

The Outlook for Natural Gas A New Plateau?

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Managing Director
Energy Services

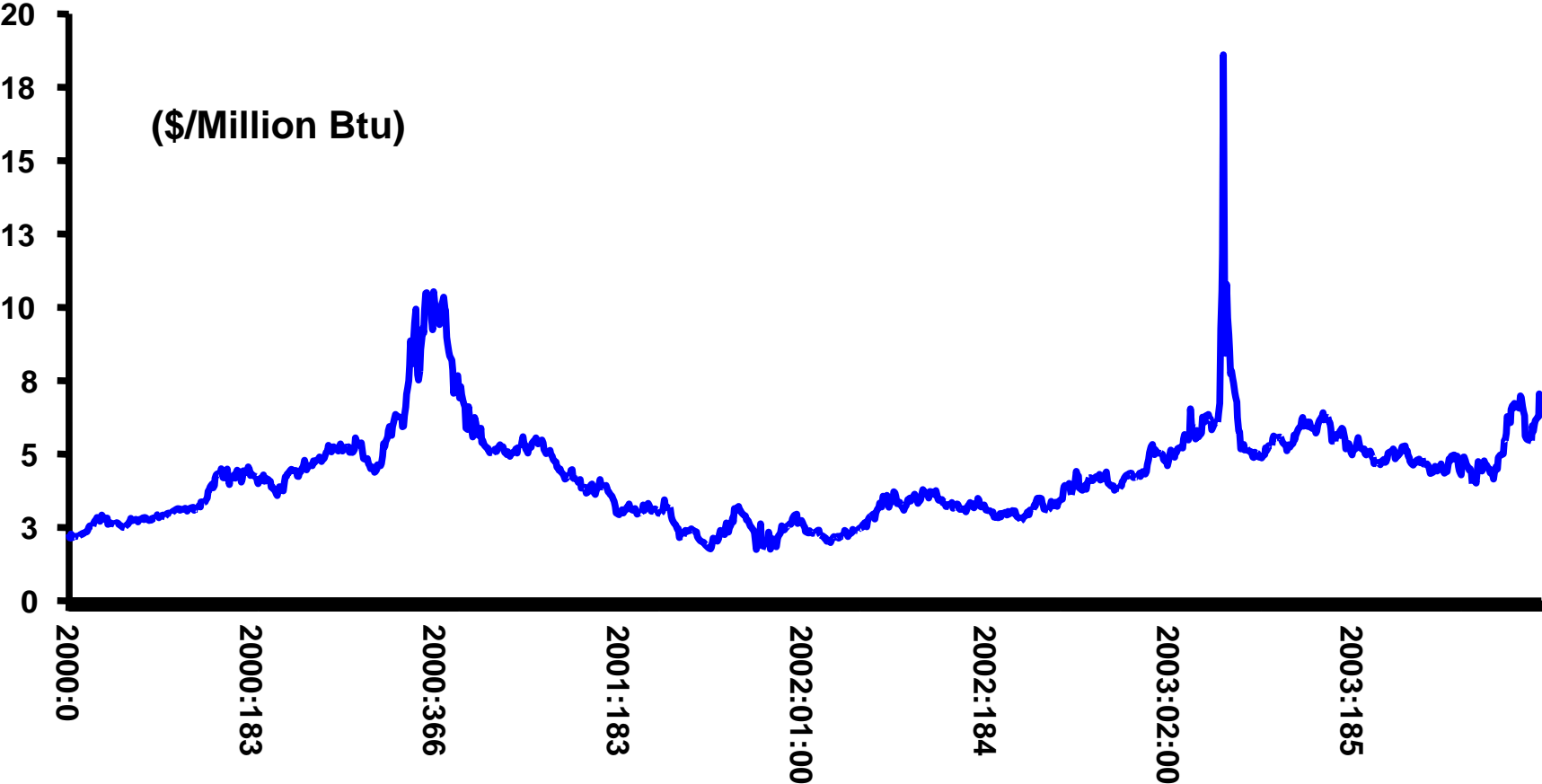
Global Insight (USA), Inc.
March 2004

Natural Gas Price Forecasts

- ◆ **Short Term Outlook: Winter Price Volatility**
- ◆ **Mid Term Outlook: A new plateau for natural gas prices?**
 - ◆ **Rising demand**
 - ◆ **LNG supply**
 - ◆ **The impact on the chemical industry**
- ◆ **Any policy solution forthcoming?**

U.S. Natural Gas Price Volatility Reflects Weather, Storage, and Imbalances

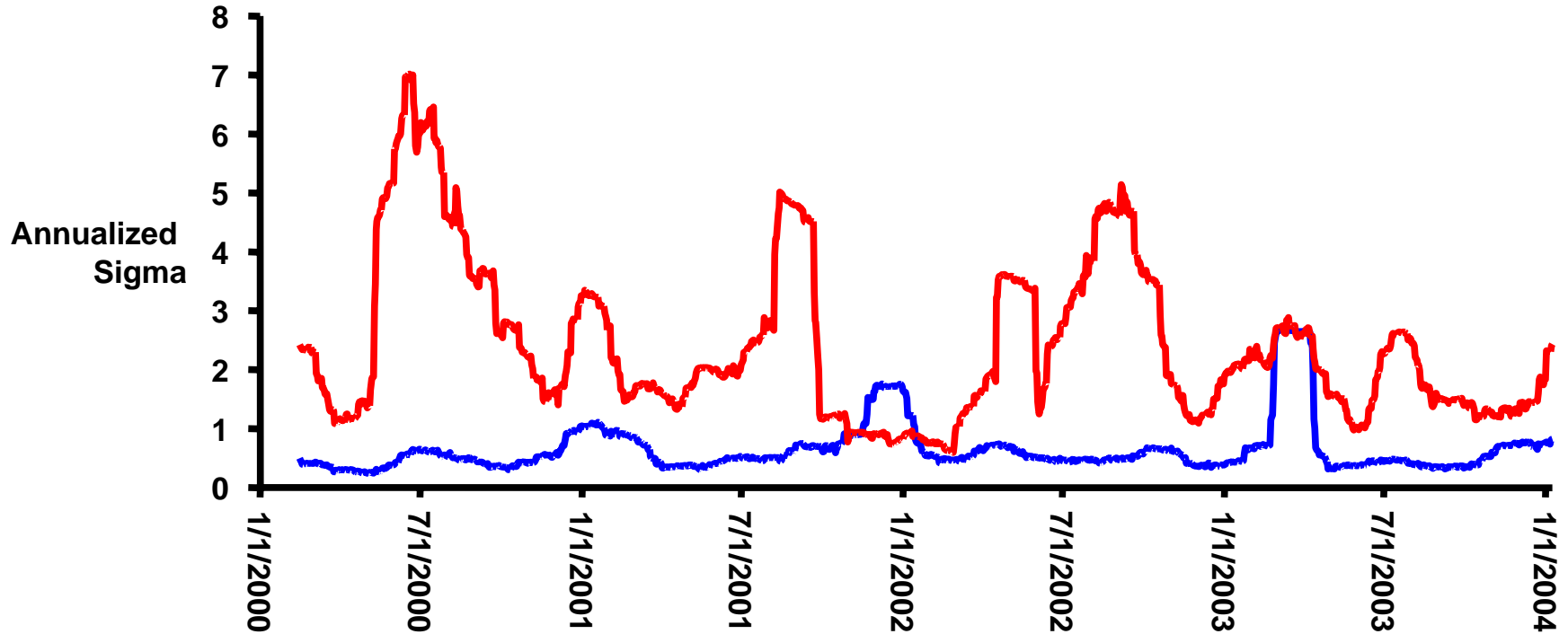
Daily Natural Gas Prices



Natural Gas Volatility Occasionally Exceeds That of Electricity Price

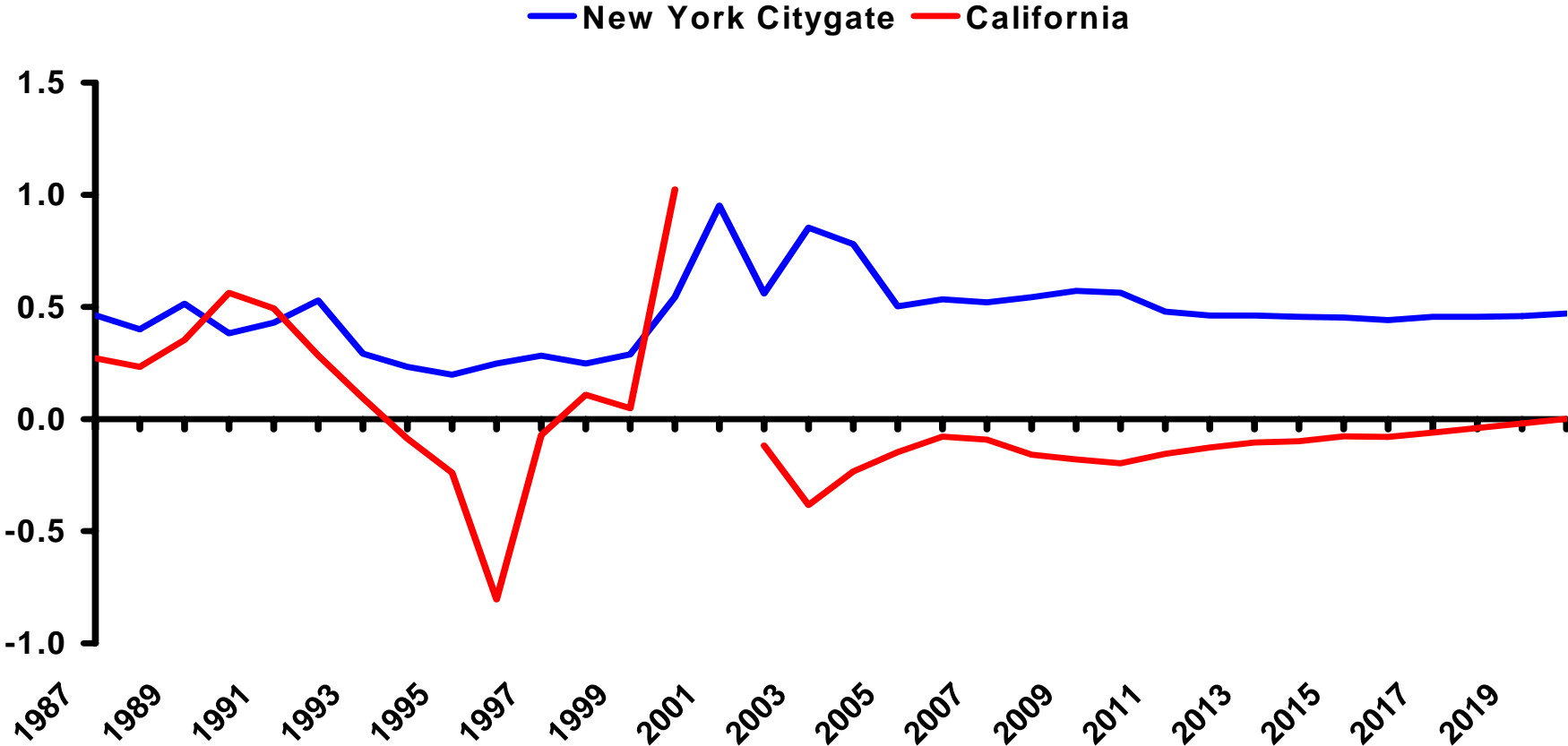
Volatility of Electricity and Natural Gas Markets

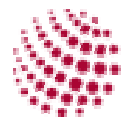
— Sigma HenryHub — Sigma PJM



Market Volatility Moves Natural Gas Price Basis

New York, California Price Basis to Henry Hub (\$/Million Btu)

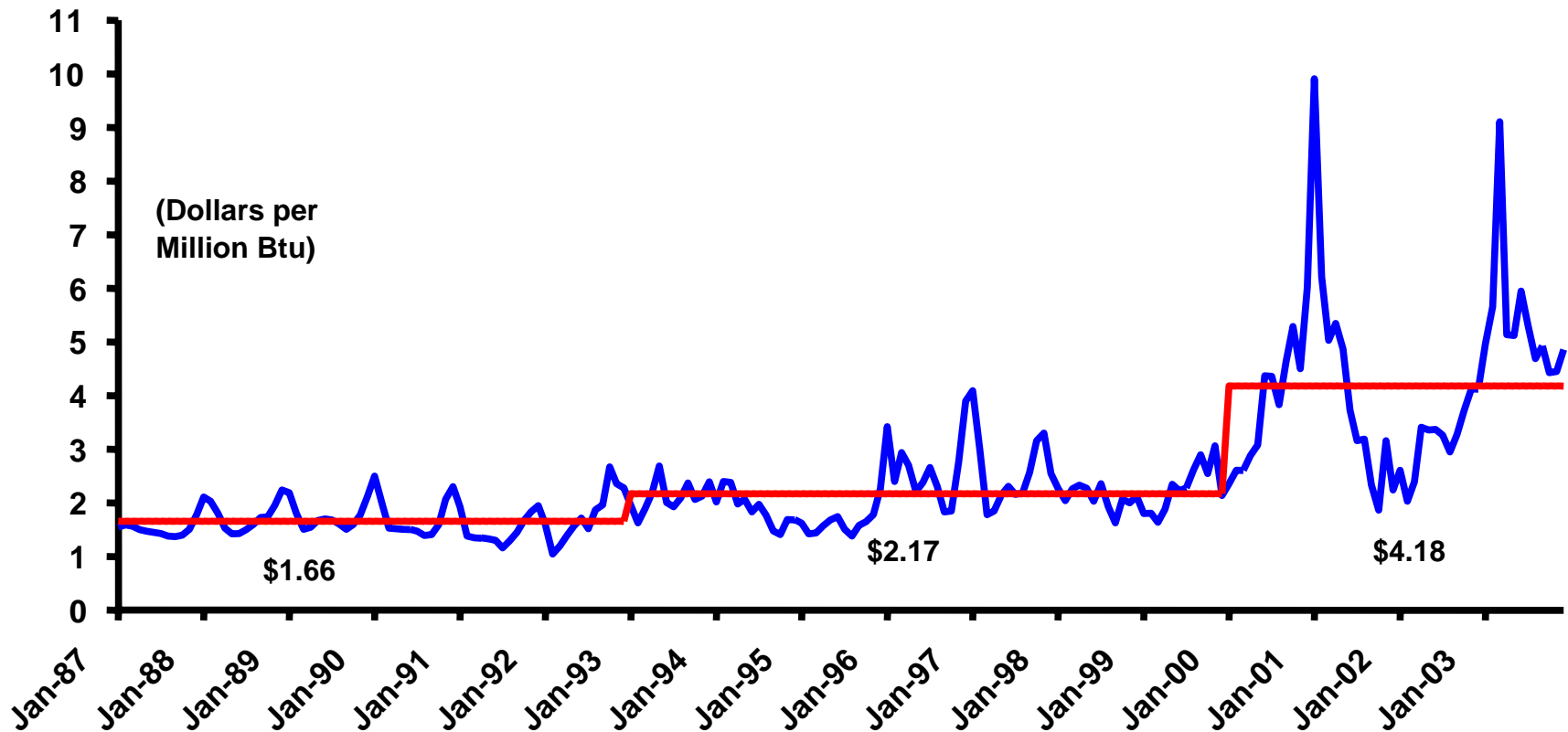




Is There A New Natural Gas Price Plateau?

U.S. Natural Gas Prices Above \$4 Since 2000

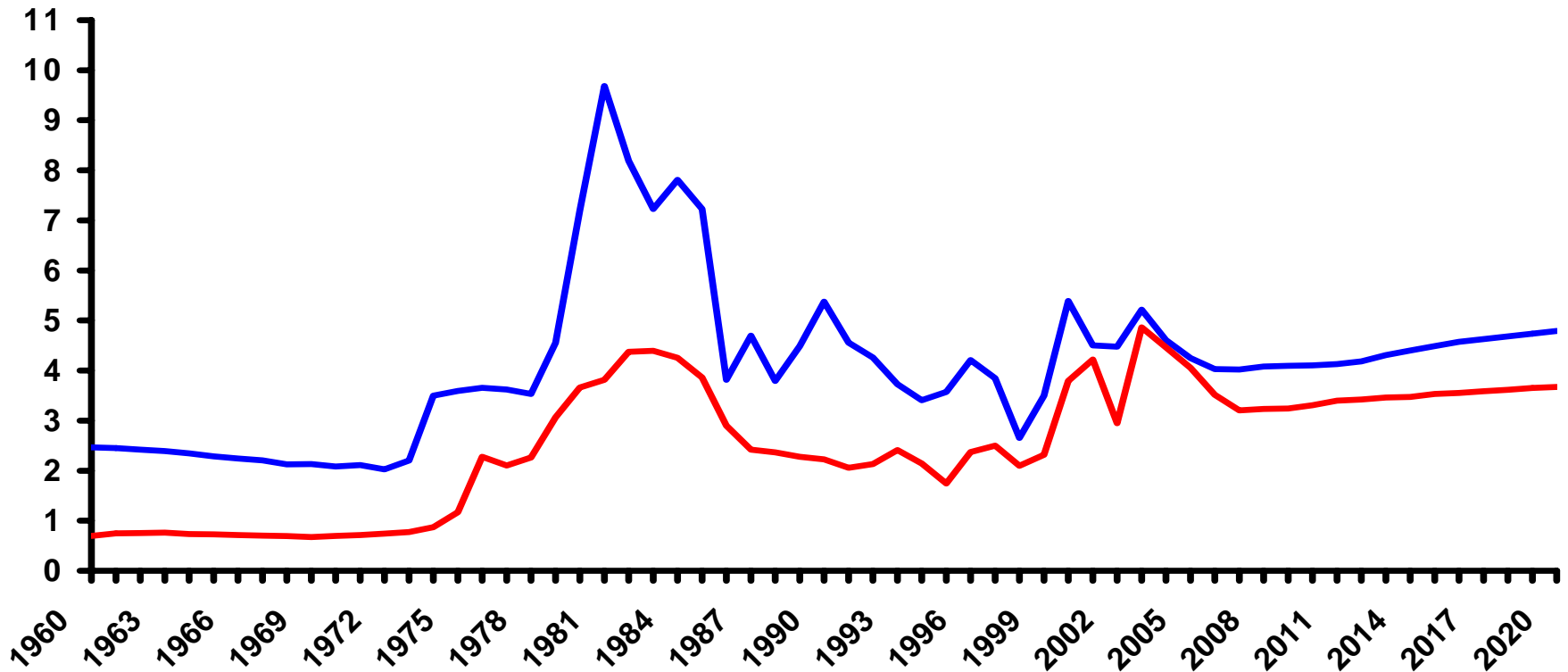
Monthly and Long-term Average Spot Prices (Henry Hub)



Natural Gas Prices Traditionally Depend Upon Petroleum Prices ...

Crude Oil and Natural Gas Prices (\$2002/Million Btu)

— West Texas Intermediate — Wellhead Natural Gas



And A Growing Relationship With Power Prices

ERCOT Power Prices (\$/MWH)

— ERCOT On Peak — WSC INDUSTRIAL — 7*Wellhead Gas



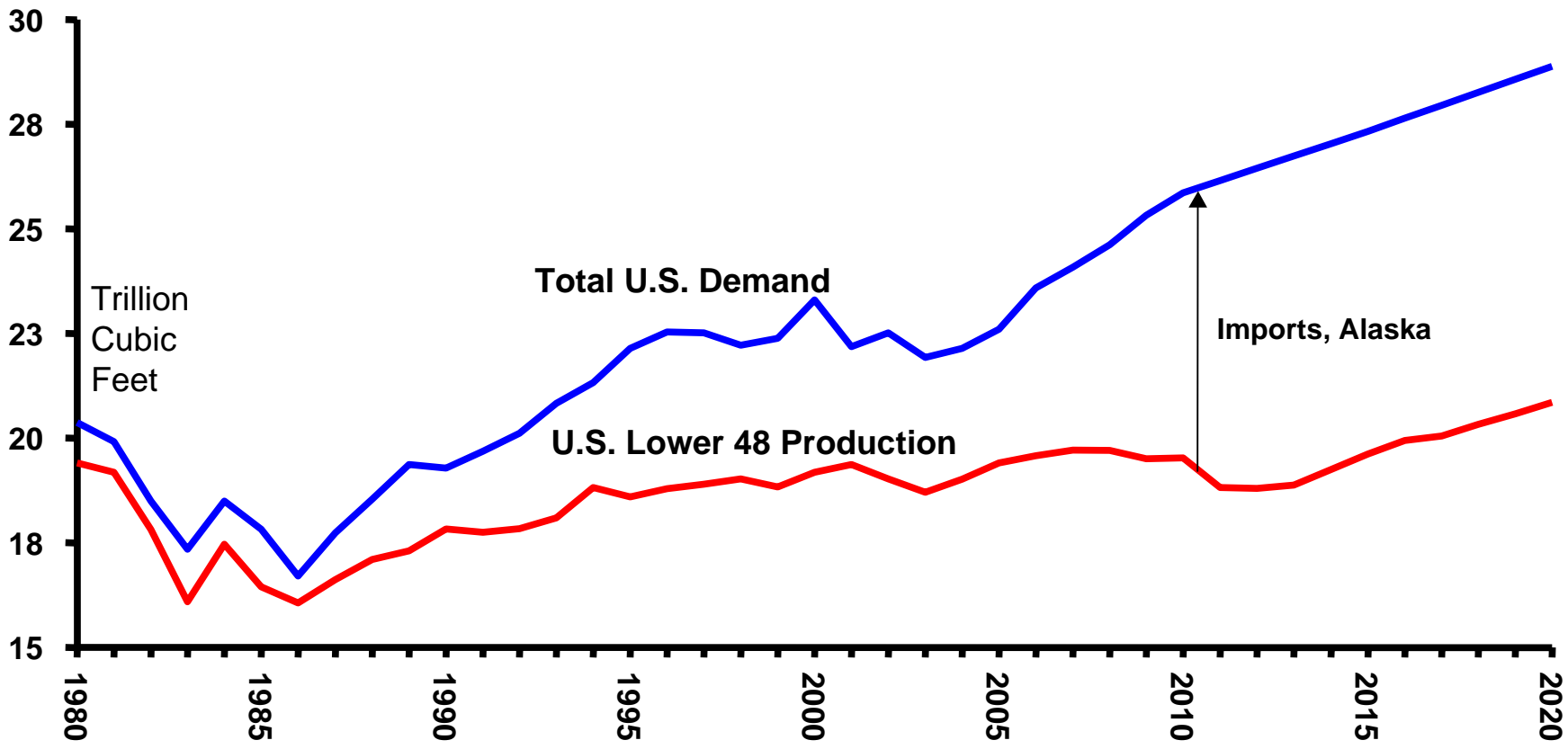
New Gas Price Plateau Reflects Tight Market

- ◆ **U.S. lower 48 production weak response**
- ◆ **Electric power demand for gas will grow**
- ◆ **Pipeline imports declining**
- ◆ **High utilization, high price**
- ◆ **Lags in realizing LNG**

U.S. Natural Gas Supply: An Almost Certain Shortfall in Lower-cost Domestic Supplies

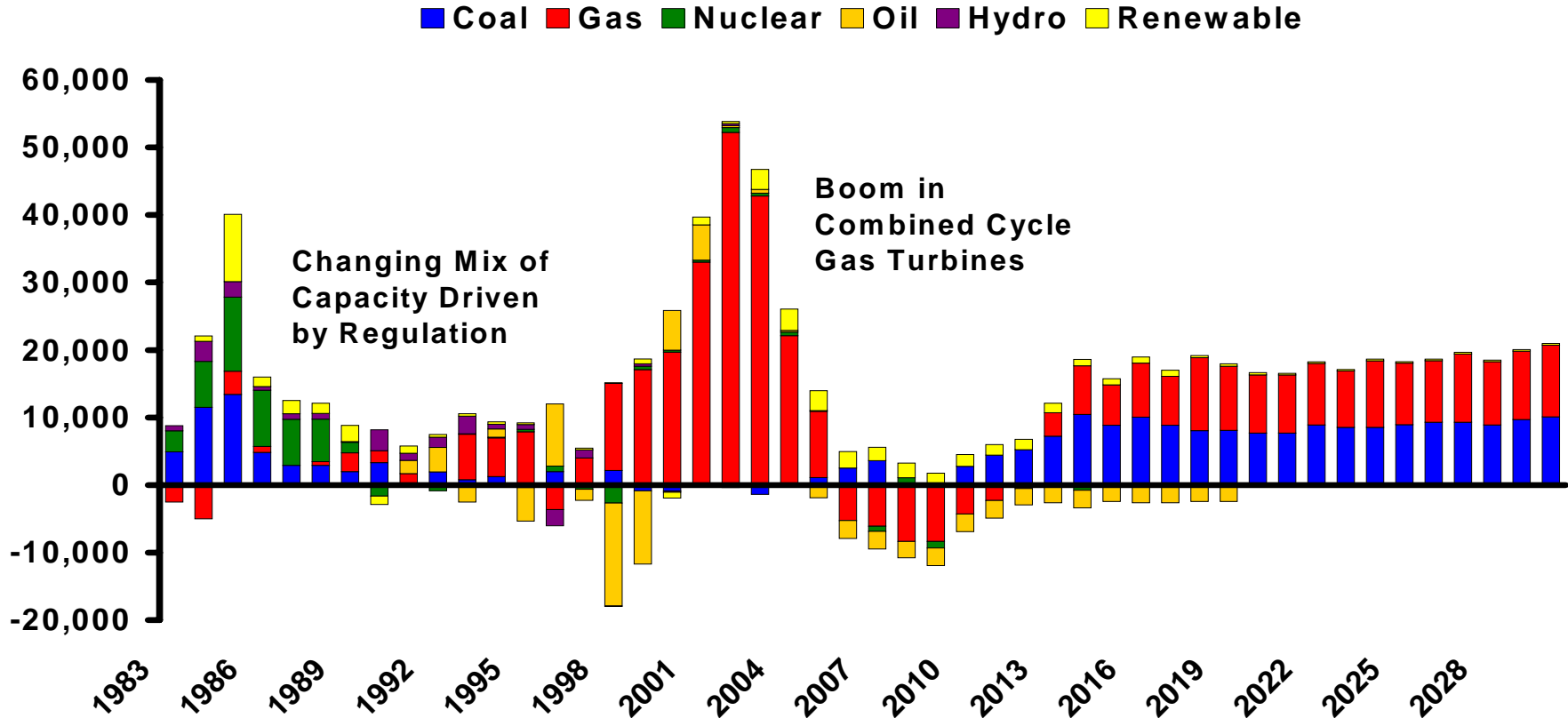
Natural Gas Demand Outpaces Production

— Demand — U.S. Production



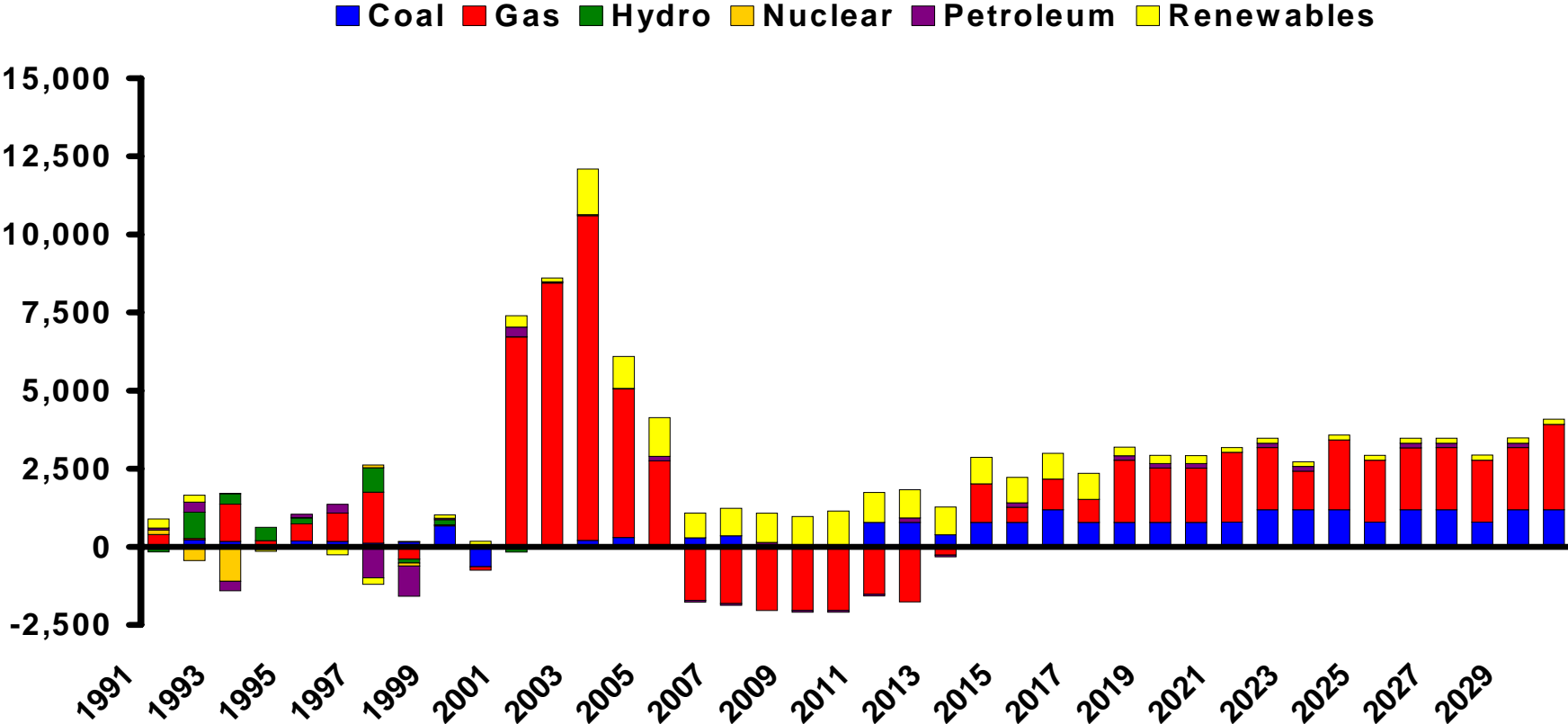
Electric Power Demand For Natural Gas Will Grow

U.S. Power Generation Net Capacity Additions (Megawatts)



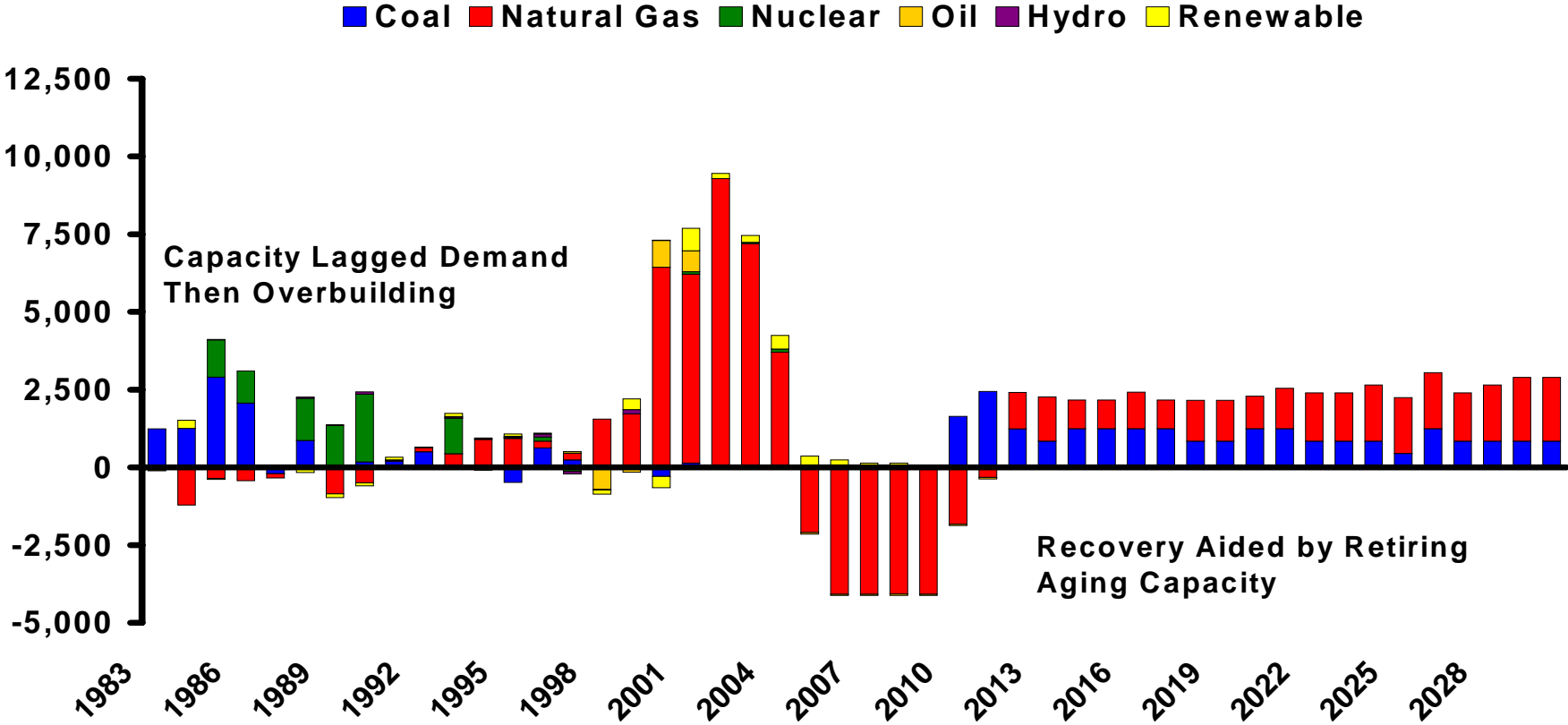
Changing Composition: Retirement of Old Gas Plants Next Phase of Cycle

WECC Power Generation Capacity Net Additions (Megawatts)



Natural Gas Dominates Southwest Power Picture

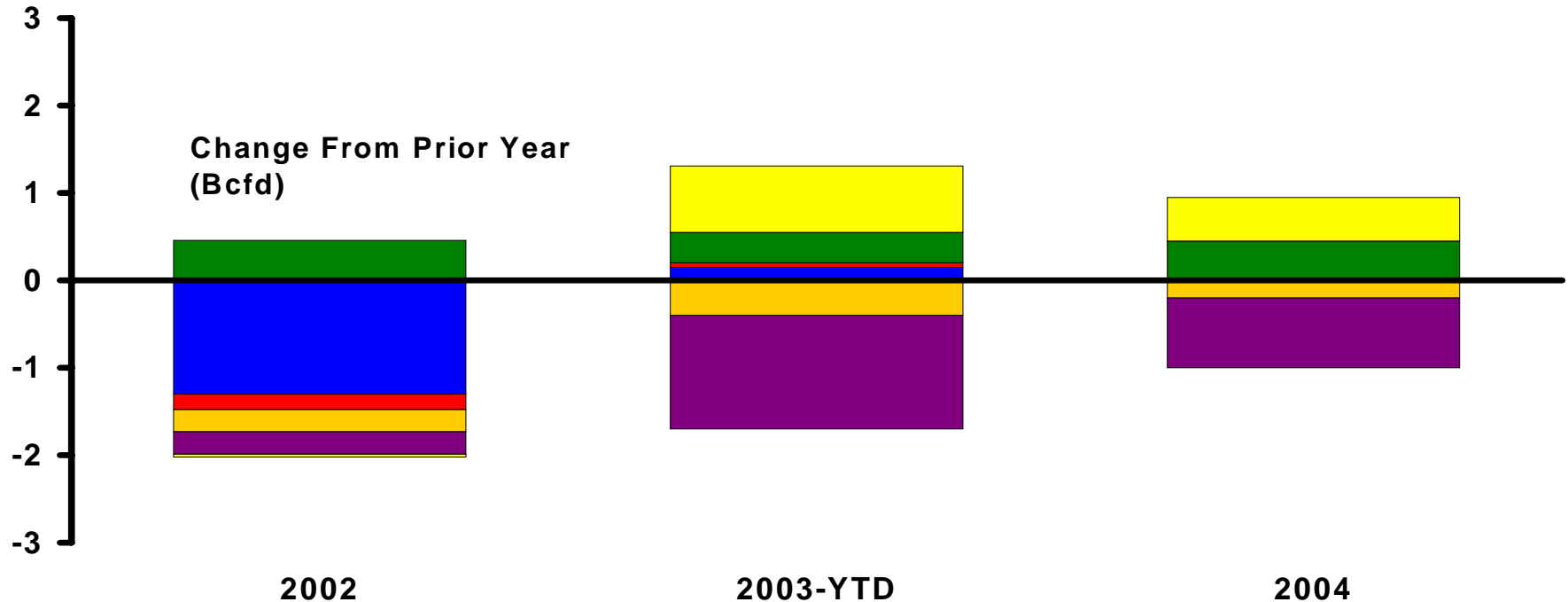
Net Capacity Additions For the West South Central (Megawatts)



Supply Growth Possible in 2004, while Pipeline Imports Falter

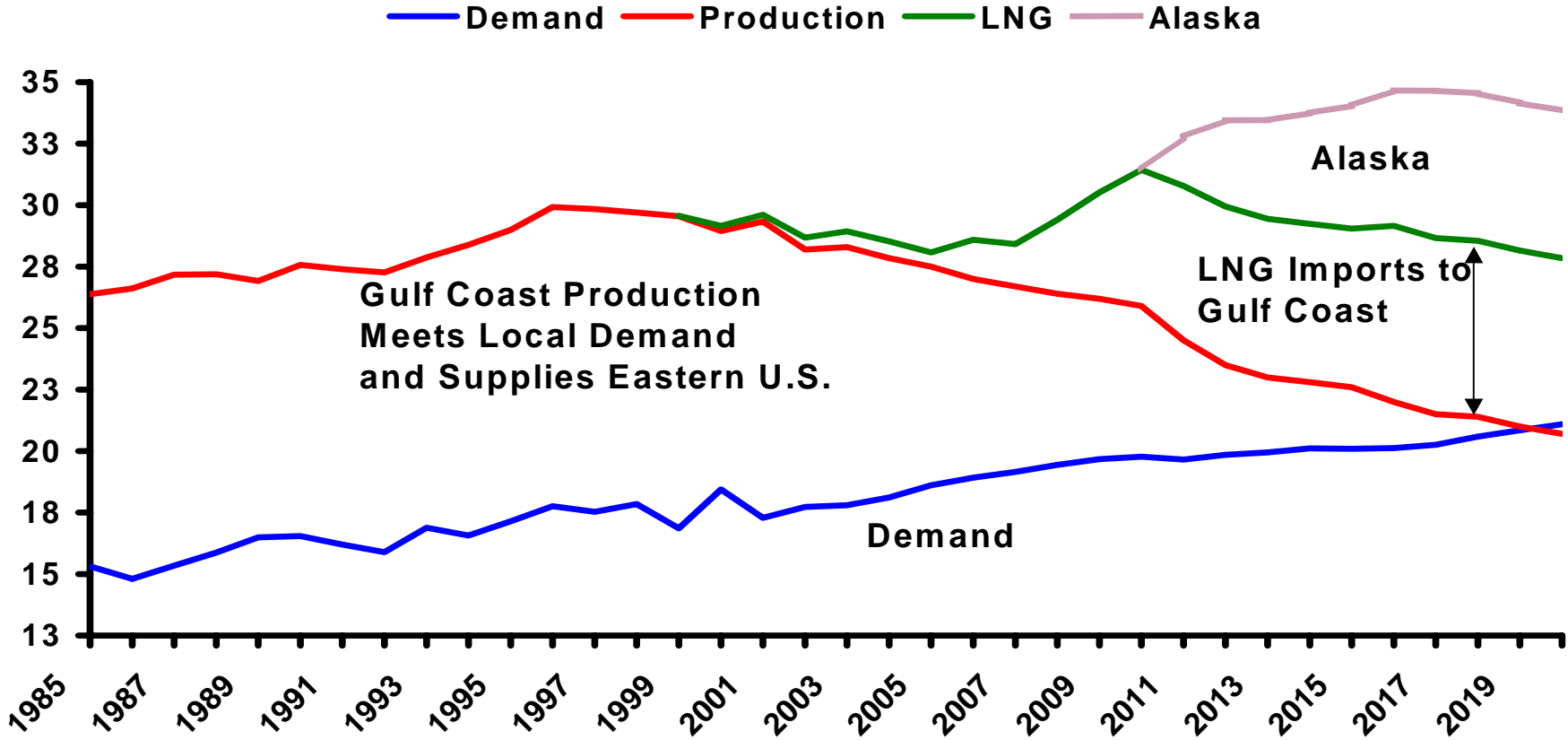
U.S. Natural Gas Supply Outlook Mixed: LNG and Wyoming are Offsetting Declines in Pipeline Imports

■ Offshore ■ Texas ■ Rockies ■ Other Lower 48 ■ Net Pipeline Imports ■ LNG



Long Term Supply Outlook Requires LNG

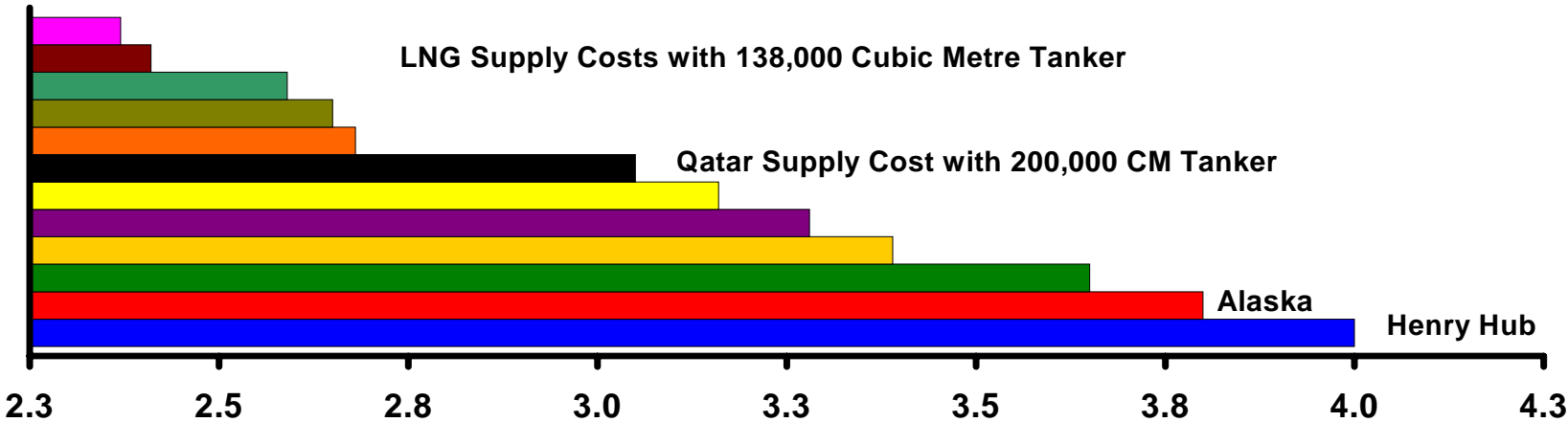
West South Central Natural Gas Supply and Demand (Bcfd)



Supply Costs Support LNG Development

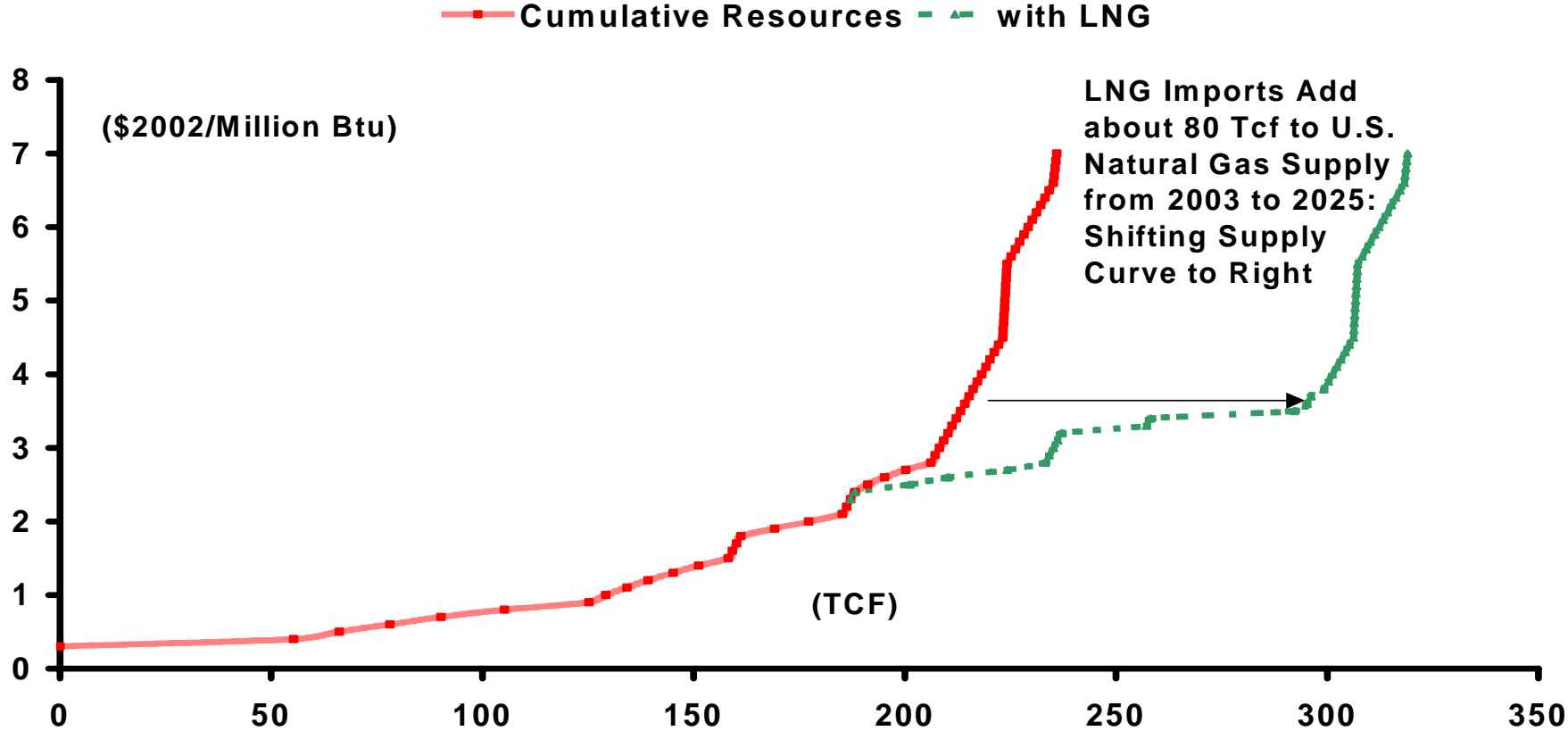
Natural Gas Supply Costs: LNG Cost Below Alaska and Henry Hub Forecast (\$2002/Million Btu)

- Henry Hub Forecast 2010-2025
- Supply Cost Alaskan Gas to U.S.
- Egypt-Idku
- Norway
- Angola
- QatarGas
- Qatar-200
- Columbia-Cartegena
- Venezuela
- Nigeria
- Algeria-Akzew
- Trinidad



LNG Will Impact Natural Gas Price

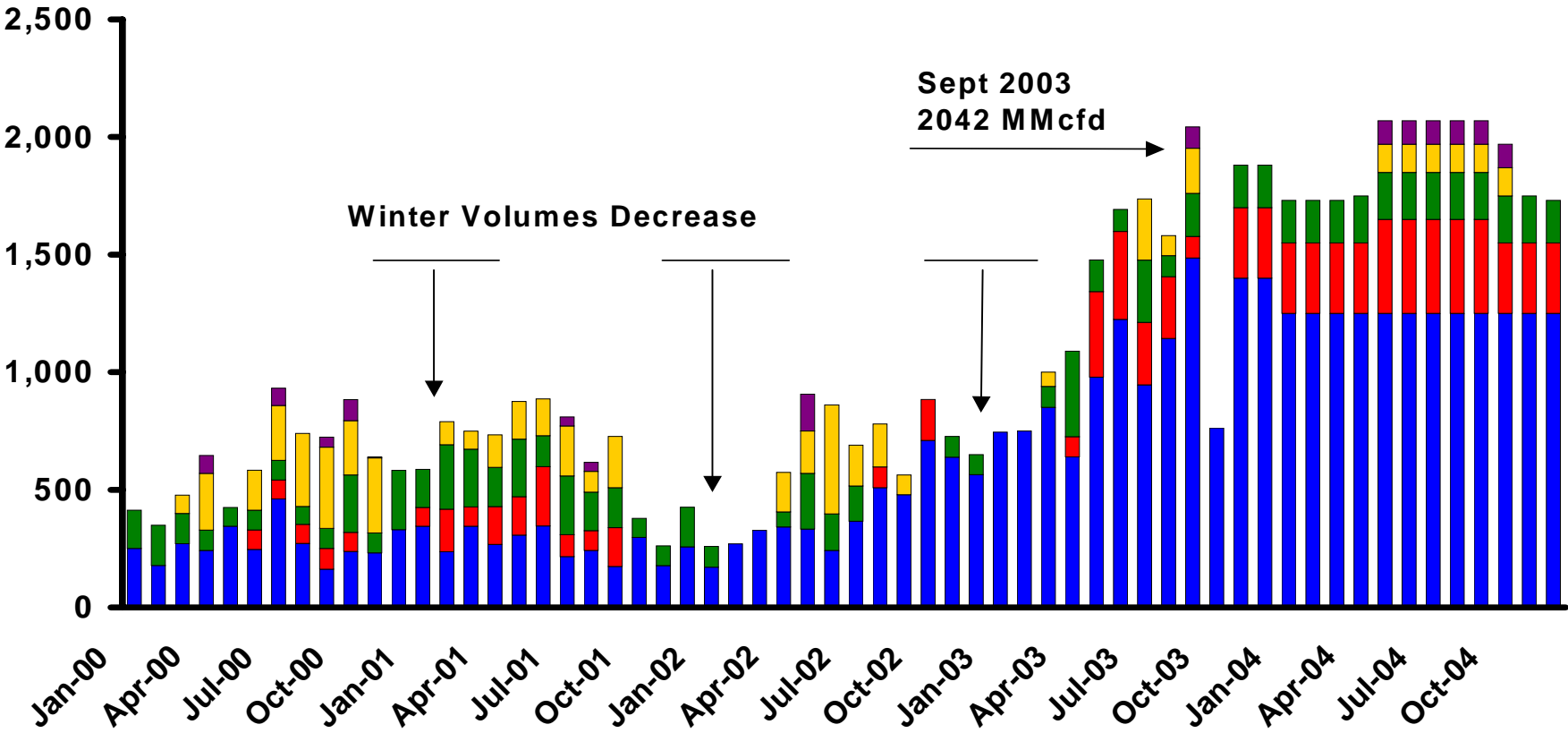
US Gulf Coast Supply Cost Including Shift From LNG Imports 2003-2025



LNG Imports Up Dramatically in Third Quarter

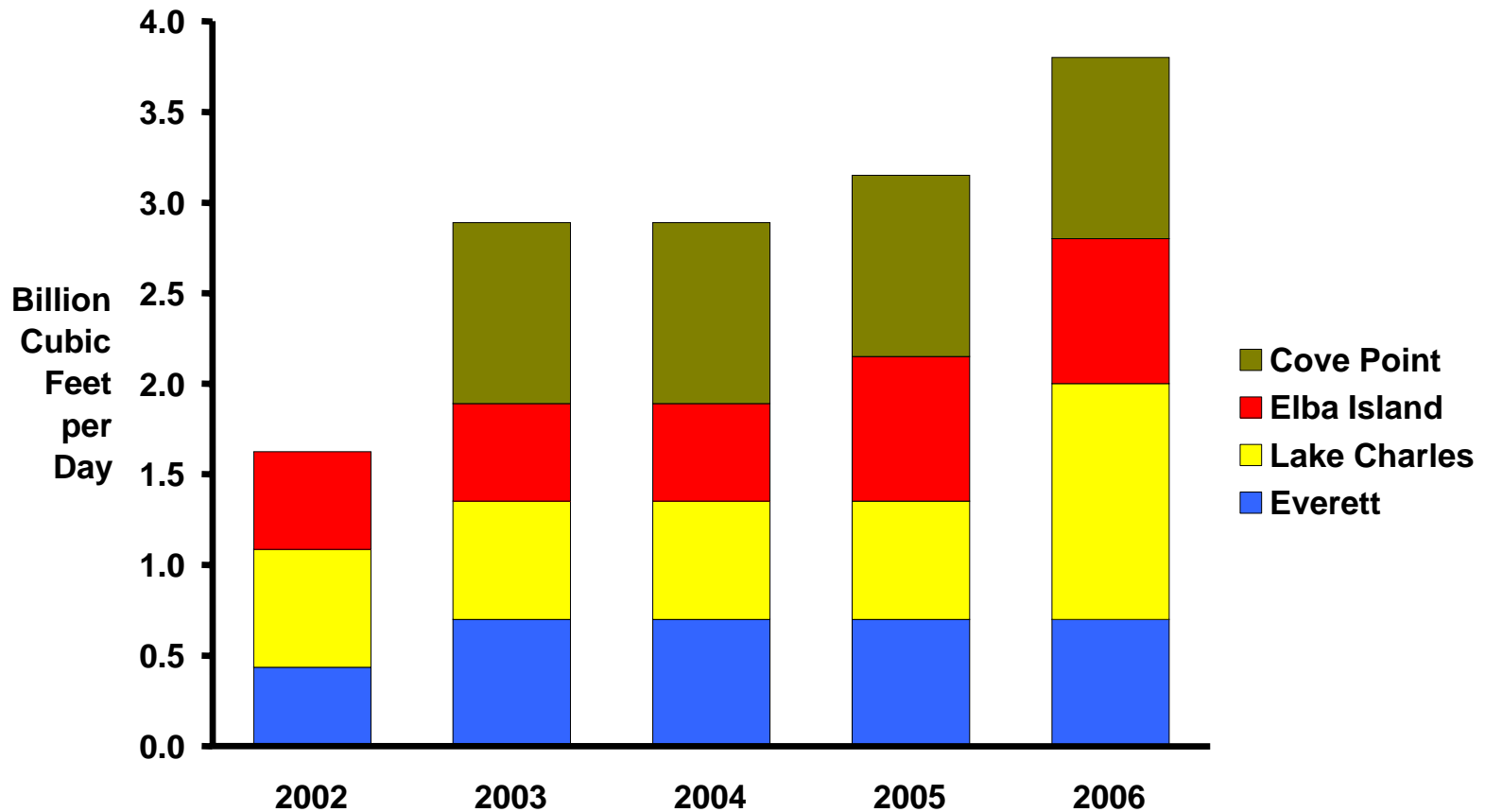
US LNG Trade is Growing Rapidly (MMCF/Day)

■ Trinidad
 ■ Nigeria
 ■ Algeria
 ■ Middle East
 ■ Asia

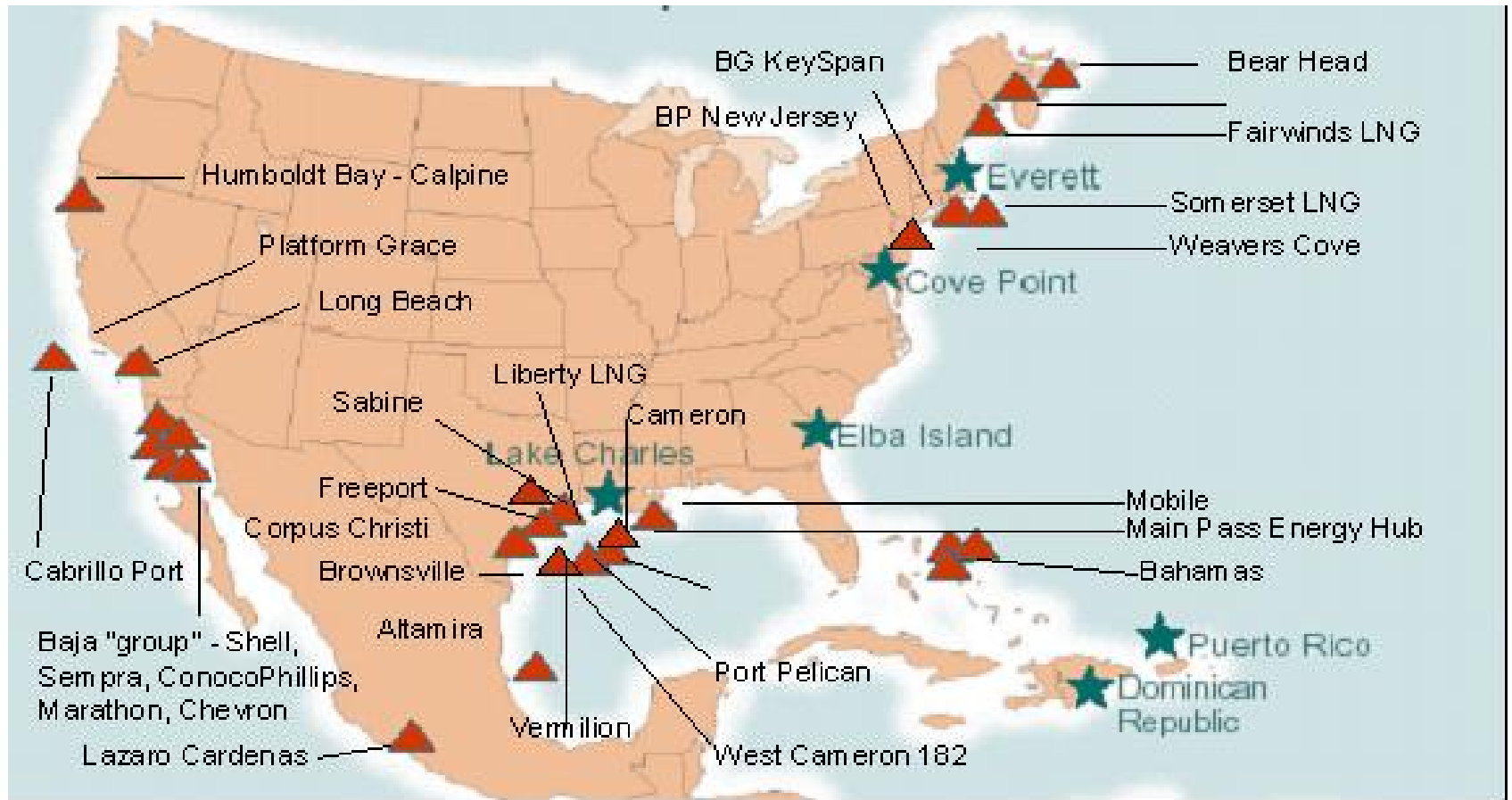


Existing Terminals Have Recently or Will Soon Expand

Capacity Expansions at Existing LNG Terminals



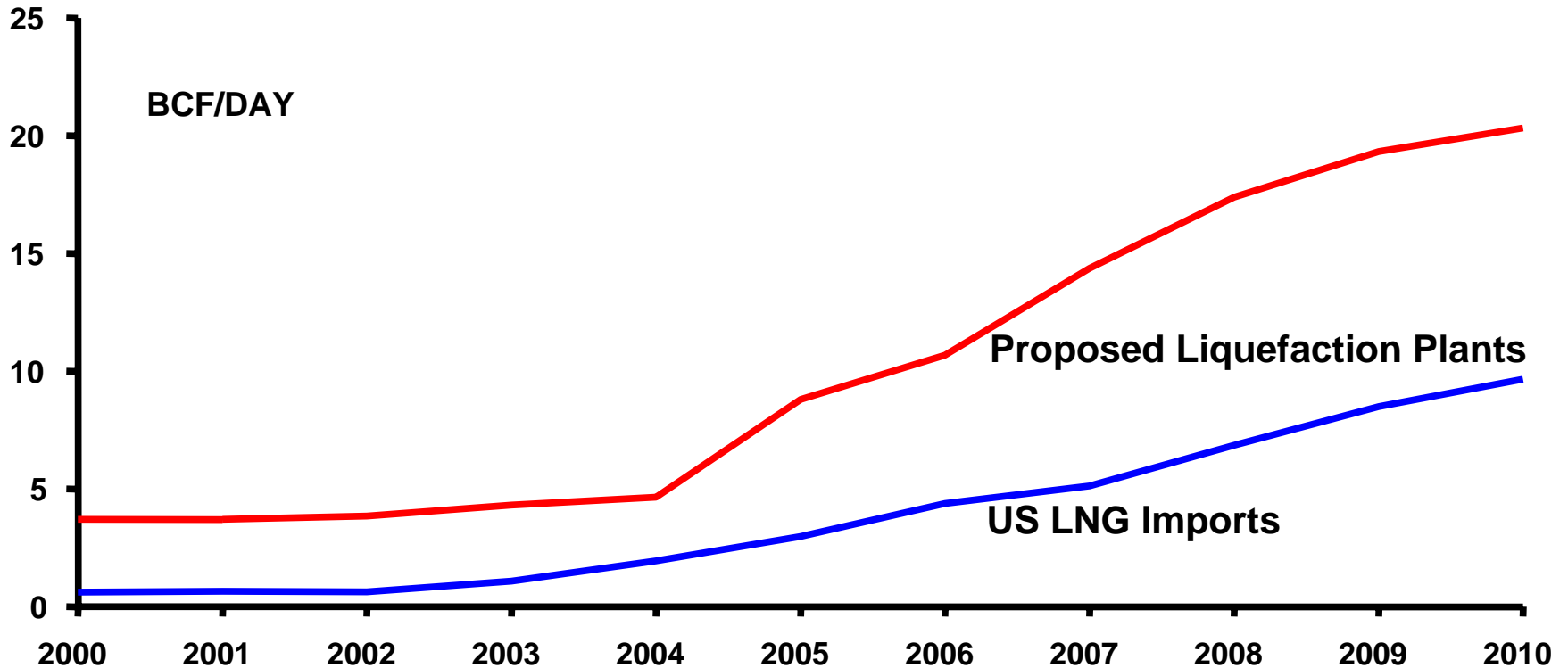
LNG Could Add Up to Ten Bcfd of Supply Over the Next Decade — New Terminals



Is There Enough LNG?: Planned & Proposed LNG Expansions Seem Ample After 2005

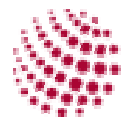
Atlantic Basin LNG Supply vs. U.S. Import Requirements

— U.S. Import Requirements — Atlantic Basin LNG Supply



U.S. Gas Prices At A New Plateau

- ◆ **Near Term Difficulties For All Existing and Potential Natural Gas Supply Sources**
- ◆ **Significant Lead Times for Solutions**
 - ◆ **LNG**
 - ◆ **Arctic**
- ◆ **Impact falls upon U.S. Industry**



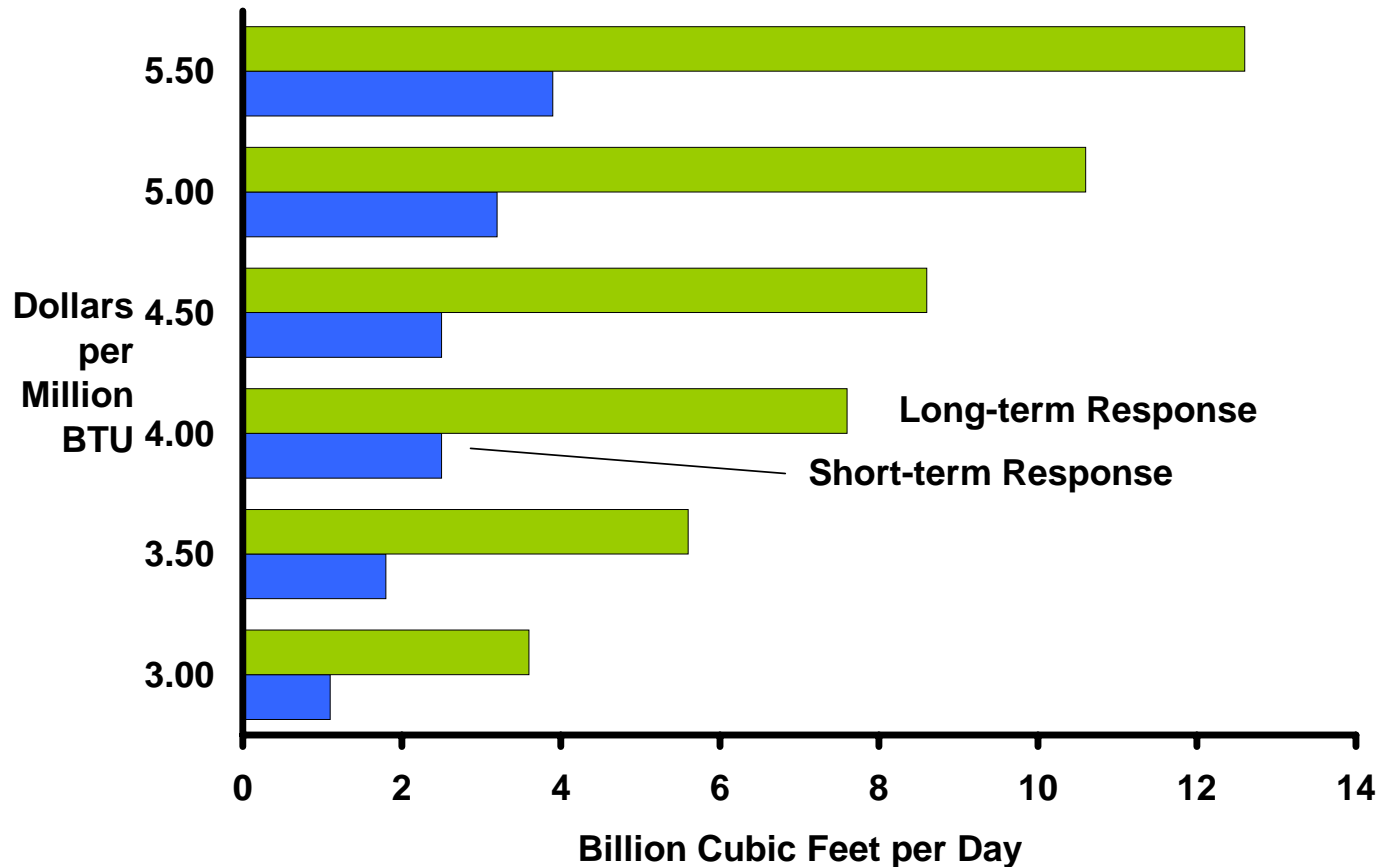
***Impact of High Gas Prices
on
the U.S. Chemical Industry***

Demand Destruction Scenario Approach: Alternative Views of Future Supplies and Prices are Essential Given the Uncertainties

- ◆ **Known elements**
 - ◆ **Maturing lower 48 supply**
 - ◆ **Existing power generation**
- ◆ **Critical uncertainties driving development of U.S. gas price scenarios:**
 - ◆ **Global oil prices**
 - ◆ **Pace of LNG development**
 - ◆ **Coal-bed methane**
 - ◆ **Opening of restricted drilling areas (e.g. ANWR)**
 - ◆ **Alaskan gas pipeline**
- ◆ **Reaction function**
 - ◆ **Macro economy & output**
 - ◆ **Energy intensive industry**
 - ◆ **Investment**

A Higher Price Plateau Will Force Market Adjustments

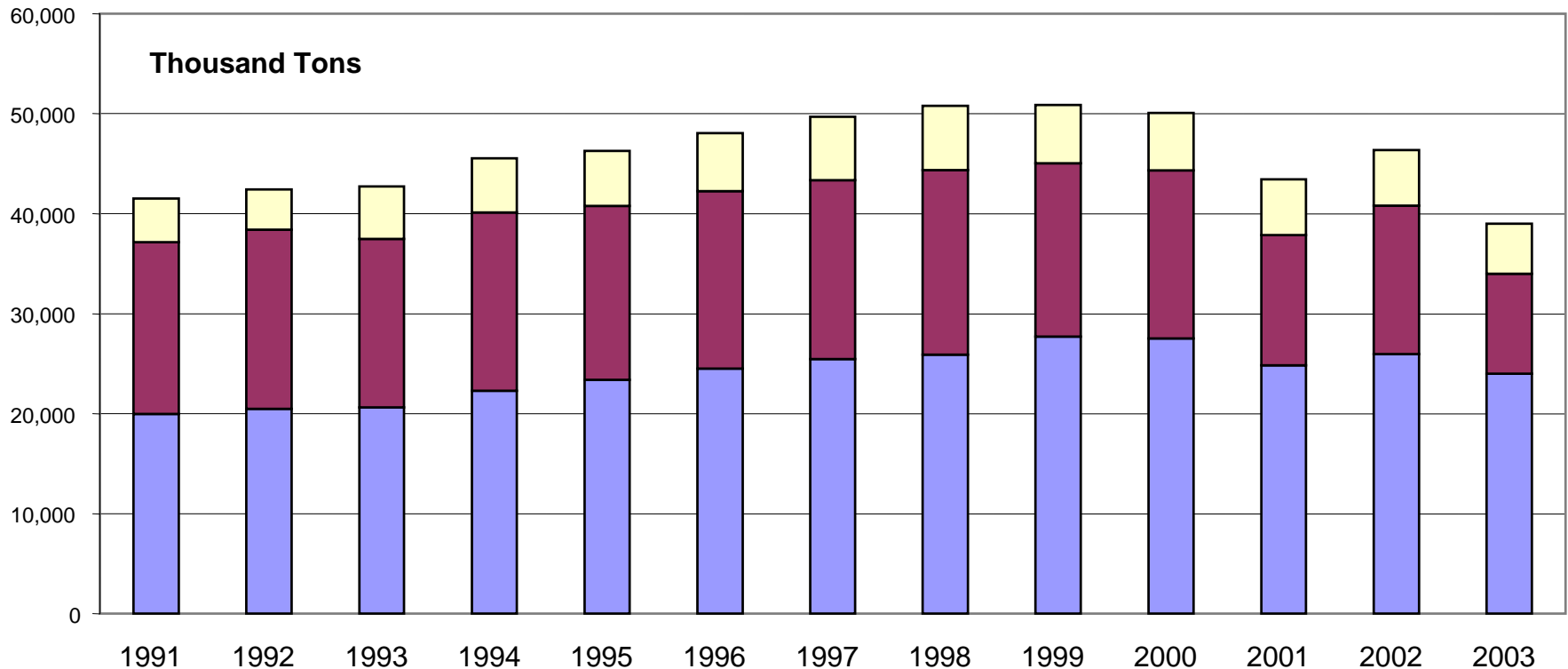
Estimated Potential US Natural Gas Demand Reduction in Response to Higher Prices



Demand Destruction: Petrochemical Production Reduced by High Feedstock Costs

Production of Basic Chemicals Relying Upon Natural Gas Feedstock

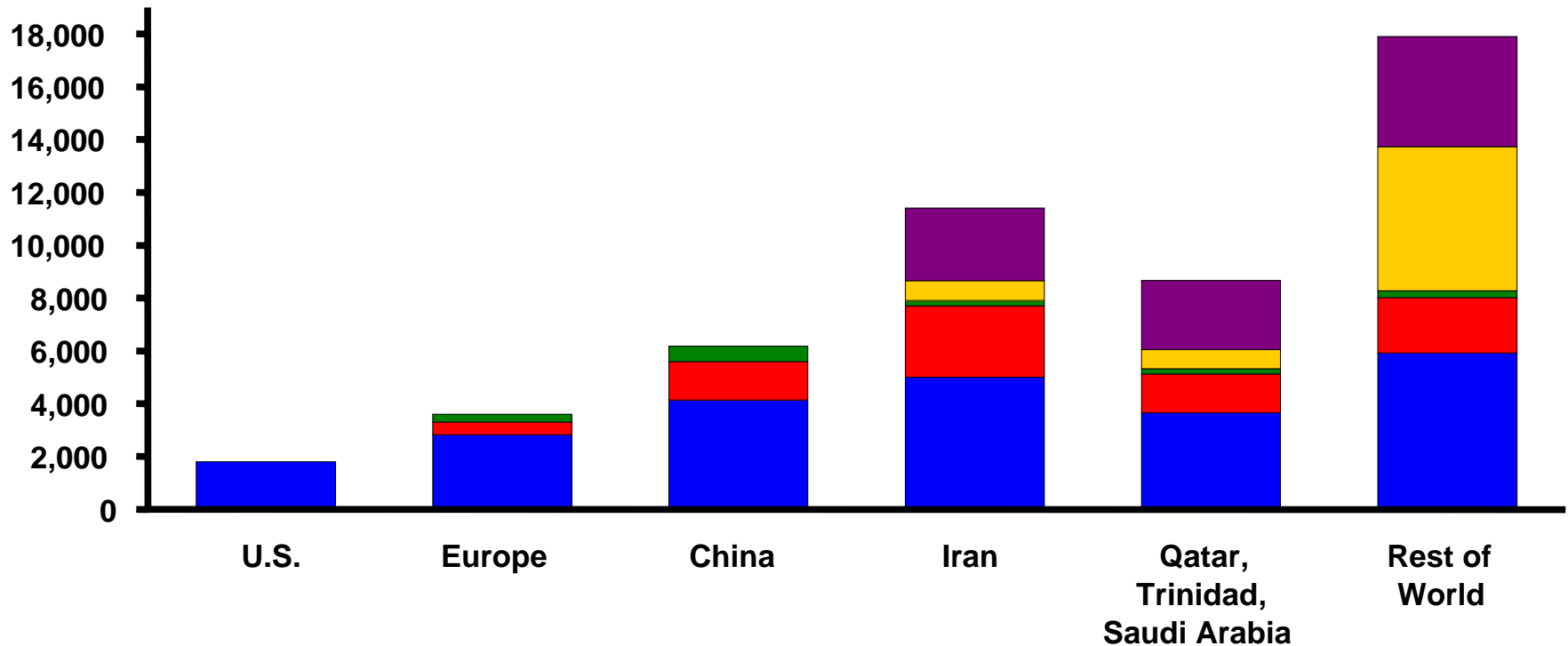
■ Ethylene ■ Ammonia (synthetic anhydrous) ■ Methanol



Demand Destruction: International Competition, Chemical Investment is Headed Overseas

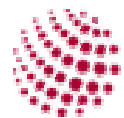
Petrochemical Construction Plans as of 2003 (Thousand Tons)

■ Ethylene ■ Polyethylene ■ Propylene ■ Ammonia ■ Methanol



Comments

- ◆ **Importing LNG will remove economic basis for natural gas feedstock for ammonia & methanol**
 - ◆ **New plants overseas**
- ◆ **Mature lower 48 supply = reduced ethane availability**
 - ◆ **Role for naphtha & integration with refining**
- ◆ **U.S. chemical industry growth is related to demand**
 - ◆ **Derivative markets**
- ◆ **Trade trends**
 - ◆ **Import LNG**
 - ◆ **Import basic chemicals**
 - ◆ **Import energy intensive**



GLOBAL INSIGHT

Status of Environmental Policy Issues

Environmental: Changes to Regulations, New Regulations Under Authorizing Legislation, and Proposed Legislation

- ◆ **Interpreting New Source Review**
- ◆ **Federal and regional emission regulations authorized under existing legislation**
- ◆ **Federal legislative proposals to alter emission standards and timing of implementation such as Bush's Clear Skies, Carper's bill, and McCain-Lieberman's proposal to control CO₂**
- ◆ **State emissions regulations—current**
- ◆ **State legislative proposal to control emissions**

Federal Environmental Regulation: New Source Review

- ◆ **Key issue: When does an *existing* unit become *new*?**
 - ◆ Issue originated with the Clean Air Act of 1970 and subsequent amendments
 - ◆ 1999: Clinton EPA sues 25% of unscrubbed units
 - ◆ 2002–03: Bush EPA relaxes rules
- ◆ **Uncertainty continues today...**
 - ◆ 13 states sue to stop Bush rules
 - ◆ Clinton-era cases continue
 - ◆ 2004 election could bring change

Proposed Federal Environmental Legislation

- ◆ **The Clean Air Act**
 - ◆ **Bush's Clean Air Act proposal would set new—lower—limits for SO₂, NO_x, mercury compared to current limits, but would also greatly extend the time period for achievement. Does not include CO₂ limits.**
- ◆ **The Carper Bill**
 - ◆ **The Carper Bill is a compromise between Clear Skies and earlier—much more onerous—legislation proposed by the Democrats.**
- ◆ **McCain-Lieberman**
 - ◆ **Proposal to control CO₂**