

**THE ROLE OF SUPPLY, DEMAND  
AND FINANCIAL COMMODITY MARKETS  
IN THE NATURAL GAS PRICE SPIRAL**

**Prepared for**

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# EXECUTIVE SUMMARY

## BACKGROUND CONTEXT OF THE STUDY

This report examines the factors underlying the recent upward spiral of natural gas prices. It paints a very different picture than the one we frequently see on television, read in the press or hear in testimony at legislative or regulatory proceedings. The easiest way for all parties to avoid responsibility is to blame tightness in the physical market and invoke Mother Nature – the weather and geology:

- Demand is soaring or skyrocketing.
- Supply is constrained by nature and public policy.
- Financial markets send efficient price signals to balance supply and demand.

This is a simple story, which is often repeated because it is easy to sell; **unfortunately, it is, at best, half true.**

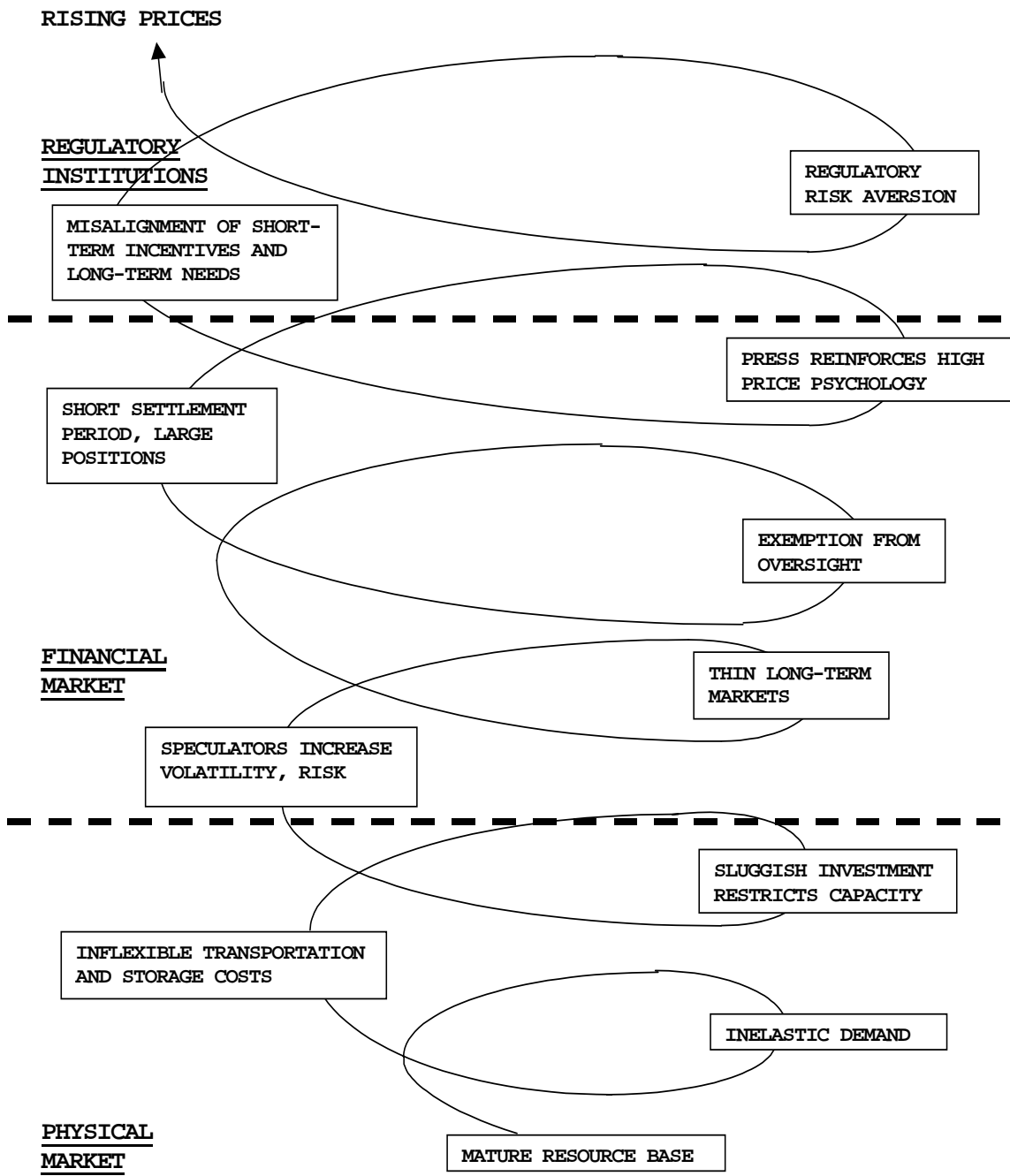
The reality is much more complex (see Exhibit ES-1). Many factors in natural gas physical and financial markets have interacted in an upward spiral to raise natural gas prices to far higher levels than they should be. Although the simple explanation/excuse is easy to tell, the more complex story is just too important not to tell. The frenetic, upward spiral of natural gas prices deeply affects household budgets and economic activity. Consider the following:

- The wellhead price of natural gas in the six-year period of 2000-2005 increased by over **\$400 billion dollars** compared to the previous six years.
- Winter heating bills in the Midwest this winter are projected to be up by **\$250 per household**, or 28 percent, compared to last winter, despite a 5 percent decline in consumption. They are up by over **\$600** compared to five years ago.

If we do not look behind the half-truth, half-hype smokescreen of the headlines, consumers will continue to pay a lot more for natural gas than they should. The public discussion must be expanded to include the other factors that have been powering the upward ratchet of natural gas prices since the start of the 21<sup>st</sup> century. We must do this not simply because high prices are harmful, but also because specific policy mistakes made in the past have helped to cause the current problems. There are policy measures that can and should be taken in the future to reduce the upward spiral.

Beyond the staggering sums at stake, two fundamental observations provide the background for this analysis:

**EXHIBIT ES-1: CAUSES OF SPIRALING NATURAL GAS PRICES**



First, the widespread reliance on natural gas commodity markets to set the price paid by consumers is an extremely recent phenomenon, just over 15 years old. As evidenced by the wild, irrational swings in natural gas prices, these new markets have not worked very well. They are deemed to be ‘inefficient’ in technical academic studies and have a history of manipulation, abuse and misreporting.

Second, natural gas has supply and demand characteristics that make it vulnerable to abuse and volatility, yet the markets in which wholesale natural gas prices are set are less regulated than many other commodity markets. Many in the industry believe these markets lack transparency and are vulnerable to abuse and manipulation. Regulators have failed to lay these concerns to rest because the vast majority of gas trading is subject to little monitoring or oversight. While regulators and policymakers have been scrambling to reform the market rules for this commodity, they have yet to impose comprehensive oversight and accountability.

Physical market fundamentals – a tight supply/demand balance – are not adequate to explain either the short-term or long-term behavior of natural gas prices. This does not mean that tight markets do not matter – of course they do – but identifying physical market fundamentals is only the beginning of the story, not the end.

- Tight markets reflect public policies and strategic behaviors, not just Mother Nature. To the extent that Mother Nature is a wild card, policymakers can and should create systems that are less vulnerable and better able to mitigate the impact of supply shocks.
- Natural gas commodity markets have exhibited erratic behavior and a massive increase in trading that contributes to both volatility and the upward trend in prices. The rules can be changed to moderate these effects.
- The incentive structures and distribution of bargaining power in the physical and financial markets for natural gas are unnecessarily tilted against the consumer. Public policy can and should ensure a better balance.

When we look for answers, we end up in Washington, D.C., where jurisdiction over the interstate natural gas system at issue resides. All of the major determinants of the wildly fluctuating price of natural gas in recent years – the physical (wellhead and pipeline) markets and the financial commodity markets – are under federal authority, but policy makers have failed to take the steps necessary to protect the public.

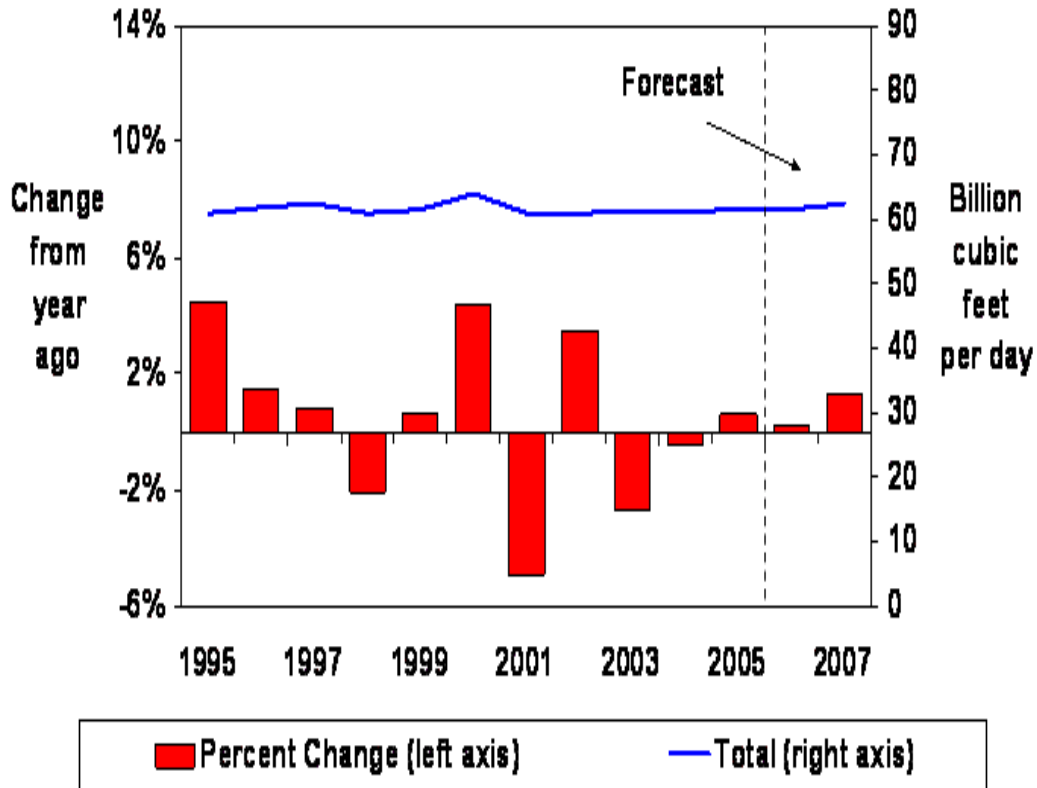
## **PHYSICAL MARKET FUNDAMENTALS**

The long-term fundamentals of supply and demand do not support the current high price of gas.

- Demand has **not** been “surging,” “soaring” or “skyrocketing,” as is frequently reported in the press (see Exhibit ES-2). Over the past ten years it has been relatively flat, with a slight moderation of the winter peak. Over the past three years, it has declined slightly.

## EXHIBIT ES-2: NATURAL GAS DEMAND: 1995-2005

Figure 12. Total U.S. Natural Gas Demand Growth



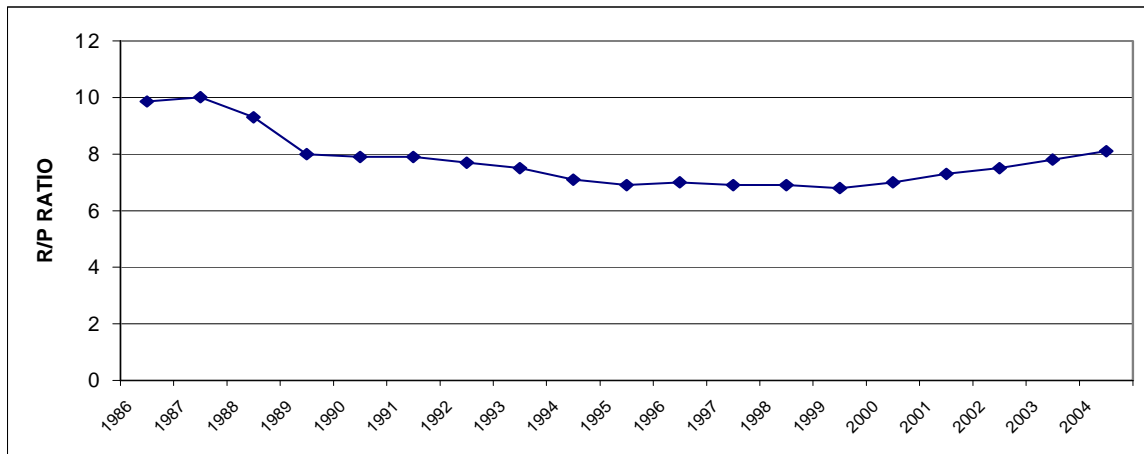
Short-Term Energy Outlook, January 2006



- Although supply reserves were drawn down in the late 1980s and 1990s and have become harder to find, in recent years reserve additions have been growing (see Exhibit ES-3). The reserve-to-production ratio has been increasing for the past six years.
- The long run cost of producing gas (even when using the high-end estimate of such cost) is far below the current price being paid.

Short-term conditions of supply and demand also do not support the current high price of gas:

**EXHIBIT ES-3: NATURAL GAS RESERVE TO PRODUCTION RATIO**

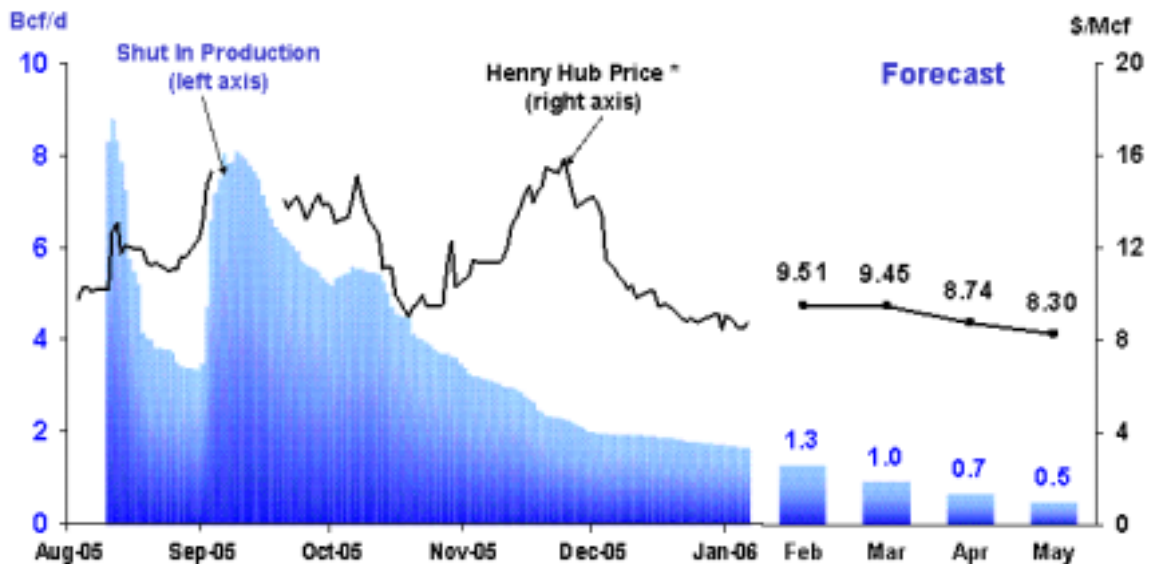


Source: Energy Information Administration, database.

- Notwithstanding the effects of recent hurricanes, supply and demand are now about where they were last year or two years ago (both down a little, with demand down more than supply) (see Exhibit ES-4).

**EXHIBIT ES-4: HURRICANES AND PRICES**

Figure 5. Shut-In Federal Offshore Gulf Natural Gas Production



\* Trading on Henry Hub suspended from 9/23 – 10/6

Bcf/d = Billion cubic feet per day, \$/Mcf = Dollars per thousand cubic feet

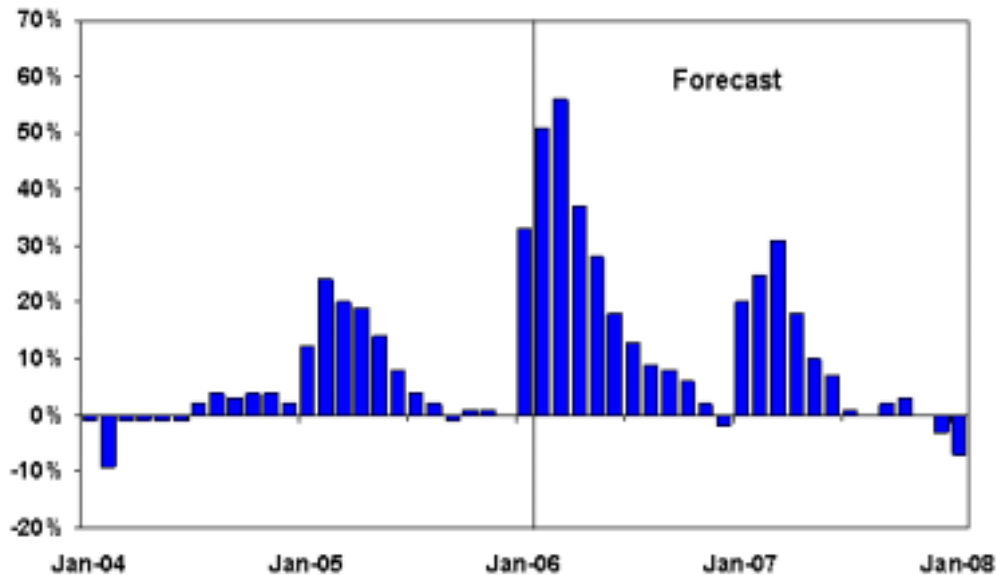
Short-Term Energy Outlook, February 2006



- Gas in storage is at or near record levels for this time of year, up over 50 percent compared to the last couple of years (see Exhibit ES-5).

**EXHIBIT ES-5: DRAMATIC INCREASE IN STORAGE**

Figure 12. U.S. Working Natural Gas in Storage  
(Percent Differences from Previous 5-Year Average)



Short-Term Energy Outlook, February 2006

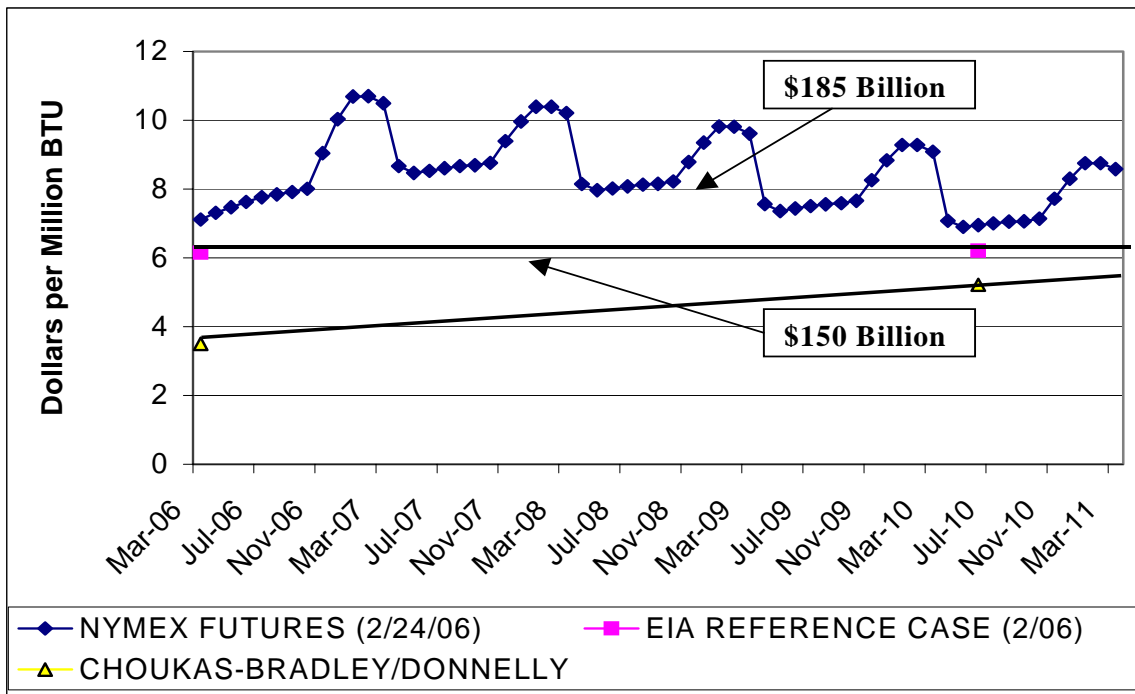


- Traditional supply and demand analysis would suggest that prices should be similar, or even a little lower than they were over the past two years, yet prices are running about \$3.00 higher, up over **60 percent** at the wellhead and in the spot market.
- Future prices are even higher still, running about 40 percent above current prices. They are about twice as high as the estimated long run costs of production.

Assurances that things will settle down three or four years in the future are cold comfort. A \$3.00 price difference costs consumers about **\$5 billion per month**. The massive increases in cash flow enjoyed by the industry in recent years have not been used to expand supply. Sluggish investment keeps supplies tight.

Exhibit ES-6 captures the essence of this concern by contrasting the February 2006 Energy Information Administration (EIA) natural gas projected prices (really production costs) with the futures prices for the next five years, at the settlement of the March 2006 contract

**EXHIBIT ES-6: PRODUCTION COSTS VS. SPOT PRICES  
(Nominal Dollars)**



Sources: NYMEX, 2/24 March 2006 settlement and Futures prices. Energy Information Administration, *Annual Energy Outlook: 200*, p. 155 for gas prices; p. 161 for price indices.

(February 24, 2006). Should the future prices become reality, there is a huge gap between those NYMEX prices and the underlying resource costs of about \$185 billion dollars over the five-year period. The stakes are just too high for policymakers to scratch their heads and say, we'll see. The EIA's projection of costs is actually well above other estimates. Thus, the stakes are in the hundreds of billions of dollars.

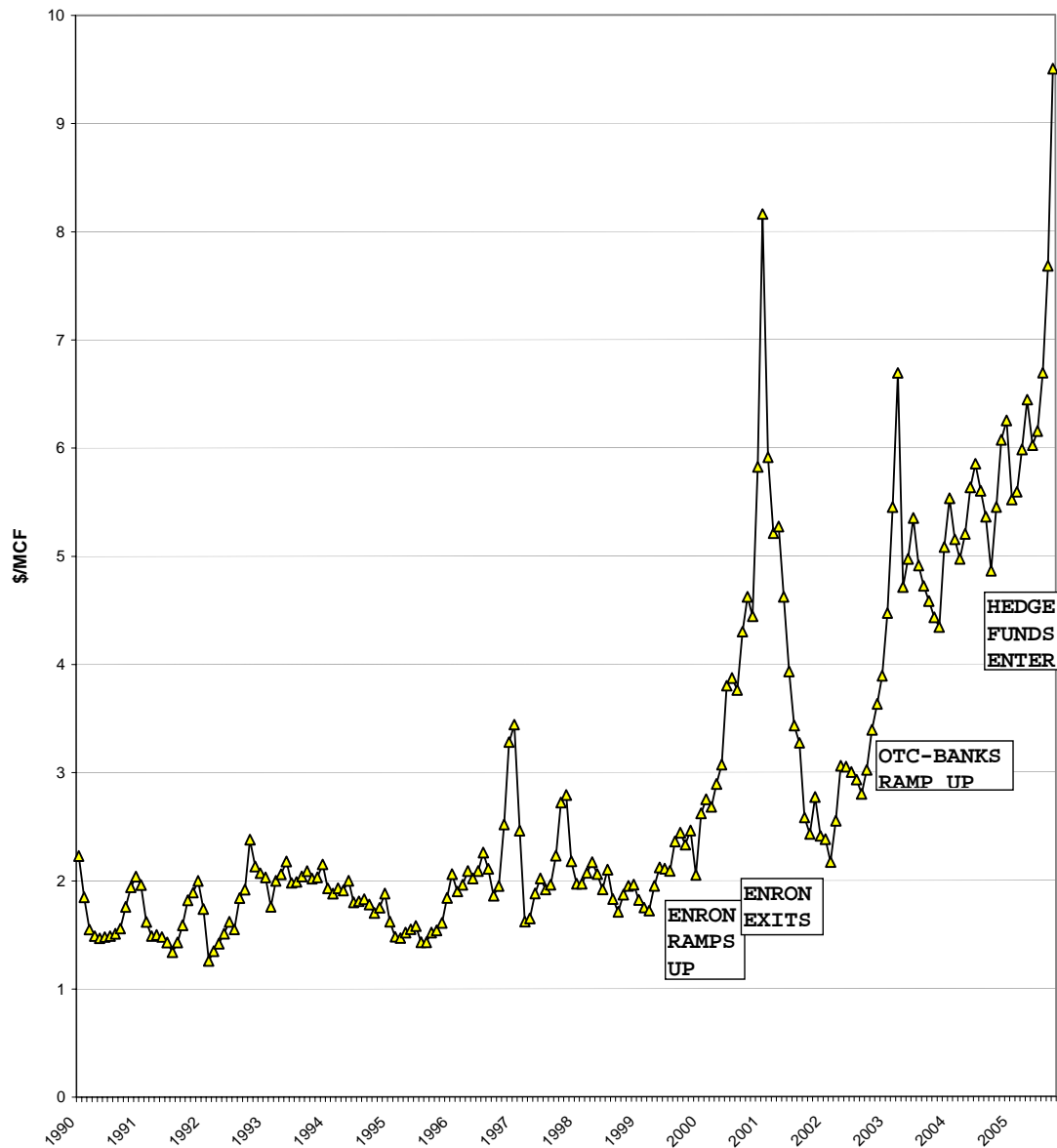
**FINANCIAL MARKETS COMPOUND THE PROBLEM**

There is a striking correlation between large increases in trading and increases in the volatility and level of natural gas prices (see Exhibit ES-7). Each time trading ramps up, prices ramp up as well. There seems to be a roller coaster and a ratchet. Prices rise rapidly, then decline, but eventually come to rest at a steadily higher base price.

Natural gas trading takes place in unregulated, over-the-counter (OTC) markets and lightly regulated exchanges, like the New York Mercantile Exchange (NYMEX). The physical commodity is traded in some cases – cash transaction – but financial instruments called derivatives that do not involve the transfer of actual ownership of the underlying commodity have become very prominent. There are concerns about both the OTC and the NYMEX.



## EXHIBIT ES-7: WELLHEAD PRICES AND CHANGES IN TRADING ACTIVITY



Source: Energy Information Administration, *Natural Gas Database*.

There are several ways in which financial markets may be magnifying the upwardly volatile spiral of prices and contribute to the ratchet:

- Financial markets thrive on volatility and volume, but volatility and volume have costs. Producers of gas demand to be paid a higher premium to bring their gas to market sooner rather than later. Traders demand to be rewarded for the risks they incur, risks that are increased by the trading process itself.
- The influx of traders fuels volatility and raises concerns about abusive or manipulative trading practices.

Econometric analyses of the natural gas markets in recent years raise important questions as to how well the natural gas markets work. Given the uncertainty about the functioning of these markets, the claim that the market price is always “right” because it is the market price should be questioned:

- The economic analysis does not support the claim that these markets operate efficiently to establish prices.
- Risk premiums, which raise the price substantially (10 to 20 percent), are high and rising.
- Prices are well above the underlying costs of production.

The operation of financial markets is no accident. Trading reflects the rules that are established – by law and through self-organization. The most troubling aspect of natural gas trading is that policymakers really cannot decipher what goes on:

- The majority of transactions take place in markets that are largely unregulated.
- These over-the-counter markets, reported in unaudited, unregulated indices, are a major factor in setting the price of natural gas. And these unaudited, unregulated markets have behaved very poorly in recent years, with numerous instances of misreporting of prices.

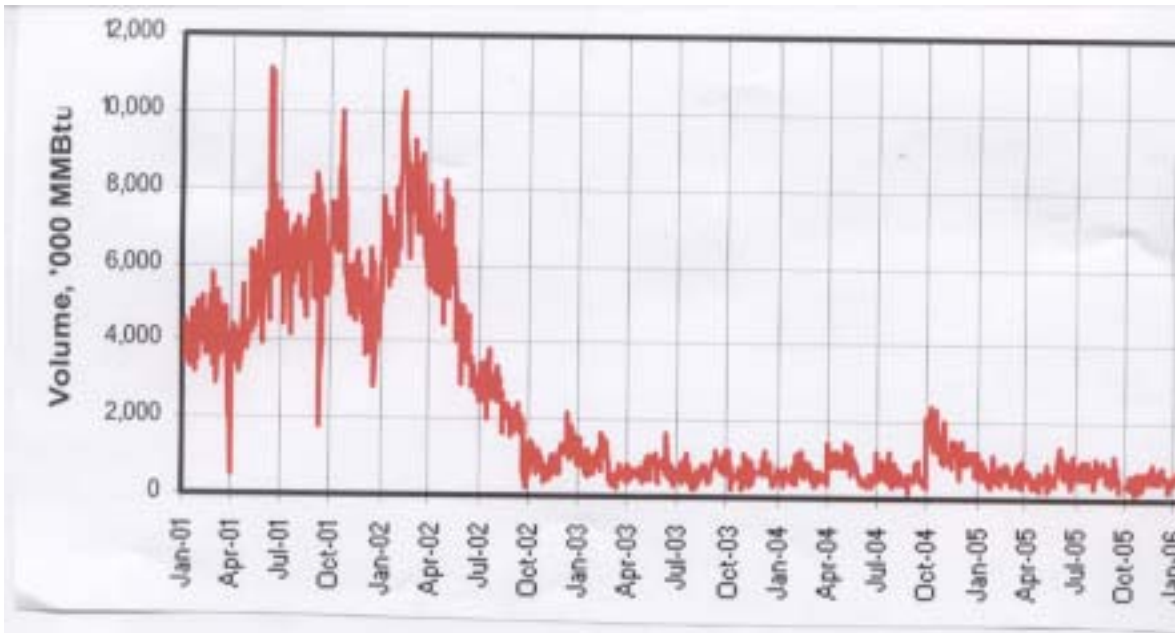
Even where there is light-handed regulation, the rules are inadequate to protect the public:

- A small number of large players can influence the price that consumers pay in a very short period of time and under circumstances that place the consumer at risk.
- Index prices are often based on a small number of self-reported transactions and there are no mechanisms for determining if such transactions represent an accurate sampling of the natural gas market. When even the hint of accountability was imposed by merely being asked to certify the veracity of reported transactions, traders stopped reporting (see Exhibit ES-8). The Exhibit below shows dramatically this phenomenon. The actual volume of trading did not dry up. Only the reporting of the volume did.

Thus, while some may be satisfied with recent market reforms and enforcement efforts, many others are not. The natural gas market lacks the most basic elements of transparency that are necessary to send proper price signals.

- The sad irony is that the markets for natural gas (a commodity which is a vital necessity for many Americans) are subject to far less regulation than most other commodities, most of which are far less crucial to consumers’ everyday lives. Most people can live without pork bellies, soybeans or orange juice; but they cannot live without natural gas for heating.

## EXHIBIT ES-8: GAS DAILY HENRY HUB REPORTED VOLUME



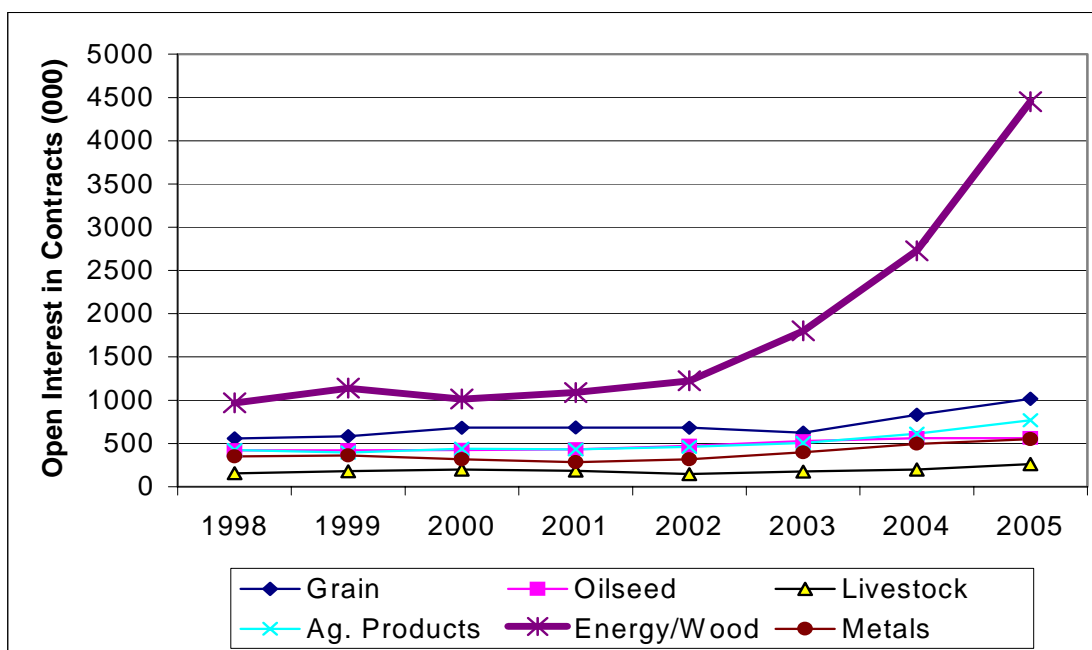
Source: Gas Daily.

Looking at the level of activity in the energy exchanges makes it hard to think that energy is just another ordinary commodity. The massive influx of traders and hedge funds has pumped up trading to astronomical levels. Exhibit ES-9 shows just the increase in the average number of open contracts (i.e. contracts entered into but not yet liquidated by an offsetting trade or physical delivery) at the end of the month over the past eight years. The remarkable growth in energy trading compared to other physical commodities is striking. Even this picture underestimates the increase in energy trading. The dollar value of these trades has increased much faster than the other commodities and off-exchange swaps for the agricultural commodities **are restricted and much less common** except in a very limited number of circumstances. In contrast, unregulated trading plays a very prominent role in natural gas markets.

### PUBLIC POLICY

While the story is complex, the bottom line is relatively simple. Things do not have to be this bad and the steps necessary to improve the situation do not involve the usual prescription about biting the bullet until the supply-side comes around. More can and should be done.

**EXHIBIT ES-9: COMMODITY TRADING OF NON-FINANCIAL INSTRUMENTS  
(Average Monthend Open Interest)**



Source: Commodity Future Trading Commission, Annual Reports: Futures Statistics by Major Commodity Group.

**Over-the-Counter market:** Unlike bankers and brokers in organized markets, traders in the over-the-counter market do not have to register or demonstrate their competence or good character. They do not have to report their holdings or positions. They can buy and sell this vital commodity/necessity with little capital or collateral to back up their promises. These markets need better oversight:

- Increased scrutiny could be achieved by requiring that traders in all the natural gas markets register and report their transaction and positions. Traders should be competent and not have a history of abusive trading.
- Natural gas traders should have the resources to meet their commitments and stand behind their trades, as bankers are required to do.
- Regulators should be able to see all markets so they can detect efforts to manipulate or exploit any individual market, including large transactions and large positions.

**Exchanges:** Even in organized exchanges where natural gas traders have to register, report and show financial and managerial competence, the rules are too lax. Market rules should discourage unproductive trading and be particularly on guard at moments of vulnerability in the natural gas markets:

- This can be accomplished by establishing reasonable limits on positions and ensuring that settlement periods are liquid and long.
- Vigorous oversight and stiff punishment of manipulation and abuse should be meted out swiftly.

Because state policy deals with local distribution utilities, it is difficult to drive change in the system from the buying end, where the primary concern is to make sure consumers have adequate gas to heat their homes. Nevertheless, there are certain measures that state governments can take to address the market concerns:

- States can create pressure for trading reforms by requiring their utilities to deal only with traders who are subject to oversight and who register, report and are audited.
- Mechanisms to promote long-term stability of commitments, transportation, storage and supply should be explored.
- States can also encourage utilities to be more aggressive in holding costs down, but the challenge is to find approaches that do so without exposing consumers to excessive risk.

The position of the major oil companies with large holdings of natural gas physical assets, dominance of natural gas marketing, and active involvement in natural gas financial markets poses a serious threat to consumers. Inadequate investment in exploration over the course of a decade or more contributed to the tight supply conditions. The massive windfall of cash flow in recent years dulls the incentive for the majors to supply gas to the market. They can keep it in the ground and hold out for higher prices. They are under no pressure to sign long-term contracts, except at extremely high prices. As major marketers and traders, they can move markets.

The fact that the majors straddle these markets, several of which are lightly regulated or entirely unregulated, compounds the problem, because their ability to profit by taking contrary positions in various markets is hidden from regulators. Policymakers must have the information necessary to make informed judgments about whether the major oil companies are exercising market power strategically in the long-term, and unfairly exploiting the tight markets they have helped to create in the short term.

A joint task force of federal and state antitrust and regulatory authorities should be formed to examine:

- the regional concentration of natural gas supplies;
- the behavior of the majors as marketers;
- behaviors of the major oil companies across all of the markets in which they are involved in physical as marketers, over-the-counter and in exchanges as traders.