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Bureau of Economic Geology, The University of Texas at Austin

Global Energy Drivers and the US OCS

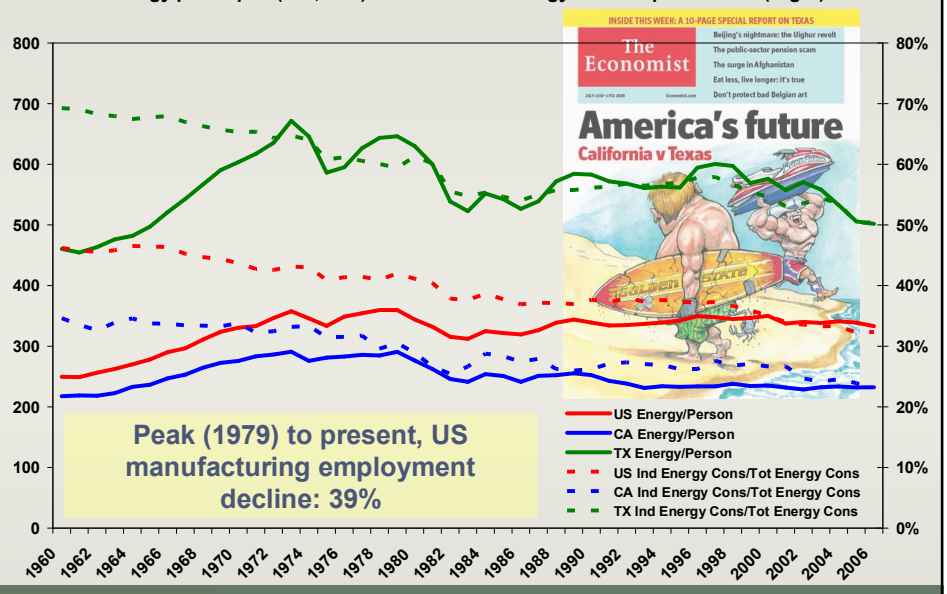
OCS Advisory Board Workshop, January 20, 2010

Dr. Michelle Michot Foss, CEE/BEG/JSG-UT

Do We Understand the Present?

- **Our energy present is a function of our demographic and economic past**
  - *Fundamental shifts are taking place*
- **For the foreseeable future, oil will remain critical to US and global energy supply**
  - *Natural gas will continue to gain market share contingent on development of internal markets and global trade*
- **New fuels and/or fuel technologies could increase in importance**
  - *Pace depends on cost and timing; incumbent infrastructure is dominant*
- **Materials and nonfuel minerals may be more important**
- **We deal in political rather than economic trade offs**
  - *Much of what we perceive in energy, economy, environment is a function of beliefs rather than evidence;* ***perception is reality***

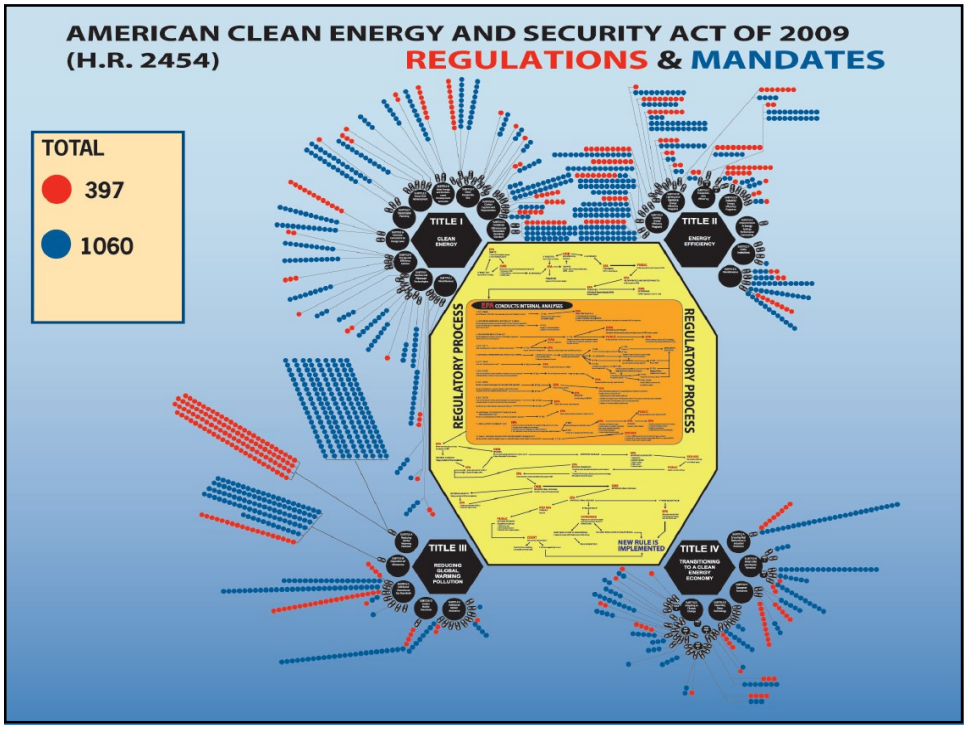
Energy per Capita (Btu, Left) and Industrial Energy Consumption Share (Right)

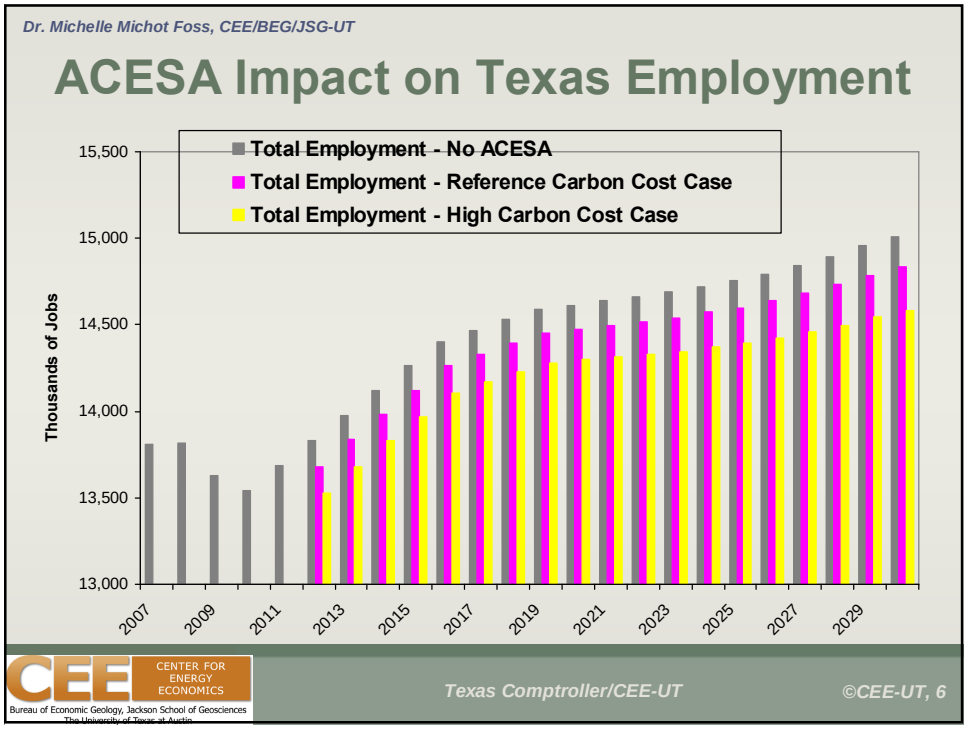


Climate Economics: An Insurance Valuation Problem

INSURANCE: Group claims stolen e-mails show risk in accepting climate change science. A major trade group for the insurance industry is warning that it is **"exceedingly risky" for companies to blindly accept scientific conclusions around climate change**, given the "serious questions" around the extent to which humans cause atmospheric warming. The National Association of Mutual Insurance Companies believes that the **new regulation leaves little room for companies to cast doubt on widely accepted assumptions about global warming…**The assertion was made in a letter to insurance regulators, who will administer the nation's first mandatory climate requirements on corporations in May. Large insurers will have to answer about a dozen questions related to the preparations they are taking to safeguard themselves from climatic hazards.

- 01/13/2010, Evan Lehmann, E&E reporter


AMERICAN CLEAN ENERGY AND SECURITY ACT OF 2009
(H.R. 2454)
REGULATIONS & MANDATES
TOTAL
397
1060
TITLE I
CLEAN ENERGY
TITLE II
ENERGY EFFICIENCY
TITLE III
REDUCING GLOBAL WARMING POLLUTION
TITLE IV
TRANSITIONING TO A CLEAN ENERGY ECONOMY
REGULATORY PROCESS
REGULATORY PROCESS
EPA CONDUCTS INTERNAL ANALYSES
NEW RULE IS IMPLEMENTED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ACESA Impact on Texas Employment
Total Employment - No ACESA
Total Employment - Reference Carbon Cost Case
Total Employment - High Carbon Cost Case
Thousands of Jobs
15,500
15,000
14,500
14,000
13,500
13,000
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
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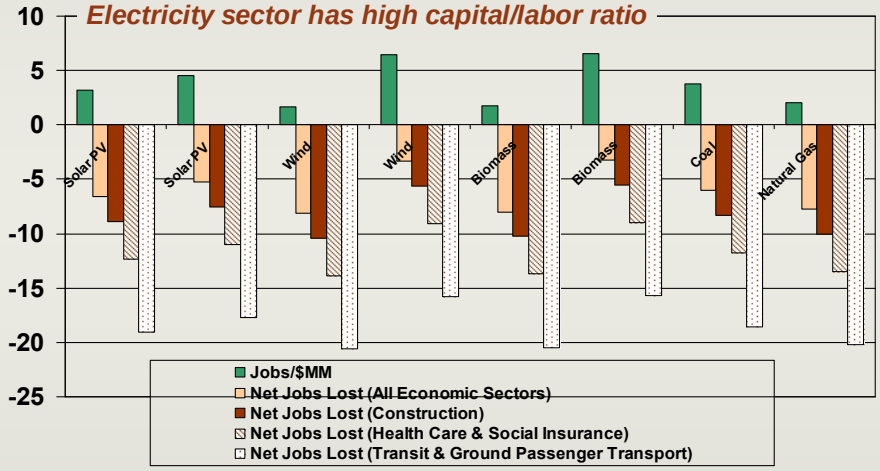
Green Jobs Debate: Jobs Gained and Lost with Incentives Programs



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CEE reconstruction based on "Creating Jobs with 'Green' Power Sources" by Hill Huntington, USAEE Dialogue, March 2009

Supply Peakology

- *If "oil is first found in the mind" then "peak oil" also is a mindset
  - Should oil prices be so high?
- It's a tough neighborhood (Geopolitics of Supply)
  - NOCs rule, but poor frameworks are bad for NOCs as well as IOCs; trade and openness are key
  - Competition for real estate in the Petroleum Heartland is tough
- ***Outside of the US, prevailing views are that we hoard our resources***

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** "Oil is first found in the mind", Norm Foster & Ed Beaumont, AAPG*

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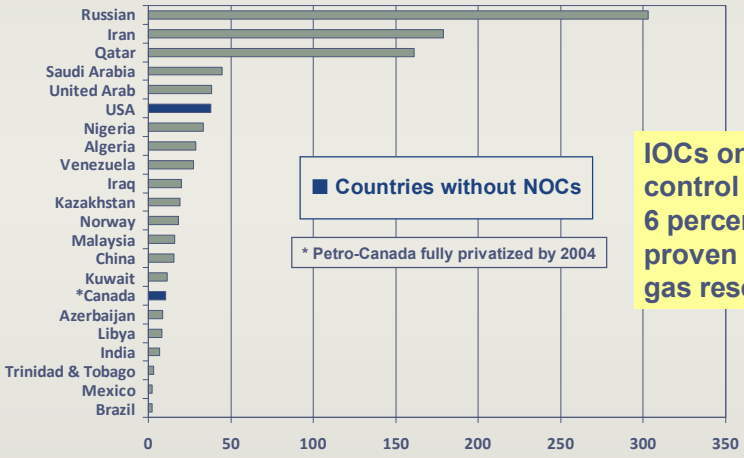
Top 20 Countries' Reserves 2006 (Bil. BOE)



IOCs only control roughly 6 percent of proven oil and gas reserves.

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BP, IEA, USEIA

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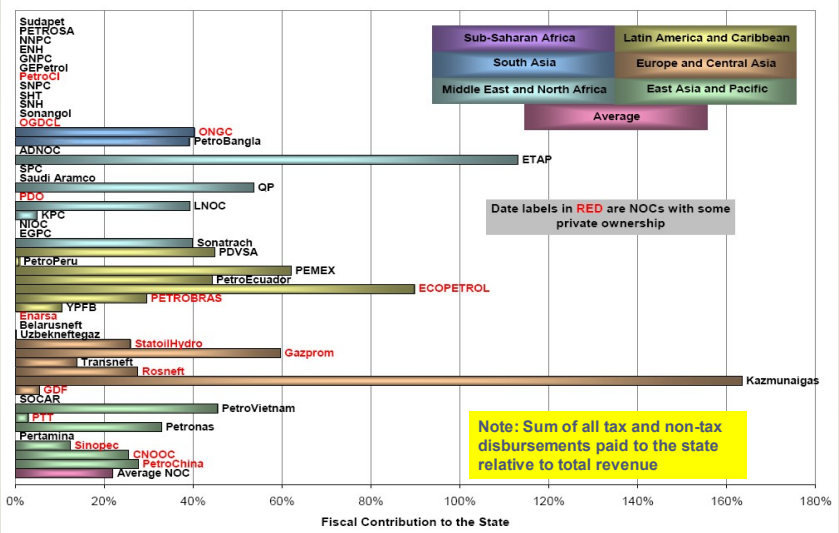
NOC Fiscal Contributions



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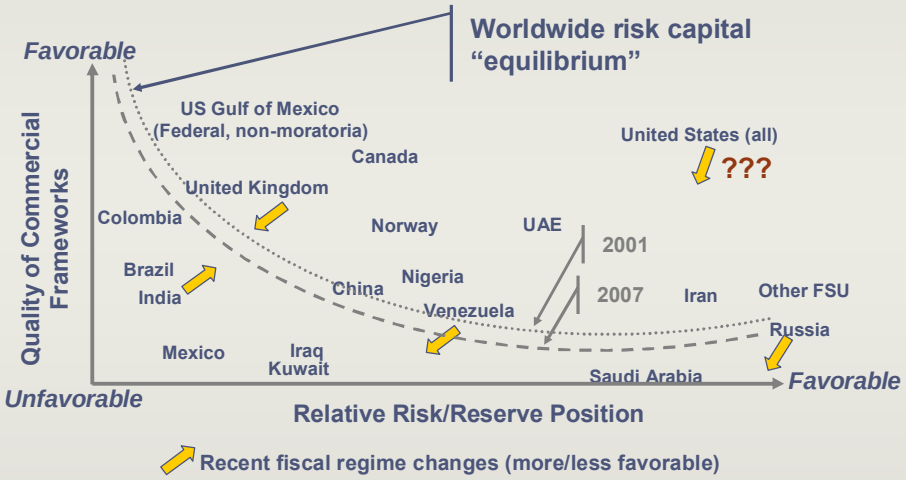
World Bank/CEE-UT. NOCs with private ownership bear less of the burden. Non-NOC operators contribute substantially.

Sample Countries: Upstream Regimes

An inverse relationship works against frameworks for FDI

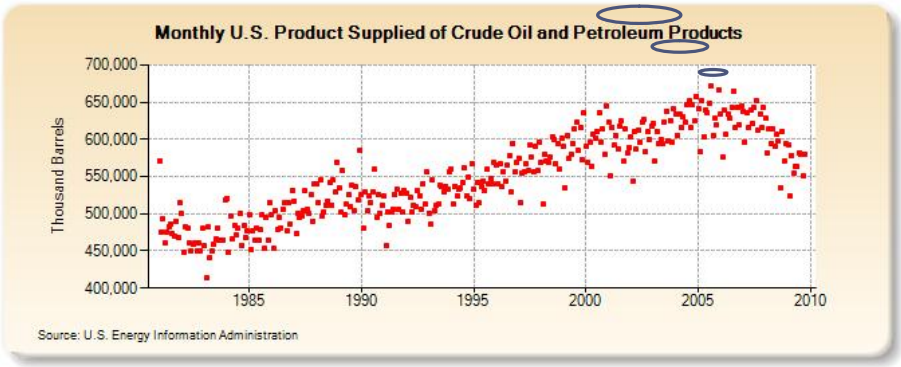


Demand Peakology

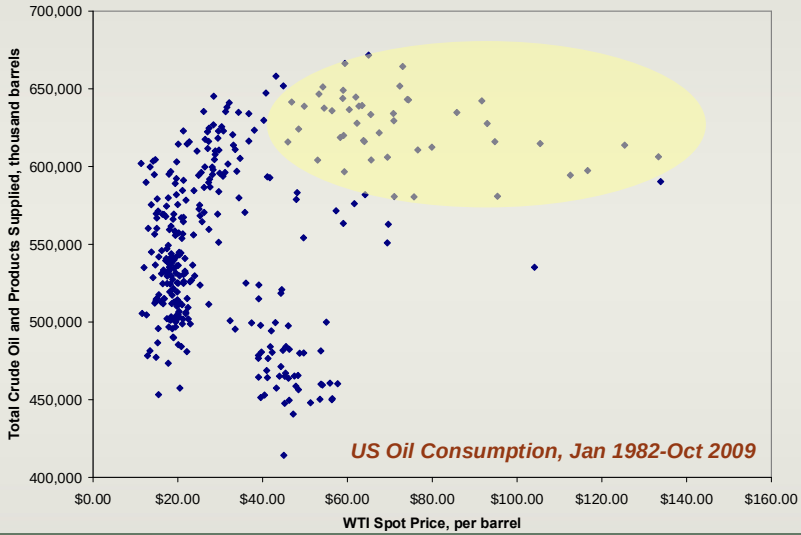
- Has world demand peaked?
- It's a tough neighborhood (geopolitics of subsidies)
  - Oil "fundamentals" and price do not reflect open and free signals of supply-demand balances
- Natural gas is different
  - Can nat gas absorb share from petroleum liquid fuels??

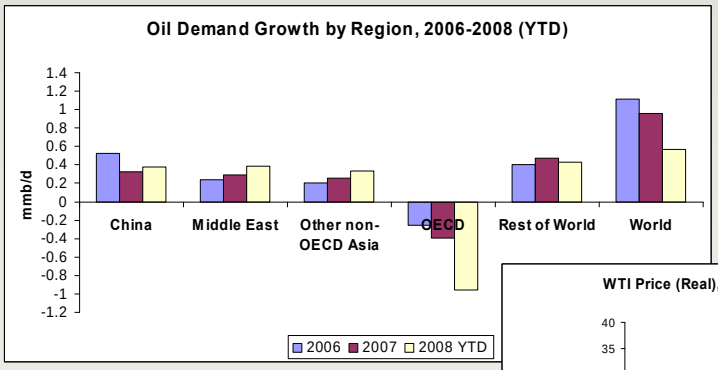
Wanna Buy A Refinery???

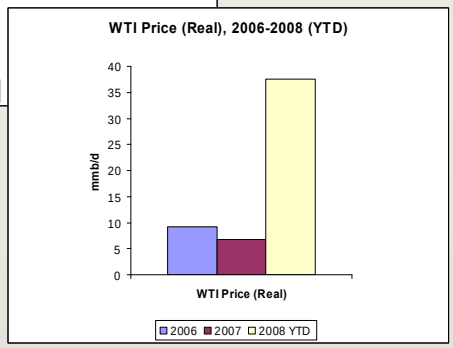
Has US demand for oil products peaked?



US Oil Consumption and Price







Subsidies and Demand

IEA, NYMEX

The Natural Gas Story

- 1970s & 1990s "redux" with regard to perceptions about reliability, deliverability
  - Similar policy/regulatory disconnects are happening now
- Even without GHG policy, gas "push" is inevitable
  - With GHG caps, low carbon technologies are immature, timing of deployment and cost highly uncertain
  - Even without caps, strategic opposition to electric power transmission hinders both coal and renewables
- Natural gas price volatility is largely a result of restructured demand
  - Lost industrial baseload, increased use of gas as the marginal power generation fuel, pressures from scaling up renewables

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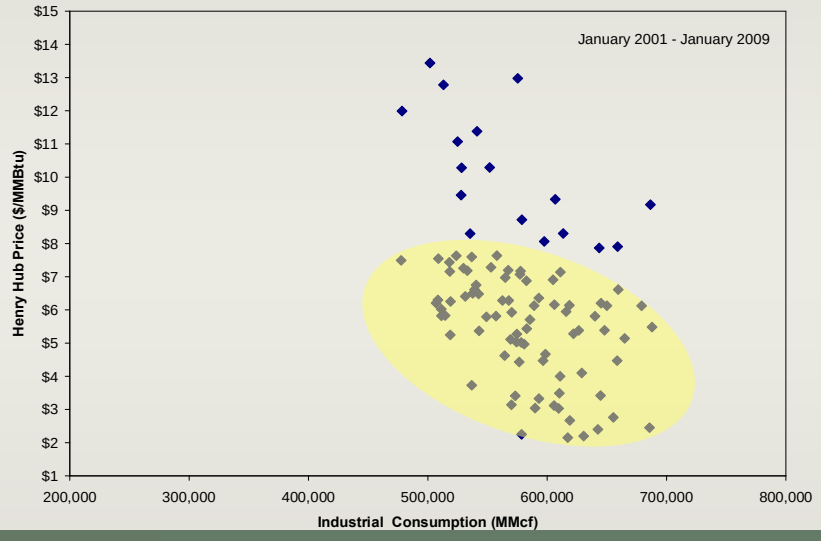
Industrial Demand and Price



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Source: U.S. EIA

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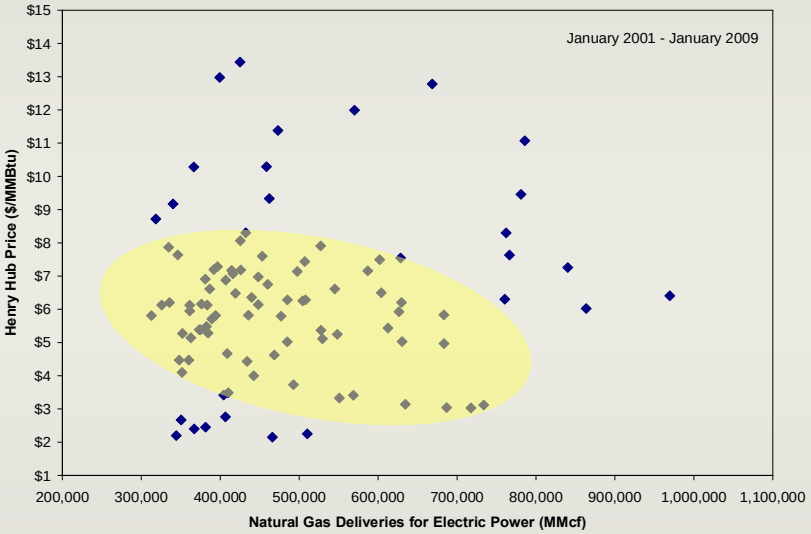
Electric Power Demand and Price



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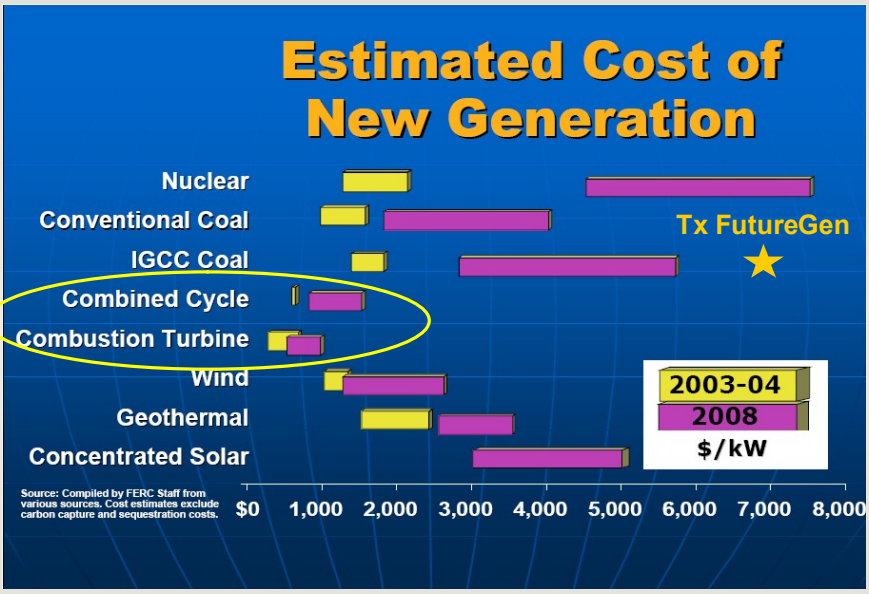
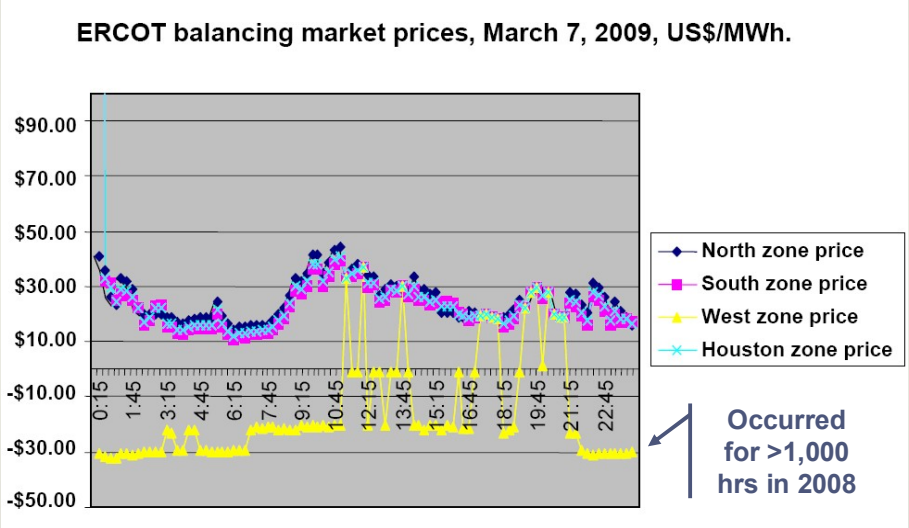
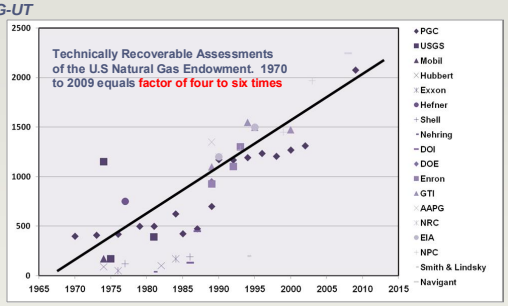


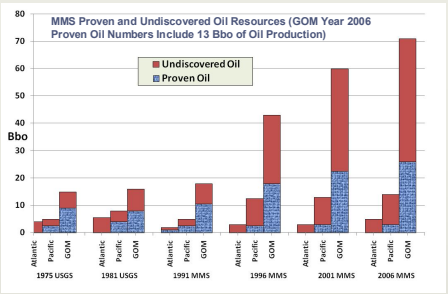
How to Lose Money on Wind

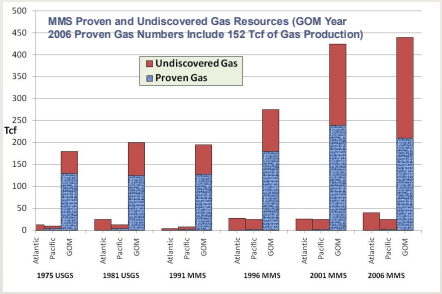


NARUC Moratoria Study (SAIC/GTI)



Source: Modified from Bill Fisher et. al., Bureau of Economic Geology





"Strengthening Our Economy: The Untapped US Oil and Gas Resources;" API, December 2008

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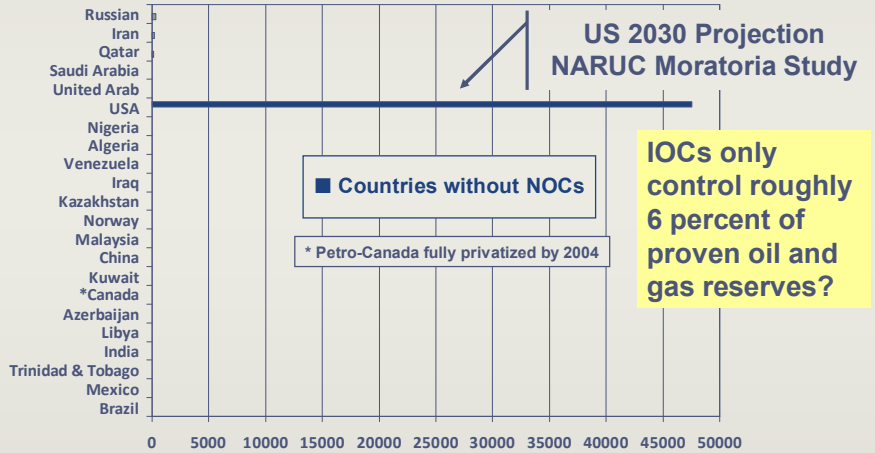

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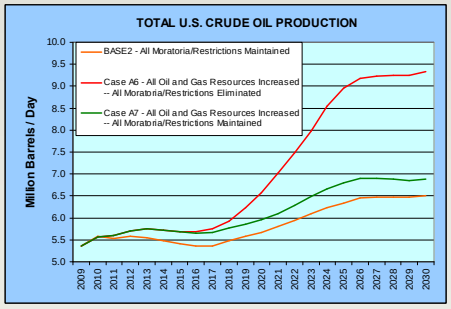
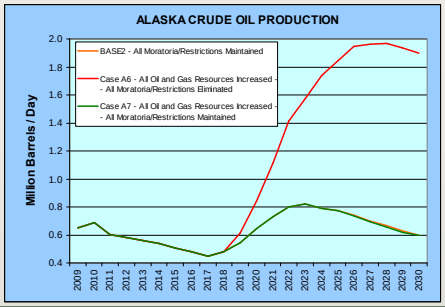
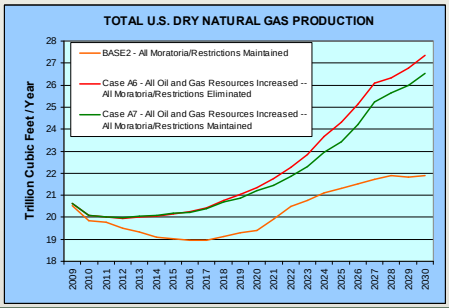
NARUC Moratoria Study

Comparison of All Oil and Gas Production







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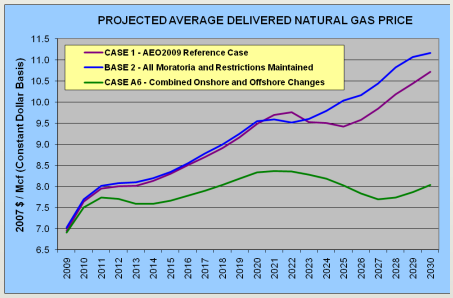
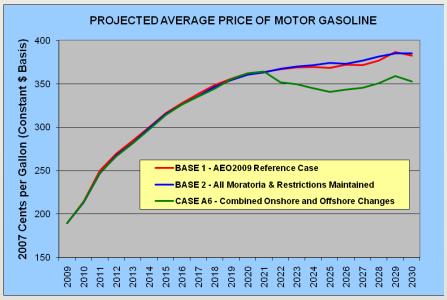
NARUC Moratoria Study

Projected Change in Delivered Energy Prices if Moratoria Is Maintained*

- Projected 2030 average delivered natural gas price increases by **28 percent**
- Projected 2030 average motor gasoline price increases by **8.4 percent**





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* These results account for the combination of both maintaining the moratoria and increasing the oil and gas resource base relative to the current resource base

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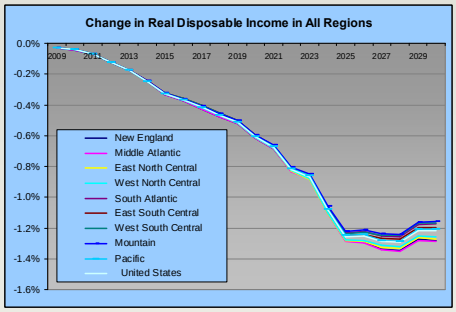
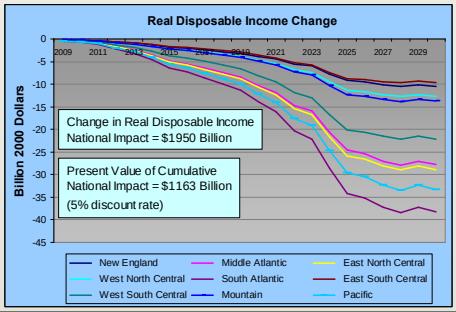
NARUC Moratoria Study

National and Regional Income Effects of Maintaining Moratoria





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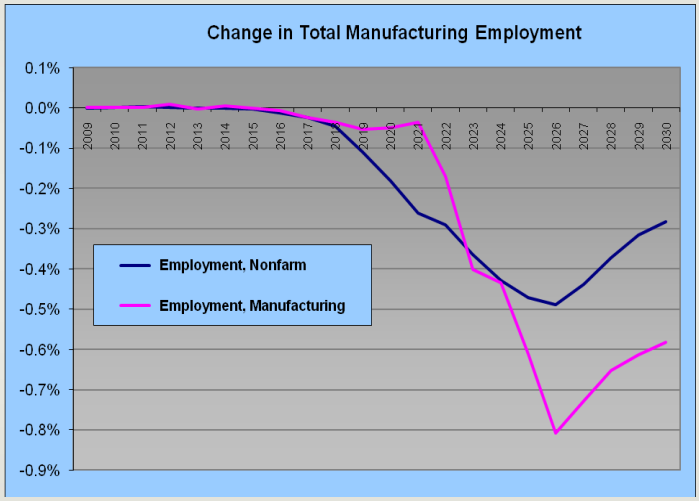
NARUC Moratoria Study

Employment Impacts



For Further Contemplation

Copenhagen Consensus May 2008

http://www.copenhagenconsensus.com

	SOLUTION	CHALLENGE
1	Micronutrient supplements for children (vitamin A and zinc)	Malnutrition
2	The Doha development agenda	Trade
3	Micronutrient fortification (iron and salt iodization)	Malnutrition
4	Expanded immunization coverage for children	Diseases
5	Biofortification	Malnutrition
6	Deworming and other nutrition programs at school	Malnutrition & Education
7	Lowering the price of schooling	Education
8	Increase and improve girls' schooling	Women
9	Community-based nutrition promotion	Malnutrition
10	Provide support for women's reproductive role	Women
11	Heart attack acute management	Diseases
12	Malaria prevention and treatment	Diseases
13	Tuberculosis case finding and treatment	Diseases
14	R&D in low-carbon energy technologies	Global Warming
15	Bio-sand filters for household water treatment	Water
16	Rural water supply	Water
17	Conditional cash transfers	Education
18	Peace-keeping in post-conflict situations	Conflicts
19	HIV combination prevention	Diseases
20	Total sanitation campaign	Water
21	Improving surgical capacity at district hospital level	Diseases
22	Microfinance	Women
23	Improved stove intervention	Air Pollution
24	Large, multipurpose dam in Africa	Water
25	Inspection and maintenance of diesel vehicles	Air Pollution
26	Low sulfur diesel for urban road vehicles	Air Pollution
27	Diesel vehicle particulate control technology	Air Pollution
28	Tobacco tax	Diseases
29	R&D and mitigation	Global Warming
30	Mitigation only	Global Warming