

The Global Energy Market: Comprehensive Strategies to Meet Geopolitical and Financial Risks

Study Overview

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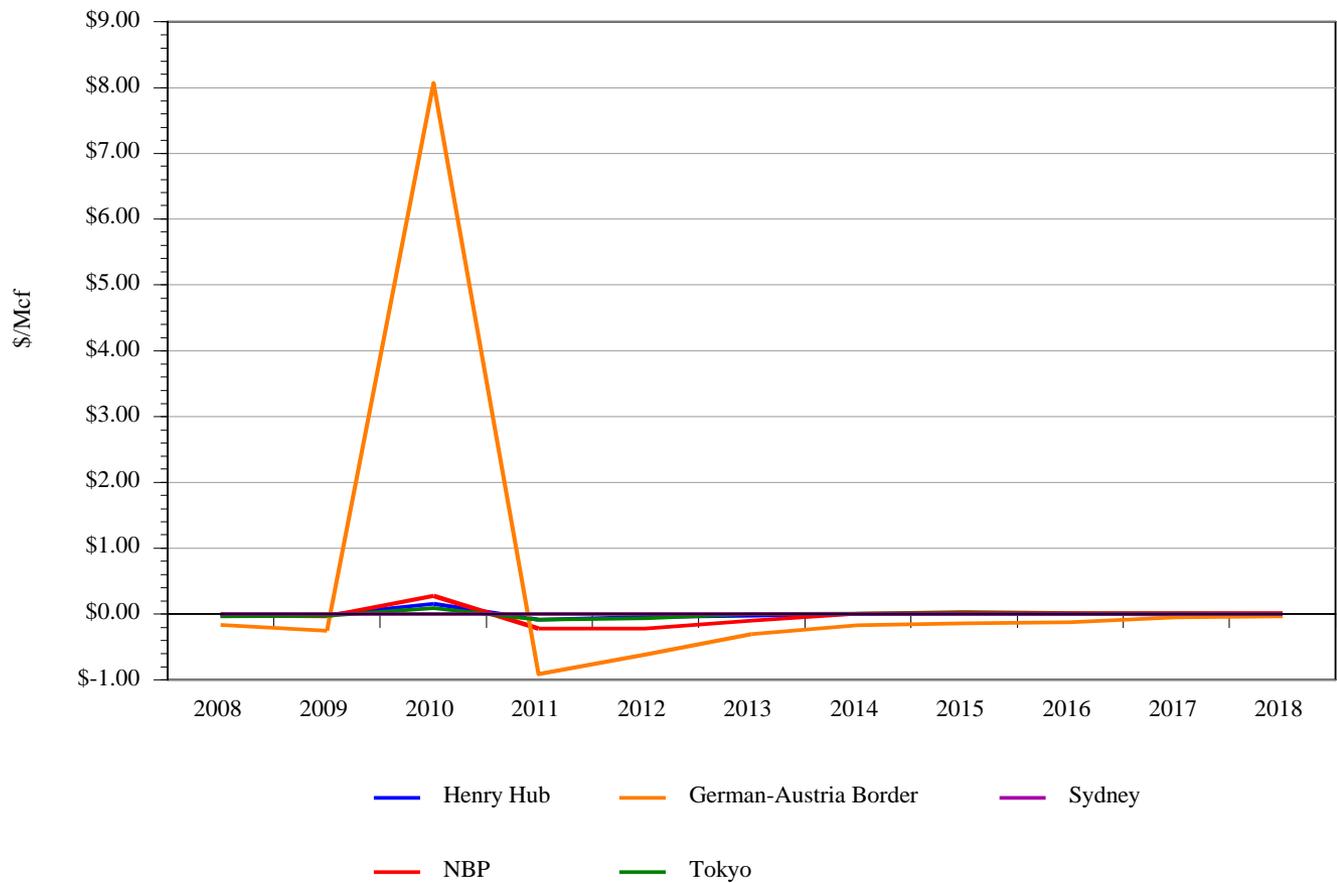
Study Purpose:

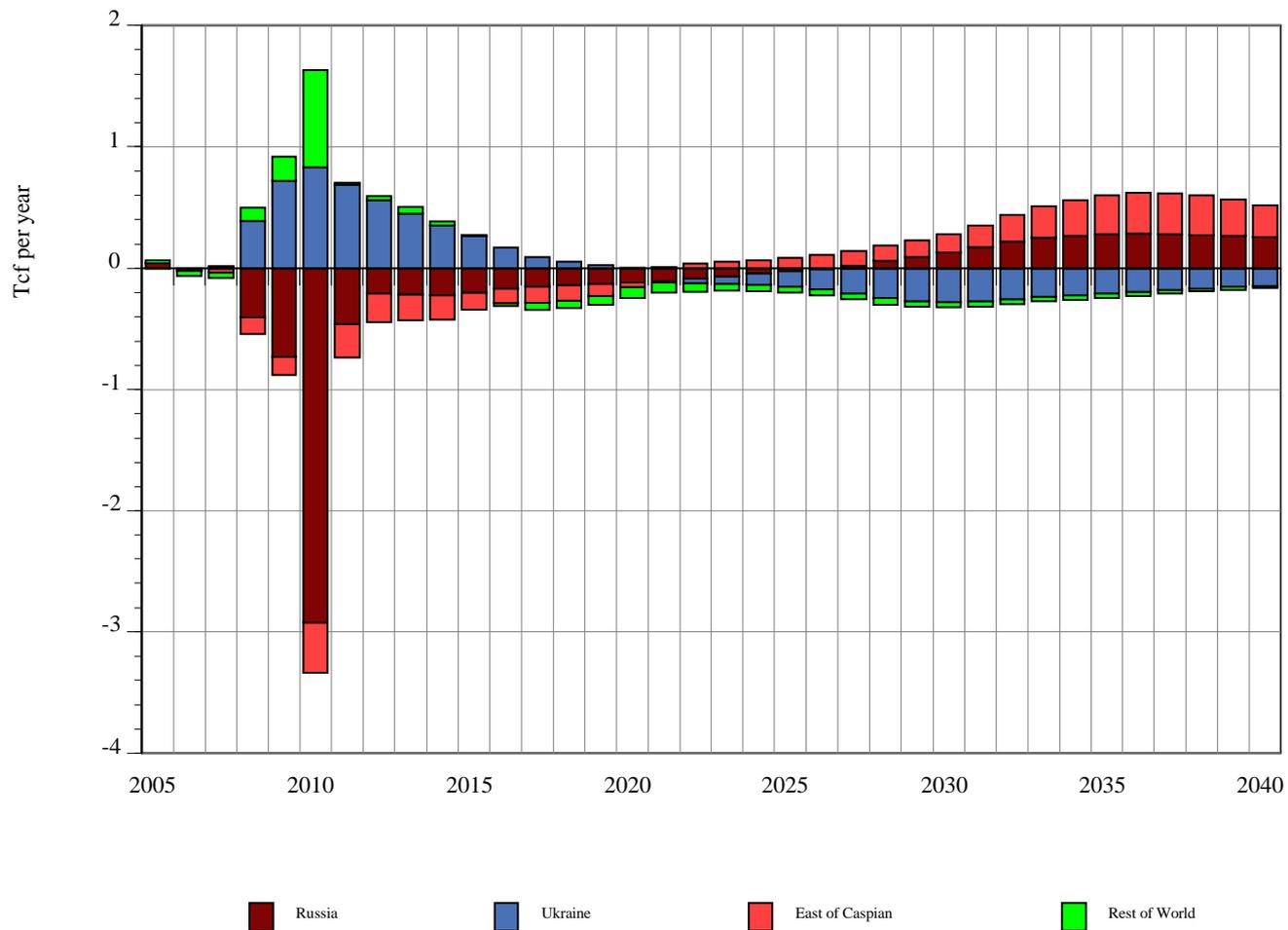
To elucidate the ongoing threats to energy markets and to recommend policies that will be needed to safeguard transparent and open markets and ongoing investment in new energy resources

- Explore the potential for failure of the global market in oil and gas
- Identify the various factors that might play in triggering an energy market crisis that would disrupt the global economic system
- Assess the geopolitical risks currently facing the international energy market
- Investigate the consequences that such risks could pose to energy security, pricing and supply as well as to the transparent and smooth operation of the global market for oil trade and investment
- study the possible impact of extreme co-movements of various global economic and financial variables triggered by the large jump in oil prices
- Develop a series of policy frameworks that can be used to fortify the current market system and ensure that it can respond flexibly to the current array of threats that might be encountered in the coming years
- Consider the stable operation of global energy markets within the context of the urgent need to adopt sustainable and forward looking policies regarding global climate change

- A politically-motivated cut-off of oil or natural gas supplies by a major exporter (such as Russia to a European country or Venezuela to the United States) or group of exporters;
- A confrontation with Iran over its nuclear aspirations that results in sanctions against Iranian oil exports, an American or Israeli attack on Iranian nuclear facilities or an Iranian and/or terrorist threat to oil shipping through the strategic Strait of Hormuz, through which 16 million b/d to 17 million b/d of Mideast oil passes each day;
- Terrorist attacks on major oil production facilities or export infrastructure;
- The possible spread of conflict or instability from Iraq into other oil producing countries or the escalation of a proxy war involving Saudi Arabia, Syria, Turkey and Iran over the outcomes in Iraq;
- A failure on the part of major energy exporters to make the investments needed to meet rising global energy demand either for geo-economic reasons or through the negative consequences of corruption, bureaucratic inefficiency, or weak government institutions;
- A cutoff of oil or natural gas exports or a delay in resource investment and development due to resource nationalism, domestic unrest, or crises in succession of political leadership;
- A work stoppage or strike by oil workers, possibly motivated by political trends involving power-sharing or human rights issues related to internal instability in a major oil-producing country;
- Destruction of oil production or fuel manufacturing infrastructure following a severe storm or natural disaster.

Many of the risks that are driving today's oil price premium may be less catastrophic than they seem at first glance.





Iranian election results an indication that economic sanctions are working.

Iran's political conservatives' concrete interests in promoting greater foreign investment and attaining a larger measure of autonomy for the private sector, put together with their current political rapprochement with domestic reformist groups could translate into a more flexible position on the nuclear issue.

Bypass routes and the difficulty of sinking tankers with swarming techniques or mines means closing Hormuz completely will be hard to implement.

Starting in 2004, the attitude towards oil shifted and Al-Qaeda writings refocused on how supplying oil to the enemies of Islam justified the destruction of oil facilities by any means necessary.

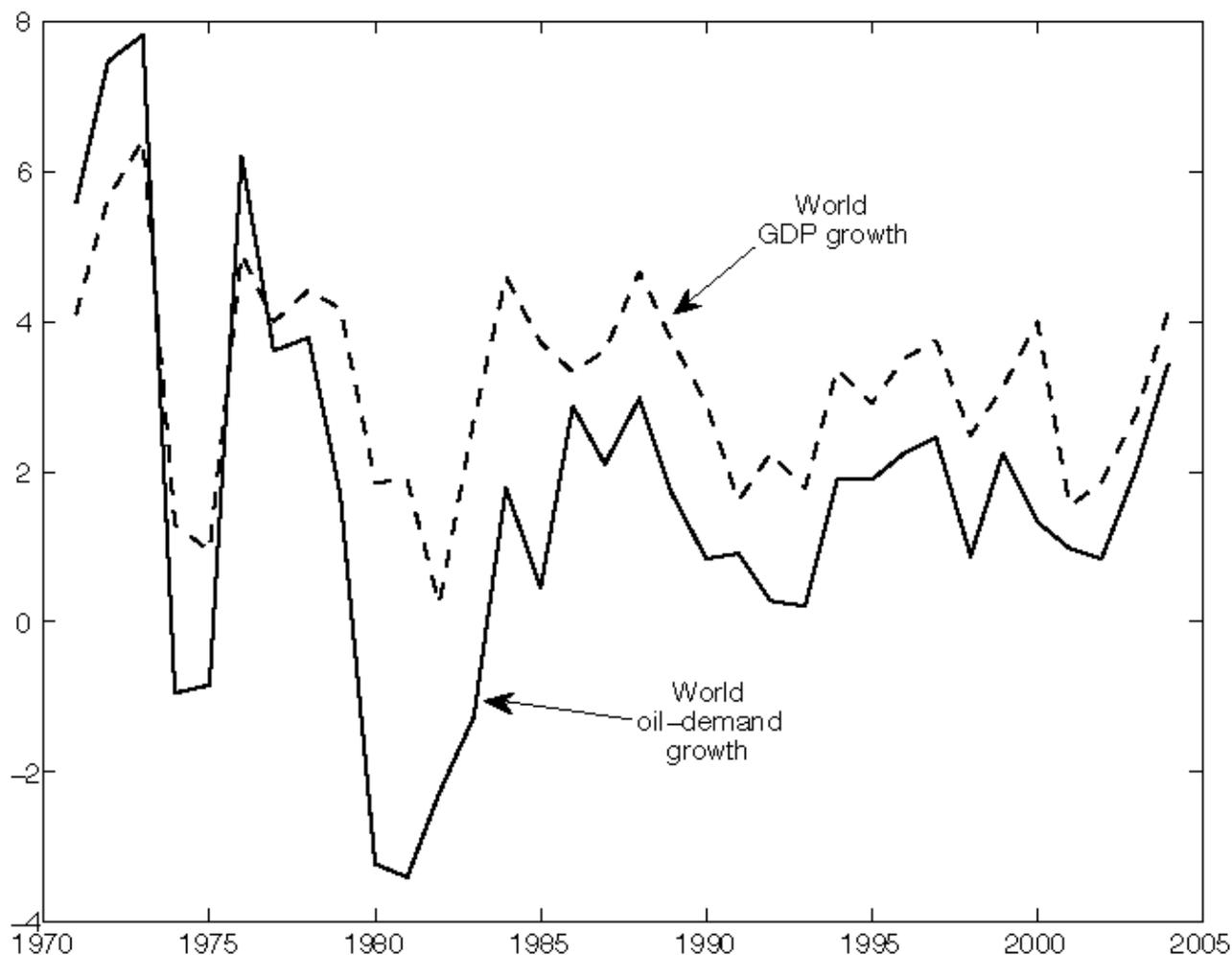
- 1) Attacks are aimed to destroy the economic basis of the kingdom rather than allow anyone collaborating with the United States to benefit from the oil**
- 2) Prominent ideologue and strategist for global radical Islam Abu Musa`b al-Suri set a strategic direction of autonomous cells carrying out terrorist operations and focused specifically on the oil industry –a strategy which appears to have been adopted both by Al-Qaeda and a number of ideological affiliates**

However, local and autonomous aspect of terror cells, in the aftermath of the U.S. military campaign in Afghanistan which disrupted some of Al-Qaeda's global coordination capability, has reduced the chances of a successful strike against major oil facilities that requires expert coordination, planning and material support.

- *Current potential for market contagion suggests the increased likelihood of global recession**
- *High oil prices worsen U.S. trade deficit and create asset bubbles**
- *Debt accumulation started commodity and asset bubbles**
- *Hot money from Middle East flowing around the world ala the 1970s**
- *Escalating U.S. debt (combined with rising developing world debt) could threatening global financial system if U.S. creditors (Asia and GCC) become fearful and begin to switch away from the dollar**
- *End of the dollar-standard era? Will it be orderly transition or chaotic crisis?**
- *Is it the 1970s all over again??? Did the Fed really learn from its mistakes about interest rates, stagflation and monetary policy?**

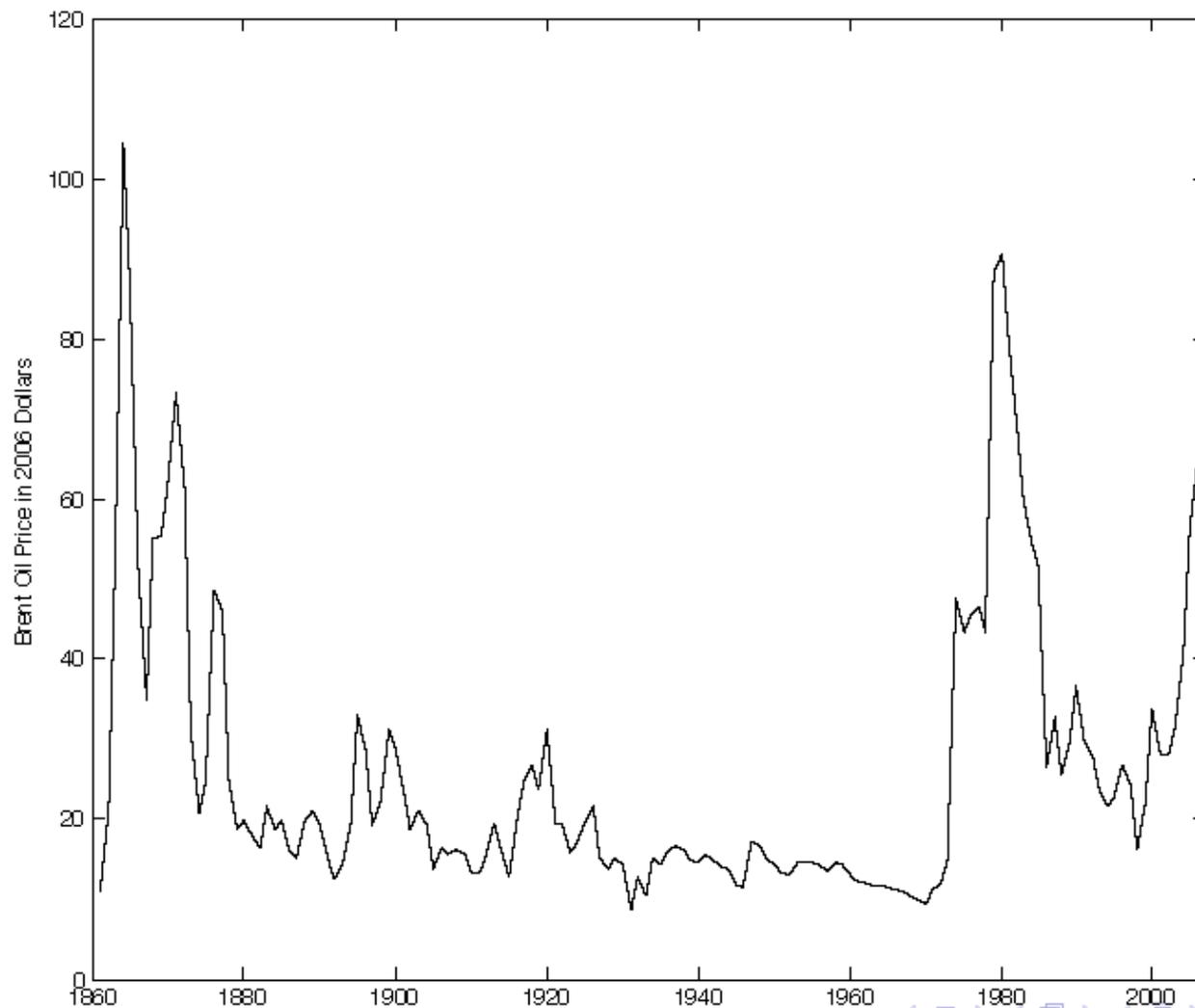
Self-Perpetuating Cycle, Magnified during Financial Crises

Reduced Long-Term Dependence on Oil?



Coincidence of High Oil Prices with Financial Crises

Currency & Banking Crises Severest 1850s-70s, 1970s-



Energy security can be redefined as reducing the vulnerability of a country to the reduction or cut off of oil supplies.

Consuming countries must increase their elasticity of demand for oil by increasing the flexibility of energy using industries or transport vehicles to shift amongst alternative fuels and by both lowering the oil intensity of its economy and increasing the diversity of alternative oil suppliers and the shares of alternative fuels and energy sources in its mix of primary energy use.

Rising U.S. oil imports have strengthened the hand of oil producers. Rise in U.S. imports represented over 50 % of OPEC's output gains between 1991 and 2000, setting the foundation for the rise in OPEC monopoly power.

Cost of each marginal barrel is higher than the price paid for that barrel since this additional purchase affects the cost of all oil consumed.

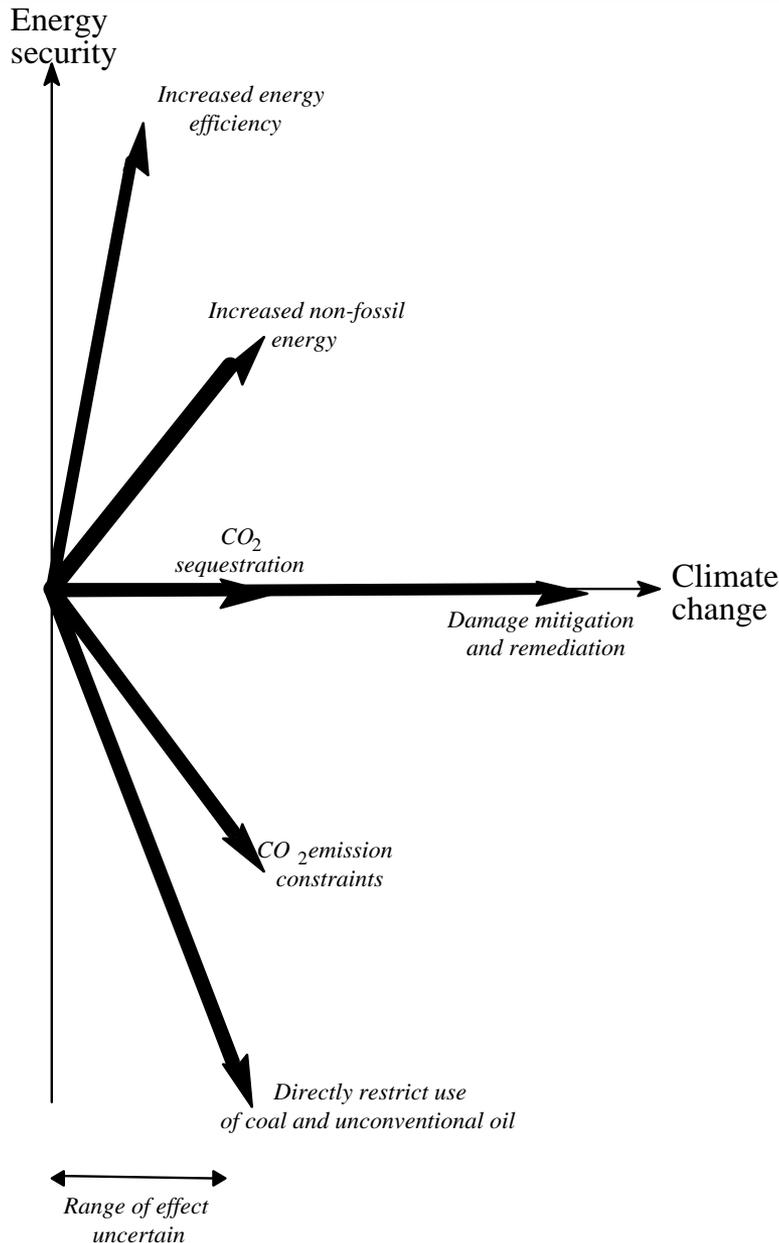
Consuming countries, particularly U.S., need to reduce the size of purchases

In past this has happened via recession but it can also be directed by sounder policy responses.

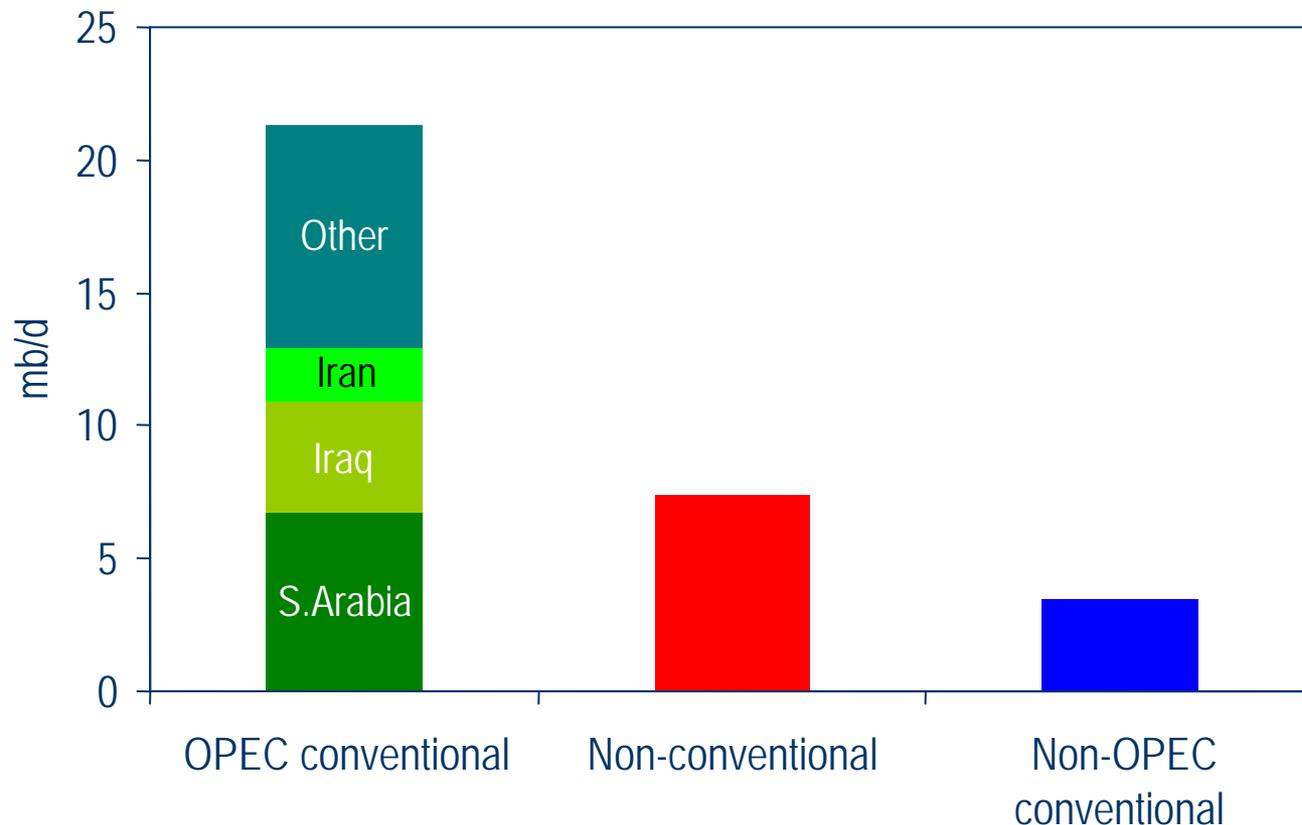
“We must treat energy security and climate security as two sides of the same coin”

--Tony Blair, October 20, 2006

This is a mistaken notion. There is a conflict between the two that will need to be resolved through smart science and good policy.



- Some policies can further both goals:
 - Increasing energy efficiency
 - Increasing non-fossil fuel sources
- Some policies have conflicting effects:
 - Directly limiting the use of coal and unconventional oil
 - CO₂ emissions constraints, which can artificially increase demand for natural gas
- Climate change policies with no effect on energy security:
 - Increased sequestration
 - Climate damage adaptation and remediation



Under a business as usual scenario, world will increasingly rely on Persian Gulf and unconventional oil, including about 3.5 to 4 million b/d of Canadian tar sands production, 1.5 to 2 mb/d of upgraded heavy oil, 2.4 mb/d of gas to liquids and 1.7 mb/d of coal to liquids, oil shale, etc

Three Interacting Forces: Energy Security/Climate Change Legislation, Energy Consumption, and Technological Innovation

- **As climate change and security of supply grow into critical geopolitical issues, governments and consumers are searching for solutions**
- **This is leading a movement to increasingly strict regulation and public sensitivity to security and environmental issues**
- **Fuel and technology types will have to change to meet consumer and legislative expectations**
 - Hybrid vehicles
 - Clean coal
 - Nuclear
 - Solar, Wind
 - Ethanol

Future fuel mix will be driven by three interacting forces

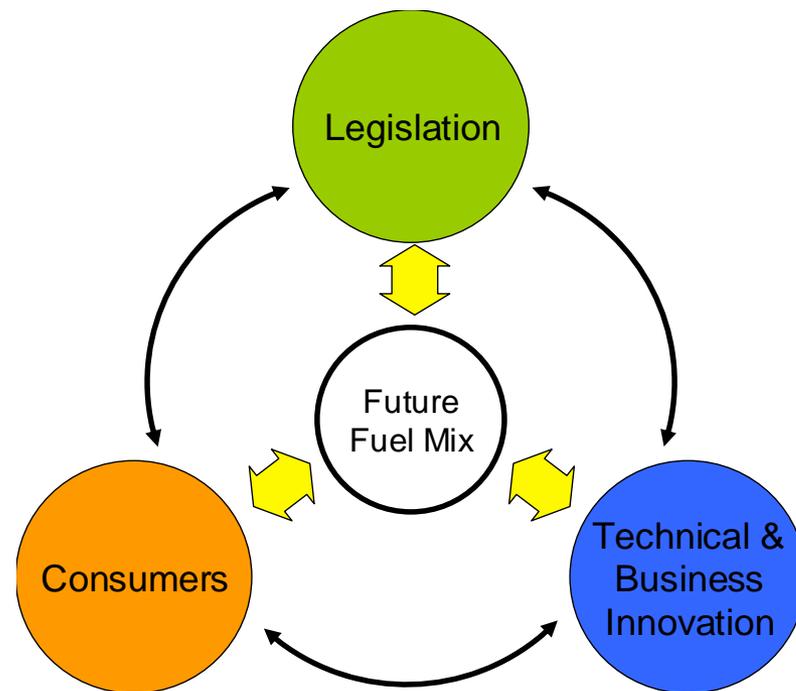


Figure source: Accenture

Sample: 1,000 adult Americans

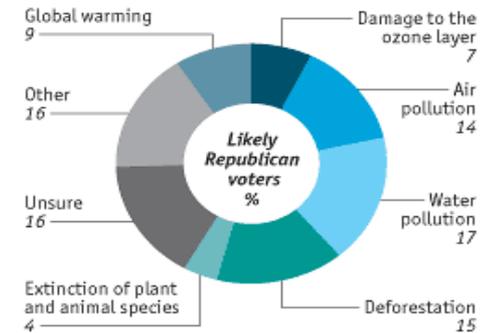
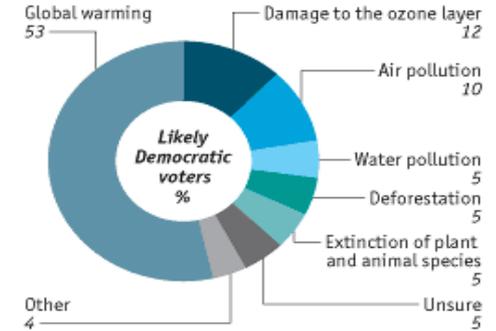
Margin of error: +/-4%

The margin of error measures only sampling variability, and does not adjust for other types of non-sampling error, such as non-response, panel participation, and misreporting.

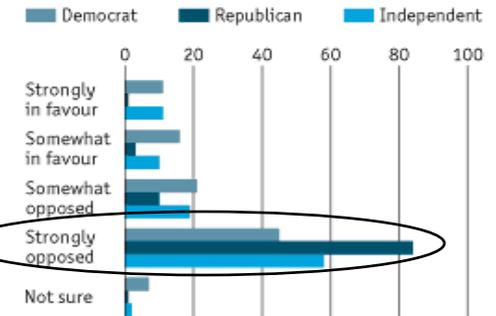
U.S. Policy: The Presidential Candidates

	Cap and Trade	Higher CAFE	Renewable Energy Standard	Drill Offshore?
	80% by 2050 with 100% auction	40 mpg by 2020	25% by 2025	No
	80% by 2050 with 100% auction; Supports Low Carbon Fuel Standard	52 mpg by 2025	25% by 2025	No
Dr.  out	No, unless global cap	No	No articulated position	Yes and in ANWR
	Yes: 65% by 2050 (Introduced a climate change bill with Sen. Lieberman in 2003)	Support increases in principle	No national standard but support state targets	States should decide; no drilling in ANWR.
Dr.  out	Maybe	35 mpg by 2020	15% by 2025 with nuclear, clean coal	Unclear

What do you consider to be the most serious environmental problem facing the world today?



Do you favour higher petrol taxes to reduce carbon dioxide emissions? %



Full poll details are available at www.economist.com/yougov

- The policy discussion is reflecting public sentiment...
 - 53% of Democrats say global warming is the most serious environmental issue
 - Republicans focus on other issues
 - Taxation is not popular among either party

- No taxes ⇒ technology and new frontiers for exploration

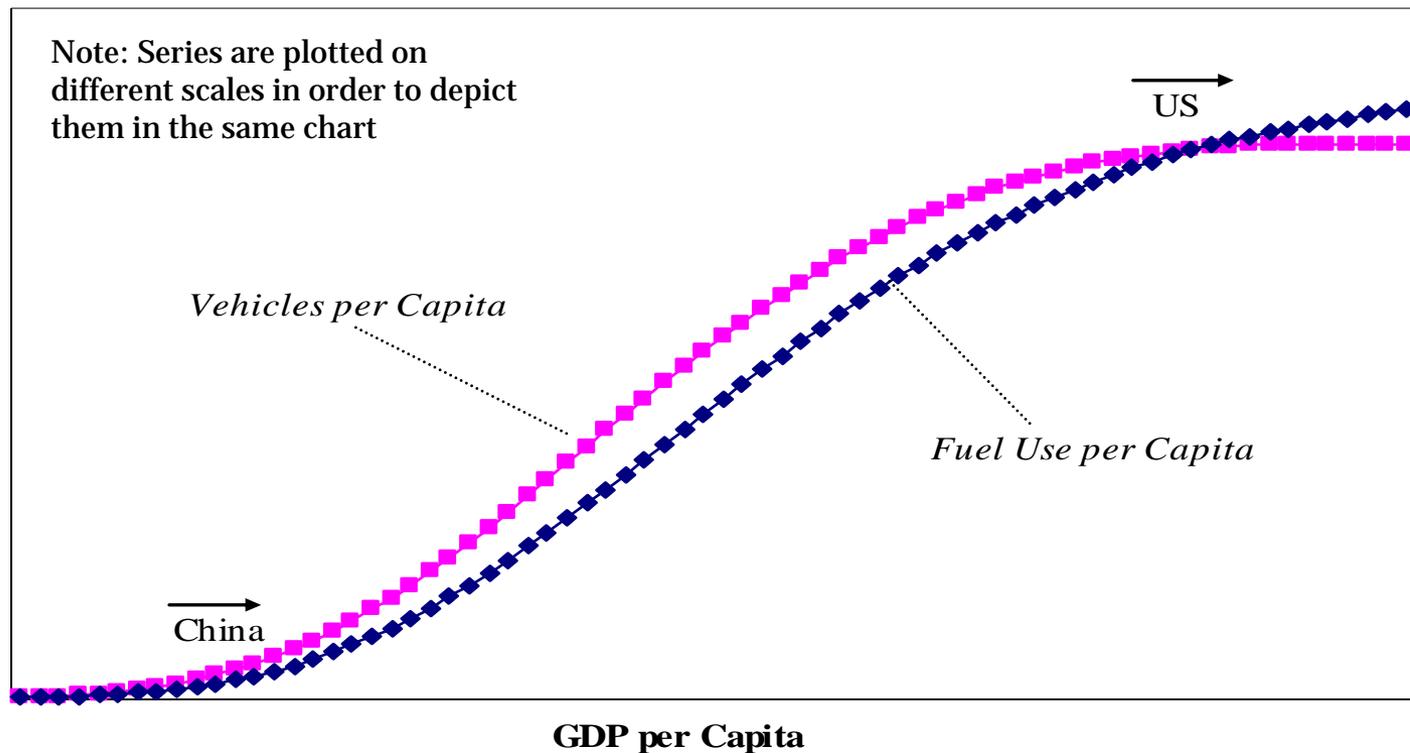


Climate and Energy Security Policy Will Focus Heavily on Promoting or Regulating Automobile Efficiency

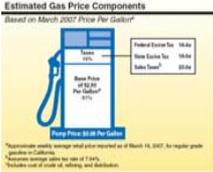
- Most forecasts indicate that future growth in global oil demand will come almost entirely in the transportation sector
- Technology and policy, therefore, will be vital to determining the pace of oil demand growth
 - European demand has been flat due to effective policies
 - U.S. is now following suit
 - California Low Carbon Standard aimed to drive innovation in the efficiency of vehicles and alternative transportation fuel
 - The extent to which China and India, in particular, also get into the act is very important to future demand growth in developing Asia

- Countries such as China are at the “launching” point. So, we should expect vehicle stocks and transportation fuel use to grow very rapidly in those countries as they continue to develop.

"Average" Country Simulation of Patterns



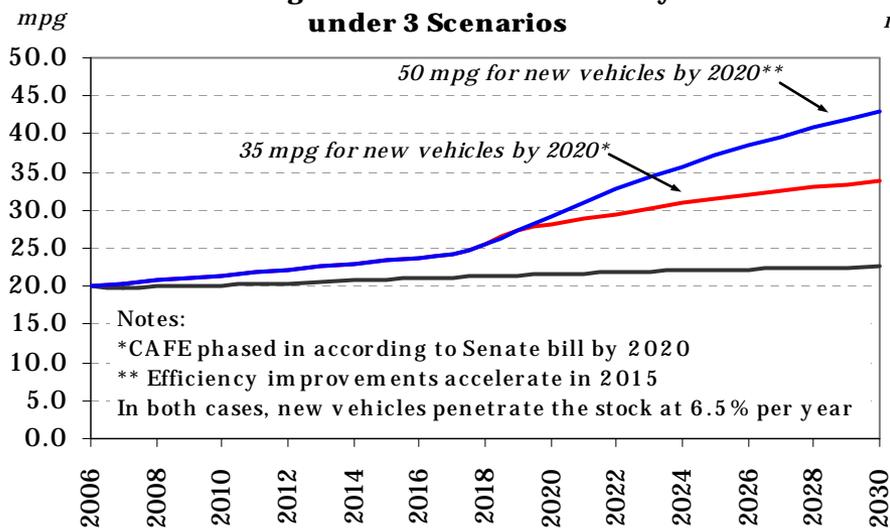
In general, policy makers have a range of tools to affect demand

Objectives	Examples	Potential Issues	
Reduce	1 Vehicles increase mpg	 Fuel and vehicle efficiency	Rebound – consumers drive efficient vehicles further
	2 Driving reduce miles driven	 Congestion charge, transit lanes, road tolls, telecommuting	
	3 Taxation reduce miles driven	 Taxation on gasoline or reduced duty on cleaner fuels: Taxation on carbon of imported fuels	Trade Relations Problems
Replace	4 Fuels lower CO ₂ per gallon	 Biofuel content in fuel mix	Biodiversity Fuel vs. Food
Offset	5 Carbon Markets	 Emissions trading scheme, carbon neutral products and services	CO ₂ leakage problems; verification issues; market design problems

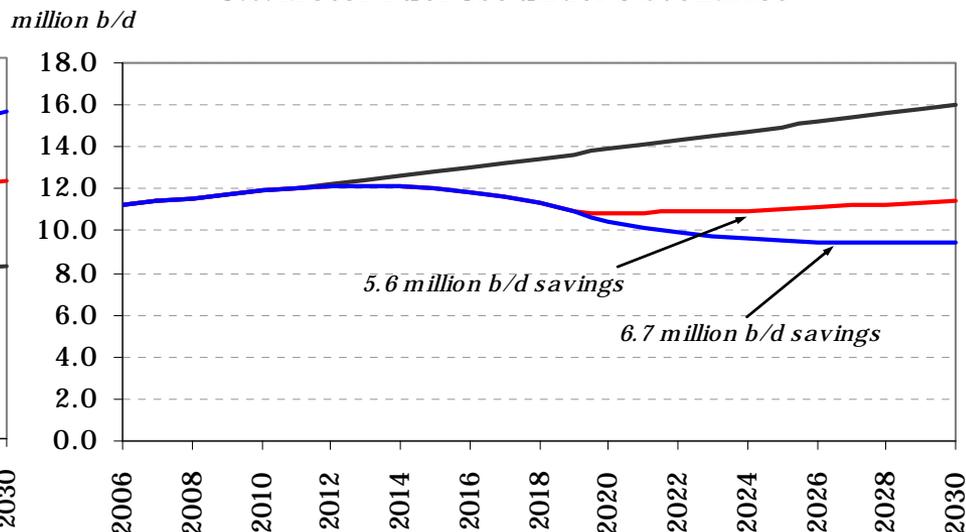
New U.S. Efficiency Standards Will Reduce U.S. Oil Demand

- Fuel efficiency improvements have significant benefit, but are offset by growth in vehicle stocks and miles driven (income and “rebound” effects)
 - High prices are revealing a demand response as recent U.S. miles driven data are slightly lower
- Similar arguments hold in all countries, with potential for efficiency improvement varying across countries
- Policy is multi-pronged in its approach
 - A technological breakthrough, such as with plug-in hybrid vehicles, could push demand lower into the future. Once these alternatives are adopted, the market is forever changed
 - Biofuels can induce even further reductions in demand

U.S. Light Vehicle Fuel Efficiency under 3 Scenarios



U.S. Motor Fuel Use under 3 Scenarios



Closing Remarks

- Energy Security and Climate Security are not always the two sides of the same coin
 - Reduction in use of unconventional oil will create higher dependence on the Middle East
 - Reduction in coal use in the U.S. will increase dependence on Middle East LNG
- Energy efficiency and new technologies for the transportation sector achieve both energy security improvements and climate security
- Further lowering oil intensity of U.S. economy and creating alternatives to oil-based fuel in the transportation sector would enhance U.S. energy security
- Oil and natural gas will remain important for the foreseeable future, but high prices can induce *rapid* change.
- U.S. needs a more pro-active diplomatic stance on energy and climate. The focal point for a high-level U.S. dialogue with other consuming countries should begin with China.
- The end game should be the development of a harmonized energy policy that could enhance the leverage both countries would have in dealing with muscle-flexing oil producing nations. Reaching energy strategy collaboration with China would also pave the way for broader coordination on global warming policy, removing a key barrier to U.S. political agreement to a post-Kyoto international accord. A U.S. deal with China on energy policy and climate policy could then facilitate similar synchronization with the European Union, Japan, India, Brazil and South Korea.
- Carbon intensive industry relocation may be a natural outcome of an emerging U.S. policy
 - “Carbon leakage” already driving the export of carbon intensive industry to the Middle East
 - Caveat involves the nature of taxation. Policy could tax carbon intensity of consumption, thus imposing tariffs on carbon intensive imports. This means even those countries that benefit from carbon leakage would be forced to take efforts to reduce carbon intensity.