



Market Update: Time to Re-Write the Models Again?

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Bethesda, Maryland
2006 EIA Energy Outlook and Modeling Conference
Washington, DC – March 27, 2006

Agenda

1. Gas market overview
2. LNG rationale
3. Competitive issues/challenges
4. Global paradigm
5. Changing basis differentials
6. Conclusions.

About BSA...

- ◆ Independent consultants on energy economics, supply, contracting, pricing, rate design, system costs, regulatory and lender risks worldwide
- ◆ Three major practice areas:
 - *Market research*, energy analysis and forecasting
 - *Due diligence* on fuel risks for 105 power projects, and gas storage and pipeline financings
 - *Expert witness* on gas markets, pricing, rates, market power, cost of capital, contract issues in 16 jurisdictions
- ◆ 400 assignments since founding in March 1984.

BSA North American Market Due Diligence for LNG Lenders

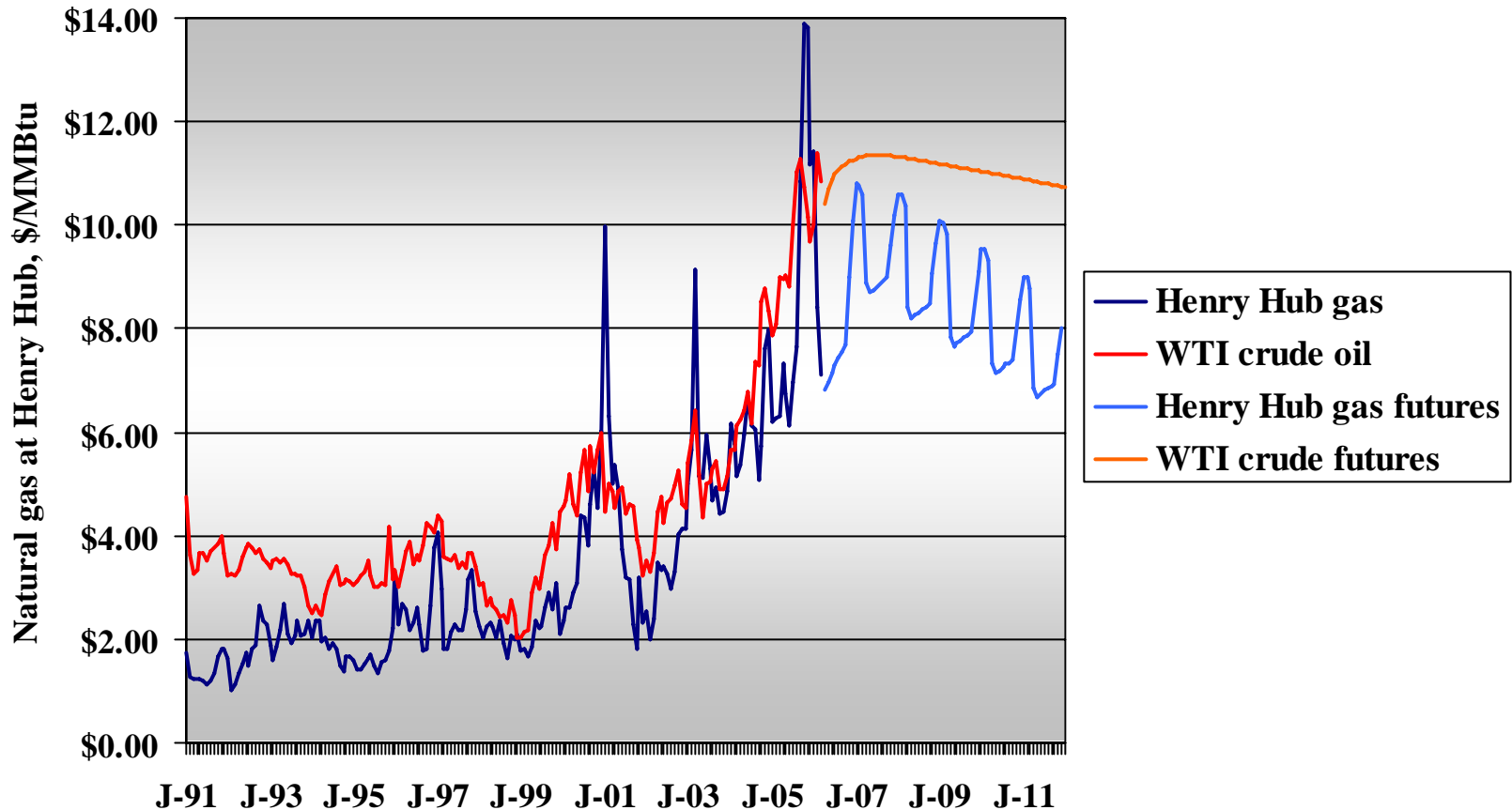
- ◆ RBS and rating agencies, for the Rasgas II/III project finance in 2005
- ◆ SocGen, for Egypt LNG phase II expansion in 2004
- ◆ BNP Paribas, for Atlantic LNG Train 4 in 2004
- ◆ HSBC and Shell, on behalf of lenders for Tangguh and Sakhalin LNG, respectively in 2004-2005
- ◆ SocGen, for Peru LNG project finance (in progress)

In 2004-2006, BSA also provided independent North American market analysis and forecasting to more than a dozen existing and prospective LNG importers.

North American gas resources are prolific, but E&P costs are rising (Tcf).

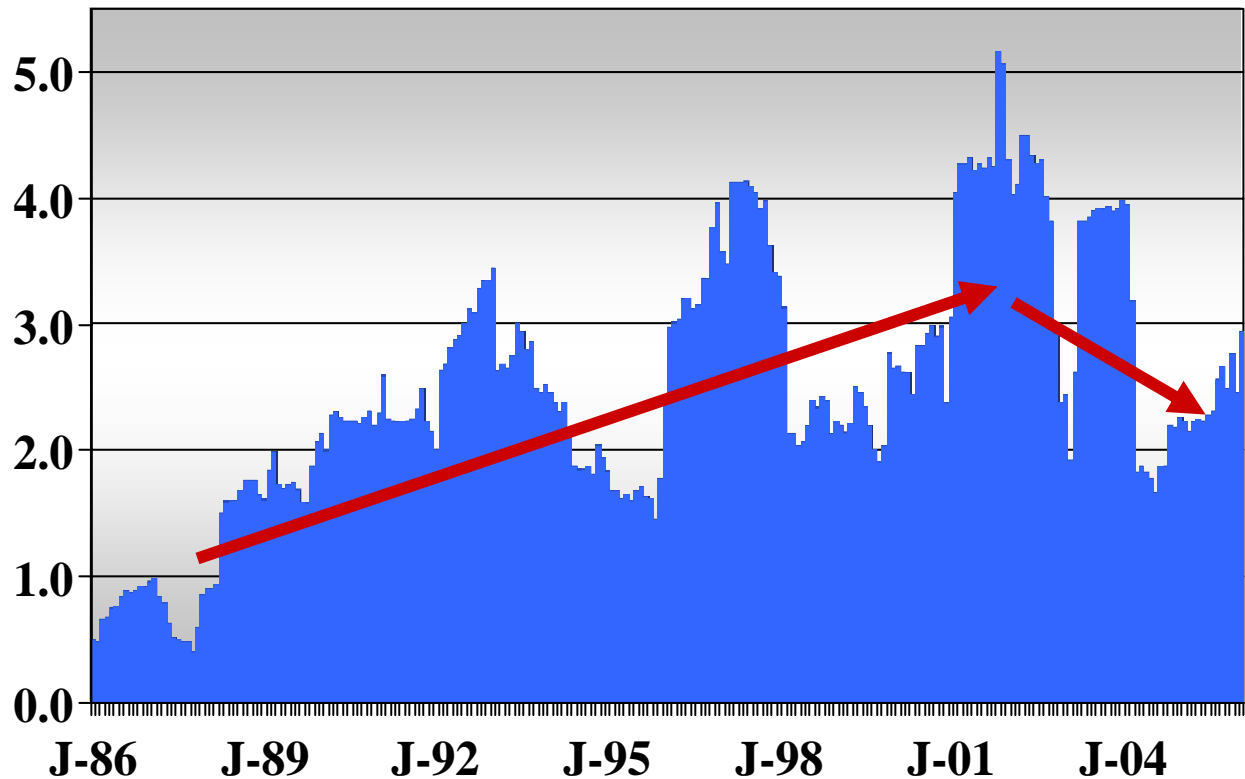


Short-term crude oil and gas prices have cooled a bit since last fall.

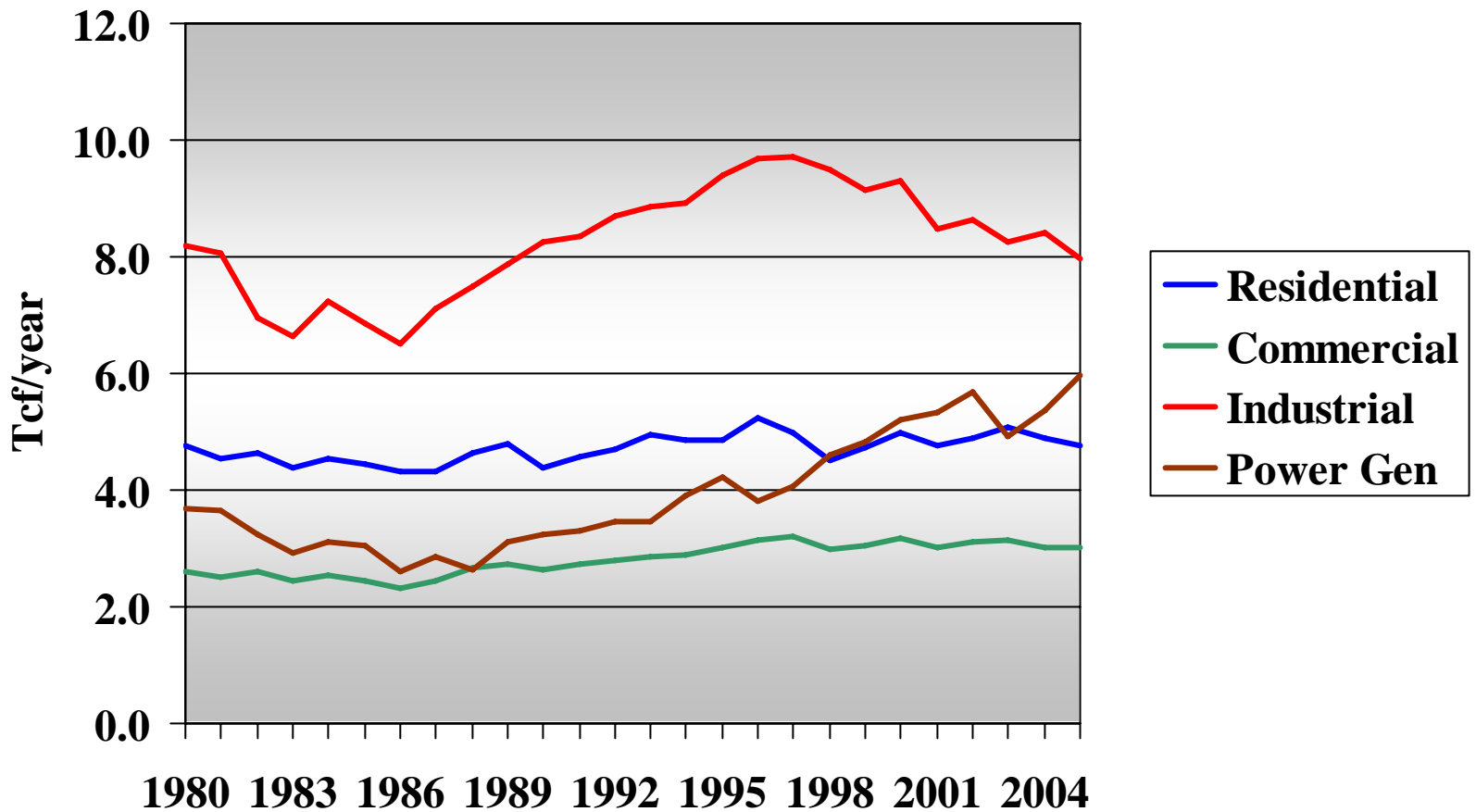


Henry Hub price volatility seems slightly off, even with hurricanes.

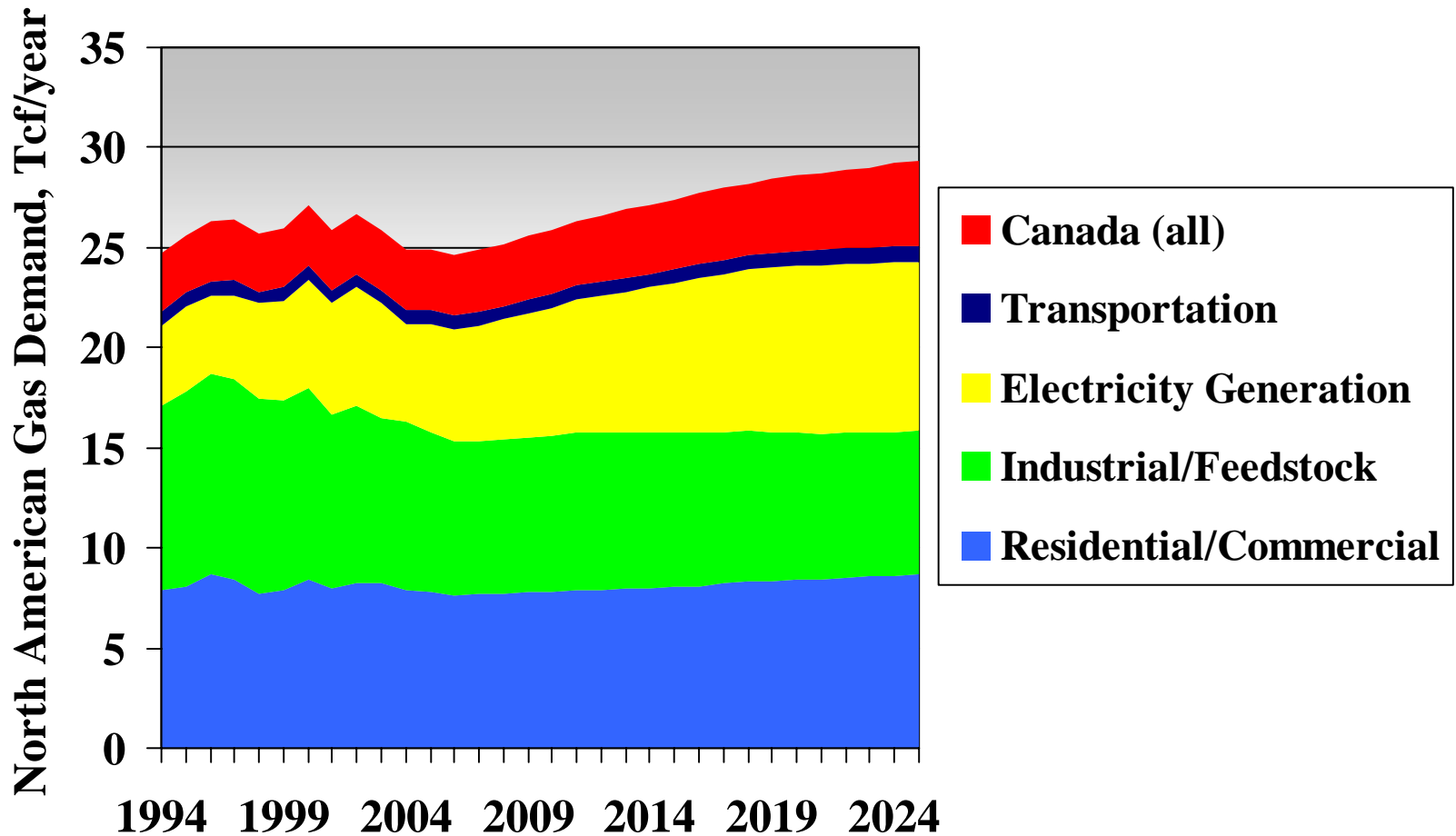
**Black-Scholes
12-Month
Volatility**



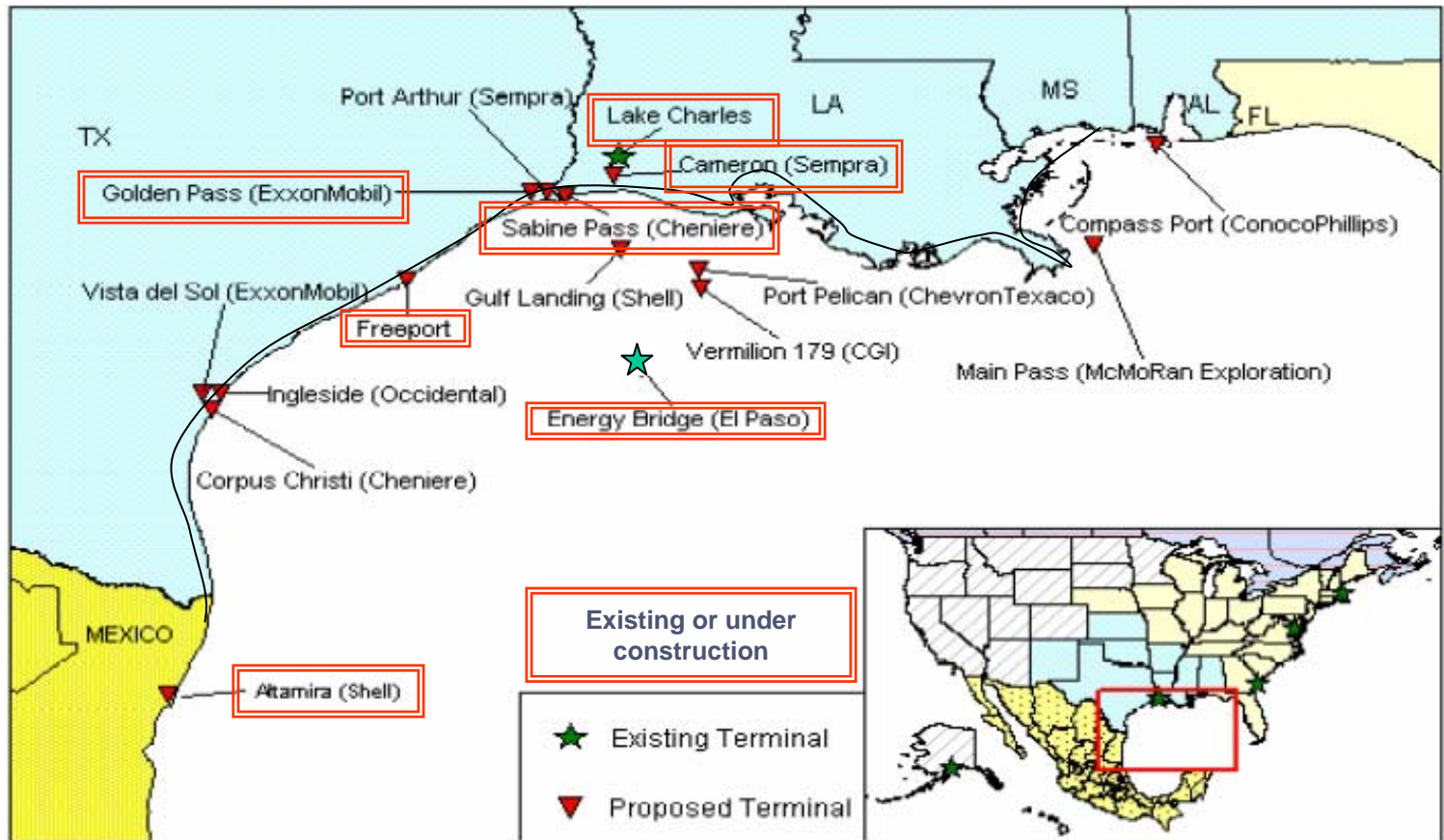
Industrial gas users have steadily shed demand since 1998.



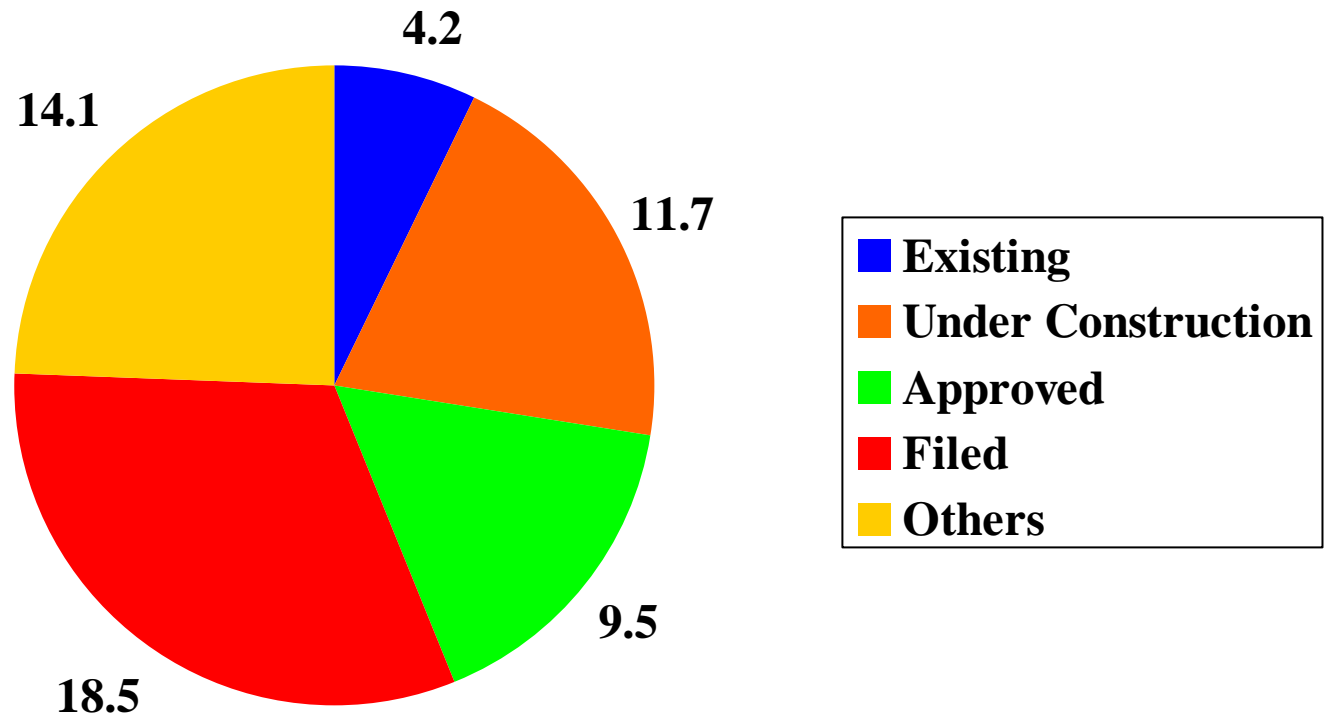
With few substitutes, gas for power will rise 2.9%/yr through 2020.



LNG construction-in-progress is focused along the Gulf Coast.

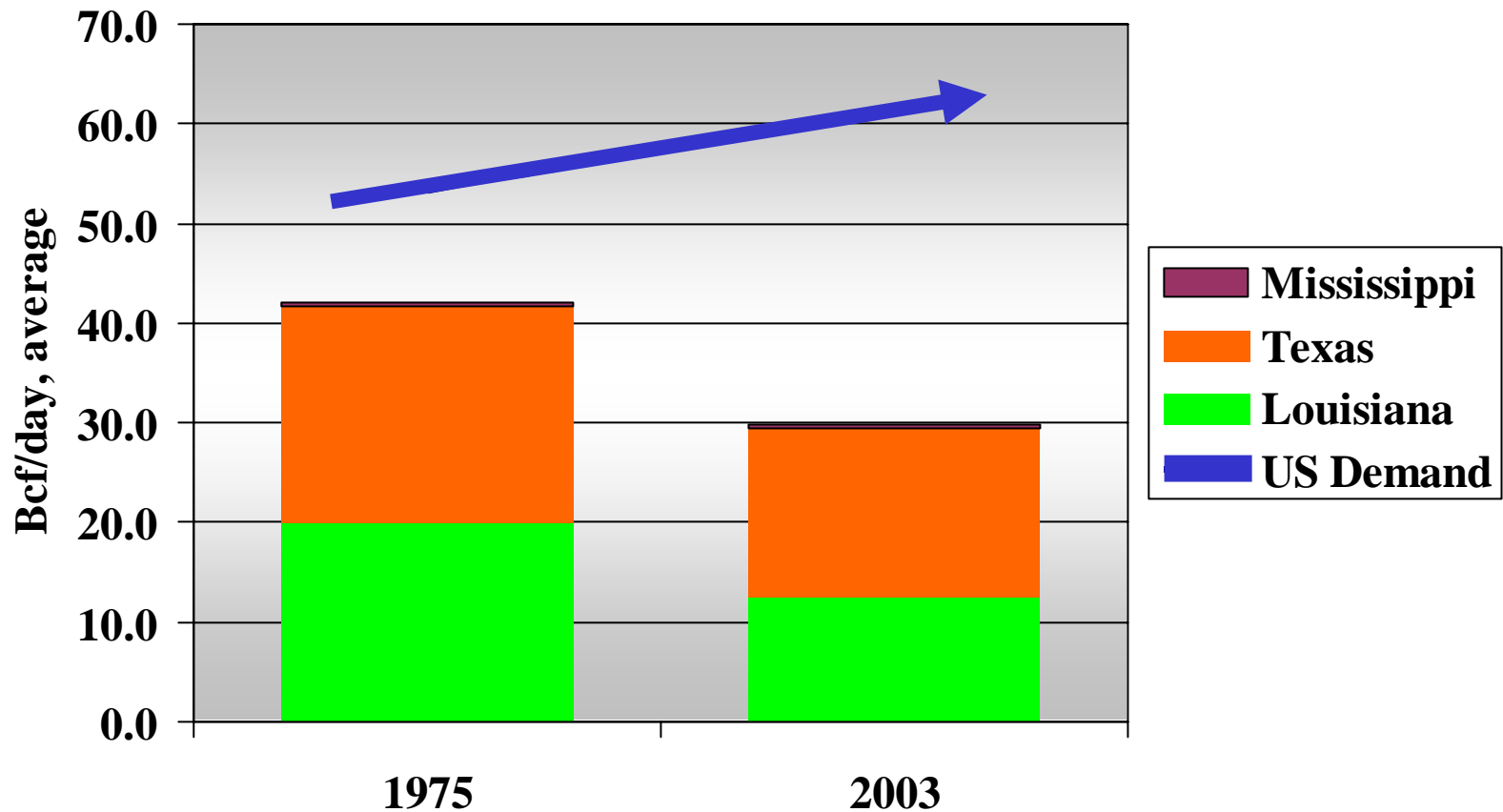


Some over-build of LNG receiving capacity seems inevitable.



58 Bcf/day of capacity proposed for North America!

Gulf depletion provides 12+ Bcf/d pipeline capacity for LNG.

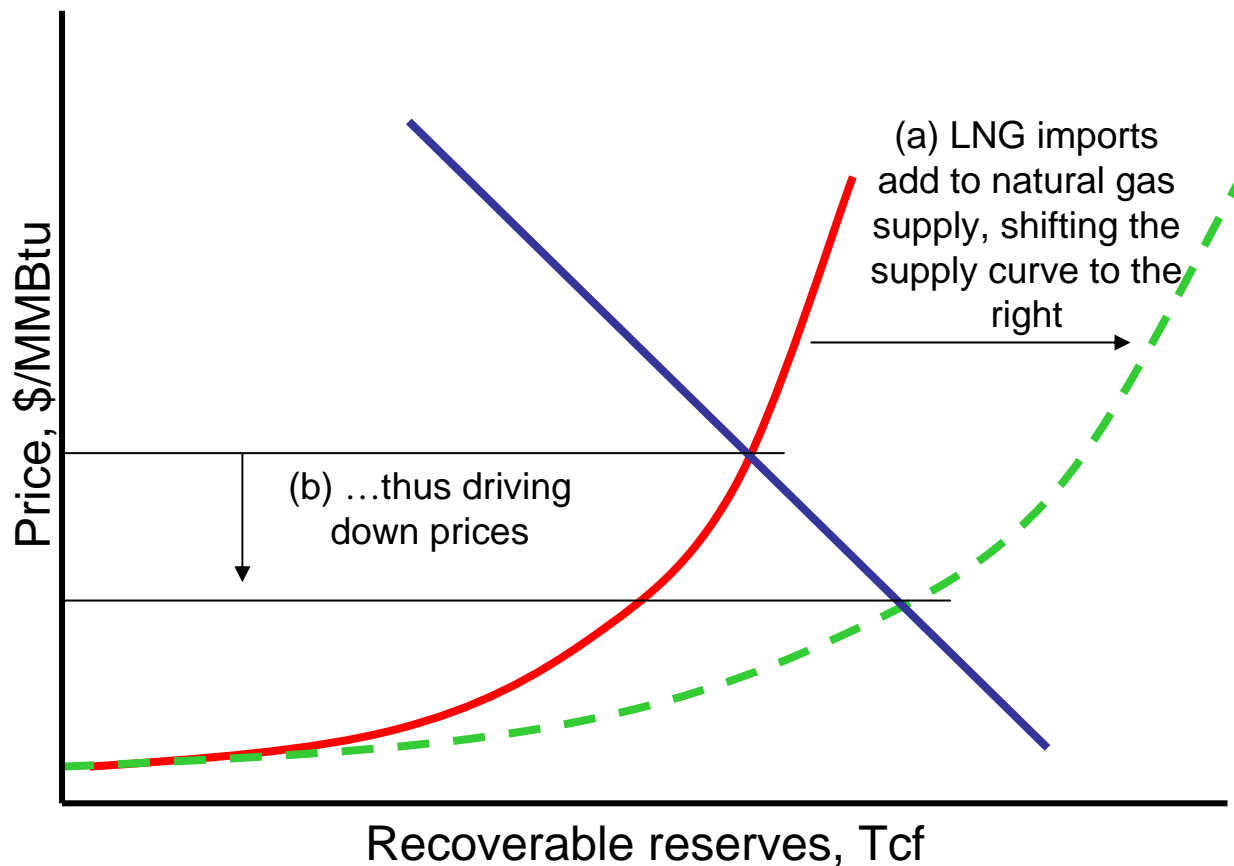


Congress codified the FERC's encouraging "Hackberry" Rule.

- ◆ In a 2002 decision approving Sempra's Cameron terminal, FERC adopted an extraordinarily pro-LNG policy.
 - Viewed LNG's role in future US gas supplies as imperative
 - Recognized need for international investment
 - Plainly conceded international commerce can't be regulated here
 - LNG terminals economically deregulated, much like gas wells.
- ◆ US Energy Policy Act of 2005 (Domenici-Barton) adopted the Hackberry rule, and extended it through 2015:
 - Placed LNG terminal siting under FERC's final purview
 - Governors can veto offshore but not onshore sites.

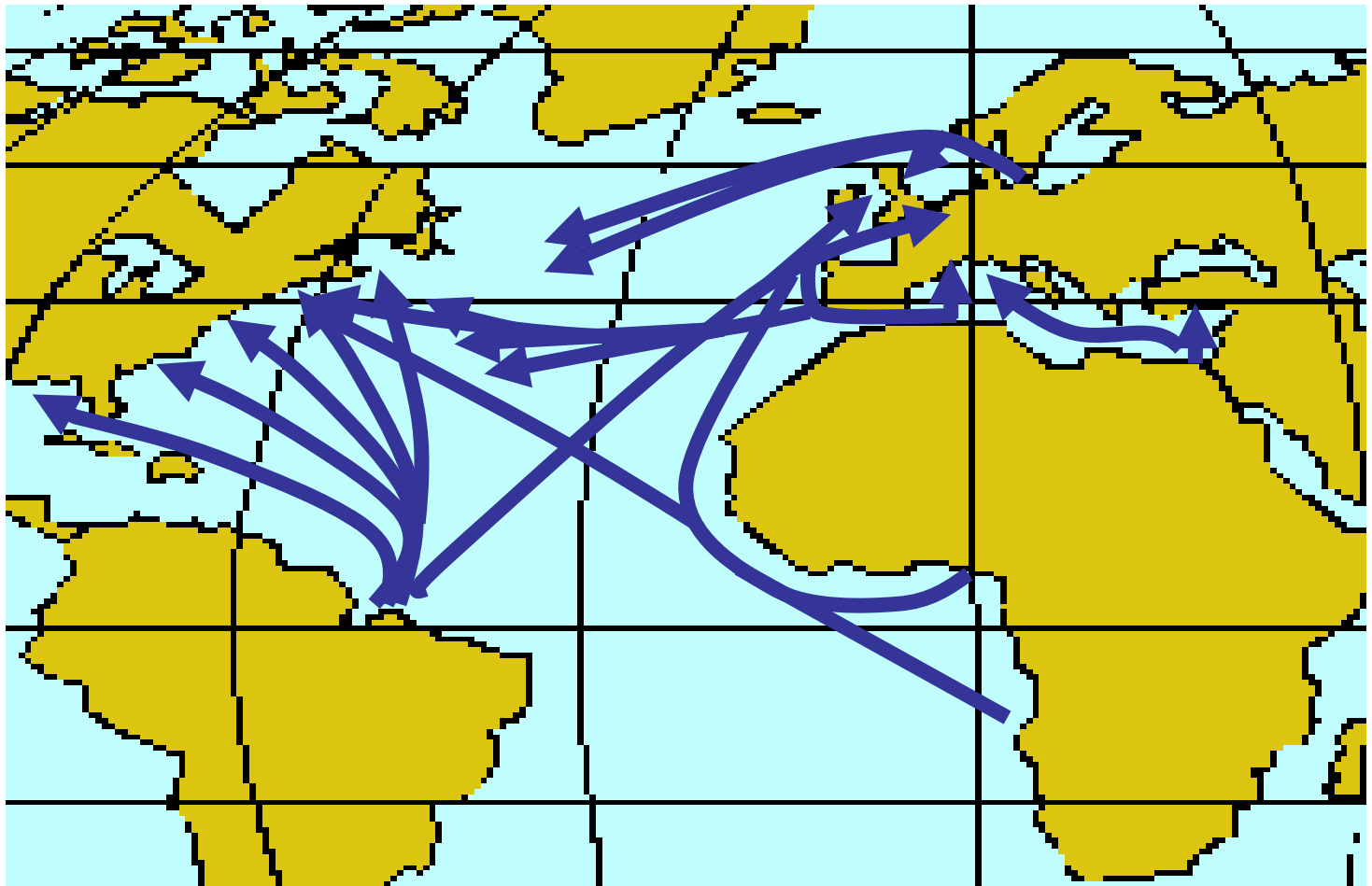
But wait, is LNG really the same as a gas well?

LNG will displace higher-cost gas, and reduce prices where it lands.

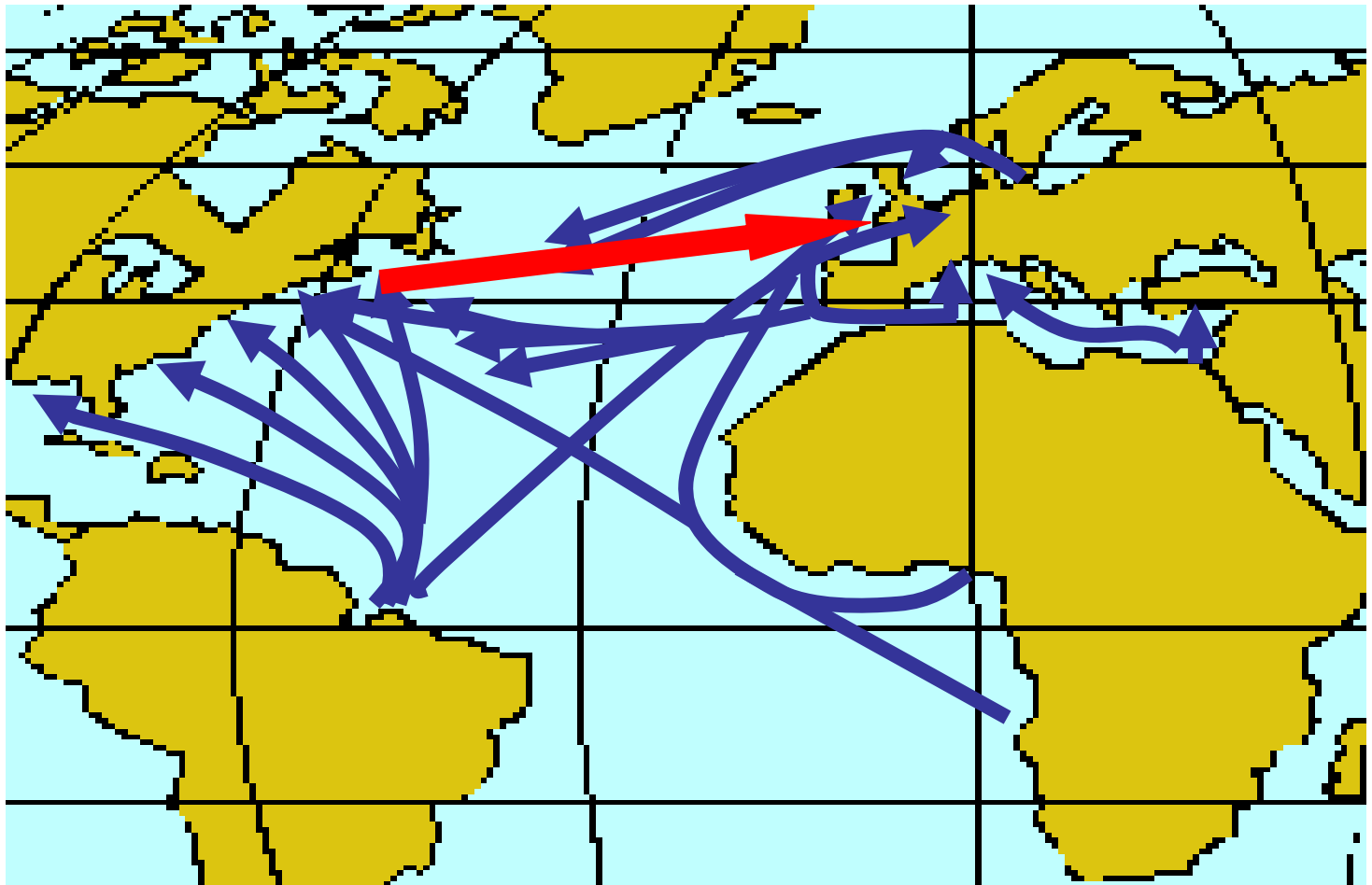


In practice, however, international buyer competition for LNG – US gas markets vs. petroleum-indexed European/Asian gas – may support and strengthen North American prices....

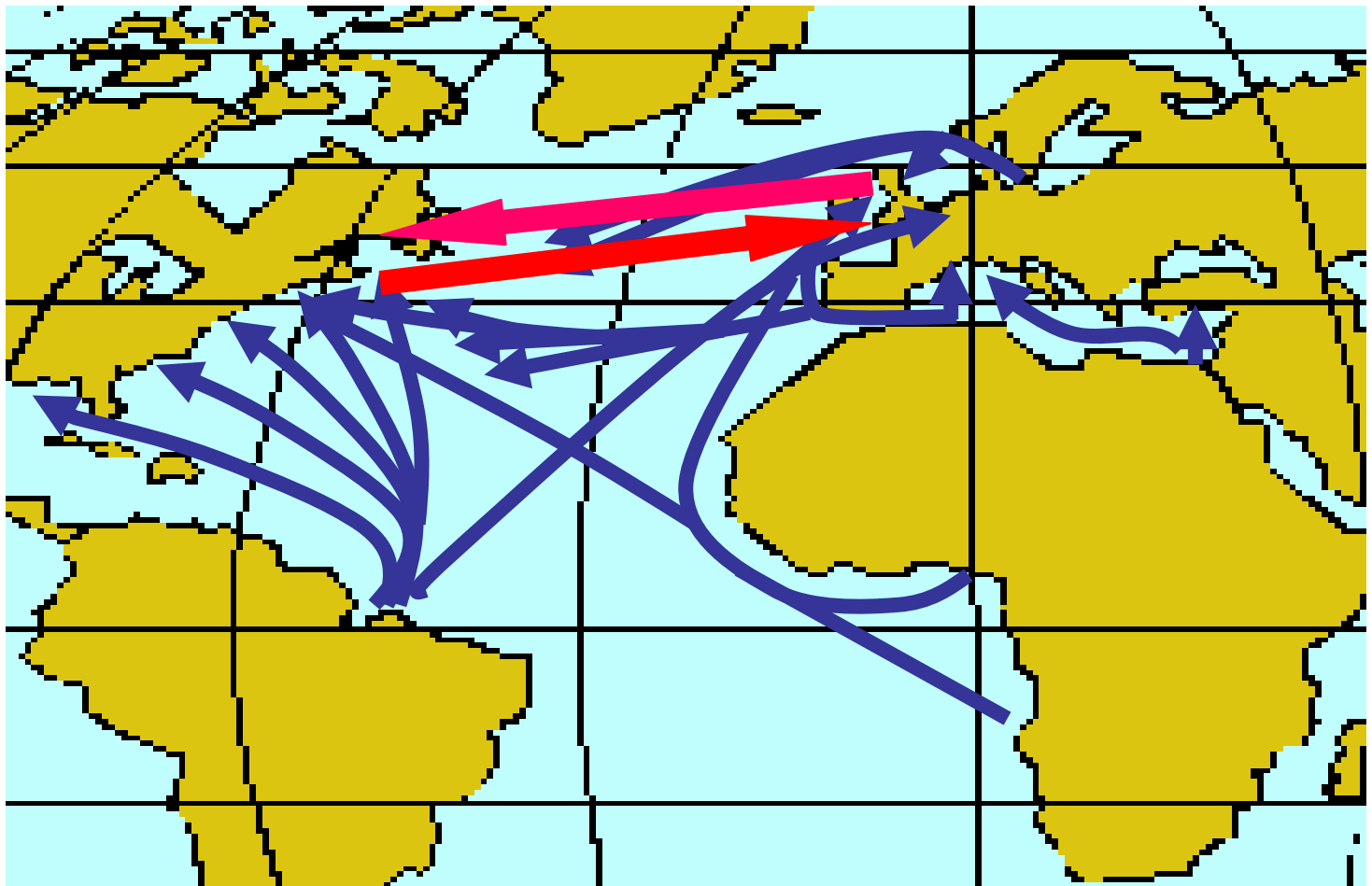
Major Atlantic LNG trading...



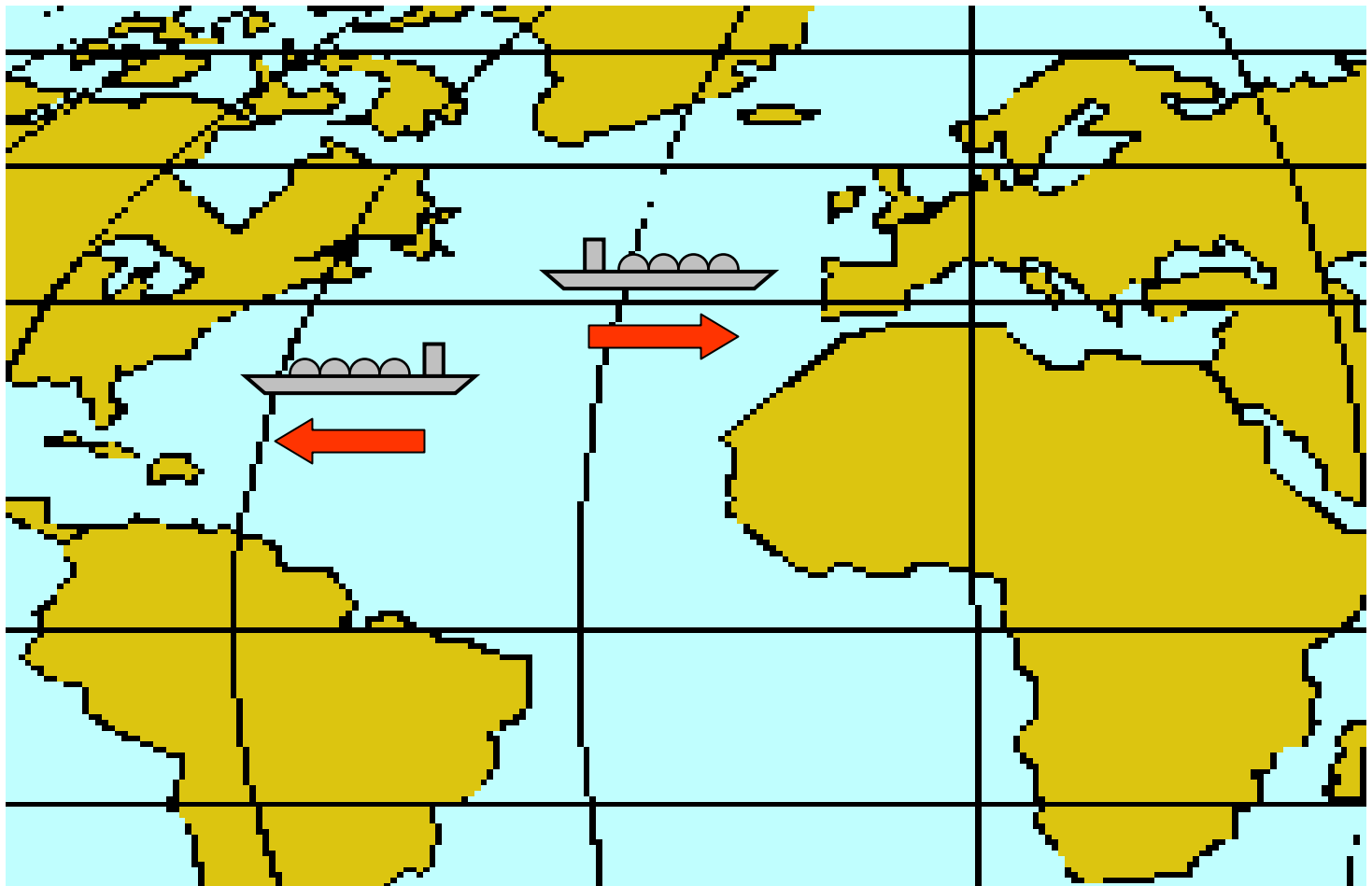
Will force price signals east...



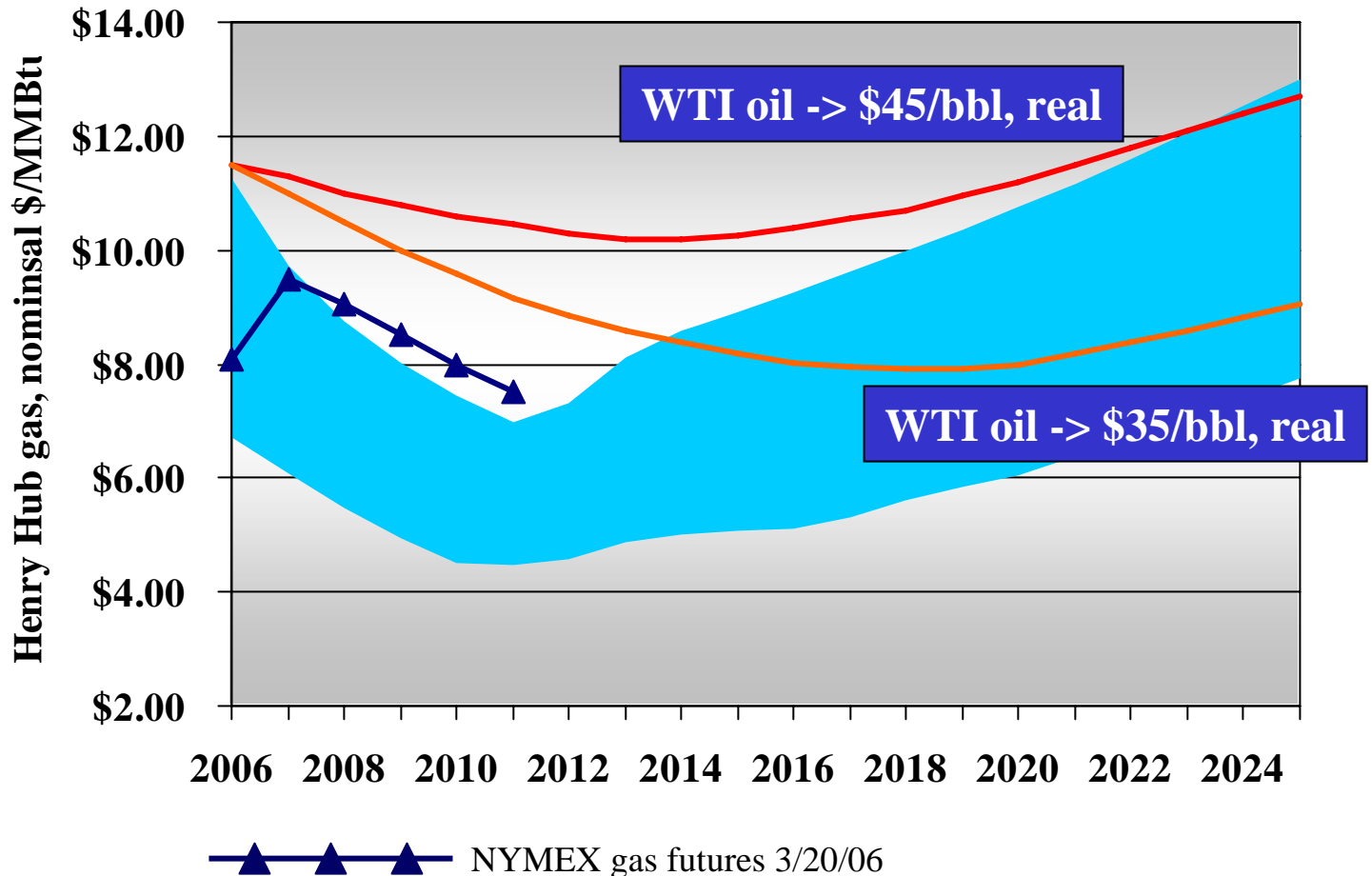
...But toward the west as well!



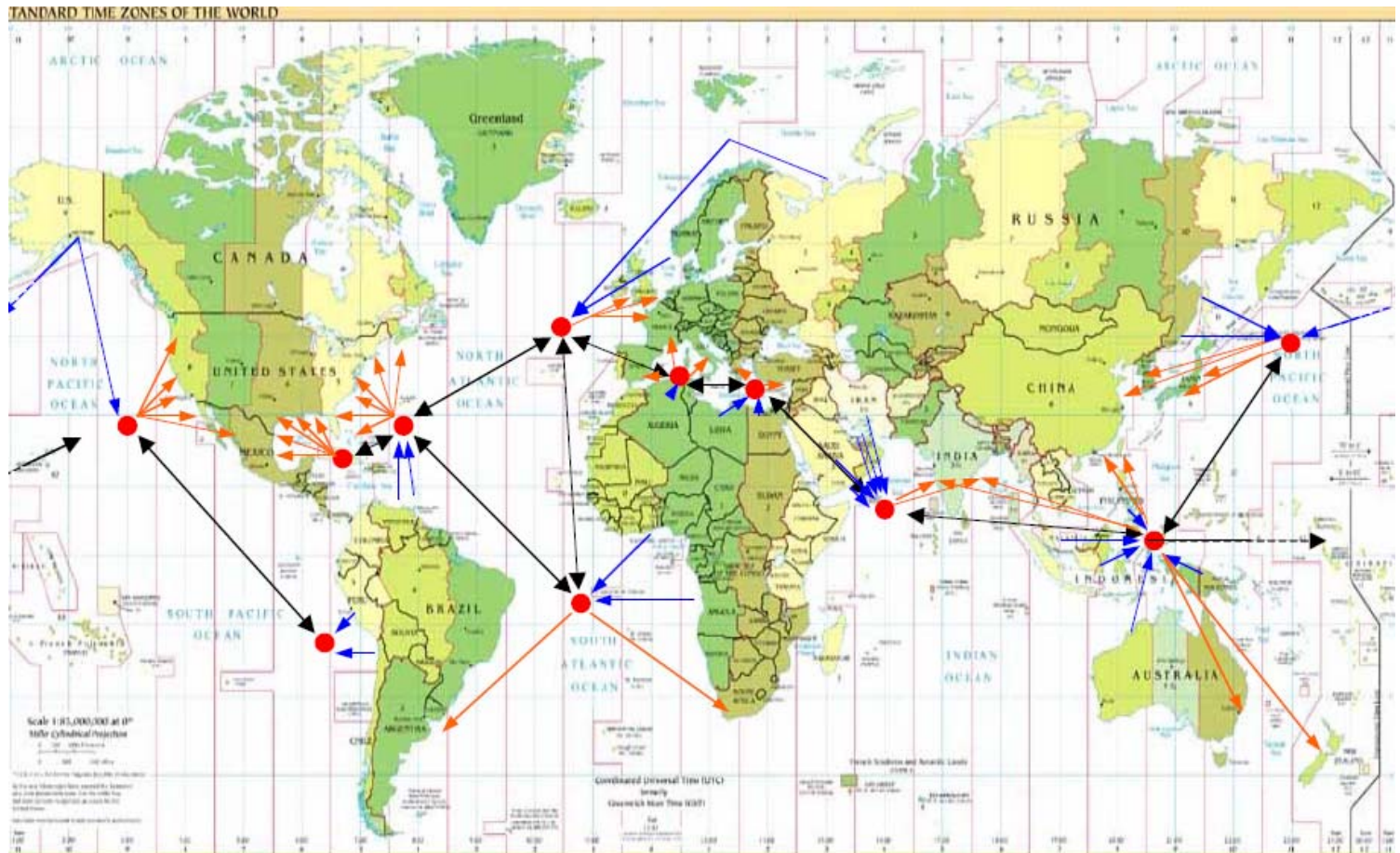
With spare terminal capacity, LNG cargoes will drive out arbitrage.



Gas forecasting models seem to be doing battle with market forwards.



One solution may be the World Gas Trade Model (WGTM).



Buyers are competing in different kinds of markets.

- ◆ North America's commodity markets:
 - Optimization models (GPCM, etc.)
 - Market clearing models (NARG, etc.)
- ◆ Europe and Asian contract markets:
 - Long-term take-or-pay SPAs
 - Prices indexed to petroleum products, corrected quarterly, annually
 - Structurally fixed, much like pre-commodity U.S. contracts.

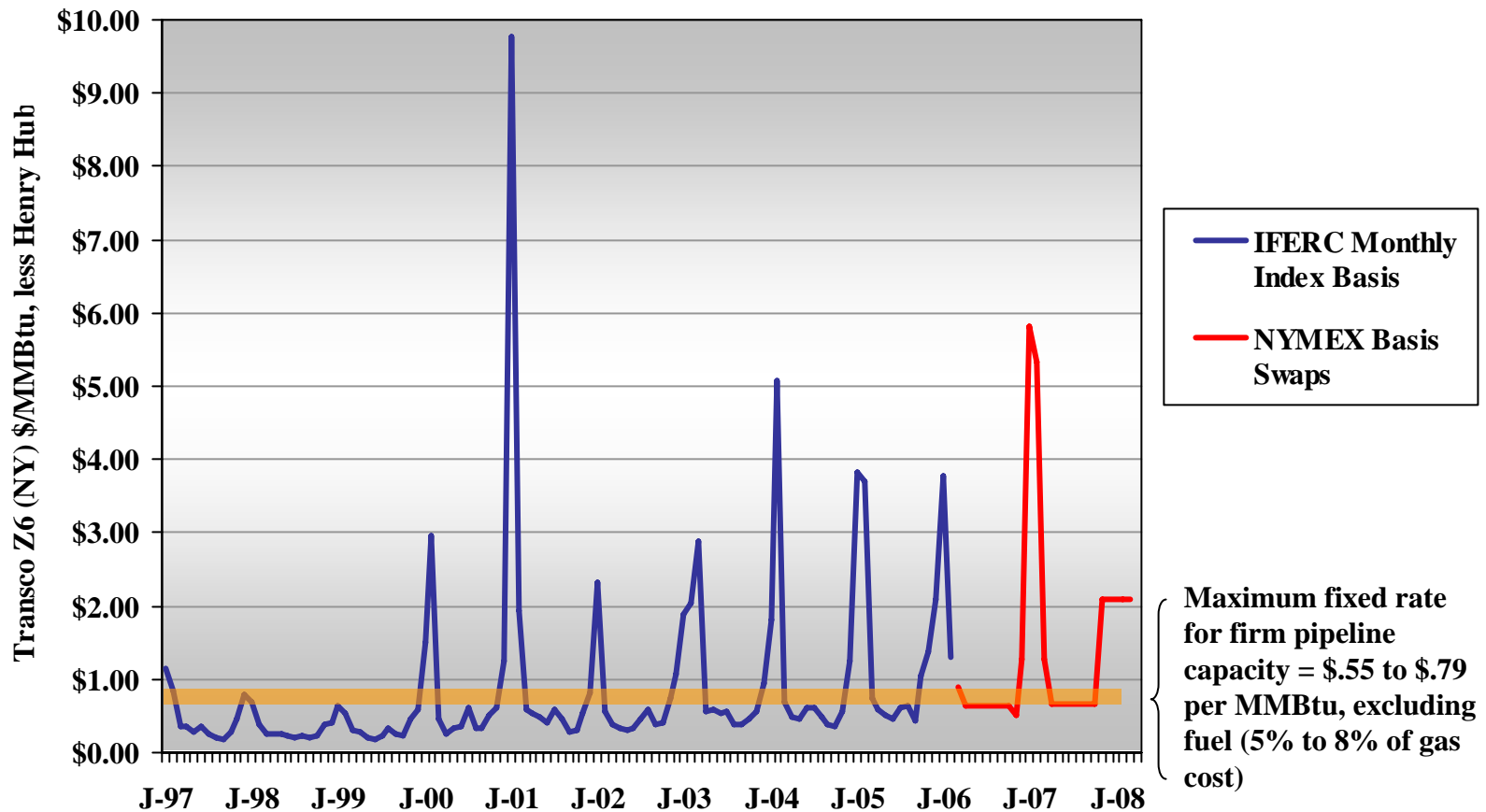
Commodity-based models not necessarily accurate for LNG trade; perhaps some kind of hybrid needed.

*Models must be reviewed
with respect to basis
forecasts as well.*

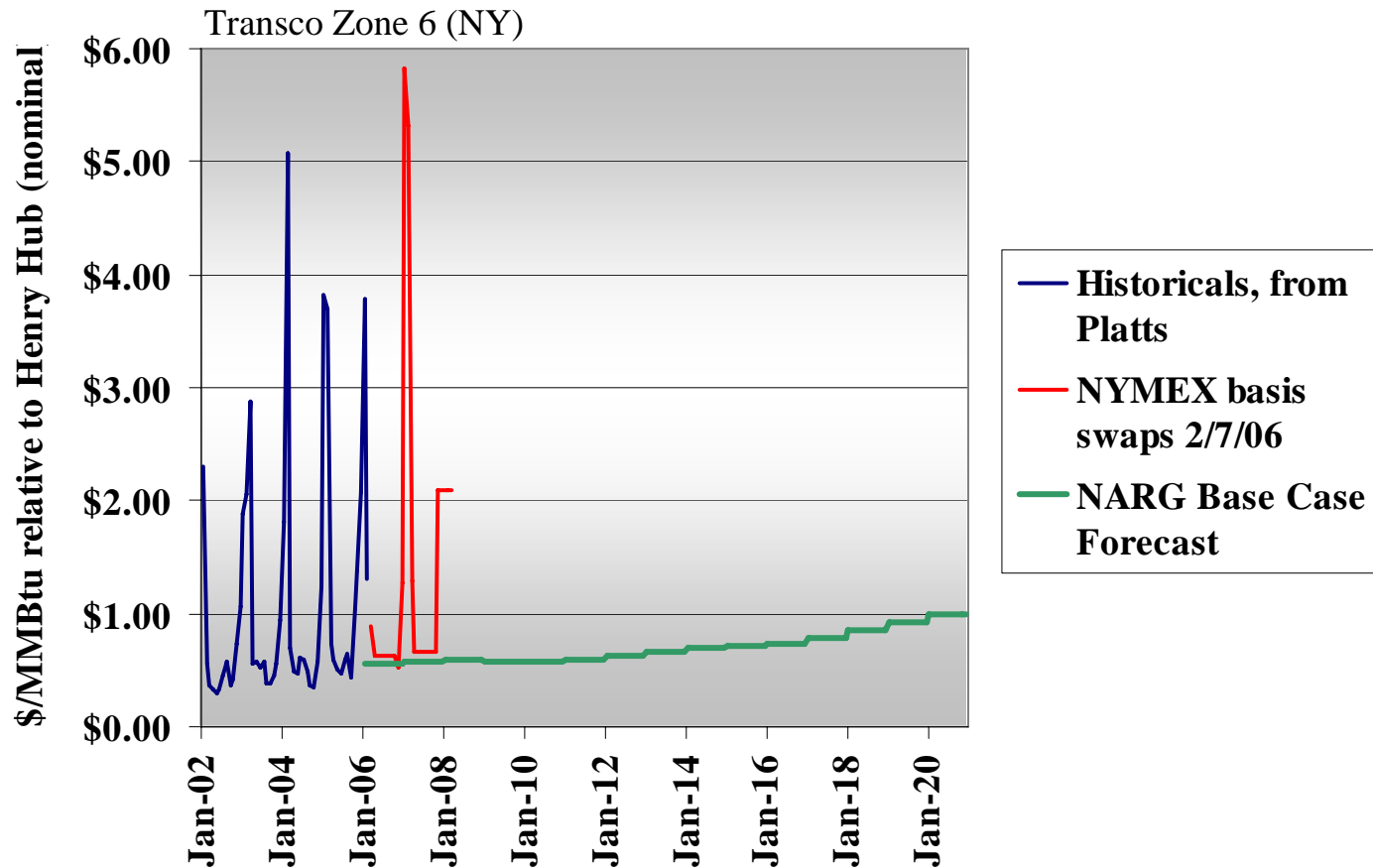
Extreme market conditions are excluded from annual models:

- ◆ Temperature-sensitive demands force 100% pipeline load factors to north/northeast, extraordinary basis spikes.
- ◆ Winter-mode utility operations:
 - Interruptible gas delivery arrangements to industrial and power plant customers (averaged only, treated as a demand reduction)
 - Underground storage withdrawals, delivered by pipeline
 - Peak-shaving LNG and propane-air (excluded from EIA weekly storage reports).
- ◆ Weather upsets – Gulf summers, northern fuel oil and coal handling/supply issues, equipment outages, potential winter delays in LNG deliveries to local terminals.

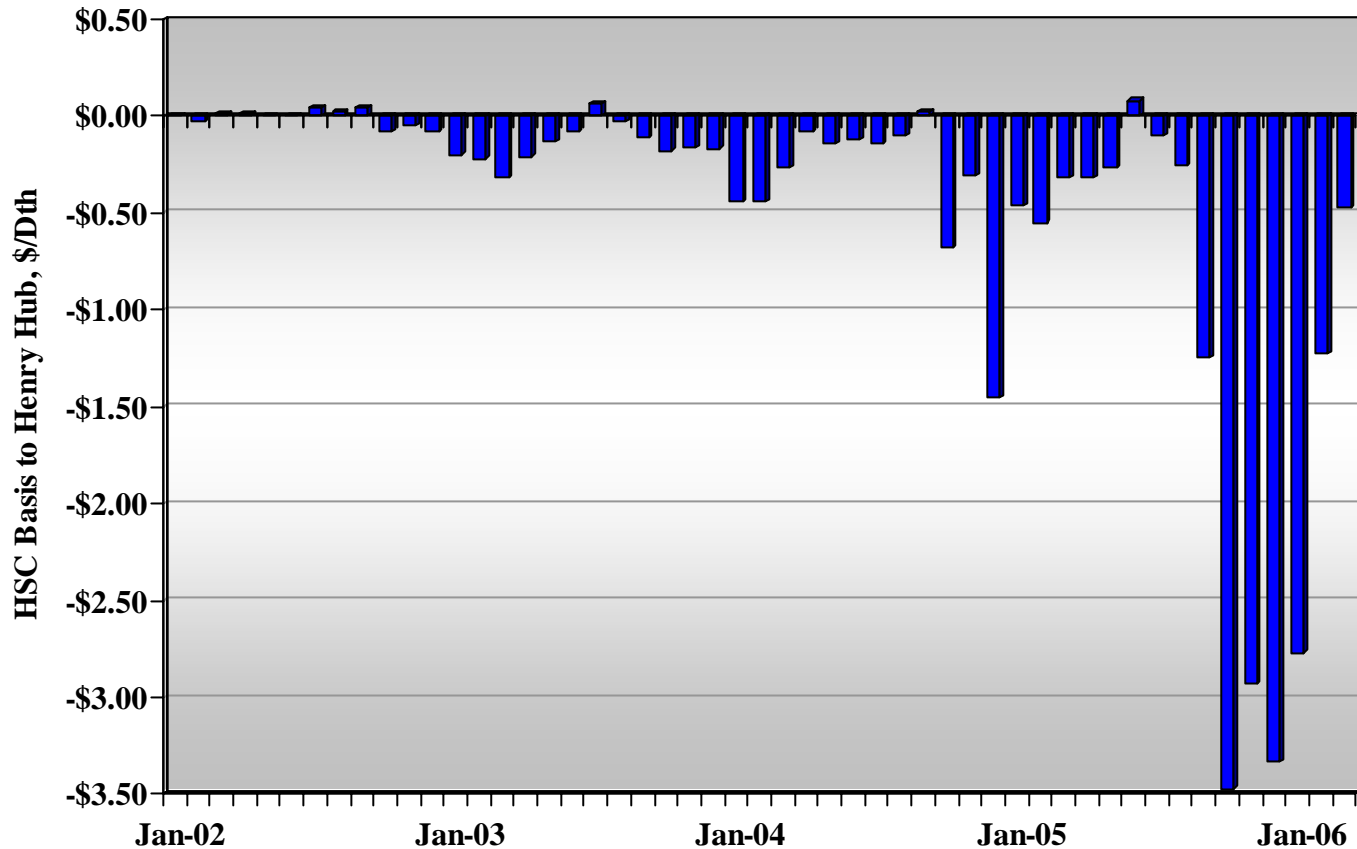
Northeast basis is highly seasonal, and has been rising for 10 years.



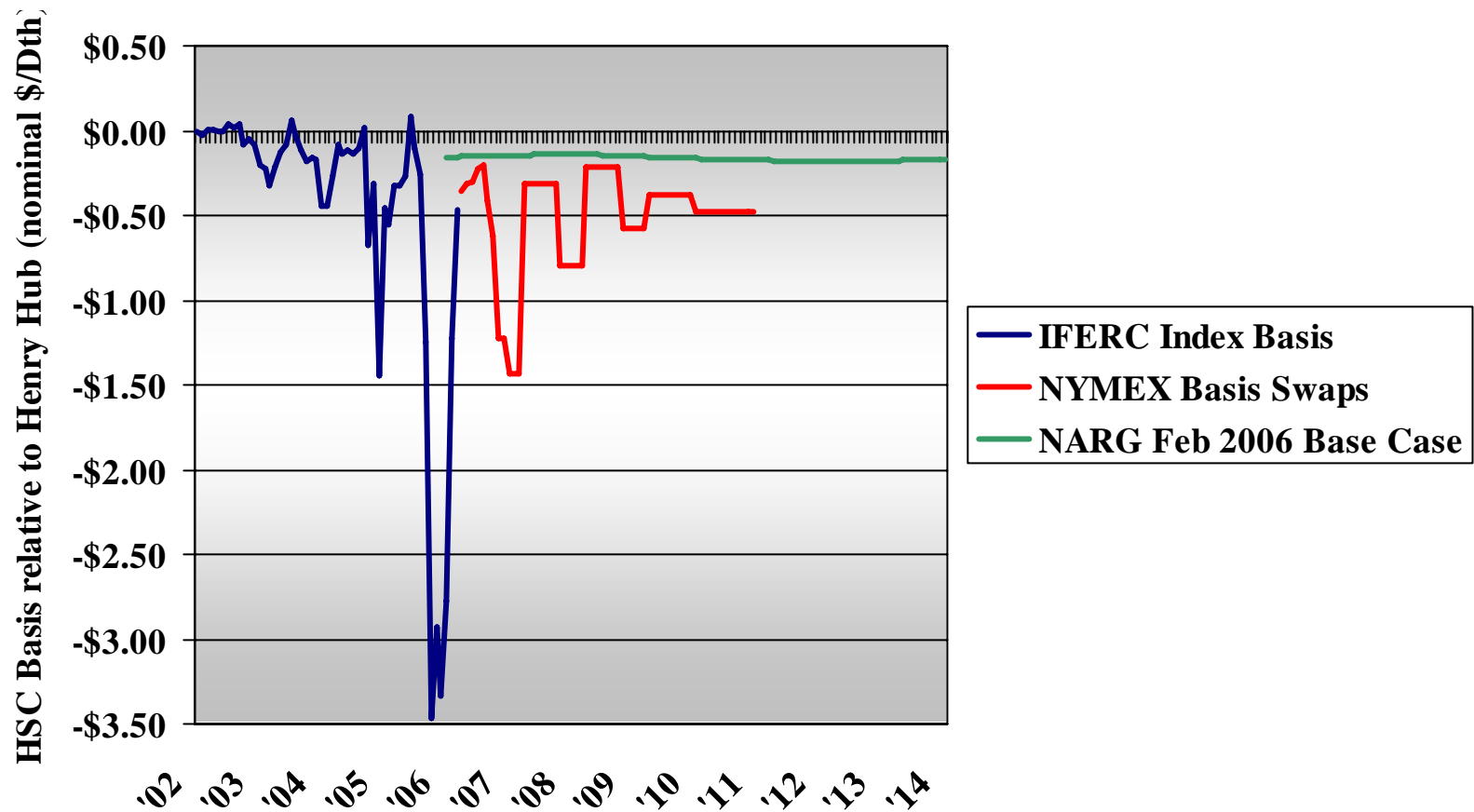
Annual models “average” Northeast basis at their peril.



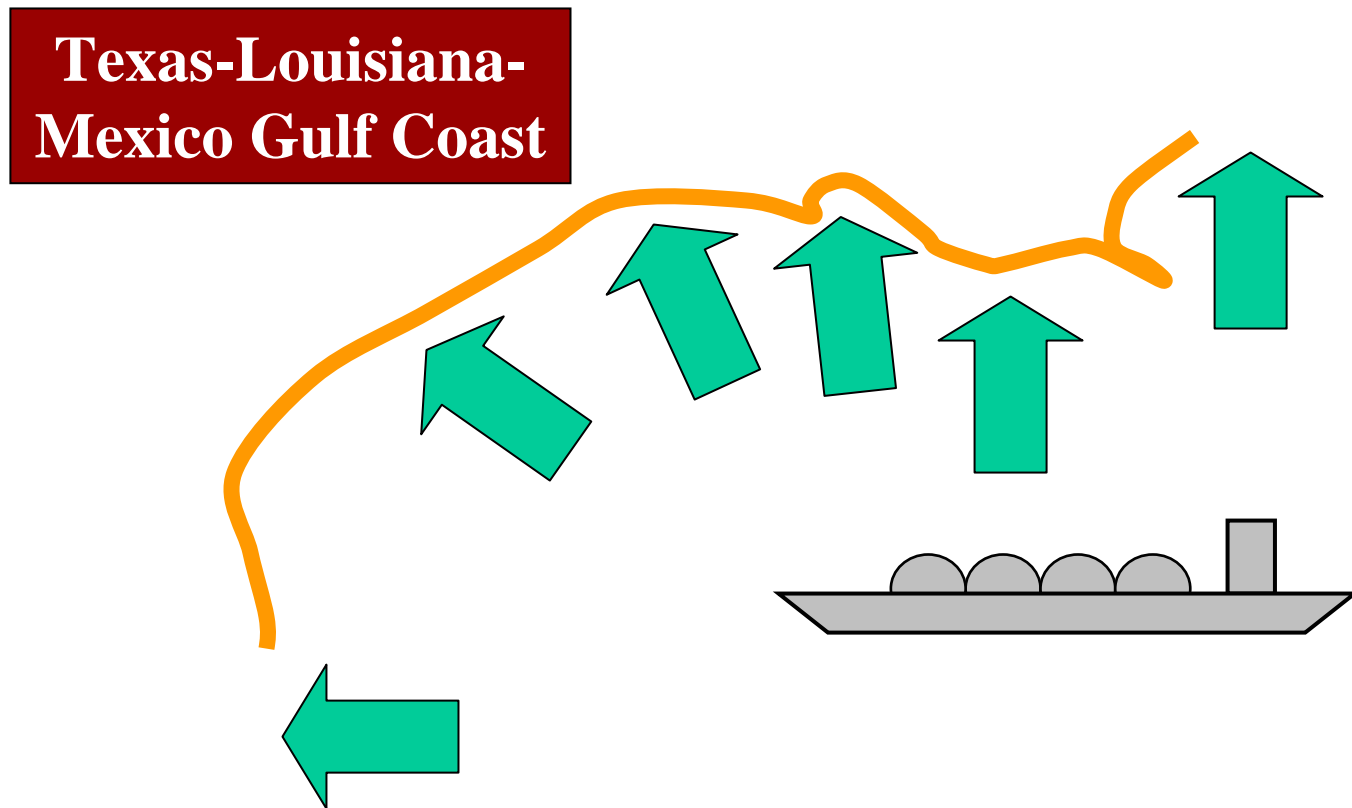
Significant basis differentials have developed along the Gulf Coast.



Thus, it's likewise important to interpret Gulf area basis forecasts.



*Enough Gulf terminals will reduce
basis differentials (absent storms!).*





Major Conclusions

- ◆ LNG's share of North American gas supplies will vary between 10% and 20% within a decade.
- ◆ Most LNG will enter the pipeline grid in the Gulf region; other new receiving capacity will be constrained.
- ◆ Markets and models disagree sharply right now.
- ◆ LNG will bring international gas market pressures to North America, reinforcing the oil price correlation and changing internal basis relationships – most domestic price forecast models will have to be re-written!
- ◆ Basis forecasting will also change, as LNG overload might not influence pricing the way excess gas supplies would.



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