

## **Managing Energy Price Risk to Benefit the Ratepayer**

By Arthur Gelber and Charlie Sanchez

### Foreword

Much attention has recently been paid by natural gas utilities to the concepts of energy price risk management with the advent of historically high natural gas prices in the winter and spring of 2000-2001. Public utility commissions created working groups comprised of commission staffers, energy consumers, consumer advocacy groups, representatives of local distribution companies and other stakeholders to bring together all the appropriate parties to discuss their collective challenges. Generally speaking these working groups were unanimous in their agreement on the need for adopting more sophisticated approaches to price risk management, changes in PGA (purchased gas adjustments) and similar mechanisms and the introduction of some incentive structures to align the interests of the utility and the ratepayer. In response to these working groups, regulators in many cases have provided broad license to local distribution companies for the implementation of procurement strategies and tactics that would survive the scrutiny of commission review. Regulators as a whole recognized the need for greater price stability and for the use of risk management techniques as a means of securing reliable supplies at attractive prices when compared to historical practices.

In this paper, we will discuss the evolving fundamentals in the natural gas industry and their impact on prices and volatility. We will further identify prevalent industry practices for natural gas procurement and price risk management and compare those to more structured and sophisticated approaches and the results that would ultimately benefit ratepayers. Given the new environment of higher volatility and prices in which we find ourselves, we believe now is the appropriate time for local distribution companies to adopt an Integrated Procurement and Price Management Approach for natural gas.

### Evolving Natural Gas Fundamentals Are Yielding Higher Prices and More Volatility

Natural gas has been promoted by many in the energy industry as the ultimate fuel for our energy dependent nation. It burns cleaner than coal or fuel oil, it is less controversial than nuclear energy and it is a readily available natural resource throughout many parts of North America and offshore waters. Demand for natural gas has increased substantially over the past decade, from 18.72 Tcf in 1990 to 22.71 Tcf for 2000<sup>1</sup>. With this increase in demand has come increased price volatility as natural gas has become a truly deregulated commodity. This increased volatility can be attributed not only to deregulation and the long-term increased demand for natural gas, but perhaps more acutely the impact of anomalous weather conditions, the increase in gas-fired power generation and increased price sensitivity to natural gas storage trends. These changes are indicative of longer-term trends, and represent substantive changes in fundamentals. We discuss our findings and observations in greater depth below.

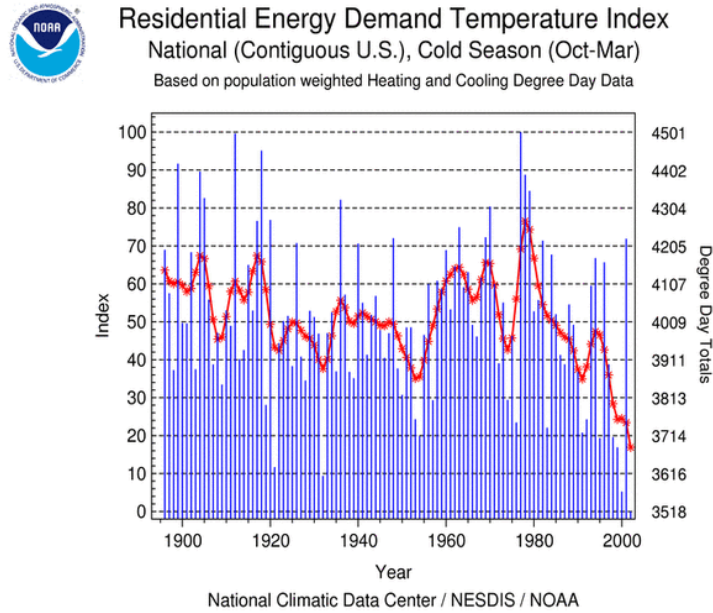
*Weather* – anomalous weather patterns have made themselves evident over the past twenty years. In basic terms, the winters have generally become milder (see figure 1) and the summers have become hotter (see figure 2). The reasons for this trend are unclear, but what is certain is that the lower 48 states are in the midst of a broad climactic shift towards warmer temperatures.

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<sup>1</sup> Source: Energy Information Administration website.

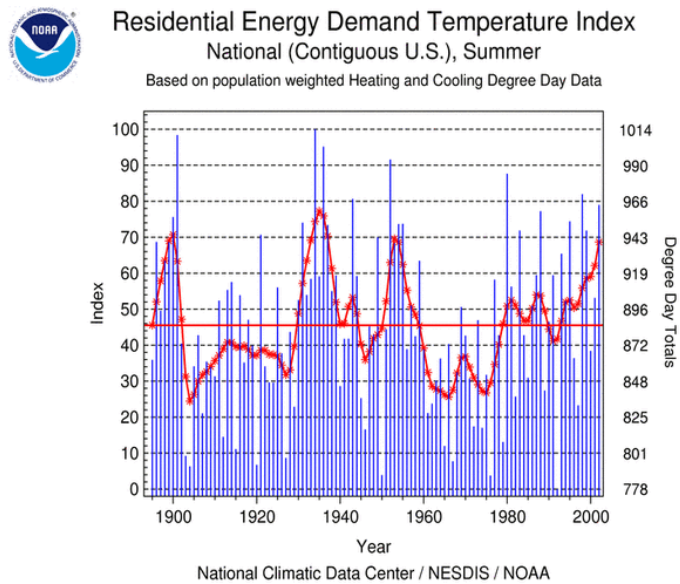
**Figure 1**

**National Climatic Center – Residential Energy Demand Index – Cold Season**



**Figure 2**

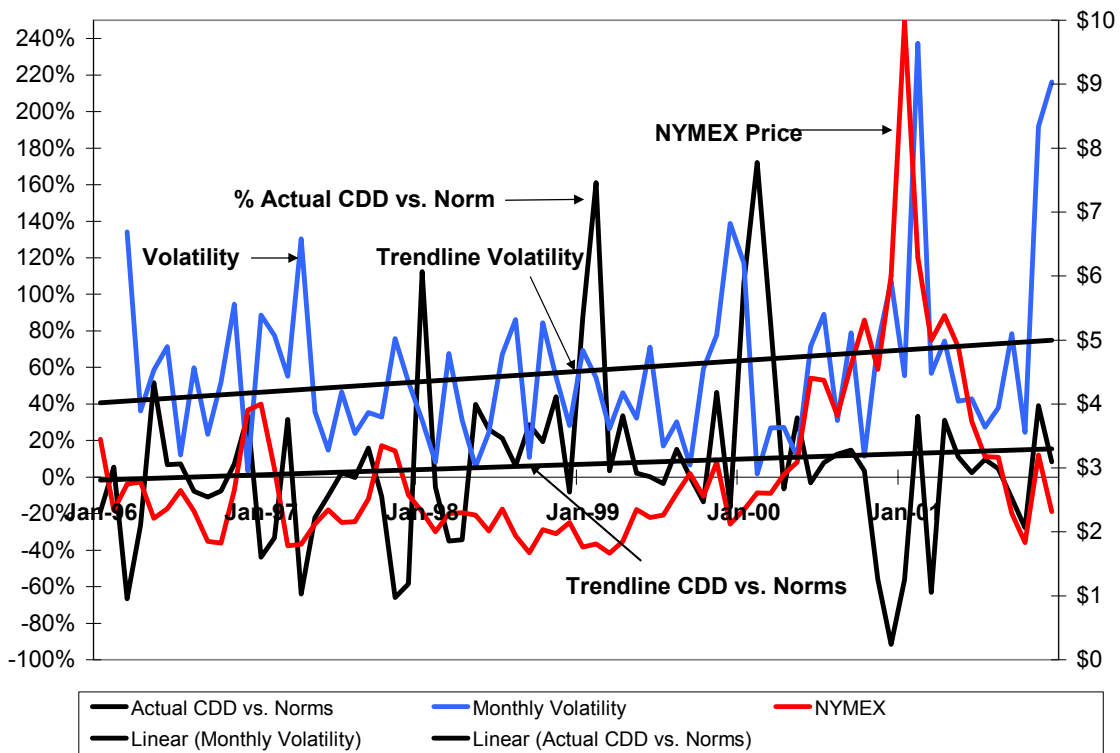
**National Climatic Center – Residential Energy Demand Index – Summer**



With increased gas-fired electricity generation both in terms of base and peak load and expectations for further increase from 16% of load in 2000 to 32% by 2020<sup>2</sup>, the hotter summers are contributed increasingly to the volatility of natural gas. Figure 3 reflects the volatility of natural gas over a 1996-2001 time frame per NYMEX prices in comparison to the percentage difference in actual cooling degree days vs. the norm. As you can see, the trends are upward both in terms of the cooling degree days and the volatility of natural gas prices during that time frame.

**Figure 3**

**Monthly Volatility and % Variance of Actual Cooling Degree Days to Norms  
1996-2001**



**Natural Gas Storage**

With this shift in mind, we expect that changes are occurring in the nature of natural gas demand due to weather. Specifically, with increased electricity gas-fired generation both in terms of base and peak load and expectations for further increases (from 16% of

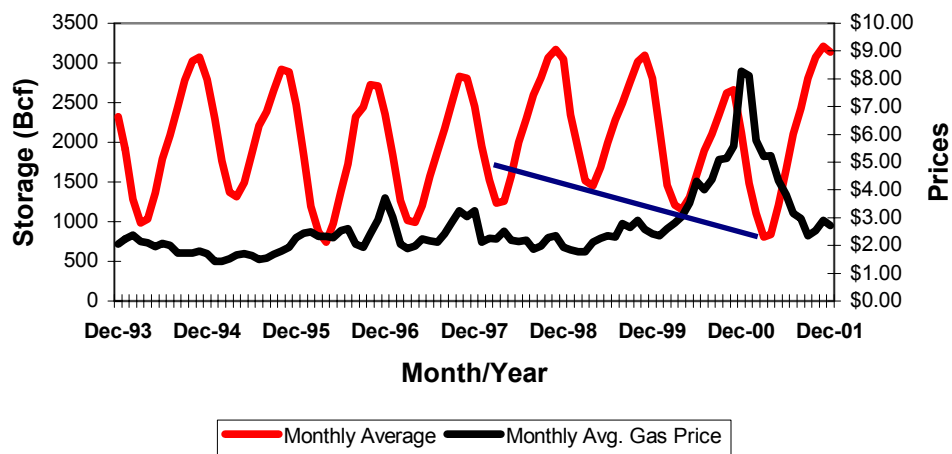
<sup>2</sup> Source: Energy Information Administration

load in 2000 to 32% by 2020<sup>3</sup>), the hotter summers are contributing more and more to the need for natural gas during the peak summer months. Figure 4 shows monthly natural gas storage vs futures prices. The blue line in figure 3 shows a trend in the depletion of natural gas storage during the summer months since 1998. Prices are observed to have increased gradually throughout the observed trend.

**Figure 4**

**Graph of Storage since 1994**

**Natural Gas Storage and Prices**

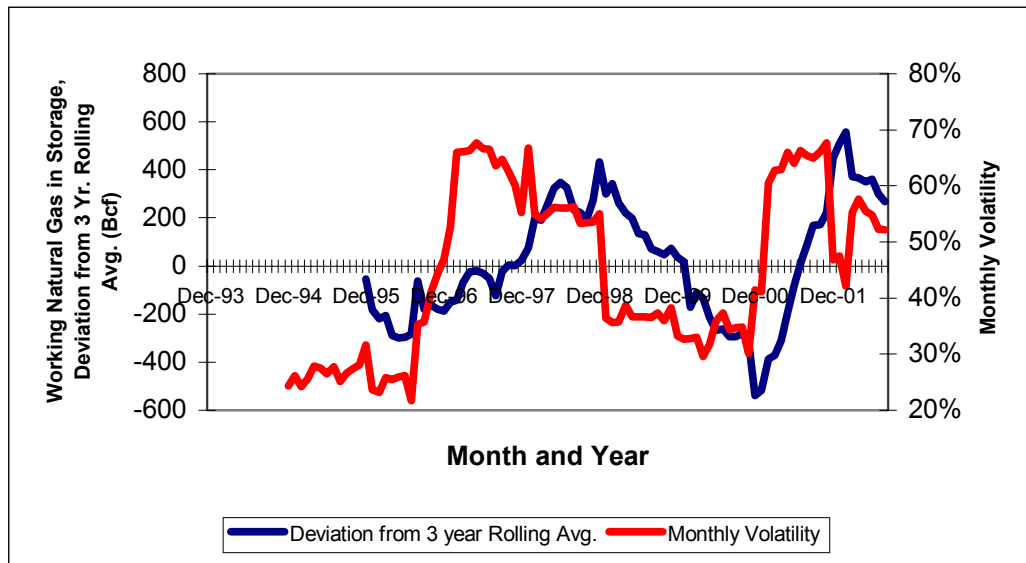


The deviation of storage from normal levels is also contributing to the volatility of natural gas. The graph below (figure 5) shows two salient trends in the natural gas market. The zero line of the left X-axis represents a 3-yr rolling average of natural gas storage. The blue line is a representation of actual deviations from that rolling average. In other words, we are observing growth and shrinkage of storage as it deviates from a chosen norm. It has proven here to have an approximate 2-year swing from negative to positive, until the year 2000.

The red line is a depiction of the volatility swings that have occurred in unison with these shifts in overall storage. The most obvious trend in volatility patterns is seen in the sharp increases and decreases that resulted from the peak divergences, which have caused volatility to turn abruptly and to dip sharply in the expected direction, up when storage is extremely low and down when storage is at its highs. Thus it can be said that the shifting of storage above and below this rolling average does appear to impact the behavioral patterns of natural gas pricing, both in terms of the absolute level of the price and in terms of the volatility that is seen when we reach the peak divergences.

<sup>3</sup> Source: Energy Information Administration

Figure 5



In 2000, the periodicity of the storage cycle declined to a one year phenomenon, observed in the comparison of the peak low from December of 2000 and the peak high in December of 2001. If the trend were to have continued at this pace, we would currently have levels well below the baseline, but instead, current levels remain above the baseline by about 200 Bcf. This would indicate that the trend is returning to its normal two-year cycle and that behavior seen during the 2000-2001 time frame was anomalous, perhaps because of the anomalous price environment.

Our forecast for storage levels shows a continued move towards more normal levels after we move through the 2002-2003 winter. Compared to an overall average level of 1 Tcf, we are expecting to have a 1.3 Tcf composite storage inventory at the end of this winter. Volatility dropped sharply after storage peaked out in 2001 and has oscillated back up incrementally, but we expect it to continue downwards as high to normal levels of gas storage remain intact. This should continue well into the 2003 calendar year with the potential for the rates of injection to begin to decline later in the year, adding upward volatility pressure and probable upward price pressure.

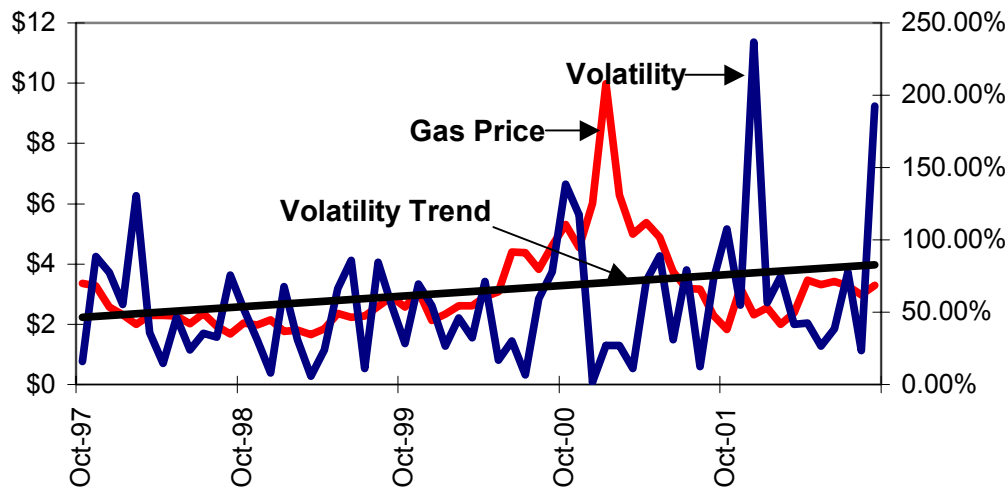
The actual volatility of monthly natural gas prices has nearly doubled over the past five years from 40% to over 75% (see Figure 6). The increased volatility of natural gas, particularly if such volatility coincides with a higher price environment, is particularly punishing for residential and smaller commercial ratepayers. Ratepayers have no options for switching fuels, have limited efficiency opportunities and therefore must suffer through price gyrations and the higher prices that usually occur during periods of highest need and market demand, creating enormous economic ripples throughout the US economy. Price spikes such as those experienced during the late-2000 to mid-2001 time frame resulted in the typical heating season bill for a home in the state of Missouri rising from \$368 in '99/'00 to \$598 for in '00/'01, an increase of 63%. To put this into perspective, the dollar difference for that period is equivalent to nearly two-thirds of a month's grocery bill for the average American family<sup>4</sup>. Clearly with increasing volatility

<sup>4</sup> Source: The Food Marketing Institute

and prices, we will face this challenge again and the need to implement workable solutions is immediate before irreparable damage takes place for million of American ratepayers.

Figure 6

### Natural Gas Prices and Volatility



#### Traditional Risk Management and Procurement Practices

Historically, local distribution companies (LDCs) have been reluctant to utilize 'robust' financial risk management techniques to manage prices and volatility. Similarly, purchasing physical natural gas through fixed price forward contract mechanisms has been less than popular. The point is discussed in a paper by Ken Costello of the NRRI titled Regulatory Questions on Hedging: The Case of Natural Gas. This is due primarily to the vague 'prudency' requirements of public utilities commissions and similar rulemaking bodies. Historically, as interpreted by public utility commissions, prudency was established as procurement of natural gas under terms and prices that seemed to be in the ratepayers' best interest at the time of the purchase. Given the mandate of and the scrutiny applied by public utilities commissions, the 'default' protocol of most LDCs was to purchase under very short-term or 'market' pricing mechanisms (Index) embedded in longer-term physical supply agreements. This practice secured availability of supply for the ratepayers but left prices floating with specific benchmarks based typically on local pooling or delivery points.

Recently Gelber & Associates conducted a survey of (LDCs) from across the United States. The intent of the survey was essentially twofold. First, to establish the basic physical gas procurement practices utilized by LDCs and second, to establish to what extent risk management strategies and tactics were implemented by those LDCs. The

survey solicited a certain degree of detail with respect to the nature of physical procurement, such as timing of purchases, duration of forward contracts and the extent of any such forward purchasing practices. Additionally, the survey solicited details related to they types of tools used and the techniques employed for using those tools. Included in a typical supply portfolio were physical forwards, financial swaps, NYMEX futures contracts, the purchase and sale of call options and put options and combinations of options such as collars.

The results of the survey highlighted the fact that there is currently no consistent theme in gas procurement practices and associated risk management strategies of the surveyed LDCs. Some LDCs attempted to protect themselves from extreme price spikes (similar to those seen in the winter of 2000/2001) by purchasing call options. Others attempted to reduce their exposure to monthly volatility by locking in forward fixed prices, utilizing NYMEX contracts or contracting directly with their gas supplier. There was no consistency in the timing of fixed price purchases or the term of the forward/fixed price contracts. The percentage of total supply needs purchased on a forward priced basis varied from a low of 10% to a high of 75%. The one common thread in their procurement strategy was that LDCs were no longer purchasing 100% of their supply needs tied to monthly index pricing.

#### Alternative Risk Management Strategies Will Benefit Ratepayers

Ratepayer expectations became more clear during the 2000-2001 price spike. Based on the considerable number of inquiries and complaints received by the state regulatory bodies, ratepayers are demanding insulation from potential price spikes. Consumers expect lawmakers to provide LDC's with the leeway and the means to provide such protection to the extent it is done in a prudent manner. Regulators to some extent have reacted to this call from ratepayers and provided some limited guidance to the LDC's to incorporate price hedging strategies and their related costs in the PGA and similar mechanisms already built into their tariff structures.

In terms of illustration, the staffs of the public utility commissions in Colorado, West Virginia, Missouri, Maryland and Ohio just to name a few, have recommended utilities incorporate hedging and risk management techniques through some combination of financial and fixed price supply contracts. The staffs go further in stating that the utility commissions provide some guidance to the individual LDC's in terms of defining the prudence of price risk mitigation. This guidance has been spotty around the nation. We attribute this to the rapid retreat of gas spot prices in the summer of 2001 and the maintenance of reasonable prices throughout the majority of 2002. However, the underlying problem and its challenges remain and given the increased volatility of natural gas prices it is but a matter of time before higher prices make themselves apparent. The evolving regulation around these issues may be too slow to prevent further unnecessary hardship.

The question on the minds of utility commissioners and utility executives is what is the optimal way to proceed in light of regulatory orientation and the ratepayer's ultimate best interests? Gelber & Associates believes a well-defined framework for risk management can be formulated and presented to the regulatory bodies so that expectations can first be established and prudence better defined by regulators. While precise courses of action will not be set forth in following this path, price range targets can be framed and a

working plan can be defined which gives the LDC the ability to work within an established framework to provide reasonable price protection to the ratepayer and prudence clarity for the utility without the commission giving up its obligation of oversight.

#### Gelber's Integrated Approaches to Price Risk Management

Gelber utilizes an integrated approach to price risk management. We follow a sensible process in defining goals, parameters, processes and the metrics that define success. In this way prudence can be illustrated and measured by our clients in their reporting to their respective regulatory bodies. Gelber's process includes the following steps:

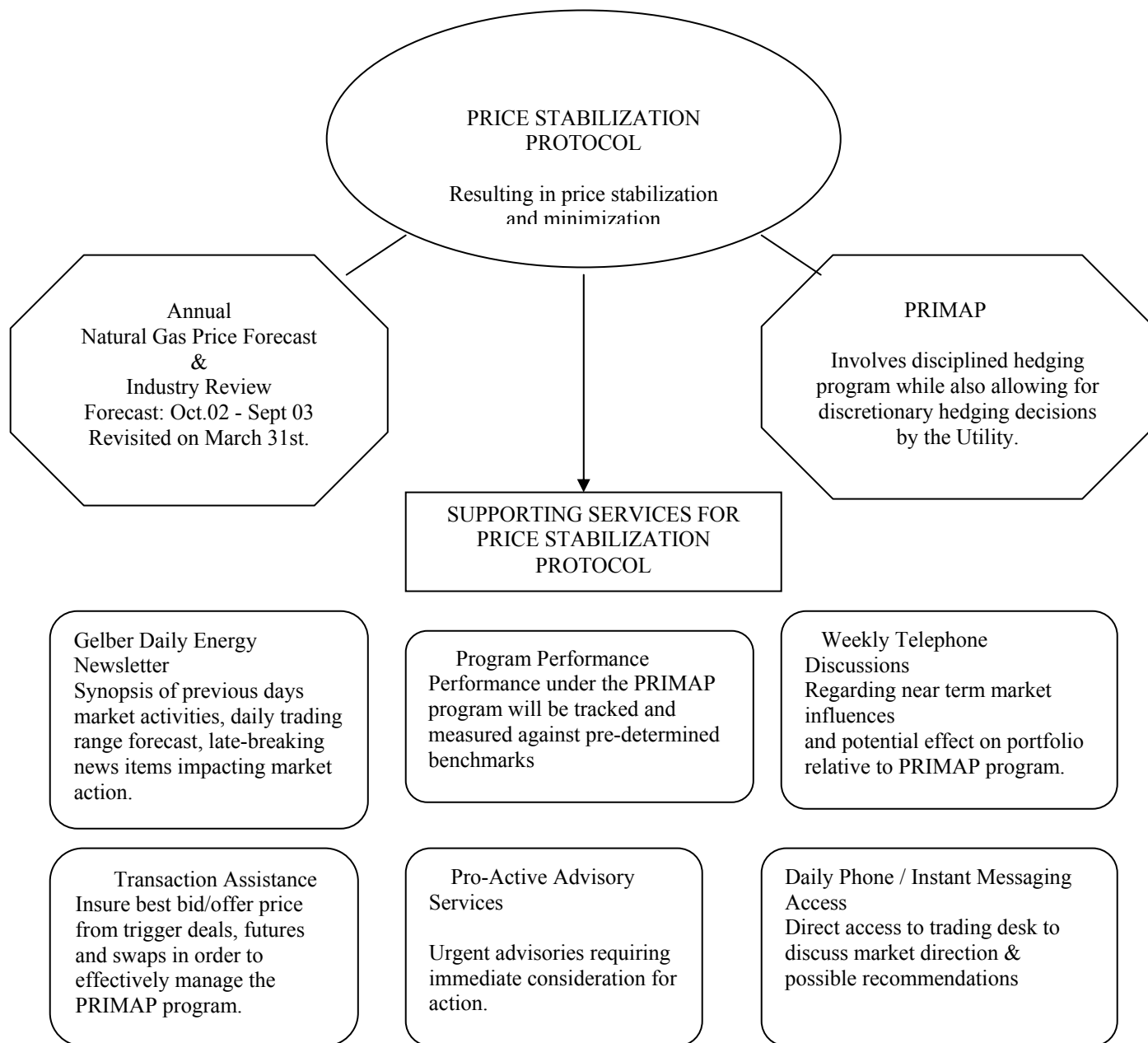
*Establish goals and objectives metrics* – considering the current and anticipated price environment, what is the reasonable price expectations that can be derived for the price for natural gas. Create a composite view of a range of potential price outcomes based on a reasonable range and blend of market dynamics and risk management tactics. Utilize this information in creating a narrow range of natural gas price objectives and the likely tactics required to deliver such prices. Gelber brings this step forward with its Annual Natural Gas Industry Review and Price Forecast.

*Define limitations* – based on recent local regulatory pronouncements and in discussions with the staffs of the utility commissions and our client, Gelber assists in defining probable limitations to risk management measures. This may take the form of price or portfolio allocation limits or the use of certain types of risk management techniques.

*Articulate and memorialize the approach* – Incorporate all relevant feedback from regulatory staffs and our client to create a framework document. This may incorporate any or all of the following components: Financial hedge components, opportunistic value component (setting off financial positions ahead of their maturity) and counterparty financial/physical arrangements, and physical asset utilization. Gelber believes it is critical to establish appropriate metric benchmarks and create a comprehensive 'report card' approach that will serve in the future as the measurement of success in attaining the stated goals. Gelber brings this step forward via the Price Risk Management Plan – PRIMAP.

*Solicit regulatory endorsement* – We assist our clients, where requested, in the presentation and discussion of the risk management approach with regulatory bodies. This is supported with historical price analysis, a discussion of market technical and fundamental drivers and other appropriate expert testimony. Gelber's experience with regulatory bodies has proven that on-going collaborative efforts aids the process of trust building, education and commensurate confidence creation with those bodies. Gelber operates as a highly regarded third-party resource to add integrity to the developing solutions.

*Implement the risk management approach, including integration of tracking systems* - provide hands-on assistance in implementing the approach, including providing daily market reports, executing NYMEX, OTC and qualified third-party transactions. We provide daily newsletters, specific market opportunity 'calls to action' and real-time information to our clients to permit them to execute on their plans. With Gelber's on-going interaction, we enhance the marketeering skills of the utility as we upsource our unique skills to their procurement staff.



Gelber & Associates is an energy advisory and risk management services firm located in Houston, Texas. The firm has been serving industrial, commercial and utility clients since 1990. Learn more about Gelber by visiting our website, [www.gelbercorp.com](http://www.gelbercorp.com)