

# **United States Natural Gas Prices to 2015: Update and Views from International Natural Gas and LNG Developments\***

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# U.S. Nat Gas Prices to 2015

*Update and Views on International, LNG  
Developments, AAPG 2008 Forum*

# Natural Gas Price Drivers Pre-2015

Pressures Toward Lower Prices	Pressures Toward Higher Prices
<ul style="list-style-type: none"> <li>No major hurricane disruptions</li> </ul>	<ul style="list-style-type: none"> <li>Adverse conditions (Henry Hub during winter 2005-06 approx. \$6-15)</li> </ul>
<ul style="list-style-type: none"> <li>Persistent inventory overhang</li> </ul>	<ul style="list-style-type: none"> <li>Persistent inventory uncertainty</li> </ul>
<ul style="list-style-type: none"> <li>Oil prices fall with demand</li> </ul>	<ul style="list-style-type: none"> <li>High oil prices, inflationary pressure</li> </ul>
<ul style="list-style-type: none"> <li>Success in tight gas plays</li> </ul>	<ul style="list-style-type: none"> <li>Moderate/low supply development</li> </ul>
<ul style="list-style-type: none"> <li>Rockies deliveries</li> </ul>	<ul style="list-style-type: none"> <li>Moderate/low supply development</li> </ul>
<ul style="list-style-type: none"> <li>Surplus LNG cargoes available at Henry Hub prices with new regas</li> </ul>	<ul style="list-style-type: none"> <li>LNG market remains tight, new regas terminals delayed</li> </ul>
<ul style="list-style-type: none"> <li>Demand erosion in key industrial applications does not reverse</li> </ul>	<ul style="list-style-type: none"> <li>Business as usual demand increases</li> </ul>
<ul style="list-style-type: none"> <li>No/little success on climate</li> </ul>	<ul style="list-style-type: none"> <li>Climate initiatives begin to bite</li> </ul>

# Natural Gas Price Drivers Post-2015

Pressures Toward Lower Prices	Pressures Toward Higher Prices
<ul style="list-style-type: none"> <li>• Permanent loss in key demand sectors (industrial); flat demand in core (residential, commercial)</li> </ul>	<ul style="list-style-type: none"> <li>• Demand increases (despite high prices) due to climate measures and other factors</li> </ul>
<ul style="list-style-type: none"> <li>• Sustained decline in oil prices</li> </ul>	<ul style="list-style-type: none"> <li>• Extreme volatility; critical resource, infrastructure improvements not achieved</li> </ul>
<ul style="list-style-type: none"> <li>• Entry of new, major infrastructure projects (Alaskan pipe)</li> </ul>	<ul style="list-style-type: none"> <li>• Alaska (and Canadian Arctic) delays continue</li> </ul>
<ul style="list-style-type: none"> <li>• Mexico exports to US, result of LNG imports and excess capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Mexican demand surges, no surplus for US</li> </ul>
<ul style="list-style-type: none"> <li>• Henry Hub basis detaches with expanding LNG shipments</li> </ul>	<ul style="list-style-type: none"> <li>• Euro, Pacific competition for LNG supply; idle US regas capacity</li> </ul>
<ul style="list-style-type: none"> <li>• Coal takes majority of new power demand (fears of gas price spikes)</li> </ul>	<ul style="list-style-type: none"> <li>• State, Federal climate measures become serious; gas benefits.</li> </ul>

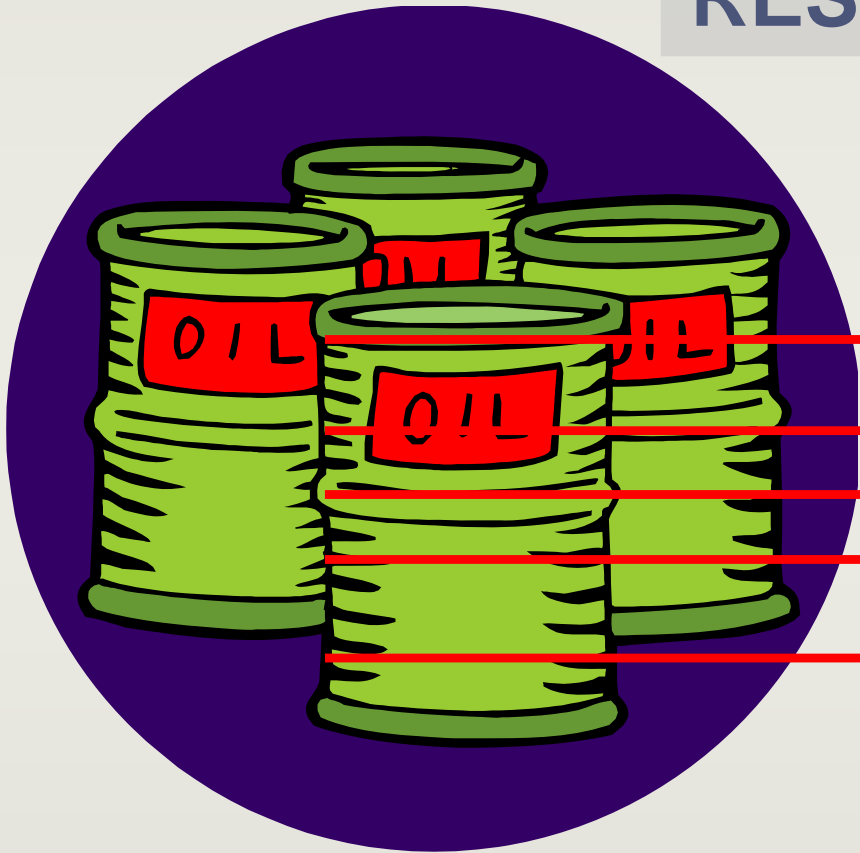
# A Line in the Sand

*Ali al-Naimi, who controls the world's biggest oil exports, said crude prices are unlikely to fall below \$60 a barrel because of rising costs to develop tar sands and alternative fuels. **Producing oil from...alternatives costs about \$60 to \$70 a barrel, "and, therefore, a line has been drawn below which the price cannot fall,"** al-Naimi said in an interview published in Petrostrategies, a Paris-based industry newsletter.*

***First Enercast, March 3, 2008***

# Determining the Price of Oil (2006)

**RESULT: Crude oil is overpriced**



Plus financial speculation (\$15-20)

Plus “artificial” demand (10-20%)

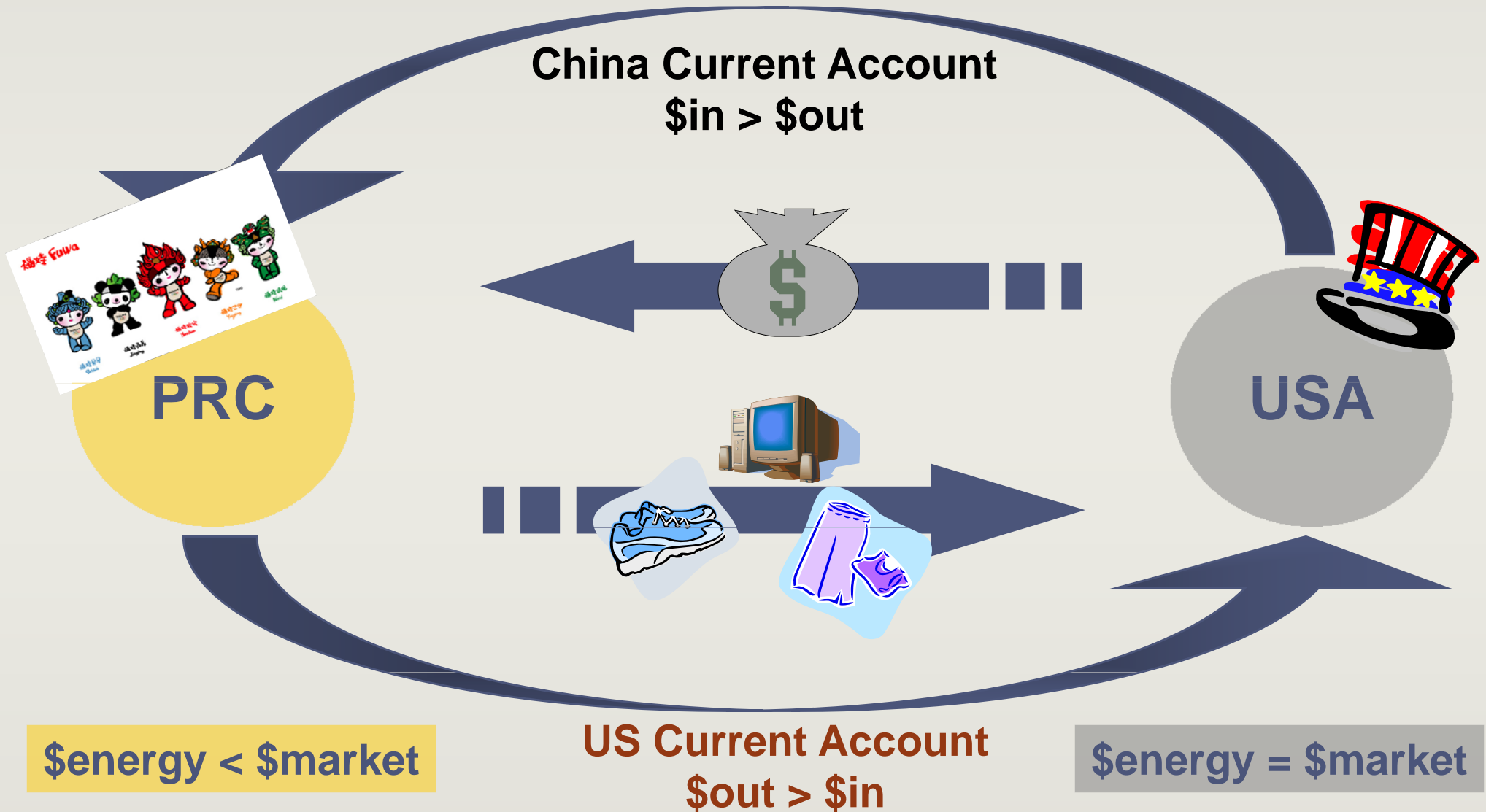
Plus growth in demand

Plus **\*political premium**

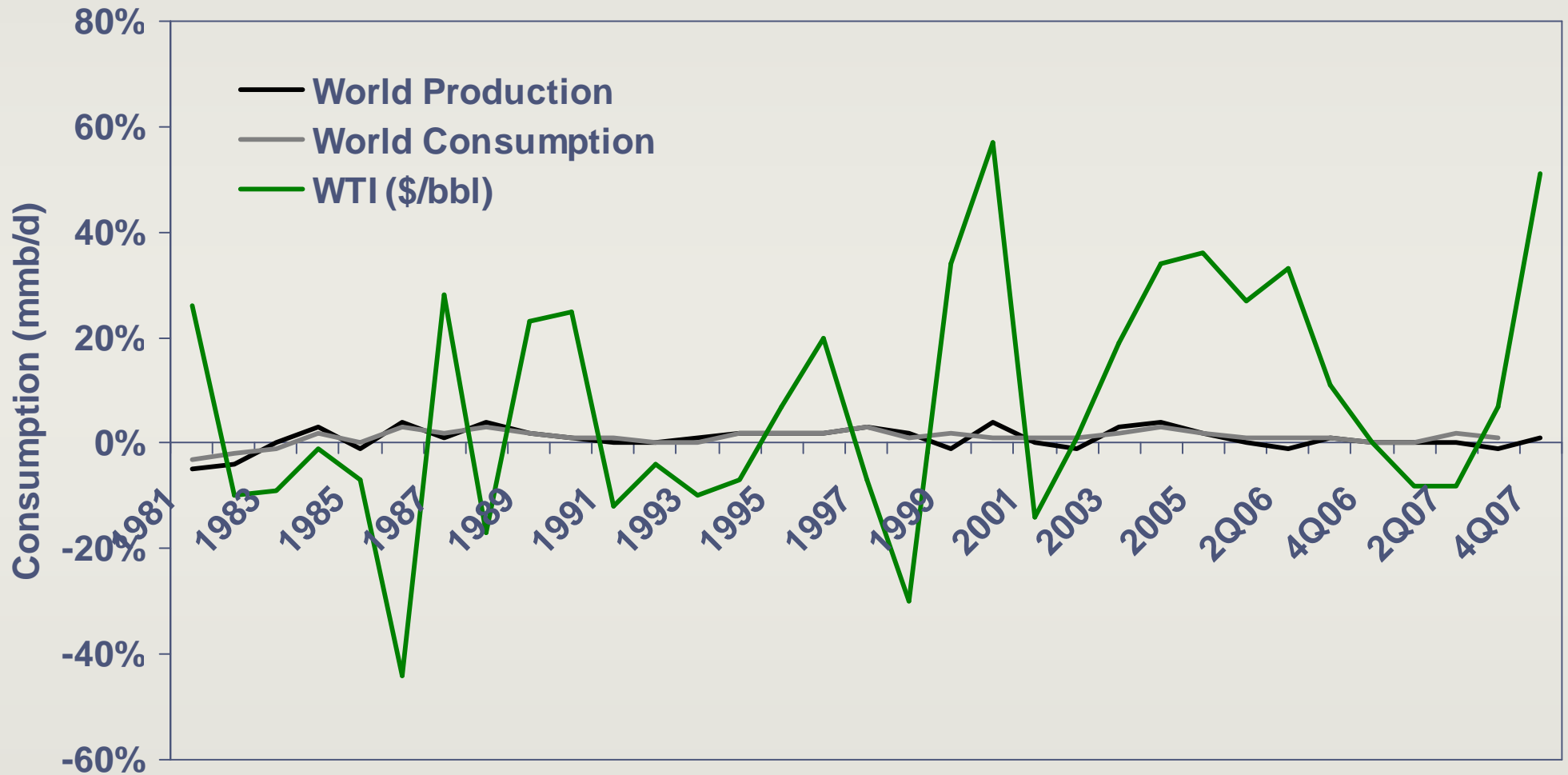
Finding and lifting cost (role of marginal producer)

**\* Oil for economic development**

# Fun with China



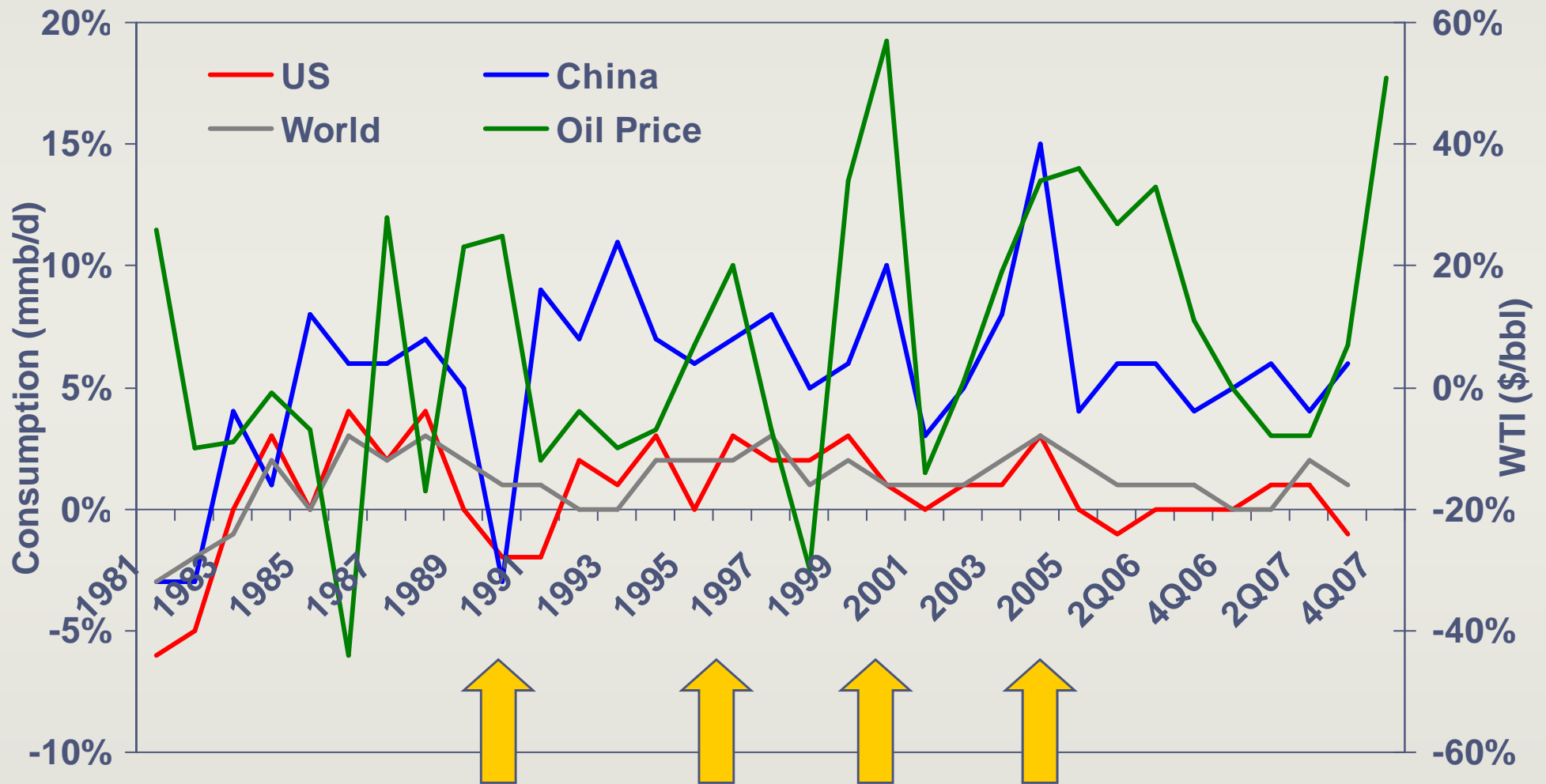
# Oil Production and Consumption



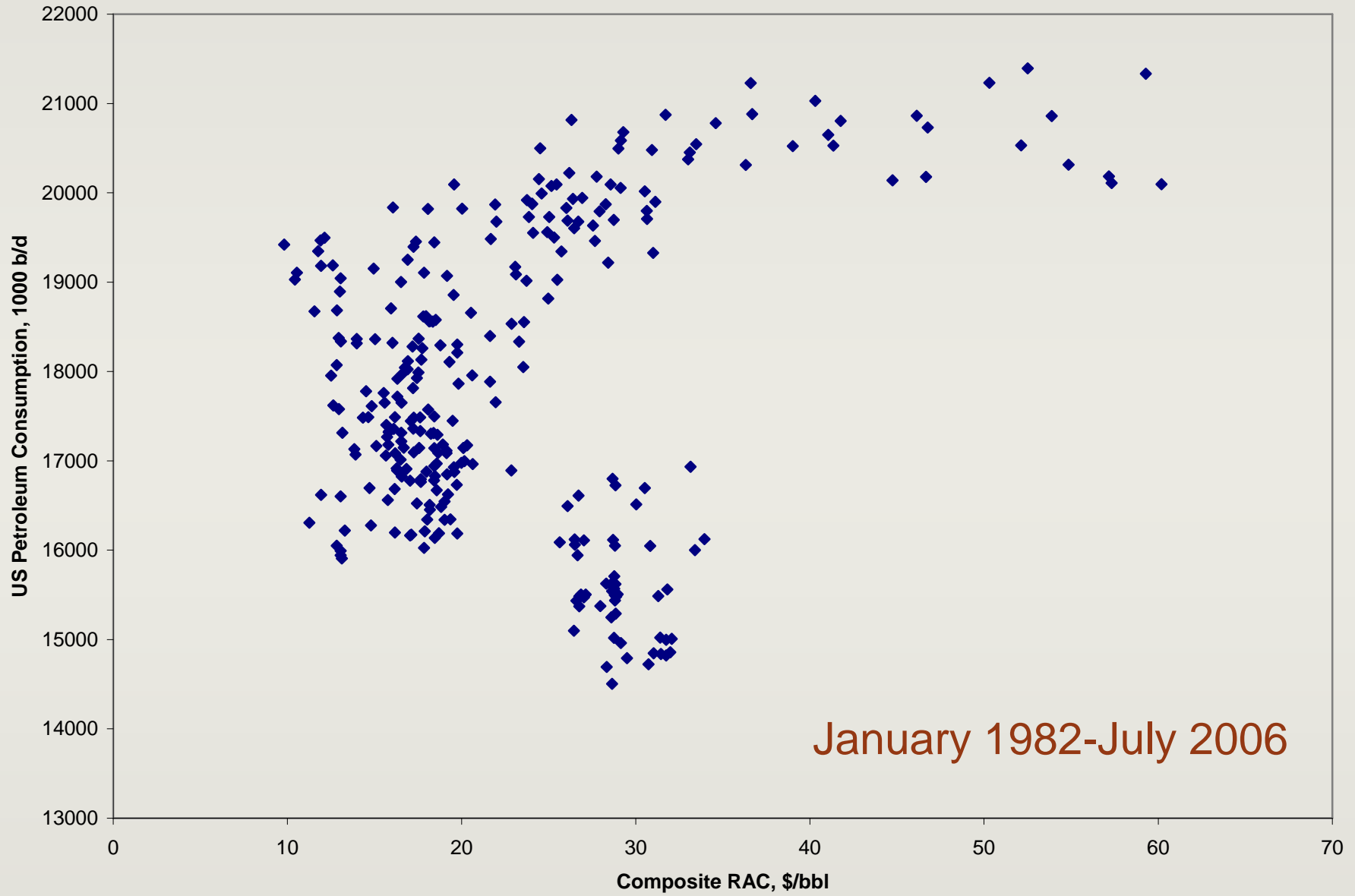


# Growth in Oil Consumption

## Impact of "Managed Prices" in China



# US Oil Consumption vs. Price

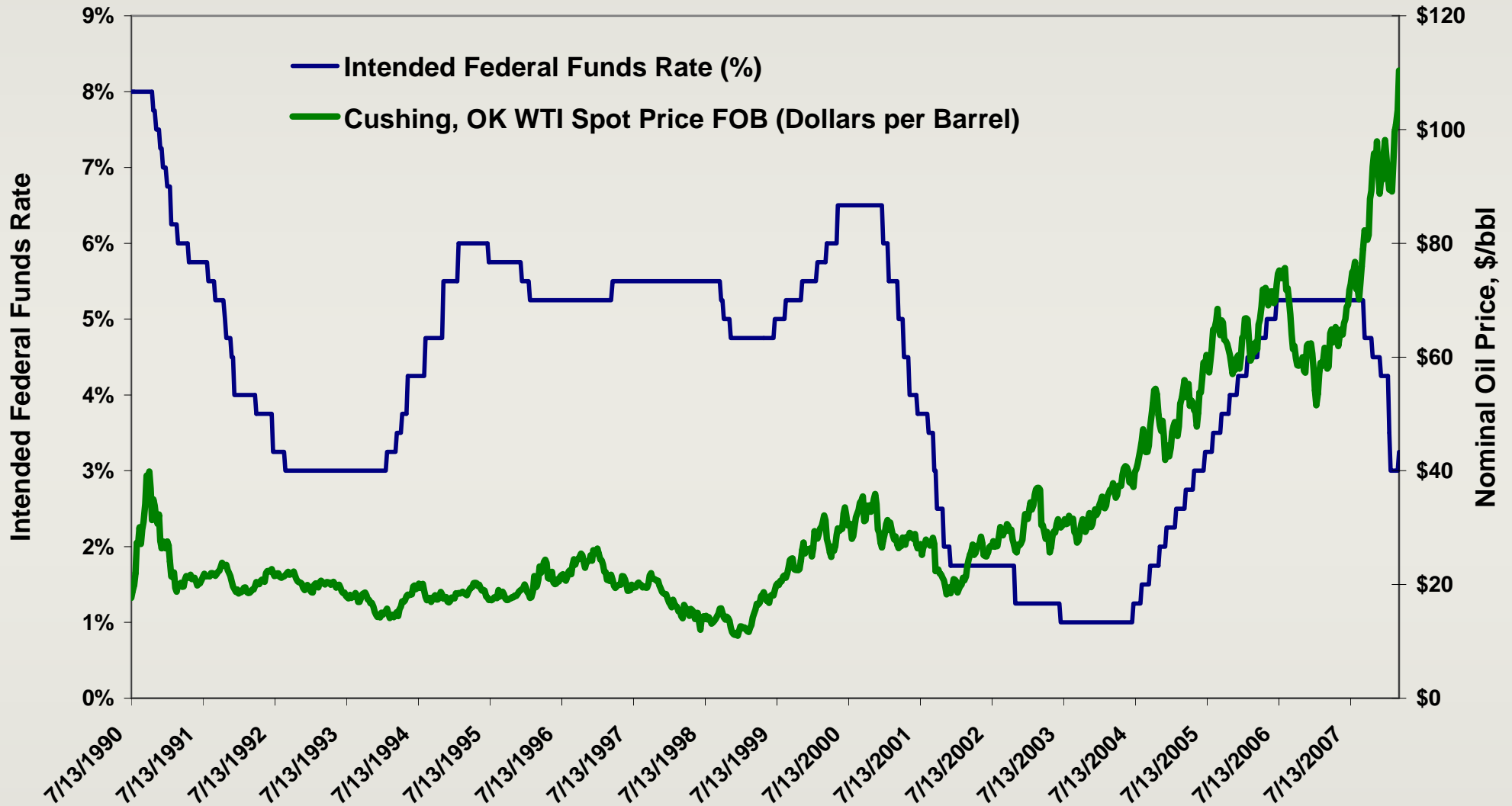


# Chakib, We Hardly Knew Ye

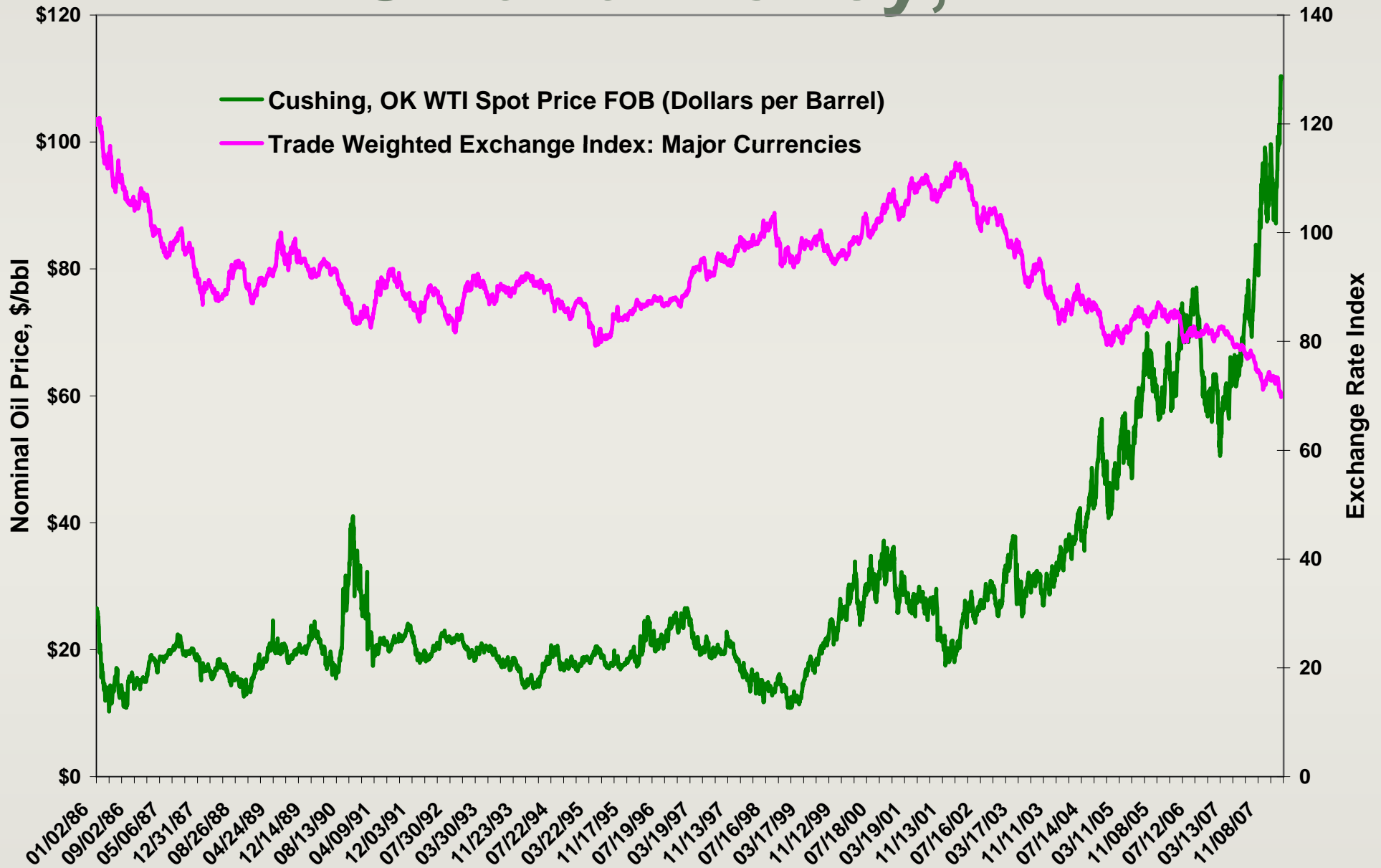
*The decision to stand pat reflects the view of [OPEC] that there is little it can do to bring down oil prices. Citing higher U.S. inventories of crude, ministers said the weak dollar was driving oil's rally...Chakib Khelil, OPEC's president, said crude stocks were above their five-year average and that soaring crude prices were caused by a weak dollar, the credit crisis in the U.S. and "speculative activity in petroleum markets." **"It's due to the mismanagement of the U.S. economy that's affecting... economies in the rest of the world," he said...**Wednesday's meeting came with OPEC in a new position. Once its decisions were the chief driver of crude prices. But factors such as U.S. interest-rate policy and bond- and equity-market movements are increasingly important.*

***"OPEC Keeps Output Level Steady", WSJ, 3/5/2008***

# Oil and Money, I



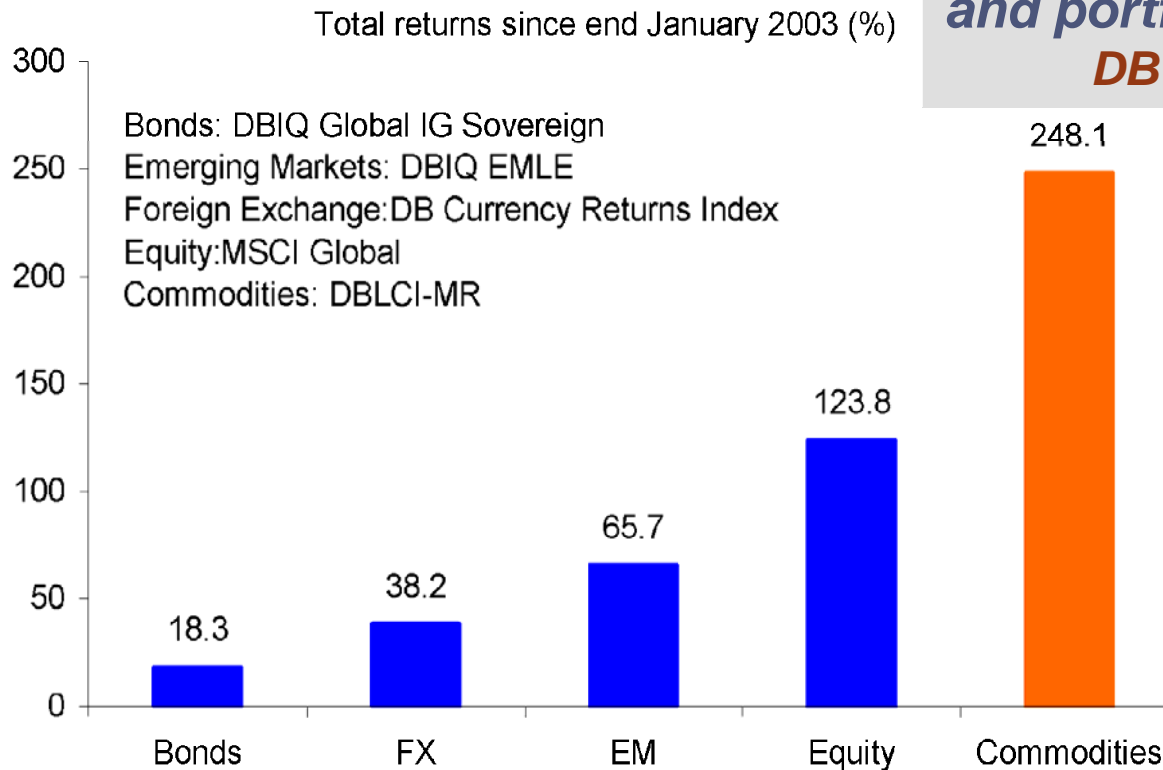
# Oil and Money, II



# Looking Under the Mattress

*Commodities have been one of the best performing asset classes over the past five years and have been widely accepted by institutional investors as an asset class in their own right, suitable for absolute returns and portfolio diversification purposes.*

*DB Global Markets Research, 2/8/2008*

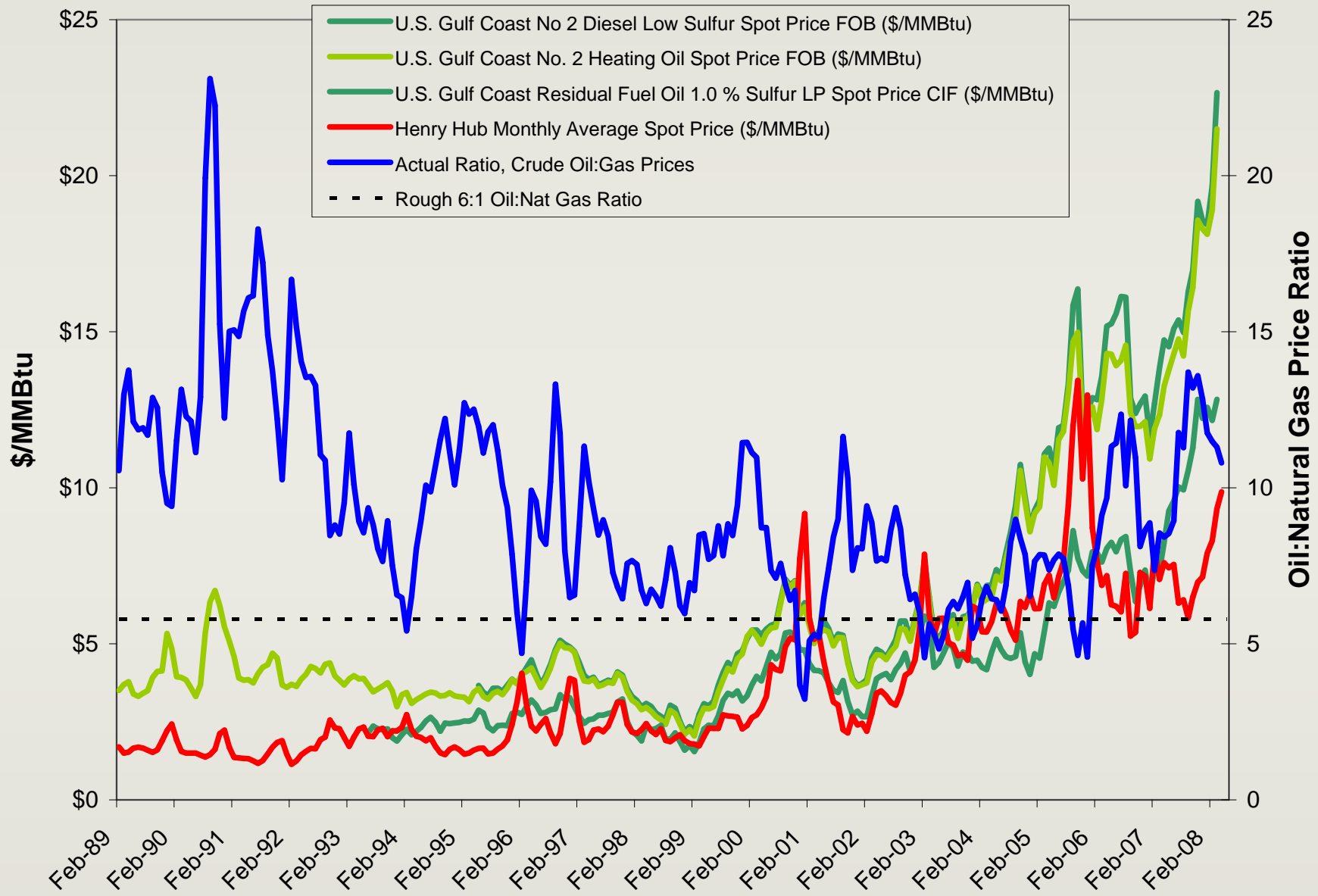


Source: DB Global Markets Research, Bloomberg

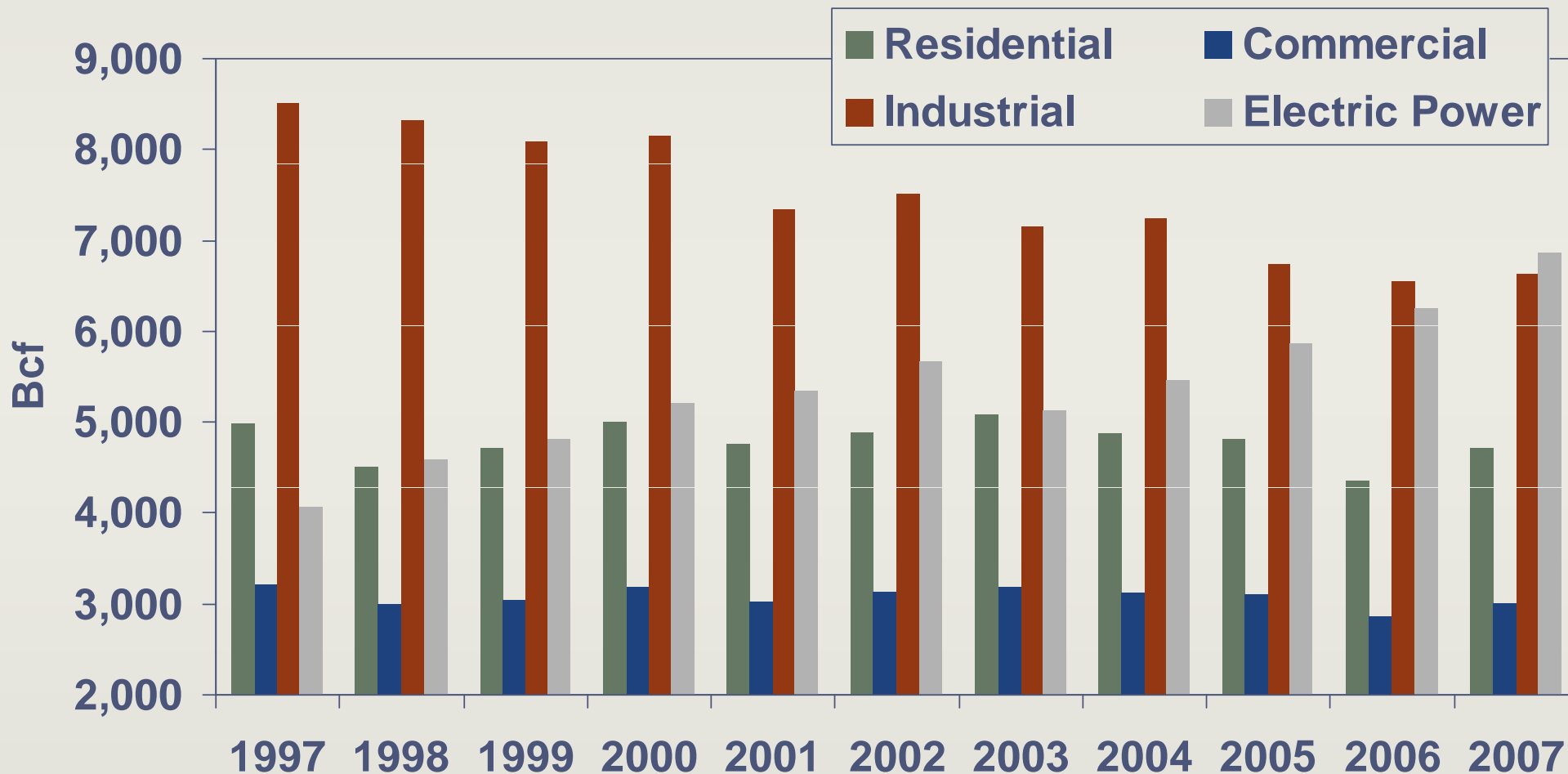
“Money is pouring into commodities as an asset class and the instruments we trade might not be up to it”.

*Comment from DB GMR, February 08*

# Natural Gas Competitiveness

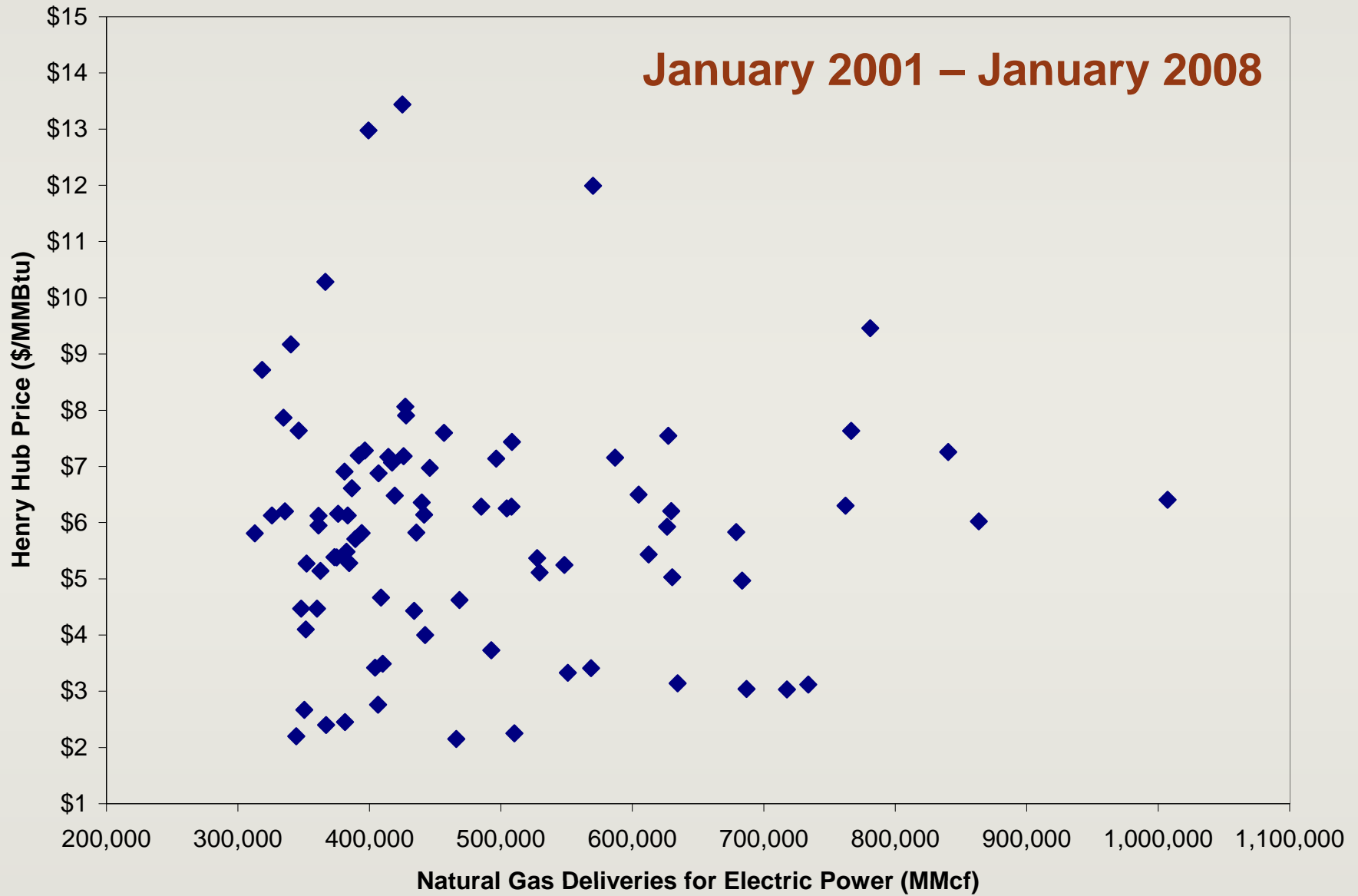


# Power Generation Has Surpassed Industrial Load





# Pricing Natural Gas for Power Gen

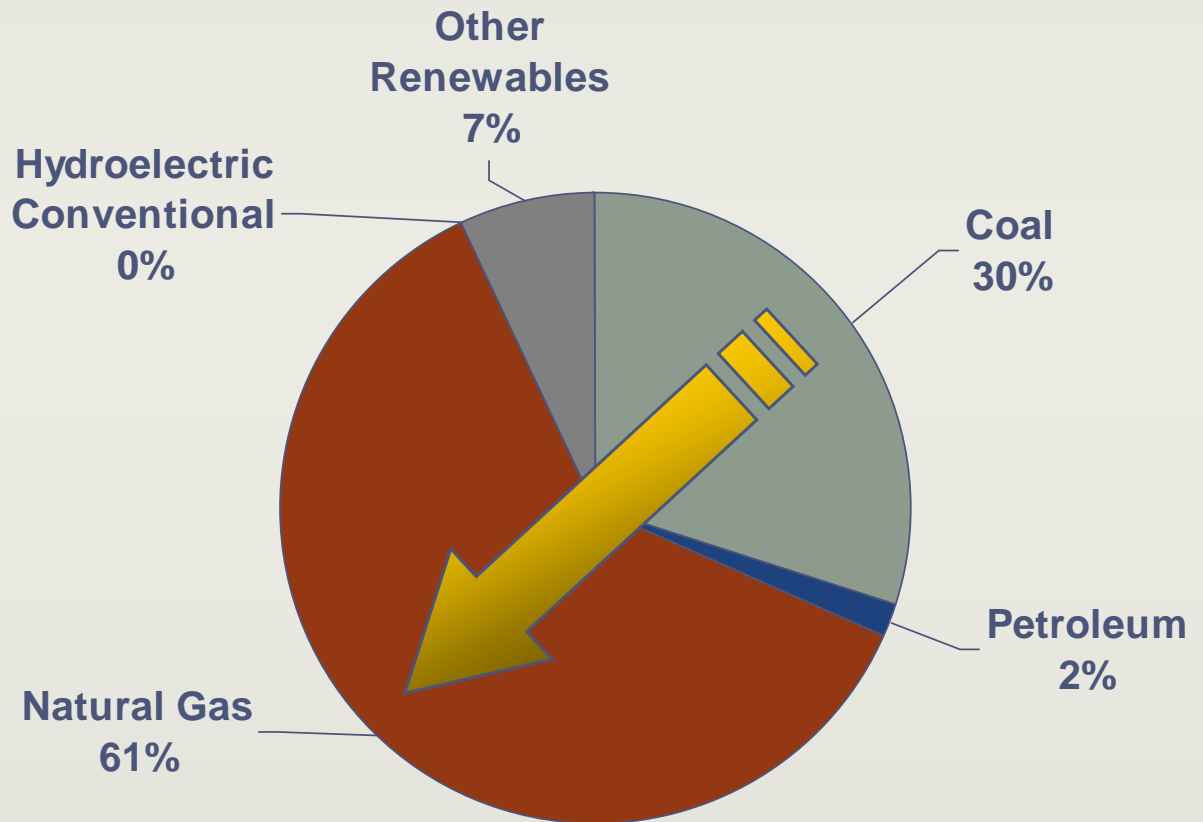


# The Future of Coal?

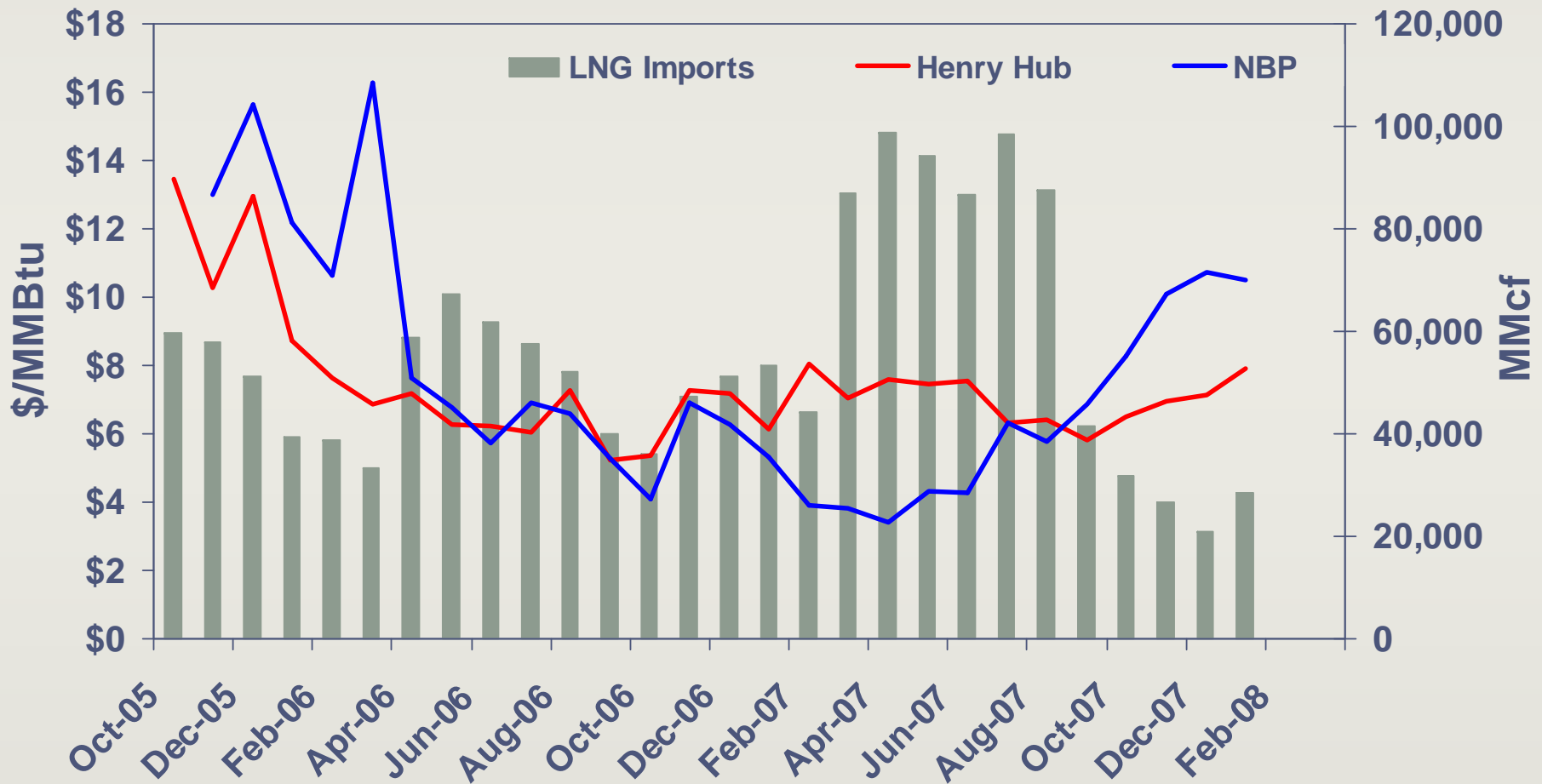
## \*\$4,000,000/MW!

\*Based on estimated total cost for Future Gen low or zero IGCC/CCS, if fully funded, built, and operated (250MW).

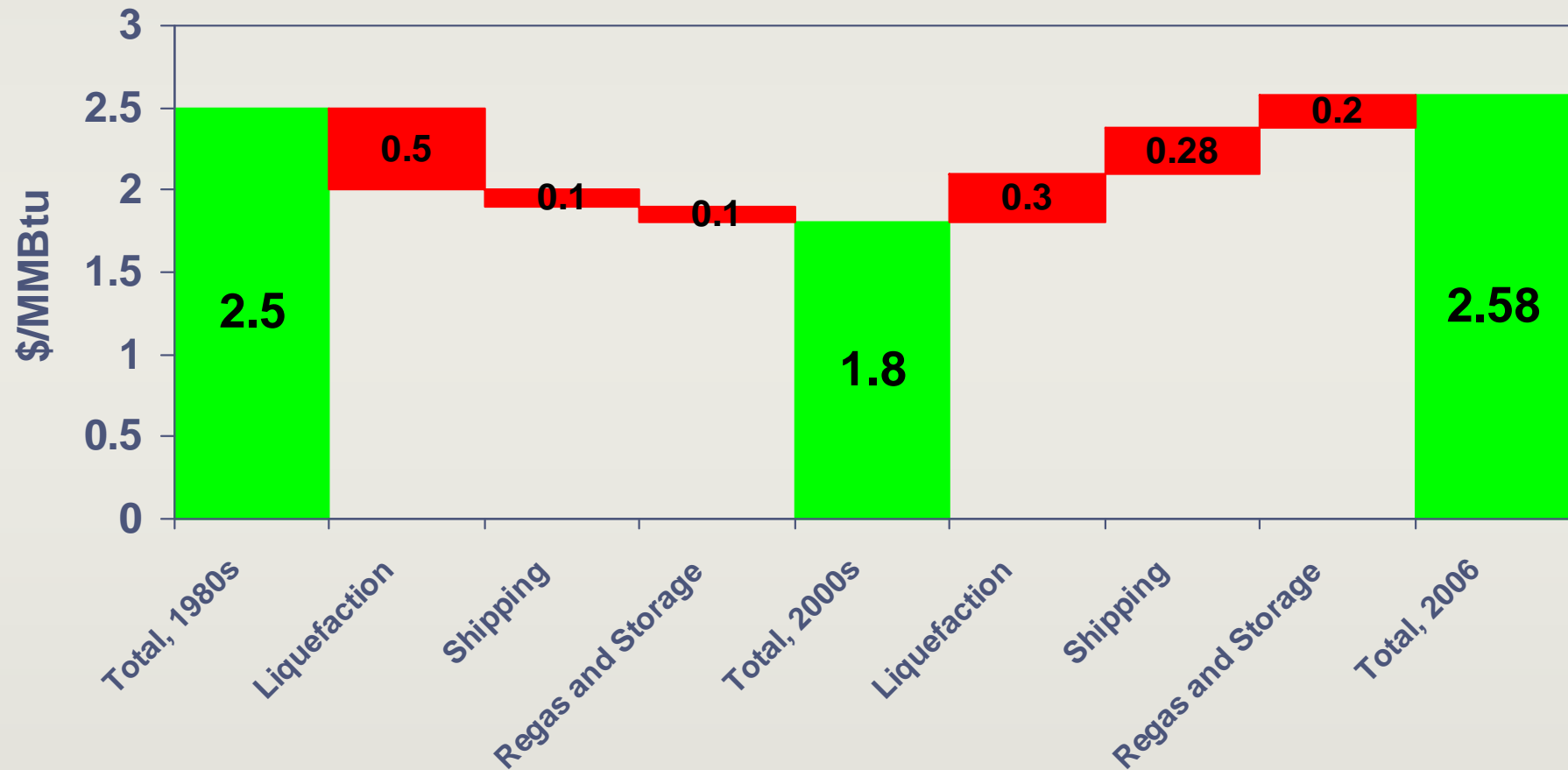
Planned nameplate additions, 2006-2010, 94 GW (shares do not add to 100% because of omitted categories)



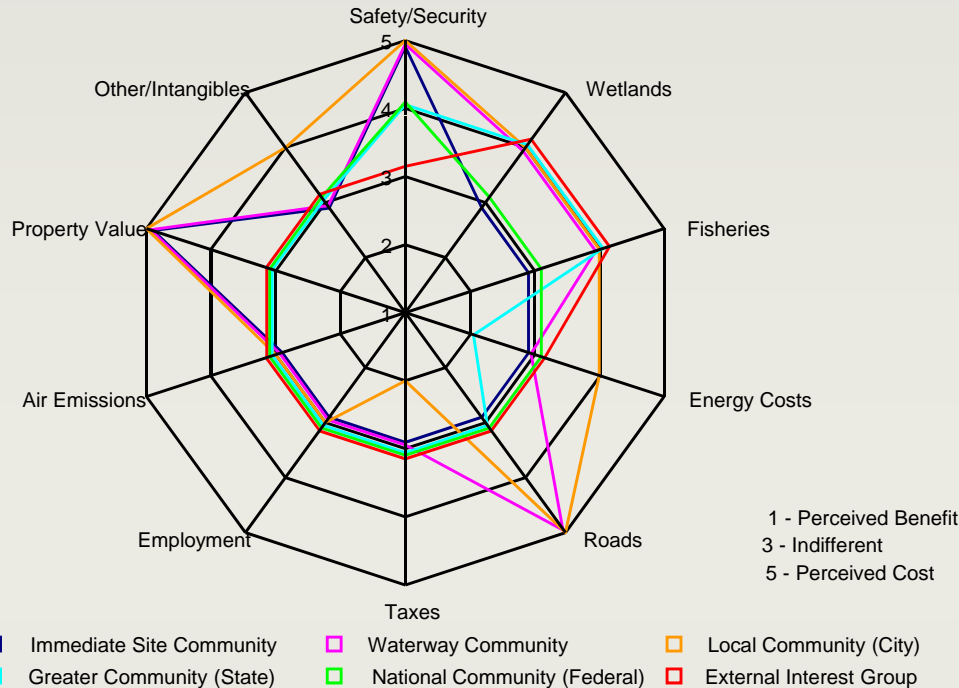
# LNG Cargo Receipts and Natural Gas Pricing



# LNG Value Chain Cost Estimates (Excludes Feedstock)

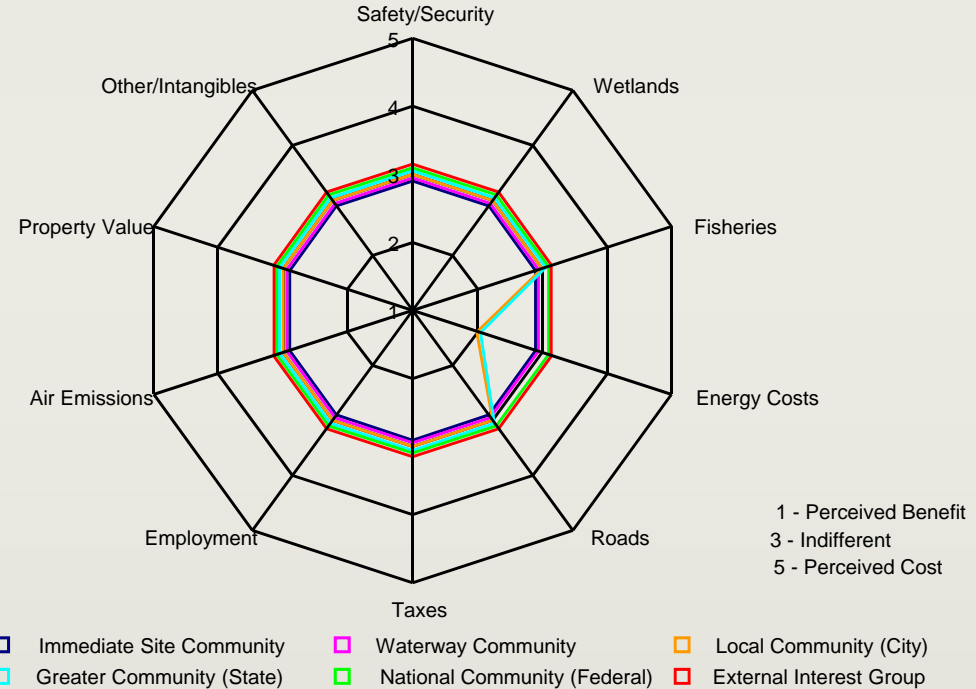


# Sample Projects in Same Region



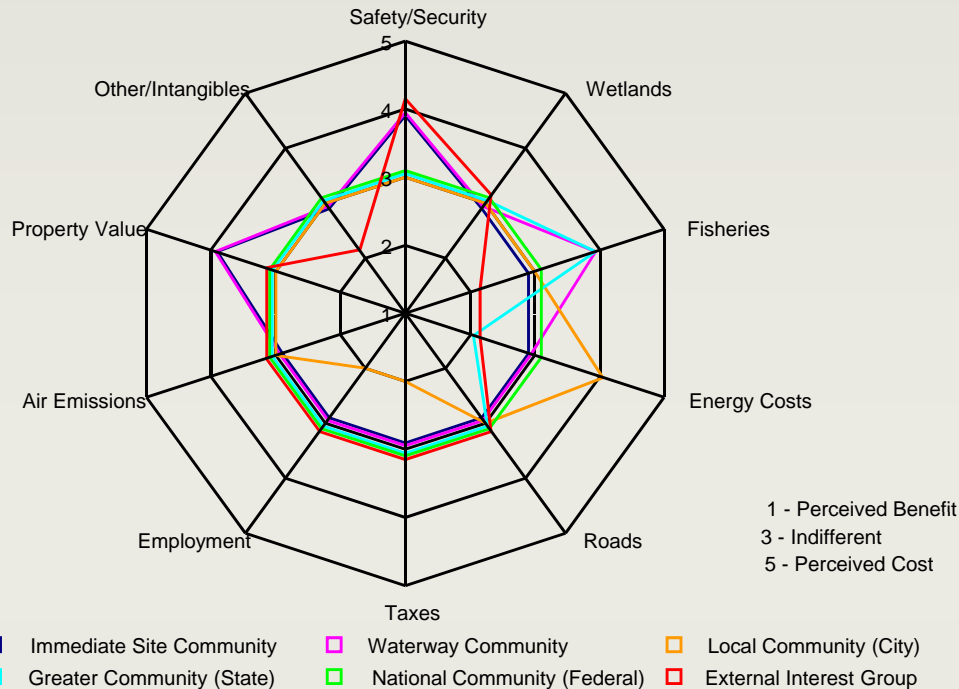
## Unlicensed Onshore Project

What caused the differences?  
Onshore vs. Offshore?  
Developer posture?  
Early dialogue?



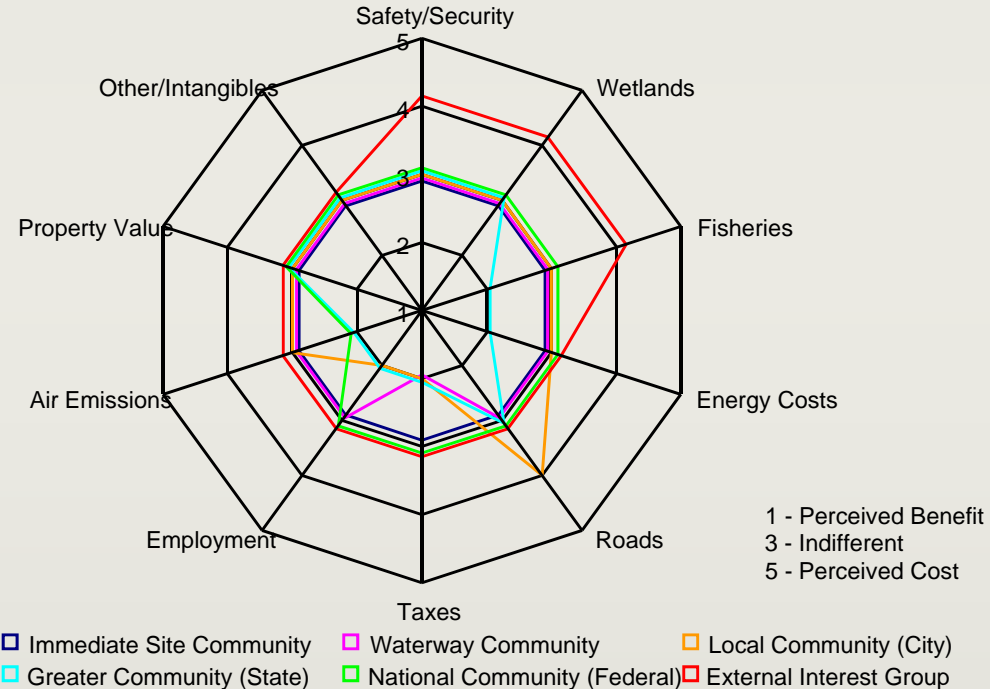
## Licensed Offshore Project

# Sample Projects in Different Regions



## Unlicensed Onshore Project

What caused the differences?  
Onshore vs. Offshore?  
Developer posture?  
Early dialogue?



## Licensed Onshore Project

# Opportunities for Northeast Projects

- Onshore projects are unlikely due to inland waterways can become problematic.
- A permanent offshore FSRU will likely face opposition unless considerably remote.
- Remote offshore projects seem possible without a permanent visible structure from the coast.
- A visible FSRU may be possible if it is only present only for continuous supply during peak demand
- Promotion of the use of LNG in marine operations (fishing, tug boats) as well as for home heating by the community would help provide tangible benefits.

# Pacific Northwest Projects

- Small storage and regasification facilities
- Facilities that serve local markets in areas where electricity will need to be generated thermally due to dam decommissioning
- Excess volumes could eventually target other markets (via pipeline or wire).



# Central/Western Gulf Coast Projects

- Preference for onshore projects; potential overbuilding in the region.
- Possible constraint associated with limits to tolerance for further, intense coastal industrial development.
- Regasification facilities with associated storage (LNG or underground natural gas) near existing pipeline takeaway infrastructure or rights of way.

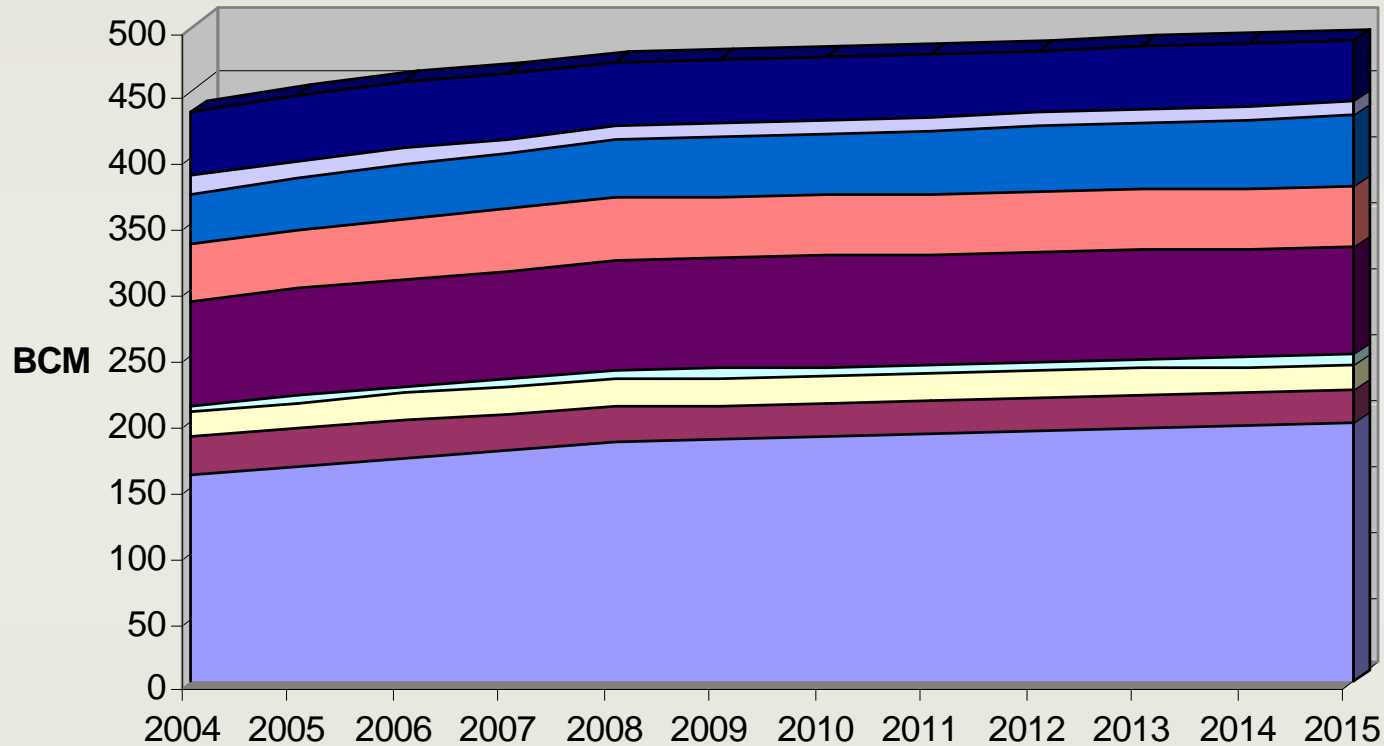
# Florida Projects

- Offshore projects face environmental challenges due to pipeline construction impacts.
- Novel pipeline construction techniques (tunnels), if economically viable, may help reduce footprint.
- Onshore projects near busy and congested ports might be supported as State shifts toward more natural gas power generation.
- Extension to greater Southeast as mid-term coal projects are displaced by natural gas.

# California Projects

- Offshore projects face ever more complex demands which are being solved “technologically”.
  - No seawater use – move to used closed loop vaporization.
  - No emissions allowed – thermal integration with shore facilities or air vaporizers to avoid onsite combustion.
  - Minimize coastal impact – pipelines in large tunnels.
  - Minimize visual impact – move further offshore.
  - Minimize security concerns – move even further offshore.
- Onshore projects unlikely unless in existing port but still face similar issues.

# CEE “Commodity Cycle” Forecast of Russian Natural Gas Consumption



- Power sector
- Metallurgy
- Chemicals
- Cement
- Communal/District heat
- Population
- Gas network
- Losses
- Other

# What Nat Gas Will be Monetized?

- Stiffer terms for upstream, HH pricing eliminates cost advantage for industrials
- Desire among NOCs to participate in LNG VC components, but can they pay up?
- Desire among host governments to use nat gas for domestic economic development
- Strategies of big players – will Russia pursue market share?