

# ***The “Cyclical” Nature of Natural Gas Prices***

Huagang “Hugh” Li

*Glen E. Sweetnam*

*24<sup>th</sup> Annual North American Conference  
of the USAEE/IAEE*

*July 10, 2004*



LUKENS ENERGY GROUP

# ***Presentation Outline***

---

Hotelling Model of Exhaustible Resources

Reconciling –

Hotelling Price Trajectories and

Observed North American Natural Gas Prices

Implications for Long Term Natural Gas Prices



# ***Hotelling Model of Exhaustible Resources***

---

## Approach

Solve for schedule of resource production that maximizes profitability (net present value)

## Key Insights

Profit rises at the discount rate

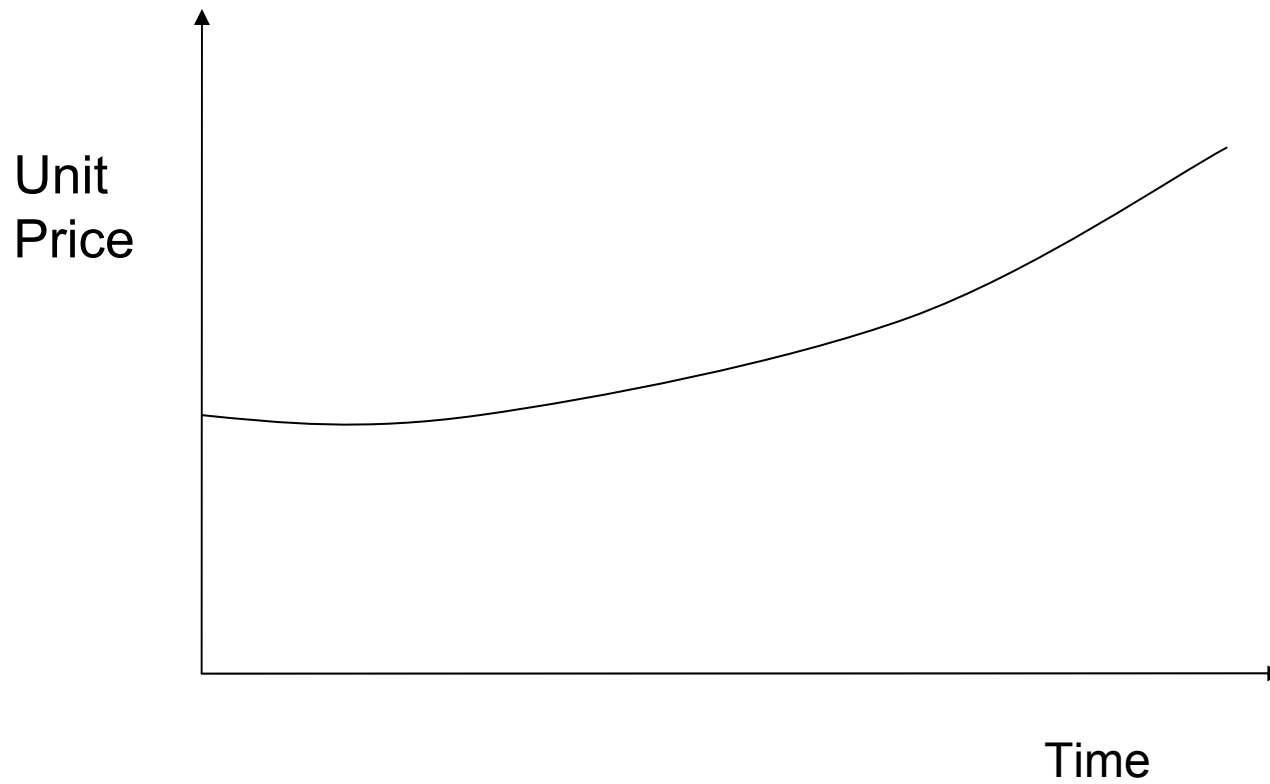
Prices can rise or fall depending on marginal cost trajectory

Resource depletion occurs when substitute becomes economic (backstop price)



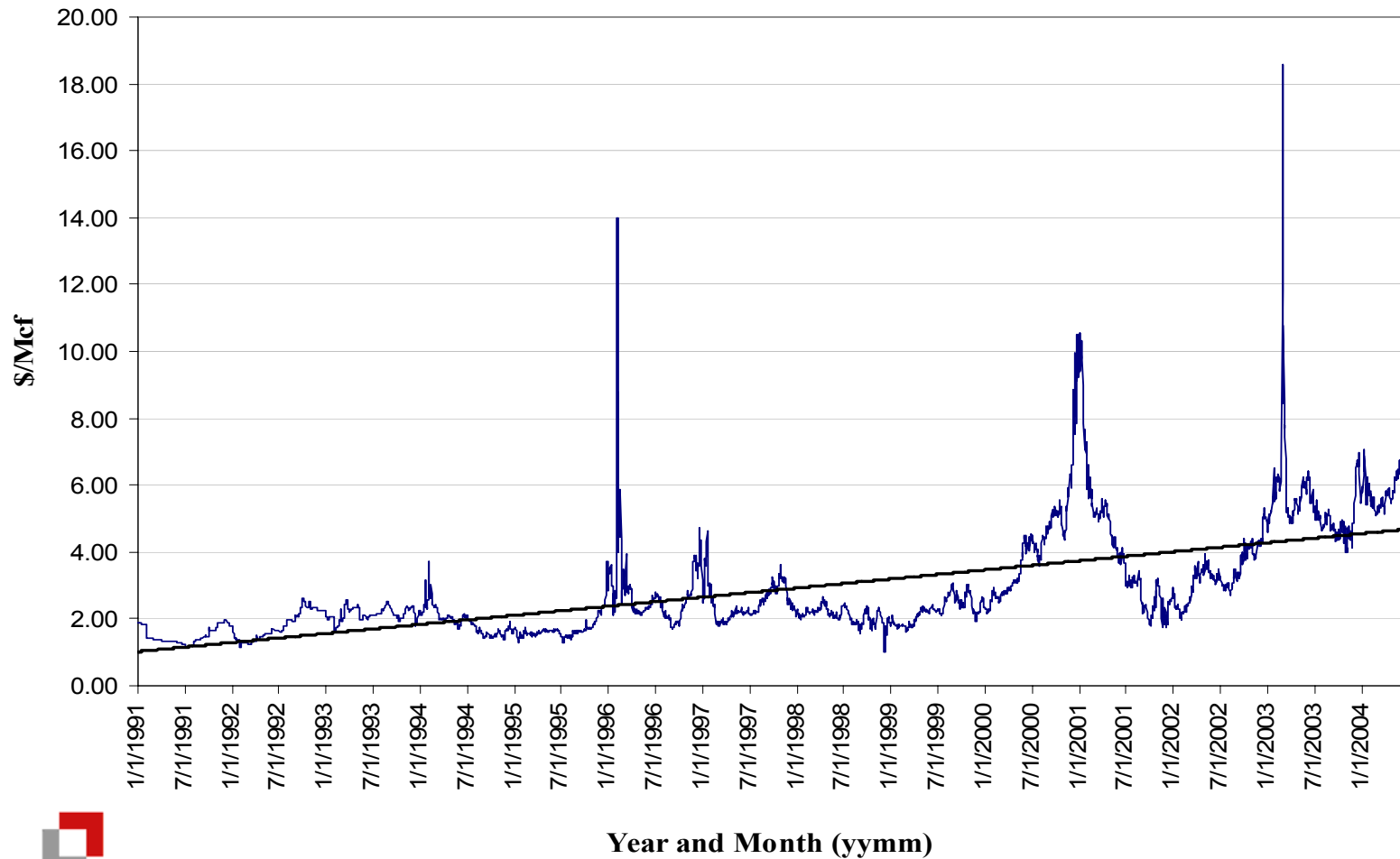
# *Typical Hotelling Price Trajectory*

---



# Natural Gas Price at Henry Hub

Figure 2. Natural Gas Spot Price at Henry Hub



# ***Reconciling Forecasted and Observed Prices***

---

## Three Important Differences

Volatility of observed prices (does this affect producer decisions?)

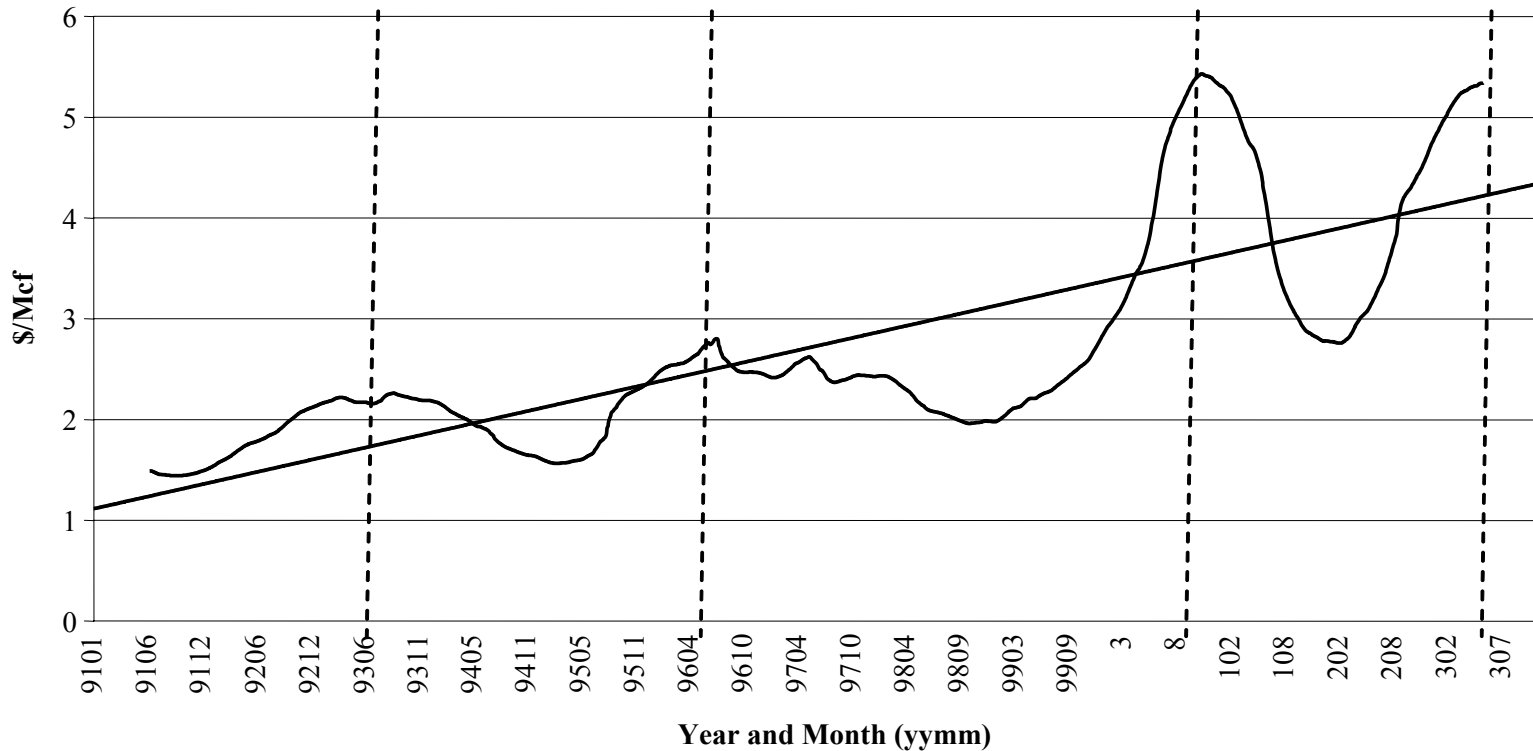
Price cycles (inconsistent with profit maximizing trajectory?)

Prices above long term substitute (LNG)



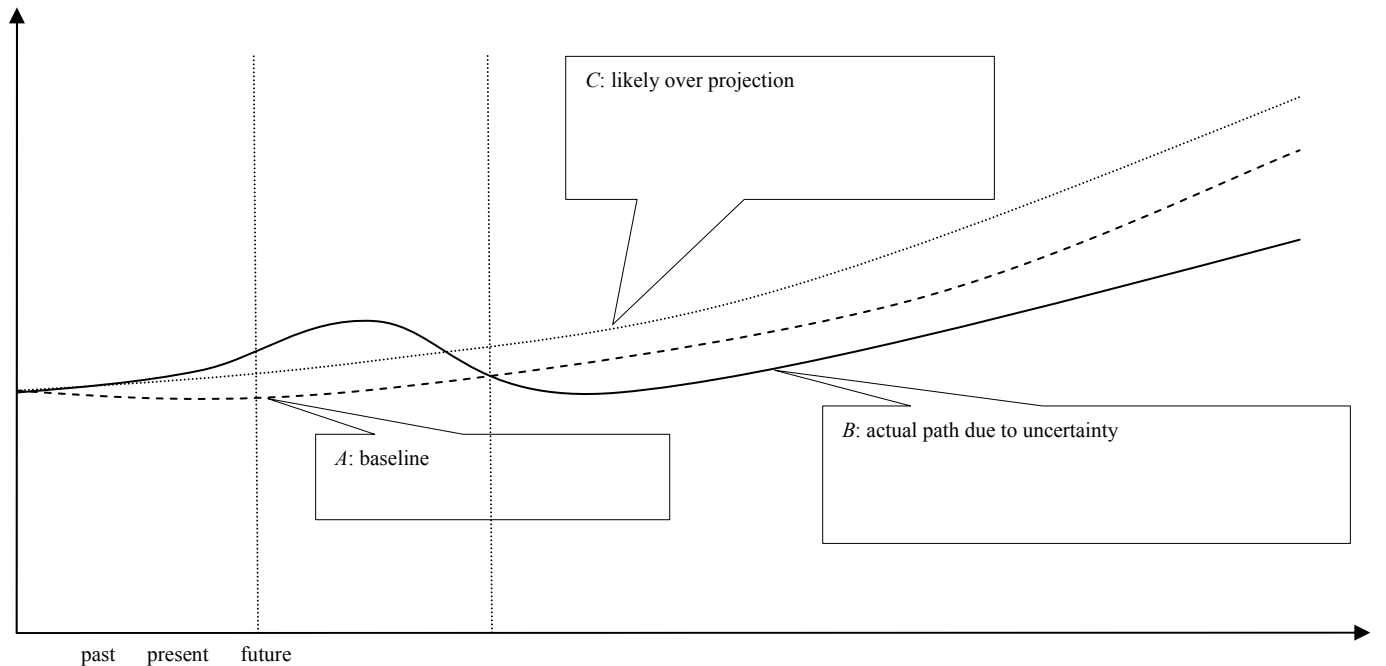
# Averaging and Removing Seasonality Reveals Cyclicity

Figure 3. Moving Average Natural Gas Price at Henry Hub



# Producers will Delay Investment when Volatility is High

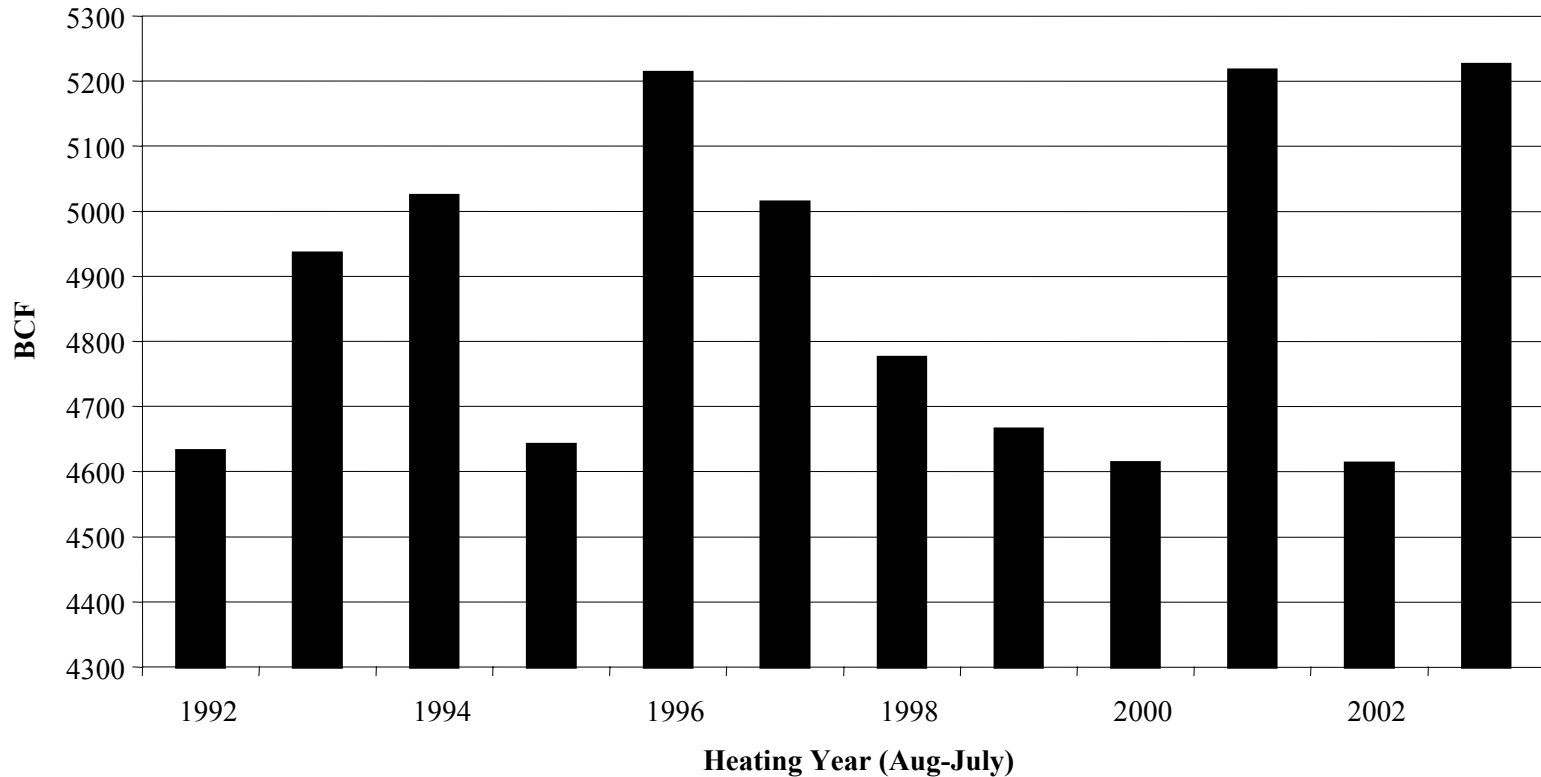
Figure 4. Price Path with Market Uncertainty





# Price “Cycles” are Weather Induced

Figure 5. U.S. Residential Gas Consumption

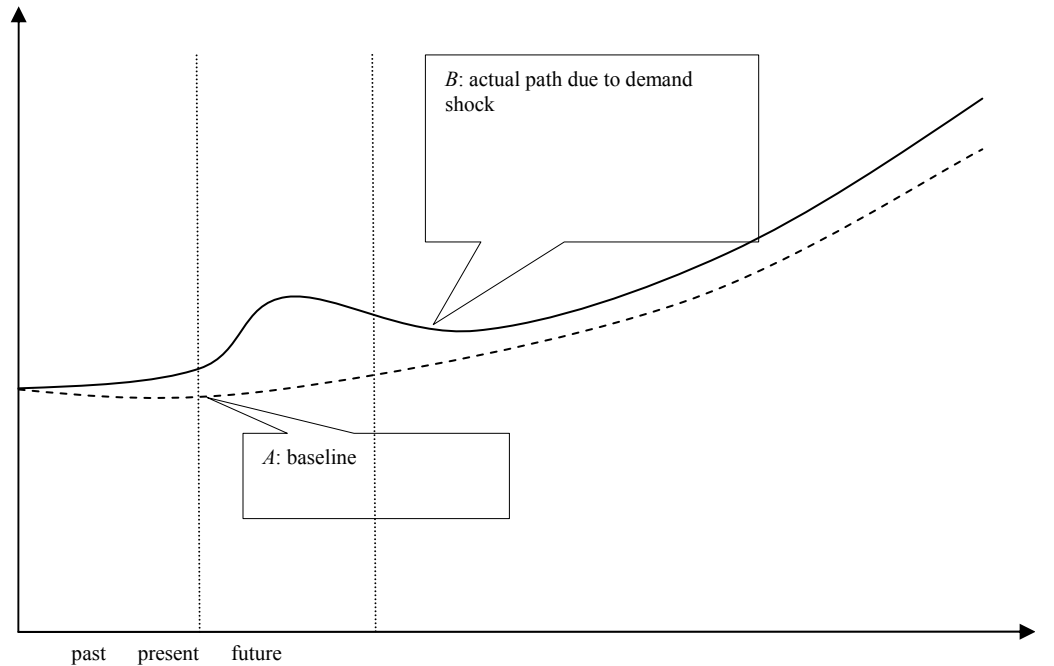


Note: 1992 Heating Year = Aug 91 – Jul 92



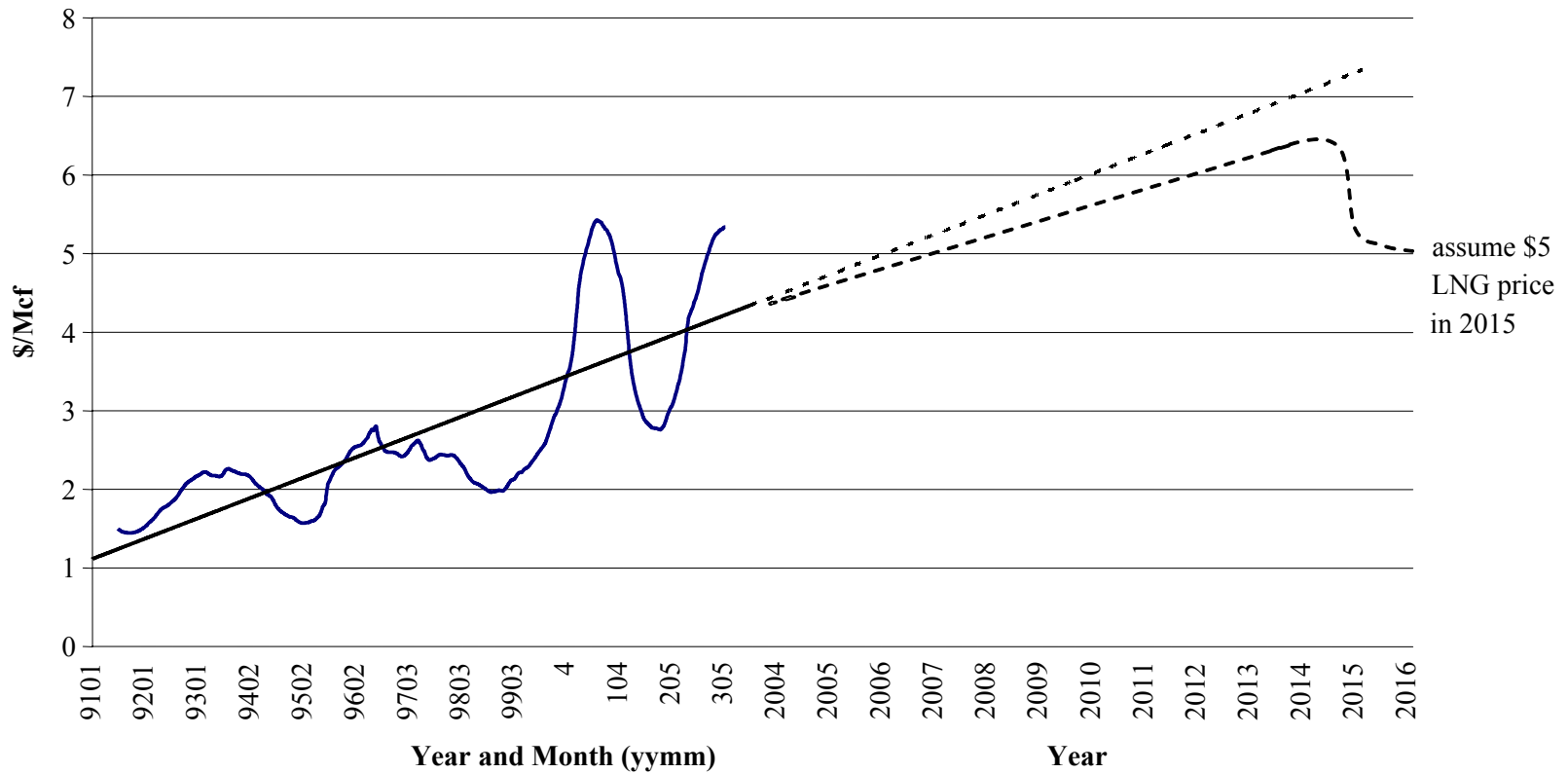
# Demand Shocks Alter the Long Term Price Trajectory

Figure 6. Price Path with Demand Shock



# Delays in LNG will Lower Current Period Prices

Figure 7. Natural Gas Price and Likely Trend



# *Implications*

---

## Factor

## Implication for Gas Prices

High Volatility

Higher prices in current period;  
lower prices in future period

Demand "Shocks"

Positive and negative price effects  
propagate through time

LNG "Delayed"

Producers will accelerate high  
cost domestic production, thereby  
lowering current period prices





**Glen E. Sweetnam**  
**Vice President & Principal**

**Phone: 713–590–2265**  
**[gsweetnam@lukensgroup.com](mailto:gsweetnam@lukensgroup.com)**

Lukens Energy Group is an independent management consulting company advising top management in the energy industry on issues of strategy, markets, regulation, valuation and risk

**[www.lukensgroup.com](http://www.lukensgroup.com)**