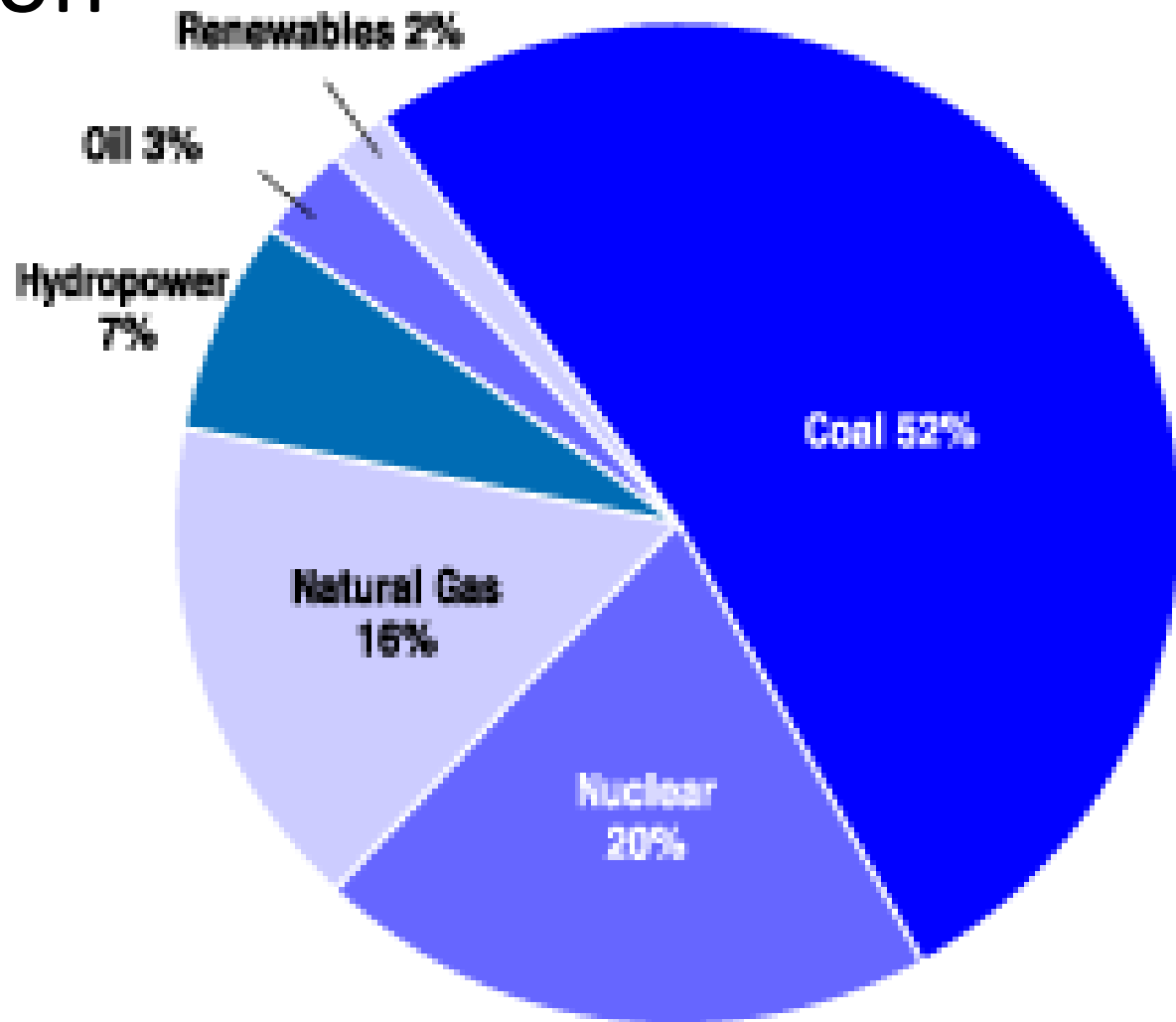
Electric cars are “green”-  
but where does/will the electricity  
come from??





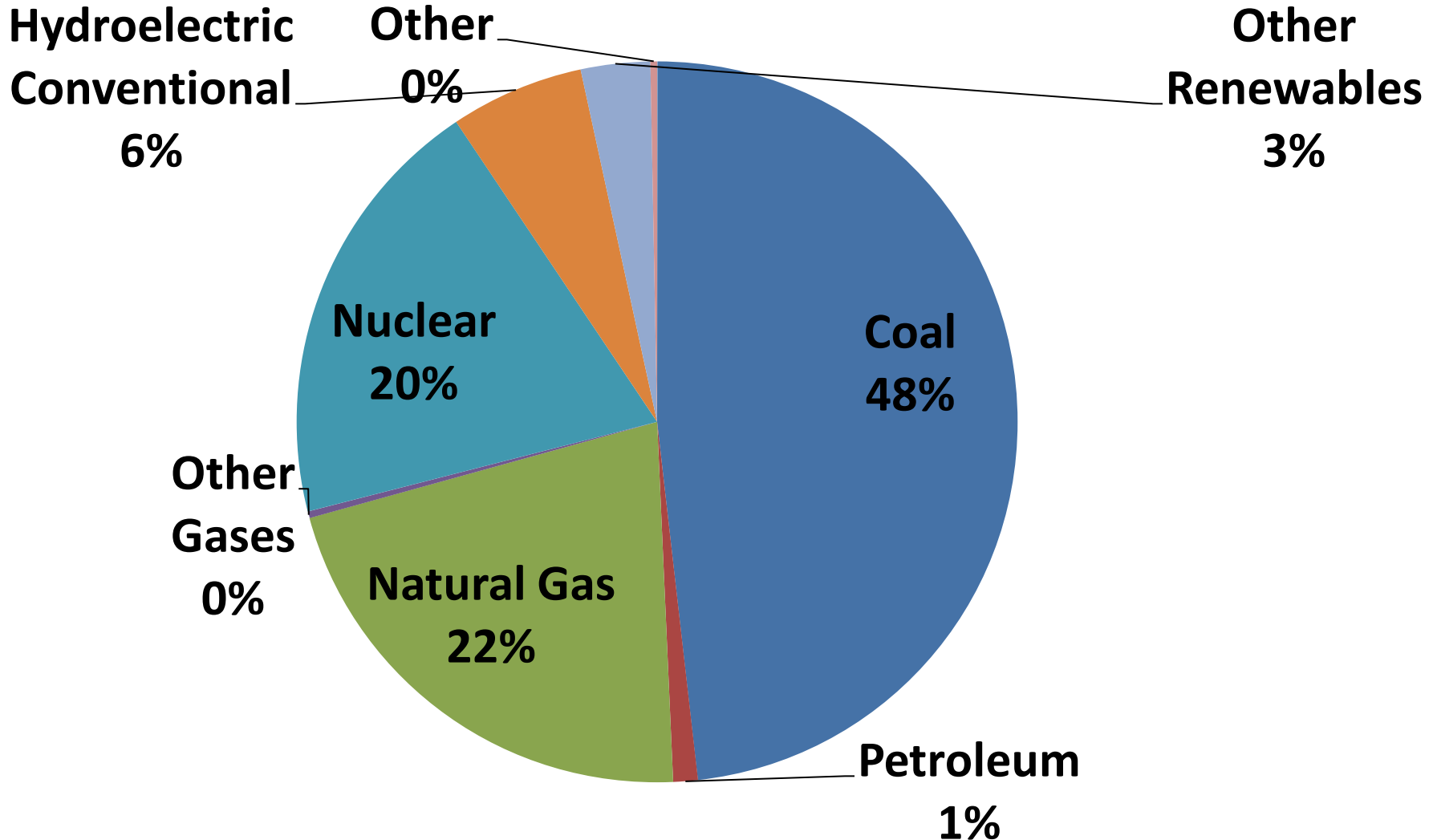
# 2005 Electrical Generation

## US Electricity Production Sources



Source: U.S. Department of Energy, Energy Information Administration

# 2009 Electrical Generation by Fuel Source



# Why not use fossil fuels?



# Animal power to liquid hydrocarbon



# internal combustion engine

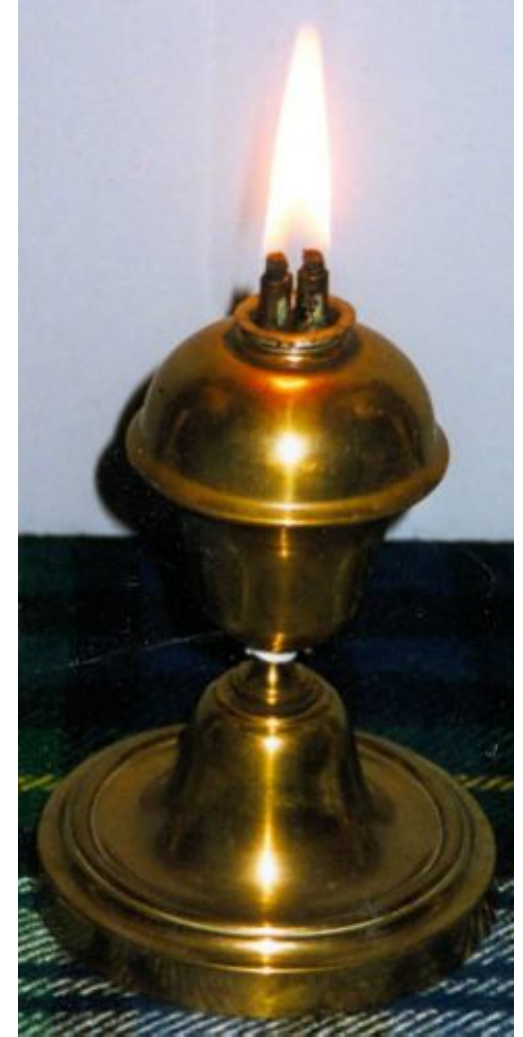
## Reliable since 1885



# Do “future generations” need fossil fuels?

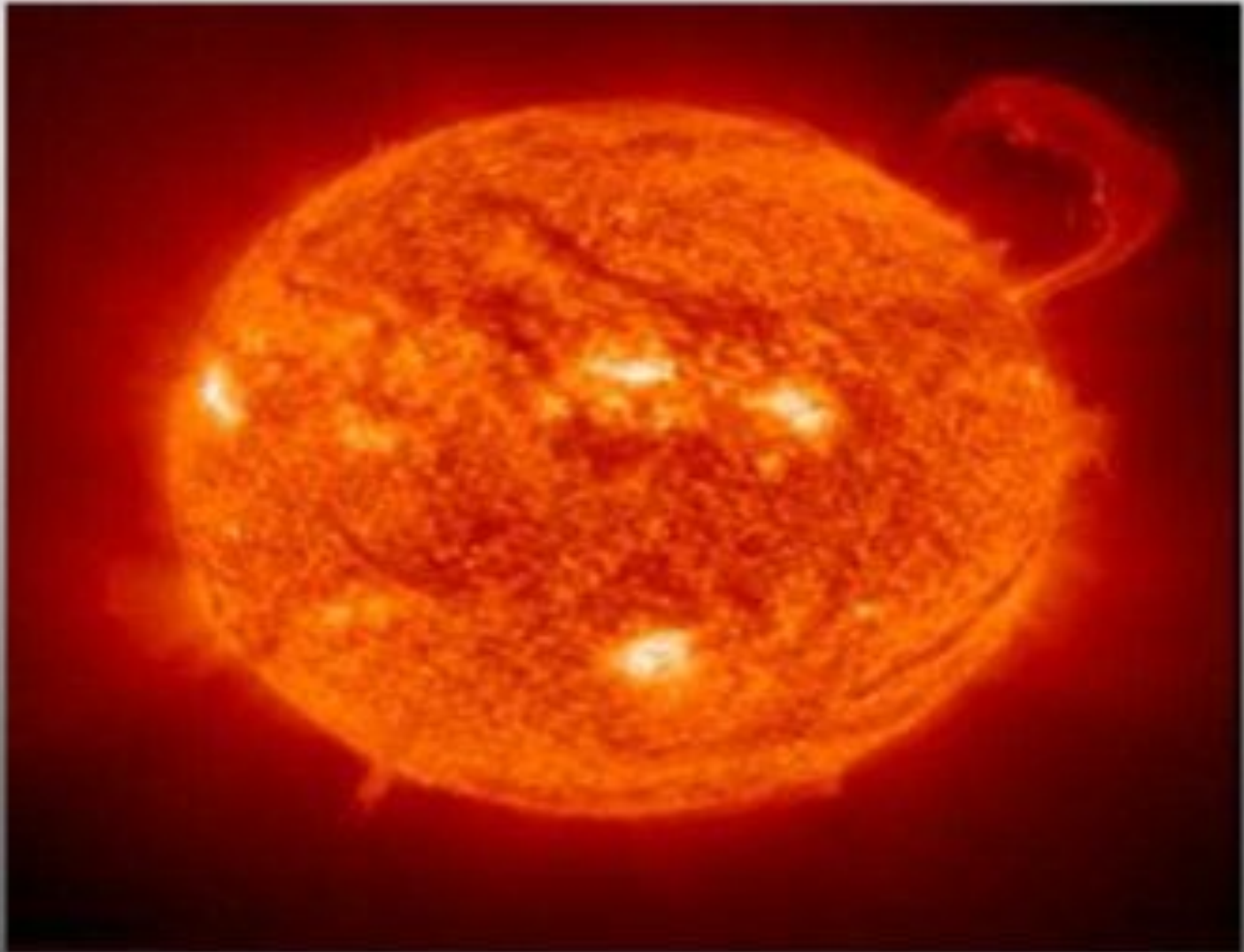


<http://capturethief.com/47G%20WHALE%20OIL%20LAMP%20SMALL%20BRASS%20cropped.jpg>



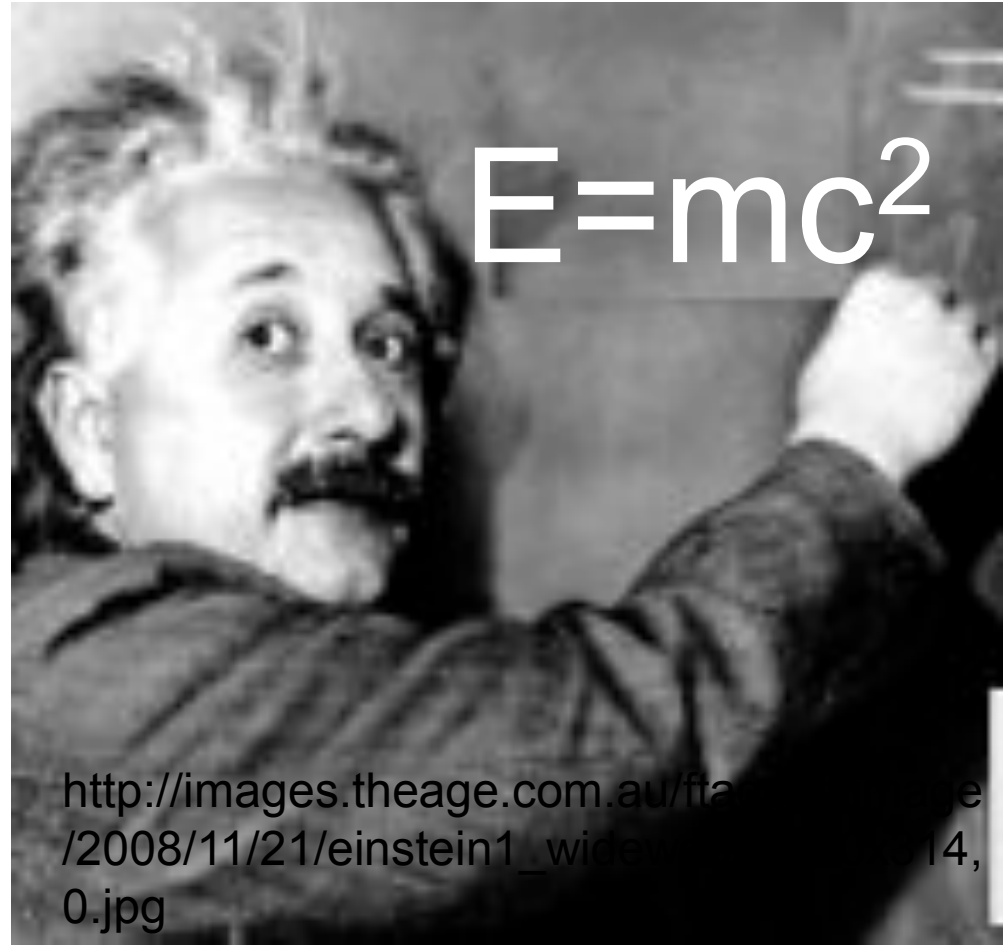
[http://img.dailymail.co.uk/i/pix/2007/06\\_02/whaleDM1406\\_468x498.jpg](http://img.dailymail.co.uk/i/pix/2007/06_02/whaleDM1406_468x498.jpg)

# The Resource is ENERGY



# Back to Basics

- Energy cannot be created or destroyed – it can only be **TRANSFORMED** from one form to another



[http://images.theage.com.au/frame/2008/11/21/einstein1\\_wide/14,0.jpg](http://images.theage.com.au/frame/2008/11/21/einstein1_wide/14,0.jpg)



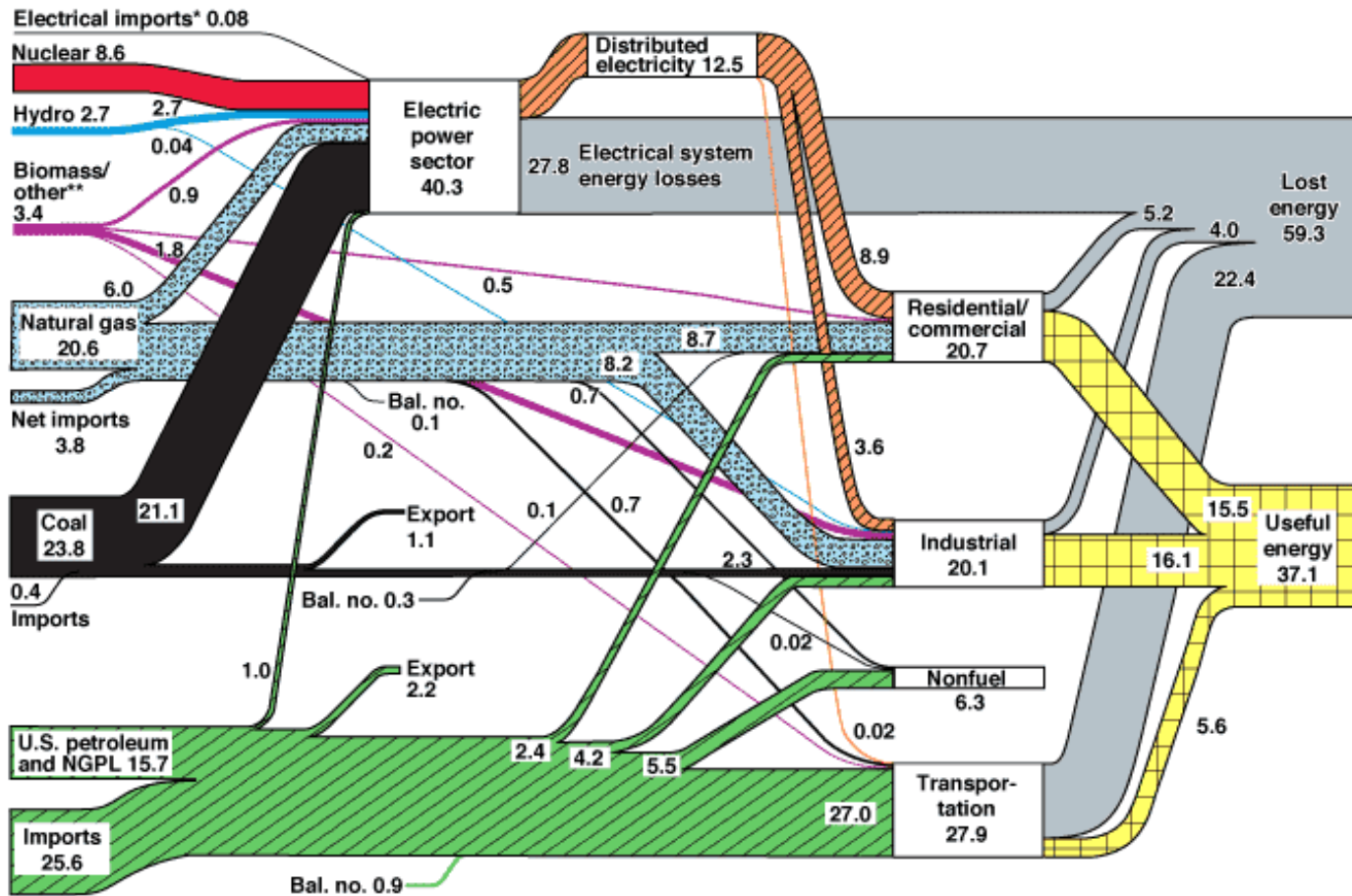
# SOURCES OF ENERGY AVAILABLE

- Nuclear Fusion (SUN: Main source)
  - Solar
  - Hydrocarbon fuel: coal, oil, natural gas (is all gas biotic?), ethanol
  - wind, hydro
  - fusion plants (future),
- Nuclear Fission
  - current nuclear plants
- Gravity
  - tidal and hydro (solar component)

# Goal of efficiency in use, storage and transportation of energy

U.S. Energy Flow Trends – 2002

Net Primary Resource Consumption ~103 Exajoules



June 2004

Lawrence Livermore  
National Laboratory  
Energy Research Center  
gov/flow

# US Policy: Promoting Energy Efficiency.

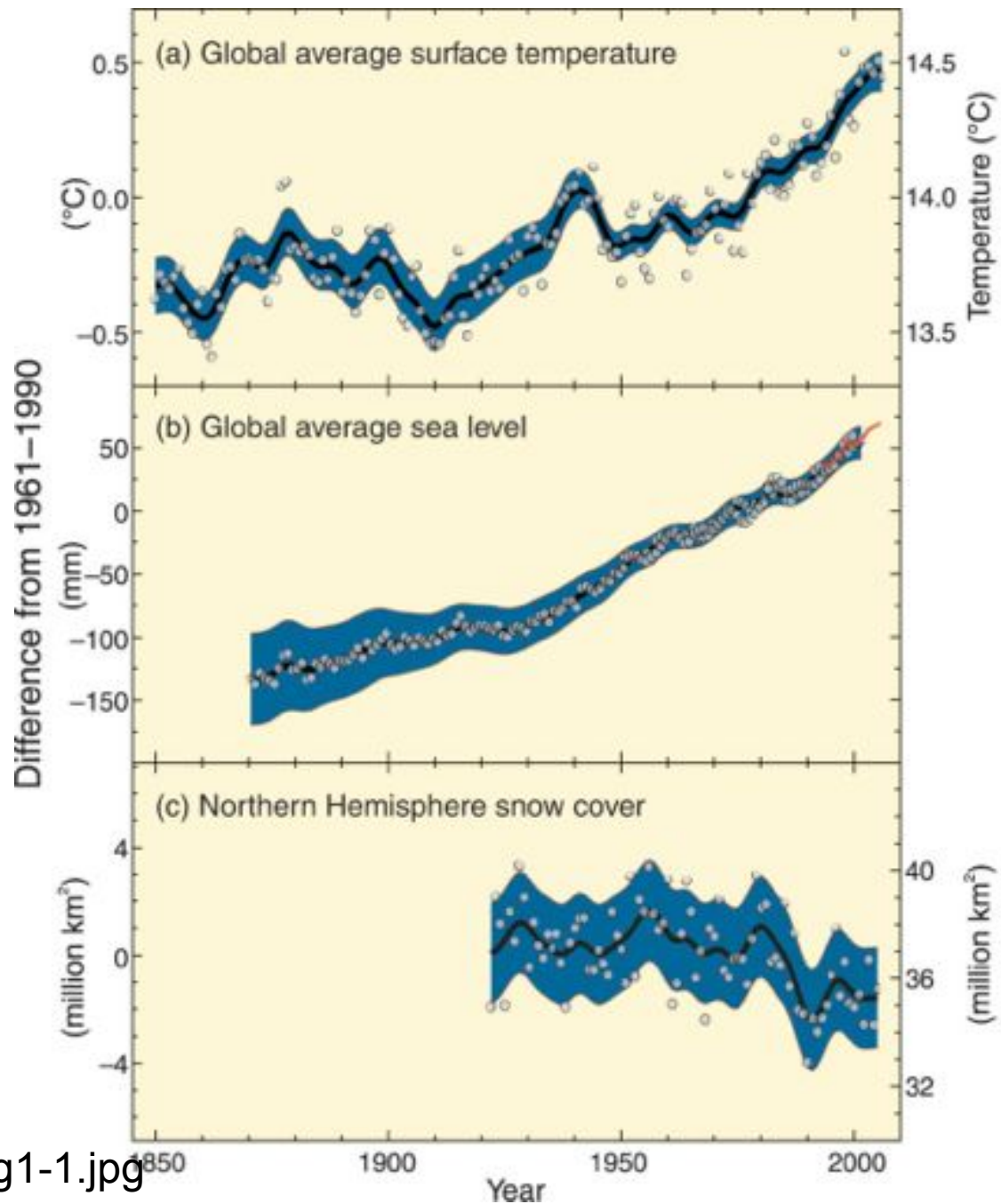
- “Promote investments in the transportation, electricity, industrial, building and agricultural sectors that reduce energy bills.”

Using fossil  
fuels efficiently  
makes sense.

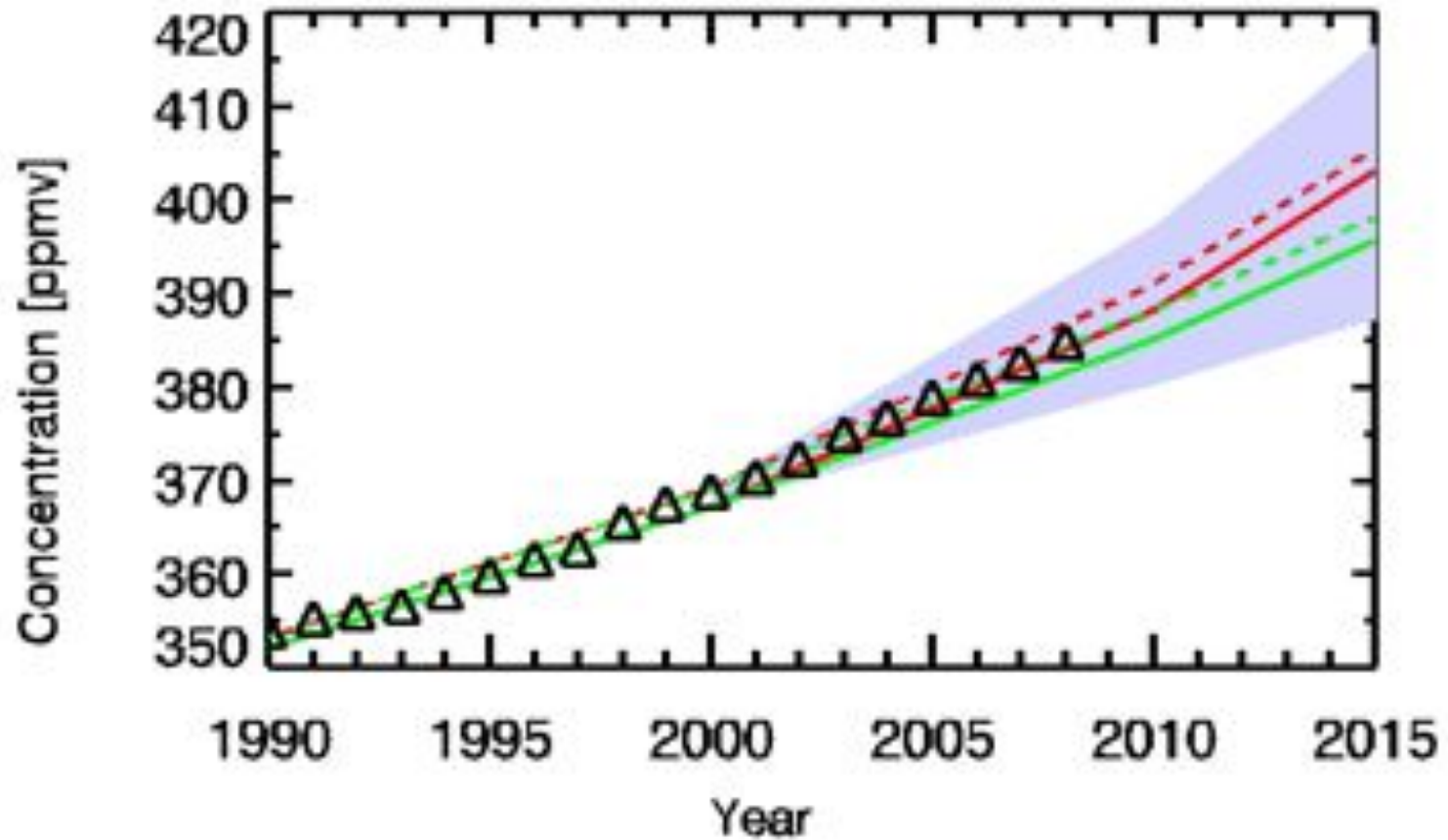
Does not using  
fossil fuels  
make any  
sense?



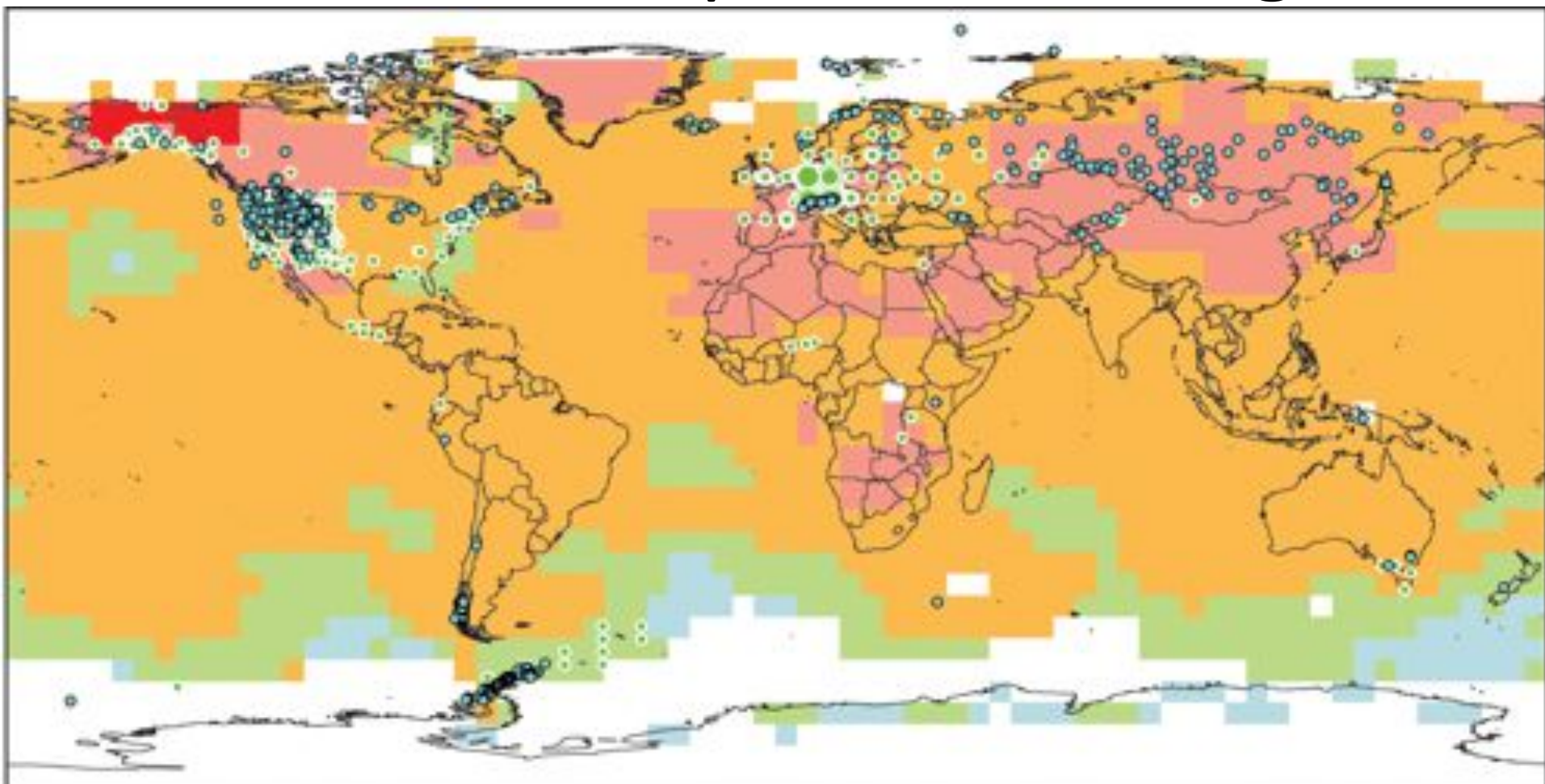
# Facts of a changing climate



# Concentration of Co2 in Atmosphere



# Modeled Temperature Changes



NAM		LA		EUR		AFR		AS		ANZ		PR*		TER		MFW**		GLO	
35%				28,115						0		120	24	764	28,586	1	85	765	28,671
94%	92%	98%	100%	94%	89%	100%	100%	96%	100%	100%	-	91%	100%	94%	90%	100%	99%	94%	90%

<http://www.ipcc.ch/graphics/syr/fig1-2.jpg>

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# Extent of Summer Arctic Ice



<http://www.pewclimate.org/docUploads/images/arctic-sea-ice-decline.gif>



Depleting non-renewable resources to generate energy need NOT be **SYNONOMOUS** with emissions of greenhouse gases.



# US Policy Closing the Carbon Loophole and Cracking Down on Polluters

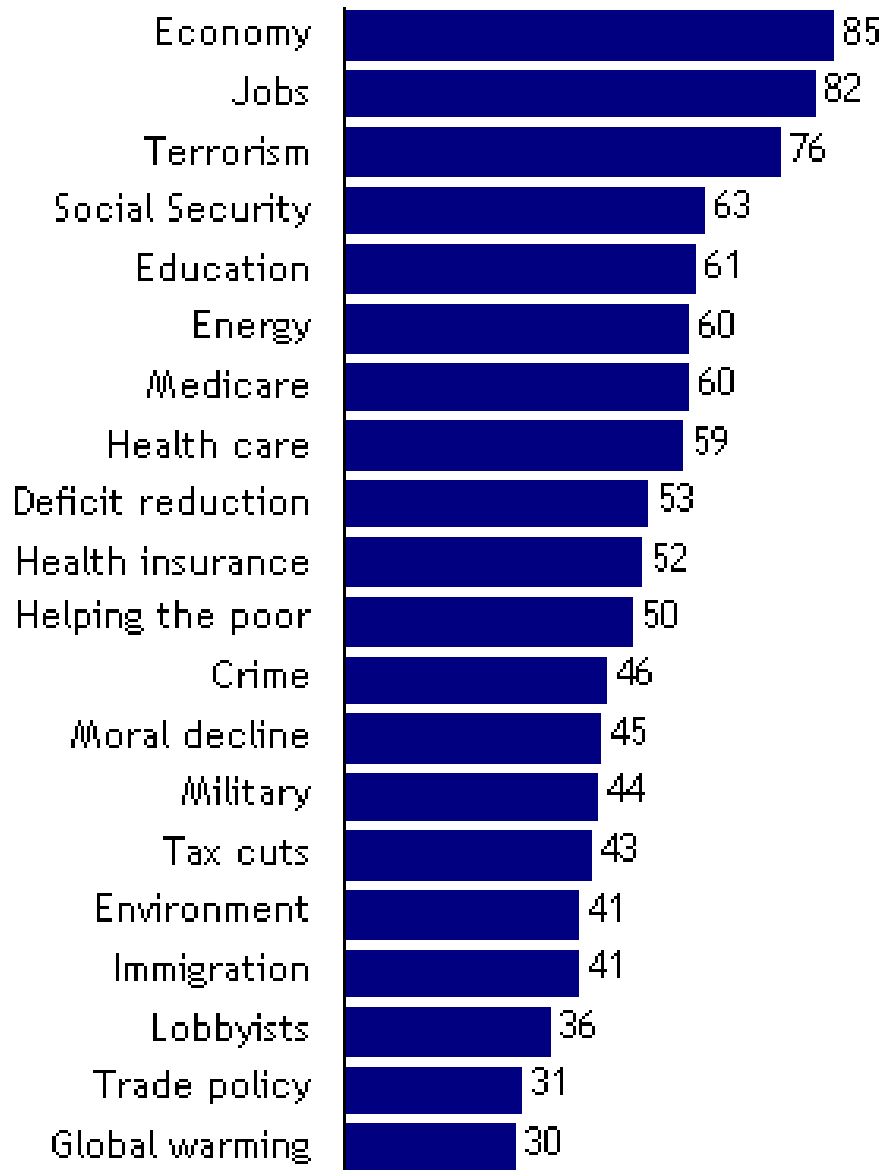
- “We must take immediate action to reduce the carbon pollution that threatens our climate and sustains our dependence on fossil fuels.  
...limiting the amount of carbon polluters are allowed to pump into the atmosphere.”

**Meanwhile,  
what do  
Americans  
think about  
Global Climate  
Change?**



## Top Priorities for 2009

*Percent rating each a "top priority"*



# American Priorities Pew Poll

<http://people-press.org/report/485/economy-top-policy-priority>

"Do you believe the theory that increased carbon dioxide and other gases released into the atmosphere will, if unchecked lead to global warming and an increase in average temperatures, or not?"

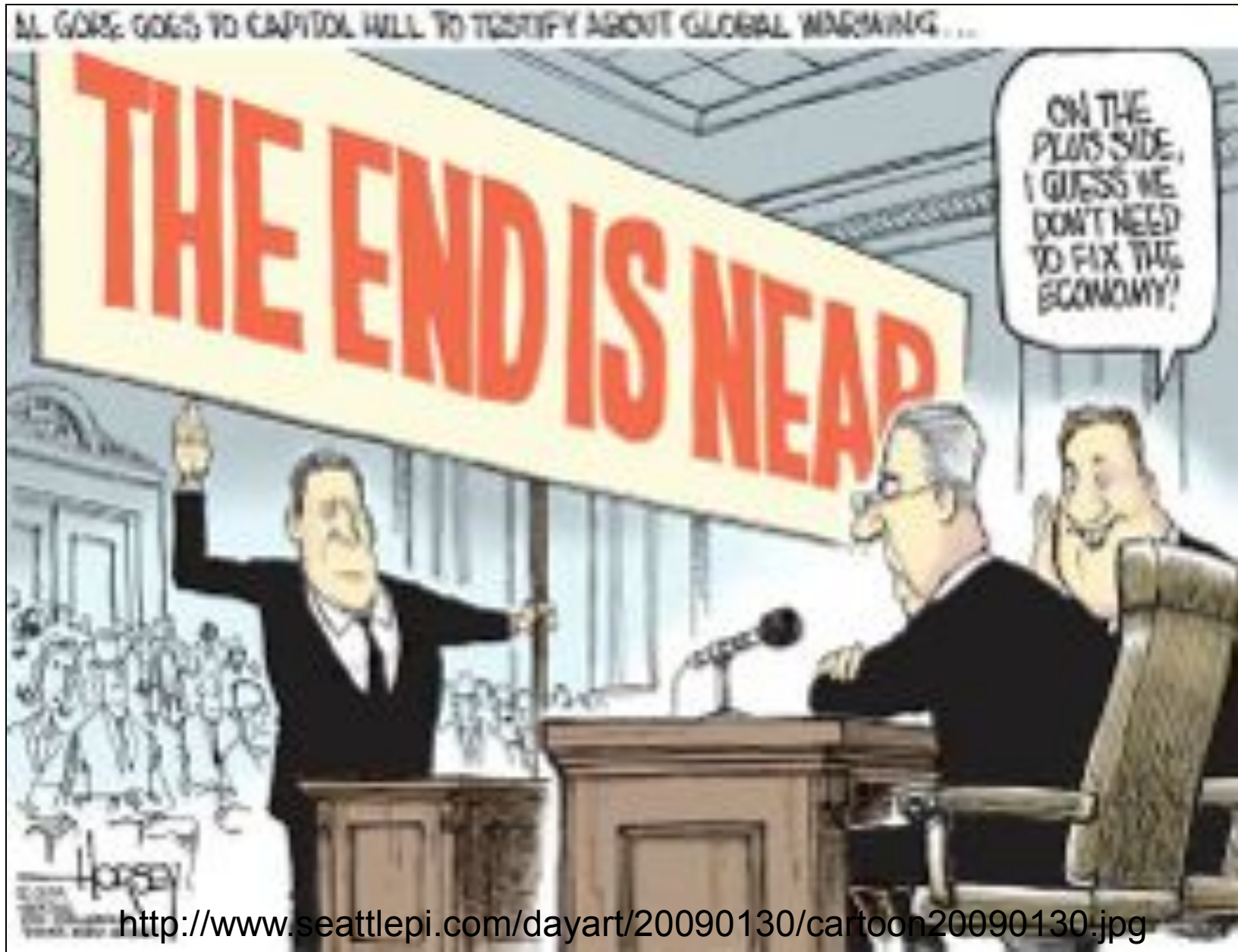
	1997	2009
Believe	67%	51%
Do not believe	21%	29%
Not sure	12%	21%

Harris Poll was conducted online within the United States November 2 and 11, 2009 among 2,303 adults (aged 18 and over).

# Belief in Global Climate Change by Party Affiliation

	Total	Party ID		
		Republican	Democrat	Independent
	%	%	%	%
Believe	51	28	73	49
Do not believe	29	51	8	31
Not sure	21	21	19	20

# Economic Crisis and Climate



# The public does not trust scientists

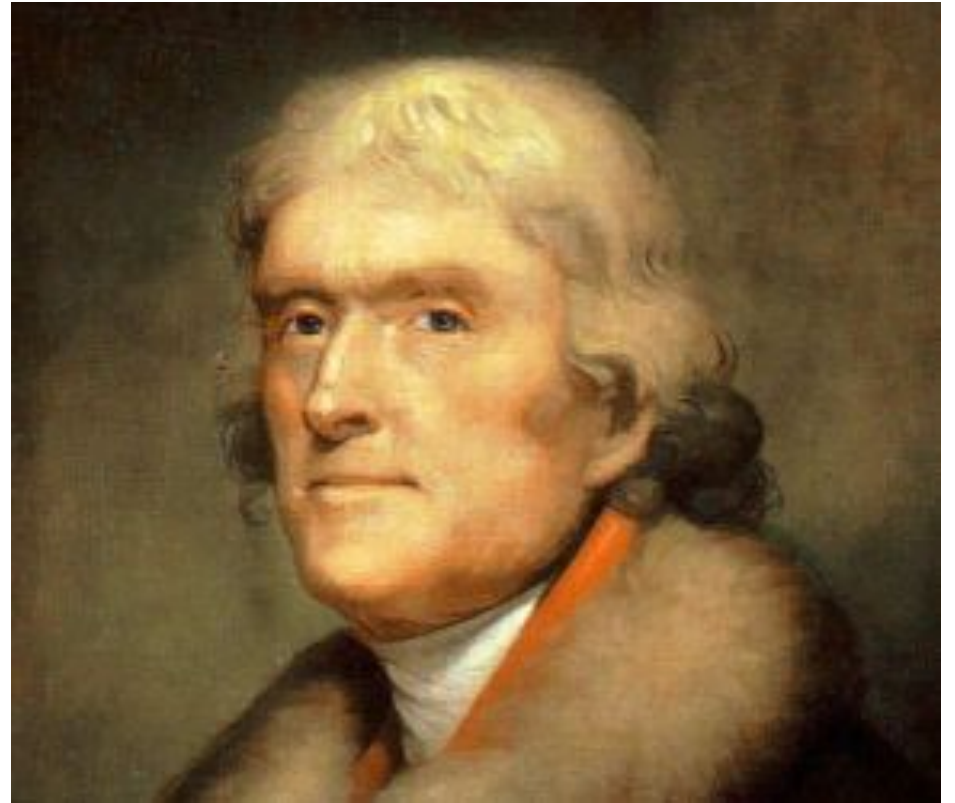
- Climategate Scandal
- Disbelief in Climate Change
- Scientists only observers on many major policy committees
- Scientists are demonized by US right wing



# Scientists



Benjamin Franklin



Thomas Jefferson

# Goal of reduction of emissions



# The problem may be that fossil fuels are too cheap and are not scarce enough

(1946-Present) in January 2010 Dollars  
© www.InflationData.com  
Updated 3/11/2010



[http://inflationdata.com/inflation/images/charts/Oil/Inflation\\_Adj\\_Oil\\_Prices\\_Chart.htm](http://inflationdata.com/inflation/images/charts/Oil/Inflation_Adj_Oil_Prices_Chart.htm)

Source of Data:  
Oil Prices- [www.ioga.com/Special/crudeoil\\_hist.htm](http://www.ioga.com/Special/crudeoil_hist.htm)  
CPI-U Inflation Index- [www.bls.gov](http://www.bls.gov)

# Carbon Sequestration Options



# Nuclear Energy

“We also need to find safer ways to use nuclear power and store nuclear waste.”

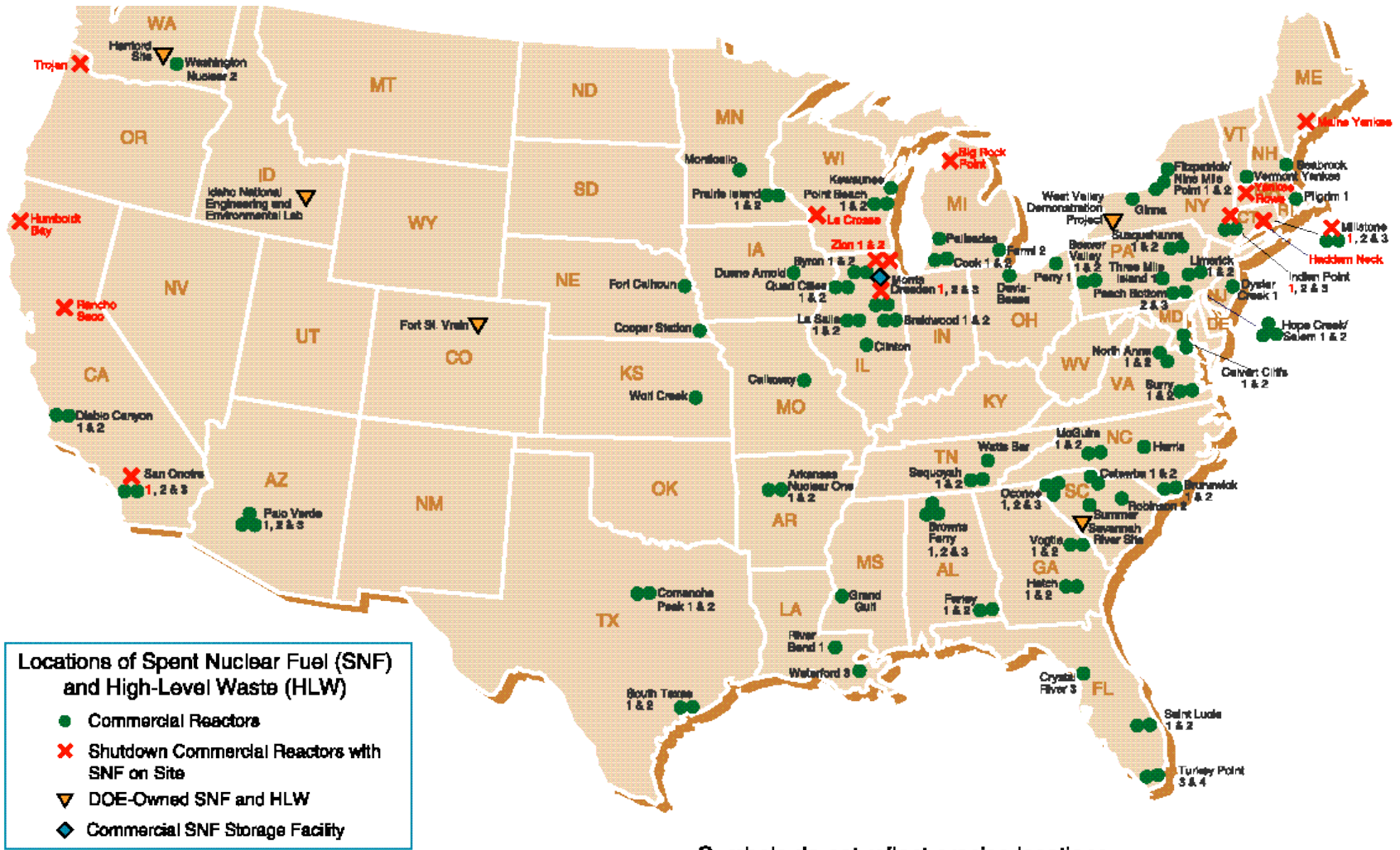
**President Obama ON CLEAN ENERGY**

Trinity Structural Towers  
Manufacturing Plant

Newton, Iowa April 22, 2009



# Cost of storing nuclear waste



**Locations of Spent Nuclear Fuel (SNF) and High-Level Waste (HLW)**

- Commercial Reactors
- ✕ Shutdown Commercial Reactors with SNF on Site
- ▼ DOE-Owned SNF and HLW
- ◆ Commercial SNF Storage Facility

Plutonium, non-DOE research SNF, and naval SNF (sites not shown) will be shipped to a DOE site prior to pickup for disposal

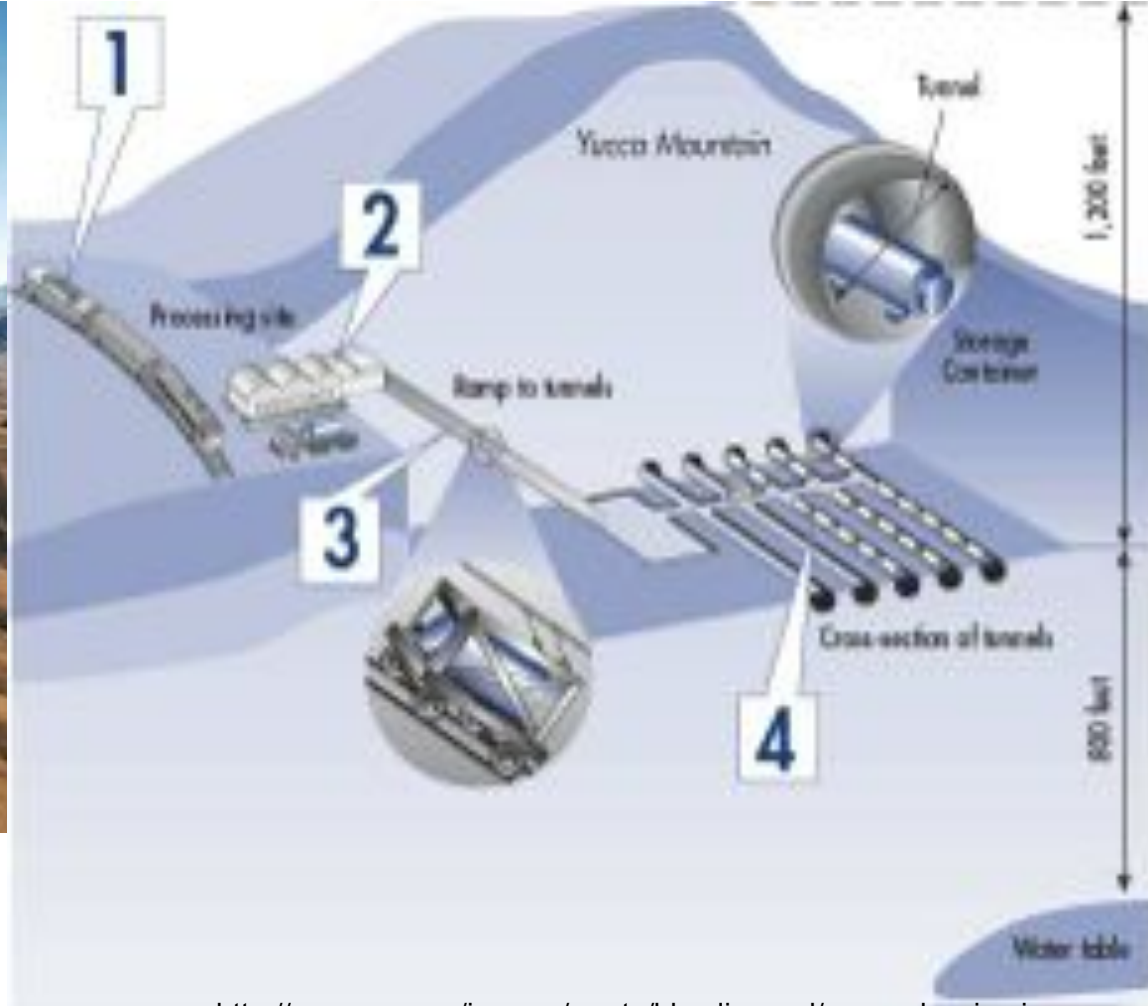
Symbols do not reflect precise locations

FV101-2

MAP1090 all names no rns hqcc.fn7

# CLOSED

## Yucca Mountain Nuclear Storage



<http://www.nrc.gov/images/waste/hlw-disposal/yucca-drawing.jpg>

[http://www.world-nuclear-news.org/uploadedImages/wnn/Images/Yucca%20Mountain\(1\).jpg](http://www.world-nuclear-news.org/uploadedImages/wnn/Images/Yucca%20Mountain(1).jpg)

# Cost of Transporting Nuclear Waste



<http://www.nci.org/3img/pswan-lg.jpg>

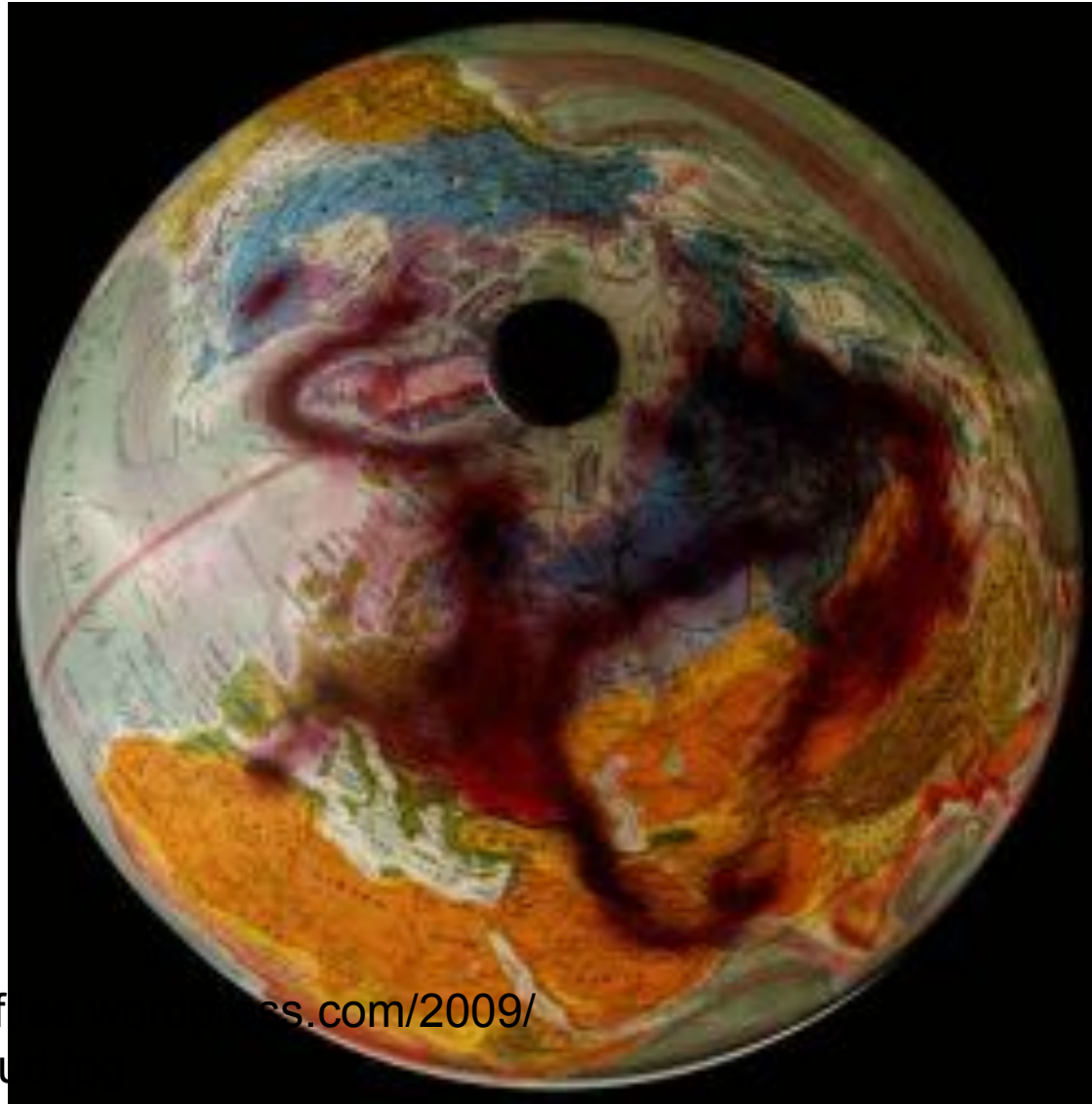


# Non-proliferation Issues



<http://www.treasurehuntadventures.com/pimg/bomb.jpg>

# Risks of Nuclear Industrial Accidents



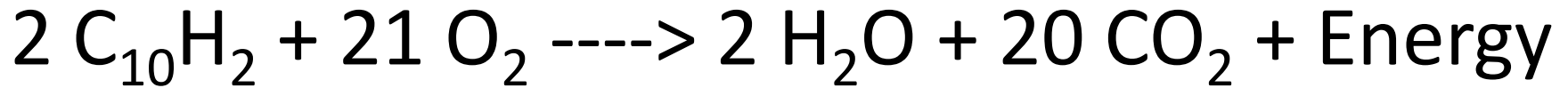
<http://citizenzoo.com/2009/06/06/chernobyl-cloud>

- **WHAT ABOUT NATURAL GAS?**



# Combustion of fossil fuels

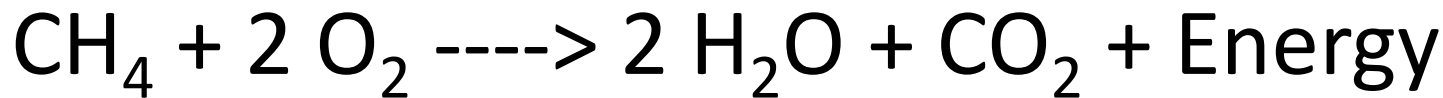
- Coal



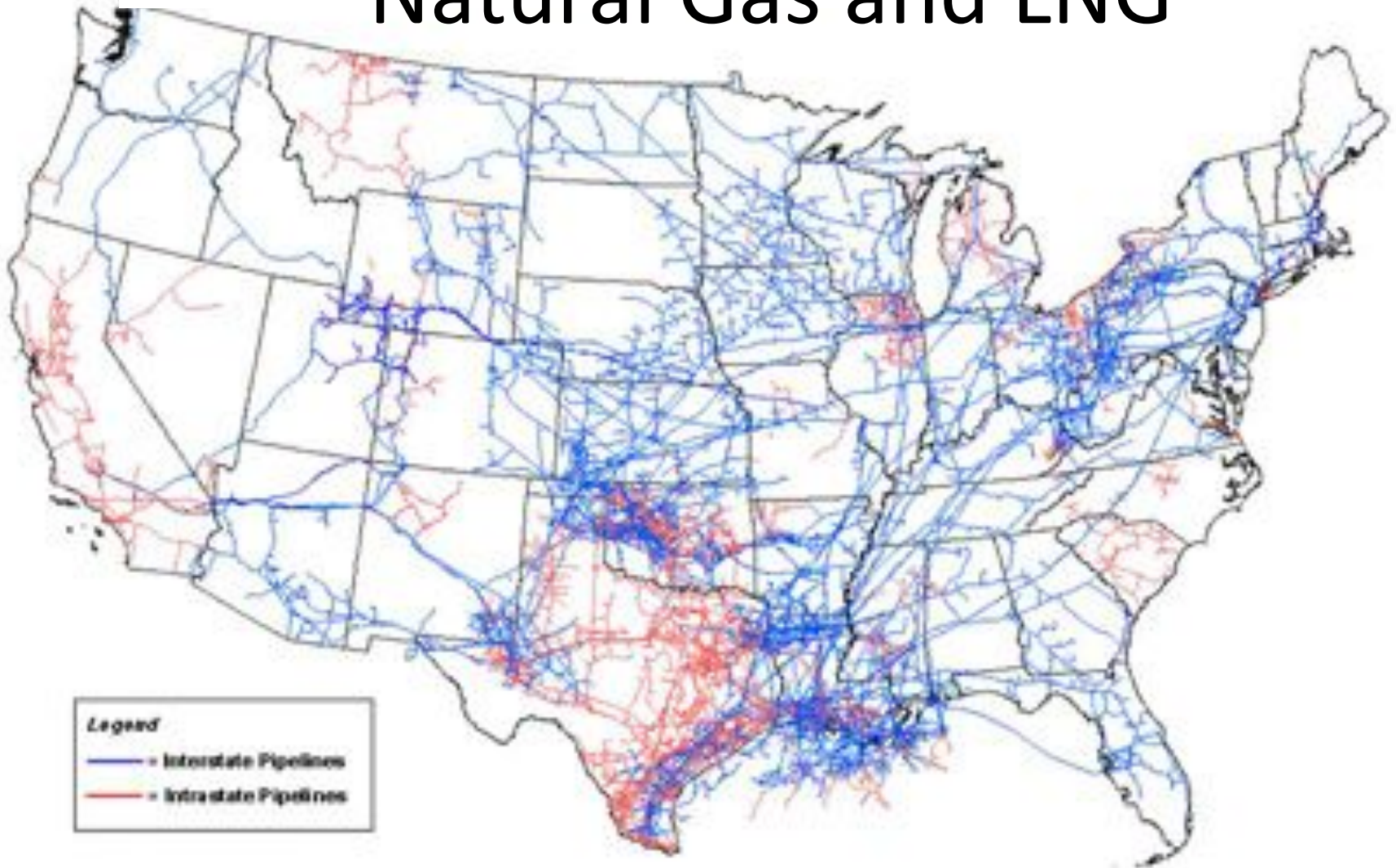
- Gasoline



- Methane (natural gas)



# Available Infrastructure for Natural Gas and LNG



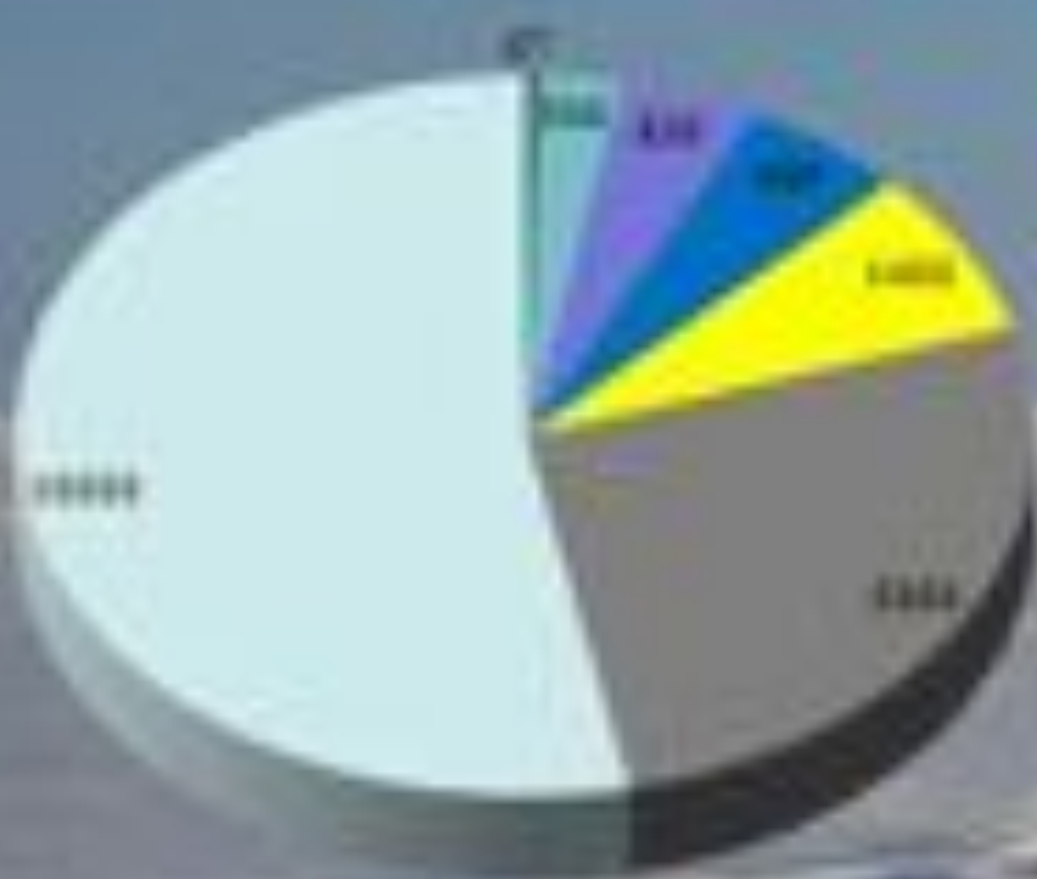
# Potential of Methane Hydrates



By Laris Karklis — The Washington Post

# Distribution of Organic Carbon on Earth

Units = 1 billion tonnes of carbon



- Plant material
- Soil
- Dead (includes all plants)
- Dissolved organic matter in oceans
- Ice
- Exposable & non-exposible fossil fuels (incl. all natural gas)
- Atmosphere

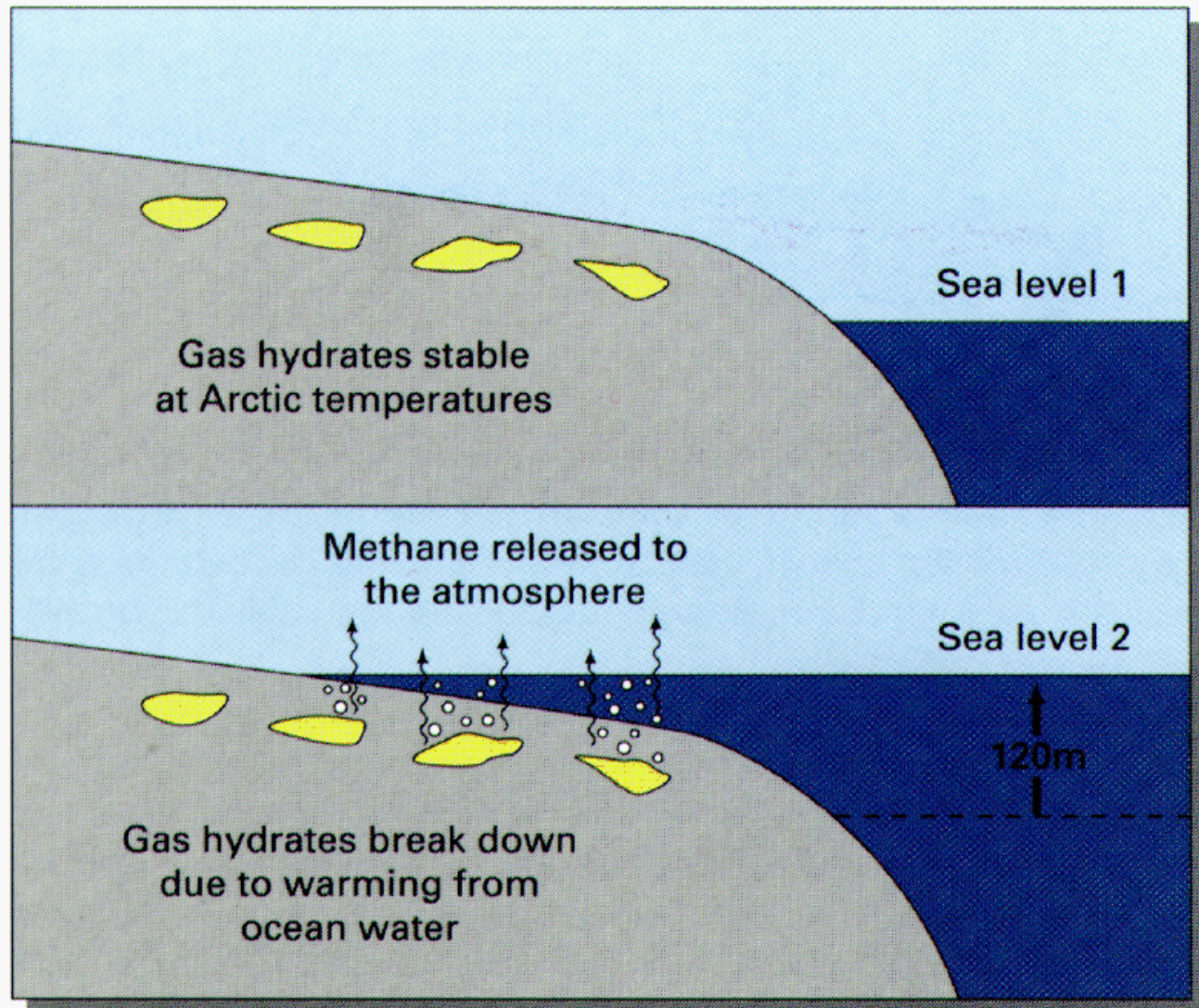
# Methane Hydrate-North America

- ✓ Petroleum System
- ✓ Infrastructure
- ✓ Technology
- ✓ Economics & Risk





# Methane Hydrate Greenhouse Driver



*Sea-level rise causes relatively warm ocean water to cover cold Arctic strata. The resulting breakdown of stable gas hydrates within the sediment releases gas into the atmosphere.*

# Government Money Promised for Energy

- \$11 billion for a bigger, better, and smarter grid that will move renewable energy from the rural places it is produced to the cities where it is mostly used, as well as for 40 million smart meters to be deployed in American homes.
- \$5 billion for low-income home weatherization projects.
- \$4.5 billion to green federal buildings and cut our energy bill, saving taxpayers billions of dollars.

# Government Money Promised for Energy

- \$6.3 billion for state and local renewable energy and energy efficiency efforts.
- \$600 million in green job training programs – \$100 million to expand line worker training programs and \$500 million for green workforce training.
- \$2 billion in competitive grants to develop the next generation of batteries to store energy.

# Government Money Promised for Energy

- **Investing in the Next Generation of Energy Technologies.** Invest \$150 billion over ten years in energy research and development to transition to a clean energy economy.

# What is the real scale of the problem?

- \$150 billion OVER TEN YEARS = \$15 billion a year investment in a “clean energy future”
- EXAMPLE: \$45.22 Billion profit only for Exxon Mobil for 2008
- Current US deficit projection is \$12 trillion

# Some money not yet appropriated



# American Heroes and Villains

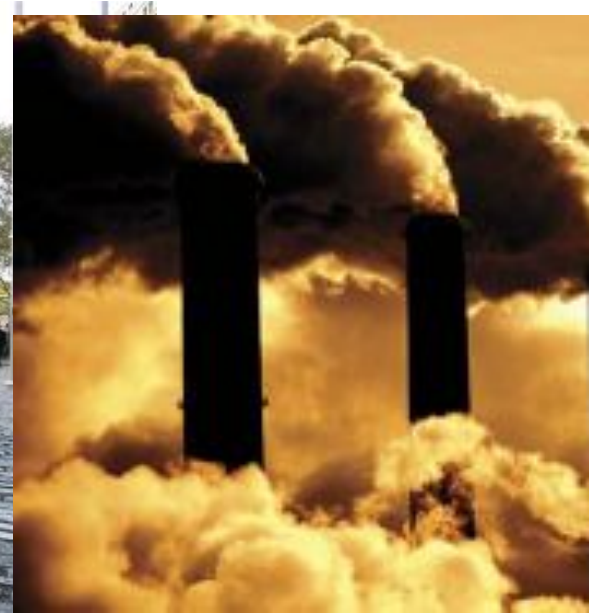


<http://korkastradio.com/wp-content/uploads/soldier-and-flag.jpg>



<http://www.cracked.com/blog/wp-content/uploads/2009/03/banker300px.jpg>

If Americans were willing to spend trillions on The War – why don't we want to spend trillions on The Recovery and The Climate?





Who invests in new technology ??



# Technology

- Recognition of LONG TIME TO IMPLEMENT from idea to mass use
  - At least 3 years from idea to proto-type
  - At least 3 years from proto-type to pilot plant
  - At least 2 years from pilot to mass use of technology
  - Elections cycles are much shorter...

# “Closing the Carbon Loophole.”

- “By stemming **carbon pollution through a market-based cap**, we can address in a systematic way all the energy challenges that we face: curbing our dependence on foreign oil, reducing our use of fossil fuels, and promoting new industries right here in America.”

# Where is cap and trade?

7DN<sup>co</sup>  
BusinessandMedia.Org



Or any other  
market-based  
proposal for  
carbon  
reduction?

# US Policy

- “President Obama does not accept a future in which the jobs and industries of tomorrow take root beyond our borders. It is time for the United States to lead again. Under President Obama, we will lead again, by developing an American clean energy industry, a 21st century economy that flourishes within our borders.... “

*“No nation was ever ruined by trade.”*



Benjamin Franklin

# Promoting U.S. Competitiveness.

- “Ensure a level playing field for domestic manufacturing and secure significant actions to combat climate change by our trading partners.”

# Competitiveness: CHINA versus USA

- 6 days of school per week
- 9.5 months school per year
- 5 days of school, now 4 days a week in some states!
- 9 months school



<http://www.theclassicplussizewoman.com/blog/wp-content/uploads/2009/09/fat-kid-eating-chips-watching-tv-300x200.jpg>

<http://www.lettersfromshanghai.com/upload/BusyClassroom2.jpg>



# Are Renewable Energies Silver Bullets?



- “There aren't any silver bullets. There's no magic energy source right now. Maybe some kid in a lab somewhere is figuring it out. Twenty years from now, there may be an entirely new energy source that we don't yet know about. But right now, there's no silver bullet. It's going to take a variety of energy sources, pursued through a variety of policies, to drastically reduce our dependence on oil and fossil fuels.”
- **President Obama ON CLEAN ENERGY** Trinity Structural Towers Manufacturing Plant Newton, Iowa April 22, 2009

# Transition....

- “As I've often said, in the short term, as we transition to renewable energy, we can and should increase our domestic production of oil and natural gas. We're not going to transform our economy overnight. We still need more oil, we still need more gas. If we've got some here in the United States that we can use, we should find it and do so in an environmentally sustainable way. ”
- **President Obama ON CLEAN ENERGY** Trinity Structural Towers Manufacturing Plant Newton, Iowa April 22, 2009



**THE END**

