

# Natural Gas Price Volatility

Joint Committee Workshop on Natural Gas Issues

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# Natural Gas Price Volatility

**Volatility** = The relative rate at which the price of a (commodity) moves up and down. Volatility is found by calculating the annualized standard deviation of daily change in price. If the price of a (commodity) moves up and down rapidly over short time periods, it has high volatility. If the price almost never changes, it has low volatility.

- *www.investorwords.com*



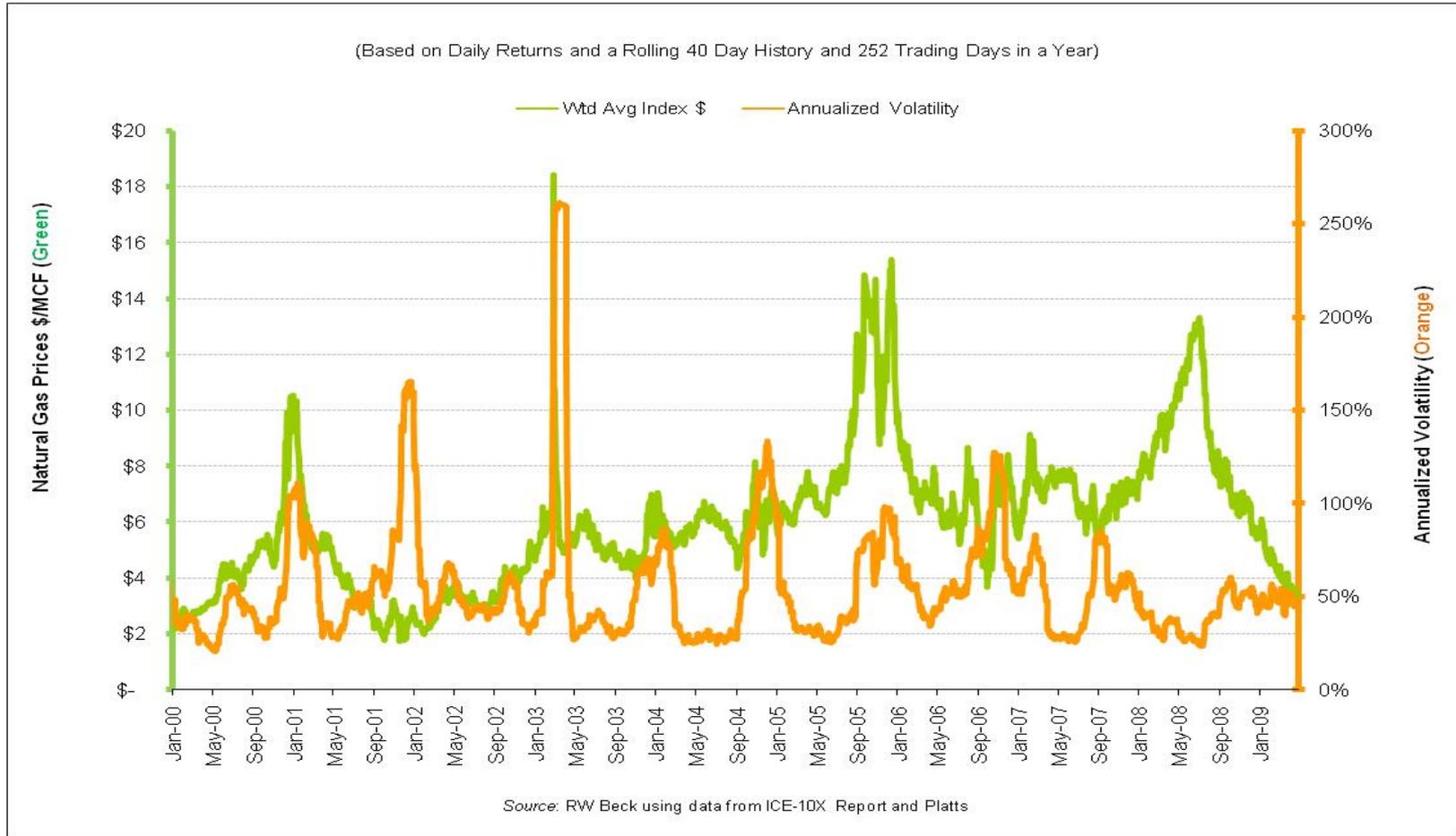
# Natural Gas Price Volatility

**Mean Reversion** = prices tend to migrate back to an equilibrium level

**Stationarity** = statistical property indicating if the equilibrium price is stable or not



# Price and Volatility



Left axis (green line) tracks natural gas prices. Right axis (orange line) tracks annualized volatility level. Periods of highest prices do not always coincide with periods of highest volatility.



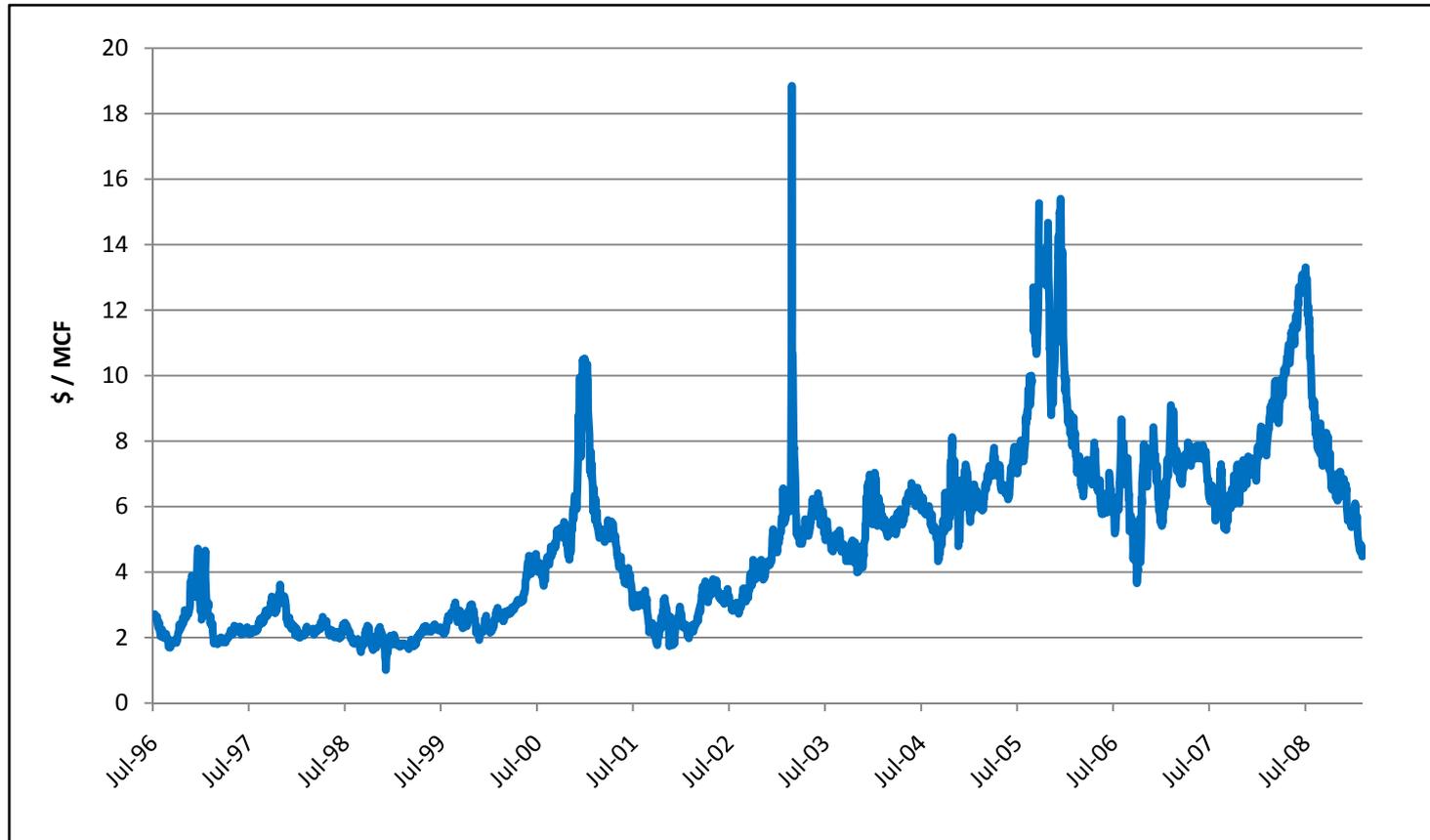
# Price Volatility Impacts

- **Residential**
- **Commercial**
- **Industrial**
- **Power Generators**
- **Gas Producers**



# Historical Natural Gas Prices

## Henry Hub Spot Prices



Spot prices remained near \$2/Mcf during last half of 1990s. Spot prices steadily moved higher since 2000, while experiencing four significant price spikes.



# Factors that Affect Prices and Volatility

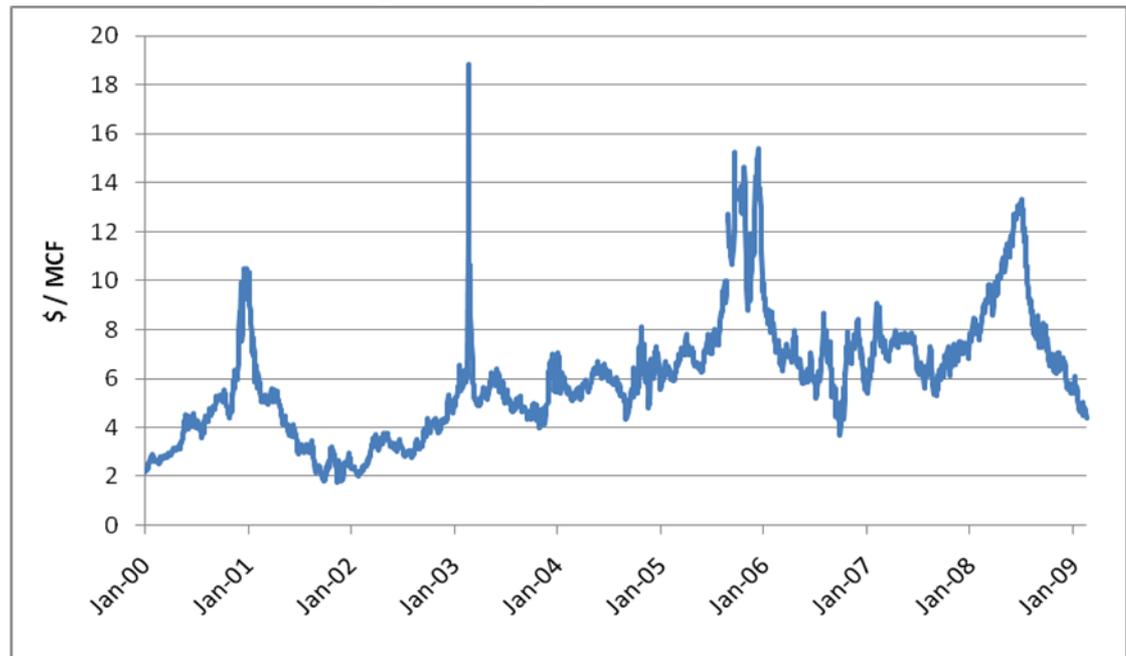
- **Supply and Demand Imbalances**
- **Infrastructure Issues**
- **Weather**
- **Regional and Global Economic Conditions**
- **Speculative Trading**
- **Market Manipulation**
- **Unreliable Data**



# Four Major Price Spikes

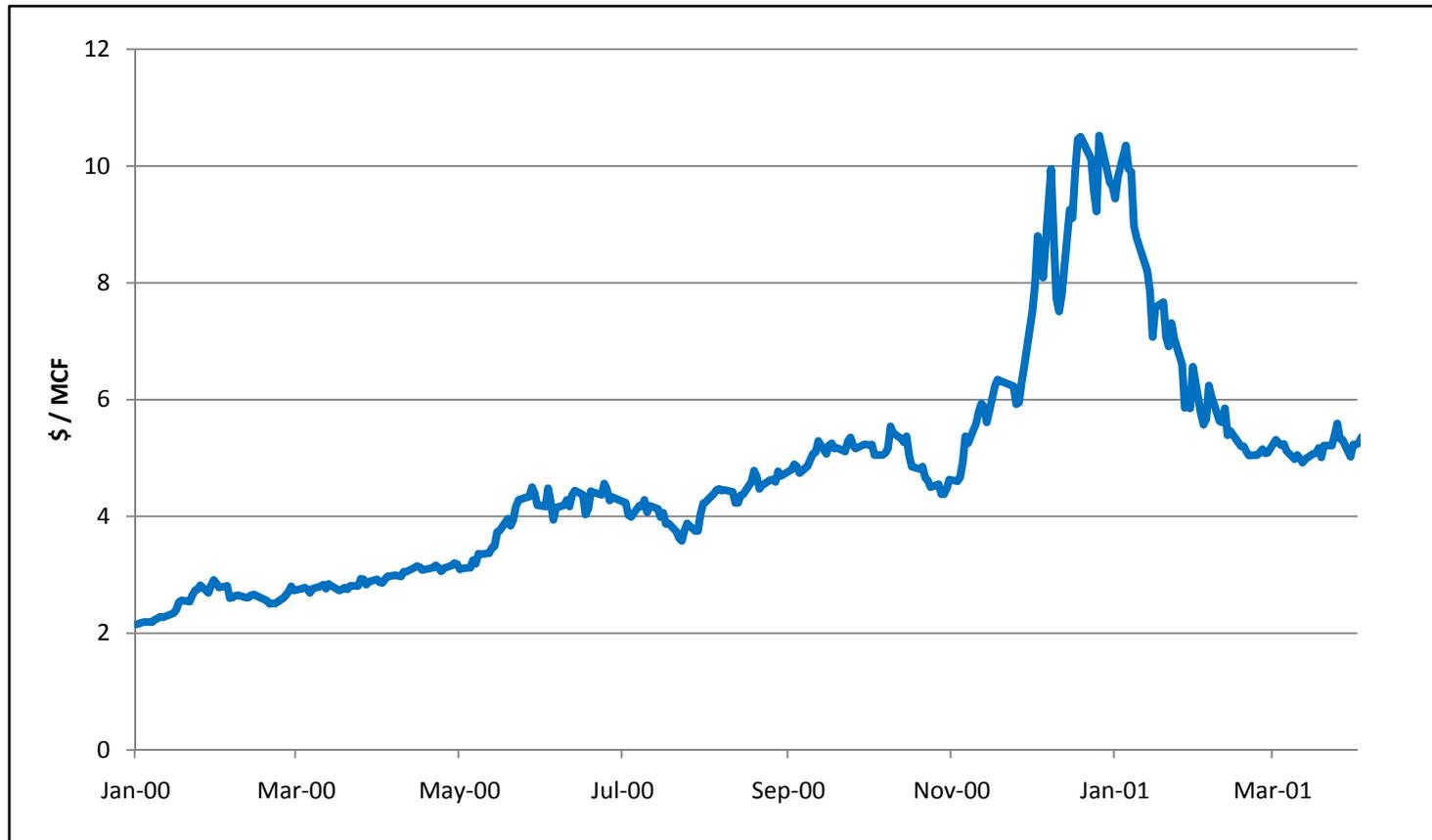
- **Winter 2000-2001**
- **February 2003**
- **Fall 2005**
- **Summer 2008**

Henry Hub Spot Prices



# Winter 2000-01

## Henry Hub Spot Prices

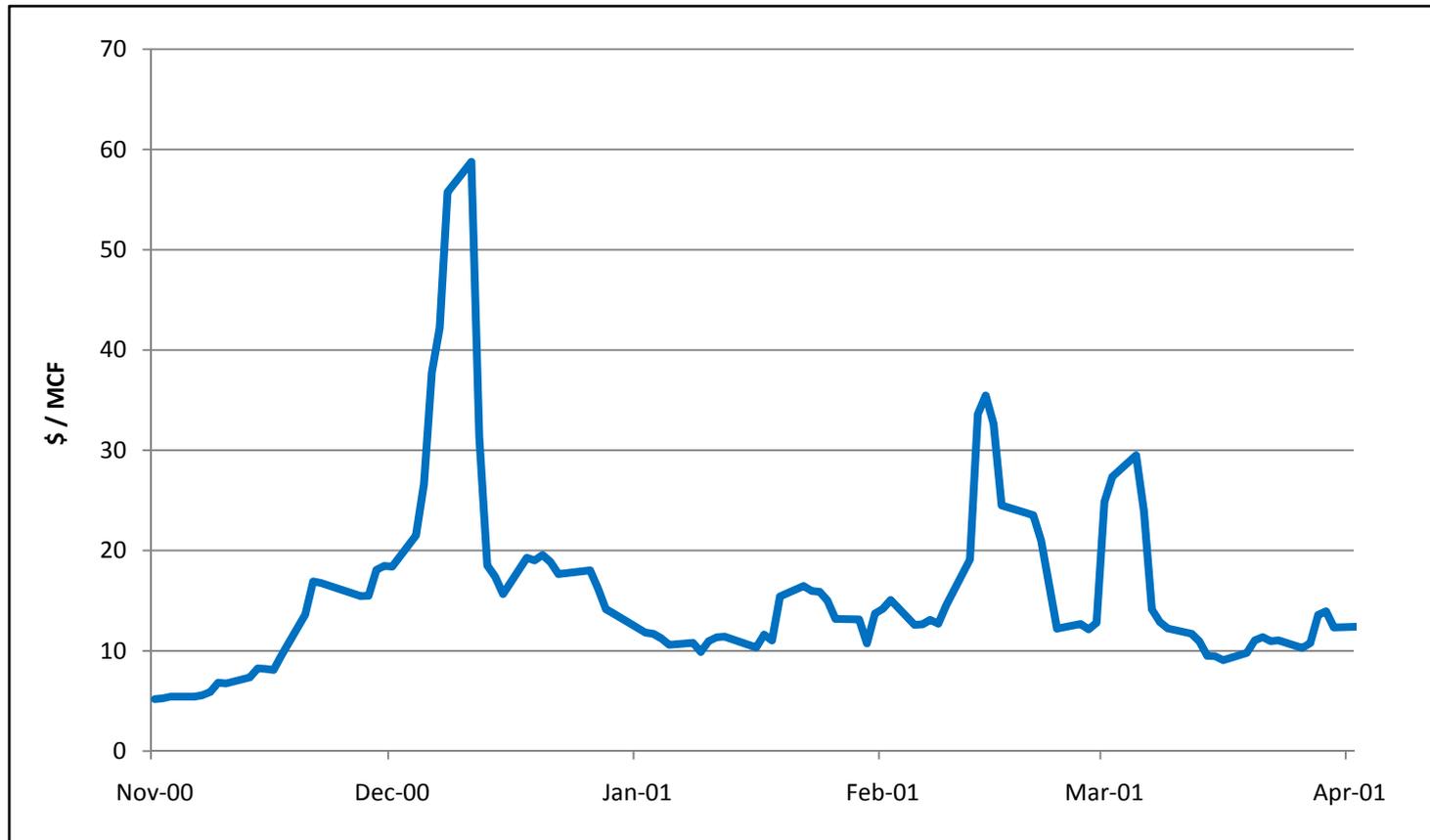


Henry Hub spot prices peaked at \$10.52/Mcf on December 29, 2000, a result of physical market factors.



# Winter 2000-01

## Southern CA Border Average Spot Prices

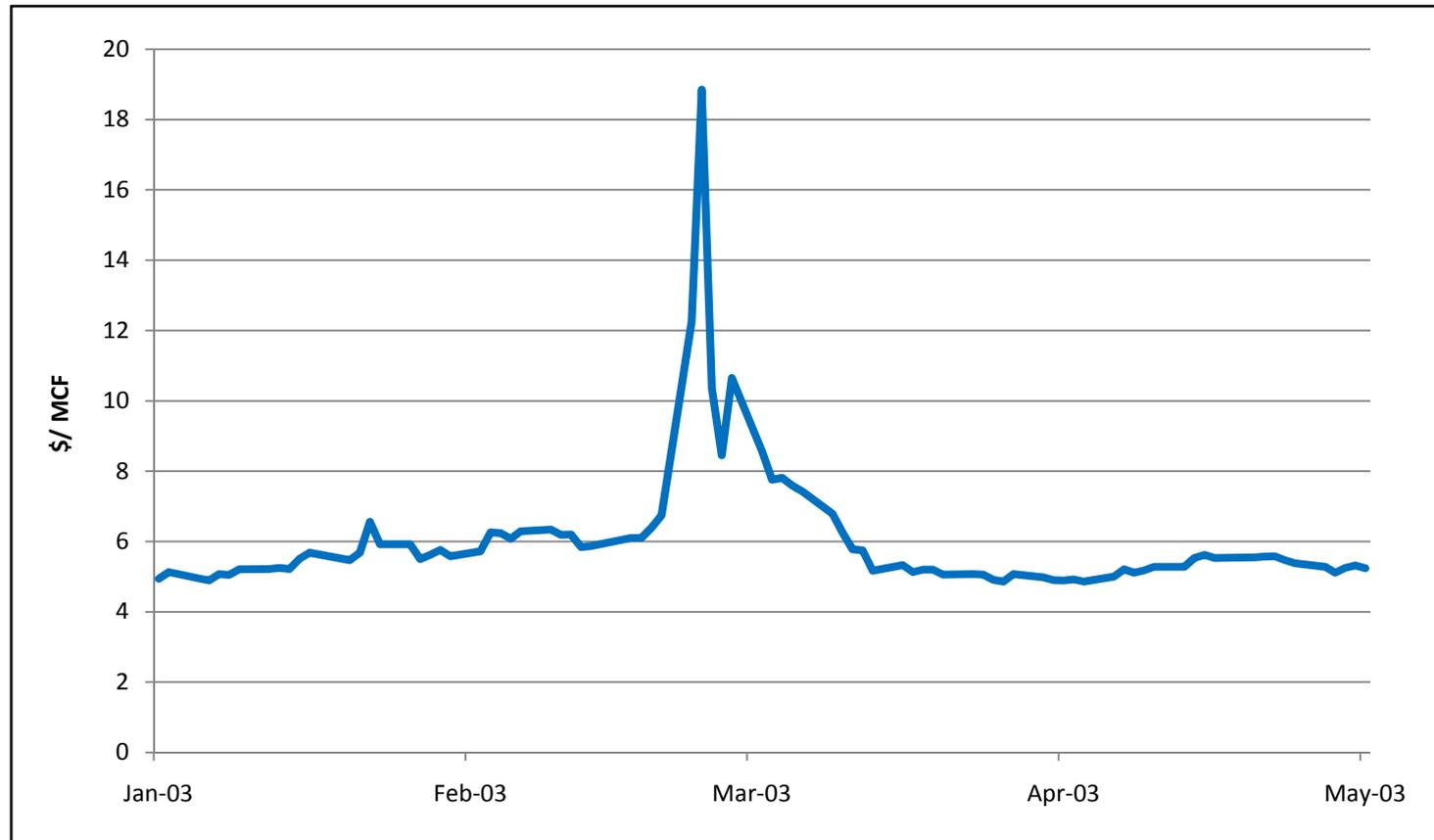


Southern CA Border Average prices peaked at \$58.76/Mcf on December 11, 2000, at least partially a result of market manipulation.



# February 2003

## Henry Hub Spot Prices

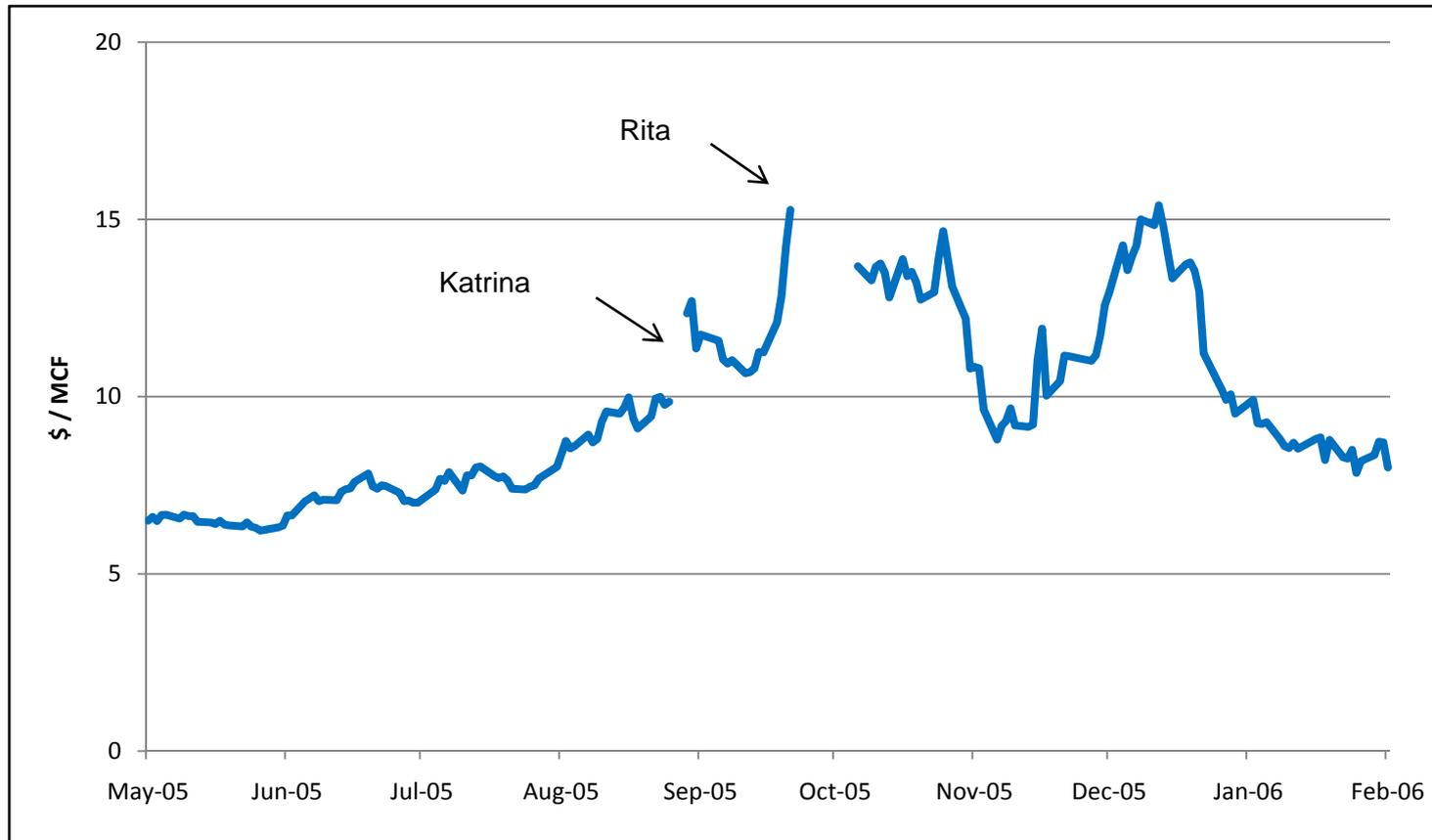


Spot prices peaked at \$18.85/Mcf on February 25, 2003, but declined to \$10.36/Mcf the next day, a result of physical market factors, in particular a severe cold front that spiked demand and reduced supply by freezing-off producing wells in the Mid-continent region.



# Fall 2005

## Henry Hub Spot Prices

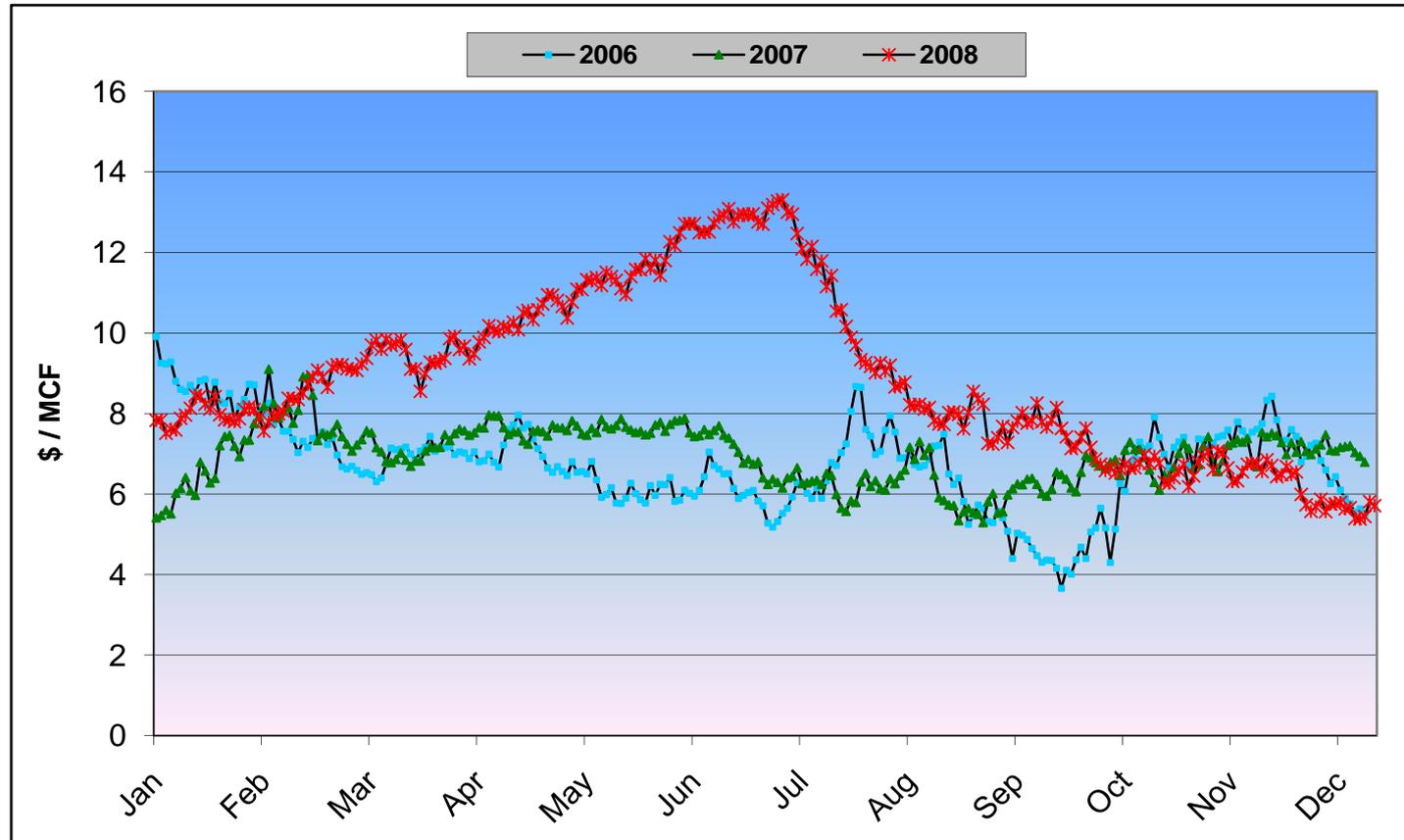


Spot prices peaked at \$15.40/Mcf on December 13, 2005, after back-to-back hurricanes damaged Gulf of Mexico production, processing, and transportation infrastructure. The two line breaks represent the suspension of natural gas trading due to effects of the two hurricanes.



# Summer 2008

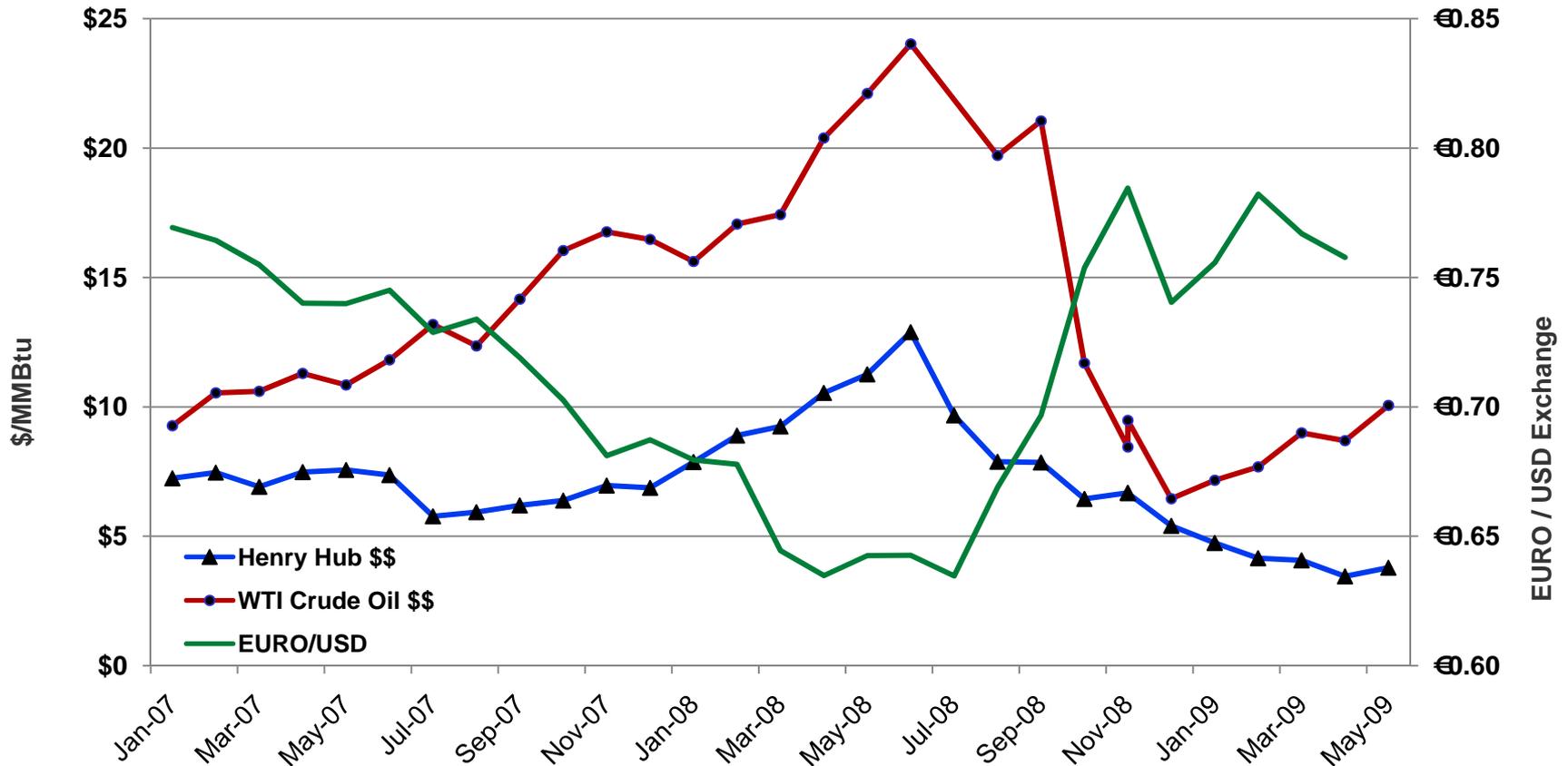
## Henry Hub Spot Prices



In 2008, spot prices broke from the \$6-\$8/Mcf range of the two previous years and peaked at \$13.32/Mcf on July 2, 2008, but ended the year at \$5.63/Mcf. 2008 price movements were the result of physical and financial market factors.



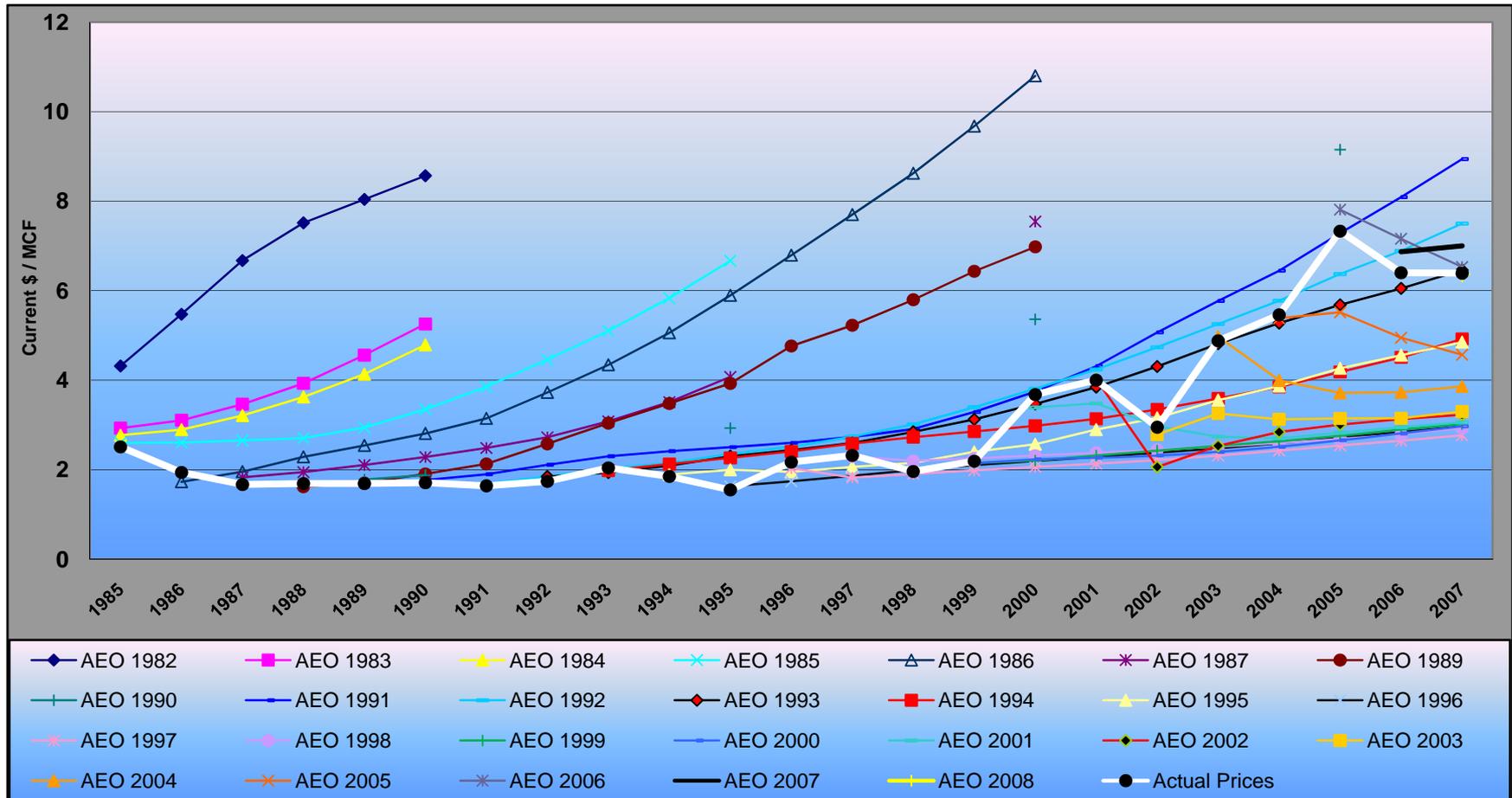
# Oil – Natural Gas - USD



Natural gas prices appear to follow the price of oil, although the correlation weakens at higher energy prices. The USD moved inversely to oil and natural gas prices, providing some support for the position that the relative value of the USD plays a role in changing energy commodity prices.



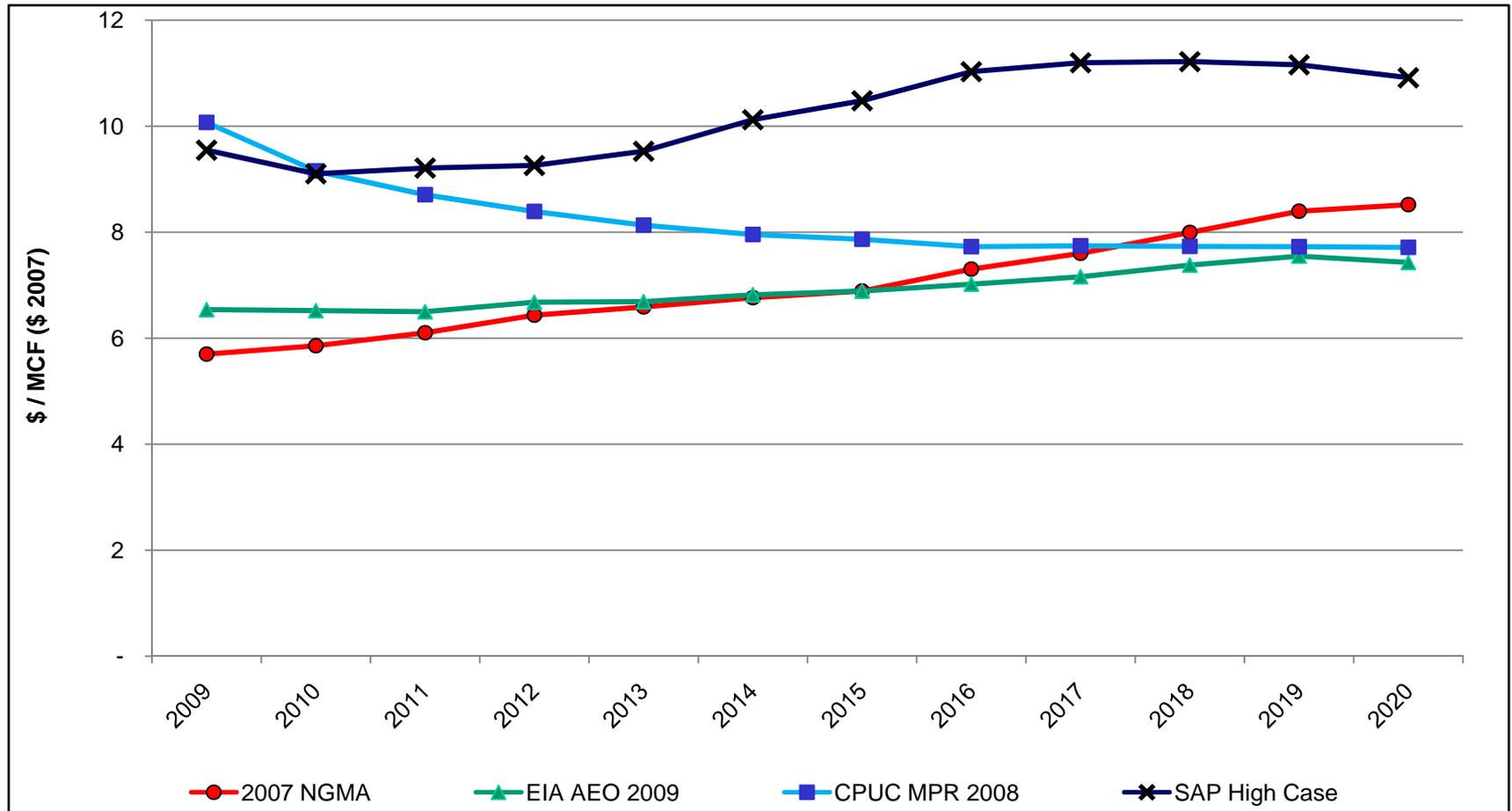
# Wellhead Price Forecasts



EIA's Annual Energy Outlook 2008 Retrospective Review provided data comparing annual AEO wellhead price forecasts to actual wellhead prices. Graphic shows the divergence between forecasted and actual prices.



# Forecasts Comparison



Four price forecasts predict 2009 Henry Hub annual prices as low as \$5.70/Mcf and high as \$10.07/Mcf. A forecasted price spread of more than \$4/Mcf in the first year, is an indication of the uncertainty associated with date-specific, single-point forecasts.



# Issues

- What key factors drive natural gas prices and volatility?
- Does speculation play a major role in natural gas price volatility?
- Is natural gas price volatility increasing?
- What impact does price volatility have on date-specific, single-point price forecasts?
- Given the likelihood of continued price volatility, what is the future of price forecasting?

