

## U.S. Natural Gas Market Dynamics

University of Houston – Global Energy Management Institute

*The Future of the Gulf Coast Petrochemical Industry*

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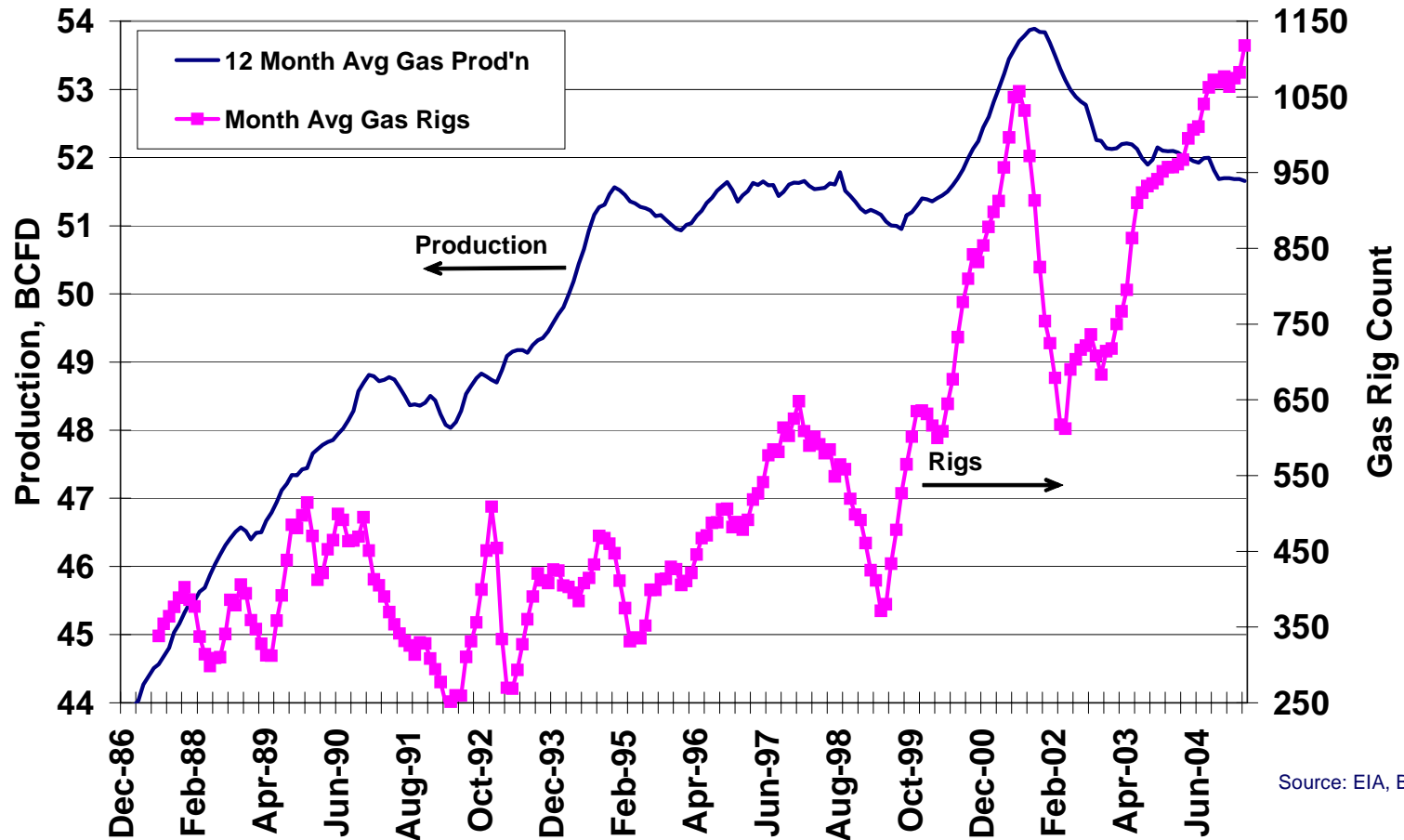
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# Discussion Overview

- Gas Drilling & Gas Price
- Gas & Oil Price Relationship
- Power Generation Demand and Coal Price
- Industrial Demand
- Henry Hub Price Projections
- Projected LNG Imports & Potential Impact on Gas Liquids

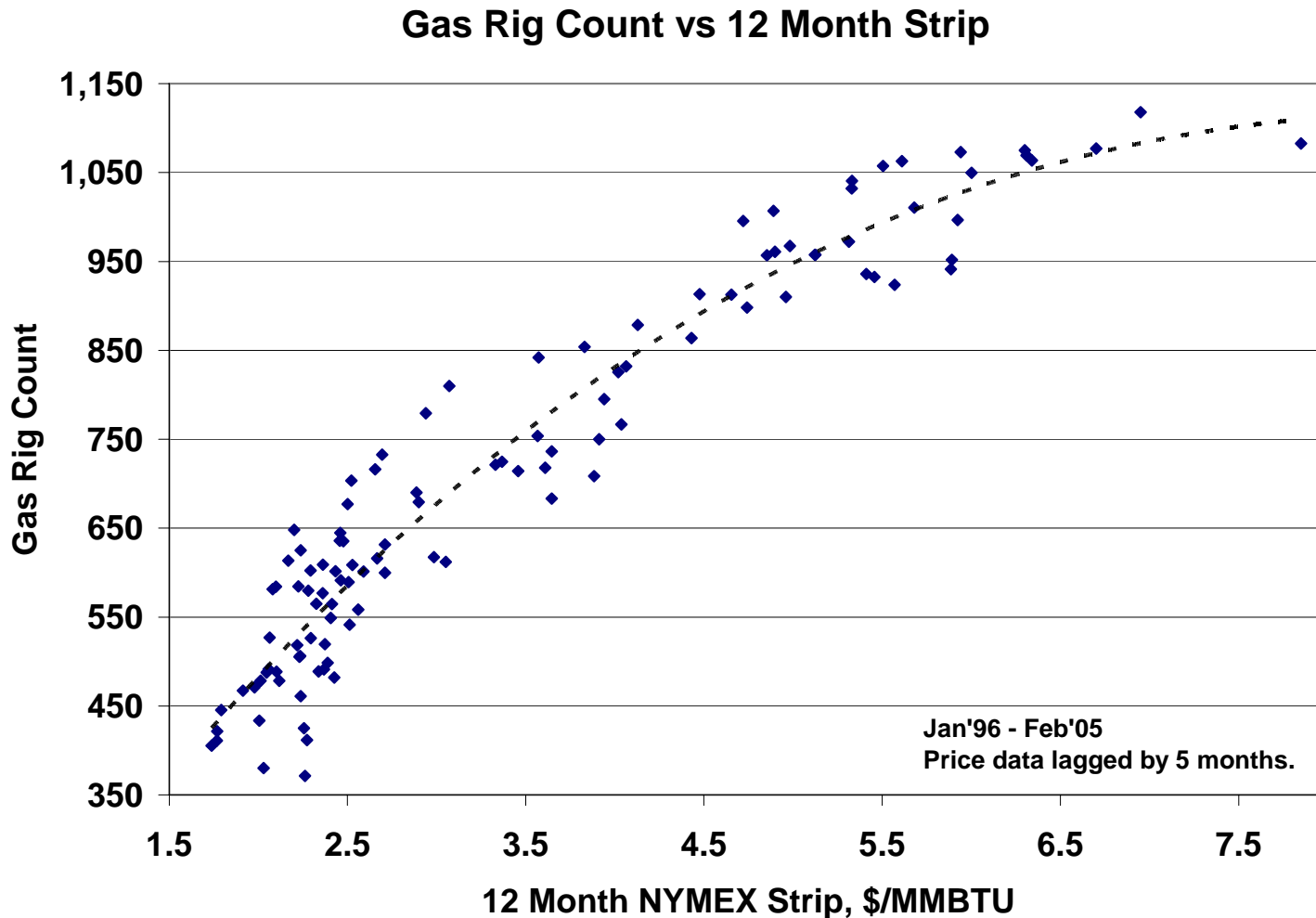
# U.S. Gas Production Essentially Flat – Despite Sharply Higher Drilling Activity

## U.S. Dry Gas Production & Gas Oriented Rig Count



Source: EIA, Baker Hughes, CVX

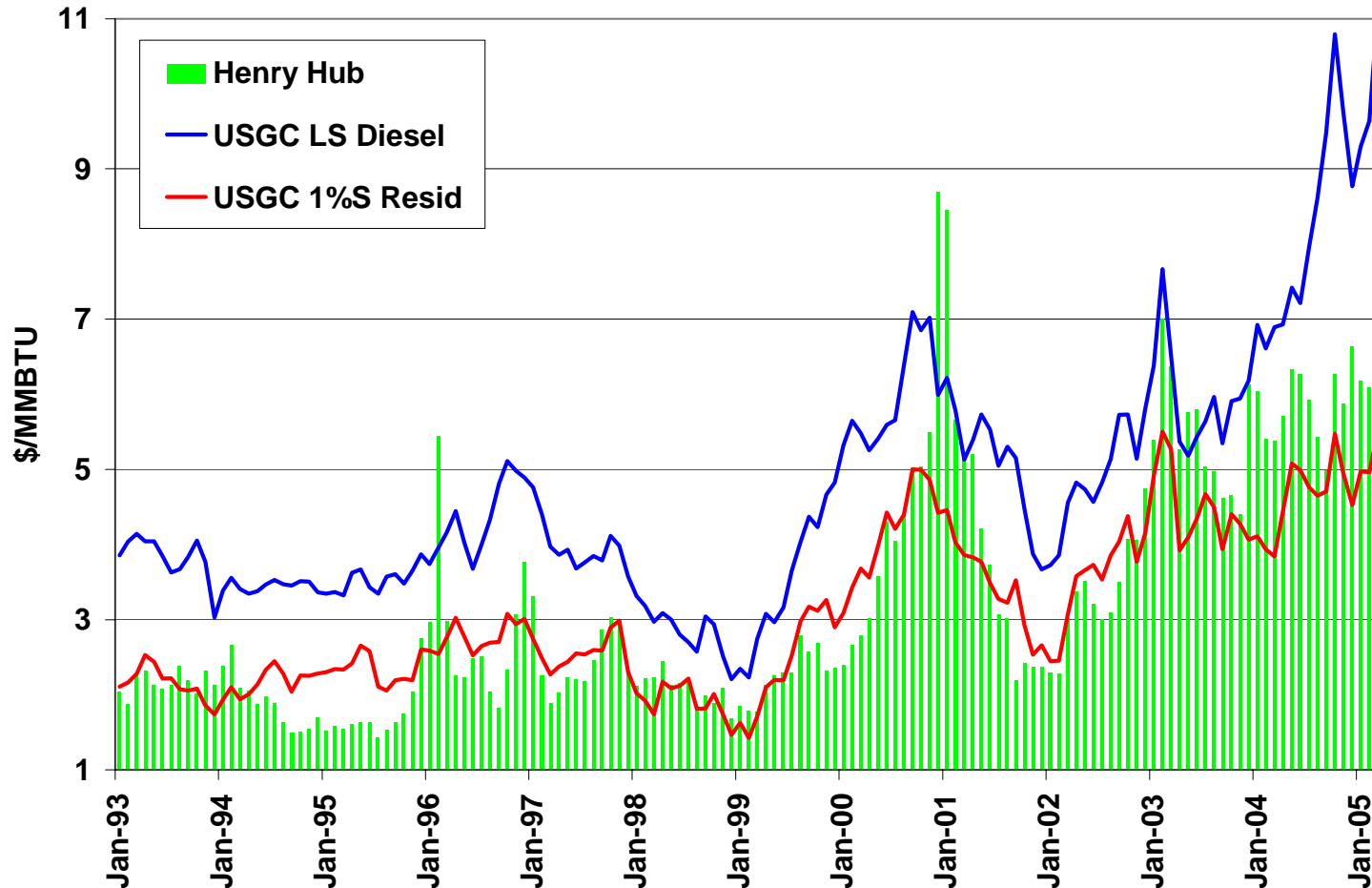
# Drilling Activity is Responsive to Gas Price



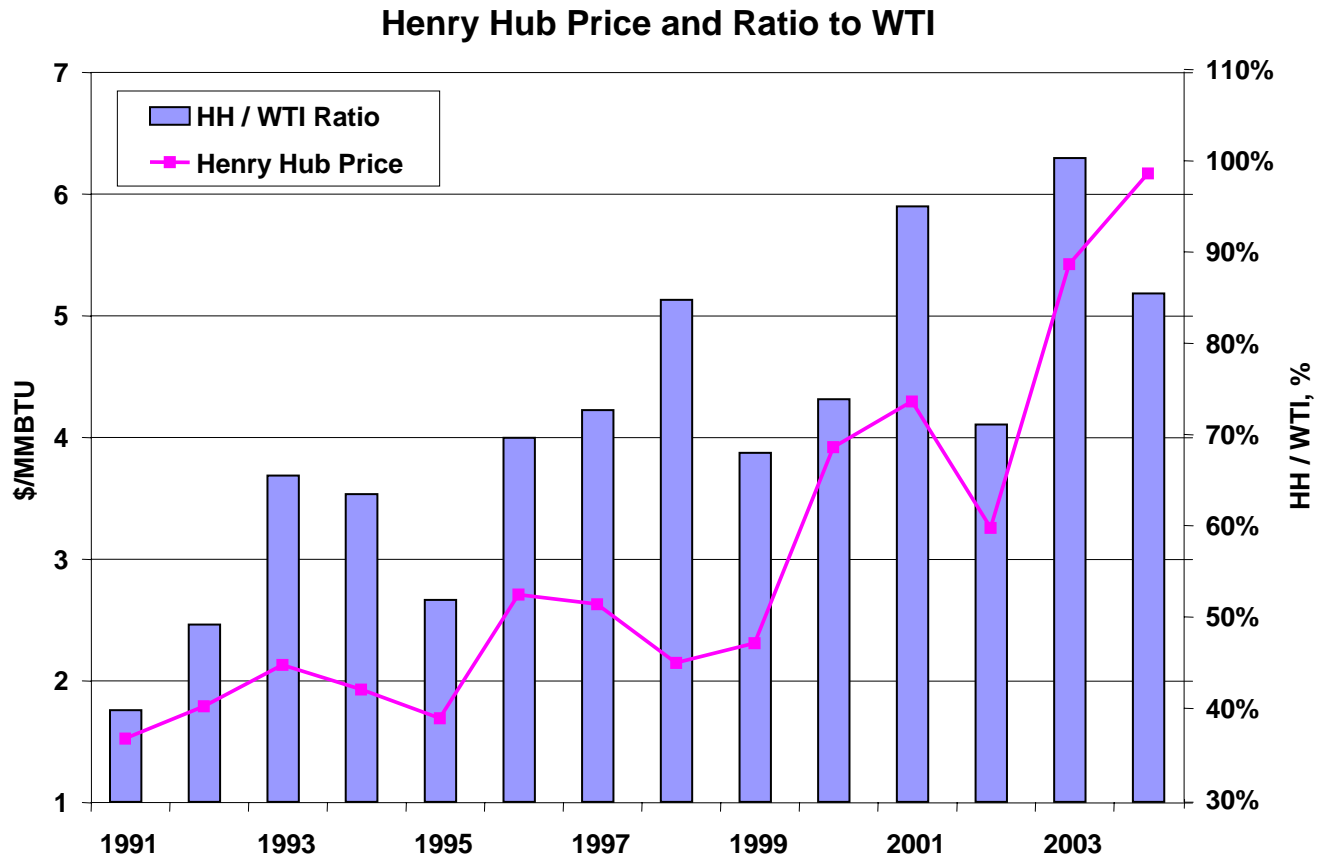
Source: NYMEX, Baker Hughes, CVX

# Oil & Gas Price Relationship has Changed

## Henry Hub & USGC Oil Prices

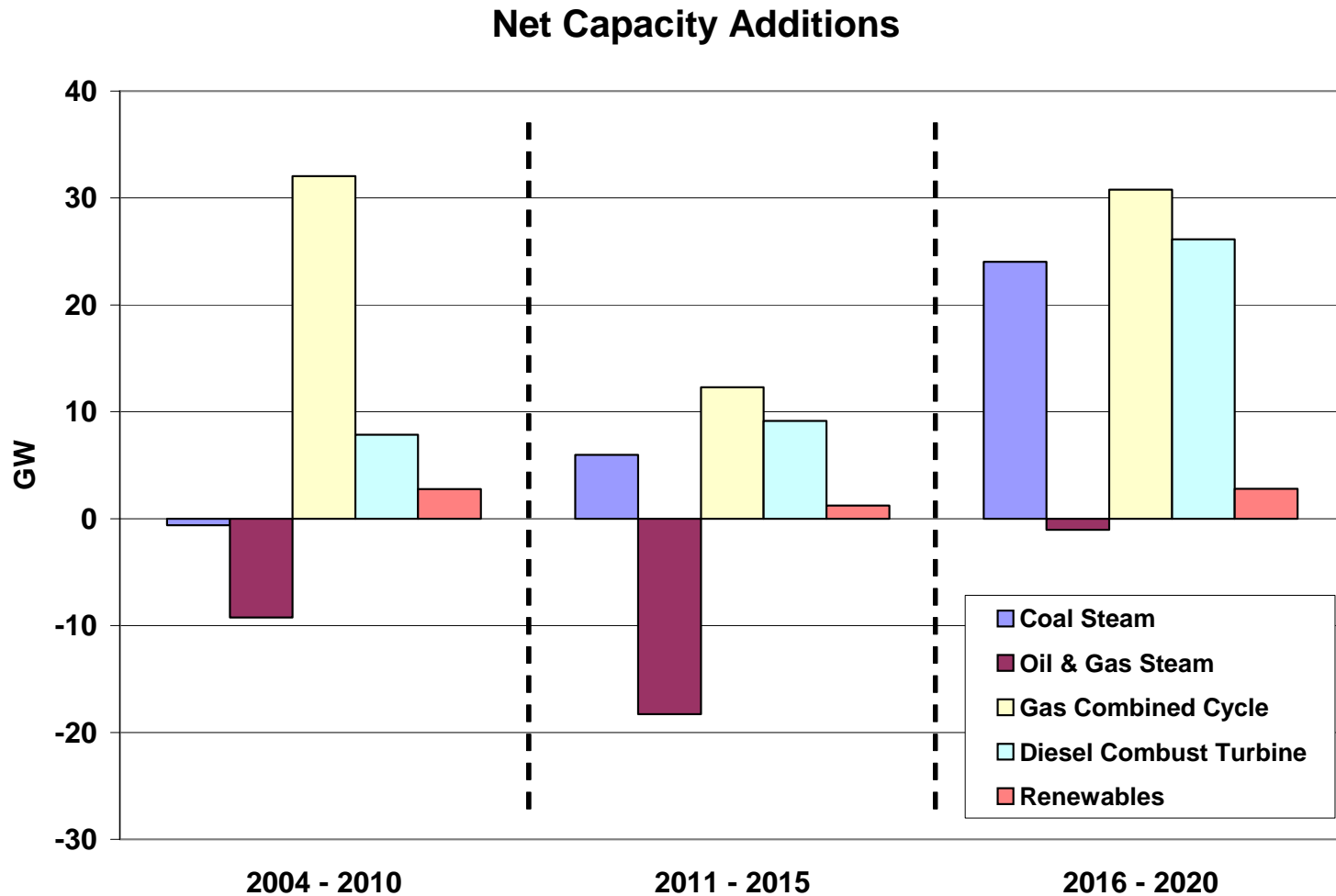


# Henry Hub Price has Strengthened Significantly Relative to Crude Oil



Source: Platts, CVX

# Projected Power Gen Capacity Additions Dominated by Gas

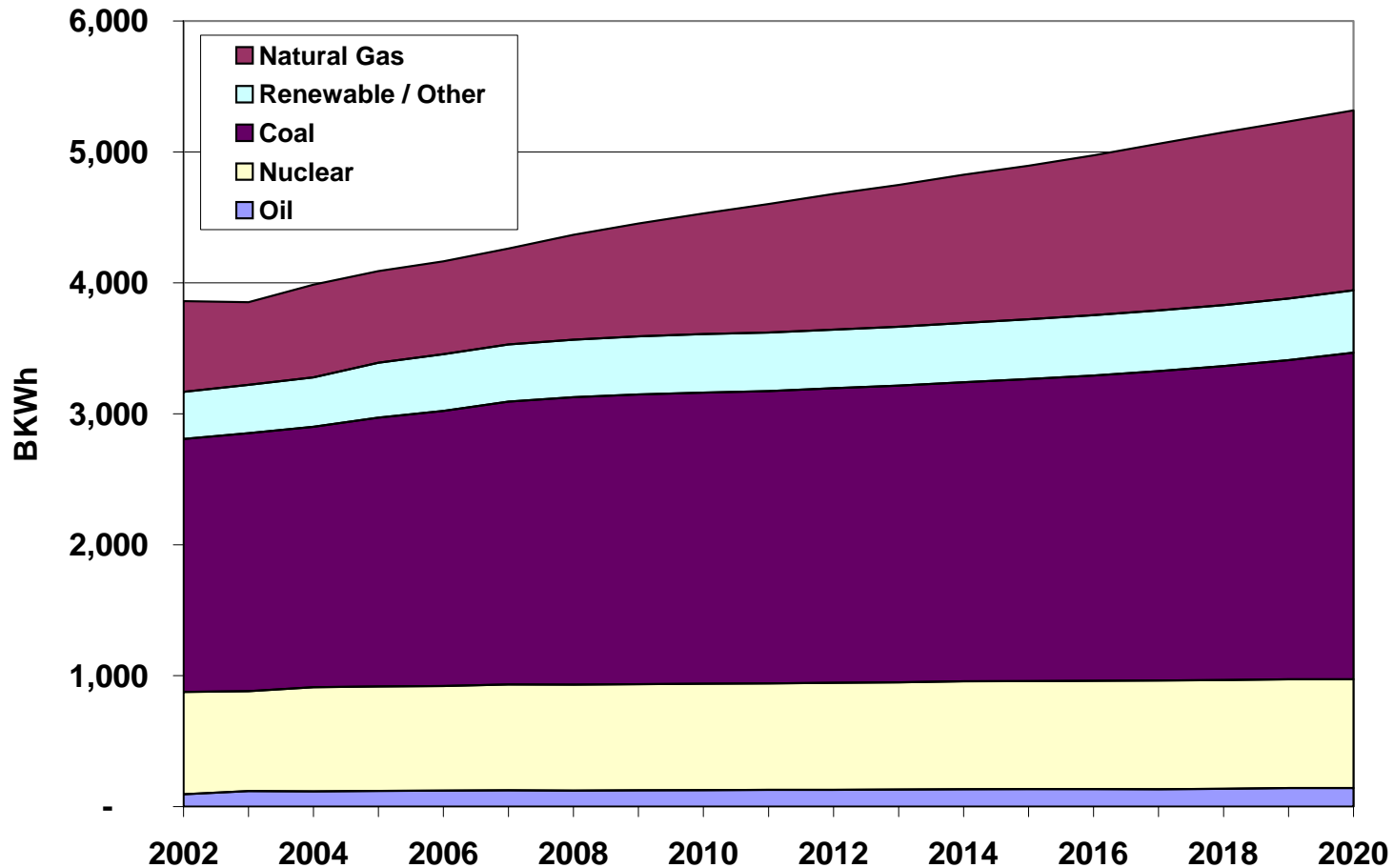


Source: EIA AEO 2005, CVX



# Gas Projected to Remain Fastest Growing Source of Power Generation

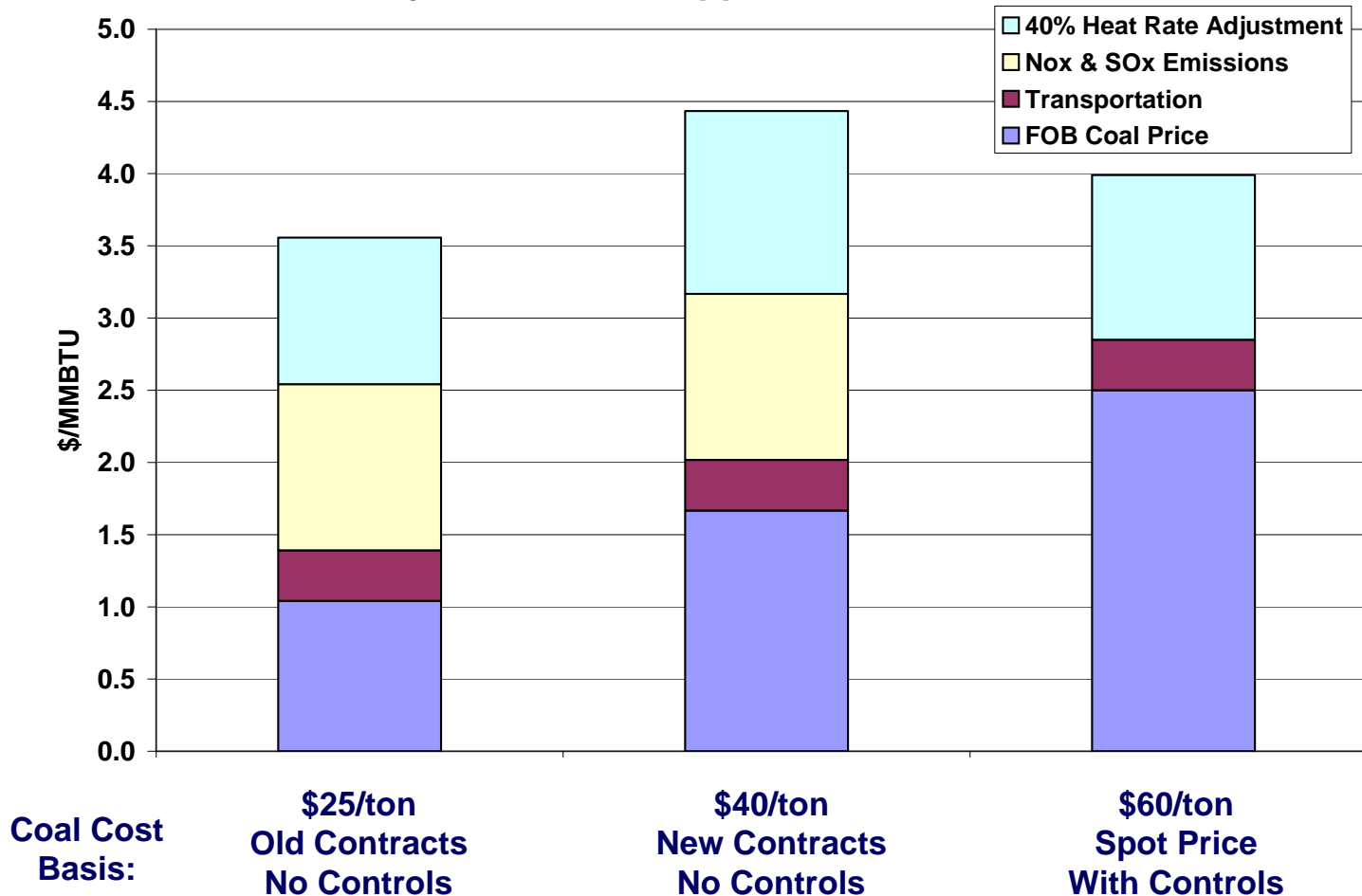
## U.S. Total Power Generation by Primary Energy



Source: EIA AEO 2005, CVX

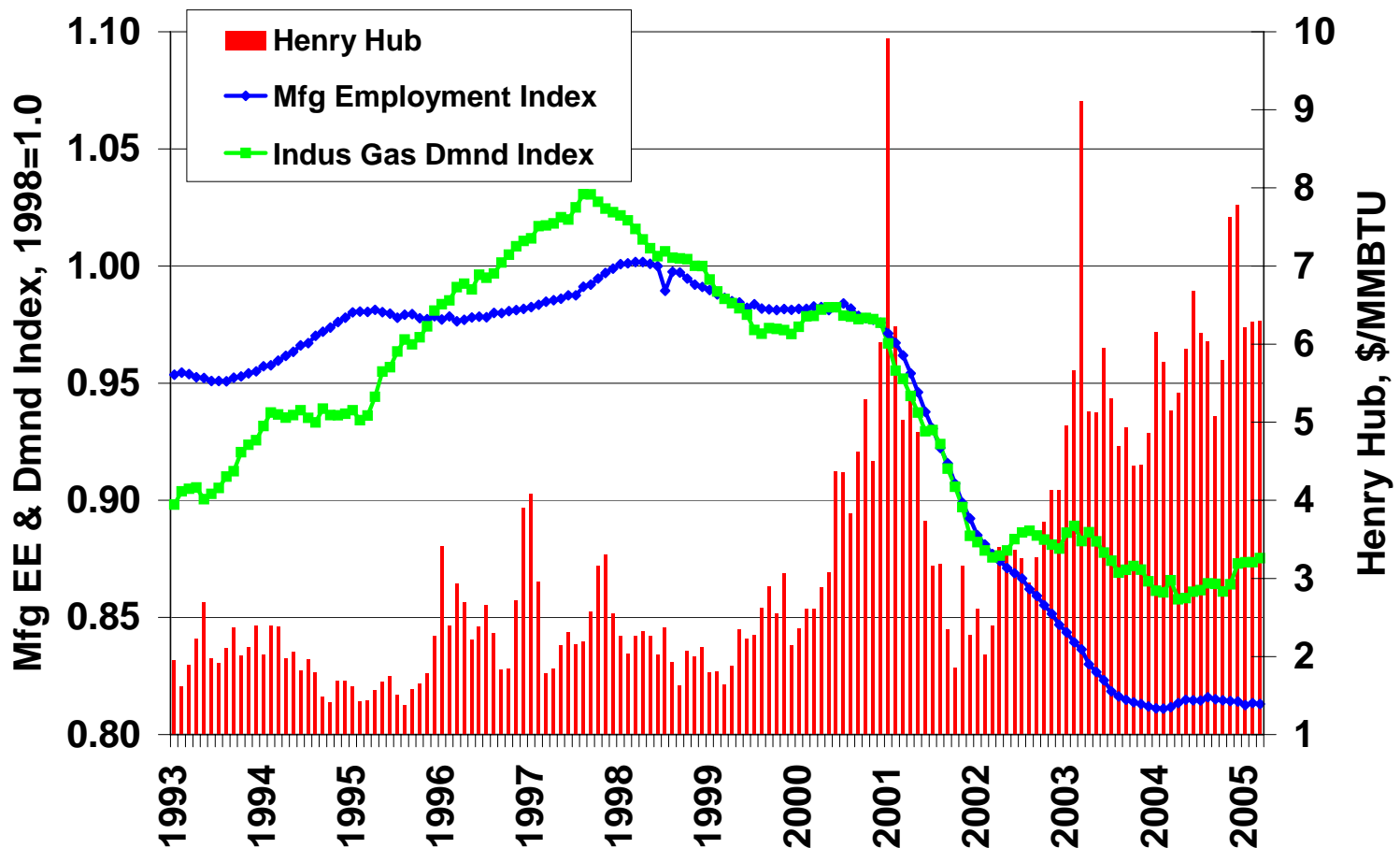
# In the East, Gas Can Compete with Inefficient Coal at ~\$4/MMBTU

## Adjusted Central Appalachain Coal Costs



# Industrial Gas Demand - Vulnerable to Additional Losses?

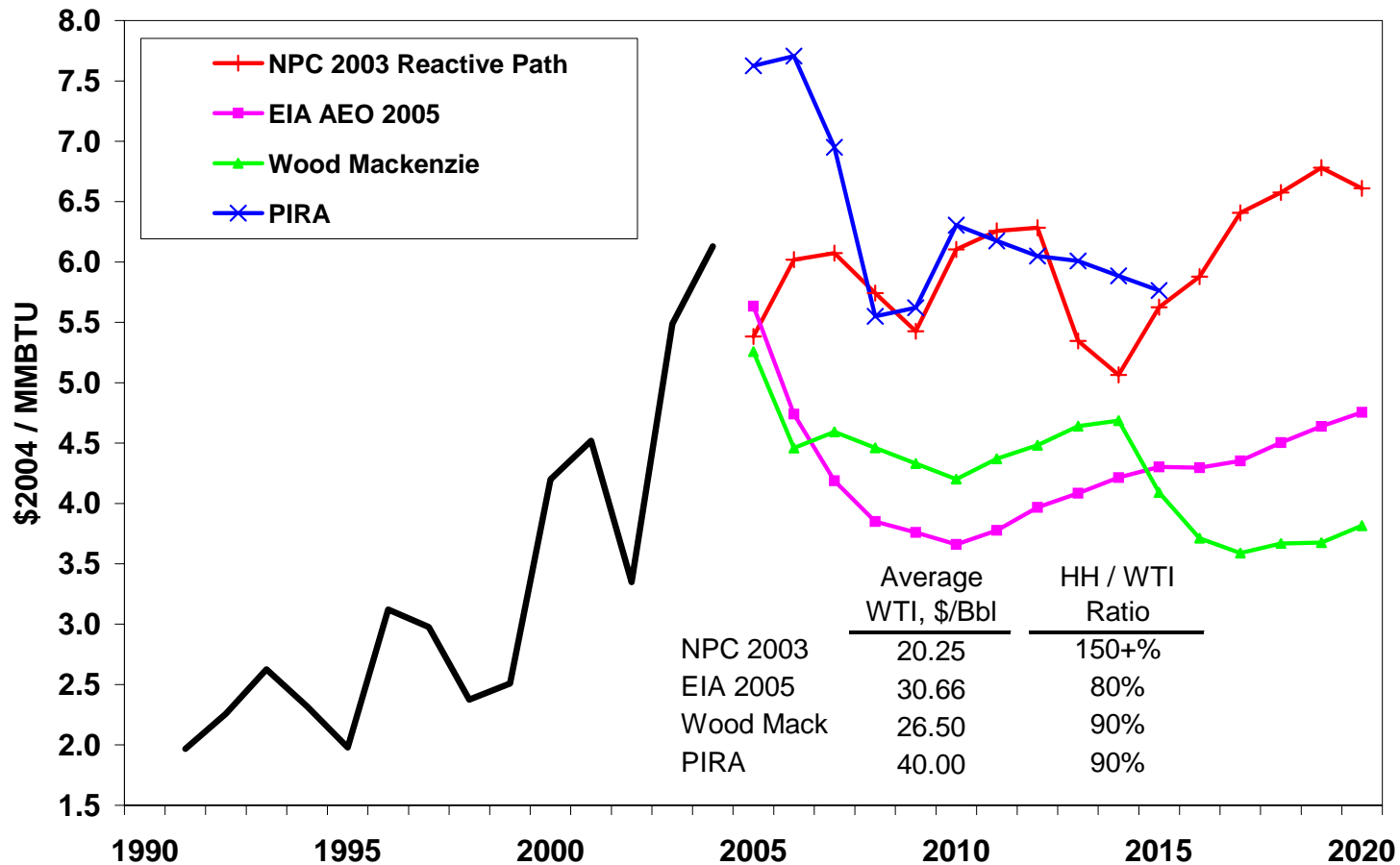
## Mfg Employees & Industrial Dmnd vs. Gas Price



Source: EIA ,BLS, Platts, CVX

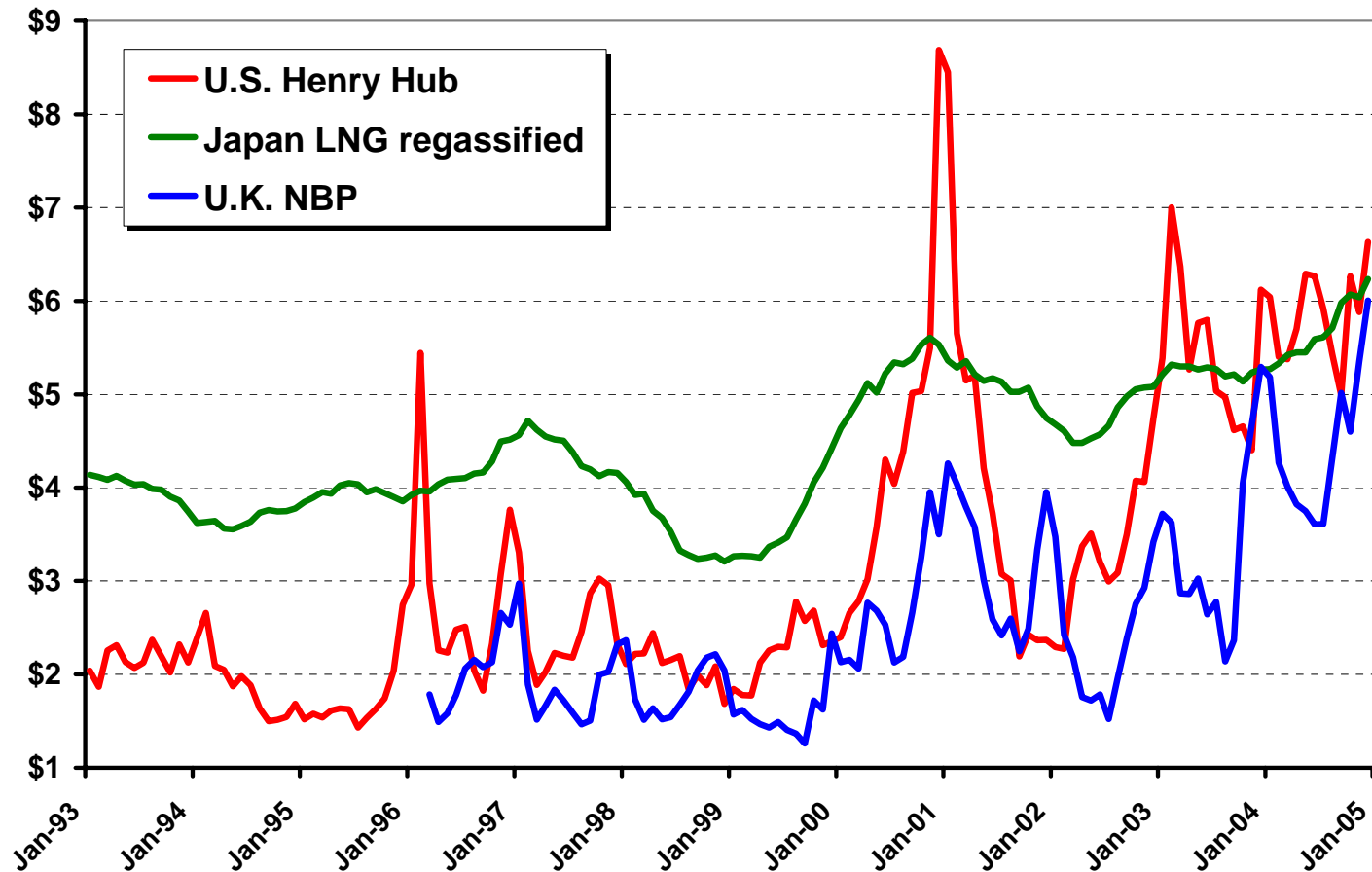
# Gas Price Expected to Remain Above Long-term Average

## Henry Hub Price Projections



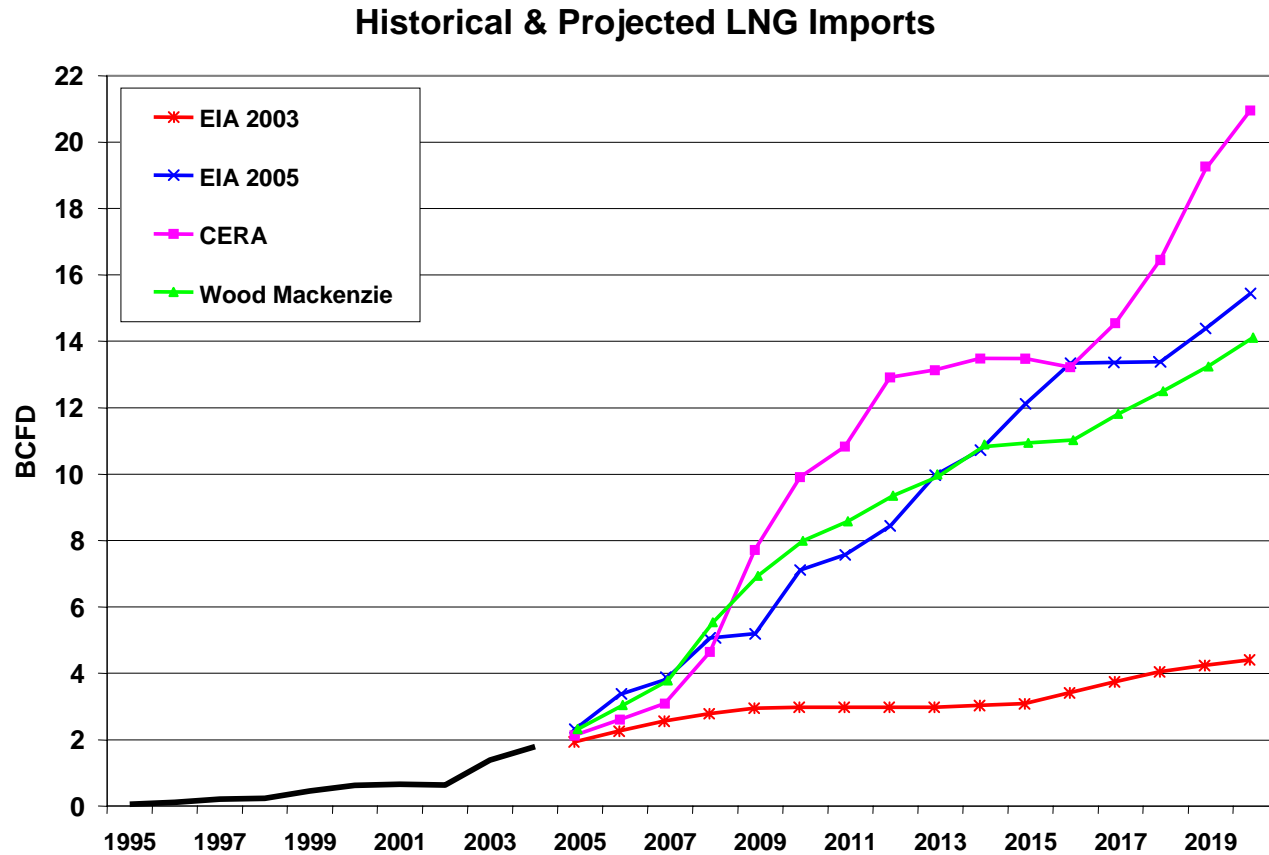
# World Gas Prices are Already Becoming More Closely Linked

World Gas Prices (US\$/MMBtu)



Source: Platts, Heron, NOC, CVX

# LNG Imports Projected to Increase Significantly



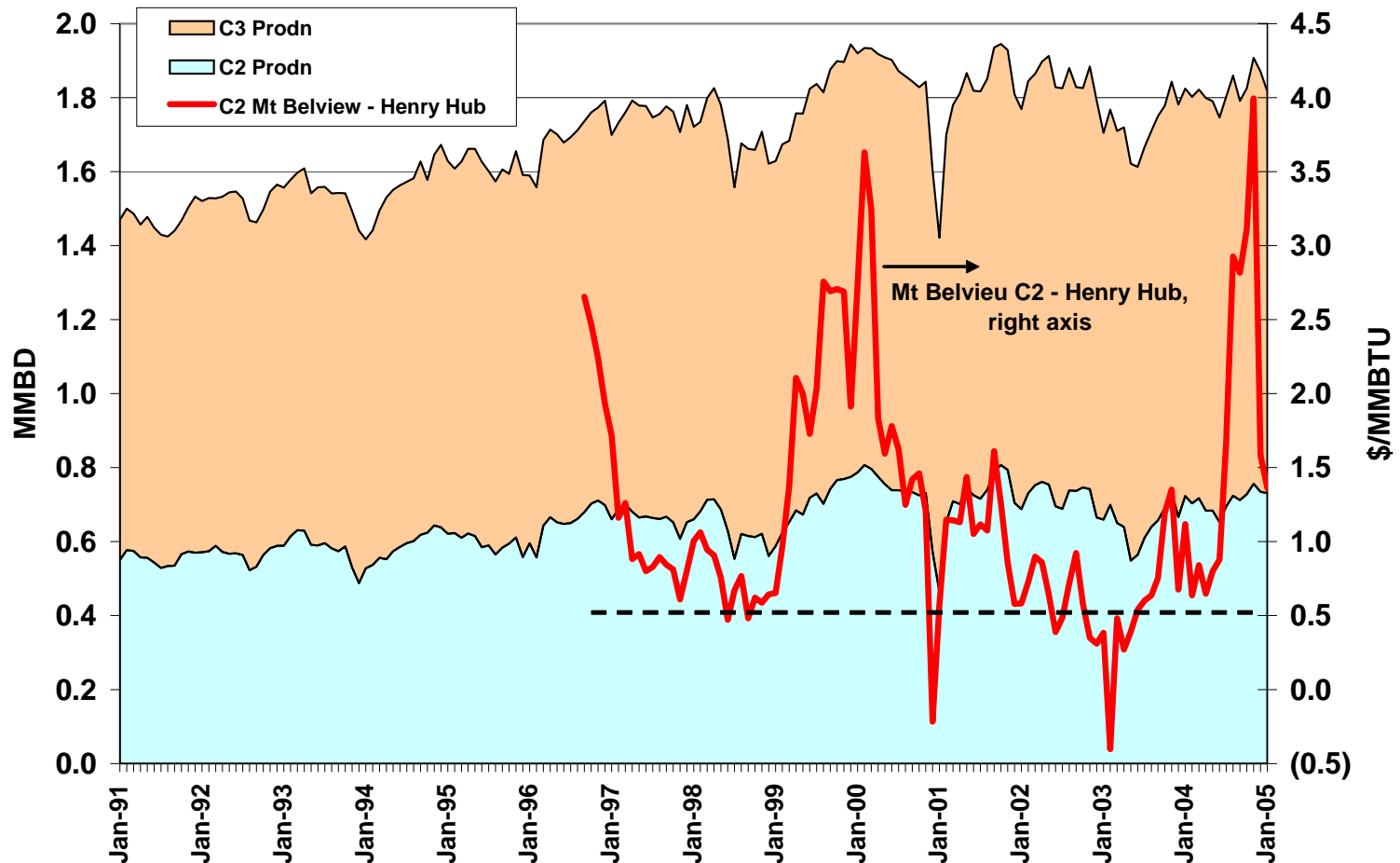
# Greater Role for LNG may Shift Gas Liquids Supply

Mole %	Indigenous Gas at Wellhead				LNG		
	South TX	GOM Shelf	Onshore	Offshore	Trinidad	Qatar	Nigeria
			LA	TX			
<b>Methane</b>	88.9	94.0	86.8	95.1	96.2	90.1	90.7
<b>Ethane</b>	5.9	2.9	6.2	1.2	3.4	6.5	8.5
<b>Propane</b>	2.1	1.1	2.5	0.3	0.3	2.4	0.8
<b>Butane &amp; Heavier</b>	1.6	1.1	2.0	0.4	0.1	1.0	0.1
<b>N2 &amp; CO2</b>	1.6	0.9	2.5	2.9	0.0	0.1	0.0

Source: Industry Data, CVX

# Gas Liquids Recovery Influenced by the Liquids – Gas Price Spread

## C2 & C3 Production and C2 - Gas Spreads



Source: EIA, Platts, CVX



# Summary

- New Sources of Gas Supply Required to Meet Projected Demand
  - Alignment Needed in Energy, Environmental, Regulatory & Foreign Policies
- Energy Policy Should Encourage Greater Fuel Diversity for Power Generation
- Gas Prices Expected to Remain Above Long-term Historical Average
- World Gas Prices Becoming More Closely Linked
- Greater Role for LNG may Shift Gas Liquids Supply

# Thank You!

- Questions?