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Gas Supply Planning and Procurement: A Comprehensive Regulatory Approach

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Executive Summary

This document presents a regulatory approach for ensuring that a utility's gas supply planning and procurement activities serve customers effectively. It will empower state commissions to make fact-based and policy-based decisions on a utility's gas supply plan and its execution. Notable issues include: (1) the role of price hedging in moderating the effect of volatile wholesale gas prices on retail customers; (2) long-term contracting for gas supplies and pipeline transportation; and (3) the early involvement of state commissions and stakeholders in the planning process.

The regulatory approach outlined in this document has six steps. These steps require commission expertise in different technical areas, including economics, natural gas markets, statistics, decision analysis, and price hedging with financial derivatives.

Step 1 establishes principles for gas supply planning and gas procurement. Principles add clarity and predictability to commission decisions. They can include articulation of major objectives of gas supply planning, criteria for acceptable gas supply plans and utility performance, and commission procedures for review and evaluation. Clear and sensible regulatory principles still leave the utility discretion to make important decisions and to take responsibility for those decisions.

Step 2 establishes planning and performance standards. Performance standards reflect, and comport with, the commission principles by specifying in more detail a utility's actions deemed to be in the public interest. An example of a principle is: "The utility should moderate the price volatility of gas purchases." A standard, consistent with that principle, is: "The utility should evaluate all feasible financial instruments and choose those that are least-cost and compatible with hedging objectives."

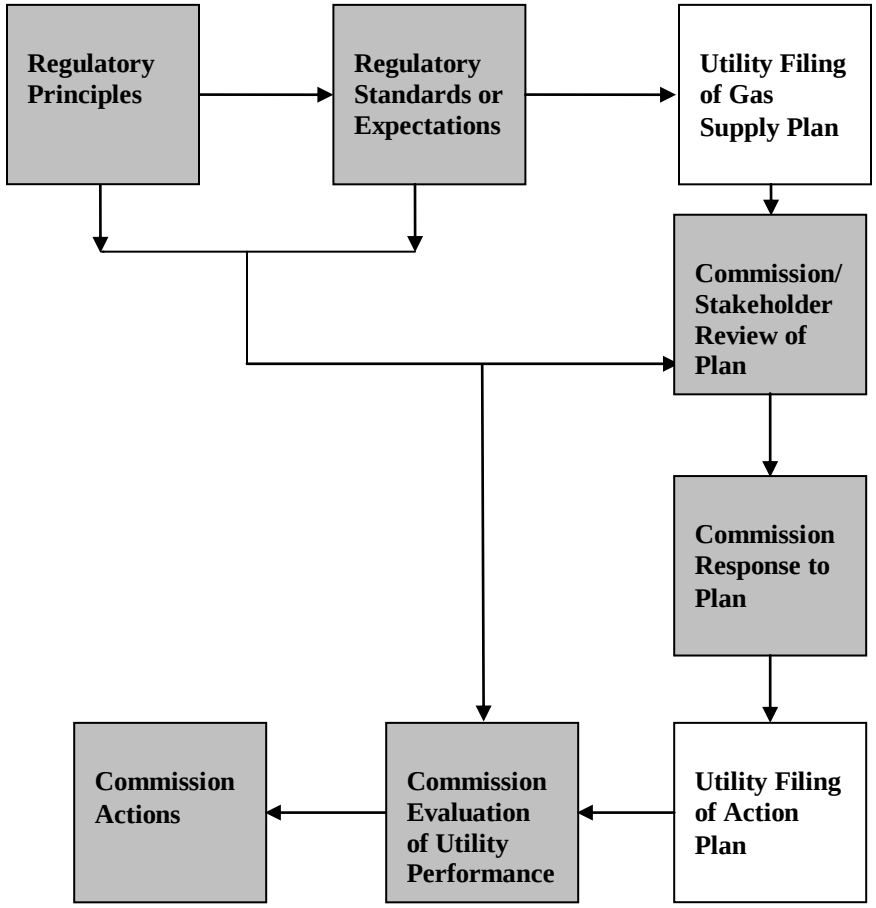
Step 3 is the commission's review and evaluation of the utility-filed gas supply plan. A commission's evaluation can address the input, analyses, and changes suggested by interested stakeholders.

Step 4 is the commission's decision on a filed gas supply plan. There is a range of possible commission decisions, reflecting different regulatory commitments, from approving a plan for cost-recovery purposes to simply acknowledging a plan's existence. A commission can find a plan acceptable without committing, prior to implementation, to the full recovery of the utility's actual costs in executing the plan. Regulatory commitment to a plan can give the utility some guidance, while reducing the likelihood of commission second-guessing. The clarity of commission commitment affects the scope and nature of later prudence review of the utility's performance.

Step 5 is the commission's evaluation of actual performance by a utility of its plan. This step involves the commission identifying any performance variances from the plan and the reasons; and detecting subpar performance in specific areas and the reasons. This evaluation can have the following three objectives: (a) identify gaps between utility performance and commission expectations, and the reasons for those gaps; (b) determine the recovery (including the timing of recovery) of gas, transportation and storage costs by the utility; and (c) examine whether commission policies and practices, for various reasons, warrant change.

Step 6 is commission actions called for by the performance evaluation. This step exercises a commission's enforcement function, especially with regard to cost recovery. It also involves a commission assessing its own policies and practices, such as those relating to cost recovery and affecting utility incentives for planning and the execution of a plan. The commission would ask: "What went wrong and how can we prevent a recurrence of the problems in the future?" and "What worked well and how can we encourage repetition of such results?"

Figure ES1. A Regulatory Approach for Oversight of Gas Supply Planning and Utility Performance: The Parts and their Relationships



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Gas Supply Planning and Procurement: A Comprehensive Regulatory Approach

I. Overview of document

This document presents a comprehensive regulatory approach for overseeing gas supply planning and utility performance. A plan is the foundation for performance: a good plan does not guarantee good performance, but a poor plan inevitably will lead to poor performance. This document focuses on a regulatory process and commission decision-making that should reduce the chances of a gas utility executing a poor plan. It presents the major features of gas supply planning without elaborating on its intricacies.

The objective of the proposed approach is to enhance the ability of state commissions to make informed decisions. Informed decisions allow a commission to be more accountable to retail gas customers and the general public. Accountability requires commission assurance of the prudence, efficiency, effectiveness and customer-responsiveness of gas supply plans and their execution. Accountability also requires a commission to recognize the financial interests of gas utilities; namely, to permit prudent utilities a reasonable opportunity to earn a fair rate of return and attract capital to serve the long-term interest of their customers.

II. The rationale for a comprehensive regulatory approach

A. Gas utility procurement responsibilities

Two major activities of local distribution companies are to acquire gas and to arrange for pipeline delivery to the city gate together represent, on average for the country as a whole, about 75-80 percent of the retail rate for residential gas service. Most retail gas utilities profit only from local gas delivery; they do not profit from the buying and selling of the gas commodity and pipeline transportation.

Prior to FERC Order 636 (1992), retail gas utilities procured much of their city-gate supplies from the interstate pipelines under long-term contracts for gas commodity, transportation and off-system storage services. Order 636 led gas utilities to procure more of their gas supplies separately from transportation service. Consequently, since 1992, gas utilities have played a greater role in managing their gas procurement practices.

Gas purchasing and management practices contain two separate components. The first component involves the utility procuring gas and transportation at a reasonable price to meet expected peak-day, peak-month and seasonal demands. The second component, which has received more attention since 2000 when wholesale gas prices began accelerating, involves managing price volatility with a combination of financial derivatives, stored gas and forward contracts. The purchase of physical gas to meet customers' demand represents an activity

distinct from hedging with financial derivatives. Before the advent of financial derivatives in the early 1990s, gas procurement and price-risk management were bundled as a single activity or product – for example, in the form of forward contracts and storage.

B. Reasons for commission involvement at the utility's planning stages

Gas supply planning and procurement ("GSPP") is important for determining future retail gas costs, prices and supply reliability. GSPP is a complex, multi-task activity demanding early and active involvement by a state commission in the formation of a gas supply plan or corporate strategy, in addition to an after-the-fact review of a utility's execution of the plan. An active state commission in the early stages helps to steer a utility's planning and procurement activities to conform to commission principles and expectations. Early commission involvement in the process lessens the scope of prudence or retroactive reviews by focusing only on the execution of a plan, rather than on both planning and execution decisions simultaneously. All in all, an active commission should benefit both customers and shareholders.

The regulatory approach proposed here stresses early communication among the commission, the utility and other stakeholders. The approach calls for commission initiation of communications in the form of principles and standards, and the evaluation of a filed gas supply plan. Open dialogue among parties during the whole planning-procurement process is a key element of the proposed regulatory process. Open communication will help to avoid later problems in performance evaluation arising from the utility and other stakeholders not knowing how the commission will likely respond to actual events affecting a utility's performance.

The possibility of interest divergence is another rationale for commission involvement in planning and execution. A holding company's financial interest, for example, may conflict with the regulated utility's customer obligations. A utility might have more risk tolerance for price volatility than its customers, resulting, from the customers' perspective, in the utility relying excessively on spot-market purchases without hedging.

Another rationale stems from the recent efforts of gas utilities to seek state commissions' pre-approval of utility contracts and investments. Before pre-approving or committing to such actions, a commission should have access to information necessary to assess their appropriateness. Since regulatory commitment would result in the shifting of risks to customers, a commission should impose a high standard on a utility to demonstrate the merits of its proposed strategy.

Utility hedging adds another complicating dimension. How much a utility ought to hedge depends on the value placed by customers on more stable prices—a value difficult to determine. Hedging requires a trade-off between the objectives of moderating price volatility and passing through to customers the lowest cost for purchased gas. Utilities and commissions face the challenge of deciding precisely how much a utility should hedge, how it should hedge, and how much it should spend on hedging. Customer tolerance of price volatility will vary among customers and between classes. Because of these complications, early commission involvement will help determine the utility's hedging parameters. Otherwise the utility has to guess about customer

preferences and then risk disallowance later if it guessed wrong—such as if the rates underlying the selected hedge strategy exceed the prevailing price for spot gas. A commission can provide a utility with at least a broad indication of the level of tolerable price volatility or, conversely, the "insurance" premium charged to customers it will find acceptable.

Lastly, if a state commission avoids involvement at the planning stages, it may react to a problem after-the-fact without understanding the causes, leading to regulatory error. A gas utility may eschew price hedging because of a commission policy, promulgated in an earlier era that disallowed the pass-through of hedging costs. Or the utility might under-hedge due to a commission policy of allowing pass-through of only those gas costs that do not exceed the prevailing spot price. Commission involvement at the planning stages allows for more informed consideration of the options for managing uncertainty and risk.

C. Other benefits of the comprehensive approach

The regulatory approach presented here recommends that commissions evaluate their own policies, objectives, data-gathering activities and pre-established expectations, in view of new information or a changed natural gas environment. State commissions should view regulation as a dynamic or adaptive process where the optimal regulatory policies and practices at any moment depend upon prevailing conditions in the natural gas sector and beyond. New events or the lack of understanding how existing commission policies and practices, in other words, affect a utility's performance oftentimes warrant a fresh review.

Although regulatory commitment to a utility's plan could shift the risk of planning error to customers, evaluating a utility's decisions at a later time also poses risk. The risk would come from the difficulties for a commission to put itself back to the mindset at the time, perhaps years ago, when utility management made their decisions and then determine: (1) what the utility knew and what it should have known, and (2) whether the utility used this information appropriately in reaching its decisions. Investigating these questions at the time a utility proposes its gas supply strategy would lessen the demands on a commission later and, arguably, increase the likelihood of exposing and remedying a poor decision. Perhaps most important, early commission input could prevent a poor decision, while waiting for after-the-fact to judge a past decision would not avoid a poor one. The major outcome of a full-scale retrospective review, instead, is to distribute the costs already incurred by a utility between its shareholders and customers, with some of these costs potentially resulting from avoidable poor decisions.[1]

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[1] One counter argument is that a commission lack sufficient resources to review all the conceivable reasons why a proposed gas supply plan is deficient. In such a situation, the argument goes, the commission should not commit to the plan or full cost recovery by the utility, since it would have incomplete information on the soundness of the plan. Another reason given

III. The "gas supply planning" demands

A. Definition of gas supply plan

A gas supply plan (GSP) represents a utility's strategy for acquiring available gas supplies, storage capacity and transportation services to satisfy the demands of its customers over a specified period of time. The strategy is based on the utility's projections, as of the time of the plan, of supply and demand over the time horizon. One management expert has depicted long-term planning as a simplified road map of complex terrain based on provisional knowledge that is subject to revision in light of new information.[2]

From a narrow technical perspective, gas supply planning is an optimization problem addressed, for example, by linear programming models such as SENDOUT®.[3] The utility attempts to maximize an objective function composed of different elements, some of which conflict. This function reflects a weighted average value of the specified objectives to customers and the general public. These objectives include reasonable cost, moderate price volatility and

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for a commission not to pre-approve a utility's gas supply plan is that, even if further resources were available for early review oversight, it will have only a fraction of the information and understanding the utility has in developing and implementing its plan. For a balanced discussion of these alternatives, see the forthcoming NRRI report by Nancy Brockway, titled *Utility Capital Investments: Consequences of the Timing and Scope of Regulatory Approvals* (July 2008).

[2] See Donald N. Sull, "Closing the Gap Between Strategy and Execution," *MIT Sloan Management Review* (Summer 2007): 30-38.

[3] The SENDOUT® model is a PC-based linear programming model widely used by gas utilities to solve gas supply and transportation optimization questions (i.e., to identify the least-cost resource mix for a multi-year planning period). The model performs least-cost optimization based upon daily, monthly, seasonal and annual consumption. The model calculates any gap between total system peak-day sendout and available supply resources and then identifies new supply resources that can close this gap at least cost. Utilities apply this model after projecting customer demand by geographic area, contractual storage, transportation capacities, supply and capacity costs, distribution system constraints and daily temperature patterns. Gas utilities use SENDOUT® and other similar optimization models as tools to test varying scenarios of future costs and gas supply options. The vendor of SENDOUT®, New Energy Associates, recently developed a new software program, called VectorGas®, to allow the modeling of various hedging strategies and the evaluation of their different effects on cost and the volatility of an overall portfolio. The program applies Monte Carlo simulation and advanced portfolio optimization techniques.

high supply reliability, subject to a set of contractual, purchase, supply and operational constraints.

An assessment of the reasonableness of the inputs and assumptions placed into models like SENDOUT®, and their effects on a utility and its customers, requires knowledgeable, experienced and skilled commission staff as well as tools and methods that extend beyond optimization modeling. (See Appendix A for a list of the knowledge and skills needed by commission analysts.) A complete assessment of the reasonableness and accuracy of gas supply planning and modeling (inputs and output) lies outside the scope of models like SENDOUT® and simple techniques of optimization such as linear programming. Such an assessment also requires additional analyses and judgment.

B. Elements of gas supply planning

A comprehensive GSP includes at least ten parts, many of which require close review by commissions and stakeholders and the consideration of alternatives. Those ten parts are:

1. ***Procurement objectives*** include reliability, security, price stability and reasonable prices. A GSP specifies the objectives that a utility wants to achieve, while recognizing the contractual, purchasing and operational constraints. An important consideration in designating an objective is the well-being of retail customers. The pursuit of price stability, for example, should require evidence showing that customers place a value on less volatile and more predictable prices. High service reliability, as another example, should require a benefit-cost calculation showing that a lower level of reliability would increase the expected level of service-disruption costs to both customers and society as-a-whole more than it would reduce customers' gas bills. A major objective of long-term planning is to ensure the adequacy of future gas supplies by identifying required new supply resources. Some of these objectives conflict; advancing one objective can impede another. In such instances, the utility will need to make trade-offs that best promote customer welfare and the public interest.[4] Here commission guidance is necessary, because it is the commission that determines the public interest which constrains utility behavior. Gas utilities have available various options and strategies for procuring gas supplies and transportation, each of which has varying effects on the different objectives of planning. A least-cost plan, which focuses on procuring the cheapest gas supply sources, might minimize costs but, in the process, compromise other objectives such as reliability and moderate price volatility.

[4] Methods and conceptual thinking on how a commission can make trade-offs among different objectives, see Ken Costello, *Decision-Making Strategies for Assessing Ratemaking Methods*, NRRI Report 07-10, September 2007.

2. ***Existing and future gas-service requirements*** must take into account projected design day demand, and energy efficiency activities and targets identified by the commission. Design day demand is a 24-hour period of demand applied by gas utilities for planning capacity requirements. Many gas utilities use the coldest day in the past twenty years or longer to determine design day demand. Some utilities even argue that the appropriate planning standard for design day demand is the "coldest day on record." By incorporating utility energy-efficiency initiatives into demand projections, a gas supply plan takes on the appearance of an integrated resource plan, and the process of creating one is a form of portfolio management.

3. ***Future availability and prices of gas supply and transportation:*** Several gas utilities project the price of gas by using the NYMEX futures price, adjusted for transaction-specific factors like the transportation differential between the local hub or delivery point and the Henry Hub in Louisiana. Many analysts consider the NYMEX price an unbiased estimator of the future price of gas supply. Consideration of price forecasts based on a strict analysis of fundamental market factors is also appropriate. If a utility needs to acquire additional pipeline capacity, it has the option of purchasing released capacity from other shippers, or new pipeline capacity through an open season process, or both. In some situations, purchase of long-term "non-firm" capacity also may satisfy the utility's transportation needs.

4. ***Affiliate relationships and outsourcing*** include an affiliate taking on the role of asset manager or a major supplier of gas for the local distribution utility: For some gas utilities, a distinct corporate entity party assumes the procurement responsibilities. Sometimes referred to as an asset manager and often an affiliate of the gas utility, this entity can help increase utilization of the utilities facilities, and therefore lower gas costs. An asset manager can increase the value of a utility's transportation and storage assets by bundling capacity, gas supply and other services tailored to the specific conditions of the market. The asset manager also can purchase gas for a group of companies that collectively have a higher load factor and a more attractive load shape than an individual utility's "peaky" load shape. The asset manager may have more expertise and resources than the gas utility (especially a small utility) for increasing the value of a utility's capacity and gas supply holdings. Most commissions would expect the asset manager to share with the gas utility the value obtained from the utility's capacity and supply contracts when the utility does not need those assets to supply its gas needs. In many instances, the utility chooses the asset manager through a request for proposal (RFP) process that mitigates the possibility of self-dealing abuses, e.g., favoring the affiliate without regard to merit. Since the gas utility is ultimately responsible for reliable and reasonably priced gas supply, it remains closely involved in procurement and asset management decisions, even on a daily basis.

5. ***Reliability criteria*** include sufficient pipeline capacity plus city gate gas supplies to meet design day load. Many gas utilities ensure the availability of peak gas supplies to core customers by a procuring a combination of: (1) firm pipeline service to the city

gate (i.e., the interconnection point between the pipeline and the local gas distribution system), (2) storage facilities, (3) on-system peaking capacity in the form of liquefied natural gas (LNG) or propane facilities, and (4) access to active spot markets where they can purchase gas on short notice.

6. ***Hedging strategy*** includes layering fixed-price physical (forward contracts, storage) and fixed-price financial price hedges. A minimum threshold level of price hedging is another example. A hedging strategy can include the following information: (1) the objective of hedging, (2) internal reporting requirements, (3) the cost of hedging, (4) the mix of hedging tools, (5) the time horizon of financial derivatives, (6) threshold hedging levels and criteria for discretionary hedging, and (7) the role of price expectations.[5] In some instances, financial derivatives such as futures contracts have advantages over forward (physical) contracts by being more liquid and having lower transaction costs. Financial counterparties generally must meet stringent credit requirements to consummate a deal. One question that often comes up in state commission proceedings is: Should a gas utility establish some minimum threshold level of price hedging to limit the potential effects of gas price fluctuations and sharp price escalations? It is just as important to consider whether a commission should impose a cap on the hedging level to protect customers from overpaying for price stability.

7. ***Portfolio policy for supply and price diversification, flexibility, and balance***. Portfolio-based approaches to gas purchases have evolved from the past least-cost paradigm, partly because of wholesale price volatility and a more dynamic gas market. Diversification gives a utility more flexibility and protection from uncertain future events: A portfolio of gas supplies accounts for (a) the multi-objective nature of planning (e.g., achieving the lowest-cost for highly reliable service, with moderate price volatility); (b) trade-offs among objectives; (c) the value placed on diversity because of complementarities among the different gas supply sources and contractual arrangements (i.e., one source of gas supply having features that compensate for the deficiencies of other sources); (d) interdependencies between the different gas supply and transportation components of a portfolio; and (e) the dynamic and uncertain state of situations in which gas utilities today must purchase gas supply, transportation, and financial and physical hedges. Even after accounting for all of these factors, utility management still has to make a series of collective judgment calls in selecting an

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[5] See, for example, Kenneth W. Costello and John Cita, *Use of Hedging by Local Gas Distribution Companies: Basic Considerations and Regulatory Issues*, NRRI Report 01-08, May 2001, at http://nrri.org/pubs/gas/01-08.pdf; and Ken Costello, "Regulatory Questions on Hedging: The Case of Natural Gas," *The Electricity Journal*, Vol. 15, no. 4 (May 2002): 43-51.

"optimal" plan. A plan that takes into account uncertainty by building in complementarity through diversity, for example, can reduce the adjustment costs to the utility from changed market conditions by mitigating the premature foreclosure of some options. A utility can assemble a diverse gas portfolio by: (a) interconnecting with multiple interstate pipelines, (b) accessing multiple supply basins and sources of supply, (c) purchasing gas supplies under different pricing rules or mechanisms, (d) balancing its portfolio, and (e) staggering of gas purchases and financial price hedges. A gas utility can achieve diversity, for example, by buying gas from geographically dispersed sources using different pricing mechanisms: (1) the first-of-month spot price, (2) the daily spot price, (3) a fixed price, and (4) the NYMEX futures price.[6] It also can achieve diversity by staggering its gas purchases and asset contracts (e.g., for transportation capacity) over different times of the year and month. [7]

8. ***Storage availability*** includes total working storage capability and maximum withdrawal capability. Storage benefits include increased reliability of winter gas supplies and price certainty, and lower transportation and balancing costs.

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[6] Spot transactions, for example, are transactions (next day or next month) whose prices depend on short-run supply and demand conditions, including the international politics of natural gas. Spot transactions provide flexibility to the utility in the daily balancing of supply with demand. Gas utilities use spot purchases to supplement firm contracts during times of high demand or to displace gas having higher cost. Spot markets also required repeated trading, which over time can drive up transaction costs. Term contracts (which are longer than one month) provide the utility with more certainty in price and other attributes of a trading arrangement than spot-market transactions.

Contracting has several dimensions that are negotiated between the buyer and seller, with the outcome largely dependent on market conditions (both physical and financial) and on other contract terms that may provide value to one party or the other. A firm contract that allows for flexibility in daily takes may be worth more to a gas utility than one without this flexibility. This will be reflected in the price. Similarly a take or pay contract will be more valuable to a supplier. On the downside, contracting can produce uneconomic results, namely, a price above the prevailing spot market price, excess gas supplies because of an unexpected downturn in demand, which customers ultimately may have to bear. Simply having a price that is above prevailing market prices, however, may not indicate an uneconomic or unwise choice, if there are other elements of the contract that allow it to work well within a portfolio or if simply unforeseen market developments occurred.

[7] For a discussion of portfolio theory and its application to electricity generation, see Ken Costello, *Making the Most of Alternative Generation Technologies: A Perspective on Fuel Diversity*," NRRI Report 05-02, March 2005, at http://nrri.org/pubs/gas/05-02.pdf.

9. ***Contracting*** includes the utility's decisions on the duration of a contract, the price, the options for changing the purchase price and volumes over the gas year, and other terms and conditions. The evolution of the U.S. gas market over the past two decades has weakened the economic rationale, for long-term contracting of both commodity gas and pipeline transportation in many parts of the country. (Long-term contracts in the past twenty some years, incidentally, have more flexible terms and conditions, including renegotiation provisions, than prior contracts.) Since FERC Order 636, the gas pipeline network has become substantially more interconnected between spatially distinct markets (meaning individual pipelines have enlarged markets). The increased number of producers and pipelines in regional markets has helped to reduce the need for long-term contracts to support investments in pipeline capacity. This development has also increased shippers' ability to switch between pipelines and thereby reduced their preferences for long-term price and reliability protections. Simply put, with a more competitive market that has evolved in the natural gas industry, long-term transactions have become less appealing to shippers such as gas utilities. Because of utilities' "obligation to serve" for core customers, however, in many instances firm and reliable supplies, transportation, and storage are necessary. Meeting this need often requires longer-term contracting with fixed volume levels and pricing. Utilities experiencing load growth, such as in the Northeast, also may need to contract for new pipeline capacity on a long-term basis for such new pipeline projects to be constructed. A utility can integrate long-term contracts into its gas supply portfolio to stabilize prices as well as to assure gas-supply adequacy. Some gas utilities have expressed their reluctance to sign long-term contracts without a regulatory commitment to full recovery of the costs. Commissions' reluctance to make this commitment stems from the downside of long-term contracts, namely, the risk to a utility and its customers from a contract with rigid terms and conditions over a multi-period period. A contract with a fixed price, for example, could lead to the gas utility being stranded with high priced gas and/or capacity, which ultimately customers could bear. Even with this concern in mind, however, longer-term fixed price/volumes contracts can have a place in utilities' gas supply planning and portfolios. The important question to address in planning for such contracts is their percentage of the total portfolio supply. Also, as domestic (including Canadian) gas supplies continue to decline and imported LNG becomes an important part of U.S. gas supplies, longer-term fixed volume and priced contracts may be necessary to ensure reliable and consistent supply of LNG into the U.S.[8]

[8] For a discussion of long-term contracting in today's natural gas market, see Jeffrey M. Petrash, "Long-Term Natural Gas Contracts: Dead, Dying, or Merely Resting," *Energy Law Journal*, Vol. 27, no.2 (2006): 545-82.

10. ***Treatment of uncertainty:*** A GSP also requires taking into account uncertainty over weather, the availability of gas supplies from different regions, the growth rate of the number of customers, gas consumption per customer, and state and federal legislation on the environment, financial trading and so forth. A plan should conduct multiple simulations comparing and analyzing the total costs for different supply and demand conditions. The plan also should examine the effects of each simulation on such factors as gas supply reliability, price volatility, diversity and balance of suppliers, contracting terms and the flexibility of supply arrangements. A well-founded plan should provide for supply adequacy under a reasonable range of contingencies.

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These ten categories of a plan require supporting data. Appendix B identifies generic data utilities should include in a gas supply plan. Much of the data represents a utility's projections derived from different analytical techniques that require scrutiny by commission staff and stakeholders.

IV. Challenges in planning and performance

A. Sources and consequences of problems

1. Divergent interests

If the presumption is that a utility would always attempt to do what is best for customers and the general public, little justification would exist for commission oversight or any involvement at all by government. The reality is that the utility's interests may diverge from customers' and the general public's. The utility, for example, strives to maximize its own financial interests and manage risks consistent with its risk tolerance, which may conflict with customers' interests.

2. Weak incentives for optimal performance

Another source of concern is that a utility may face weak incentives to achieve a high level of productivity or cost efficiency. Weak incentives could come from a purchased gas adjustment (PGA) mechanism that allows for a monthly pass-through of cost changes with a little likelihood of effective prudence review. A utility may be lax in finding the best deals for gas supplies or to manage its storage facilities most efficiently. Under conventional regulatory incentives, a utility would try to avoid a cost disallowance from grossly subpar performance but has little motivation to perform exceptionally well.

3. Incentives which undermine performance

Some regulatory incentives may distort performance by diminishing customer welfare while advancing the utility's interests. One example of such behavior is a utility subject to an incentive mechanism trying to minimize short-run gas purchased costs, while paying insufficient

attention to longer-term costs and cost stability. Uneven strengths of regulatory incentives for interrelated utility functions (for example, as gas procurement and storage management) can lead to perverse incentives with higher overall costs to customers.[9]

Although there is no evidence pointing to widespread inefficient or ineffective behavior by gas utilities, certain inefficiencies are difficult to detect. Detection would require a commission to investigate thoroughly the planning and procurement activities of a gas utility.[10] In carrying out their duties, state commissions need to assure customers and the general public of the prudence and efficiency of a utility's behavior. This assurance requires commissions to have access to information and undertake analysis that allows them to make this determination.

B. List of potential problems warranting commission attention

Discussed below are areas where a utility could plan or perform below expectations or unsatisfactorily, along with the consequences. The adverse consequences fall into one of the following three categories: (1) excessive prices, (2) deficient or excessive reliability, and (3) a level of price volatility incompatible with customers' willingness to pay for stable prices.

1. Utility pays too much for gas supplies and transportation.

The utility could be paying above market price, or not negotiating hard enough to get discounts. A utility generally is a price taker in wholesale gas markets, with little opportunity or ability to negotiates a different price. The actual price it pays, however, depends upon the timing of its purchases, which is subject to management discretion. Spot and futures prices can change quickly and fluctuate widely, with the timing of gas purchases having a large effect on a utility's actual annual average gas costs. What price a utility should pay for gas under contract, and its relationship to the spot price, depends on the relative price-risk aversion of the seller and buyer, If a buyer exhibits more risk aversion than a seller, for example, the buyer would tend to pay more then the spot price to reduce price uncertainty. A buyer operating in a non-liquid spot

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[9] See, for example, Ken Costello and James F. Wilson, *A Hard Look at Incentive Mechanisms for Natural Gas Procurement*, NRRI Report 06-15, November 2006, at http://www.nrri.org/pubs/gas/06-15.pdf.

[10] Uncovering problems often is difficult because it requires detailed and time consuming tasks demanding a high level of skill, knowledge and experience. Analogous to these tasks are those performed by another regulatory agency, the Federal Aviation Administration (FAA). As expressed in a recent article, the FAA "relies on accurate data so that it can identify trouble spots and fix them before they contribute to a crash." See *New York Times*, "Fault-Finding in Dallas between Controllers and Pilots Becomes a Problem for the F.A.A.," April 25, 2008, C4.

market might also pay a premium for contracted gas to protect against possible regional supply shortages.

2. Utility holds excess amounts, or an inefficient mix, of transportation capacity, or fails to take advantage of capacity release[11] and off-system sale markets.

Many gas utilities have taken actions to reduce their pipeline costs by seasonally shaping their pipeline capacity under contract to avoid paying high demand charge throughout the year. An inefficient mix of capacity refers to a utility purchasing year-round, seasonal, and peak capacity in a proportion that is not optimal for its firm load.

3. Utility hedges too little of its gas supplies.

Hedging too little might imply that the utility is purchasing gas mostly on the spot market without covering these purchases with a financial hedge. Even if a utility buys all of its physical gas supply in the relatively more volatile spot market, it can stabilize the purchase price by purchasing financial derivatives. In other words, contrary to common perception, spot and futures transactions are not substitutes. A large number of gas utilities purchase futures contracts to cover future months' requirements and to fix their purchase price. When the month for which the utility requires physical gas approaches, it will sell its futures contract and purchase physical gas. As the two transactions occur almost simultaneously, their prices cancel each other (with an adjustment for basis to account for the difference in the spot price at the Henry Hub and the local delivery point). The result is that customers pay the original price of the futures contract for the physical gas they purchase from the utility. Under-valuing the benefits to customers from less volatile prices could result in the utility not taking sufficient steps to stabilize costs and reduce customer exposure to rapidly escalating gas prices.[12]

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[11] Since FERC Order 636 in 1992, holders of firm pipeline capacity can resell their temporarily excess capacity to other parties in what is called a capacity release market. The holders typically post their available capacity on an Electronic Bulletin Board (EBB) operated by each interstate pipeline. Major sellers of unused pipeline capacity include local gas utilities, which purchase sufficient capacity to meet peak demands. Capacity is consequently available for sale during non-peak periods. These utilities charge their customers for the full cost of all contracted capacity, and then credit their customers with revenues earned from selling released capacity. The ability to release capacity therefore acts to offset the cost of holding excess pipeline capacity.

[12] A few examples exist where a commission penalized or reprimanded a utility for not hedging or not hedging enough. One commission rejected the utility's interpretation of "just and reasonable" rates as necessarily satisfied when the utility pays the spot price for gas. The

4. Utility hedges too much of its physical gas purchases.

It could, for example, fix the price of nearly all winter gas and thereby creating a portfolio that is not sufficiently flexible to purchase lower-priced spot gas in the short term. Customers prefer lower prices over time to higher prices over time (assuming the same reliability of gas service). What is less clear, however, is whether customers prefer more stable prices if they result in higher expected prices over time or require payment in the form of a "risk premium" to those parties willing to bear the price risk (i.e., speculators). Customers have unequal risk tolerances: some customers would be willing to take a chance on always paying the spot price while others would be willing to pay extra to have more stable prices.

5. Utility procures insufficient gas supplies.

The utility might (1) rely excessively on the spot market to purchase gas to meet unexpected demand, (2) over-estimate the reliability of gas supplies from different sources, or (3) diversify too little of its gas supplies from different sources. Unlike many markets, a gas utility cannot rely solely on the price system to prevent service or supply curtailments: when weather or other events cause customer demand to increase, a utility cannot immediately respond by adjusting its rates to balance supplies with demand. Even if it could, evidence shows gas customers to have extremely low short-run price elasticities (i.e., even with large price increases, most gas customers are not likely to reduce their gas consumption by much until they decide to replace their existing gas-using equipment with more energy efficient models).

6. Utility has inadequate knowledge of changing gas market conditions.

A deficiency in acquiring and using market intelligence could hinder the utility from making "opportunistic" purchases. The effect would be higher prices to customers because the

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commission reasoned that: (1) the spot price, over time, may not produce the lowest prices, and (2) volatile spot prices may be incompatible with the expectations and preferences of customers, which would support a more balanced gas-supply portfolio. See *RE PNM Gas Services, A Division of Public Service Company of New Mexico*, 175 PUR 4th 393 (New Mexico Public Utility Commission 1997. In another case, the Nevada Public Utilities Commission found the gas purchasing strategy of Southwest Gas Corporation to be imprudent in failing to mitigate price risk. The commission disallowed recovery of $4.7 million of gas costs. See *Re Southwest Gas Corporation*, 183 PUR 4th 323 (Nevada Public Utilities Commission 1997). In a third case, the Indiana Utility Regulatory Commission criticized a gas utility for not adequately mitigating price risk. The commission disallowed the recovery of $3.8 in gas costs. See Indiana Utility Regulatory Commission, *Application of Indiana Gas Company, Inc. for Approval of Changes in Its Gas Cost Adjustment in Accordance with I.C. 8-1-2-42(g) and 8-1-2-42.3*, Cause No. 37394-GCA68, January 4, 2001.

utility failed to take advantage of good deals offered by gas suppliers and other market participants. Inadequate knowledge of gas market conditions also might lead to reliability problems from, for example, the utility failing to make alternative transportation arrangements when capacity limitations on contracted pipelines occur;

7. Utility shows preferential treatment to an affiliate.

The outcome would be higher prices to customers and less competition for supplying or delivering gas to a utility. Regulatory prevention consists of implementing standards of conduct or requiring competitive bidding for gas supplies, storage service and transportation; and, prohibiting corporate structures that create conflicting loyalties. Although affiliate transactions sometimes can benefit customers because of scope economies, a commission must weigh the benefits against the costs to decide whether it should allow such transactions.

8. Utility fails to base reliability and security criteria on customer values.

The effect is either an excessive level of reliability that results in higher prices to retail customers, or a deficient level of reliability that increases the probability of curtailments of firm services and other reliability-related problems.[13] If the utility wants to achieve higher reliability, it will have to incur additional costs. The planning question is: Would customers value this higher reliability at a level that is at least equal to the additional cost that they will have to pay to achieve it?

9. Utility poorly manages its storage capacity.

A utility might under-fill its storage facilities as of the beginning of the winter heating season. The outcome could be higher prices to retail customers and increased curtailment risks during the winter months. A utility also can schedule the timing of gas injections and withdrawals that does not best serve customers. A third example is the utility omitting gas

[13] Both commissions and gas utilities have a strong incentive to avoid service curtailments because of the high economic costs to customers and the economy and the potential high negative political and organizational effects on the utility, regulation, and public confidence. This public reaction could lead to (1) the state legislature holding the commission accountable and (2) the commission, in turn, holding the utility responsible through detailed prudence hearings. Loss of service is also costly for a gas utility because it requires relighting of all the pilot lights that were extinguished because of a curtailment.

storage from its gas portfolio, thus leaving customers without the reliability protection and mitigation of price increases and volatility during peak demand times provided by storage gas.[14]

10. Utility applies faulty analytics and modeling tools.

Such deficiencies could result in inaccurate modeling output—for example, demand projections and the mix of gas supply sources—leading to poor decisions that can drive up prices to customers or jeopardize reliability.

11. Utility uses poor decision-making processes.

The utility might specify the wrong objectives for planning and procurement or impute the wrong weights to each objective. A utility's objective might include minimizing (1) risk or a worst-case scenario, (2) the expected unrecovered costs, or (3) the probability of unrecovered cost. It might place too much emphasis on purchasing the cheapest gas today, avoiding opportunities to contract for gas that could lead to lower prices in the long term. Another example of a poor decision-making process is the utility not comparing its proposed or actual decision with other available options. The utility, for example, did not fully analyze the effect of other options on customers.

* * *

The following table shows the sources and consequences of some of the above-mentioned problems. A commission may use such a matrix to help investigate the source of certain problems and the effects they might have on customers and the public in general.

[14] In Cause No. 2001000057, the Oklahoma Corporation Commission rejected the argument from Oklahoma Natural Gas Company that storage did not have to be included in a competitively bid gas supply portfolio. The Commission noted that storage is a fundamental, portfolio resource.

Table 1. Sources and consequences of possible problems with gas supply planning and procurement

Problem	Source	Consequence
Excessive price for purchased gas	Weak incentives for minimizing costs	Higher-than-necessary prices to customers
Too little hedging	Risk objectives of utility deviating from customers'; deficient utility staff resources	Higher-than-necessary price volatility for gas purchases
Inadequate knowledge of the gas market	Deficient utility staff resources; weak incentives for pursuing lower-cost gas purchases	Higher-than-necessary prices to customers; inability to exploit market opportunities, reliability of supply negatively affected
Poor forecasting methods for projecting future demand and future resource needs	Lax management, deficient in-house expertise	Inadequate level and mix of gas supplies, raising prices to customers and jeopardizing the adequacy of gas supplies
Abuse of affiliate transactions	Inadequate or lack of standards-of-conduct, inter-affiliate pricing, competitive bidding (for gas supplies) rules	Higher-than-necessary prices to customers, reduced competition for gas supplies
Poor decision-making process	Lack of adequate background knowledge and experience in making decisions under conditions of uncertainty; lack of appropriate analytical tools and/or the knowledge necessary to use tools properly; lax management, wrong objectives and/or weights assigned to each	Sub-optimal gas operations and higher prices to customers

V. A six-step regulatory process for overseeing and evaluating gas supply plans and utility performance

A. Generic functions of comprehensive regulatory oversight

A commission's oversight function for utility planning and performance involves the following six generic and sequential tasks:

1. *Establish principles for utility actions*
2. *Establish expectations or standards for utility actions*
3. *Evaluate a utility's planning strategy*
4. *Make a decision on the planning strategy*
5. *Evaluate utility performance or execution of a planning strategy*
6. *Take actions following evaluation of utility performance*

These six tasks together will enable a commission to detect, examine, respond to, and eliminate or mitigate problems that could jeopardize customers' interests and the public interest. The commission's task is to establish standards and ensure utility compliance. It is not necessary, however, for the commission to tell the utility how to run its business. The utility typically has access to better information and knows better than a commission how to exploit that information to operate and manage its system. Taking the role of a second manager, besides, makes it more difficult for a commission to scrutinize a utility's costs and disallow those costs reflective of imprudent utility decisions.

B. The six steps

1. Establish principles

A commission's principles reflect its highest-order goals for an acceptable gas supply plan and its execution by utility management. These principles must comport with legal mandates, commission rules and policy objectives, national and local policies, including federal regulation of wholesale markets. They can express, for example, what a commission will look at in reviewing and evaluating a utility's planning and procurement activities. Principles can include criteria for acceptable gas supply plans and utility performance, commission procedures for review and evaluation, articulation of major objectives of gas supply planning, general policies, and general factors that the commission will consider in reviewing a plan and a utility's performance.

Examples of principles include:

(1) Gas procurement at reasonable cost (e.g., market-determined costs, costs reflecting a portfolio of gas supplies).

(2) Recovery of all prudent costs, with "prudent" defined.

(3) Cost-effective moderation of price volatility.

(4) Analysis of all available gas supply alternatives on a comparable basis (e.g., discounted costs accounting for differences in attributes among alternatives).

(5) The filing of verifiable data and other pieces of information for commission review and evaluation.

(6) Reliable gas deliveries to the city gate under different demand scenarios.

A commission can articulate, for example, that it will not evaluate the prudence of costs with the benefit of 20-20 hindsight (i.e., not second-guess a utility's decisions solely because of poor outcomes) by considering any cost reasonable that falls within the principles and expectations of the commission. A utility's performance may reflect prudent management even when prices turned out higher, even much higher, than projected under the gas supply plan.

2. Establish planning and performance standards based on the principles

Planning and performance standards comport with the principles by specifying types of utility actions deemed acceptable by a commission. Another way of defining standards is that they translate principles into concrete actions.

An example of a guideline is: A utility should moderate the price volatility of gas purchases. A standard consistent with that guideline is the utility should evaluate all financial instruments and choosing those that are least-cost and compatible with hedging objectives (e.g., protection for residential customers during the winter heating season from extremely high gas prices). Standards should not be so prescriptive as to prevent management from using judgment in light of facts.

Appendix C illustrates commission planning and performance standards for the functions gas supply, pipeline transportation, storage and financial hedging.

3. Review and evaluate the filed plan

The utility's plan should lay out a road map for the next several years (e.g., 5 years), with sufficient detail allowing the commission to evaluate whether the plan conforms to its principles and standards. A commission's evaluation can include the input, analyses, and suggested changes for the filed utility plan from all interested stakeholders.

This step allows a commission and stakeholders[15] to have early input on the elements of planning that arguably they should have to supplement the utility's input.[16] These elements include: (1) hedging or management of risk, where how the utility manages risk may be self-serving and not in the interest of customers or the public generally, (2) the utility's objectives for planning and the weights assigned to each may differ from the commission's, (3) reliability criteria, and (4) others where important policy concerns demand the broadest participation possible.

Appendix D provides a list of questions that a commission would profitably ask in its review of a gas supply plan. The purpose of these questions is to provide the commission with a better understanding of the plan along with its documentation and rationale so that it can judge whether the plan satisfies its own principles and standards.

4. Make decisions on the filed plan

A commission can make different commitments to a plan it approved. In some states, as discussed in Appendix E, commission acceptance of a filed plan, or modifications to a filed plan, means only that the plan meets all information requirements specified by statute or commission rules. This interpretation leaves open the commission's review of the plan's forecasts and other substantive components at a later time when the utility requests recovery of the costs associated with carrying out the plan.

If a commission finds a plan acceptable, this decision should narrow the scope and nature of a retrospective review. Such a review would evaluate the utility's effectiveness in carrying out the approve plan. A commission's commitment to a plan it finds reasonable gives the utility relevant but partial guidance in its activities to carry out the plan, in addition to reducing the likelihood of commission second-guessing.

A commission can offer or impose various remedies to the parts of a plan it deems deficient. A commission, for example, can decide that a utility should file additional or higher quality information, such as forecasts from better analytical models. The commission also may conclude that the documentation supporting the plan's analyses to be wanting. If the utility

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[15] Stakeholder input achieves transparent commission decisions, which increase public credibility and the legitimacy of the commission. This input allows the general public the opportunity to participate in the regulatory process, which should mitigate dominance by any one group.

[16] Some experts of public utility regulation view the primary role of commissions as agents for customers with the duty of protecting customers against abuses by a utility granted *ex facto* monopoly status.

incorporates these remedies into a revised plan, the commission should have a stronger commitment to the plan than if the utility ignored the commission and executes its own preferred plan.

5. Evaluate the utility's performance

A utility's performance depends on both the plan itself and its execution. As a general rule, as long as the utility has carried out its approved plan prudently, the commission should rule its performance as satisfactory.

A prudent utility, for various reasons, might take actions that deviate from its plan. A commission might view a plan or strategy as a work in progress that is open to changes when warranted by new information. A commission should expect deviations when opportunities arise for midcourse corrections to achieve better performance (for example, lower prices and higher reliability). Oblivious to new information, and the use of that information to execute a plan, inevitably would lead a utility to a failed course of action.[17] Thus, a commission's approval of a plan does not protect a utility from imprudence of not modifying the plan when warranted by later facts. A commission therefore should take care to articulate the factual premises supporting the approval of a plan, and state further if these premises change the utility has an obligation to modify the plan accordingly. It is not prudent for a utility to stick to a failing plan merely because the commission previously approved it.

This step involves the commission (1) determining whether the utility's performance complies with the latest gas supply plan; (2) identifying deviations (or the need to deviate) from the plan and the reasons; and (3) detecting subpar performance in specific areas and the reasons. A commission would want to separate out avoidable outcomes from unavoidable ones to evaluate a utility's decisions and actions. Avoidable outcomes mean that evidence of poor performance partly resulted from imprudent or inefficient utility management. Appendix F identifies questions that a commission may want to ask about a utility's performance.

A state commission's review of a utility's procurement activities can have the following three objectives:

1. Identify gaps between a utility's performance and commission expectations as well as the reasons for those gaps (e.g., inefficient utility management, unanticipated market events, weak or perverse regulatory incentives);

[17] A rote execution of a plan means that the utility executes a plan no matter what happens, that is, a utility "places its bets and takes its chances."

2. Determine the recovery of gas, transportation and storage costs by the utility (e.g., via a prudence test or cost-sharing rule that allows a utility to recover less than 100 percent of its costs above a predetermined "benchmark" level);

3. Examine those commission policies and practices that may warrant change because of new developments in the wholesale gas market, changes in commission objectives and conflicts between commission expectations and the incentives provided to utilities (e.g., poor utility incentives for hedging in conjunction with a commission objective of price stability and predictability).

State commissions have heard two polar views on retrospective ("prudence") reviews.[18] One regards these reviews as nothing more than regulatory opportunism directed at penalizing a utility for poor outcomes (even if the utility's decisions underlying the outcomes were prudent).[19] The other view looks at these reviews as dissuading a utility from poor decisions with the threat of a penalty—for example, making the utility more diligent and careful in its planning and procurement. Given asymmetric information, where a utility knows more about its operations and market supply/demand conditions than the commission, some analysts characterize retrospective views as a second-best mechanism to market-like incentives. For most gas utilities, the strong incentives for controlling purchased gas costs derive mainly from the time lag between the incurrence of a cost and its recovery from retail customers, and regulatory prudence reviews where, for example, abnormal costs attract special attention and review. Pressures for cost control also can come from competition between natural gas and other energy sources (e.g., electricity, fuel oil, propane) for meeting the end-use needs of customers.

The early involvement of a commission in the regulatory process reduces the scope and complexity of retroactive reviews. It precludes the commission from having to assess, all at the same time, the utility's planning decisions and its execution of the plan. Such a review process could overwhelm a commission and stakeholders, paralyzing the review process itself and resulting in few positive outcomes.

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[18] See, for example, Glen Blackmon and Richard Zeckhauser, "Fragile Commitments and the Regulatory Process," *Yale Journal on Regulation* Vol. 9, no.1 (Winter 1992): 73-105; and Eric Blank and Stephen Pomerance, "After-the-Fact Regulatory Review: Balancing Competing Concerns," *Yale Journal on Regulation* Vol. 9, no.1 (Winter 1992): 107-18.

[19] Some gas utilities feel vulnerable to an after-the-fact regulatory interpretation of outcomes that resemble Monday morning quarterbacking, especially with regard to their hedging activities. By design, hedging is expected to result in higher prices to customers during some years. Critics point to the excessive focus of retrospective reviews on short-term outcomes, discounting the effect of past utility decisions over a multi-year period.

6. Take actions following performance evaluation

This step involves a commission responding to its evaluation of a utility's performance. It includes a commission assessing its own policies and practices, such as those relating to cost recovery and affecting utility incentives for undertaking specific actions.[20] The commission would ask: "What went wrong, and how can we prevent a recurrence of the problems in the future?"

A commission cannot ignore the interaction between its actions and utility behavior. These actions include: (1) criteria for cost recovery, (2) scope and nature of prudence or retrospective reviews, (3) commission commitment to a utility's gas supply plan, (4) guidance and expectations for utility planning, (5) rules for affiliate transactions and relationships, (6) commission definition of imprudent decisions, (7) incentives for gas procurement and hedging, and (8) incentives for utility energy efficiency programs and sales promotion.

Retrospective reviews and cost-recovery rules affect the risks faced by a utility, thereby directly influencing its actions to best accommodate those risks. Retrospective reviews, for example, may stimulate additional hedging by a utility to avoid the possibility of future cost disallowances from relying on the spot market and paying an extremely high price that a state commission would disapprove. The outcome of this response by a utility would be higher expected gas costs in the long run (from the additional hedging costs) but lower variance of costs. Even if a utility is risk-neutral, it would likely not want to simply minimize expected gas-purchase cost in light of the threat of potential retrospective reviews.

Regulatory incentives have a strong effect on a utility's behavior. Property structured incentives would steer a utility toward those actions that best serve customers and the general public. As one example, good incentives would motivate a utility to manage price risk compatible with customers' preference for stable prices and at least cost. A commission might ask if existing incentives for gas procurement produce results consistent with a least-cost objective over a multi-year period.

When a commission's policies and practices change, utilities adjust their expectations and behavior in line with the likely effects of the policy change such as those pertaining to retrospective reviews and the criteria for cost recovery. Just stating the possibility of imposing

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[20] Events can unfavorably affect a utility's performance. These events may include a high rate of inflation and macroeconomic instability. Major shifts in the general economy or in a specific utility sector can cause a commission to regulate differently. The unstable and inflationary macroeconomic and energy market conditions of the 1970s, for example, led state commissions to create innovative policies and practices to cope with those conditions.

costs or risks on a utility after the fact, for example, can influence the utility's initial decisions on what gas supply strategies to pursue and how to execute them.

Appendix A: Commission Staff Expertise Required for Oversight of Gas Supply Planning

The comprehensive approach presented in this document requires commission expertise in a wide range of areas.[21] Below is a table listing the skills and knowledge required by commission staff to adequately perform the tasks underlying the comprehensive approach. Many of these skills require knowledge of statistics, different branches of economics, decision analysis and finance, among others. Although most state commissions have staff with these skills, dedicating them to gas supply planning and procurement when needed would pose a challenge for almost all commissions. Those commissions may want to petition their legislatures for additional funding to acquire more resources to carry out their obligation of protecting customers and the public interest from imprudent and inefficient utility activities. One area of concern is the origins and consequences of threats to utility customers and the general public from inadequate planning and commission review of planning.

[21] Constraints in staff resources probably account for one reason why most state commissions do not apply the comprehensive approach presented in this document. Another reason might be that the skill set existing at a state commission is rooted in staffing decisions made decades ago, when the industry was different. Other reasons might include statutory or judicial limitations on the extent to which a commission can specify management activities. On this last subject, NRRI will produce a legal analysis by Spring 2009.

Review of	Required staff expertise
Demand projections	Econometric and statistics techniques; customer behavior (e.g., response to price, economic conditions, utility energy efficiency activities)
Price hedging strategy	Basics of risk management, including knowledge of financial derivatives (e.g., futures contracts, options, swaps, collars)
Bundling of gas supply and transportation alternatives by a utility	Optimization tools such as linear programming; portfolio theory
Gas supply price projections	Wholesale gas markets, including supply and demand conditions
Gas distribution physical constraints (city gate capacity, balancing requirements, on-system storage capacity)	Gas utility operations
Utility's decision-making process	Decision analysis under uncertainty
Utility's motivation for different activities	Effect of regulatory incentives, policies and rules on utility behavior

Appendix B: Generic Data Used in a Gas Supply Plan

Demand

1. Annual and seasonal demand
2. Design day demand
3. Load factor (average load divided by peak load)
4. Base load (non-weather sensitive load)
5. Swing load (changes in day-to-day load)

Gas supply

1. Gas hubs and other sources available for delivery to the city gate
2. Contractual and other transactional arrangements available to the utility
3. Termination dates of different contracts
4. Prices for contract gas (e.g., fixed price, indexed price)
5. Maximum daily quantities (MDQs) of gas supplies

Pipeline transportation

1. Pipeline services purchased (e.g., no-notice, other primary firm, secondary firm, interruptible, overruns, imbalance)
2. Contractual terms and conditions
3. Projected gas flows to the city gate from different pipelines
4. Nominations of capacity from different pipelines (e.g., capacity entitlements for transportation to a utility's city gate from different supply areas)
5. Available pipeline capacity and services (e.g., flexibility to meet any balancing and no-notice requirements)
6. Secondary market in capacity

Storage

1. Storage capability (from on-system facilities and leased facilities)

2. Storage injections during non-winter season

3. Management strategy of storage injections and withdrawals

4. Different functions of storage (e.g., meet peak day requirements, exploit seasonal price variations, lower imbalance costs)

5. Maximum daily injection/withdrawal rates

6. Storage capacity and costs

7. Pipeline interconnections

Financial hedging

1. Costs and availability of different financial instruments

2. Minimum hedging threshold (e.g., "dollar cost averaging" where a utility hedges on a pre-determined percentage of its winter purchase requirements based on pro rated purchases over the following 18 months irrespective of prevailing price or forecasted trends)

3. Discretionary hedging (e.g., triggered by the relationship of expected prices to current prices)

4. Role of price expectations

5. Information on the benefits of hedging to customers

Appendix C: Commission Planning and Performance Standards

Gas supply

1. A utility should have reliable and adequate gas supplies to meet design day (i.e., 24-hour period of demand used as the basis for planning peak gas-capacity requirements), winter, shoulder and summer demand under a reasonable range of contingencies.

2. Prices for gas purchased by a utility should conform to current and expected future market conditions.

3. A utility should exhibit effective utility management in contracting, including evaluating and selecting gas suppliers, and negotiating, executing and administering contractual agreements, ensuring adequate counterparty credit-risk protections and flexibility in contract requirements where cost justified.

4. A utility should have a reasonably diversified, balanced and flexible gas supply portfolio consistent with risk and other specified objectives.

5. A utility should bargain hard with suppliers and marketers (e.g., requiring renegotiation rights and flexible terms and conditions when justified by total portfolio benefits).

6. Any utility transactions or interactions with affiliates should conform to open competitive process, standards of conduct and other regulatory rules aimed at achieving arm's length transactions.

Pipeline transportation

1. A utility should have adequate deliverability of gas to the city gate to meet annual, seasonal and peak day demand under a reasonable range of contingencies.

2. A utility should minimize excess deliverability capacity or over-committing the utility financially.

3. A utility should consider long-term contracting and engage in it under appropriate conditions (e.g., required for buying into new regional pipeline capacity or for discounted pricing by the pipeline).

4. A utility should exhibit effective utility management in contracting, including evaluating and selecting pipeline providers, and negotiating, executing and administering contractual agreements.

5. A utility should shape it transportation arrangements, when feasible, to reduce demand charges.

6. A utility should actively participate in the secondary market for surplus pipeline capacity.

Storage

1. A utility should exploit the full benefits of storage, from both on-system facilities and out-of-system contracted or leased facilities, in (a) reducing future gas prices, (b) mitigating price volatility, (c) assuring winter gas supplies, (d) minimizing imbalance penalties, and (e) reducing pipeline demand charges.

2. A utility should consider, on an ongoing basis, storage purchases or leasing from pipelines and other facility owners when available and more cost effective than alternative actions.

3. A utility should schedule storage injection and withdrawal schedule based on historical demand and weather that a utility will attempt to follow baring significant events in demand or weather, which require deviation.

4. A utility should inject gas during low-price periods when possible, i.e., when the current market price falls below forward prices for periods of withdrawal.

5. A utility should not speculate with utility-owned or leased storage where the utility intents to profit from arbitrage.

Financial hedging

1. A utility should hedge at a level and at a cost consistent with customers' willingness to pay for stable prices.

2. A utility should document its hedging strategy, including its decision-making process and internal policies.

3. A utility should structure its hedging strategy and actions in line with hedging objectives and its circumstances (e.g., protection for residential customers during the winter heating season from extremely high gas prices).

4. A utility should evaluate all available financial instruments.

5. A utility's hedging strategy should accommodate changed market conditions and updated information (e.g., discretionary hedging where utility reviews the latest information on price expectations and other market events to determine whether it should hedge more or less).

6. A utility should report to the commission all of its hedging activities and costs, in addition to past hedging performance.

7. A utility should select only qualified utility personnel, or outside contractors, to carry out its hedging activities.

4. Utility senior management should oversee all hedging activities.

Appendix D: Questions That a State Commission Can Ask about a Gas Supply Plan

Element of gas supply plan	Question
General	1. Does the plan comply with the principles established by the commission? 2. Does the plan include sufficient information to evaluate the plan reasonably, and is that information verifiable by commission staff and stakeholders? 3. Does the plan apply well-grounded and generally acceptable modeling techniques and analytics? If not, are the techniques employed sufficiently explained and documented? 4. Was the plan reviewed and approved by senior utility management? 5. Does the plan explain how utility management used the information generated by its studies, analyses and modeling to arrive at its proposed actions (i.e., its decision-making process)? 6. What improvements has the utility made since its previous plan on data collection, forecasting techniques, analytics and the treatment of uncertainty? Are these changes explained and documented to allow commission staff and stakeholders to determine if they are reasonable?
Planning objectives	7. Does the plan express the different planning objectives and the relative importance of each? Does the plan attempt to meet those objectives?

Element of gas supply plan	Question
Existing and future customer demand requirements	8. Does the plan include reasonable demand forecasts for peak (single day, month, and season), shoulder, and base-load demand? Are these forecasts documented sufficiently?
Future availability and pricing of gas supply and transactions	9. Does the plan explain how the utility projected prices for gas supplies from various sources and for transportation and storage services?
Affiliate relationships and outsourcing	10. Does the plan explain the justification for any utility interaction with an affiliate (e.g., scope economies) in supplying gas, transporting gas, leasing storage facilities, or managing its gas procurement and transportation? 11. Does the plan explain the justification for any outsourcing arrangements involving gas procurement or asset management?
Reliability criterion	12. Does the plan explain and document the utility's design-day weather criteria?
Hedging strategy	13. Does the plan include a hedging strategy, assuming that the commission has identified moderate price volatility as a planning objective? 14. Does the plan include an evaluation of financial derivatives and the utility's decision on the purchases of particular derivatives?

Element of gas supply plan	Question
Portfolio policy for gas supply and price	15. Does the plan examine all possible options on a comparable basis? 16. Does the plan explain how the utility will purchase a diverse portfolio of gas supplies from different locations and under different transactional arrangements (e.g., spot market, term contracts)? 17. Does the plan have built-in flexibility for the utility to take advantage of market opportunities as they arise?
Released pipeline capacity and storage management	18. Does the plan show the utility's strategy for releasing surplus pipeline capacity in the secondary market and making off-system sales? 19. Does the plan explain how the utility will mange its storage facilities and gas stored in third-party (e.g., pipeline, marketer) facilities?
Treatment of uncertainty	20. Does the plan take into account uncertainty by examining outcomes under a reasonable range of contingencies? Does the plan include scenario or sensitivity analysis? Does the plan include alternative base-case analysis? 21. Does the plan include an action plan for meeting expected demand in the event that supply resources are not available?

Appendix E: An Overview of Present Regulatory Approaches for Addressing Gas Supply Planning and Utility Performance

State commissions apply varying levels of scrutiny of a gas utility's planning and procurement activities. Some do not review a utility's gas supply plan while others take an active role in overseeing and evaluating a utility's proposed plan. Most state commissions do not apply a comprehensive approach, as outlined in this document, to review and evaluate a utility's gas supply strategy and its execution. They, instead, use some parts of the comprehensive approach, but almost without exception they do not use all of them. In many instances, a commission gets actively involved only when a utility experiences abnormal outcomes, such as sharply higher purchased gas costs or supply shortfalls.

Most commissions also do not provide gas utilities special incentives for gas procurement and related activities. The most common situation for a gas utility is that it does not profit from acquiring and reselling gas. The utility, at best, recovers its full costs; a commission may disallow pass through of some costs to customers with evidence of imprudent utility decision-making.

A recent trend is for state commissions to be more involved in a utility's gas supply plan, especially with regard to its hedging strategy. A 2007 rule enacted by the New Mexico Public Regulation Commission, for example, requires the gas utilities to file a plan every four years. The commission reviews the utility's plan for compliance with the procedures and objectives specified in the rule. The commission can accept the plan without a hearing, unless parties protest to the satisfaction of the commission the need for a hearing. The commission must act within 45 days of the filing of a proposed plan or else the plan is deemed compliant with the commission rule. If the commission determines the plan not to be in compliance, it will identify deficiencies and return the plan to the utility with instructions for re-filing. Utilities also file annual gas supply plans compatible with their long-range plans. The annual plans specify the utility's gas procurement activities taking into account storage, hedging and transportation.

In other states, such as Idaho, Massachusetts, Nevada, Ohio, Oregon, Utah and Washington, gas utilities file long-term gas supply plans with their commissions. Some of these plans include utility demand-side programs that pass some form of a cost-effectiveness test. Commissions in those states review the filed plan and suggest changes.

The Massachusetts Commonwealth Utilities Commission requires a gas utility to file a five-year plan every two years. A plan must include a long-term forecast of gas sendout necessary to serve projected customers, and available supplies, for the ensuing five-year period. The commission also requires that a plan should include "substantially accurate historical information and reasonable statistical projection methods and include an adequate consideration of conservation and load management." The forecasts presented by a utility must meet the

following criteria: (1) reviewability (contains enough information to allow a full understanding of the forecast methodology), (2) appropriateness (technically suitable to the size and nature of a utility), and (3) reliability (provides a measure of confidence that the utility's "assumptions, judgments, and data will forecast what is most likely to occur").

Ohio gas utilities submit ten-year demand and supply forecasts. The Public Utilities Commission of Ohio requires a utility to provide sufficient documentation to permit a thorough review by the commission and stakeholders of the forecast methodology, including testing its validity. A utility also provides (1) analysis of its ability to meet peak requirements under design weather conditions throughout the forecast period and (2) a description of supply projections for meeting winter season requirements.

A review of commission practices reveals that positive signals to a filed gas supply plan (either as proposed by a utility or modified after commission staff and stakeholder input) usually does not include a regulatory commitment to the recovery of all costs associated with the plan. In Utah "acknowledgement" of a plan by the Public Service Commission means that it deems the planning process and the plan itself reasonable at the time of the plan's presentation before the commission. The commission's acknowledgement does not guarantee recovery of all costs incurred to execute the plan.

In Oregon, the Public Utility Commission's approval of a plan also does not assure utility recovery of all costs pursuant to the plan (although the commission will give favorable consideration to a utility's actions consistent with an approved plan). The commission staff makes recommendations to the commissioners. The Oregon commission places much emphasis on a technical-working group and public-meetings process to provide input from a wide variety of interest groups and individuals. Gas plans require: (1) the evaluation of all resources on a consistent and comparable basis, (2) the consideration of uncertainty, (3) specification of the primary goal as least cost to the utility and its customers consistent with the long-run public interest, and (4) consistency with the energy policy of the state of Oregon. A utility must file an action plan that describes its actions over the next two years to carry out its long-term plan. The commission expects the utility to exploit unanticipated least-cost opportunities beneficial to customers after commission acknowledgement of a plan, or explain to the satisfaction of the commission why such opportunities were not pursued. The commission also expects the utility to update the plan at least annually and show that the plan continues to meet the commission planning principles.

In several other states, a commission evaluates the performance of a utility after-the-fact, frequently in an annual PGA reconciliation hearing addressing the recovery of past purchased gas costs. In some of these states, commissions require filing of a gas supply plan. In West Virginia, the Public Service Commission staff reviews a utility's management policies and performance to determine whether the utility has purchased reliable gas supplies at the lowest possible cost; the staff then submits a report and recommendation to the commissioners at the time when the utility requests a PGA change. The commission uses a three-part criterion for cost recovery: (1) reliable, least-cost gas supplies, (2) arm's length transactions, and (3) competitive bidding for the purchase of a substantial portion of the natural gas supplied to a utility's

customers. The Iowa Utilities Board specifies that "the burden should be on the utility to prove it is taking all reasonable actions to minimize its purchased gas costs." The Board has a policy of disallowing any purchased gas costs "in excess of costs incurred under responsible and prudent policies and practices."

In other states, commissions require gas utilities to file annually a supply/procurement plan for the upcoming winter season or for the next year. Gas utilities in New York provide annually a winter-preparedness plan showing they have adequate gas supplies, transportation capacity and stored gas to meet customer demands under peak day and severe winter design conditions. The New York commission also has a policy on gas purchasing practices that emphasizes the need for a gas utility to diversify its gas supplies to mitigate price volatility. The policy highlights the importance of diverse pricing mechanisms by stating that "Excessive reliance on any one gas pricing mechanism or strategy does not appear to reflect the best management of the gas portfolio. Any utility without a diversified gas pricing strategy will have to meet a heavy burden to demonstrate that its approach is reasonable." (See New York Public Service Commission, *Statement of Policy Regarding Gas Purchasing Practices*, Case 97-G-0600, April 28, 1998.)

Colorado gas utilities must file an annual gas purchase plan that shows how a utility will purchase gas and delivery services to meet forecasted demand during each month of the gas purchase year (a twelve-month period from July 1 through June 30). The commission reviews the plan solely for its compliance with information requirements. The commission staff reviews a plan and notifies the utility of violations in filing the required information. The commission makes no judgment on the substantive information contained in the plan. The commission at its discretion may hold a prudence hearing after reviewing a utility's actual performance and the gas purchase plan. The utility then has the burden of showing the prudence of its actions, using the gas purchase plan as a benchmark.

Rules promulgated by the Arkansas Public Service Commission require a gas utility to submit an annual gas supply plan, along with its hedging objectives. The commission staff reviews a plan and determines whether the plan comports with the commission's policy principles. These principles obligate a utility to " achieve the optimum balance of reliability, reduced volatility and reasonable price for the benefit of customers . . . The options that [gas utilities] should consider are long-term contracts as well as financial hedges which act like insurance policies on the cost of gas that utilities must buy." The rule expects a gas utility to take all reasonable and prudent steps to develop a diversified gas supply portfolio. The rule states that the commission will not carry out hindsight reviews, but traditional prudence reviews.

Finally, some state commissions have required management audits of the gas supply and procurement functions of gas utilities. These audits frequently result from evidence of poor utility performance. Some of these audits (i.e., prospective audits) attempt to identify deficiencies of the utility's procedures and decision-making process and make recommendations

for change. Their major objective is to identify ways for a utility to improve its future performance, rather than compiling information to judge the prudence of a utility's past actions. (The other class of audits, called "retrospective audits," reviews a utility's past decision-making and actions to determine any cost disallowances.)

Appendix F: Questions That a State Commission Can Ask about a Utility's Performance

Topic	Question
Gas supply plan execution	1. What actions did the utility take that deviated from planned actions? What were the reasons for these actions? 2. How did the utility respond to market conditions and opportunities not included in its gas supply plan? Did the utility, for example, take advantage of a decline in wholesale gas prices? 3. Is the overall gas supply, transportation, and storage portfolio prepared as a result of the utility's planning consistent with the actual portfolio during the latest period? If not, please explain.
Hedging	4. Did hedging result in more stable prices or avoidance of extremely high prices? Was this outcome consistent with the objective of hedging expressed in the gas supply plan? 5. If hedged prices exceeded market prices, explain the reason in terms of the utility's hedging strategy?
Storage management	6. Did the utility manage its storage facilities to maximize benefits to customers?

Topic	Question
Forecasting accuracy	7. How accurate were the utility's demand forecasts? What accounted for any difference between forecasted and actual demand? Will the utility change its future forecasting approach and methods based on any identified shortcomings of its present approach and methods? 8. How accurate was the utility's price forecasts? What accounted for any difference between forecasted and actual prices? Will the utility change its future forecasting approach and methods based on any identified shortcomings of its present approach and methods?
Abnormal (unexpected) outcomes	9. If prices increase sharply from previous levels, how does the utility explain this development?
Documentation	10. Have all the above answers been adequately documented by the utility?