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A Primer for Avoiding Winter 2004-05 Natural Gas Price Risk

G&T's as well as distribution cooperatives must efficiently manage purchased power costs while effectively communicating to cooperative members the reasons behind price fluctuations that directly impact their monthly bills.

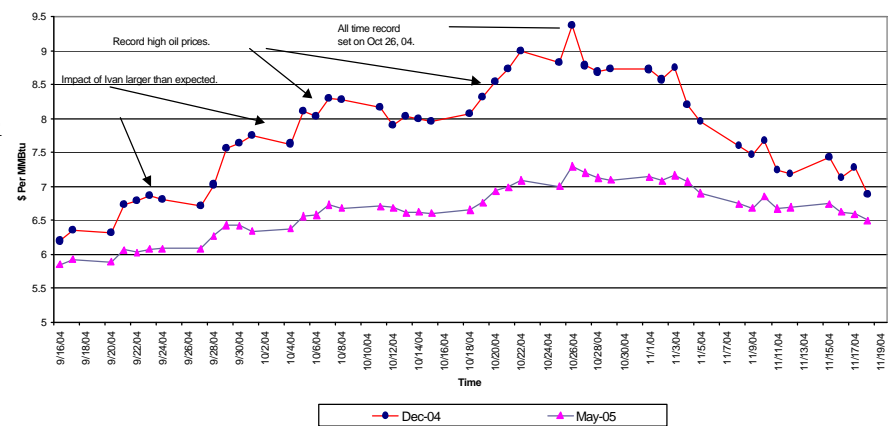
The Recent Natural Gas Market

Natural gas prices are major contributors to recent and projected power cost increases. Understanding the marketplace's volatility helps cooperatives communicate with members. Implementing effective hedging strategies helps cooperatives to mitigate fuel cost price swings in a volatile market.

The U.S. natural gas market has had a roller coaster ride over the last several months, first driven by the aftermath of Hurricane Ivan, then by historically high oil prices and finally speculation caused by uncertain winter weather and future oil prices. The market is volatile, but is it any more volatile now than in the past? If you only consider the percentage of price fluctuation around the mean price, the market is not more volatile. But is that really true?

At the onset of Hurricane Ivan in the second half of Sept., the New York Mercantile Exchange (NYMEX) Dec. '04 gas contract settled around \$6.50/MMBtu. In the wake of the more widespread and severe damage to the Gulf Coast production, the December contract price soared to about \$8.30/MMBtu. Further pushed by an

Chart 1 - Recent NYMEX Dec. '04 & May '05 Gas Contract Prices



all-time, high oil price, the market set a record, high natural gas price of \$9.36/MMBtu on Oct. 26. However, the weaker oil price and a historically high storage level reintroduced reality to the gas market, and the Dec. '04 contract shed nearly \$2.50/MMBtu in about three weeks - an almost 30 percent decline in value (see Chart 1). Chart 1 shows the recent paths of the selected NYMEX futures contracts.

A Comparison of Forecasting Techniques: Two Approaches

When it comes to forecasting natural gas prices, analysts fall into two methodological camps. One relies on fundamental market analysis; the other relies on technical market movements.

Each of these techniques can be a useful tool for large purchasers of natural gas such as G&T cooperatives trying to hold down gas prices. The analytical trick is knowing which is best.

When predicting gas prices, fundamentalists - guided by the principals of supply and demand - identify forecastable demand variables such as winter heating, summer cooling and industrial loads. These, in turn, are determined by weather and macroeconomic factors such as economic growth and oil prices. Supply factors are domestic production, including interruptions and new connections,

and foreign imports such as liquefied natural gas. An important market-moving variable is gas in underground storage that signals supply and demand balances.



To predict prices, fundamental analysis relies on econometric techniques to model market performance and statistics to interpret results.

Forecasted supply and demand factors add a time dimension and statistical probabilities weight results to enhance reliability of price forecasts. Fundamental analysis is especially valuable for identifying longer-term market trends and price movements well in advance of other market signals.

Technical analysis, without regard to causes, evaluates past pricing behavior to forecast future price movements. It assumes prior and current trading patterns reflect relevant information and market participants' reactions, which reveal market tendencies. The principles of supply and demand also underlie technical analysis, which focuses only on the results of market forces. A technician considers it intuitive that, when prices increase, demand exceeds supply.

Because they reveal pricing patterns, charts are technicians' tools. Prices trend, whether intra-day or longer-term, and technical analysis attempts to reveal the strength, duration and potential reversal of these trends. Traders' actions also reveal their judgments regarding support and liquidation levels, whether evaluating short-term or long-term market movements.

For purchasers of natural gas who try to minimize weighted average gas costs, both fundamental and technical analysis are useful tools. Sometimes one fits the price behavior better than the other. Identifying which describes the current market best is the challenge.

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A Comparison of Forecasting Techniques: Two Approaches

The ability to accurately forecast natural gas prices may depend on the techniques used.

Abstract: An Analysis of Market Power

Cooperatives should closely examine the competitiveness and efficiency of natural gas trading hubs cited in power contracts.

A Primer for Avoiding Winter 2003-04 Natural Gas Price Risk

Has the natural gas market become more volatile?

NRECA's Upcoming Seminar

GUERNSEY's Randy Nason and Brian McCulloch are set to present "Balancing the Need for Employee and Critical Infrastructure Protection" at TechAdvantage 2005 on Feb. 25 in San Diego, Calif.

Is this kind of price volatility unusual?

Recently, the market experienced tremendous volatility - more noteworthy, a big trend reversal. Has

the market become riskier? Not really. The price levels are higher, but the level of volatility is about the same. This kind of volatility is typical of the gas market in recent years. For example, from Sept. 15 through Nov. 15, the

standard deviation of the Henry Hub spot price was \$0.83, meaning 95 percent of the time gas prices were

See Price Risk on page 2.

Price Risk

cont. from page 1.

fluctuating in a range approximately \$1.70 above or below the period mean value \$6.14/MMBtu. Therefore, the percentage of the price fluctuation to average price (coefficient of variation) is about 13 percent. As a comparison, for the same period from last year, the standard deviation of the Henry Hub spot price is \$0.62. However, the mean value was lower as well at \$4.79/MMBtu. Again, the coefficient of variation is about 13 percent. However, during the same period last year, the oil prices were about \$10 to \$20 lower and hurricanes did not impact Gulf production. To summarize, gas prices are volatile.

What drives market prices?

As a commodity, the law of supply and demand governs natural gas price movements. These market fundamentals include factors such as weather, gas-in-storage and oil prices. However, market prices occasionally deviate from perceived fundamentals. Herding by investors and speculators alike is an observed phenomenon in commodity markets as well as the financial markets. Market dominance causing high prices during periods of market stress, which was a theme frequently mentioned anecdotally during the Enron era, may still be a problem in today's market.

Because of the influence of nonfundamental market pressures, many traders rely on technical analysis, especially to predict short-term market trends. By its nature, technical analysis overrides market fundamentals for many traders, taking uncertainties

regarding future fundamental values into account. This can excite the market and inflate gas prices with a risk premium.

The current state of long/medium term weather forecast technology, for example, is far from practical or even useful. It is now clear that hot-weather forecasts by forecasters prior to the past summer were wrong. Future oil price predictions and other fundamental values can cause additional volatility through risk premiums. In reality, the the natural gas market is volatile.

The rational functioning of the gas market

Despite market volatility the natural gas market functions well, and it is comforting to know it is still driven primarily by fundamentals.

Table 1 - Heating Season (November to March) Natural Gas Price with Selected Fundamentals

	Heating Season				
	2003-2004	2002-2003	2001-2002	2000-2001	1999-2000
Henry Hub Average Price	\$5.51	\$5.53	\$2.47	\$6.72	\$2.50
Highest Price of the Season	\$7.05	\$18.60	\$3.46	\$10.53	\$2.93
Month Highest Price Occurred	Early January	February	End of March	Early January	End of March
Storage Level (Season Begin)	3187	3145	3237	2744	3090
Storage Level (Season End)	1014	623	1491	738	1123
Drawdown	2173	2522	1746	2006	1967
Average Oil Prices	\$33.80	\$31.60	\$20.73	\$29.86	\$27.52

Going into this coming winter, the single most important fundamental is the level of gas in underground storage. The substantial decline of the NYMEX prices from October highs due to the historical level of gas in storage and declining oil prices attest to this. In addition, Table 1 shows that when storage levels are low, prices tend to be higher.

During the 2002-03 heating season, the average Henry Hub price for the period of November to March was \$5.53/MMBtu. However, at one point, the spot prices spiked to \$18.60/MMBtu. Even though the storage level was higher than the industry normal comfort level of 3,000 Bcf before the season started, a much colder winter translated into

much heavier drawdown from storage, and the ending gas in storage was only 623 Bcf. In comparison, high average prices during the season of 2000-01 were caused by a low level of gas in storage despite normal winter weather.

What will happen to gas prices this heating season?

We have already started the current heating season with a historically high level of gas in storage (3,327 Bcf) and the first drawdown week was only 6 Bcf. Based on the last five years' average consumption, we could end the heating season with a remaining level of gas in storage well above average, or 1,292 Bcf. If this happens, it will depress prices even before the end of the heating season.

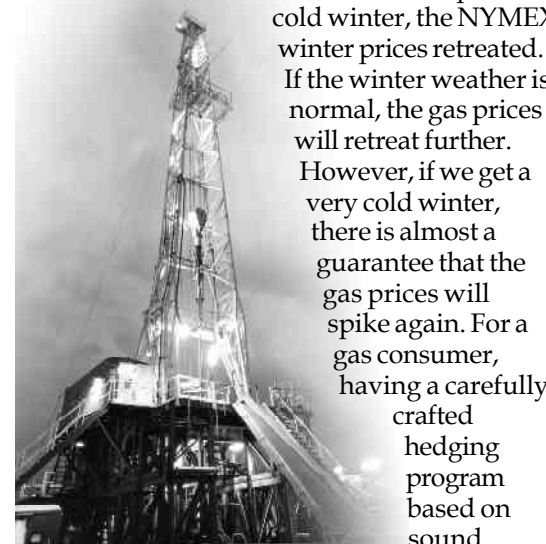
However, if we experience an especially cold winter, the historically high storage level at this point of heating season may not stave off a price spike. For example, the 2002-03 heating season consumed 2,522 Bcf of gas, reducing a

healthy pre-season storage level (3,145 Bcf) to an all-time low of 636 Bcf. Whether the market prices for the rest of the heating season will be stable or

not (aside from its normal winter seasonal shape) depends on the weather from November into early January. At this time, the weather forecast from National Weather Services calls for cooler-than-normal weather in the South and parts of the mid-Atlantic states. But for the Northeast and the entire midsection of the nation stretching from Minnesota to Texas, the National Oceanic and Atmospheric Administration repeated that "there are equal chances of above, below and normal temperatures" in December-February feeding the volatility of the natural gas market.

Diversification and Hedging Strategies

With a full storage, declining oil prices, Gulf production returning to normal and no clear threat of an exceptional cold winter, the NYMEX winter prices retreated. If the winter weather is normal, the gas prices will retreat further. However, if we get a very cold winter, there is almost a guarantee that the gas prices will spike again. For a gas consumer, having a carefully crafted hedging program based on sound



market analysis and portfolio management strategy certainly is a value-adding practice.


Depending on the requirements, because of the price volatility, diversification and hedging strategies fall into two broad categories that depend upon the operations and the objectives of the natural gas purchaser. One of these is the purchaser, such as a power generator, that needs to protect a margin on a power sale from price spikes. This is a classic hedge to protect the profit margin. The second is the purchaser that will flow costs through to customers, but is trying to reduce the customers' exposure to high prices. This is a desire to ensure against the effects of episodic high prices by trading-off prospects of low prices to reduce the risk of high prices. The unique needs of the purchaser set the requirements for this program.

The purchaser protecting the margin has only two alternatives. One is to match the purchase of physical supplies to the sale. That is, the generator can purchase future supplies for delivery to his plant to coincide with the sales contract. This requires coordinating future transport arrangements with suppliers. The second alternative is to use the NYMEX to purchase futures contracts with expiration dates that coincide

with sales contracts. This method, nevertheless, may leave the purchaser exposed to residual supply and transportation price variations linked to physical delivery points.

For the purchaser merely trying to reduce his customers' exposure to price spikes, diversification of supplies, or financial instruments that substitute for supplies, is the effective insurance. All risk-avoidance programs rely on diversification principles. Diversification policies can take

on a variety of dimensions, depending on the circumstances and even the risk-avoidance objective of the purchasers. Most commonly, one may plan to diversify supplies or financial contracts simply by laddering their acquisition over time. This method simply averages prices over time avoiding the highest highs and trading-off the lowest lows.

With average natural gas prices at historically high levels, even the usual price volatility produces large price swings. However, the tools for avoiding the most significant impacts of price volatility remain the same. The natural gas purchaser can tailor his hedging and/or diversification of natural gas supplies to his unique situation and mitigate unacceptable market price volatility. 

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*"...gas market...
a roller coaster
ride..."*

Abstract: An Analysis of Market Power

The significance of efficient natural gas markets extends well beyond the boundaries of the natural gas market. Natural gas fired generation is the marginal source of power in many regions of the U.S. and long-term power contracts often specify the indexed price of gas at a specified heat rate as the price determinant. It is important for G&T electric cooperatives to closely examine the competitiveness and efficiency of

trading hubs cited in power contracts. Developments in the physical natural gas market focus interest on market efficiency of the various trading hubs. Deregulation of the natural gas market increased the dependence upon and the importance of maintaining efficient trading hubs. Due to power contracts' reliance upon published index prices at specific trading hubs to determine

cost of power, understanding the distinctly different market characteristics of the individual trading hubs is imperative. Some trading hubs are more competitive, some hubs possess market power on the buyer side and some on the seller's side. All adjust accordingly to the NYMEX, but they adjust at varying speeds and various measures of market efficiency. Finally, market characteristics of the trading hubs

change over time. For persons who rely on effective, functioning natural gas markets, such as policymakers, participants and energy consumers, effective competition at a trading hub is a significant precondition.

To obtain a working copy of "An Empirical Analysis of Market Power in the U.S. Natural Gas Market" or for questions contact Don Murry, Ph.D. at don.murry@chguernsey.com or Zhen Zhu, Ph.D. at zhen.zhu@chguernsey.com. 