NATURAL GAS AND ENERGY PRICE VOLATILITY

PREPARED FOR THE
OAK RIDGE NATIONAL LABORATORY

BY THE

American Gas Foundation

400 NORTH CAPITOL STREET, NW

WASHINGTON, DC 20001

PRINCIPAL AUTHORS:
BRUCE HENNING, MICHAEL SLOAN, MARIA DE LEON
ENERGY AND ENVIRONMENTAL ANALYSIS, INC.
1655 N. FORT MYER DRIVE, SUITE 600
ARLINGTON, VIRGINIA 22209
(703) 528-1900

October 2003

ENERGY AND ENVIRONMENTAL ANALYSIS, INC.

4. Strategies for Managing Price Volatility

4.1 Background

Over the last five years, energy price volatility has become the most significant issue facing the natural gas industry and energy companies. Natural gas, electricity, crude oil and oil product markets have all exhibited price volatility for some portion of the period. Price volatility has contributed to a climate of uncertainty for energy companies and investors and a climate of distrust among consumers, regulators, and legislators.

Energy price volatility creates uncertainty and concern in the minds of consumers and producers, who may delay decisions to purchase appliances and equipment or make investments in new supply. Such delay may result in lost market opportunities and inefficient long-run resource allocation. In addition, volatility may create pressures for regulatory intervention that can bias the market and penalize regulated entities and market participants by generating wide and unpredictable revenue swings. Finally, volatility can hurt the image of energy providers with the customers and policymakers and create doubt about the industry's integrity and competency to reliably provide a vital economic product.

As discussed in Chapter One of this report the impacts of energy price volatility fall into one of two categories:

1) Investment/planning price volatility. Planning price volatility refers to long-term uncertainty in energy price levels that influence investment planning.

2) Short-term price volatility. Short-term price volatility reflects the amount of short-term (day-to-day or month-to-month) price volatility that influences short-term energy purchasing and hedging strategies.

The focus of this report is the development of strategies principally designed to address investment/planning volatility in natural gas prices. In most instances, it is the unanticipated changes from one winter to the next or over the next few years that create the negative consequences for market development for distributed generation and present the greatest risk to gas consumers and market participants.

The impact of trading price volatility is generally limited to those entities that trade large dollar value positions in the short-term market. Trading losses were an important factor in the recent decline in the financial health of many large energy companies and therefore create critical challenges for the natural gas industry. However, the strategies used to address trading volatility are less applicable to most market participants and will not be addressed in great detail.

The objective of this chapter of the report is to consider strategies, policies, and approaches that can be used to reduce the destructive effects of price volatility. The chapter is divided in two sections. Section 2 presents a discussion of basic techniques that service providers or consumers can use to manage price volatility. The section also presents a discussion of the elements of risk associated with price volatility and the interdependencies of these elements. The section concludes with a discussion of some generic barriers to implementing the techniques with a focus on the relationships between utility regulation and price volatility management.

Section 3 presents 15 specific strategies for addressing price volatility. The strategies considered fall into two broad categories.

1) Volatility Management Strategies: Strategies, policies, and approaches that can be used to manage price volatility. These techniques are designed to reduce the negative impacts in a volatile energy price environment. In general, these are strategies that can be adopted by an individual market participant. The strategies are differentiated as consumer-initiated strategies and vendor-initiated strategies.

2) Volatility Reduction Strategies: Strategies, policies, and approaches that may reduce energy price volatility. These approaches could potentially reduce price volatility by increasing the elasticity of supply and/or demand (i.e., increase the magnitude of the market response to changes in energy prices) in the broader market. In general, these strategies would require a fundamental change in the structure of the market and would need to be adopted broadly by market participants to be effective.

The format for the exposition is as follows. A description of the strategy is presented along with a statement of the specific objective of the strategy. The “Pros” and “Cons” of each strategy are identified. Finally, barriers to implementing the strategy are discussed.

The strategies developed here address natural gas price volatility, with an emphasis on their applicability to the emerging distributed generation market. Nevertheless, in a number of instances, the strategy can be readily adapted to addressing volatility in other energy markets, such as electricity or oil. One must recognize, however, that regulation – particularly utility regulation – can significantly complicate the implementation of some of the strategies. These issues will be explicitly discussed.

4.2
Managing Price Volatility: Techniques, Issues and Barriers

Strategies designed to ***manage*** price volatility all involve allocating price risk among the market participants. The strategies do not change the underlying volatility of natural gas prices. These strategies represent alternatives that may be used in a market environment with highly volatile prices.

In a real sense, the re-allocation of risk embodied in these strategies are fundamentally a "zero sum" game. These strategies do relatively little to affect the underlying price volatility in the market. To the extent that the price risk for one participant is reduced, the price risk for another participant is increased. In considering these strategies, a market participant should carefully assess the nature of the risk and quantify the magnitude of any risk that is assumed.

For a regulated entity such as a natural gas local distribution company (LDC), it is important to fully integrate any strategy into the framework of regulatory review and oversight used by the regulators. Many of the elements of the strategies presented will require regulatory approval and in some instances, regulators have been reluctant to grant approval of the type of program suggested by the strategy. As a result, regulatory approval of some elements of the strategies may be difficult to obtain and will require intensive education of regulators regarding the relationship between price volatility management and the element of the strategy. Moreover, certain regulatory models (e.g., performance-based rates or rate cap regulation) may present additional challenges to the adoption of individual strategies.

Four basic elements are common to a number of the management strategies.[1] They are:

- Market segmentation – Market segmentation refers to the differentiation of customers based upon the characteristics of the customer. In the context of strategies to manage price volatility, segmentation involves differentiating the customers based upon their risk tolerance and need for price stability.

- Long-term (multi-year) contracts – The effect of a long-term contract is to transfer an entitlement and/or obligation between two or more parties. Contracts are the basic business tool for the allocation of risk between parties.

[1] Specific strategies are presented in Section 3.

- Asset diversification – The value of energy production or delivery assets is highly correlated to the market price of energy. As a result, a diversified portfolio of energy production or delivery assets can be used to balance energy price risk. When the energy production assets span energy commodities with prices that are uncorrelated or loosely correlated, the portfolio provides additional insulation from price volatility and may provide arbitrage opportunities.

- Financial derivatives – Financial derivatives (e.g., futures, options, and swaps) are a contractual vehicle that conveys a right and/or obligation to buy or sell a commodity (such as natural gas) at a specified price. Financial derivatives can offer a method of offsetting price risk with modest transaction costs.

4.2.1 Managing Natural Gas Price Risk

Three of the four basic elements presented above – long-term contracts, asset acquisition, and financial derivatives – form the core tools for a commodity price hedging strategy. Hedging can be simply defined as establishing a price today for some good or service that will be bought or sold at some time in the future. By "fixing" the price for some future transaction, the value of the transaction to the market participant will not change with price movements in the market.

4.2.1.1 Hedging a Gas Acquisition Portfolio

Prior to the restructuring of the gas industry that began in the late 1970s, the principle objective of a supply portfolio was to assure the reliability of supply. However, with unbundling[2], a principal objective of gas supply portfolio management became gas cost minimization. In the wake of the 2000–01 gas price run up, gas price stabilization has become an additional objective of supply portfolio management.

Price stabilization is realized through a program of hedging of gas supply costs. The objective of a hedging program is to provide price stability and predictability. This is achieved by locking in future prices with a combination of physical and financial tools. LDCs hedged gas supplies with three basis tools:

- Seasonal storage injections and withdrawals of gas supplies;

- Long-term[3] firm transportation contracts with pipelines;

- Multi-month fixed price gas supply contract;

- Financial hedges.

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2 A description of gas industry restructuring and unbundling, as well as the implications for gas price volatility, is contained in the companion report, *Price Volatility in Today's Energy Markets.*

3 FERC defined long-term firm transportation contracts as contracts that are one-year or longer.

The first three of these tools involve physical hedges. They are extremely well understood in the gas industry and have been utilized in gas supply portfolio management for decades.

All of the LDCs interviewed hedged at least some of their gas supply for system customers with a mix of physical hedging tools. However, a number of the activities that provide some degree of a price hedge are viewed by LDCs principally as a method of obtaining reliable gas supplies or gas cost minimization. The price stabilization impacts of the activity were recognized by the LDC, but were often considered a secondary benefit.

Gas Storage

All of the LDCs interviewed purchased gas during off-peak periods and injected gas into storage. Storage gas provides a natural hedge against unanticipated changes in price. However, most LDCs view the primary purpose of storage as a method of insuring reliability and as a method of managing pipeline demand charges associated with firm transportation contracts. Two-thirds of the companies questioned identified storage as a hedging tool without prompting. In further discussions, all of the LDCs recognized the price stabilization effects of storage gas.

Placing gas into storage is not risk free. Because of weather patterns and other market conditions, the price of gas in the winter withdrawal season has been below the injection season price in two of the last five years. As a result, use of storage gas does not always minimize gas costs. However, storage gas always serves to stabilize price movements by diversifying the timing of gas purchases.

Long-term Firm Transportation Pipeline Contracts

All LDCs interviewed also used long-term firm transportation contracts. However, once again, the LDCs did not identify hedging as the reason for the contractual commitment. Reliability was identified as the principal rationale for entering into firm transportation (FT) contracts. Nevertheless, an FT contract provides a hedge against “basis blowout” – a sudden increase in the market value of gas transportation that can occur in pipeline constrained markets.

However, FT contracts are an expensive method of hedging against basis blowout. Over the past five years, the average transportation basis has remained well below the maximum regulated rate for transportation contract. In many markets in the Midwest, basis values averaged less than 40 percent of the maximum regulated rate for firm transportation contract. Even in pipeline constrained markets such as New York, Florida, and California, the annual basis value rarely exceeds the maximum transportation rate to a significant extent.[4] As a result, the cost of a maximum rate contract is far above the expected basis value, implying a significant spread between the contract and the market rate.

[4] Generally, when annual basis exceed maximum transportation rates, pipelines are able to market capacity expansions. The expansions have the effect of reducing the annual basis after the expansion is completed.

Multi-month Gas Supply Contracts

All of the LDCs interviewed use multi-month gas supply contracts as part of their gas supply portfolio. In the 2000-01 winter, more than 80 percent of LDCs surveyed indicated that their gas supply portfolio included long-term contracts, defined as one year or longer. However, the vast majority of these contracts – 75 percent – used "first of the month" index pricing rather than fixed prices. As such, these long-term contracts did not serve as a price hedge.[5]

About 53 percent of companies use some fixed price contract to hedge gas prices. The amount of gas supply hedged varied significantly from company to company, from less than 10 percent to more than 30 percent of the expected winter purchases. There is no uniform practice in the industry.

Hedging with Financial Tools

Financial hedges include a seemingly endless array of contract vehicles. Financial derivatives (e.g., futures, options, and swaps) are a contractual vehicle that conveys a right and/or obligation to buy or sell a commodity (such as natural gas) at a specified price. The contracts convey a right and/or obligation to buy or sell a natural gas at some time in the future for a specified price and under specified terms and conditions. A discussion of the use of financial hedges to mitigate price risk is presented in Appendix F.

The use of financial hedges as a gas price management tool has grown dramatically. Prior to 1995, very few LDCs used financial instruments. By the 2001-2002 winter heating season, 55 percent of LDCs surveyed used financial instruments. The transaction cost of financial hedging tools can often be less than physical hedges, contributing to their appeal. However, as discussed later, the tools can present elements of regulatory risk to LDCs.

Weather Derivatives

Weather derivatives are products that were developed specially for the management of weather related price and volume risk in energy market. For years, financial houses offered weather insurance to farmers and other producers of products that could be affected by weather. The providers of these contracts recognized that there was an opportunity to develop products for energy companies.

The weather risk management product class includes caps, floors, collars, and swaps with payouts defined as a specified dollar sum multiplied by differences between the Heating Degree Day (HDD) level specified in the contract (i.e. the "Strike") and the actual HDD level which occurred during the contract period.

There are no standardized swap transactions. However, most transactions involve an exchange of periodic payments between two parties, with one side paying a fixed price and the other side

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[5] *LDC Supply Portfolio Management During the 2001-2002 Winter Heating Season*, July 2002, American Gas Association.

paying a variable price. Specific terms of swap agreements - including the fixed price of a commodity and its floating price reference, the term of the contract, and the quantity to be hedged - are established by the two parties involved, and can vary, subject to their specific needs and objectives.

A recent survey compiled by Weather Risk Management Association (WRMA) and PriceWaterhouseCoopers shows that the number of weather transactions grew 43 percent from April 1, 2001, to March 31, 2002, with 3,937 transactions that had a total value of $4.3 billion, which is a 72 percent increase over the year before. Despite this growth in transactions, only 13 percent of LDCs surveyed reported using weather derivatives during the 2001-2002 heating season.

4.2.1.2 Hedging Fundamentals: Costs and Risks

Hedging is not a risk-free activity. While hedging can result in lower gas prices if the market prices are higher than expected, it can also result in costs higher than the market if, for example, the market falls due to factors such as a warmer than normal winter. In any given period, there is a roughly equal chance that the cost of a hedged gas portfolio will be above the market price as there is that the cost of the hedged portfolio will be below the market price.

To understand this more fully, consider the following hypothetical hedging program. Assume that a gas "buyer" requires 24,000,000 cubic feet per month. In order to manage gas price volatility risk, this shipper could build up a series of purchase contracts that "ladder" the expiration dates so that one contract expires every month. Although the example uses long-term gas purchase contracts, an equivalent hedging program could be created using financial hedging products.

Figure 4-1

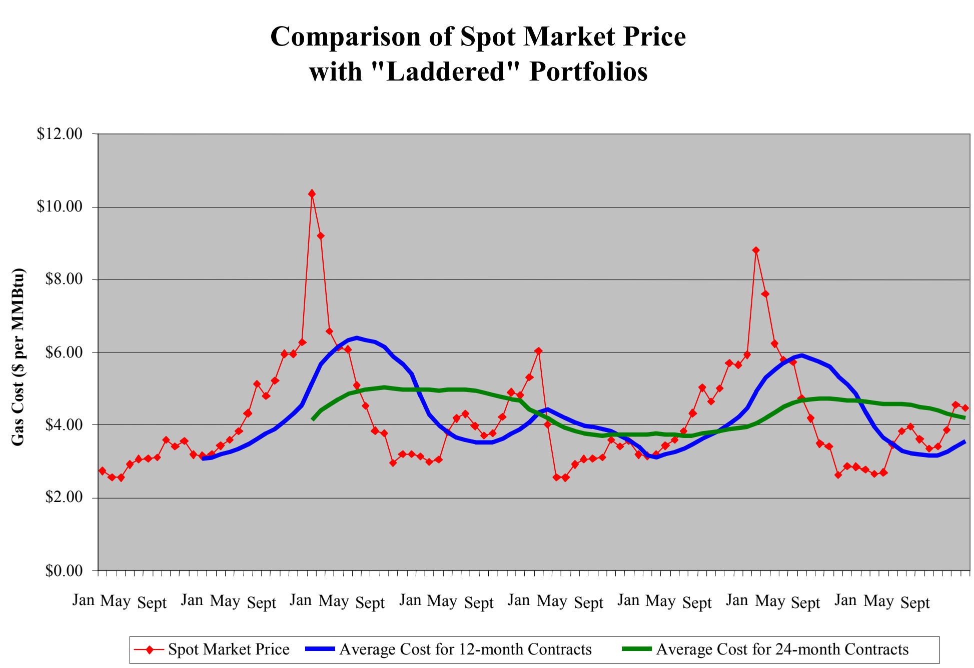


Figure 4-1 presents a comparison of spot market gas prices to the average gas prices for two contract portfolios. In one case, the gas "buyer" chooses to maintain a portfolio of 12-month contracts. In the second case, the portfolio consists of 24-month contracts.

The figure presents hypothetical price data for an 8-year period constructed from gas prices and price volatility in Chicago from 1999 though 2003. The illustration also assumes that there is no premium or discount in the average price of a multi-month contract. The average price over the entire period is essentially the same for the three approaches. However, at any given point in time, the price for gas purchased with a hedged portfolio can be above or below the "market" price.

Both of the portfolios of longer-term contracts reduce volatility compared to the spot market with the portfolio of 24-month contracts providing even greater price stability than the portfolio of 12-month contracts. By increasing the length of the contract, the portfolio provides the additional price stability that is expected.

Credit Risk

But the longer-term contracts also add a liability to the buyer's balance sheet. The magnitude of the liability is directly proportional to weighted-average of term of the contacts in the portfolio. In other words, the liability of a five-year fixed price contract is five times greater than the liability of one-year contract for the same daily volume. So long as the "buyer" is large and financially healthy, the liability may not be a problem. If the dollar value of the gas purchase commitment is large compared to the size of the "buyer", the obligation can create "credit risk" that increases the costs of financing and creates pressure on the equity prices of any company in such a position. In the wake of the Enron bankruptcy, problems created by "credit risk" have decimated many of the largest energy marketing firms.

Volume Risk

Extending the term of the contracts in a gas portfolio can also create "volume risk." The example presented above assumes that the gas "buyer" knows that the gas requirement will be 24,000,000 cubic feet per month. However, any forecast of gas requirements becomes less accurate as the projection goes further and further into the future. So long as the actual gas requirements are above the forecasted gas requirement, the problem is limited to a need to acquire additional gas at "market" prices. If the market price is above the average cost of the portfolio, the effect is to increase the average cost of gas slightly.

However, if the actual requirements are below the forecasted requirement, the "buyer" is in the position of having committed to buy more gas than is needed and will need to sell gas back into the market at prevailing market prices. If the market price is above the average cost of gas in the portfolio, the "buyer" will record a profit on the transaction. But if the market price is below the average cost of the portfolio, the "buyer" can suffer a loss.

Contracts and a "Balance Business Book"

One approach to managing volume risk attempt is to balance gas purchase obligations with contracts to sell the same volume of gas at similar prices. If the gas buyer in our example is a marketer, he or she could enter into a contract with one or more end-users where the end-user commits to purchase a specific volume of gas. The marketer would then mange the gas purchase portfolio to "balance" their overall position in the gas market or "book." If a marketer has more obligations to buy gas than contracts to sell gas, they are said to be "long" on gas. If the marketer has more contracts to sell gas than obligations to buy gas, they are said to be "short."

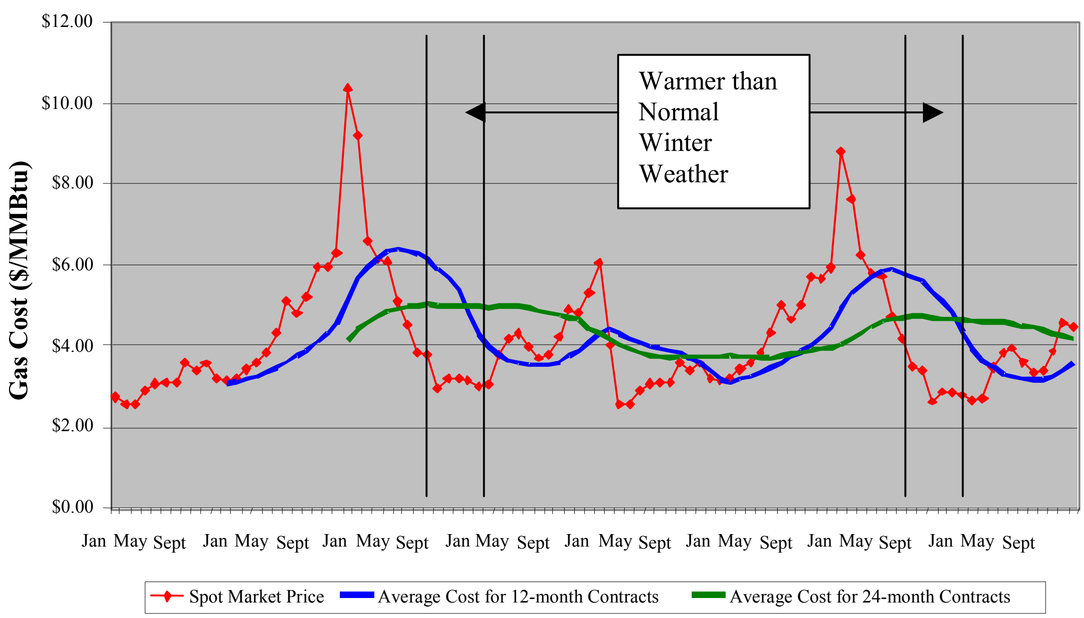
For a marketer to make money on a "balanced book," the marketer would need to have a difference or "margin" between the average gas purchase price in their portfolio and the average price in the contracts to sell gas. With intense competition between marketers, it is difficult to sustain a margin of any significant size.

Correlation of Price and Volume Risk

Volume risk can be quite problematic for an LDC or retail gas marketer that serves temperature-sensitive load. For these gas buyers, warm weather can cause gas requirements to fall significantly below forecasted levels. Moreover, if the weather is warmer than normal for one LDC, it is warmer than normal for all LDCs in the region. With lower total demand, prices are likely to be relatively low as well. This is precisely the behavior observed in the example presented. (See Figure 4-2)

Figure 4-2

Comparison of Spot Market Price with " Laddered" Portfolios



In the Chicago price data used to construct the example, the high price winter periods were constructed based upon prices during the cold weather experienced in winter of 2000-01. The relatively low price winter periods were constructed based upon the warm winter of 1999-00. The price increases observed in the winter of 2000-01 were driven by generally tight supply conditions combined with weather driven increases in gas demand.[6]

Because the requirements of an individual LDC or retail marketer are correlated with total gas consumption, they also tend to be correlated with price. As the figure shows, an LDC or retail gas marketer that entered into longer-term supply contracts to fully hedge forecasted[7] requirements would be expected to have to sell gas at a loss during warmer than normal winters.

Hedging Costs

Moreover, hedging activity incurs additional costs. In addition to the staffing overhead costs directly related to the hedging activity (including accounting activity and risk management oversight), there are direct costs including fees for hedge products, such as futures, options, swaps and collars. As a result, a "fully hedged" gas supply portfolio does not guarantee that the gas is acquired at the lowest possible price. In fact, because of the transaction and administrative costs associated with hedging, over the long-term the expected cost of a hedged gas supply portfolio will be slightly above average of the market price for gas over the same period.

Correlation of Gas and Electricity Price Risk

The correlation – or lack of correlation – between electricity prices and gas prices are important elements of the economics and risks of installing distributed generation, particularly in an application that expects to sell some or all of the electrical output to the grid. In a companion volume to this report entitled *Impact of Energy Price Volatility on Emerging Markets*, the nature of the relationship between gas and electricity prices was discussed.

Summarizing the conclusions, the correlation between gas price and wholesale electricity market prices is a function of the amount of non-dual fuel gas capacity that is included in the generation mix. Generators bid and the marginal clearing price for the electricity will be based upon the cost of generating electricity in the power plant with the highest operating costs included in the generation mix. Since gas-fired generation is often the marginal cost unit, the electricity price often will reflect the cost of the least efficient gas-fired unit in the generation mix.

Implication for Distributed Generation

In the case of distributed generation, the economics of the decision to install has less overall market risk when electricity prices and gas prices are highly correlated. When the prices are correlated, increases in the cost of gas are reflected in increases in the price of electricity, thus

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[6] A complete description gas market conditions and gas price behavior is contained in Chapter 1: *Price Volatility in Today's Energy Markets.*

[7] This assumes that the forecasted requirements were based upon "normal" weather.

the value of the electricity output covers the cost of the input. The risk to a DG application may be greatest during periods of high gas prices combined with modest and stable electricity prices. Under these conditions, the electricity output is less economic than purchasing electricity from the grid.

As a result, ironically, hedging a gas purchase portfolio can actually increase overall market risk for distributed generation under certain conditions. Specifically, since a hedged gas supply portfolio can diverge from the "market" price, the hedging activity can decrease the correlation between the gas price and the wholesale market electricity price. In most of the applications for distributed generation, however, an increase in market risk is more than offset by cost predictability, budget certainty, and planning advantages afforded by a hedged gas supply portfolio.

4.2.1.3 Regulatory Risks Associated with Hedging Activity

As regulated entities, gas LDCs face a number of issues in considering whether to engage in hedging activity to reduce price volatility that are not faced by unregulated entities. These issues arise from two fundamentals of utility regulation:

1) Prudence review – Traditional utility regulation allows for "after the fact" review of utility costs, subjecting utilities to potential disallowance of costs already incurred.

2) Tariffs with restrictive conditions – Utility service is generally specified by a tariff that carefully describes the terms and conditions of service and limits the utility in terms of the flexibility it has to negotiate the details of a service or its price.

3) Non-discriminatory service requirement for "similarly situated" customers – The application of this requirement limits the ability of a utility to "segment" the market. As a result, a utility may not be able to offer different prices and services to customers that have different characteristics and needs.

Pre-approval vs. Retroactive Review

Over the past two years, a number of gas LDC have approached Public Utility Commissions (PUCs) requesting that the Commissions approve certain parameters for its hedging activities. The utilities have sought approval with the following objectives:

- To limit the risk of disallowance of the costs of the hedging activity;

- To determine the applicable accounting methods to be applied if financial derivatives are used, and;

- To limit the risk of "second guessing" by regulators if market prices turn out to be below the "locked-in" gas price of the hedged portfolio.

Intervening parties argued that a Commission should not pre-approve any plan unless and until it can be demonstrated that the program provides consumer benefits.[8] In addition, parties have argued that a utility hedging program would reduce the ability of unregulated marketers to compete with the utility.[9]

Throughout their history, state PUCs have been reluctant to restrict themselves or future commissions from exercising certain actions that may be deemed appropriate in the future. Intervenors argue it is inappropriate for the Commission to fully commit itself up-front to a utility's actions given that market conditions may evolve in a manner rendering the pre-approved plan imprudent.[10]

At the same time, some utilities have been criticized for not hedging a sufficient gas volume. In the wake of the high gas prices in the winter 2000-01, an intensive review of purchase practices ensued. The Staff of the Missouri Public Service Commission argued that the LDCs in the state should have hedged a minimum of 30 percent of its projected gas requirements and that some costs be disallowed for insufficient hedged volumes. The utilities responded that it is not reasonable to be held to a minimum hedging threshold that was established only after the gas costs were incurred and, therefore, not known to the utility at the time the purchase decisions were made.

The objective of a hedging program is to provide price stability and predictability. This is achieved by "locking in" future prices with a combination of physical and financial tools. As noted above, a hedging program does not guarantee that the price of the gas will be minimized. In contrast, the premise of traditional gas cost prudence review is that gas costs be minimized based upon the information that was available at the time that the decisions were made.

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8 For example, earlier this year in Maine a Hearing Examiner rejected a hedging plan proposal by Northern Utilities. The proposal called for the approval of a hedging plan that would include futures contracts as a means of reducing the volatility of the price of natural gas. The proposal also requested that any transaction costs incurred in the purchase of futures contracts, as well as any cost of administering the program, be fully passed on to the utility's customers. In her report, the Hearing Examiner argued that the proposal "amounts to pre-approval of the added costs of a hedging plan that may not provide any benefits for ratepayers and does not contain performance incentives for the utility." The state's public advocate argued that weak incentives would result in the utility passively managing the hedging program, contending that "[c]ontinuous oversight and management of a hedging plan is necessary and will be fostered only when the Company shares in both the costs and benefits." The public advocate also argued that the program does not require pre-approval from the Commission, and that consumers may not be willing to pay the cost that would be required of them for having price stability

9 In a Massachusetts proceeding, marketers and the state's Attorney General criticized Bay State Gas' proposed hedging plan. They argued that the proposal would weaken competition and has the potential to harm customers as well by raising gas costs. The Attorney General asserted that the Commission should allow the competitive market to provide gas sales services with capped prices or any other pricing variations, created with or without hedging.

10 In a separate Commission investigation in Massachusetts, the Attorney General strongly recommended against allowing LDCs to hedge with financial derivatives. Among other things, the Attorney General argued that hedging with financial derivatives has not been shown to provide net benefits to consumers and that hedging can produce "huge" losses.

These differing objectives creates tension between an LDC and the state Public Utility Commission (PUC) if the LDC adopts a strategy to address gas price volatility that involves hedging. In cases where an LDC locks in prices that are higher than the actual market price turns out to be, the LDC runs the risk that a portfolio will be "out of the market," with the potential for subsequent cost disallowance as part of a prudence review of gas purchase costs. As a result, without pre-approval of a hedging program, traditional utility regulation creates a strong incentive for an LDC to manage its gas supply portfolio so that it closely tracks market prices.

Volume Risk from Customer Migration

LDCs can also face additional volume risk derived from the structure of a customer choice program. Customer choice programs in a number of states offer considerable flexibility for customers to migrate to alternative gas suppliers and return to the utility for regulated service. In those states that set some restrictions on migration and return, the restrictions are prescribed in the tariff and the utility has little or no ability to adjust to the restrictions without Commission approval.[11]

As a result, a utility with a customer choice program has an additional inherent uncertainty in forecasting gas requirements. If a utility hedges a large percentage of its projected requirements and a large number of customers migrate to alternative suppliers, the utility may find that it has committed to buy more gas than it needs. As a result, the utility is exposed to the risk that market price is below the price of the hedged portfolio in this instance.

Moreover, the volume risk from customer migration can be correlated with price risk, creating even greater total risk. If the utility has entered into long-term contracts or hedged in some other manner to provide price stability and market prices fall, alternative service providers will have a price advantage in the eyes of prospective customers, thereby increasing the rate of migration.

Finally, the utility is likely to be prohibited from taking the actions that an unregulated supplier is likely to adopt in this situation. If an unregulated marketer were faced with this situation, the marketer would likely analyze their customer base and potential customers and segment the market according to those customers that are most likely to be lost to competition. The unregulated marketer could reduce the price offered to these customers, while maintaining the higher price to the customers that are contractually committed, only offering the lower price to those customers upon contract expiration. In most instances, the utility is prohibited from adopting this strategy because all of the customers in the same rate class must be charged the same rate.

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[11] For example, a number of choice programs prohibit a migrating customer from electing to return to utility service for a period of at least one year. Another approach is to establish "open seasons" during which customers can choose alternative suppliers.

4.2.2 Service Offerings Designed to Reduce Price Risk for End-Use Customers

Because energy marketers and LDCs have tools to hedge price risk, they are capable of designing service offerings that provide end-use customers some protection against price volatility risk to end-use customers. The objective of these service offerings is to meet a customer's perceived need or preference for predictable and stable prices without subjecting the service provider to unacceptable price risk.

All of the major retail gas and electricity marketers and most small marketers offer customers fixed-price service options. Marketers perceive a fixed-price offering as an effective tool in capturing market share. However, these programs can present significant risk to the marketer. Complete hedging of both the price and volume risk for temperature sensitive gas or electric load can be very expensive. As a result, many marketers hedged only a portion of the risk in an attempt to increase profitability. However, during the 2000-2001 winter heating season, the gas price increase along with the volume increase resulted in major losses for many of the marketing companies. The losses contributed to the bankruptcy of a significant number of retail marketers and caused a number of other retail marketers to withdraw from the business.

By contrast, few LDCs have such service alternatives. Only a handful of utilities offer fixed-price service alternatives. In addition, at least one utility offers a capped-price option in addition to the fixed-price option. A fixed-fee is charged to customers choosing the capped-price option. The fee is related to prevailing option prices, which can be as high as 20 to 25 percent of the gas costs during periods of high volatility. One Midwest utility received approval to offer a fixed-bill offering as part of a pilot program in addition to a fixed-price offering. However, the fixed bill option was withdrawn.

Most of the fixed-price service offerings by marketers or LDCs require the customer to make a contractual commitment to the service offering for a one-year period. This limits the risk that the customer will leave the service if prices fall and leaves the service provider with gas purchase commitments that are above the market price.

Fixed-price options can be extremely difficult for LDCs to structure given the restrictions placed on programs by state regulators. The programs require the ability of the utility to "stream" gas supplies to specific customers.[12] Moreover, the programs can result in over-collection or under-collection of gas costs. LDCs can be at risk for differences if there is asymmetric regulatory treatment.

Moreover, it is not clear how much value customers place on fixed-price service. Customer participation in choice programs are relatively low. LDCs that have such offerings find that only 5 to 10 percent of customers participate. Nationally only 12 percent of customers that are

[12] "Streaming" refers to the creation of a dedicated gas supply that is priced separately from the portfolio used to serve "core market" customers.

eligible – *but not forced* – to participate in customer choice programs actually do so.[13] The relatively low participation rate suggests that many customers do not consider the opportunity for a fixed-price service option to be sufficiently attractive to justify changing service providers.

[13] Data published by the American Gas Association in May 2002 indicates that 21,319,813 customers were eligible to participate in choice programs. Of these, 3,888,648 chose an alternative supplier. However, of these, 1,459,700 were in programs that required all customers to migrate to alternative providers. Only 12.2 percent that had the option to remain with LDC sales service chose to migrate to an alternative supplier.

4.3
Specific Strategies for Managing Price Volatility

4.3.1 Strategy Options for LDCs and Energy Holding Companies

The strategies presented in this section are designed to assist a regulated LDC or its holding company to manage price risk in a volatile market environment. They represent a series of options that may be considered and are not recommendations. Whether or not any of the strategies is appropriate for an individual company must be determined on a case-by-case basis.

4.3.1.1 Strategy 1: Regulatory Pre-approval of Multi-year Hedging Activity

Objective: Provide stability in gas commodity prices while limiting the risk of being "second guessed" in a regulatory prudence review.

Description: The LDC initiates a proceeding or collaborative with the PUC and other stakeholders. The objective of the proceeding is to: 1) establish parameters guiding hedging activity; 2) determine the procedure for adjusting the parameters, with the adjustments evaluated prospectively from the time the adjustment is made; and 3) specify the procedure for record keeping and accounting for the hedging activity.

Rationale: There is no single level of hedging that is inherently the "right" amount to hedge. Neither the LDC nor the state's regulators can know precisely how much of a gas supply portfolio should be hedged. This is because the "correct" amount of hedging reflects the amount of additional costs that customers are willing to pay for stability in gas prices and as insurance against unanticipated increases in gas prices. In a regulated market, the Commission should act on behalf of the LDC's customers to provide guidance in determining how much of the LDC gas supply portfolio should be hedged. The only way that a reasonable program can be designed is for the LDC and its regulators to define, in advance, the objectives and parameters of a hedging program.

Pros: The strategy allows the utility to make a case for an appropriate program and creates a record that can be used to defend against *ex post facto* review of the program. Pre-approval allows the utility to argue that the prudence review should be limited to the prudent execution of the program and not the parameters of the program itself.

Cons: The strategy can invite the regulators to become more closely involved in the day-to-day management of gas supply.

A hedged portfolio can expose a utility to significant additional volume risk.

A hedged portfolio can create additional price risk if the utility has "performance-based" incentives as part of the gas acquisition regulation, particularly if the incentives are tied to market index prices.

Implementation Barriers: Regulators have been reticent to restrict their future actions. In a number of instances, the regulators have declined to grant pre-approval.

4.3.1.2 Strategy 2: Multi-year Fixed Price Service Option for Combined Heat and Power Customers, or Other Segmented Customer Classes

Objective: Segment the market to allow for a customized service to CHP applications. Natural gas is delivered at fixed price for multiple years and is combined with a contractual commitment from the facility owner for most or all of the period. A particular focus should be on new facilities, which would foster penetration of the technology.

Description: The LDC would file with the PUC for a new optional tariff service for CHP applications. The tariff should allow the LDC to "stream"[14] a dedicated gas supply to the facility with prices set by contract. Since the customer also has the option to elect the standard tariff service, the LDC can argue that the standard service is a "recourse" option.

Pros: By segmenting the market, CHP customers are recognized as a separate customer class. The customized service offerings would allow the utility to develop the CHP market and meet the specific needs of their customers.

"Streaming" remains a cost-based gas supply portfolio for CHP customers and the offering does not affect the gas cost of other customer classes.

"Streaming" combined with the contractual commitment allows the utility to maintain a balanced business book for CHP customers as the market grows.

The non-gas portion of the tariff rate can continue to be determined using existing mechanisms.

Cons: It may be difficult to differentiate CHP gas load from other applications at the same location without dual metering.

[14] "Streaming" refers to the creation of a dedicated gas supply that is priced separately from the portfolio used to serve "core market" customers.

The approach will require additional marketing resources since it involves customized marketing and client support. The strategy may also require changes to billing systems so that the bills reflect the correct gas costs.

A focus on CHP or other specific technology may leave other opportunities unexploited without further segmentation and streaming.

Implementation Barriers: Regulatory precedent developed before the commoditization of natural gas viewed streaming as discriminatory and preferential. The barrier set by this precedent may be difficult to overcome. However, the basis of the historical objection, that streaming allowed selected customers preferential access to "lower price" sources of supply, might not apply in a market environment where gas is a fungible commodity traded at various liquid market centers.

4.3.1.3 Strategy 3: LDC Provides Non-Discriminatory Transportation Service that Allows Unregulated Entities, Including an LDC Affiliate, to Craft Segmented Service Offerings to Distributed Generation and Other Market Segments

Objective: Allow unregulated merchants to compete, providing the incentive to offer tailored gas supply services.

Description: The LDC would file with the PUC for a transportation tariff service suitable for DG customers including CHP applications. The unregulated marketer performs the gas supply management function and has the option to "stream" a dedicated gas supply to the facility with the price set by contract. Competition in the marketplace will determine the success of fixed price offerings. The LDC is able to present to the Commission that the unregulated affiliate provides alternatives to consumers and that non-discriminatory tariffs and codes of conduct can provide adequate protection from the transfer of market power from the transportation function to the merchant function.

Pros: The strategy is consistent with the unbundling programs in most states.

Price volatility risk is principally borne by the unregulated merchant and the customer with risk allocations defined by contract and negotiation.

Cons: State unbundling proceedings offer the opportunity for intervenors to inhibit the LDC affiliate from competing successfully or to transfer costs to the regulated utility.

To the extent that the LDC remains a "supplier of last resort," the LDC may incur costs and be subject to price risk. These issues can become quite severe in the event of a bankruptcy of a major retail marketer in the service territory.

Implementation Barriers: Currently, the financial health of many unregulated marketing companies is problematic and it is unclear when – or if – these companies will return to a healthy state. It may be some time before marketing companies are in a position to absorb the credit risk associated with offering long-term fixed price offerings, even when the liabilities are "backed" by purchase contracts.

Investors are disenchanted with energy marketing, therefore making large-scale development of the sector difficult.

4.3.1.4 Strategy 4: Develop Integrated Gas Supply and Diversified Electric Generation Supply Portfolio

Objective: Integrate the contractual and physical assets to create economies of scope and scale. Diversify so as to reduce the amount of correlated price risk.

Description: A utility or holding company works to create a broad portfolio of physical and contractual assets. The gas supply portfolio could include gas reserves as well as purchase contracts and transportation capacity. The electric generation portfolio should have diverse fuel sources (such as oil, coal, and hydropower) and include both central station units and distributed generation assets.

Pros: A large and diversified portfolio is a natural hedge against price volatility. If natural gas prices rise, the value of non-gas fired generation increases.[15]

Cons: The strategy requires large amounts of capital and therefore may not be appropriate for medium or small companies. In addition, the need for more capital can lead to a higher debt to equity ratio, thus leading to increased credit crunch.

Efficient management of a large portfolio can become difficult. Loss of efficiency and a lack of synergy can result in under-performance and a significant loss in shareholder value.

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[15] When gas prices increase, the wholesale price of electricity also increases during peak periods when gas is fueling the generation of electricity. The operating costs of non-gas fired generation are unaffected or, in the case of oil fired-generation, affected to a lesser degree. As a result, the difference between the operating costs and the average price of electricity increases, providing increased returns on the generation portfolio.

Implementation Barriers: Currently, capital markets are extremely tight and it remains unclear as to how long the condition will persist. Moreover, many of the large companies are shedding “hard” assets to shore up their balance sheets and are not in a position to solidify a portfolio. Finally, equity markets are severely punishing companies that show any risk of under-performance.

4.3.1.5 Strategy 5: Develop Storage Assets and Optimize Utilization in the Regional Gas Market

Objective: Develop strategically located storage assets and obtain the necessary regulatory approval to optimize the utilization of the storage assets.

Description: The value of storage extends well beyond being a source of reliable winter supply.[16] While significant progress has been made, there remain significant structural and regulatory impediments to creating additional economic value in the gas marketplace. The LDC would file proposals asking the PUC to grant the utility additional flexibility in the operation of existing assets and petition the FERC to review jurisdictional storage tariffs to seek to remove any unnecessary operational restrictions. New storage facilities should apply market-based rates or banded rates in markets that are not highly concentrated[17], so long as the storage provider is placed “at risk for the recovery of the cost of storage the storage facility". This would provide incentives for the development of storage assets by parties other than interstate pipelines and allow these facilities to be profitable by capturing rates above the cost of service rate in some years to offset underrecovery that occurs during warmer than normal years.

Pros: Storage can serve to reduce the magnitude of price spikes in a regional gas market. The strategy would encourage the construction of additional storage and the entry of additional participants in the market for storage.

New storage, particularly high deliverability storage, can provide important operational benefits in managing the natural gas network with an increased power generation load.

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[16] Nevertheless, storage continues to serve an important role in assuring reliability of service. Moreover, storage will continue to serve that function for the foreseeable future.

[17] Market concentration is a measure used to evaluate the ability of a participant to exercise market power. Concentration generally measured with a Herfindahl-Hirshman Index (HHI) = $\Sigma(s_i)^2$ where s_i is the market share, as a fraction, of the i^{th} firm. The HHI takes a maximum value of "1" in the case of monopoly (the market share of the single firm is 100% or "1", and $1^2 = 1$), and takes a very small value when the market is characterized by a large number of firms with similar market shares. In the context of natural gas regulation, FERC uses a HHI value of .18 or below as the threshold level for less scrutiny.

Cons: During periods of warmer than normal weather, the value of storage capacity can be quite low. A series of consecutive warm winters could devastate the value of storage and the "at risk" conditions would prevent the recovery of the cost of the facility under Base Rates.

Implementation Barriers: While FERC and the Ontario Energy Board have granted flexibility in storage rates and services, PUCs in the United States have not demonstrated a willingness to do so. State jurisdictional LDCs may find it difficult to obtain the flexibility needed to operate more efficiently in the regional gas market. Many states limit an LDC's ability to use storage to serve off-system customers.

4.3.1.6 Strategy 6: Develop Delivered Energy Service Options for Electricity Load Where the Service Provider Owns and Operates the Energy Production and Delivery Assets Including Distributed Generation

Objective: Market delivered energy to large and mid-size energy consumers using a portfolio of energy assets owned by the service provider.

Description: The service provider, or an unregulated affiliate, develops and owns assets to manage the delivery of energy gas, electricity and other requirements to customers. The asset portfolio would include CHP and other distributed generation technologies with multiple fuel sources to generate the electric energy requirements for all of their customers as well as providing other delivered energy. The objective of the strategy is to have a diversified portfolio of options to generate electricity combined with a gas load in an area that is subject to both electricity transmission constraints and gas transportation constraints. The service provider uses the portfolio of assets to arbitrage changes in the relative prices of different energy types in the market area while collecting base load revenue from the end use customers for financing developing and maintaining the equipment on the customers premises. The strategy is most valuable in an environment with extremely volatile energy price environment.

Pros: The strategy presents arbitrage profit opportunities without some of the credit risk associated with a pure trading operation. The strategy also ensures a stable revenue in the form of service fees.

Cons: The strategy places the service provider at risk from a change in the nature of the energy market. For example, if new electric transmission of pipeline capacity were constructed, the arbitrage opportunities would be reduced significantly. Moreover, in such an event, the service provider might be less competitive in the regional market. The provider could be forced to discount the cost of the service to the end users, thereby decreasing margins.

Implementation
Barriers: The strategy requires favorable interconnect policies and at least some level of retail electric choice in the market area. Over the last several years, many states have delayed or abandoned retail electricity choice programs and the momentum is moving away from this regulatory model.

4.3.1.7 Strategy 7: Increase Prearranged Buyback Programs with Large Volume Gas Consumers

Objective: Increase the incentive for large volume industrial and power generation customers to take advantage of pre-arranged buyback contracts.

Description: Over the past 15 years, most large volume gas customers have converted from gas sales service to transportation service. This has made the process of managing gas supplies somewhat more difficult for the LDC. During period of high demand and tight supplies, most LDCs attempt to buy back gas from transportation customers. Prearranged commitments to sell supplies facilitate these arrangements. The strategy would provide for an incentive for large volume transportation customers to enter into such arrangements. The LDC would file a proposal with the PUC to allow for payments at the time that the LDC and the customer enter into the agreement. The payment would provide an incentive to large volume customers to participate. The agreement would also contain a provision whereby the large volume customer would be required to pay an amount equal to the payment plus a penalty in the event that the customer cannot honor the commitment to deliver the gas to the utility. The objective is to provide a guaranteed payment with the capability to deliver.

Pros: The strategy would provide an additional element to the LDC's supply portfolio.

The strategy would increase demand response, thereby serving to decrease volatility. (See Section 4.2)

Cons: The strategy raises issues of cost recovery and lost revenue for the LDC.

At the time that the utility requires the gas committed under the prearranged deal, the transportation customer could be experiencing difficulty with their marketer, and transportation customers would be subjected to the penalty.

Implementation
Barriers: PUCs may be reluctant to approve a payment for a contingency that may not occur.

4.4
Strategies, Policies and Approaches that Reduce Energy Price Volatility

This section is intended to discuss strategies and policies that affect energy price volatility and market fundamentals. Unlike the strategies presented in the earlier section, an individual company cannot implement the options presented here. Rather, any change from status quo would require legislative or regulatory changes that would affect a broad range of parties.

Several of the alternatives discussed here have been included in the policy recommendations of a number of diverse organizations or in various proposals that were considered as part of the energy legislation put before the United States Congress in 2002. The fact that some of these recommendations and proposals are included here while others are not should not be construed as an endorsement of any policies. Rather, the inclusion of the recommendations and proposals reflect an analytic conclusion that the proposals could have a direct impact that reduces expected volatility. However, there are many other effects to consider that are beyond the scope of this research. As such, the inclusion of a particular option should in no way be considered an endorsement of the policy by the authors or sponsors of the study.

4.4.1 Status Quo

It needs to be recognized that largely maintaining the status quo is an option and may be a likely outcome. Many of the alternatives available would require additional investments from some parties or increase the costs of some services. As such, one should recognize that it may be quite difficult to obtain the necessary consensus to implement any of the alternatives discussed.

4.4.2 Strategies that Increase Demand Response

As discussed in this report,[18] demand elasticity – or the lack thereof – is an important factor in determining the volatility of prices. Under certain market conditions, very large price movements are necessary to evoke the relatively small demand responses needed to balance supply and demand. This can be particularly true in natural gas and electricity markets where much of the demand curve is highly inelastic.

Consequently, strategies or policies that increase the magnitude of the demand response to changes in price can fundamentally decrease price volatility in a fundamental way. Analysis

[18] *Price Volatility in Today's Energy Markets* and *Outlook for Future Natural Gas and Electricity Price Volatility*

Table 4-1
Projected U.S. Natural Gas Consumption (Bcf)

	2000	2005	2010	2015	2020
Total	**22,790**	**22,890**	**26,033**	**28,713**	**30,602**
Residential	5,092	5,256	5,590	5,793	6,047
Commercial	3,325	3,325	3,706	3,906	4,173
Total Industrial	**8,748**	**8,104**	**8,562**	**8,857**	**9,133**
Boilers	1,300	1,300	1,300	1,300	1,300
Process Heat/Other	6,750	5,806	5,964	5,959	5,935
CHP/DG	698	998	1,298	1,598	1,898
Total Power Generation	**3,957**	**4,455**	**6,352**	**8,209**	**9,227**
Steam Generation	3,403	2,049	2,605	2,980	2,917
CC/CT	554	2,406	3,747	5,229	6,310

Estimated Technical Fuel Switching Potential (Bcf)

	2000	2005	2010	2015	2020
Total	2,439	2,066	2,851	3,524	3,952
Residential	-	-	-	-	-
Commercial	-	-	-	-	-
Total Industrial	**682**	**740**	**799**	**857**	**916**
Boilers	546	546	546	546	546
Process Heat/Other	1,265	1,088	1,118	1,117	1,112
CHP/DG	136	194	253	311	370
Total Power Generation	**1,757**	**1,325**	**2,052**	**2,667**	**3,036**
Steam Generation	1,701	1,025	1,302	1,490	1,458
CC/CT	55	301	749	1,177	1,578

Estimated Available Fuel Switching Potential (Bcf)*

	2000	2005	2010	2015	2020
Total	**1,560**	**1,238**	**1,686**	**2,060**	**2,268**
Residential	-	-	-	-	-
Commercial	-	-	-	-	-
Total Industrial	**341**	**370**	**399**	**429**	**458**
Boilers	273	273	273	273	273
Process Heat/Other	316	272	279	279	278
CHP/DG	68	97	126	156	185
Total Power Generation	**1,219**	**868**	**1,286**	**1,631**	**1,810**
Steam Generation	1,191	717	912	1,043	1,021
CC/CT	28	150	375	588	789

* Based On Status Quo

indicates that the following policies would have the potential to increase the magnitude of demand response.

By far, the largest potential source for additional demand response capable of adjusting to short-term imbalances of supply and demand are the applications capable of switching from gas to oil. Table 4-1 presents data that can be used to estimate the amount of additional fuel-switching potential that could technically be developed. The data indicates that by 2010 more than 1 Tcf of additional potential supply response could be created with increased dual-fuel capability. By 2020, the total potential increases to 1.5 Tcf.

4.4.2.1 Strategy 10: Establish Minimum Requirements for Dual Fuel Capacity for Gas-Fired Electric Generation

Objective: Increase the amount of electric generation capacity that can switch between gas and oil based upon the relative prices and availability of the two fuels.

Description: Gas-fired generation built in the last five years and under construction today has substantially less dual-fuel capability than the older vintage of gas generation. While the new combined cycle and combustion turbine technologies are not capable of burning residual oil, there is no technical impediment to burning distillate oil.

The strategy is designed to provide an incentive to invest in dual-fuel capability in new plants and to retrofit some of the plants built over the past several years. Differentiating between dual-fuel capacity and single-fuel capacity in the evaluation of a state generation resource plan or in any resource adequacy requirement could create the incentive to invest in the capability.

Pros: The strategy would diversify the portfolio of electricity production assets while adding to the demand response in electricity markets. The result would be to reduce price volatility in both markets.

The costs of dual-fuel capability are a relatively small portion of the total capital cost of a generation plant. Therefore, the additional investment required is not prohibitive.

Cons: The strategy would penalize generation in urban and suburban locations where obtaining the land and land use permits for oil handling facilities would be more difficult.

The strategy could increase distillate oil price including home heating oil during winter heating season.

Implementation Barriers: Implementation of the strategy at the state level would increase already disparate standard within control areas used to determine dispatch of generation. The strategy would be most effective if it were implemented on a national or regional basis. As a result, implementation would be embroiled in the broad debate surrounding the FERC Notice of Proposed Rulemaking for Standard Market Design (SMD).

4.4.2.2 Strategy 11: Implement Electricity Demand Response Programs as Part of the Structure of Regional Transmission Organizations

Objective: Increase the penetration of "demand response" programs in additional markets and expand participation in those markets where they exist.

Description: "Demand response" refers to the demand-side participation in the wholesale electricity market and includes direct load control[19] and price responsive load. Demand response programs have been in operation in all four operating ISOs[20] and are considered an important component in the successful operation of an RTO. The programs can be categorized either as bid-based programs or programs where the load is a "price-taker."

The strategy involves the development of additional incentives for participation and strengthens the requirements for demand response to be included in Standard Market Design. The strategy would include state or rate-based funding for enabling technologies such as interval meters and load control equipment. The strategy would also include advanced payments for participating load, particularly load that is participating as a "price-taker."

Pros: The strategy would directly increase the demand response in the electric market. In addition, the programs would indirectly increase demand response in the gas market by reducing the need for peaking generation units to bid up the price of gas.

Cons: The strategy raises issues of cost recovery and lost revenue for the utility and gas providers.

The strategy raises issues of cost causation and whether the costs should be socialized across multiple Load Serving Entities (LSEs) or system-wide.

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[19] Direct load control such as control of air conditioners and water heaters by the utility, partial load reductions and curtailments.

[20] California ISO, New York ISO, ISO New England, and PJM.

Implementation
Barriers: As in the case of SMD, a series of jurisdictional issues are raised. For example, does FERC have the authority to create a market for load reduction?

4.4.2.3 Strategy 12: Implementation of Dynamic Pricing for Price Sensitive Electricity and Retail Gas Customers

Objective: Provide customers with awareness of market price signals in a timely manner and create an incentive for participants to respond to the market signals.

Description: A major impediment to the development of demand response is the existence of rate structures that do not respond to changes in market prices. Customers have little incentive to adjust consumption patterns if their bills are not significantly affected.

The strategy will eliminate regulatory mechanisms that "smooth" prices to large volume, price sensitive customers. This change in regulation would not affect residential and small commercial customers since these customers have significantly less ability to adjust consumption. In addition, exempting these customers would avoid the costs involved in installing time-of-use meters for these classes of customers.

Pros: The strategy would directly increase the demand response in gas and electric markets thereby reducing the likelihood and magnitude of price spikes.

Cons: The strategy raises issues of cost recovery and lost revenue for the utility and gas providers.

In markets where customer choice programs are available, the shift in pricing could result in increased migration to unregulated providers that provide price stability.

Implementation
Barriers: Customer resistance could make it difficult to obtain the needed consensus.

4.4.3 Strategies that Increase Infrastructure and Supply Response

As discussed in other chapters[21], increasing energy infrastructure to create a "reserve margin" of available supply can reduce energy price volatility. Once all of the available sources of energy supply are being fully utilized, increasing prices will not make any additional supply available in

21 *Price Volatility in Today's Energy Markets* and *Outlook for Future Natural Gas and Electricity Price Volatility*

the short-term and the market must be balanced solely on the basis of the demand response. Analysis indicates that the following policies could create a "reserve margin" in the supply of gas and/or electricity.

4.4.3.1 Strategy 13: Implement Floor Prices above Variable Cost on Interruptible Pipeline Transportation

Objective: Increase the contribution of interruptible shippers towards the fixed cost of a natural gas pipeline.

Description: The strategy is similar to the regulatory framework currently in place on the TransCanada Pipeline. Regulation establishes a floor price well above the variable cost of transportation. Any increase in IT revenues that results in overrecovery would be credited back to the firm shippers.

Pros: The floor price would also support the market price of capacity release thus benefiting firm shippers.

Cons: The floor price could decrease throughput offsetting the potential revenue increase expected from the higher price.

Implementation Barriers: Producers and interruptible shippers would likely object to floor price, thereby making it difficult to gain consensus.

4.4.3.2 Strategy 14: Return to a Natural Gas Pipeline Rate Design that Reduces Demand Charges and Increases the Volumetric Component of the Rate

Objective: Increase the contribution of interruptible shippers towards the fixed cost of a natural gas pipeline and reduce the cost of firm transportation contracts.

Description: Historically, pipeline rate design has been used to adjust the incentives regarding new pipeline construction. Reducing the demand charge component increases the demand for firm capacity by shifting risk from the shipper to the pipeline. An increase in demand supports new construction by increasing the level of commitments for the new projects.

Pros: The decrease in the demand charge would reduce the risk to firm shippers and attract more power generation customers to firm service.

Cons: The floor price could decrease throughput offsetting the potential revenue increase expected from the higher price.

Implementation Barriers: Producers and interruptible shippers would likely object to the floor price making it difficult to gain consensus.

4.4.3.3 Strategy 15: Augment Electric Generation Resource Adequacy Requirements to include Assessment of Fuel Portfolio Assets

Objective: Provide an incentive for power generators to enter into long-term gas supply contracts and firm transportation contracts on gas pipelines.

Description: In the Notice of Proposed Rulemaking, FERC has proposed a resource adequacy requirement for all electric Load Serving Entities (LSEs). The objective is to ensure that LSE have identified sufficient generation capacity and taken steps to build or contract for capacity to meet their load. The proposal is to differentiate between gas-fired capacity that have entered into firm commitments to buy and transport their fuel and those that have not. The strategy would require a larger capacity margin for LSEs that rely on gas firmed capacity with less than firm gas supply.

Pros: The strategy would foster long-term contracts with gas producers thereby reducing the risk of exploration and development to at least some degree.

The strategy would increase the amount of firm transportation pipeline capacity contracted by power generation customers thereby supporting additional pipeline construction.

Cons: The requirement would increase the cost of gas-fired generation relative to coal and other alternatives.

Implementation Barriers: Implementation would be embroiled in the broad debate surrounding the FERC Notice of Proposed Rulemaking for Standard Market Design (SMD).

4.5 Conclusion

Strategies designed to address volatility fall into two categories: 1) Strategies and policies that are designed to reduce volatility including a reversal of the trend in regulation that has inhibited long-term contracts and investment in supply facilities, and 2) Strategies that are designed to manage volatility and allocate the risks associated with volatility.

Strategies and policies that are designed to reduce volatility

Strategies and policies designed to reduce volatility create incentives or regulatory requirements to invest in facilities that increase the availability of "reserve supply" capacity or increase the amount of demand that is shed in response to increasing prices. Returning to a greater use of longer-term contracts could be an effective method of financing the infrastructure required to supply the reserve supply capacity needed to moderate price volatility.

During restructuring over the last several decades, policies that foster price stability through long-term contracts and investment in facilities that provide a reserve supply capability were often abandoned in favor of policies promoting market efficiency goals with the effect of increasing price volatility. Adopting policies that would provide incentives for increased use of long-term contracts could recreate a balance that would moderate volatility compared to a continuation of current trends.

Strategies and policies designed to reduce volatility must be adopted by a large number of participants to be effective. Without structural changes that create broad incentives or regulatory requirements to make the required investments, an individual participant would incur additional costs compared to their competitors without the ability to affect volatility to a significant degree. Hence individual market participants typically do not undertake such investments on their own without an identified mechanism to recover the cost of the investment. A market structure design that relies solely on market determined basis differentials for the recovery of transmission and distribution infrastructure costs is unlikely to recover the costs of investment in reserve capacity. Similarly, there is no incentive for a producer of natural gas or any other energy resource to voluntarily develop production capacity that is held as reserve supply capability.

Without a cost recovery mechanism, participants often see the reserve capacity requirements as the imposition of unnecessary costs that are at risk. As a result, they generally oppose these types of requirements. Compounding this problem, regulated entities have been directly or indirectly restrained from entering into long-term contracts needed to finance the infrastructure investments that could moderate volatility even if a cost recovery mechanism in regulated rates could be constructed in the structure of utility rates.

It will likely be difficult to achieve consensus on adopting policies to increase demand response or create reserve supply capacity without significant support from the general population. Moreover, the general population does not understand the fundamental causes of energy price volatility and is more likely to attribute price movements to market manipulation and profiteering. As a result, there is a significant risk that any public outcry for policies designed to address volatility would not result in the needed investment in infrastructure.

Strategies that are designed to manage volatility and allocate the risks associated with volatility

There are many risk management tools available that a company can use to manage the risks of price volatility. Moreover, unlike the strategies designed to reduce volatility, individual companies can implement strategies that are designed to manage volatility. However, for regulated entities, such as gas local distribution companies, regulatory approval and/or review of the results of a price volatility management program can be problematic. Risk management and hedging programs are not yet well understood by many regulators. In addition, regulators are often reluctant or unable within existing legislation to "pre-approve" a program. A concerted effort to educate regulators and to engage regulators in discussions regarding hedging is necessary.

To date, regulatory oversight of hedging programs generally has not provided the "pre-approval" of the objectives of programs that is needed to rationally implement hedging strategies. As a result, utilities are at risk for hedging decisions and have limited incentive to allow their supply portfolio to deviate significantly from market prices. As a result, gas consumers have been subjected to greater price volatility than might have otherwise occurred had such approval been in place. A concerted effort to add to regulators' understanding and to engage regulators in discussions regarding hedging is necessary.

Importantly, regulators and customers must understand that risk management programs are likely to result in some increase in costs. Just like insurance, hedging and price volatility management involves a payment to a counterparty that is willing to take the risk of an unfavorable outcome. For regulated energy companies, the company and the regulator should determine the appropriate amount of risk management. The appropriate review for a price volatility management program is the prudent implementation of program that is agreed upon in advance.

Unfortunately, there is no "silver bullet" to address market volatility that is guaranteed to reduce gas and electricity prices in the long-term. Rather, there are real, and in some cases, significant costs associated with all of the analyzed strategies that would increase prices over time, but result in more stable prices in return. It is important that industry, consumers, regulators, and policymakers consider the alternatives in an informed manner to develop a consensus approach to addressing energy price volatility.