The Potential for Natural Gas

in the United States

Regulatory and Policy Issues

December 1992 National Petroleum Council

On the Cover: Graphic Representation of Methane Molecules, CH4, the Primary Chemical Compound in Natural Gas.

NATIONAL PETROLEUM COUNCIL 1625 K Street, N.W., Washington, D.C. 20006 (202) 393-6100

December 17, 1992

The Honorable James D. Watkins Secretary of Energy Washington, D.C. 20585

Dear Mr. Secretary:

On behalf of the members of the National Petroleum Council, I am pleased to transmit to you herewith the Council's report entitled *The Potential for Natural Gas in the United States*. This report was prepared in response to your request and was unanimously approved by the membership at their meeting today.

Natural gas has the potential to make a significantly larger contribution both to this nation's energy supply and its environmental goals. Achieving that potential will take a commitment of innovation, leadership, and resources by the industry to overcome challenges that arise from its current operations, its history, and its regulation. The National Petroleum Council concludes that industry has already initiated actions in support of that commitment and believes the industry is prepared to continue those activities.

This study finds that natural gas is uniquely positioned to take on this expanded role for three reasons:

- 1. Natural gas can be produced and delivered in volumes sufficient to meet expanding market needs at competitive prices.
- 2. Natural gas is a clean-burning fuel, and can be used in a variety of applications to satisfy environmental requirements.
- 3. Natural gas is a secure, primarily domestic source of energy that can help improve the national balance of foreign trade.

In addition, much of the groundwork necessary to develop a more competitive and customeroriented industry has already been laid.

Perceptions of natural gas that arise from its heavily regulated past represent the greatest challenge to be overcome by the industry. In particular, the industry must pay more attention to meeting customer needs through greater efficiency and more competitive services. Efforts like this study to define the problem and outline its solution, have become critical to realization of natural gas' potential.

The National Petroleum Council sincerely hopes the enclosed report will be of value to the Department of Energy, and government at all levels, as natural gas and the natural gas industry realize their potential.

Respectfully submitted,

Ray L. Hunt Chairman

Enclosure

An Advisory Committee to the Secretary of Energy

The Potential for Natural Gas

in the United States

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December 1992 National Petroleum Council

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U.S. DEPARTMENT OF ENERGY

James D. Watkins, Secretary

The National Petroleum Council is a federal advisory committee to the Secretary of Energy.

The sole purpose of the National Petroleum Council is to advise, inform, and make recommendations to the Secretary of Energy on any matter requested by the Secretary relating to oil and natural gas or to the oil and gas industries.

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INTRODUCTION

In requesting the overall natural gas study, the Secretary of Energy stated, "The study should consider technical, economic, and regulatory constraints to expanding production, distribution, and use of natural gas... and consider carefully... potential barriers that could impede the deliverability of gas to the most economic, efficient, and environmentally sound end-user." (See Appendix A for the complete text of the Secretary's letter and a description and roster of the National Petroleum Council.)

Volumes II and III of this report assess the economic potential for domestic gas resources and available imports to satisfy growing U.S. demand. Volume IV details the abilities of the transmission and storage system to meet various demand requirements. Those volumes deal primarily with physical aspects of natural gas markets.

The focus of this volume is two fold: (1) to discuss how the regulatory environment affects the operations of the natural gas industry and (2) to address cultural and psychological issues that may affect the operations of natural gas markets. To conduct this portion of the study, a Regulatory and Policy Issues Task Group was established. As the subjects assigned to the group touch all aspects of natural gas, the membership of the group represent production, transmission, and distribution companies and association, as well as federal and state regulatory bodies. (See Appendix B for the Task Group roster.)

OVERVIEW AND CONTEXT

An abundant supply base, adequate delivery capacity, and unmet market needs portend bright prospects for growth of the natural gas industry. What regulatory and policy constraints could prevent our industry from achieving that growth? This question represented the starting point for this study's assessment of the regulatory and policy conditions facing the industry.

In order to assess the perceptions of the industry and its customers more accurately, the NPC sponsored a set of focus group sessions. The feedback from these sessions resonates in major themes and recommendations throughout the entire report.¹

Major Themes: A More Business-Like Approach

In particular, four needs regarding regulation, policy, and behavior emerged as central regulatory and policy themes:

- Reduce regulatory uncertainty
- Reduce the traditional overreliance on regulation

¹The findings of the focus group sessions, as summarized by the consultant employed by the study, are presented as Appendix C. Critical review of this material is suggested, but the study does not necessarily endorse all of the specific conclusions made by the consultant in that document. For those interested in obtaining copies of the reports of the individual focus group sessions, an order form is at the end of this volume.

- Stop behavior that leads to fragmentation and fractiousness within the industry
- Improve customer orientation.

Each theme emerges from an established industry history and culture. Dealing creatively with these challenges requires re-thinking some of our most ingrained beliefs.

Reduce Regulatory Uncertainty

For the past fifteen years, the natural gas industry and U.S. energy markets overall have undergone a fundamental transformation. The resulting regulatory structure has allowed competitive market forces to shape and develop a greater degree of customer-oriented natural gas services and pricing than in the past.

This evolutionary process has contributed to uncertainty about how regulation and competitive forces are likely to work in the natural gas market in the future. Unpredictable changes in the ground rules may alter the business context in which marketplace decisions are made. Regulatory risk borne of after-thefact changes in regulatory requirements may in fact undermine the larger policy goal of changes intended to increase reliance on market forces.

As one focus group participant put it, "Things are changing so fast, you finally think you're starting to understand what the ground rules are and they change again." Customers perceive this regulatory uncertainty as an additional cost of buying natural gas. Therefore, reducing regulatory uncertainty is important to increasing the competitiveness of natural gas.

Halting regulatory reform is no solution to current problems of regulatory unpredictability, regulatory lags, and regulatory risks. Instead, regulators should advance changes that allow for more healthy, market-based competition where possible. Establishing the industry more firmly on a base of competitive transactions gives natural gas the best prospects for the future.

Regulation's role in the emerging industry must shift away from efforts to control markets and toward (1) assuring that adequate information is available to all customers and (2) policing the industry to prevent the abuse of market power. Making that shift quickly and clearly is the regulator's most important task. In particular, clarity of vision on the part of regulators and effective communication of that vision are the best ways to reduce the uncertainty felt by many customers.

Overreliance on Regulation

As regulators struggle to allow competitive pressures to influence price and new service development, the gas industry's traditional overreliance on regulation and regulatory cues (or miscues) must also change. Industry participants must instead rely on their own business acumen and commercial business tools to define success in the markets. As one focus group participant related, "One utility president told me his customer is in the . . . capitol. And he was straight-faced." This kind of attention to regulatory influence broadly characterizes the natural gas industry—a consequence of many decades of heavy regulatory interference in markets.

As the pattern of natural gas regulation changes, the consequences of continued overreliance on regulation are increased regulatory uncertainty and a dangerous lack of customer focus.

Greater attention to competitive forces brings both opportunities and problems—but the problems can (and should) be managed creatively by those parties best suited to the job. A more flexible and competitive industry will naturally develop more services that are better designed to meet customer needs. Overreliance on regulatory signals will stifle the quantity and quality of new services that could flourish if market signals are allowed to replace regulatory cues.

Fragmentation and Fractiousness

All industry participants must work to end the fragmentation and fractiousness that have long characterized our industry. A strong sense of competition is natural, and even necessary, in the industry. Still, the *way* natural gas companies pursue competitiveness is important in creating a positive perspective of the industry.

As one focus group participant explained, "We spent a lot of time fighting the regulatory group in Washington. In so doing, we have made arguments that have been counter to what we should have been making to the customers." Future advantage will come not from victory in adversarial regulatory proceedings, but from customer-oriented efforts across industry segments to create natural gas services that economically and efficiently meet customer needs.

Many industry participants understand this need for change. The NPC study effort itself is an indication of changing attitudes. However, more must be done.

Customers interpret industry fragmentation, and the conflicting signals that arise from it, as evidence of unreliability. The industry needs, for example, more cooperative efforts to develop services designed for dispatchable power generators, to commercialize new gas cooling technologies, to invest in the infrastructure necessary to support natural gas vehicles. At the same time, the industry must develop better ways to meet the needs of our traditional customer base—residential, commercial, and industrial consumers—for reliable services at reasonable cost.

Increasingly, as companies see the value in these efforts, cooperative ventures will become the norm. Today, natural gas companies have the opportunity to begin to develop the relationships necessary to make that change happen.

Need to Improve Customer Orientation

Most importantly, the natural gas industry must improve responsiveness to customers. As one focus group participant explained it, "... we have had to step back and try to figure out what it is that the customer wants. Not what we think the customer wants, but really finding what the hell the customers really want." Confusion regarding roles of industry players impedes this type of customer-oriented thinking. Such confusion is a natural consequence of changes in natural gas regulations and energy markets overall, but solving the "identity crisis" problems of industry participants must be a top priority.

Each company must listen to its customers to determine energy and service needs, alternatives, and business drivers. The services that add value to natural gas will have to fit customer needs better than alternatives. Success will depend on how the industry develops and markets these services.

Natural gas starts with the inherent advantage of being a clean, abundant, and efficient fuel. How this advantage is carried into the market will determine the natural gas industry's success in building the market.

Approach: A Vision Tested through Focus Groups

Without an overriding vision of the desired framework of the regulatory policy processes, individual constraints and their solutions are impossible to evaluate. Therefore, much effort was dedicated to developing a collective vision of regulation and policy. This vision allows for concrete comparisons of existing regulation and policy to a preferred condition.

In addition, and unlike the supply, demand, or transmission study areas, the regulatory process does not lend itself to readily quantifiable measurements. A different and fundamentally more qualitative methodology was dictated by this difference in the type of question posed.

To broaden and test the opinions and experience of study participants, a series of sixteen focus groups was initiated to build a "database" of views on the regulatory process and other key areas of concern in the study. Focus groups were held with producers, marketers, local distributors, industrials, electric utility fuel buyers, electric utility CEO's, independent power producers, state commissioners, state commission staffs, consumer advocates, cooling equipment manufacturers, gas industry equipment manufacturers, pipelines, financial institutions, and natural gas vehicle fleet operators.

Hypotheses were tested against focus group responses in order to document current industry conditions and perspectives, and to identify specific constraints posed by the existing regulatory system.

In summary, the approach was to reconcile the vision of the *desired* regulatory framework with the workings of the *current* system, as documented by the focus groups and the collective experience of the study participants. What lies between the vision and the existing system represents the true constraints, for which recommended policy and/or regulatory options are offered.

History and Context: Rigid Regulation Evolving Toward Reliance on Markets

The complex array of federal and state regulatory oversight which has grown up with the natural gas industry is unparalleled in our domestic economy. Directly or indirectly, this regulatory structure divides the pie of what has grown to be a \$66 billion industry (in direct sales revenue, or about 1.2 percent of total Gross Domestic Product). Regulation also affects the flow of capital investment that determines the role of natural gas in the nation's energy future.

Historical federal regulation of natural gas viewed interstate pipelines as monopolies and put them at the center of a closely controlled, bundled natural gas business. Producers sold gas to pipelines, who in turn sold it to local distribution companies (LDCs), who in turn sold it to customers. The system sought to manage risk through long-term contractual and regulatory commitments and regulatory oversight.

Current state regulation of natural gas evolves from a long and troubled history of determined public interest protection in search of "just and reasonable" rates. This experience sits firmly within the context of broader public utility regulation concepts while attempting to respond to the particular needs of the state's populace.

With the energy crisis of the 1970s, the combined framework of state and federal regulation that had evolved over the century proved to be poorly adapted to changing market conditions. Since then, the natural gas industry has undergone a series of fundamental structural changes, including widespread wellhead price deregulation in 1985, open-access transmission, and the unbundling of pipeline services. A structure of rigid regulation was replaced by a regulatory regime that relies in part on market forces and in part on the vestiges of price and service regulation.

In the 1990s, policy makers and regulators are continuing to make and implement deci-

sions that foster competitive market dynamics and spur increasing reliance on contractual relationships and market-based price signals between the wellhead and the burnertip. The natural gas industry's transition from regulated relationships to voluntary agreements between willing buyers and willing sellers is to be encouraged and facilitated.

Despite this potential, the current mix of regulatory and market change has produced several glaring deficiencies in the industry. In the following section, we examine the constraints posed by this existing regulatory system.

REGULATORY CONSTRAINTS TO GROWTH

The focus group results, as well as the industry's collective experience over the past decade, point to numerous problems with the existing regulatory scheme. Ultimately, these may be described in terms of eight major constraints:

- 1. The regulatory process is unpredictable. Inherent unpredictability of regulatory decision making hampers successful natural gas marketing to energy markets that require any reasonable degree of certainty. Although some of this unpredictability arises from change itself, much of it arises from two other separate issues. First, regulators have often not been clear about the reasons for changes in regulatory practice. Second, changes in review methodology after-the-fact make straightforward commercial decision making difficult.
- 2. The regulatory process is slow. State and federal regulation has been slow to respond to fast-changing competitive market dynamics unleashed through (and sometimes in spite of) recent regulatory reforms. This lag in regulatory response creates market distortions by delaying or preventing market-based action. Compounding the problem, virtually inevitable court appeals stretch delays and attendant regulatory risks to intolerable levels.
- 3. The state and federal regulatory processes are uncoordinated. As natural gas passes from wellhead to burnertip, it is subjected to an uncoordinated stream of federal- and state-level regulation con-

cerning subjects like proration, gathering, interstate, or intrastate pipeline rate making, and LDC regulation. Consumers and industry participants are often confused by the mixed signals they receive from these regulatory bodies. Overlapping and uncoordinated regulation increases costs to the industry and consumers alike, undermining the attractiveness of gas versus competing fuels.

- 4. The regulatory process distorts business decision making. By its very nature, natural gas regulation diverts the attention of regulated companies from promoting natural gas use. Focus group results indicate that, for natural gas, this tendency has reached an extreme where "distributor and pipeline executives are more concerned with meeting the needs of the regulators than they are the needs of customers." After-the-fact prudence reviews may distort business decisions like fuel procurement. Rate-of-return rate making, which may reward capital investment in rate base more highly than business-like decisions, encourages inefficient capital use by gas companies and biases electric utility fuel choice away from natural gas options. Regulatory risk/reward tradeoffs provide inadequate incentives for new pipeline capacity. Taken together, these distortions and disincentives prevent efficient use of management and assets to meet expanding market opportunities.
- 5. The regulatory process causes industry fragmentation. Producers, pipelines, marketers, distributors, and customers routinely find themselves in seemingly perpetual disputes before the Federal Energy Regulatory Commission (FERC) as well as 48 states' regulatory bodies. Parties often begin their battles before these agencies, continue the argument before Congress, and appeal not only to the courts, but even more often to the trade press. Current as well as potential markets are left viewing a divided industry with little credibility or appearance of reliability. Industry pays dearly for the way it competes.
- 6. Regulation limits customer choice. The nature of natural gas regulation has been to define and price a standard set of services from a sole supplier to a broad class

of customers. This principle severely limits the effective marketing of natural gas products and services to niche markets with specific fuel needs and alternatives. The lack of meaningful incentives to provide enhanced, creative service options (and thereby better control costs and increase efficiency) thwarts increased use of natural gas.

1

- 7. Mixing rate making with social policy distorts natural gas markets. Rate making for regulated monopolies has become infused (and even confused) with social policy making. Historical economically inefficient cross-subsidies among customer classes have been justified on the basis of social policy. These decisions create additional costs for some or all customers. This indirect pursuit of social policy prevents efficient pricing, and it places natural gas at a competitive disadvantage versus unregulated energy alternatives (e.g., oil, coal, propane). Ironically, it may even ultimately prevent or discourage more direct and effective means of accomplishing the social goals intended.
- 8. The regulatory and policy environment implicitly treats natural gas as a scarce commodity and rewards existing customers or practices at the expense of new opportunities. Much state and federal regulation concerning natural gas assumes it is a scarce resource to be rationed among historical customers. As a result, traditional "high-priority" customers have received better quality service offerings than new "incremental" customers. "Incremental" markets including power generation, industrial use, etc. have, therefore, been under-served. As a consequence, the resource base has been under-developed and, in the long term, historical customers are denied the benefits of an expanding market base.

The consequence of these constraints is a natural gas industry that cannot achieve the levels of supply and demand needed to produce the greatest efficiency and productivity. To fix these problems, regulators must help the industry move forward toward a more competitive, commercially driven future. The next section describes those recommended solutions.

SOLUTIONS

To better address the dilemmas facing today's natural gas industry, regulators and policy makers need to promote a clear, economically responsible regulatory vision, define the attendant standards, and implement the recommendations described below.

A Regulatory Vision

In the NPC's proposed new regulatory and policy model, increased reliance on competitive market dynamics supplants pervasive regulatory intervention as the preferred means of protecting and advancing the public interest. This vision's premise is the successful functioning of a competitive gas industry that provides a range of services and products to informed consumers who may choose the terms and prices that best meet their needs.

Thus, correspondingly, regulatory policy should be directed toward increasing the *number* and *quality* of choices available to buyers and sellers of energy goods and services, without unnecessarily interfering in the consequences of the choices buyers and sellers may exercise.

This vision emphasizes the role of competitive market principles, while recognizing a reduced role for regulation. Where market forces produce choices of adequate quantity and quality, regulatory policies should rely on those market forces. Where market forces exist, but are not adequately developed to provide sufficient choices to consumers, regulatory policies should strengthen those market forces. Where market forces cannot produce adequate choices, regulatory policies should continue to protect consumers from exercise of market power by imposing a minimum level of choice on the industry, i.e., via the traditional "regulatory bargain."

This vision for the natural gas market incorporates business objectives of stability and profit opportunity based on commercial interaction, as well as regulatory objectives of ensuring customer choices in natural gas service while policing market power. A robustly competitive gas industry will, first and foremost, maximize consumer satisfaction. Implicit in the vision is an industry that will recognize and accommodate differing levels of risk tolerance among segments of the gas industry and its consumers. Risks and associated costs will then be managed by the most capable party.

Under this competitive vision, regulators need to step back and allow customers to decide freely their own levels of service and risk tolerance. Those customers will then bear the costs or reap the savings associated with their choices. Because the functioning of individual choice is integral to achieving the public interest, regulators should not usurp or forestall customer choices by substituting their opinion of risk tolerance for that of the customer.

New Standards for Natural Gas Regulation

The standards that emerge from our vision of natural gas regulation are summarized and contrasted in Table 1 with the widely adopted (or perceived) existing standards.

Two conclusions must be drawn from this side-to-side comparison. First, the new standards are a radical departure from the existing model of regulation. Having let the genie of competition out of the bottle, the efficiencies of competitive markets will be severely distorted without a near complete overhaul of the existing model. Second, the new standards involve policy trade-offs between government's former role in controlling industry and its future role in encouraging industry to develop new services.

In adopting new standards, the industry will take strides toward further deregulation. Nonetheless, this standard deliberately stops short of recommending complete deregulation. It recognizes that natural monopolies persist in some sectors and may preclude direct competition from producing an economically efficient outcome. However, it also recognizes that the bundled natural gas services of the past have distorted the nature of existing natural monopolies. For example, natural gas resales are no longer a natural monopoly, although, in many cases, natural gas transportation or distribution remains a natural monopoly. These important distinctions must be made explicitly.

As a practical matter, and despite apparent efficiency costs, some form of continuing regulation is necessary at both the federal and state level. That regulation should police markets for exercise of market power. Regulation should no longer control those markets for policy purposes.

TABLE 1

NEW STANDARDS FOR NATURAL GAS REGULATION

Existing Model

Just and Reasonable Prudent

Cost Based Social Policy Influenced Protection Tariffs Regulatory Uncertainty Penalties Stability Adequate Supply Lowest Reasonable Cost Guarantee Reliability Franchise

Recommended Model

Competitive Responsive (To Shareholders & Customers) Market Based Neutral Choice (And Risk) Products Observable Market Risks Incentives Efficiency Contractual Security Market Cost Opportunity Service Market Focus

Recommendations

Accordingly, this study's regulatory and policy recommendations, separated into categories of general, federal, and state applicability, are designed to move the industry toward the vision that best meets the goal of allowing natural gas use to grow to its economically efficient level.

General Recommendations

The following recommendations apply broadly to both FERC and state regulatory agencies.

Public Interest Definition

Policy makers and regulators should redefine the public interest pursued in their policies, consistent with the following:

- The objectives that govern the natural gas regulatory process should be reviewed anew, and should include a clear identification of the public interest being furthered.
- Regulatory objectives should be the result of a coordinated state and federal agreement on a new definition of "public interest."

- The public interest should be defined in terms of a functional, competitive gas industry that provides a range of products and services to informed consumers who may choose the terms and prices that best meet their respective needs.
- Industry participants as well as consumers must work with regulators to develop a new regime consistent with revised "public interest" goals.

Regulatory Philosophy

Regulators should enunciate and act upon a regulatory philosophy consistent with the redefined public interest.

- Regulators should affirm the use of market forces in lieu of regulation where such forces are sufficiently robust to provide the market with reasonable service choices.
- Regulation should refrain from unnecessarily restricting the number or quality of choices made available to the buyers and sellers of energy services; neither should it interfere with the consequences of those choices.
- Cross-subsidies among customer classes should be phased out.

Use of Competition

Regulators should identify competitive markets and consider alternative rate structures.

- Regulatory decision making should defer to market forces where they are sufficient to meet customers' needs for choice among economic, efficient, and reliable services.
- Phased activities and pilot projects should be used actively to explore the feasibility of new regulatory structures that use competition in place of traditional regulatory control.
- For markets in which meaningful competition does not exist and where adequate safeguards can be developed, regulators should explore the potential value of incentive rate making. Rate ceilings should be emphasized over profit ceilings. Where continued regulatory oversight is required, pilot projects should be adopted to develop regulatory and industry experience en route to more wide scale programs. Potential examples include sharing-of-savings mechanisms and flexible rate authority.
- Gas procurement should be deregulated where appropriate competitive markets are determined to exist and buyers have meaningful equal access to competing gas supplies.
- Regulation of safety and related minimum service standards should remain intact.

Communication

Regulators should invite meaningful communication with each segment of the industry, and across regulatory jurisdictions, with regard to general policy and rate issues.

- Communication should take place individually and through regulatory and industry associations.
- Regulators should attempt to understand the effects of their regulatory decisions on sectors of the industry, in order to prevent undesirable side-effects, and for consistency with overall national policy objectives.
- The FERC should clarify its interpretation of *ex parte* rules to recognize the impor-

tance of effective communication in the context of generic rule makings.

- Congress should modify the Sunshine Act so that it does not apply to generic proceedings.
- Federal and state regulators should be encouraged to meet in order to discuss general regulatory issues and objectives.

Regulatory Certainty

Regulators should develop procedures that improve regulatory predictability.

- Individual rules and regulations, as well as authorizing statutes, must be reviewed to remove impediments to real-time informed choices and educated risk assumptions by natural gas sellers, transporters, and customers.
- Regulatory proceedings that remain necessary must be timely and efficient. Procedures should be adopted so that no rate case at the state or federal level would take longer than a reasonable time certain, such as nine months.
- Adequate staff and resources to perform timely regulatory functions should be sufficiently budgeted.

Specific Federal Recommendations

New Construction Test

The FERC should eliminate the traditional tests for new interstate pipeline construction:

- The historical test of sufficient supply backed up by long-term contracts and attendant firm service agreements should be eliminated.
- Parties should be permitted to allocate risk through contractual mechanisms.

Up-Front Rate Treatment

The FERC should provide determinations of the rate treatment for new facilities in advance of construction.

 Both project sponsor and affected customers must be afforded reasonable predictability in regulatory rate treatment before construction commences.

Secondary Markets

The FERC should continue to promote the development of robust secondary markets for regulated transport services. Customers should be allowed to trade capacity rights in minimally regulated secondary markets.

Define Competition

The FERC should continue its efforts to establish a definition of competitive markets for transportation and other services.

Specific State Recommendations

LDC Unbundling

State commissioners should evaluate and direct as appropriate the unbundling of LDC sales and transmission services to further the general pro-competition and pro-consumer objectives of the National Energy Strategy and FERC Order 636.

Uniform Code

To promote consistency in state regulation, an appropriate body, such as the National Association of Regulatory Utility Commissioners, the National Association of State Legislators, or the National Governor's Association, should investigate the establishment of a uniform code of regulation available to all state jurisdictions.

Integrated Energy Resource Planning

State regulators should adopt a fully integrated approach to energy resource planning.

- Environmental advantages of natural gas should be recognized in total energy resource planning.
- Evaluation of natural gas applications in meeting traditional end-use markets for electricity (e.g., gas cooling) should proceed in tandem with evaluation of alterna-

tive electric integrated resource planning solutions.

Re-evaluation of Franchise Protection

The benefits of and need for franchise protection for LDC services should be reviewed and reevaluated.

- State regulators should distinguish between captive and non-captive customers and should explore alternatives to traditional service obligations where competitive markets exist or can be created.
- Access to multiple supply options for all customers should be encouraged.
- Regulatory policy should provide LDCs with the appropriate cost allocation, rate design, and pricing flexibility to enable LDCs to compete in the marketplace so that regulators do not have to promote or prohibit bypass of local distributors.

Proration Policy

States should continue to protect the correlative mineral rights of producers and royalty owners and to prevent physical waste through proration rules.

- Limitations on production to protect correlative rights and to prevent physical waste should be divorced from any efforts to control supply or to raise the wellhead prices of gas.
- Producers should be left with the maximum possible discretion to manage their production in relation to swings in market demand and prices.

Define Competition

State regulatory commissions should establish task forces to define and identify competitive markets for transportation and distribution services.



To attain the key domestic policy goals of both a stronger economy and a cleaner environment, natural gas must be permitted to play its optimum role as an energy choice for American consumers. That optimum role will be achieved only if federal and state legislative and regulatory decisions are properly mindful of those larger policy goals.

Government generally and regulators specifically are charged with responsibility for promoting (or at least protecting) the "public interest." Fulfilling that responsibility requires that regulators have more than a vague or ad hoc notion of the "public interest" they are to serve. The public interest standards or criteria to be applied in any given context must be reasonably defined and must be responsive to both current and foreseeable conditions in that context. This is certainly true with respect to regulatory policies affecting the natural gas industry. State and federal regulators must enunciate and act upon relevant, broadly accepted public interest standards for natural gas consumers and the natural gas industry.

The "public interest" with respect to natural gas includes a functional, competitive gas industry that can and does provide a range of services and products desired by informed consumers who may choose the terms and prices that best meet their respective needs. Accordingly, regulation should refrain from unnecessarily restricting the number or quality of choices made available to buyers and sellers of energy goods and services; likewise, regulation in the public interest should not interfere unnecessarily in the consequences of those choices.

Consequently, where market forces produce choices of adequate quantity and quality at reasonable prices, regulatory policies should rely on those market forces. Where market forces are inadequate to provide sufficient choices or to restrain market power, but such forces could be encouraged to develop, regulatory policies should encourage that development. Where market forces cannot produce adequate choices or restrain the exercise of market power, regulatory policies must protect those lacking market power.

Government policies should be designed generally to remove the historical constraints on the development of the natural gas market. Government actions should provide predictability in the regulatory ground rules under which the industry must operate; they should not add to the uncertainty of business decisions made by those in the gas industry or by natural gas consumers.

BROAD POLICY AND PUBLIC IN-TEREST CONSIDERATIONS FOR NATURAL GAS REGULATION

The Secretary of Energy requested the National Petroleum Council to study the potential for natural gas to make a larger contribution to the nation's energy supply and to its environmental goals. The Regulatory and Policy Issues Task Group considered obstacles that may potentially bar or impede the deliverability of natural gas to the most economic, efficient, and environmentally sound end uses.

Many obstacles involve regulation. This suggests that a new regulatory model is needed. The task group determined to identify principles that would underlie the vision of optimal, effective regulation for a reshaped natural gas industry.

This vision is widely, though not universally, shared. Even during the course of this study, the Federal Energy Regulatory Commission (FERC) and some state commissions have taken actions, such as the recent adoption of FERC Orders 636 and 636A, that appear to be consistent with this vision at least in part. The task group also recognizes that the principles and guidelines outlined here may not lead to identical application in every situation.

Blueprint for Regulatory and Public Policy Influences Shaping the Natural Gas Industry

Two levels of obstacles to more efficient natural gas use must be removed. First, *regulatory obstacles* must be removed where market forces are robust. Where regulation is still needed, it should rely, wherever possible, on effective incentives to achieve maximum efficiency. Second, regulation can itself help to eliminate *market barriers* where economic forces are not wholly effective in sustaining a fully competitive market. Although regulatory principles and attention must focus on eliminating market barriers, government must also strive to eliminate regulation in areas where it is no longer needed.

A More Relevant "Public Interest"

An updated and expanded "public interest" touchstone must guide natural gas regulation in this new era. Supply curtailments, takeor-pay costs, statutory prohibitions on expanding natural gas markets, and other disruptions occurred under the largely outmoded regulatory regime whose purpose had been defined as ensuring adequate gas supplies at the lowest reasonable cost, primarily to protect residential and commercial customers. While service reliability and reasonable prices remain the overarching goal for the gas market as it is for any market, whether free or regulated—today's public interest goal should also include a functional, competitive natural gas industry capable of providing a range of services and products desired by informed consumers who may choose the fuels, terms, and prices that best meet their respective needs.

The new public interest definition incorporates both (1) *business objectives* of stability and profit opportunity based on contract and (2) *regulatory objectives* of ensuring customer choices in natural gas service while policing market power.

- A functional gas industry must, first and foremost, maximize consumer satisfaction in both the short term and long term.
- A functional gas industry must meet standards of both reliability and nondiscrimination in gas and service delivery while operating under market pricing of the gas commodity itself in any sector where willing gas sellers and buyers have fair and meaningful access to one another.
- A functional gas industry must recognize and address differing levels of risk tolerance among segments of the gas industry and its consumers. Risks and associated costs must be explicit. Ultimately, customers should be allowed to decide freely their own levels of service and risk tolerances (bearing the costs or reaping the savings associated with the respective levels so chosen). Because this choice is an integral factor in the public interest, regulators should not usurp or interfere with customer choices by substituting their own opinion of risk tolerance for that of the customer.

A Less Intrusive Role for Regulators

Regulation should be even-handed among suppliers of competing energy sources and among consumers' fuel use decisions. Natural gas regulators must avoid imposing real or perceived costs and risks of regulatory interference on gas suppliers and consumers. Such costs and risks distort the market in which buyers, sellers, and transporters must make decisions. The trigger for regulatory intervention must be the market's inability to meet a legitimate, recognized regulatory purpose, such as preventing the accumulation or exercise of unacceptable market power. The benefits of any such regulatory intervention should clearly exceed its costs.

Regulatory actions must be prompt and definitive so that buyers and sellers of the natural gas commodity, of transportation services, and of other gas-related services can make informed economic decisions. Industry decision makers must be able to know, at the time they make their decisions, the actual prices, terms, and conditions that will apply to their transactions. The regulatory system should avoid creating unnecessary uncertainty in the environment in which business decisions are made or implemented.

A Cooperative Mission for Regulators, Industry, and Consumers

Regulators, the natural gas industry, and consumers must work together to resolve the inherent tensions among (1) the use of price both to support capacity additions and to ration limited capacity and services, (2) the political desire to minimize rates for certain classes of consumers, and (3) the public interest in deterring abuse of market power. Resolving these tensions may be difficult, but doing so is necessary to reduce regulatory and market obstacles to the more efficient use of. natural gas and the development of a more functional industry. Regulatory actions should be evaluated in terms of their potential effects on a sufficient supply of natural gas for the future, on sufficient capacity for the future, on service reliability, and on the level of business certainty needed to justify new investments in exploration and production and in transmission facilities.

Government, the natural gas industry, and consumers should frequently re-examine the theoretical basis for regulation. All must recognize, however, the importance of the varying public perceptions and expectations reflected in the premises underlying regulation. If those premises are not (or are no longer) supportable, they should be modified through regulatory reform, policy changes, educational efforts, and other appropriate means.

IDENTIFYING AND DEVELOPING SPECIFIC REGULATORY GOALS

Updating Regulatory Responsibilities

Protection and promotion of the new "public interest" may require regulatory intervention in order to:

- Prevent abuse of market power wherever it may occur, for example by:
 - Avoiding market dominance, e.g., actions that limit the choices of buyers or sellers
 - Avoiding entry barriers, e.g., such as limitations created via unneeded certificate or franchise requirements
 - Avoiding affiliate abuse in areas where a company can be shown to exercise market power.
- Mitigate the effects of market dominance where it cannot be prevented.
- Remove obstacles to the functioning of a competitive market.
- Foster other public policy objectives, such as eliminating cross-subsidies.

Regulatory agencies can intervene and serve these legitimate regulatory purposes in several ways, including the following:

- Encourage alternative forms of dispute resolution. Regulatory agencies can provide specialized forums in which to settle a wide range of controversies, e.g., billing and service problems, capacity access, location of facilities, earnings levels, and rate design.
- Cause or influence outcomes over a wide range of public interest factors. These factors may relate either to the gas industry specifically (e.g., protection against abuse of market power, reducing cost, increasing competition, economic development, energy efficiency, or environmental improvement) or to public interest goals outside the traditional industry arena (e.g., safety and health matters).
- Monitor outcomes for consistency with regulatory goals.

Avoiding Regulatory Pitfalls

With a dual system of regulation, some tension between federal and state regulators may be unavoidable. But conflict can be reduced if regulators, the industry, and consumers can articulate and act upon common goals consistent with the new "public interest." Ideally, state and federal regulators will cooperate to define jurisdictional boundaries, with input from consumers and industry participants. Jurisdictional clarity would help allow the gas industry to pursue unified national goals while allowing each regulatory agency to continue to act within its zone of expertise.

Public policy goals underlying regulation should not be permitted to become confused with any party's or sector's vested interests either in the status quo (or, worse, in a narrowing market) to the detriment of the public welfare that regulation is intended to promote. Regulators should be especially vigilant, during the current era of transition toward increased competition, that their procedures and due process safeguards are not abused by those who wish to thwart new programs, new market entrants, or overall growth in the natural gas industry.

POLICY FAILURES IN THE CUR-RENT MARKET

General dissatisfaction with the natural gas industry's performance is related, at least in part, to failures of current governmental and regulatory policy to act consistent with the vision outlined above. These failures may be described and analyzed in terms of (1) customeroriented service development, (2) uncertainty, and (3) fragmentation.

Developing Customer-Oriented Service

The regulated sectors of the natural gas industry have not developed the types of customer-oriented sales, transportation, and other services that the vision described above requires if the public policy goal of choice is to be achieved. This failure is attributable in part to the industry's traditional lack of customer orientation. Some responsibility must also be assigned, however, to the traditional regulatory structure, and there is growing recognition among regulators that some change is essential for the gas industry to become more customerresponsive.

The sales, transportation, and other services necessary to allow natural gas to compete effectively for current and incremental markets in the increasingly competitive energy market are quite different from the services bundled into the utility services of the past. While ease and reliability of transactions have not traditionally been highly valued attributes in the gas industry, they must become a hallmark of a successfully competitive gas industry. Wherever possible, customers should have a choice of sales, transportation, and other services from competing suppliers at various price levels. Regulatory and market support for such vitality in choice should be encouraged through ratemaking policies, terms and conditions of operation, and billing practices that promote choice and flexibility, promote reasonable business predictability, and, whenever possible, encourage reliance on private, rather than governmental, action to avoid hardship.

Service providers and their regulators need to understand that sales and transportation services must take into account the differing needs of various types of consumers. Based on usage characteristics and needs, natural gas consumers are traditionally sorted into four categories: residential, commercial, industrial, and electric generation. Within each of these categories, however, there is often great diversity. Broad customer classes can easily mask individual customer demand characteristics and impede responsiveness to actual customer needs. Accordingly, when sales, transportation, and other services are being developed by the gas industry (and, where appropriate, reviewed by regulators), these traditional customers categories should be analyzed and subdivided as necessary to reflect actual characteristics and needs.

Ultimately, industry participants must work together to allow the development of sales, transportation, and other services that integrate any or all phases of a natural gas transaction for those customers that want and need such integration. The goal is easy movement from the wellhead and through the gathering system, the pipeline(s), perhaps the storage field, and the distribution system, to the consumer. Allowing competitive markets to develop for these kinds of services—on both an integrated and stand-alone basis—must be a central goal of legislative and regulatory policy. Thus, while a uniform governmental approach is rarely likely to be adequate to address all situations, legislative and regulatory policy solutions must, as a general matter, encourage the development of sales, transportation, and other services that better meet customers' needs.

Limiting Regulatory Uncertainty

Another policy factor that has undermined effective marketing of natural gas has been uncertainty about its price and availability. Some uncertainty, of course, is inherent in any market, but governmental and regulatory policy in the natural gas industry appears to have created additional, artificial uncertainties and risks. These extra uncertainties undermine customer confidence and make other fuels appear more attractive by comparison. Regulators seem aware of this problem and are beginning to act on this awareness.

More specifically, some of the uncertainty regarding industry relationships has arisen from the recent shift from heavy utility-type regulation across all sectors of the industry to an increasingly market-responsive approach in some sectors. One obvious example of this is experience with "take-or-pay." Renegotiation of take-or-pay contracts undermined producers' and pipelines' confidence in contracts as an effective means of allocating risk in business relationships. Regulatory handling of settlement costs confronted consumers with, in effect, charges for reforming and reallocating this risk. Today, regulators must encourage and facilitate the transition from a pattern of regulated relationships to a pattern of contractual relationships where possible.

The regulatory process itself has also been the source of some uncertainty. In particular, unpredictability of regulated rates and access to transportation capacity in the future makes it difficult for some customers to make decisions regarding future energy needs—and for the natural gas industry to meet those needs. The challenge is to develop a regulatory system that allows the affected parties to know natural gas prices and transportation rates with certainty at the time a transaction occurs. Consequently, both the industry and its regulators must no longer permit rate increases or decreases that have a retrospective impact. This change will require that rate cases be completed far more rapidly than they are now, while protesting all parties' legitimate due process rights.

In order to sustain a meaningfully competitive natural gas industry based on contract terms, rate changes should go into effect prospectively after the responsible regulatory agency, with the cooperation of industry parties, has had an opportunity to act expeditiously within a certain time to approve or disapprove proposed rates. Refunds are an inadequate remedy. Reasonable predictability is a must: uncertainty stemming from market swings is inevitable and expected by business people, but the uncertainty caused by regulatory moving targets must be reduced to the greatest practical extent.

Of course, competitive forces too can themselves be derailed by too great uncertainty about market conditions. If competitive forces are to be useful in achieving policy goals, regulation must take more careful account of how its actions create or affect uncertainty among current and potential energy customers.

Overcoming Industry Fragmentation

Another legacy of historical regulation is fragmentation across participants in the gas industry. Instead of working together to achieve an industry that can productively handle the competitive energy challenges natural gas now faces, all segments of the industry too often fall into divisive behavior which current and potential customers may read as poor or unpredictable service. The only way to fix the problem is for each member of the industry to exhibit the leadership necessary to recognize the cooperative benefits of providing service more effectively. Unfortunately, regulatory patterns of the past make achievement of such cooperation a particularly challenging task.

Deciding among conflicting interests is inherent in regulation of the costs of natural monopolies. How these interests are heard, and how their arguments are considered and resolved, can have a fundamental effect on the behavior of industry participants. Witness the long and divisive process of working out the curtailment issues of the 1970s, the pricing issues and anti-gas initiatives of the early 1980s, and the more recent take-or-pay and pipeline restructuring controversies. The inadvertent signals sent by the natural gas industry during these disputes are inimical to encouraging new business. Conflict resolution processes that reward cooperative negotiation and expedited settlement of rate and regulatory issues must be actively encouraged.

While there is probably no single solution to this problem, removing regulatory incentives for interests to fight rather than settle could represent a concrete advance in the development of a more customer-oriented natural gas industry. As the industry faces many complex transition cost and other issues arising from the movement to greater deregulation of some of its sectors, divisive regulatory infighting will only continue to erode customer confidence in the natural gas industry and limit the greater competitive role gas could otherwise play in the nation's energy mix. Prospective gas consumers understand price and service competition; they see it and live with it in their own businesses. What they do not understand (and like even less) is "regulatory competition"i.e., the long and often incomprehensible and inconclusive battles in regulatory forums which, ironically, the consumers themselves are called upon to pay for.

RECOMMENDATIONS

In view of the considerations discussed above, a few policy recommendations can help move the natural gas industry closer to achieving its vision. In some specific instances, however, the appropriate governmental or regulatory policy solution may diverge from these general principles.

Uses of Competition in Certain Markets

In those parts of the natural gas industry where competitive market forces (1) already exist or can be established and sustained and (2) produce an adequate array of valuable services, state and federal regulators should eliminate active regulation. The best example of this type of market is the actual sale of natural gas after interstate pipeline systems offer truly equal and open access to a variety of unbundled services.

Approaches to Regulation in Other Markets

In those parts of the natural gas industry where meaningful competition has not been established, regulatory policy should not simply assume that it has been, but should instead:

- Attempt to develop the conditions under which market forces can be used to develop and maintain adequate service options.
- Failing that, make explicit the principles by which effective regulation of rates will be applied, consistent with the following goals:
 - Protection of industry participants lacking market power
 - Minimal interference with those parts of the industry that can operate competitively
 - Avoiding any regulatory policy actions that intentionally or unintentionally discourage natural gas use.
- Regulate where possible using incentives to simulate market conditions and stimulate efficient operations.

Where robust competition cannot be established or sustained, regulators must recognize that market forces cannot be depended upon to achieve public policy goals. For example, regulation will continue to be necessary for the transmission, storage, and distribution of natural gas where an adequate variety of providers of such services is not available.

Incentive Regulation

Regulators should search for ways to include incentive mechanisms in those areas in which regulation continues to be needed. The objectives of incentive plans may be to reduce costs, to increase service quality, to increase throughput, or to encourage investment in new facilities to meet market demand.

Light-Handed Regulation

Where possible, regulation should police market power rather than explicitly dictate business relationships. For example, in those areas in which private contracts can most efficiently allocate business risk (which assumes that the contracting parties possess reasonably equivalent negotiating leverage), regulators should support, encourage, and refrain from interfering with private contracting. A good example is new pipeline construction, where project financing can often allocate risks and costs through private contracts more efficiently than can regulation. In those areas where regulators cannot rely on private contracts, however, regulators have a responsibility to identify applicable rules in advance of applying them and, whenever possible, in advance of the business decisions to which they apply.

Social Policy and Natural Gas Regulation

Regulators should refrain from pursuing social policies (e.g., income redistribution policies) through the regulation of natural gas sales, transportation, or distribution rates. Such an approach does a serious disservice to both—creating bad energy policy and bad social policy. Direct and measurable, but separate, efforts in each respective area will be better designed to further their respective public policy goals.

Where regulators find cross-subsidies embedded in regulated rates, they can usually improve the efficiency of the natural gas system by removing them. Cross-subsidies cause unrealistically low prices for some services and artificially high prices for others. These incorrect price signals distort the decisions of buyers and sellers of all affected services. If the elimination of cross-subsidies creates sudden rate increases for certain customers, regulators can use cost mitigation measures to phase in the change and soften the impact. But any such mitigation must be transitional. This approach is superior to preserving cross-subsidies that interfere with system efficiency.

Reduce the Burden of Regulatory Procedures

Where possible, unduly time-consuming or costly regulatory procedures should be streamlined or eliminated. Different regulatory bodies will have different issues, but reductions in costs and time will clearly allow more effective functioning of the market.

Use of Experimental Procedures

Most of the above recommendations require new approaches to old problems. In some cases, these new approaches are likely to make policy makers and others uncomfortable. To examine the validity of these principles, the industry should propose and participate in alternative methods for regulatory decision making, and actively discuss the results.

Fragmentation

Participants in the industry must commit to work together to resolve the regulatory issues that prevent the industry from achieving its goals for the greater, more efficient use of natural gas as part of the nation's energy mix. Innovation from the industry itself, as well as from regulators, will be needed to achieve this goal. In seeking and exploring the value of potential innovations, both the industry and regulators should bear in mind that, to be successful, any business must be customer-driven, seeking out and acting on the suggestions of existing and potential natural gas consumers.

<u>Chapter Two</u> Federal Regulation

Many of the problems currently confronting the natural gas industry result from 50 years of well-intended federal regulations under the Natural Gas Act of 1938 (NGA), one farreaching Supreme Court decision, and compensating legislation. Indeed, much of the current federal regulatory effort attempts to remediate the legacy of those sources of authority and the problems arising from them. This chapter summarizes that legacy, explains current efforts to fix those problems, describes the issues remaining, and makes recommendations regarding their resolution.

HOW THE GAS INDUSTRY GOT HERE

Federal regulation of the natural gas industry began in 1938 with the Natural Gas Act, which established federal control over interstate pipeline rates and federal certification of the "public convenience and necessity" of new interstate pipelines. The NGA did not provide for regulation of the price of gas at the wellhead (that came 16 years later with the *Phillips* decision), nor did it interfere with the states' jurisdiction over the activities and pricing practices of the local distribution companies (LDCs), i.e., the largest customers of most interstate pipelines and who serve retail customers.

The early years of federal regulation, which largely coincided with the second world war production effort and the post-war boom, were aimed primarily at promoting the development of an interstate natural gas industry. There was plenty of natural gas available, found over the years as a by-product of the search for oil, and the central problem facing the industry and its regulators was getting that gas to market. Building long-distance pipelines was expensive and risky and, to encourage the construction of a pipeline network, regulations were designed to reduce the risks to private investors. In an effort to reduce supply risks, the regulations required that pipelines, prior to their certification, line up at least 20 years of gas reserves under long-term contracts.

To prevent competition among pipelines and thus reduce market risks, access to markets was severely restricted among the pipelines. Furthermore, financial risks were shifted downstream as the rates approved for pipeline sales to LDCs included commodity minimum bills that required the LDCs to pay for both demand and commodity charges for an agreed-upon amount of gas whether they used it or not. (The pipelines argued that minimum bills were necessary to avoid shifting their fixed costs among customers and because of their take-or-pay contracts with producers.) In exchange for these advantages, pipelines assumed an obligation to serve their markets-a regulatory obligation extending beyond any contractual obligation. That is, although pipelines' commitments were originally established by long-term contract, their obligation to serve continued, even if contracts expired, unless formal abandonment was authorized by the federal regulators.

The regulations deemed pipelines to be monopolies and put them at the center of the natural gas business. Producers sold gas to pipelines, who in turn sold it to LDCs, who in turn sold it to consumers. In this era of economic growth, all parties had reason to like the way the system worked: gas producers had guaranteed markets for their gas; pipelines were able to shift financial risks downstream to final consumers; LDCs were assured of longterm gas supplies; and even consumers were content with relatively inexpensive gas that was always there when they turned the valve or turned up the heat.

By the 1970s the interstate gas industry had matured. Most of the major pipeline systems as we know them today had been built, and a large and diverse gas producing sector had developed. Gas was no longer simply a by-product of oil. However, the regulated fixed price of gas—which was already low—was declining in relation to the prices of other fuels. Gas consumption began to overtake production capacity.

Extremely complex wellhead price controls resulting from the 1954 Supreme Court decision in the *Phillips* case ultimately engendered deliverability shortages in the interstate market which, in turn, led to the adoption of pipeline curtailment plans. Such plans consisted of priority rankings establishing which end users were entitled to which gas at which prices in the event of shortage. Because gas was viewed as a premium commodity, the first to be curtailed were industrial end users and electric utilities; the last to be curtailed were residential and commercial consumers.

The energy price shocks of 1974 aggravated the gas shortage and led to interruptions of gas service to low priority customers and to moratoria on new customers. At the same time, new gas reserves were sold into unregulated intrastate markets at higher prices, and the volume of reserves dedicated to interstate markets began to shrink. For many, the lack of wellhead deliverability was a sign that the resource itself was almost depleted.

Many in the utility and industrial sectors went with less or without, and, as a result, many of those industrial consumers able to do so, began to install alternative fuel capability in their facilities. These installations reversed the moves to natural gas of twenty to thirty years previously. At the same time as markets were being actively discouraged, pipelines—forbidden to compete for scarce gas by bidding up the price—competed instead by bidding up other contract terms, including take-or-pay terms. These contract provisions promised the producer that the pipeline would either take at least a certain percentage of the gas contracted for, or pay for it and take it within a fiveyear make-up period.

Another fallout of the *Phillips* decision was the manner in which interstate pipelines were constructed. Because the NGA had declared natural gas to be "affected with the public interest," and because the *Phillips* decision conferred on federal regulators authority from the wellhead to the city-gate, those regulators required pipelines to demonstrate that their gas supplies matched their market needs. For decades, this showing served well to ensure adequate pipeline capacity; but, in the late 1970s, the regulatory underpinnings of the gas industry, and their effects on supply and demand, were unstable.

This confluence of events led to enactment of the Natural Gas Policy Act of 1978 (NGPA), which effectively reversed the Phillips decision by eliminating the distinction between interstate and intrastate gas sales. With the NGPA's wellhead price deregulation of some categories of gas and steady escalation of the prices of others, the search for gas intensified and production capacity increased substantially. This produced an abundance of gas in the early 1980s, just as a national recession also occurred. The resulting decline in natural gas demand-coupled with the market losses resulting from the curtailment era-produced a rapid drop in prices for newly contracted gas and a surplus of gas deliverability, often referred to as "the gas bubble," at the wellhead.

The combination of declining demand, excess supply, and partially deregulated prices created a paradox in which past and present regulatory requirements had combined to prevent less costly gas from reaching the markets. Producers with excess gas supplies could not get access to pipelines to carry their gas to market. Pipelines, in turn, were reluctant to transport gas for others that would displace their own gas sales and thus aggravate their take-or-pay liabilities to producers. Further distortions stemmed from pipeline decisions to buy high-cost gas—in order to minimize their take-or-pay obligations to producers—in lieu of lower-cost gas not subject to take-or-pay penalties. As a consequence, retail gas prices did not fall along with wellhead prices, and the advantages of *lower*, decontrolled wellhead gas prices did not seem to make it through the nation's transportation and distribution to benefit consumers.

In an effort to get the market started, the Federal Energy Regulatory Commission (FERC) permitted pipelines to implement "special marketing programs" that allowed large industrial consumers to arrange purchases of cheaper spot market gas from producers, marketers, and pipelines, with the pipeline serving only as transporter. To further encourage this competitive supply market, the FERC decided in 1984 to free distributors from pipeline "minimum bills," i.e., the obligation to take or pay for the gas levels specified in their firm service agreements with pipelines. Pipelines were not given the same freedom from their high-price and high-take gas supply contracts with producers.

The court in *Maryland Peoples Counsel* found the multiple eligibility restrictions of these "special marketing" programs to be unduly discriminatory and abruptly ended the programs in 1985. But the impressive success of these and related market-oriented programs was convincing evidence that a new competitive marketplace was anxious to be born. The FERC quickly responded in October 1985 by opening access to pipelines with its Order 436.

Order 436 directed pipelines that volunteered to transport for others to do so for all comers by establishing nondiscriminatory transportation services in addition to their merchant services. Having previously bound pipelines to their existing supply contracts while freeing customers from pipeline sales contracts, the regulators found a pipeline industry unwilling to "volunteer" and thus faced even greater exposure to take-or-pay liabilities. However, as competition forced the pipelines' hand, the pipelines grudgingly began accepting the FERC's open-access rules.

Starting in 1986, pipeline transportation volumes under open access accelerated and displaced pipeline sales. This displacement caused pipelines' take-or-pay liabilities to mushroom to alarming levels by 1988. Those liabilities were eventually disposed of largely through settlements, but also through a crediting program and then a pass through mechanism under which the costs to eliminate takeor-pay liabilities were partially absorbed by producers, partially absorbed by pipelines, and partially absorbed by some LDCs, with the greatest portion passed through to consumers.

By 1991, only 16 percent of annual gas volumes were pipeline sales. That 16 percent, however, was sold largely during the winter heating season, and many in the industry felt that it represented a market on which pipelines had a monopolistic hold. Thus, to complete the seven-year old transition to open-access transportation, the FERC broke that hold in 1992 by issuing its Order 636, a restructuring rule that requires "equality of transportation service" and thus allows non-pipeline merchants using the pipeline-as-transporter to offer the same reliable service that the pipeline-as-merchant can offer.

WHERE WE ARE NOW

In many ways, Order 636, the FERC's restructuring rule, attempts to correct the mistakes of the past, including problems introduced by prior regulatory attempts to remediate other problems. The restructuring rule attempts to correct these problems by:

- Allowing any gas seller to provide a merchant service equal to that offered by the pipeline by separating (unbundling) the pipeline merchant function from its transportation function.
- Taking the FERC out of the role of controlling gas sales. A restructured pipeline can, like its competitors, charge marketbased rates for the gas commodity itself.
- Permitting the pipelines' sales service obligation to expire along with the underlying contract.
- Mandating a capacity release program to create a regulated secondary market for pipeline capacity.
- Providing for pipelines to retain full operational control of their systems.

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• Providing for recovery of all "transition costs" prudently incurred as a result of compliance with the restructuring rule.

While it is too early to tell how successful pipeline restructuring will be (or how long it will ultimately take), FERC Order 636 and the more beneficial aspects of the regulatory and legislative changes of the 1980s appear to be resolving many of the problems that have plaqued the natural gas industry. For instance, the free market for gas production has revealed an enormous natural gas resource base in the United States and Canada, which should put to rest fears of an insufficient supply source. By 1993, regulators will be out of the business of determining the correct price for gas, and the market is beginning to behave (although not consistently) in ways that can be explained by business cycles, competing fuel prices, and other market phenomena. In addition, one source of burnertip price distortions-the never-ending pipeline service obligation—has begun to be eliminated; from now on, natural gas prices (up to the citygate, at least) should reflect the terms of contracts and be subject only to market forces. Finally, confidence in the regulatory compact is at least partially restored with renewed acknowledgment that an efficiently run, regulated entity has a reasonable expectation to recover all prudently incurred costs.

Most importantly, the concept of the "public interest" is being updated and expanded. Whereas the FERC previously sought to protect the public interest exclusively through regulatory fiat, the FERC now contemplates that competitive forces too may contribute to that function. The open market will provide a range of services to consumers who choose the terms and prices that best meet their needs. And, because NGPA curtailment plans apply only to pipeline sales gas, they will no longer control the priority of gas deliveries at the citygate. Increasingly, gas priority will be established and defined (except in serious emergencies) according to gas consumers' own assessments of their needs.

REMAINING CHALLENGES

Recent regulatory and legislative changes do not solve all the problems that have been afflicting the natural gas industry. This section describes regulatory obstacles still hindering the industry's efficient growth. The gas industry, gas consumers, and gas regulators must find ways to reduce the need for regulation by creating workably competitive markets. Where workably competitive markets are not achievable, the challenge is how to reduce regulatory intrusion to the minimum level necessary to protect against exercise of market power to the extent that such power exists. Lesser, but still significant, obstacles include regulatory uncertainty, antiquated construction rules, and divisiveness in the regulatory process.

Mixing Regulations and Competition

Pipeline market power resides in its capacity to flow gas. Not all pipelines possess the same market power, but all pipelines are regulated as if they do. Two questions emerge from this situation: (1) how should regulation differentiate among different levels of pipeline market power? and (2) how can regulators encourage competition for pipeline capacity? These questions tacitly acknowledge that, when available, market forces always do a better job of regulating than regulators can. This fact in no way depends on the quality of the individual regulator or institution. Rather, it simply recognizes that the market most often acts with blunt but fair force to eliminate the inefficient, and it does so quickly.

Of course, competition brings its own set of problems. For example, allowing multiple pipelines to lie along the same corridor would mean duplicate facilities and thus potentially higher costs to consumers. On the other hand, if competition between these two pipelines ensured that consumers would see no more than a fair price for the capacity, these pipelines' rates would not have to be regulated. Inevitably, then, efforts to introduce competition in this area require a weighing of the benefits of regulation (which prevents wasteful duplicate facilities) against the benefits of the market (which eliminates the inefficiencies of regulation).

The FERC still relies on the utility method of rate making: original cost-of-service rates. This method was designed for regulated entities subject to a regulatory compact, in which the pipeline meets its traditional service obligation in return for certain protections from competition. Under this scheme, the original cost of the facility is depreciated for an expected life, and the annual costs are allocated to each service offered according to a test year and projected volumes. This methodology works best when the pipeline is protected from transportation competition.

Original cost-of-service rate making may no longer make sense where a pipeline can demonstrate meaningful competition with its transportation service. Retaining original costof-service rate making in the presence of meaningful competition may force the pipeline to accept the lower of either the competitive rate or the original cost-of-service rate-or it may result in higher cost-based rates than a competitive rate would provide, as was the case when lower-cost gas could not reach the markets. Because the competitive rate is often below the cost-of-service rate, either the pipeline faces the risk of being unable to recover its cost of service or the customer faces the risk of higher-than-market rates. This potentially dangerous situation deserves attention because continuation of original cost-based rates in a competitive environment may lead to a natural gas industry whose risks and rewards have little to do with market realities.

Regulatory Uncertainty

Perhaps the greatest problem still facing the gas industry is regulatory uncertainty. Such uncertainty stems not only from the actions of federal regulators and federal courts, but also from the lack of coordination (and often inconsistency) between federal and state energy regulatory policy.

Federal regulators have made repeated attempts to change the natural gas industry, as

charted in the diagram of the regulatory rule makings that have significantly modified the way in which natural gas is bought, sold, and transported (Figure 2-1).

Moreover, all of the orders identified in the above diagram underwent judicial review, most of it extensive. More often than not, the FERC Orders have been reversed, remanded, and significantly changed in the judicial review process—all of which heightens regulatory risks and disadvantages natural gas as a competitive fuel. In short, natural gas transactions have had to be planned, consummated, and sometimes even reopened in the uncertain context of judicial second guessing of federal regulatory decisions.

The third facet of regulatory uncertainty involves the failure of federal and state regulators to provide consumers with a consistent regulatory policy. While both federal and state regulators are responsible for protecting the public interest, the two bodies often do not appear to agree on what the "public interest" is. For instance, while the FERC has been striving to introduce competition into the pipeline industry it regulates, most state regulators still seem to subscribe to the traditional philosophy that the costs of risks imposed on distributors by the FERC should be borne entirely by consumers.

When gas consumers, potential gas consumers, and Wall Street investment houses look at the natural gas industry, they see a seemingly endless parade of regulatory changes, court challenges, and inconsistent regulatory philosophies. This pattern inspires



no confidence that natural gas is sold and transported by a stable industry.

Construction

Throughout the legislative and regulatory upheavals of the 1980s, the method by which the interstate natural gas industry expanded remained essentially unchanged, except for the Optional Expedited Certificate program created in FERC Order 436, which enjoyed limited application. As described earlier, pipelines applying for a construction certificate have traditionally been required to demonstrate that they had lined up sufficient, long-term supply to meet the demand projected. Under restructuring, pipelines will no longer be the entities who guarantee supply. Recognizing that the traditional test no longer makes sense, the FERC made a failed attempt to deal with it in Order 555. Because that order was removed from the regulations before it became effective, the traditional test technically remains on the books.

The dilemma federal regulators face with respect to pipeline construction is how to encourage sufficient capacity expansions without promoting overbuilding. There are three fundamental issues in any given situation: (1) is a potential expansion warranted? (2) if so, how much? and (3) what rate should be charged for use of the capacity expansion? The FERC's first attempt set up a system of tests that would have virtually guaranteed not only that little expansion would take place but also that anything that built would be sized for the off-peak market and inadequate to handle the peak season. As to rates, the primary issue is whether the cost of new facilities should be (1) rolled into the established system, (2) priced separately as incremental service, (3) priced on the basis of some compromise between rolled-in and incremental treatment, or (4) negotiated among the affected parties.

Divisiveness in the Regulatory Process

As noted more generally in Chapter One, federal regulatory policy has evolved through an adversarial process that promotes contention and litigation. Parties begin their battle before the FERC, but the arguments are continued in the trade press, at conferences where panels are set up to argue opposite points of view, and eventually in the courts where the disputes are finally resolved. While exchange of ideas is certainly healthy, the current process seems structured to frame the debate of any issue in a counterproductive manner.

RECOMMENDATIONS

Federal regulatory impediments to efficient gas use must be eliminated if natural gas is to be allowed to achieve its full potential in building a strong domestic economy and a cleaner environment. To that end, we make the following recommendations:

Define Competitive Markets and Consider Alternative Rate Structures

Federal regulators should tackle the difficult job of defining the characteristics of a competitive market for transportation services. The definition should include criteria that, if met by a pipeline, permit that pipeline to charge marketbased rates for its transportation services.

For markets lacking meaningful competition, federal regulators should explore incentive rate making. Under incentive rate making, as traditionally defined, a pipeline could increase its earnings in return for making needed improvements in productivity or for providing a higher quality of service, lower operational or maintenance costs, or lower investment costs, resulting in tangible benefits for gas consumers. Obviously, adequate protections and safeguards would have to be developed to ensure that incentives truly improve performance and increase efficiency.

For pipelines where market forces exist, but are not strong enough to curb market power, a creative approach is needed that includes some reliance on market forces where appropriate and some reliance on regulation. Regulators should not be reluctant to experiment with combinations of techniques, such as overlaying non-cost-based mechanisms on cost-based rates. The goal should always be to regulate so as to influence pipeline behavior (e.g., through economic incentives and disincentives), rather than to direct it.

Enunciate a Consistent Regulatory Philosophy

Federal regulators should enunciate and affirm the use of market forces in lieu of regula-

tion where such forces are sufficiently robust to provide the market with reasonable service choices. Where market forces cannot produce adequate choices, regulatory policies must balance the protection of those lacking market power with the needs of the regulated entity to provide reliable service at the lowest reasonable cost.

Due to the historically pervasive federal regulatory role, and the equally pervasive fear of the uncertainty associated with it, federal regulators should publicly and repeatedly affirm-and act upon-their intention to rely on market forces to the greatest practical extent to secure adequate supplies of natural gas. While the damage of previous regulatory uncertainty can only be undone over time, the time needed can be shortened by federal regulators' concerted effort to reaffirm their intended reliance on market forces wherever such forces are deemed sufficient to protest against exercise of market power. Such assurances are needed to persuade the gas industry and gas consumers that no more significant changes in direction are on the way.

Finally, federal regulators should work with their state counterparts to reexamine the theoretical basis for regulation itself, working toward agreement on a new definition of "public interest," as described in Chapter One. Under the traditional definition of the concept, the regulatory compact sought to protect both the consumer from monopolistic prices and the regulated entity from the risks of competition. Gas consumers, where possible, should be able to "dial their own risk." In this way, no consumer would find itself forced to accept less reliable service than it now enjoys, nor pay for more reliable service-or a different servicethan it wants or receives. Regulators must be prepared, however, for the fact that such reallocation of risk and reward, along with the elimination of cross-subsidies, will likely result in some services costing more and others costing less than they do now.

Develop New Analyses of New Construction

With pipelines virtually out of the merchant function, it makes little sense to continue to apply the historical test of sufficient supply backed up by long-term contracts and attendant firm service agreements. The FERC should not prevent parties from allocating risk, wherever possible, through private contracts. Indeed, the FERC should generally rely on negotiated rates when they are agreed to on an arm's-length basis in situations where neither party has market power and there is no financial or service impact on other parties.

Provide Up-Front Determinations of the Rates of New Facilities

One of the most harmful aspects of regulatory uncertainty is the arbitrary change from rolled-in rates to incremental rates or vice versa. When gas consumers agree to purchase a service, they need to understand from the beginning what the terms are. Once they agree to those terms and plan their business accordingly, an unanticipated and unpredictable change in the ground rules, sometimes several years after the fact, can make natural gas an extremely unattractive option. Indeed, such changes in rates makes corporate planning all but impossible.

We make no recommendation as to whether incremental rates, rolled-in rates, or some other rates are best; such rate determinations depend on the needs of the particular market being served and on the current regulatory context. Indeed, capacity release and freely available secondary markets for pipeline capacity may necessitate a full reevaluation of issues involving rate making for capacity additions. The FERC should establish market-based principles by which the appropriate method of calculating rates for new facilities can be evaluated on a case-by-case basis, and then allow the market to operate without the threat of subsequent arbitrary changes.

Clarify the Applicability of *Ex Parte* Rules in Generic Rule Makings

Much of the fractiousness of the natural gas industry is due to the lack of a neutral forum where issues can be discussed before they become contentious and where constructive communication can be accomplished. In this connection, current interpretation of the rules may appear to block effective communication on generic rule makings. While a rigid exclusion of any private discussion of individual cases is still generally appropriate, generic proceedings should not be subject to the same standard.

The FERC's guiding principle should be to represent itself to the industry as a collegial body. Being collegial means visiting with all sectors of the gas industry, including the marketplace, with the goal of understanding better the needs of those involved anywhere along the chain from production to consumption.

To this end, the Congress should modify the Sunshine Act, which prohibits more than two commissioners from meeting on any subject without public scrutiny. The intent behind the sunshine rule was to prevent decisions from being made outside the protection afforded by exposure to public scrutiny. In practice, however, the rule has bogged down the process intolerably by preventing commissioners from exchanging ideas with one another except in full Commission meetings. At minimum, the Sunshine Act should be modified so that it does not apply to generic proceedings.

Adjust Rate-Making Structure to Reflect the New Marketplace

For the traditional monopolist, traditional original cost-of-service rate making is appropriate, perhaps along with incentive rate making where appropriate. But, for any pipeline that lacks any market power over transportation services, the FERC should permit marketbased rates just as it now does for competitive unbundled sales services. For the pipeline that has some degree of market power (i.e., is partmonopolist and part-competitor), there is no universal solution. The FERC must attempt to balance its responsibility to protect consumers with its responsibility to allow the natural gas industry to become a functional, stable contributor to the nation's energy needs.

Chapter Three State Economic/Political/Social Regulation

SHORT HISTORY

Black's Law Dictionary defines 'regulate' as follows:

To fix, establish, or control; to adjust by rule, method, or established mode; to direct by rule or restriction; to subject to governing principles or laws.

Based on the Latin word "regula" or "a rule," regulation per se has always been deemed to be a form of control on behalf of the "public interest," the latter concept changing according to the circumstances of the time and context to focus upon economic practice or social policy or both. The public nature of the control makes the political aspects of regulation a given.

Economic regulation, developed and refined in this country through more than a century of carefully crafted legislative and court pronouncements, has emphasized the concept of "business affected with the public interest," focusing upon prices, earnings, entry, exit, and other business essentials. This provided an early American rationale to uphold government intrusions into private business. The term "affected with the public interest" served its purposes initially but later became difficult to apply. It became apparent that the economic forces behind regulation gained strength in pairing with social objectives for regulatory intrusions. *Social regulation,* often seen in other policy areas, also became a tool of control, looking at the "public interest" as reflected in specific standards of conduct, extent and nature of product and service offerings and residue, and comparative social values evidenced by business activities.

Each of these threads has evolved over time to their present embodiment, not only in this country's national regulatory policies but also in the individual states' principles for regulation. In colonial America, regulatory practices included fixing the prices of a number of commodities as well as those of common carriers on both land and sea. With increasing reliance on the railroads during the 1860s and thereafter, state regulation of railroads became the primary exertion of public regulatory control in the latter part of the 19th century.

Regulation of utilities, including gas distributors, followed the pleas of such leaders as Iowa Governor Beryl Carroll, who in 1909 proposed a commission to regulate the public utilities of the state. "Is it not . . . necessary," asked the Governor, "that those who will buy shall not be wholly at the mercy of those who have to sell, especially where there can be no choice of places of buying, such as in the purchase of water, gas, and electricity?"

As interstate pipelines developed in the 1920s, three states asserted jurisdiction over the flow of gas through the pipes, only to have their assertions of power dashed by the federal courts. State regulation of wellhead natural gas prices and processes appeared to be confined only to gas dedicated to intrastate movement as a result of a succession of federal activities culminating in the U.S. Supreme Court's decision in *Phillips Petroleum Co. v. Wisconsin.* State regulatory jurisdiction was thus tailored by federal edict as well as by corresponding federal legislative developments, but it retained much of its viability in economic control over both the production and distribution of natural gas through its flexibility to recognize local circumstances as well as the obvious political need to both protect and promote state constituencies.

State regulatory commissions either developed as deliberative and adversarial judicialtype models or instead took on the role as tough control agents, reporting on behalf of the public to the legislatures. Some perhaps assumed a blended role in the creative judgment of the individual states. Early efforts to exercise regulation through the franchise powers in order to protect investments in a service area—literally to limit entry and competition in a newly emerging natural gas industry-set the framework for the consequent trade-off: establishing regulatory authority to determine rates, review profits, and oversee dividends in exchange for franchise protection. The tables ultimately turned, however, when the artificial world of protective regulation brought with it the price distortions and profits that soon had constituencies seeking instead to change the focus of the "protection"-from protection of investments against eager competitors, to protection of customers against perceived profit maneuvering by the now-protected gas utilities.

Outside of the producing states, the particular form of regulatory commission chosen to regulate natural gas was more likely to be a function of the particular state's experience with regulation of railroads, waterways, and electricity, than it was a specific response to natural gas itself. Modern state regulation of natural gas evolves from a long, yet troubled, history of determined public interest protection in search of "just and reasonable" rates within broader public utility regulation concepts, while responding to the particular needs of the state's populace.

The force and shape of state regulation of natural gas for the past 60 years has been af-

fected more by federal actions than by many of the other potential regulatory factors; this is probably due to the interstate nature of the modern natural gas pipeline system and the relative lack of integration of the natural gas industry. To both the consumer and the industry player, state regulation of natural gas is truly a blended oversight. To the state regulator, the exercise of public control over natural gas is continually tailored and buffeted by the concurrent jurisdiction between state and federal regulation that affects the gas molecule on its journey from the wellhead to the burnertip. This tension lends itself to both some jurisdictional competition over the subjects of control as well as an enhanced sense of independence for state regulation to assert its particular perceived need for tighter or looser regulatory control, depending upon the state's particular political and economic regulatory context.

Within that structure, state regulation of natural gas in the 1990s thus runs the gamut in both the degree and comprehensiveness of regulatory controls. It retains the capability for creativity and responsiveness, for good or bad, stemming from its origins. To many in the natural gas industry (at least those upstream of the citygate), state regulation remains an afterthought, focusing primarily on the regional functions of distribution or on the limited scope of production oversight allowed. Yet, a review of state regulation of natural gas clearly shows that such regulation has indeed made a difference in the natural gas arena and will continue to do so whether inside or outside of the spotlight. Indeed, in light of the Federal Energy Regulatory Commission's (FERC) recent initiatives in restructuring the interstate pipeline industry, the role of state regulation of natural gas can be expected to expand in many respects.

CURRENT STATUS

As the American Gas Association recently observed:

The natural gas industry has undergone a series of fundamental structural changes since 1984. A structure of rigid regulation has been replaced by a regulatory regime that relies on market forces.

The first step in the regulatory change was the move to deregulate the wellhead market for

the natural gas commodity. The second step in the evolutionary process involved the transmission and distribution sectors of the natural gas industry. While both sectors remain regulated, a series of regulatory actions—including openaccess transportation and changes in facility and service certification—have resulted in market forces replacing regulation as the principal factor impacting industry pricing and operations. This change has resulted in a significant reordering of gas rates (prices) to the advantage of certain classes of customers and the disadvantage of others.

With so much focus in the natural gas regulatory arena today on activities at the federal level—due to the dramatic changes brought about by the series of the FERC Orders issued over the past few years—few state commissions working on natural gas industry matters are willing to raise the flag of "deregulation," if for no other reason than to avoid the inordinate scrutiny that follows any use of that buzzword. Yet, a closer look at the current array of state regulatory activities in natural gas shows considerable movement in competitive market areas—movement akin to the much touted deregulation forces at work in the federal arena.

State commissions in gas-consuming states deal today with several different aspects of the regulation of natural gas:

- Traditional rate case questions concerning rate base, rate of return, non-gas cost allocation, and rate design
- The widespread practice of allowing automatic adjustment clauses for gas costs
- Reviews of gas portfolio, capacity, and storage purchases
- Routine price tariffing reviews, including contract and flexible rate tariffs
- Service territory determinations
- Federal case intervention
- Service reviews and complaint forums.

A look at several of the principal areas of statelevel natural gas regulation can be instructive.

Traditional Rate Case

One rule of thumb puts upstream costs at 60 to 80 percent of a local distribution company's (LDC's) expenses, leaving the balance of costs—e.g., distribution pipe, operation, and maintenance—available for scrutiny in a traditional rate base/rate of return contested proceeding. The rate design issues of this function take on increased importance in the context of a competitive market where a good portion of the flexible market is not buying gas from the LDC but is using the LDC only as a transporter. Questions of equity arise with respect to what contribution those shippers should make to the fixed costs of the distribution system.

State commissions are not necessarily moving away from the traditional rate-making policies implicated by this issue, but are instead perhaps seeking two refinements:

- The first portends a move to literal costbased rates, dropping the subsidies that have previously been maintained so that commercial and industrial consumers carry a disproportionately heavy burden of the fixed costs. Such a shift would reflect a revised view of the long-term benefits to the "core" sales customers of the system having a healthy industrial/commercial load—seeking to offer to reduce transportation customers' rates (but not necessarily below the actual cost of serving them) in return for their remaining on the system and thus making some contribution to fixed costs.
- The second is the advent of Demand Side Management or Integrated Resource Planning, a relatively new move into strategic planning by the regulator—a glimmer of long-term awareness and comprehensiveness in public policy that is currently meeting with mixed reviews. To the extent that the state regulator, through a rate case or parallel mechanism, supports, pushes, or requires the LDC to adopt the role of energy manager for itself and its customers, as opposed to simply being a buyer and seller of gas, the character of the LDC would likely be significantly changed and would need to be reflected in its expenses and revenue requirement.

If this course were pursued, however, information and analysis would become rate case tools rather than mere numbers. Gas as a commodity would be viewed as having value. The LDC would be seen as working with that value when it provides services to itself and its customers—services to which attributes and externalities attach and must be accounted for. While Demand Side Management or Integrated Resource Planning is a new emphasis, to the *well-run* LDC it should be simply a confirmation of traditional corporate goals.

Procurement Reviews

If any aspect of state regulatory authority has attracted attention in recent months, it is that of LDC gas procurement reviews. This includes both direct purchases entered into by an LDC with entities other than interstate pipelines, as well as more traditional pipeline arrangements. As an LDC seeks the speedier market response afforded by adding gas supply available from the spot market, brokers, and other non-pipeline suppliers, as well as the much sought-after flexibility in supply portfolio, the traditional regulatory questions of reliability and cost become paramount to the state regulator concerned primarily about the "core" market of LDCs' residential sales customers.

The quest for the perceived reliability of long-term contracts, contradicted by the desire for attractive spot market prices, has given rise to incredible miscommunications and misperceptions in the regulatory/industry relationship. It is here, for example, that the single newspaper headline of one state's disallowing one LDC's procurement costs is seen as heralding a widespread trend of the time—whether or not that perceived trend is based in fact and whether or not it is the reason for particular LDC practices alleged to be in response to it.

More than two-thirds of state commissions have some kind of oversight of LDCs' direct gas purchases. Most of that oversight is conducted through the use of regularly occurring purchased gas adjustment reviews or rate case reviews. The reliability/cost standard most often utilized is a balancing judgment exercised by the regulator, premised upon the validity, reliability, and extent of the specific information available to that decision maker about the LDC in question. That judgment is informed in part by the regulator's perception of the natural gas industry as a whole. A desire or mandate to protect the core customer requires the balancing of long-term and short-term goals, most often affecting reliability as well as the cost considerations.

More and more state regulators are concluding that "best cost" standards are superior and more responsive to customer needs than are "least cost" standards. They are allowing a range of higher-cost, longer-term contracts along with good risk spot arrangements. To the extent that an LDC is actively working the market and avoiding 10-year contracts as a result of its own best business judgment, state regulators will not typically push that LDC into such long-term arrangements. It bears noting that the market itself is not necessarily in a long-term mode at present—and, to the extent regulators seek at least to replicate the market mode, they must remember to change when the market so changes.

An emerging issue in the procurement review process is how to deal with pipeline transportation and storage capacity. Storage clearly has a significant role in a "best cost" supply plan; for example, storage can enhance transportation flexibility. New players are entering the industry, offering varieties of storage facilities and services. The buyer's choices seem now to be geometrically expanded. Watching this occur, the regulator becomes more likely to seek out the information on the impact of these developments and to determine where it fits into the portfolio review—all suggesting that this is a crucial time for LDCs and other industry and consumer representatives to communicate with regulators for the benefit of all.

Tariff Reviews

The traditional LDC tariff as the primary and ever-present regulatory tool is taking on even greater importance in this age of information, both for what they are and for what they are not. To the "core" consumer without market choices, tariffs are the standard for comparative protection. They provide that certainty of offering that brings with it both the insulation from subsidy (i.e., of others) and the implicit fairness that supposedly goes into its approval. To the competitive market participant in need of real time pricing standards, the traditional tariff poses concerns. Timely filings are important to regulators, but they serve the more important role of giving potential buyers a chance to learn the prices and terms on which gas can be bought or moved. That knowledge is an essential condition for a workably competitive market. Alternately, a one-size-fits-all tariff becomes an obstacle to the purchaser seeking responsiveness to its particular needs.

Some state commissions are aware of this current uncertainty and are creative in their responses to it. Utility services are increasingly provided under contracts or special tariffs that are negotiated between utilities and customers outside the traditional rate case, taking the form of economic development rates, incentive rates, interruptible rates, and rates for special services. They often include discounting tools to allow pricing of both supply and transportation below regular tariff rates for the same or similar services, and they may be subject to less regulatory scrutiny than that applied to regular tariffs. Some provisions allow for shareholders and rate payers to share revenue requirement deficits on the theory that maintaining a healthy commercial/industrial customer base is in their mutual long-term interests.

LDC contracting is generally widespread. Intervention by industrials and other competitive purchasers in state commission proceedings is increasing and is showing results. "Control" is becoming less and less the watchword for state commissions' tariff reviews rather, "oversight" is in.

Franchises

The dual role of local and state regulatory authority over franchise assignment causes this area of regulation to be less responsive to emerging trends and more reflective of historical needs. Both sets of regulators are more likely to be promoting the expansion of gas service into new cities and towns—perhaps for different reasons, but to the same end. The long-standing "obligation to serve" is viewed in this time of abundant gas as one of risk for the sophisticated buyer, a trading pawn in the market. But it remains, and is likely to remain, the prevalent standard for the heating customer without supply alternatives to his/her LDC.

Franchise assignments are often viewed as a municipal revenue source under a franchise tax. Instances in which competing providers seek out "core" customers are few, if any; such customers thus typically have no supply alternatives. Cream-skimming by suppliers competing for the lucrative industrial customer is another story. While today jurisdictional bypass disputes are likely to be between the interstate pipeline and the intrastate LDC, it remains to be seen whether such disputes will change to LDC versus LDC controversies.

Federal Intervention

State regulatory commissions are taking an increasingly aggressive stance before the FERC, recognizing that regulatory standards today are determined more on a national basis than they previously have been for any jurisdiction. Similarly, given the direct or indirect effects of federal activity on the LDC transmission and distribution functions, a growing number of state commissions are making sure that their jurisdictional utilities are making their presence known in the federal arena. Anticipatory regulation is the growing trend in public policy. The extent to which it moves into the determination of market policy is an issue inherent in this discussion.

Service Reviews and Complaint Forums

Last, but by no means least, consuming state commissions generally provide some type of oversight of LDC service offerings, approving service tariffs in the traditional mode, and acting as a dispute resolution forum for persons aggrieved by the actions or inaction of their local gas utility. This tends to be a low-key activity but, in the eyes of the public, an extremely important safeguard. To the aggrieved customer, it is a "day in court" for which fairness and an opportunity to be heard are key. It is an ongoing function, likely to take on added importance as rate and pricing reviews decline. It is also a function that is much more within the control of the particular LDC, depending upon its approach to its own service function.

General Comments

State commissions regulating natural gas are busy, confronted by the need to respond fairly and promptly to the day-to-day concerns of people seeking to heat or cool or cook or drive or process or generate—real people, real activities. State regulators are criticized in the utility halls, praised in the editorial pages, and grilled by state legislators. They come in voting blocs of one or two or even a majority, if they are lucky. They operate in a fishbowl of public records laws, open meeting restrictions, and ethical restraints.

State regulatory principles tend to be traditional tenets, tempered by the needs of the moment. Politically born, regulatory standards are not inherently long term or strategic—that is assumed to be the province of the regulated private industry. For most states, the primary regulatory directives—or at least the regulatory structure—is just as likely to be the product of legislative action as commission action. The policies of state regulation of natural gas do not originate or stop at the door of the public utility commission. Indeed, the sources of such policy will vary from state to state.

The combination of the real and the theoretical, the past and the present, are what brings the current status of state natural gas oversight to its regulated/deregulated status. It is practice borne of the need for political practicality—a search for balancing of uncertainty. It is, above all, diverse. These qualities are themselves likely to be slow to change under any circumstances. The *goals* to which these qualities are applied, however, are ripe for discussion.

ISSUES

State Regulation Needs to Respond to Changes in Federal Regulation and the Growth of Competition

The existing regulatory model was created during a different era of the natural gas industry. The traditional model may be less well suited to the changing characteristics of LDC services, the new responsibilities being imposed on LDCs, the new risks confronting LDCs, and the initiatives and innovation expected of LDCs. More specifically, it may be said of the new era: the LDC's customer base is becoming increasingly segmented; the monopoly power of the LDC is becoming weaker; the LDC's gas supply function is becoming more challenging and even fraught with risk; Integrated Resource Planning and Demand Side Management are imposing new requirements on the LDC; and the entire gas industry's future, as bound up in the development of potential new natural gas markets, such as gas-fired vehicles and commercial air conditioning, depend in large part on the LDC's marketing initiatives.

Restructuring of pipeline services under the FERC's direction will bring more competitive options to citygates. LDCs will be able to choose among multiple suppliers, pick unbundled service components that match their needs, and seek pricing terms corresponding to their market needs. But, as these choices are brought to the edge of LDC service areas, they also become more accessible to the LDC's own customers. The competitive demands of these customers put pressure on the LDCs to become more competitive.

Diminishing Rate Base

For many distribution utilities, accounting depreciation of assets has outstripped new investment. In determining the allowable level of retail revenues, retail rate-making methods typically deduct accrued depreciation from the plant-in-service account to set a rate base on which the rate of return may be earned. When depreciation is more than the amount reinvested, the rate base shrinks, and so eventually does the return the LDC is allowed to earn.

Alternative Rate-Making Methods

The issues of growing competition and diminishing rate base, among others, invite consideration of alternatives to rate-based regulation. Among the alternatives being studied are:

- Reliance on market forces. When is reliance on market forces appropriate as a replacement for economic regulation?
- Traditional methods of regulating fair competition.
- Incentive rate-making mechanisms.

Yogi Berra reputedly stated: "You need to know what you want or you might get something else." Any incentive regulation plan requires the regulator to select the desired objectives carefully. The chances of success are greater if the regulator's objectives match those of the utility and the customer.

The first corollary is that *every* regulatory system carries incentives. The second is that regulation does not create *all* incentives. There are many incentives in the world outside the regulatory sphere, and these may be more powerful influences on a utility than anything the regulators can do. Tax collectors, labor unions, tort liability, and environmental enforcement are just a few examples. An incentive regulatory system must coexist with those external incentives. The real regulatory art is to harness and channel them.
Today's existing rate base/rate-of-return system must be looked upon as a form of incentive regulation. Its incentives are to invest and to increase volume. The problems are that these goals are not generally accepted as desirable today. The present system presumes that costs are relatively stable and that they are within the control of the LDC. The system actually does work reasonably well when these conditions are met.

In several situations, however, investment or increased sales are not desired. We have had to create special controls—certification requirements and prudence reviews—to prevent excessive investment. Energy efficiency programs are a counterweight to the incentive to increase volumes. Today's usual adjustments, like the purchased gas adjustment, are designed to deal with situations where the costs are volatile and outside the control of the LDC.

Complaints about the current system are that it encourages inefficient capital use because investment produces earnings while expenses diminish them. The system may reward high risk firms because of the way return on equity is calculated: lower business risk will give a lower return on equity in the next rate case. Unfortunately, the system does not reward firms that build business or maintain service without new investment; the system penalizes these firms through declining rates (on declining rate bases) and earnings. The length of time between rate reviews (called "regulatory lag" in no pejorative way) is critical. For that length of time, an LDC retains the advantage of any performance or sales gains it can create. Frequent rate cases diminish the incentive.

Therefore, the search is on for a workable incentive regulatory method that addresses today's objectives. The biggest costs facing gas utilities now are gas supply and reliability. These costs are volatile but probably within the LDC's control.

Price Cap

Who controls results? LDCs are the primary marketers of gas and thus determine things like load factor that indicate efficiency. It would be fundamentally wrong to reward pipelines for LDC marketing success, or vice versa. This suggests that the price cap concept may be more appropriate for LDCs than for pipelines. On the other hand, unless gas costs are covered by the program, its results would reach only a small part of the end user's bill while potentially making earnings more volatile.

The question now is whether there exists a consensus about what performance we want to encourage, through price caps or through another form of incentive regulation. Though "economic efficiency" would be everyone's answer, there would probably be little agreement about what that means. Would it allow customer choice with greater LDC or pipeline risk? Would it match today's assurance of full cost recovery?

Until general agreement can be reached on the goals of the gas utility, attempts to make a fundamental shift in regulatory method would probably provoke more controversy than benefit. But the search for that agreement should certainly continue.

Maintaining the Decisional Independence and Resources of Regulatory Agencies

A cornerstone of the American regulatory system has been the delegation of regulatory decision making to specialized agencies removed from the mainstream of political control by the executive or the legislative branch. A concern of many regulators and students of regulation, however, is the continuing tradition of expert and apolitical agencies. The immediate cause for this concern is the condition of state budgets. Over half of the states faced deficits during the past year and no relief is evident. Regulatory commissions have not been immune from the resulting cost-cutting pressures. In such a working environment, regulatory agencies find it difficult to retain adequate numbers of personnel with necessary training and experience to deal with the increasingly complex situations LDCs must now present to the agencies.

For the regulated industries, these constraints hold two threats. The first is that regulatory commission staffs will become so lean that they become unable to give prompt or individual attention to particular applications and requests, or else they will lack familiarity with the implications of regulatory decisions. The other potential hazard is that too much of many state commissions' time and political capital must be spent getting approval from the state's personnel, budget, management, and revenue departments for "administrivia" such as personnel actions, purchase orders, and travel requests.

Purchasing Reviews

Purchasing reviews are being given attention by more state commissions for two reasons. One is the least cost strategy that is usually a part of Integrated Resource Planning. When the LDC's menu of needs is clearly identified, including reliability levels and other qualitative characteristics, it is easier to review whether the LDC has achieved the best price for that service package. The other reason stems from the awareness that pipeline open access has multiplied the number of purchasing options available to an LDC to meet its requirements. Historically, one of the basic functions of regulation has been to assure the public that utilities are making sensible decisions in providing service.

LDCs sometimes object to these afterthe-fact reviews. But state regulators' alternative has been *prior* review. Given potential delays in prior review proceedings, that procedure can be unsatisfactory. The controversy between prior approval and after-thefact prudence reviews remains unresolved.

Limiting Regulatory Uncertainty and Overcoming Industry Fragmentation

The discussion of these topics in Chapter Three applies equally to state regulation. The same reasoning and recommendations apply with respect to regulatory uncertainty and fragmentation in state regulatory proceedings as they do with respect to federal regulatory proceedings.

State Regulation of Production and Gathering

As the FERC concentrates its regulatory efforts on the interstate transportation of natural gas, more importance attaches to the upstream functions that are subject to state jurisdiction. The vigor of competition in the interstate pipeline system and at market hubs depends on the ability of many producers to reach these systems and hubs with their gas on economically reasonable terms.

State resource management involves a set of complex issues. Most oil and gas commissions reflect the model codes developed by the Interstate Oil and Gas Compact Commission. Its primary purposes are:

- To prevent waste, i.e., to obtain maximum production for least cost
- To give all mineral owners a fair opportunity to participate in production of their gas and oil.

The Interstate Oil and Gas Compact Commission models stop short of regulating the movement of oil and gas to market after production. State regulatory authority over these transportation, processing, and gathering functions may be vested in the public utility commission, a natural resources agency, or a separate oil and gas commission. This phase of regulation, however, is not strong. The agencies generally do not feel inclined to regulate transactions that take gas into an interstate system subject to FERC regulation. Moreover, production and gathering are functions often performed by companies that do not cleanly fit the definition of utilities that provide a public service.

Yet transportation, processing, and gathering facilities have the potential of exerting monopoly power over producers dependent on them for access to the interstate system. Anecdotal evidence abounds that such market power is real in many cases. As with distribution systems and consumers at the other end of the interstate transmission system, the availability of competition and bypass options may determine the extent of that market power.

In a narrow set of circumstances, some regulation of gathering may be warranted. A possible example to consider is when an interstate pipeline sells gathering facilities to an unregulated company and there is no contract between the gatherer and the producer. This issue is complex and is discussed more fully in Volume IV, Transmission and Storage.

RECOMMENDATIONS

The preceding discussion has outlined not only the historical objectives and current status of regulation by state jurisdictions, but also the primary issues of natural gas regulation that lead us to our visionary quest for change. The objective is clear as stated in the vision. The specific routes that must be taken to reach that objective will depend on two related reassessments:

- Revisiting the historical objectives of regulation
- Resolving issues arising from current practice.

Redefining the Public Interest

It is incumbent upon state policy makers and those who help initiate or frame the discussions from which state regulatory policies arise to revisit and clarify the "public interest" concept that has traditionally guided state regulation. Just as the natural gas industry itself must seek to determine who its own customers are, so too must the state regulatory community determine who its "customers" are, whose public interest is being furthered by what actions. The answers to those questions will likely be different from answers offered several years ago.

Our call to action on this point is that the industry must participate in, if not initiate, the necessary discussions and seek out those theorists and policy makers able to credibly raise the issue of a revised public interest and contribute to its discussion. That discussion must not be internal to the gas industry; it must be open to all interested participants.

Current State Regulatory Methods

As for the tools of state regulation, the foregoing discussion of issues has described concerns and set forth the need for change. Those points reveal that the issues themselves have changed in the natural gas industry for state regulators, thus creating a need to revisit the very regulatory tools traditionally used.

Although we cannot endorse all the conclusions of the report, these elements are perhaps best set forth in a report by the National Regulatory Research Institute, *State Regulatory Challenges for the Natural Gas Industry in the 1990s and Beyond* (June 1992), which breaks the issues into four areas.

- 1. The extent of regulation should be driven by the level of competition in the market.
- 2. Regulation through obligations to serve should be applied in cases where customers are captive and competition is not possible.
- 3: Competitive market prices can and should be used as benchmarks for regulation.
- 4. Secondary markets, even for regulated services, can add value that should be recognized by regulators.

State Regulatory Flexibility to Work Through Those Changing Issues

Communication with Regulators

Regulators can react to changing circumstances if they are given a chance to observe and understand the changes. But the industry mistakenly assumes that state regulators understand the effects of their LDC-regulating decisions on other sectors of the industry, e.g., producer activities. Thus, communication with state regulators is key. If the natural gas industry seeks to have state regulation change, *each* component of the gas industry must devote the time and effort to conveying its needs and its rationale to the principal regulatory policy makers, individually and through regulatory associations.

Alternatives to Conventional Rate Making

The issues of growing competition and diminishing rate base invite consideration of alternatives to rate-based state regulation. Reliance on market forces where appropriate should be the primary objective of state regulation, within a newly defined public interest. Phased activities to achieve that reliance include regulatory recognition and encouragement of appropriate incentives, particularly those emphasizing sharing-of-savings mechanisms and flexible rate authority.

Strategic Review of Planning and Purchasing

Integrated Resource Planning activities, as well as the incredible array of purchasing

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options opening to LDCs, put considerable emphasis on natural gas purchasing reviews, including oversight of each LDC's participation in the whirling arena of pipeline capacity, storage, brokering, unbundling, futures, and mechanisms yet to be identified. As the tendency grows for distinct core and competitive markets to be served, the state regulatory body is likely to keep an eye on any disparities between "bargain" purchases for non-captive customers and high mark-up purchases for the core market—a cross-subsidy issue.

Additionally, the question arises whether there remains an obligation to serve the noncaptive customers who possesses alternative fuel capabilities. If that obligation is dissolved, then the reasons for the traditional purchasing reviews relating to purchases for that customer may become more difficult. The load requirements for non-captive customers are, by definition, unstable and comparatively unpredictable—difficult to apply to the regulatory purchasing review standards of reliability and "best cost" applied to determine how an LDC is serving a stable and predictable load. Movement made by some state regulatory bodies incorporate relatively simple standards through sharing incentives within a competitive commodity market in lieu of the traditional "best cost" standards. Such movements should be encouraged and pursued where appropriate competitive markets are determined.

Regulatory Uncertainty

To answer the challenge of developing a regulatory system and a market system that allow affected parties to know the natural gas prices and transportation rates with certainty at the time a transaction occurs, the regulatory community is looking only at prospective rate determinations and time-confined proceedings. More is needed. Individual state rules and regulations, as well as authorizing statutes, must be reviewed to remove impediments to real-time informed choices and risk assumptions by natural gas customers. Regulatory proceedings that do occur must be timely and efficient.

One component of such regulatory efficiency is the quite mundane but strikingly important point of allowing the regulatory body to have sufficient resources to carry out its functions in a thorough yet timely manner. A rolling trend of state budgetary concerns has decimated many state regulatory commissions of staff and support resources at a time when regulatory functions and indeed deregulation functions are becoming more complex and demanding. Regulated utilities, as well as the customers they serve, have a stake in the viability of the regulatory body—a stake that must be recognized in the provision of adequate staff and resources to perform these important functions thoughtfully and well.

Speed of Change

As stated in the previously cited National Regulatory Research Institute report:

As the natural gas industry as a whole becomes more open, market-driven, and decentralized, . . . a growing number and variety of "stakeholder" groups will seek accountability from the LDC and due process from the commission, and with growing effectiveness. On the whole, these groups will be more familiar with unrequlated markets and less sympathetic to inherited regulatory concerns and conventions than previous cohorts of commission intervenors. We are convinced, therefore, that a sequence of demands . . . will sooner or later prove irresistible to most LDCs and to most commissions.

State regulators as a whole are not adverse to the changes potentially to be brought about. Just as other parts of the natural gas industry look with uncertainty to a future governed by changed (and changing) issues and attitudes, state regulation shares that hesitation. State regulation, however, is born of perceived need in the public interest and is a political, cooperative venture by nature. The time is ripe for regulatory change in the state arenas. To the extent that change is achieved by consensus and understanding among the parties, the results for public policy purposes, as well as for industry purposes, are likely to be satisfying.

But time is of the essence, and a timely willingness to communicate, educate, and cooperate, must be the tools of change on the part of the gas industry. And, in the final analysis, it is not the regulated utilities, not the pipeline, but ultimately the public at large who are the recipients and moderators of that change. While the point is made throughout this report, it bears emphasis again here that the customer will have the final say as to whether the gas industry and those who regulate it have tried hard enough to provide what *customers* want in an efficient and reliable manner.

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CHAPTER FOUR INDUSTRY BEHAVIORAL ISSUES

Not all the challenges faced by the natural gas industry grow directly out of governmental regulation or policy. Many of the most difficult challenges arise from the behavior of industry participants. It was decided early in the study that these behavioral and cultural issues deserved a new, open, non-defensive look.

Obvious to all within the gas industry are the following: (1) a frustrating and apparently institutional slowness to react to the marketplace, (2) an internal divisiveness based on long years of fighting one another in regulatory forums, and (3) a weak image before the public as a whole. These themes are debated in the trade press and in public seminars all the time. The industry needs to step back and get a fresh view of itself.

In order to get this perspective, the NPC sponsored focus group sessions in which participants were asked to point out problems with the industry and suggest solutions. It was concluded that what the "focus group" approach might lose in statistical viability (compared to questionnaires) would be outweighed by not limiting the discussion to preconceived survey questions. As it turns out, the industry's failure to consistently perform this kind of active listening to the customer appears to be one of the greatest challenges identified in the focus group sessions.¹

In the end, the focus group sessions revealed perceptions that, though possibly not surprising, indicate that the industry has serious behavioral challenges ahead of it in areas such as:

- Fragmentation and fractiousness
- Overreliance on government regulation
- Lack of market focus
- Image with the general public.

Changing the behaviors that have caused these problems is a tough challenge—far tougher to achieve than the regulatory change described above. At the heart of it is the need for a stronger focus on customer needs and perceptions. With decades of inward focus behind us, waking up to the customer is the only way this industry can move forward and achieve its goal of increasing markets.

In this chapter, we will consider in some detail the perceptions revealed in the Focus group sessions, then describe and examine the behaviors that we believe may impede the ability of the natural gas industry to grow in the future.

PERCEPTIONS OF THE NATURAL GAS INDUSTRY: FOCUS GROUP RESULTS

In order to identify growth-limiting attitudes and perceptions (or misperceptions) of

¹ The findings of the focus group sessions, as summarized by the consultant employed by the study, are presented as Appendix C. Critical review of this material is suggested, but the study does not necessarily endorse all of the specific conclusions made by the consultant in that document. For those interested in obtaining copies of the reports of the individual focus group sessions, an order form is at the end of this volume.

the natural gas industry, the focus groups attempted to examine the widest possible variety of industry representatives, regulators, and customers. In total, the NPC targeted fifteen industry groups for research, including:

> Consumer advocates Cooling equipment manufacturers Electric utility executives Electric utility fuel buyers Energy financial analysts Fleet vehicle managers Independent power producers Industrial consumers Industrial gas equipment manufacturers Interstate pipeline companies Local distribution companies Natural gas marketing companies Natural gas producers State utility commission staffs State utility commissioners

These sessions were held across the United States during the first half of 1992.

Why Focus Groups Were Chosen

Focus groups are an excellent mechanism to obtain qualitative information about attitudes. In each focus group, six to ten representatives of the industry, regulatory, or customer segments identified above were led in discussion concerning the following objectives:

- Identify the barriers and opportunities for increasing the efficient use of natural gas
- Determine which barriers are myths or misconceptions
- Identify remedial actions that can be undertaken to overcome real obstacles and correct misconceptions.

These discussions were designed to address the objectives by asking a series of openended, but increasingly focused questions of the participants. The discussion moderator continually probed to ascertain why participants held their beliefs.

Focus group sessions had limitations. Results could not be projected to the general population. Group interaction during the discussions typically resulted in the sharing of individual ideas and beliefs that did not necessarily reflect the considerations that individuals or companies bring to bear when making their business decisions. In that sense, these focus group results must be treated carefully—and not generalized to all industry participants.

Still, the primary value of the focus group results was to provide the natural gas industry with a objective portrait of what those inside and outside the industry—including regulators and customers—think of the industry, its operating practices, and service offerings. The observations discussed in this chapter are those that appear to represent a strong consensus across the focus group sessions. This consensus, along with the reader's own judgment and experience within the industry, should be ample evidence of the truth of many of these observations.

Themes Developed by the Focus Groups

Although the findings of the focus group effort are extensive, detailed, and quite interesting, this discussion focuses on four major themes relevant to the overall NPC study:

- Marketing
- Reliability
- Regulation and the political environment
- Leadership.

Each of these areas encompasses a variety of issues that, taken together, describe an industry facing significant, long-term challenges.

Marketing

In a sense, almost all of the natural gas industry's shortcomings appear to be associated with marketing—or, more accurately, its lack. In particular, however, the focus group results indicate that the industry needs to:

- Become more market-driven in decision making
- Develop stronger marketing functions within its companies
- Develop services with pricing and cost structures that reflect customer and supplier needs
- Improve product commercialization efforts.

Market-Driven Decision Making

Focus group participants agreed that the marketing efforts of the industry have been poor. Industry marketing programs have failed to eliminate or effectively counter memories of curtailments during the 1970s or the more recent well freeze-offs and shortages of 1989. Further, the industry has not adequately informed customers about price and reserve trends nor effectively promoted benefits associated with burning natural gas.

Focus group participants also believe that the industry and its regulators show little interest in or respect for the needs of natural gas customers. Rates and sales programs of pipelines, producers, distributors, and marketing companies appear designed to be operationally convenient for the supplier rather than designed to meet the needs of the customer. Accordingly, customers are unable to realize the value of a full array of natural gas energy services, but often only the inherent BTU value of the commodity itself.

Stronger Marketing Functions

Compounding the natural gas industry's failure to be market-driven is the prevailing belief that "everybody else but me" is responsible for marketing. Local distributors, all groups agreed, were once the primary marketing arm of the industry. Today, the confusion of a changing industry, in which producers and marketers are actively interested in end-use markets, has led to similar confusion regarding advertising and load building activities.

Each segment of the industry, as indicated both in their behavior and in comments of their focus group representatives, appears to believe that marketing efforts are the responsibility of some other group. The bottom line seems to be that no sector of the industry has identified its customers and acted to market aggressively to those customers.

Service and Price

Natural gas consumers underscored their need for competitive prices, because most of them have and will use substitutes for all or a portion of their needs. Natural gas providers appear to believe they need higher prices or they will not be able to find and develop new reserves. Neither set of perceptions is inconsistent with a competitive market.

Some participants suggested that pipelines and distributors should be more efficient, resulting in improved prices for both ends of the market. Others expressed concerns that some sectors of the industry may be encouraging governmental action to increase prices.

In too many cases, the participants did not believe that competitive commodity pricing could, or would be allowed to, result in adequate natural gas supplies and services for the industry. These perceptions are an unfortunate but powerful legacy of the industry's past.

Product Commercialization

Focus group participants believe that new products and improvements in existing products can play a major role in raising consumption levels of natural gas. While all participants (except, significantly, consumers) believe that the industry's research and development efforts through the Gas Research Institute are successful, they are sharply critical of the industry's commercialization programs. Many states emphasize that commercialization simply does not exist in the industry. Others acknowledge the American Gas Association's Cooling Center and Industrial Gas Technology Commercialization Center, but believe that these efforts are underfunded.

A key commercialization feature identified by participants is the ability to finance subsidies for cooling equipment and refueling stations for natural gas vehicles. Both of these technologies show promise for adding significantly to demand, but require significant upfront expenditures to develop the infrastructure necessary to compete. With few exceptions, participants believe that local distributors cannot or will not make these investments. Suggestions were made to improve commercialization efforts by combining the research efforts of the Gas Research Institute with the American Gas Association's commercialization efforts.

Reliability

Reliability concerns of focus group participants appear to stem from actual experience with the curtailments of the 1970s or the pipeline capacity interruptions of the 1980s. Collectively, five general concerns were identified that present an image of natural gas as a risky energy alternative:

- Supply and deliverability
- Pipeline capacity
- Price volatility
- Role of marketing companies
- Regulatory uncertainty.

Supply and Deliverability

Focus group participants were split on the issue of deliverability. Some believe that adequate deliverability over the long run can be achieved only through unacceptably high prices. Others think that currently prevailing low prices will result in shortages. Increasingly, however, participants believe that competitive pricing of the natural gas itself will result in a balance of supply and demand.

Pipeline Capacity

Focus group participants were concerned about a variety of pipeline capacity issues, including changing and complicated nomination procedures, inability to obtain firm transportation capacity, the cost and rate treatment of capacity additions, and the financial health of interstate pipelines. For example, the incompatibilities of existing pipeline nomination and scheduling procedures and electric dispatching appear to threaten natural gas' ability to penetrate farther into what many believe to be its most promising incremental market.

Price Volatility

Focus group participants believe that the relative price volatility of natural gas compared to coal and electricity undermines confidence in natural gas.

Role of Marketing Companies

Marketing companies have emerged as a major supplier of natural gas to local distributors and industrial end users, but some focus group participants were skeptical of their value. Rather than perceiving marketers as useful in managing business risk, they have been perceived by some as unreliable and existing only to make a quick dollar.

Regulatory Uncertainty

Due to recent transitions in both state and federal regulation of natural gas companies, focus group participants—both consumers and providers—don't know how the industry will operate in the future. This uncertainty undermines the ability of participants to manage risk through contracts, and increases the difficulty of planning in an already challenging business environment.

In particular, regulation is seen as injecting inefficiency into both regulated and unregulated companies. For regulated companies, inefficient decision making arises in a variety of ways:

- Regulation diverts the attention of management away from promoting natural gas and toward the concerns of regulators, which are not necessarily the same as the concerns of customers.
- Open-ended prudence reviews and inflexible attitudes towards fuel choices and ownership of generation plants are cited as distorting economic fuel use decisions.
- Traditional rate-of-return regulation is seen as discouraging distributors and pipelines from investing shareholder money in riskier efforts, such as marketing.
- Traditional rate-of-return regulation is seen as encouraging additions to the capital base of regulated companies.

For unregulated companies, focus group participants believe that inefficient decision making arises from two other sources:

- In order to protect their interests, unregulated companies have to intervene in a variety of state and federal regulatory processes, none of which resemble any other. Other fuels do not require customers to incur this cost.
- Restrictions on regulated service suppliers reduce the number and quality of service choices available to unregulated companies.

In general, consistency appears to be lacking in the regulatory arena. Without such consistency, other fuel choices become more attractive.

Leadership

There appears to be a deep-seated mistrust and dislike for segments of the natural gas industry among various, important groups of people. The historical association with big oil and alleged abuse of market power results in concern about the impact of the very deregulation that could best improve service in the industry. Given these attitudes, regulators and consumers have become suspicious of even the innovative solutions proposed by the industry.

Given this set of perceptions, the need for creative, active, and relevant leadership is clear. But the source of that leadership within the natural gas industry is not clear. Participants evidenced frustration with industry leadership's apparent inability or disinclination to move the industry beyond its fractiousness.

The focus group results, as well as the individual reports, make for unpleasant, even frightening, reading. But the message of the focus groups is abundantly clear: status quo behavior and attitudes form a significant barrier to the natural gas industry's hopes of playing a larger role in the nation's energy mix.

BEHAVIORS THAT NEED TO CHANGE

Chapter One includes a discussion of three failures in the natural gas industry that have forced it to fall short of the Regulatory and Policy Issues Task Group's articulated vision:

- Failure to develop customer-oriented service
- Failure to limit regulatory uncertainty
- Failure to overcome industry fragmentation.

These failures are strongly confirmed by the focus group results. Consequently, three general types of behaviors must change for the natural gas industry to meet its goals.

Customer Orientation

The U.S. natural gas industry has long been characterized by an inward focus. Economic forecasts, policy discussions, regulatory debate, and even marketing plans have rarely paid much attention to the competitive forces inherent in U.S. energy markets that emerged starting in the 1970s. This inward focus must change. Regulatory bodies cannot, and will not continue to protect regulated companies from market forces. Competing energy sources, freemarket commodity pricing, and non-regulated competitors have opened up some sectors of the natural gas market and forced it to become more responsive to the needs and desires of customers. The result is a drastic need for improvements in marketing, for new product and service development, and for the reality *and* perception of reliability.

Marketing

Given the significant changes faced by the industry over the past 10 to 20 years, there is tremendous confusion throughout the industry regarding roles. Each industry segment must determine, define, and promote its role in the future. Each segment has a crucial role to play: to identify its particular customers and to effectively develop and market services to those customers.

Producers can achieve significant opportunities in downstream markets as pipelines and distributors open up their systems and as financial markets develop to allow them to manage risk more effectively. Pipelines and distributors face the challenge of developing more customer-oriented and efficient transportation services that attract a variety of customers to their systems. Marketers must define their role as risk-managing intermediaries with expertise in designing attractively priced, easy-to-use services. These segments then must work together to convince customers that the disappointing experience of the past has no relevance to the natural gas industry of the future.

New Product/Service Development

Like so many debates within the industry, the continuing *internal* discussion of the Gas Research Institute's role and funding have begun to underscore a far deeper problem of ex*ternal* perception. Customers have come to the dangerous conclusion that the natural gas industry does not believe in its product; that it is more concerned with not paying the business costs for new product development than it is about the future use of its fuel. For whatever reason, the natural gas industry has signaled customers that natural gas is a risky prospect. Compounding this problem is the sluggish development of customer-oriented services. The gas industry must recognize that its marginal markets will compare gas services to alternatives, and if gas is found lacking, gas will not win that business. For example, nomination and scheduling rules on some pipelines and distributors could drive away incremental industrial and electric utility load. It is possible that these rules cannot be changed, but the industry must be prepared to live with the consequences of that decision.

Ultimately, effective and competitive services will have to reflect a profitable compromise between (1) the ability to provide a service at the lowest reasonable cost and (2) customers' need for that service. The natural gas industry's perceived and real failure to pay attention to customer needs in the past must be remedied if progress is to be made toward the goal of increasing the efficient use of natural gas.

Reliability

The natural gas industry performs in a manner that is remarkably reliable across a wide variety of customer classes. Unfortunately, this message is often lost in a cacophony of competing interests. Persuading customers of this reliability is an important first step in achieving the industry's goals.

Limiting Regulatory Uncertainty

In general, the experience of the past 15 years in the natural gas industry has been an overall reduction in the intrusiveness of regulatory intervention. While this reduction has necessarily created great uncertainty, it has also allowed the development of more market-based pricing and more customer-based service. In general, the change has been for the best.

To reduce the uncertainty created by regulatory action, the perceived pace of change in regulation and regulatory philosophy must slow. Restructuring of regulation must proceed quickly, and then end quickly. Delay itself is another source of uncertainty and perceived unreliability. Regulators can help. As discussed in Chapter One, regulators need to make clear the principles that they will follow in their decision making and then stand by those principles. If the direction and content of change can be made clearer, industry participants will have an easier time explaining change to their customers and developing responsive solutions to the problems their customers will naturally face.

Ultimately, however, the solution to the problem of regulatory uncertainty lies within the industry, not its regulators. Reducing the dependence on regulation through a stronger emphasis on settlement of issues among parties is key. This approach requires *all* segments of the industry to behave responsibly and with a clear eye on the customer. Disagreement about the best way to achieve customer and policy goals will not go away, but the method by which the industry tackles these tough problems will send a clear message to its customers.

Overcoming Industry Fragmentation

The regulatory issues identified in this report are reflected in perhaps the most difficult challenge the industry faces—reduction of internal fragmentation. For whatever reason, most of the competitive fight in the industry works itself out in adversarial regulatory proceedings. This fragmentation makes coordinated efforts to pursue marketing goals almost impossible.

To achieve the policy and marketing goals that are so promising for natural gas, fragmentation must be reduced. No longer can every policy debate be seen as a zero sum game in which someone in the industry will lose. Producers gain from more efficient and effective transportation and distribution services. Pipelines and producers gain from increased production. Marketers gain from smoothly functioning production and transportation sectors. No one—least of all the consumer—gains from the disagreement and dissension that have characterized the history of the gas industry.

CHAPTER Five Recommendations

Consistent with the preceding discussion of federal and state natural gas regulation and policy, the Regulatory and Policy Issues Task Group makes the following recommendations. These recommendations, separated into categories of general, federal, and state applicability, are designed to move the industry toward the vision that best meets the goal of allowing natural gas use to grow to its economically efficient level.

GENERAL RECOMMENDATIONS

The following recommendations apply broadly to both the Federal Energy Regulatory Commission (FERC) and state regulatory agencies.

Public Interest Definition

Policy makers and regulators should redefine the public interest pursued in their policies, consistent with the following:

- The objectives that govern the natural gas regulatory process should be reviewed, including a clear definition of the public interest being furthered.
- Regulatory objectives should be the result of a coordinated state and federal agreement on a new definition of "public interest."
- The public interest should be defined in terms of a functional, competitive gas industry that provides a range of products and services to informed consumers who

may choose the terms and prices that best meet their respective needs.

 Industry participants as well as consumers must work with regulators to develop a new regime consistent with revised "public interest" goals.

Regulatory Philosophy

Regulators should enunciate and act upon a regulatory philosophy consistent with the redefined public interest:

- Regulators should affirm the use of market forces in lieu of regulation, where such forces are sufficiently robust to provide the market with reasonable service choices.
- Regulation should refrain from unnecessarily restricting the number or quality of choices made available to the buyers and sellers of energy services; neither should it interfere with the consequences of those choices.
- Cross-subsidies among customer classes should be phased out.

Use of Competition

Regulators should identify competitive markets and consider alternative rate structures:

 Regulatory decision making should defer to market forces where they are sufficient to meet customers' needs for choices among economic, efficient, and reliable services.

- Phased activities and pilot projects should be used actively to explore the feasibility of new regulatory structures that use competition in place of traditional regulatory controls.
- For markets in which meaningful competition does not exist and where adequate safeguards can be developed, regulators should explore the potential value of incentive rate making. Rate ceilings should be emphasized over profit ceilings. Where continued regulatory oversight is required, pilot projects should be adopted to develop regulatory and industry experience en route to more wide scale programs. Potential examples include sharing-of-savings mechanisms and flexible rate authority.
- Gas procurement should be deregulated where appropriate competitive markets are determined to exist, and buyers have meaningful equal access to competing gas supplies.
- Regulation of safety and related minimum service standards should remain intact.

Communication

Regulators should invite meaningful communication with each segment of the industry, and across regulatory jurisdictions, with regard to general policy and rate issues.

- Communication should take place individually and through regulatory and industry associations.
- Regulators should attempt to understand the effects of their regulatory decisions on sectors of the industry, in order to prevent undesirable side-effects, and for consistency with overall national policy objectives.
- The FERC should clarify its interpretation of *ex parte* rules to recognize the importance of effective communication in the context of generic rule makings.
- Congress should modify the Sunshine Act so that it does not apply to generic proceedings.
- Federal and state regulators should be encouraged to meet in order to discuss general regulatory issues and objectives.

Regulatory Certainty

Regulators should develop procedures that improve regulatory predictability.

- Individual rules and regulations, as well as authorizing statutes, must be reviewed to remove impediments to real-time informed choices and educated risk assumptions by natural gas sellers, transporters, and customers.
- Regulatory proceedings that remain necessary must be timely and efficient. Procedures should be adopted so that no rate case at the state or federal level would take longer than a reasonable time certain, such as nine months.
- Adequate staff and resources to perform timely regulatory functions should be sufficiently budgeted.

SPECIFIC FEDERAL RECOMMENDATIONS

New Construction Test

The FERC should eliminate the traditional tests for new interstate pipeline construction.

- The historical test of sufficient supply backed up by long-term contracts and attendant firm service agreements should be eliminated.
- Parties should be permitted to allocate risk through contractual mechanisms.

Up-Front Rate Treatment

The FERC should provide determinations of the rate treatment for new facilities in advance of construction.

• Both project sponsor and affected customers must be afforded reasonable predictability in regulatory rate treatment before construction commences.

Secondary Markets

The FERC should continue to promote the development of secondary markets for regulated transport services. Customers should be allowed to trade capacity rights in minimally regulated secondary markets.

Define Competition

The FERC should continue its efforts to establish a definition of competitive markets for transportation and other services.

SPECIFIC STATE RECOMMENDATIONS

Local Distribution Company Unbundling

State commissioners should evaluate and direct as appropriate the unbundling of local distribution company (LDC) sales and transmission services to further the general pro-competition and pro-consumer objectives of the National Energy Strategy and FERC Order 636.

Uniform Code

To promote consistency in state regulation, an appropriate body, such as the National Association of Regulatory Utility Commissioners, the National Association of State Legislators, or the National Governor's Association, should investigate the establishment of a uniform code of regulation available to all state jurisdictions.

Integrated Energy Resource Planning

State regulators should adopt a fully integrated approach to energy resource planning.

- Environmental advantages of natural gas should be recognized in total energy resource planning.
- Evaluation of natural gas applications in meeting traditional end-use markets for electricity (e.g., gas cooling) should proceed in tandem with evaluation of alternative electric IRP solutions.

Reevaluation of Franchise Protection

The benefits of and need for franchise protection for LDC services should be reviewed and reevaluated.

- State regulators should distinguish between captive and non-captive customers and should explore alternatives to traditional service obligations where competitive markets exist or can be created.
- Access to multiple supply options for all customers should be encouraged.
- Regulatory policy should provide LDCs with the appropriate cost allocation, rate design, and pricing flexibility to enable LDCs to compete in the marketplace so that regulators do not have to promote or prohibit by-pass of local distributors.

Proration Policy

States should continue to protect the correlative mineral rights of producers and to prevent physical waste through proration rules.

- Limitations on production to protect correlative rights and to prevent physical waste should be divorced from any efforts to control supply or to raise the wellhead prices of gas.
- Producers should be left with the maximum possible discretion to manage their production in relation to swings in market demand and prices.

Define Competition

State regulatory commissions should establish task forces to define and identify competitive markets for transportation and distribution services.



The Secretary of Energy

Washington, DC 20585

June 25, 1990

Mr. Lodwrick M. Cook Chairman National Petroleum Council 1625 K Street, N.W. Washington, D.C. 20006 Dear Mr. Cook:

Through this transmittal, I am formally requesting that the National Petroleum Council (NPC) perform two studies that are currently of critical interest to the Department of Energy. These studies are described below.

Constraints to Expanding Natural Gas Production, Distribution and Use

I request that the NPC conduct a comprehensive analysis of the potential for natural gas to make a larger contribution, not only to our Nation's energy supply, but also to the President's environmental goals. The study should consider technical, economic and regulatory constraints to expanding production, distribution and the use of natural gas. In the conduct of this study, I would like you to consider carefully the location, magnitude and economics of natural gas reserves, and the projected undiscovered and unconventional resource; the size, kind and location of future markets; the outlook for natural gas imports and exports; and potential barriers that could impede the deliverability of gas to the most economic, efficient and environmentally sound end-uses.

This study comes at a critical time, given the increased interest in natural gas, for developing public and private sector confidence that natural gas can make a greater contribution to the energy security and environmental enhancement of our Nation. I anticipate that the results of your work will be able to contribute significantly to the development of the Department's policies and programs.

The U.S. Refinery Sector in the 1990's

U.S. refineries face significant changes to processing facilities in the next decade, particularly in response to new environmental legislation that will affect emissions and waste disposal from refineries and the composition of motor fuels. Substantial investments are likely to be required to comply with proposed Clean Air Act Amendments, including provisions dealing with air toxics and alternative fuels. There is concern about the U.S. engineering and construction industry's capability to design, manufacture, and install quickly the large number of new, sophisticated processing facilities that would be necessary to supply these fuels.

Product imports, which are projected to increase, may also have to be treated differently than in the past. For example, if U.S. refiners have different gasoline specifications (e.g., Reid Vapor Pressure, aromatics, olefins, oxygen content) than foreign refineries, imported products may require additional U.S. refining.

I request that the NPC assess the effects of these changing conditions on the U.S. refining industry, the ability of that industry to respond to these changes in a timely manner, regulatory and other factors that impede the construction of new capacity, and the potential economic impacts of this response on American consumers.

 ${\bf I}$ look forward to receiving your results from these two studies and would like to be notified of your progress periodically.

Sincerely,

James D. Watkins Admiral, U.S. Navy (Retired)

DESCRIPTION OF THE NATIONAL PETROLEUM COUNCIL

In May 1946, the President stated in a letter to the Secretary of the Interior that he had been impressed by the contribution made through government/industry cooperation to the success of the World War II petroleum program. He felt that it would be beneficial if this close relationship were to be continued and suggested that the Secretary of the Interior establish an industry organization to advise the Secretary on oil and natural gas matters.

Pursuant to this request, Interior Secretary J. A. Krug established the National Petroleum Council on June 18, 1946. In October 1977, the Department of Energy was established and the Council was transferred to the new department.

The purpose of the NPC is solely to advise, inform, and make recommendations to the Secretary of Energy on any matter, requested by him, relating to oil and natural gas or the oil and gas industries. Matters that the Secretary of Energy would like to have considered by the Council are submitted in the form of a letter outlining the nature and scope of the study. This request is then referred to the NPC Agenda Committee, which makes a recommendation to the Council. The Council reserves the right to decide whether it will consider any matter referred to it.

Examples of recent major studies undertaken by the NPC at the request of the Secretary of Energy include:

- Unconventional Gas Sources (1980)
- Emergency Preparedness for Interruption of Petroleum Imports into the United States (1981)
- U.S. Arctic Oil & Gas (1981)
- Environmental Conservation—The Oil & Gas Industries (1982)
- Third World Petroleum Development: A Statement of Principles (1982)
- Enhanced Oil Recovery (1984)
- The Strategic Petroleum Reserve (1984)
- U.S. Petroleum Refining (1986)
- Factors Affecting U.S. Oil & Gas Outlook (1987)
- Integrating R&D Efforts (1988)
- Petroleum Storage & Transportation (1989)
- Industry Assistance to Government (1991)
- Short-Term Petroleum Outlook (1991)
- Petroleum Refining in the 1990s—Meeting the Challenges of the Clean Air Act (1991).

The NPC does not concern itself with trade practices, nor does it engage in any of the usual trade association activities. The Council is subject to the provisions of the Federal Advisory Committee Act of 1972.

Members of the National Petroleum Council are appointed by the Secretary of Energy and represent all segments of the oil and gas industries and related interests. The NPC is headed by a Chairman and a Vice Chairman, who are elected by the Council. The Council is supported entirely by voluntary contributions from its members.

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UNDERSTANDING BARRIERS TO AND OPPORTUNITIES FOR INCREASING NATURAL GAS CONSUMPTION

FINAL REPORT

OCTOBER, 1992

PROVIDED BY:

BENTEK ENERGY RESEARCH AND SUNDELL RESEARCH

EXECUTIVE SUMMARY

The U.S. natural gas industry faces an immense set of challenges. Driven by growth in the industrial and power generation markets, natural gas demand has risen by about 20 percent since 1986. Market share, lost during the late 1970s and early 1980s due to the imposition of curtailments, laws promulgated to curb consumption, and soaring gas prices has been partially regained. Furthermore, the nation appears poised to embrace natural gas as the fuel of choice for the 1990s and early into the next decade. Given the drive toward improved air quality, reduced exposure to international energy crises and efforts to control the cost and consumption rate of energy at home, natural gas has clear and widely accepted advantages over alternative fuels.

At the same time, however, there is widespread concern inside and outside the industry about how well increased demand can be served. Questions about reliability, safety, regulation and economic competitiveness are just a few of the concerns of the markets that plague the industry as it strives to meet the projected rising demand.

The National Petroleum Council (NPC) initiated this study as part of a much larger effort to assess for the industry and government the potential to increase the efficient use of natural gas and identify constraints that might restrict that growth. The specific charge of this study is to identify the impediments faced by the industry as it works to increase demand for natural gas. Focus group discussions comprise the information source for the analysis. Discussions were held with representatives of 15 of the key groups that comprise the industry, including regulators, customers and suppliers. This report integrates and summarizes their comments and presents them in a manner that provides direction to the industry.

The results of the focus group analysis underscore the magnitude of challenge that faces the industry. Virtually all of the discussants believe that greater volumes of natural gas should be consumed over the next two decades. Unfortunately, for the gas industry and the numerous service sectors that depend on it, the expected growth will not be automatic. The focus group discussions vividly document the frailty of the opportunity. While the participants perceive that natural gas has numerous inherent benefits which should drive demand upward in many markets upward, they also identify numerous real and potential impediments to growth.

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Furthermore, the participants are emphatic that substitutes are available should the gas industry falter. Alternative fuels exist to serve many of the same markets. The coal industry, the diesel industry and the electric industry are working hard to overcome the environmental disadvantages of their respective energy sources. These competing industries, the participants believe, can and will provide the services customers need if the natural gas industry fails to meet their challenge. Thus, the participants describe a "window of opportunity" available to the industry in which a significant increase is attainable. Alternatively, should the industry fail to meet their challenge, consumption could once again fall.

These challenges will require action by individuals, corporations and trade associations from all segments of the gas industry. It is important to note, however, that the initial step that should be taken entails a statistically-based quantitative survey to validate and measure the degree to which the perceptions identified in this project are held. The focus group methodology that was used as the basis for this analysis does not permit projection or measurement of the insights gained; it simply identifies the range of perceptions that are present among the various subject populations. Before specific remedial programs are undertaken, the key observations must be verified through additional analysis and research.

What challenges must be met for the natural gas industry to grow? Each focus group identifies numerous impediments to growth. Analysis of their disparate comments, however, suggests that the industry should focus on eight key concerns, which are presented below:

CHALLENGE #1: IMPROVE THE IMAGE OF THE NATURAL GAS INDUSTRY.

There appears be a deep-seated mistrust and dislike for segments of the natural gas industry among some publics. Participants' misgivings partly derive from suspicions of big business. The historic association of the oil industry, pipelines and utilities with alleged abuse of market power taints concerns for the impact of deregulation. Participants believe that given their way, these industries will abuse their market power to control transportation capacity and gouge the captive customer.

At another level, mistrust is reinforced by caricatures of the oil and gas industry as tycoons from Texas and Louisiana. The prorationing efforts by some states contribute to this image.

Image issues are also evident in the apparent mistrust by the consumers toward regulators and management of regulated companies. Regulators are believed to be more interested in their short-term political aspirations than in what is good for customers. Similarly, local distributor executives are perceived as more concerned

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with addressing the concerns of regulators, than attending to needs of consumers.

Factiousness, however, appears to be the most significant image problem facing the industry. Participants from all groups discuss the tendency of the gas industry's segments to fight with one another as one of its least useful characteristics. At best, the infighting results in conveyance of confusing and occasionally conflicting information. At worst, participants state, it forces them to reduces their commitment to natural gas.

CHALLENGE #2: IMPROVE NATURAL GAS MARKETING. THE GAS INDUSTRY MUST BECOME MARKET-DRIVEN.

Participants from all groups agree that marketing in the natural gas industry is poor. Industry marketing programs appear to have failed to eliminate, or effectively counter, memories of curtailments from the 1970s, and the more recent well freeze-offs and shortages of 1989. Similarly, the industry apparently has not allayed safety fears associated with natural gas-fired vehicles (VFMs) or older pipeline systems. Further, the industry has not adequately informed customers about price and reserve trends nor effectively promoted benefits associated with burning natural gas. As a result, customers and regulators appear to perceive little of value in the commodity other than BTU content.

Participants believe that the gas industry and its regulators show little interest or respect for the needs of its customers. Rates and sales programs of pipelines, producers, distributors and marketing companies are designed to be operationally convenient for the supplying segment rather than designed to address the operational needs of the customers. Accordingly, customers do not obtain the services that they want and to which they attribute value above the value inherent in the commodity. This is particularly true with respect to long-term contracts.

Poor marketing also appears to be enforced by regulation. Most states' regulatory policies appear to prohibit nearly all promotional activities specifically focused on adding new loads. Additionally, they discourage local distributors from expanding their systems to connect new customers. Thus, these policies severely handicap the local distributors' efforts to expand their customer base.

CHALLENGE #3: DEVELOP A STRONG MARKETING FUNCTION IN THE INDUSTRY.

Compounding the industry's failure to be market-driven is the prevalent belief that "everybody else but me" is responsible for marketing, (defined as advertising and load building activities). Each segment of the industry appears to look to the other segments for marketing leadership. Local distributors, all groups agree, once were the primary marketing arm of the industry. Today, distributors appear to believe

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that all of the other provider groups are stealing their markets and that customers would rather purchase from producers and marketers. Since they are being reduced to transporters, they believe they no longer need to market.

Pipeline participants believe that the producers are now responsible. Passage of Order 636 enables them to pass on the responsibility. Producer group participants acknowledge that they now have more responsibility for marketing, but they do not believe that they have the skills or sufficient corporate commitment to be effective. The marketers are sympathetic to the plight of the pipelines and distributors, but indicate that they only have access to limited portions of the market; therefore, it is economically infeasible for them to be aggressive marketers. These attitudes of the providers give great credence to the claims by regulators and customers that nobody, including trade associations, markets natural gas.

CHALLENGE #4: IMPROVE RELIABILITY.

Reliability concerns appear to stem from actual experience with either the curtailments of the 1970s or pipeline capacity interruption during the 1980s. That the panelists remember the curtailments is not surprising. What is remarkable, however, is that they do not appear to understand or believe that changes in the industry have eliminated the likelihood that the 1970's type of shortages will recur. In this context, reliability concerns primarily reflect poor marketing.

Other comments on reliability by the participants suggest that the issue is multi-faceted and that there is little agreement on some of the key components. Five forms of reliability impediments are defined:

- Supply deliverability. The participants are split on this issue. Some, including members of the regulatory and demand groups, believe that supplies will be adequate only if prices rise substantially, possibly reaching the point where gas becomes unacceptably expensive. Other members of the regulatory, pipeline and producer groups believe that because wellhead prices are currently so low, drilling is not adequate to maintain reserves and shortages will ensue. Yet others, including members of the producer, demand and regulatory groups, are unconcerned about the issue. They believe that reserves will be added as needed without undue dislocations.
- Pipeline deliverability. Again, actual experience with pipeline capacity problems (inability to obtain firm transportation capacity and seasonal interruptions of interruptible capacity) lie at the root of this perception. Participants also believe that incremental pricing is a major regulatory obstacle to further capacity expansion projects because it places too much financial burden on the developer. Frequently, the added burden is sufficient to make an entire project uneconomic.

Pipeline operating procedures also contribute to questionable pipeline deliverability. Participants suggest that pipeline procedures are continuously changing and are too complicated. More importantly, electric utility consumers believe that the maintenance of the 24-hour notice requirements by most pipelines will limit their ability to efficiently use their planned combustion turbines. The electric utility participants also believe that the pipelines are capable of, but unwilling to change these rules because they facilitate pipeline operations. In many cases, the participants may not have alternatives. They must install and use the turbines at a sub-optimal level. However, here is a clear case where the failure to be market-driven may potentially cost the customer efficiency and the industry load.

- *Price volatility*. Participants perceive that the relative price volatility of natural gas compared to coal and electricity undermines the confidence of consumers in natural gas.
- Regulatory environment. Participants believe one of the outcomes of the present transitional nature of federal and state regulation is uncertainty. Consumers are not sure what the reconstituted supply and transportation industry will look like. Similarly, providers are not sure of the rules under which they will operate. Accordingly, no one is confident that the deals they make will withstand the test of time. Planning in this environment is very difficult.
- *Marketing companies*. Marketing companies have emerged as a major supplier of natural gas to local distributors and industrial end users, but participants are very skeptical of their value. They are perceived as existing to make a quick dollar and as being unreliable.

Collectively, these concerns present an over-riding image of unreliability. In spite of the benefits inherent in the fuel choice, natural gas becomes a risky alternative. One participant from the electric utility panel illustrates the impact of unreliability in his decision process. He starts with the belief that natural gas technologies offer significant capital cost, environmental and efficiency advantages over coal-based technologies. Furthermore, he believes that the differential is so great that even the higher cost of purchasing gas on an MMBTU basis does not significantly alter the conclusion. However, reliability does. Since he cannot predict the price of the fuel with certainty, cannot predict the regulatory regime under which he will be purchasing the fuel, cannot predict how natural gas decisions will be handled through the prudence reviews of his state commission, he discounts the natural gas advantage to the point where coal becomes competitive.

CHALLENGE #5: REDUCE THE IMPACT OF REGULATORY HURDLES

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THAT IMPEDE GROWTH OF THE INDUSTRY.

Participants believe that the transitional nature of the regulatory environment results in a general feeling among customers and suppliers of uncertainty, unreliability, and fragmentation. The regulatory process compounds the negative impacts of the transition because it is based on adversarial procedures that position companies and sectors against one another, which typically results in the proliferation of confused and conflicting messages being sent to regulators and customers.

The participants also suggest that regulation injects inefficiencies into both regulated and non-regulated companies. With respect to regulated companies, participants identify four ways in which regulation prevents efficient management:

- Regulation diverts the attention of senior management from promoting natural gas. Distributor and pipeline executives are more concerned with meeting the needs of the regulators than they are the needs of the customers. Implicit in this belief is the assumption that the needs of the regulators and the needs of customers are not coterminous. The comments of demand group participants lend credence to that assumption.
- Open-ended prudence reviews, and inflexible attitudes toward mixture of generation fuels and utility and non-utility ownership of generation plants, and attitudes toward long-term contracts are cited as examples of ways in which utility commissions distort fuel procurement economics.
- Rate-of-return reward systems discourage distributors and pipelines from investing shareholder money, making them risk-averse. Participants believe that aggressive promotional activities may result in greater throughput in the short term, but in the long term will simply be used by regulators to reduce their rates. Accordingly, they do not see sustained economic benefit from promotional efforts. Failure of regulators to allow promotional expenses to be passed through to the rate base, therefore, acts as a disincentive to aggressive marketing of natural gas.
- Participants believe that the rate-of-return system rewards utilities for increasing their capital base. Participants sharing this view suggest that one outcome is that utilities are predisposed to build coal-fired plants or install scrubbers to existing units rather than install natural gas units, which have substantially lower capital costs. Participants from the electric utility and commissioner groups disagree. They believe that utilities today are neither willing nor able to make large capital expenditures if less expensive alternatives are available.

Regulation also distorts the economic decisions of non-regulated customers.

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Several examples are given.

• Gas consumption taxes and mandated investments in R&D (GRI charges) directly increase manufacturing costs. Less obvious are requirements for industrials to purchase expensive alternative fuel capable technologies in order to receive the lowest transportation rates.

Moreover, since the regulators and suppliers are perceived as failing to consider the needs of the customers in the design of their tariffs and operating procedures, customers must intervene in various regulatory proceedings. As the movement to create more competition moves from the federal to the state level, the costs associated with these activities will multiply substantially. Participants report that use of alternative fuels requires substantially less effort in this respect.

Specific regulations also potentially increase costs for consumers. Incremental pricing of pipeline expansions has been cited as an example. Additionally, the inconsistency of regulation across states and between federal and state levels adds costs to compliance efforts over what would be involved if regulation was more consistent.

• Participants also describe how regulations prevent them from achieving maximum cost reductions. LDC bypass restrictions and the failure of most local distributors to reduce their non-gas costs are cited as examples of this type of intervention.

CHALLENGE #6: DEVELOP PRICING AND COST STRUCTURES THAT MEET THE NEEDS OF BOTH CUSTOMERS AND SUPPLIERS.

Price could potentially be the ultimate impediment to growth. Participants from all of the demand groups indicate that the present, relatively low natural gas prices make natural gas an attractive fuel source. Furthermore, substitute fuels are available for many uses and, they state, if prices rise too much, the substitutes become economically attractive. Furthermore, many participants point out that nonresidential natural gas demand is derived demand; it results from demand for other products that are either produced by natural gas-fired processes or are composed of natural gas. Accordingly, the gas industry should be focused on improving its operating efficiency to become more profitable and continue to provide them with energy value. This is not to say that these participants do not expect prices to rise. Modest price escalation is acceptable, they believe, so long as it results from rising demand and market forces.

On the other hand, the providers participants believe that natural gas prices

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must rise. Without a substantial price increase, they cannot explore and develop new reserves. Without exploration, they believe, supplies will tighten and prices will rise anyway.

Reconciling these two seemingly contradictory positions constitutes a significant challenge for the industry. Many participants believe that producers want prices to rise artificially through prorationing or some sort of national energy policy that promotes natural gas at the expense of other fuels. These kinds of artificial price increases, they believe, are not palatable. In this respect, the price challenge is an extension of the marketing challenges; maintenance of low delivered prices, appears to be a cornerstone of a market-driven sales strategy for the industry. Suppliers must develop and rely on marketing acumen to enable them to capture the added value associated with the inherent characteristics of natural gas. If successful this will lead to higher demand with higher prices.

Some participants suggest an alternative approach to increasing prices for the producers. They suggest that producers should receive a larger proportion of the delivered price. Industrial participants, in particular, suggest that the producer community should assist them in introducing efficiency to local distributors. This, they believe, will result in lower non-gas costs, and lower transportation rates, and allow them to pay higher wellhead prices.

CHALLENGE #7: IMPROVE THE FINANCIAL HEALTH OF PIPELINES IN ORDER TO IMPROVE THEIR ABILITY TO EXPAND TO MEET NEW DEMAND.

Participants from the pipeline and regulatory groups indicate that the interstate pipelines are not financially healthy. They believe that this may inhibit their ability to attract capital needed to finance the expansions needed to remedy capacity bottlenecks.

CHALLENGE #8: IMPROVE PRODUCT COMMERCIALIZATION EFFORTS.

Participants believe that new products and improvements in existing products will play a major role in the raising consumption levels of natural gas. While they generally believe that the industry's research and development efforts through the Gas Research Institute are successful, they are sharply critical of the industry's commercialization programs. Many state emphatically that commercialization simply does not exist in the industry. Others acknowledge the efforts of the AGA Cooling Center and Industrial Gas Technology Commercialization Center, but say that they are woefully underfunded.

A key feature of the needed commercialization effort is the ability to finance subsidies for cooling equipment and refueling stations for VFMs. Both of these

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technologies show promise for adding significantly to demand, but require substantial up front expenditures to develop the infrastructure necessary to compete. With few exceptions, local distributors, the participants suggest, are generally unable or unwilling to make these investments. Accordingly, the industry must develop some other financing tool. Perhaps, they suggest, the commercialization efforts of the AGA and GRI should be combined into one organization, which focuses more energy on commercialization than research and development.

These challenges will require action at all levels and from all segments of the gas industry. It is important to note, however, that the initial step that should be taken entails a statistically-based, quantitative survey to validate and measure the perceptions on which these challenges are based. While the focus group methodology that was used as the basis for this analysis is not projectable, the challenges are grounded in the comments made by participants from more than one group. Accordingly, they simply represent attitudes that are present among the general population. Before specific remedial programs are undertaken, the key observations must be verified.

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INTRODUCTION AND OBJECTIVE

Since the early 1980s, the behavior of natural gas markets has been a conundrum. Between 1972 and 1986, gas demand fell by almost 30 percent. This decline was attributed to an increase in the price of natural gas, the imposition of curtailments and legal curbs placed on consumption. Since the mid-1980s, however, wellhead natural gas prices have fallen precipitously; and various Federal Energy Regulatory Commission (FERC) orders have opened up the nation's transportation network. As a result, local distribution companies and large end use consumers are able to procure their supplies directly from producers and marketers at sharply reduced prices. Although total demand has risen since 1986 by 20 percent, and potential new markets have emerged, many in the industry believe that the pace of growth is far too slow. Given today's relatively low prices and the inherent benefits to consumers and the nation, natural gas demand should be rising at a much greater rate.

In 1991, the National Petroleum Council (NPC), at the behest of the Secretary of Energy, initiated a study of the natural gas industry in order to find ways to increase the efficient use of the commodity. As part of that study, BENTEK Energy Research was retained by the Cultural/Psychological Issues Subgroup of the NPC Regulatory and Policy Task Group. BENTEK's role was to conduct a series of focus group discussions with participants from fifteen industry groups to define impediments to the gas industry.

The fifteen industry groups targeted were the following:

State utility commissionersStateElectric utility executivesIndElectric utility fuel buyersLocCooling equipment manufacturersIndConsumer advocatesNatural gas marketing companiesNatural gas marketing companiesEncInterstate pipeline companiesEncIndustrial gas equipment manufacturersEnc

State utility commission staffs Industrial consumers Local distribution companies Independent power producers Natural gas producers Automobile fleet managers Energy financial analysts With the exception of state commissioners, only one focus group was held for each industry group. Two groups were held with state commissioners.

Each focus group discussion had three objectives:

- 1. Identify barriers and opportunities for increasing the efficient use of natural gas;
- 2. Determine which barriers are myths or misconceptions; and
- 3. Identify remedial actions that can be undertaken to overcome real obstacles and correct misconceptions.

The objective of this report is to integrate and summarize the results of the individual focus groups. The intent is to create a composite picture of the natural gas industry -- how its behavior is conducive to increased sales and how its behavior inhibits growth. The specific focus group discussions are described in the individual reports that comprise the Appendix.

METHODOLOGICAL LIMITATIONS

Focus groups were conducted for this project because they are an excellent mechanism to obtain qualitative attitudinal information. Six to ten representatives comprising each of the industry segments identified above were assembled in focus group facilities. The discussions were designed to address the objectives by asking the participants a series of questions. The discussion moderator continually probed to ascertain why participants held their beliefs. Each of the conversations was recorded and observed by a member of the NPC study team. Focus group participants were not directly involved in any of the NPC study task forces; however, in a few instances, personnel from NPC member companies were participants.

While focus groups are a revealing and useful exploratory research technique, they have limitations. First, the results of the discussion are not projectable. The participants are not randomly selected nor are sufficient numbers included in the discussion to ensure statistical significance. The fact that only one focus group discussion is held for each industry group, with the exception of the state commissioners, underscores this limitation. Second, focus groups allow for group interaction and stimulate discussion; however, the ideas and observations described in each group report are not necessarily reflective of the considerations that individual persons or companies bring to bear when engaged in actual decision processes. Other factors not discussed in the focus group also affect individual actions.

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Given these limitations, what is the value of the conclusions reached in this report? The primary value of this report is to provide the natural gas industry with a fresh and objective portrait of the natural gas customers' attitudes toward the industry, its operating practices and service offerings. The information on the following pages reveals many instances where the attitudes of the customers appear to be remarkably different from the standard beliefs of the industry. Although the data is technically not projectable, the degree of consensus among participants from all fifteen groups is dramatic. Among other things, the customers are clearly saying that the industry's practices and services are not consistent with their needs, and that the industry makes little effort to understand them as customers. Since customers have available substitutes for natural gas, development of a market-driven approach is a prerequisite to demand growth. Quantitative surveys are necessary to validate and address the details of the conclusions and to formulate strategies to overcome barriers identified in this report. The information in this report provides the foundation on which to frame additional research and remedial efforts.

DEFINITION OF TERMS AND CONVENTIONS

Throughout this report, the following terms are used that need definition. Frequent reference is made to "participants" which refers to the individuals that participated in the focus groups. Because the methodology does not permit generalization of the group discussion to the population, any references to the general population from which the group members were selected also refers to the specific group members unless otherwise noted.

In an effort to make the report more readable, wherever possible specific focus groups are addressed collectively. The following combination of focus groups are included in each assembly.

Demand Group - The participants in the electric utility fuel buyers and CEOs, independent power producers, industrial consumer and automobile fleet managers focus groups.

Provider Group - The participants in the producer, pipeline, marketer and local distributor focus groups.

Manufacturers - The participants in the cooling equipment and industrial gas equipment manufacturers focus groups.

Regulatory - The participants in the state commissioner, state commission staff and consumer advocates focus groups.

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Financial Institutions - The participants in the energy financial analysis focus group.

Throughout the report, quotations from the actual discussions are presented to support the analysis. Square bullets (\blacksquare) delineate actual comments by participants. The comments have been edited for grammar only; references necessary to understand the comment are inserted between brackets []. The focus group in which the comment was made is identified in parentheses after the quote using the following abbreviations:

CONADV - Consumer advocates COOL - Cooling equipment manufacturers EU - Electric utility fuel buyers EUCEO - Electric utility CEOs FIN - Energy financial analysts IGE - Industrial gas equipment manufacturers IND - Industrial consumers IPP - Independent power producers LDC - Local distribution companies MKTR - Natural gas marketing companies VFM - Vehicle fleet managers PIPE - Interstate pipeline companies PROD - Producers STCOMM - State utility commissioners STCOMMSTF - State utility commissioner staffs

REPORT ORGANIZATION

The focus groups were conducted using a consistent format. Initially, the participants were asked to discuss their expectations of the role that natural gas would play in the nation's energy future. Subsequently, they were asked a series of questions designed to identify the obstacles that they believe inhibit growth of the industry.

The format of this report follows a similar pattern. Part I describes three visions that the participants have for the role of natural gas in the nation's energy future. Initially, Part I describes their general visions for the future, then focuses on their perceptions regarding specific market segments.

Part II reviews the impediments raised by the participants. Individual sections discuss:

• The industry's inability to market effectively

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- Attitudes toward the natural gas industry
- The belief that natural gas is unreliable
- The role of regulation and the political environment
- Economic issues
- Inadequate commercialization efforts

ACKNOWLEDGEMENTS

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Industry personnel also helped to recruit membership for each focus group. In most cases these same individuals also aided in the design of the moderator's guide and observed the focus group discussion. Their assistance is also greatly appreciated. They include:

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Ms. Karen A. Berndt, Texaco Exploration & Production Company

- Ms. Nancy S. Boyd, Iowa Utilities Board
- Mr. Keys A. Curry Jr., Destec Energy
- Ms. Karima D. Davis, American Gas Cooling Center
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- Mr. Glen S. Howard, Sutherland, Asbill & Brennan
- Mr. Skip Horvath, Interstate Gas Association of America
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- Mr. Joseph Maybank IV, Lazard Frères & Co
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PART I

OUTLOOK FOR THE FUTURE

PERSPECTIVES ON GROWTH

The prospects are good for significantly increased natural gas demand, according to most participants involved in the various focus groups. While the majority of participants agree that natural gas consumption will grow, some participants are more enthusiastic about the prospect than others. A small minority holds that a variety of obstacles will prevent increased use of the commodity. This chapter will review each of these visions of the future, then discuss the comments made by participants from each group about the growth prospects for five market segments:

- Power generation
- Natural gas-fired vehicles
- Cooling
- Industrial
- Commercial/Residential

The Optimists

The optimists believe that natural gas consumption will rise significantly through the decade.

- In my state, there is a big move toward the use of natural gas. (EU)
- Everybody, I think, agrees that natural gas use is going to increase. (STCOMM)
- I see it [natural gas] as a growing field, very much so. (CONADV)
- I think natural gas has a very bright future. (IGE)
- I think natural gas is going to play a large, future role in terms of the energy mix in the United States. Production levels in excess of 25 TCF per year, in my opinion, are not out of the question. (PROD)

Most groups indicate that three primary market opportunities drive this projection. The power generation markets are the most extensively discussed, but VFMs and gas-fired cooling technologies are also expected to stimulate demand.

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- It is our view that we are going to see more gas used for power generation. (LDC)
- We see gas air conditioning as a new product with good potential. (LDC)
- A market we are very enthusiastic about is natural gas vehicles. (LDC)

Participants in the consumer advocate, industrial, manufacturing and pipeline groups believe the more traditional market sectors -- industrial and residential -- may also grow. Indeed, participants believe that direct consumption of natural gas by the industrial and commercial/residential markets is substantially more efficient than conversion of gas to electricity.

- I look around the room, and I see about a half a billion cubic feet of usage out of 18 or 19 trillion cubic feet [estimated U.S. annual usage], and most of us here are involved in basic manufacturing. I think the use of natural gas is going to go hand in hand with whether or not we're still in business 10 or 20 years down the road. Our consumption of natural gas was considerably higher 10 years ago than it is now. Now we downsize facilities; now we abandon facilities. If that continues, the outlook for natural gas may not be that good.
- I think, from an industrial standpoint, gas does have a leading role. (IGE)
- I think in a lot of the expansion areas of suburban cities, or suburban areas around the United States, there should be more of an emphasis placed on developing new properties with natural gas, as opposed to electrical. (CONADV)
- In the series of the energy use equipment at the end user. If you really look at the overall conceptual use of energy it would make a lot more sense to take natural gas.

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directly to a lot of the end uses that's not done now. (PIPE)

One marketer holds the contrary opinion: electric power is the more efficient form of energy.

Well, the other thing is [that] the most efficient distribution system of energy is electricity. (MKTR)

Over the long term, some of the participants that anticipate increased shortterm growth are less sanguine about the competitiveness of natural gas.

Participants in the commissioner, industrial and marketer focus groups suggest that the long-term (twenty years plus) trend is toward greater electrification. Over this time frame, these participants believe that electrical technologies will gradually replace gas-burning technologies, particularly for industrial and residential uses. Thus, natural gas consumption will fall.

- I don't think gas will grow at the rate, say, that electricity does. I think there are a number of reasons why the need for electricity will grow faster. I think, in the home now, so much is done mechanically that I think you'll have computers and other things being much bigger parts of the situation at home. So...many people who are doing rote type jobs now will be doing other types of things that require engines...engines that will run by electric motors. (STCOMM)
- But, on the longer-term perspective, I view natural gas as a bridge fuel. I think the trend [is] to electricity [and] I think it's going to continue. I don't think the lowest gas prices in the world are going to stop the trend to electricity...because it's the easiest to use when all [is] said and done. (IND)

The Conservators

A second, relatively small, group of participants also believes that the natural gas demand will grow significantly. However, they believe that reserves are finite; thus, they are far less optimistic that gas supplies are adequate to meet increases from existing and new markets. In their view, since natural gas resources are

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limited, they should be husbanded for the highest value markets. Participants in the industrial group believe that residential and industrial process users have the fewest alternatives; thus, they should be given priority.

Well, the memories of the '70s are still very clear in my mind. It just won't last forever. It's going to last longer than they thought...but it's still a finite resource; it's a valid statement. The emphasis, then, is get it out from underneath boilers, because there are people who use it as a primary fuel and a priority fuel, and in many cases, as you've heard here, a feedstock to which there is no substitute. So, I am concerned when I hear the environmentalists saying natural gas is the answer to environmental problems; that we ought to generate all our electricity with it. I think it's a horrible use for natural gas. I think we have good alternatives. (IND)

Participants in the local distributor, marketer, consumer advocate and state regulator groups share this attitude.

- I agree that probably the use of natural gas will increase. But I would like to be a little hesitant about the extent to which it will be used as the immediate supply for electric generation. I'm somewhat concerned that it's not long ago when we were very much concerned about the finite quantity of natural gas and really reduced the use of natural gas in many areas. Now the estimates are very different, but it is still a finite supply...therefore, I think the use would increase only in areas where it can be used efficiently, and some of the indications are that generation of electricity is not necessarily the most efficient use for natural gas. (STCOMM)
- But I'm a little concerned that natural gas vehicles can get out of control, for example...there may be a specialized need for a fleet vehicle program. [However,] when you start getting into ordinary passenger vehicles with millions of cars and the infrastructure that would be needed to fill those gas tanks up, I don't think the natural gas resource is adequate and I don't think it's a proper use for natural gas. Natural gas outside the home heating area, in my judgment, should be a

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specialized, focused use where it clearly has an economic, [and] social benefit that's competitively better. (STCOMM)

- As a matter of fact, if you really want to get down to the truth of the matter, we shouldn't be burning natural gas in boilers. It's a huge waste of [a] tremendous resource, but we certainly need to do it. We'd all be out of a job if we weren't doing it, but it is a fabulous fuel and we wasted it, a ton of it, and [are] going to continue to do so with what we're doing right now and have done in the past. (MKTR)
- Electric generation is talked about a great deal. It appears that most new power plants which are being planned today are planned to be fueled by natural gas. From the local distribution company standpoint, we have not really felt that natural gas was the best fuel to use in baseload electric generation. And I think we still feel that way. (LDC)
- One load that is conspicuously talked about is power generation - and that's common whether you like it or not. I happen to be in the minority. I don't like it. From a business perspective, I recognize I gotta get on the train or get run over. So I'm going to do what I can to get my share of the business. (LDC)
- I think that higher prices will flow from increased usage. That is why some advocates are concerned about things like electric generation. That's not a best use for a resource like natural gas. (CONADV)

The Pessimists

A third group of participants believes that natural gas demand will not grow substantially. Members of all provider groups, and the industrial consumer groups project this pessimistic outcome. To some of these participants, the potential for growth is real, but the obstacles facing the natural gas industry -- primarily related to the regulatory climate -- are too monumental to be overcome. To others, the impacts of conservation efforts will negate any growth that might come from expanded or new markets.

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- I think that's really what it comes back to, when you asked the question what's the future role, it should be a greater share of the energy market. But it will not happen given the [problems] in the near term. I'd say, next ten years we're going to be struggling to make this industry what we all want it to be -- growth -- and I agree with the growth projections -- modest growth. It's not going to be significant growth. (PIPE)
- In terms of future role, I would say that there's going to be relatively slow growth. (PROD)
- So, the bottom line is, its role is going to be a function of how several things happen that are generally out of our control. (PROD)

MARKET-SPECIFIC ANALYSES

A number of benefits make natural gas the fuel of choice. The most frequently mentioned benefit is its relatively clean burning character, which is advantageous for the power generation, cooling and natural gas vehicle markets. Other benefits which are cited include:

- Adequate supplies for the foreseeable future
- Stable wellhead and delivered price projections
- Low capital cost of gas-fired power generation technologies
- BTU efficiency advantages of gas-fired technologies
- Domestic nature of gas resources
- Cooking characteristics
- Relative price of gas compared to electricity

The benefits that are most associated with each market are described in the following market-specific discussions.

Each section discusses the potential of the principle natural gas markets: power generation, gas-fired vehicle, cooling, industrial and commercial/ residential. Through all of the focus groups, many comments are made regarding each of these market segments.¹

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¹For more detailed comments of the participants from each group, please refer to the individual focus group reports.

Generally, the discussions of each market reflects one of three perspectives:

- Market sector perspective. Focus groups were held with representatives from several market sectors. Electric utility CEOs and fuel buyers, as well as IPP developers, discuss the power generation market. Cooling manufacturers discuss the cooling market. Industrial consumers discuss the industrial market and fleet operators discuss the VFM market potential. In addition, consumer advocates who represent residential/commercial customers, discuss the potential from the standpoint of the residential market.
- **Provider group perspective.** All of the provider groups were asked several questions designed to obtain their opinions on the potential of each market sector. In addition, they were asked to discuss the problems faced by the industry addressing each market sector.
- Other group perspective. Members of the finance group, manufacturing groups, as well as other demand groups and regulatory groups, including consumer advocates, express a variety of opinions and expectations about the potential associated with each of the market segments.

The discussion of each market will focus on each perspective.

The Power Generation Market

The power generation market is often portrayed as the market sector holding the most significant potential for growth. Comprised of four subsectors (IPPs, cogenerators, electric utility capacity expansion projects and electric utility capacity conversion projects), the power generation market is projected by many analysts as doubling its present consumption by the year 2000.

Attitudes of the Power Generators

The electric utility CEOs and fuel buyers, as well as IPP participants, expect that natural gas consumption by their respective market sectors will increase significantly due to the environmental benefits, low capital costs and high energy efficiencies associated with natural gas-fired technology options. Participants from the electric utility fuel buyer group even go so far as to suggest that the environmental and economic advantages of natural gas are sufficiently strong as to preclude other fuel options.

> I don't see any obstacles to increased use of natural gas, at least in terms of its use to produce electricity. I

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think that this industry is pretty much in a default mode with respect to generation that it plans to add over the next 10 years, maybe 15 years, regardless of who builds it. I just think it's going to be very difficult [to build anything else], with the exception of a few niche locations where coal, through subsidies and research dollars, or renewable energy sources or others... are enhanced because of some peculiar set of circumstances. (EU)

 By and large, I think there's really not anything that the industry can do to enhance gas [it is already the best choice]. (EU)

Expectations of growth aside, the participants from the electric utility and IPP groups also have numerous concerns about the gas industry's ability to meet their challenge and deliver on the promise of natural gas. All three power generation groups share concerns on four issues: reliability, natural gas price trends, a general lack of familiarity with natural gas and regulation.

Reliability. Reliability is the most important concern of the electric utility participants. Many of these participants experienced curtailments in the 1970s and early 1980s and they fear that similar actions might be taken in the future. The electric utility CEOs are particularly skeptical because they note that state regulatory authorities still hold the power to curtail them in times of supply shortages, regardless of the electric utility's contractual arrangements with their gas suppliers.

> There's no guarantee they can put in the contract that is going to give you any kind of comfort that, if push comes to shove, gas is going to come to you and not go... to the LDCs. (EUCEO)

Deliverability, not supply availability, is the main focus of the electric utility participants' concerns. They question the adequacy of pipeline capacity and believe that pipeline operating rules are evolving in ways that are inconsistent with their needs as customers. Participants from utilities in the northeast and California annually experience interruption in their interruptible service. These experiences, plus the inability to obtain storage service, which they perceive will enable them to avoid interruptions, lead them to conclude that pipeline deliverability is suspect.

> All our units can burn gas, but we went through some periods in the '70s when we couldn't burn gas; it just was not available. In the '60s, we burned a lot of gas,

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and then it disappeared. Now gas is back again and there are questions in people's minds: "Well, it's here today, but is it going to be here tomorrow?" We know where coal is, but where are we going with gas? (EU)

• We are in the northeast area and there are some pipeline capacity constraints. (EU)

IPP participants also question supply deliverability. They believe that the present wellhead prices are too low to encourage drilling, which, they fear, may result in supply disruptions. Reserve ownership and the use of alternative fuels are viewed as means of hedging this type of risk.

- Interstate Natural Gas Association of America (INGAA) forecasted an additional two trillion cubic feet of gas usage [by] the IPP industry for the year 2000 which is roughly...a 15 to 20 percent increase in gas usage. In order to achieve those levels, you're going to have to have gas prices at a high enough level to encourage production. Otherwise, that segment of the industry is going to stop drilling wells, deliverability is going to decline, and when production capacity declines, you may have interruptions in supply and facilities not built to transport the gas to the marketplace. So it's going to be an interesting couple of years with gas prices at historically low levels, to see how the gas industry shakes out. (IPP)
- If you don't do something to move gas to a new market, then you are running the risk of running out of gas because people will not be out there looking for new gas. (IPP)
- In the past, they [LDCs] bought from an interstate pipeline primarily or a broker and if they came up short, then the little old lady who needed her house warmed up got the gas first. That still is going to happen to a certain extent, but not to the extent it did back in the '70s. You're going to own your own gas. (IPP)

Pipeline requirements for 24-hour notice and the changing nature of their operating procedures also underlie the electric utility participants' concerns about reliability. Many of the participants plan to install combustion turbine peaking

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facilities, which are designed to come on-line with little, if any, notice to meet demand spikes. Weather phenomena or unanticipated equipment failures usually create these situations, so they rarely happen in such a way that permits the utility to provide the pipeline with the required 24-hour notice of delivery. Accordingly, the 24-hour rule prevents the utility from using the combustion turbines as designed, thereby reducing their efficiency. Since the pipelines have not provided them with any real reason for the rule, the participants attribute it to a lack of concern for them as customers and question the seriousness of the pipelines' interest in serving them. Some of the electric utility participants suggest that failure by the pipeline industry to accommodate this operational concern might reduce their use of gas-fired combustion turbines.

- Right now we're in a unique situation in that we have three combustion turbines, which basically have loads... from zero to 70,000 dekatherms. We basically have to go out on a day-to-day basis and contract with this gas, and again, with 24-hours notice. But these are peaking units, combustion turbines, which supposedly should be able to come with two hours notice. We try to put restrictions on [the] electric side, telling them they must run these units. If they tell us they're going to need this gas, they're going to have to take it. However, this makes it economically less desirable for them -- for [states] -- to dispatch those units because they know they'll have to run even if it's not economic. (EU)
- You need a lot of prior notice [for pipelines] -- 24-hours prior notice -- whereas electric generation often does not give us any notice. (EU)

Use of storage is also discussed as a means of insuring greater reliability. The IPP and electric utility participants suggest that "in and out" type of service would be a useful mechanism to make the delivery system more efficient. However, they indicate that it is currently too expensive to be useful.

I don't see storage, though, as a way to move more gas. A certain amount, but not great big volumes. It's a way of making it work better. Storage of gas is so expensive, it probably kills it for us, or at least the ones we've looked at, if you only use it the way that LDCs use [it] -once a year. There's got to be some kind of a way to use it a bunch of times or it just costs too much. (IPP)

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Natural gas prices. The participants indicate that electric utilities' consumption of gas is highly sensitive to the relative cost of natural gas, coal, fuel oil and purchased electric power. The operation of any single generation facility is a function of its position in the dispatch curve: the lower the variable operating costs of a plant, which primarily are comprised of the fuel costs, the higher its utilization rate or dispatch. Even though the life-cycle cost estimate on which the decision to build the gas-fired unit was based showed that natural gas is the least expensive option over the life of the plant, the plant's use on any given day depends on its variable operating costs. For a utility to be able to operate a gas-fired facility often and for long periods of time, the plant's gas cost must compete favorably with the fuel costs of the other plants that comprise the dispatch grid.

- It [the plant] will run for sure when it's over 85 degrees.
 Other times it will be a question of economics. The lower the gas price, the more that plant goes on. (EU)
- If you believe that things [gas prices] will change as time goes on, the amount of gas that we use will depend to a large extent on how competitive gas is with our other generations [fuels]. (EU)
- There still has to be a realization in the gas industry that the competition is not just between gas producers or gas pipelines. It's between coal, oil, and gas. It's also between purchase power...between cogenerators [and between] IPPs [for dispatch]. (EU)

Accordingly, the plant's gas costs must compete with coal and other options available to the utility. 2

Lack of product familiarity. The participants indicate that they are not as comfortable buying natural gas as they are coal. All of the participants have purchased large quantities of coal for many years. They are comfortable with the contracting arrangements, including pricing, and are accustomed to seeing 60 to 90 day stockpiles at their plants. In contrast, only one of the participants has purchased large volumes of natural gas for extended periods of time. The others do not feel comfortable with their knowledge of storage and the transportation system, the

²While the participants do not explicitly discuss the role of externalities in the dispatch cost calculation, they are increasingly a factor. States such as California and New York are beginning to require the inclusion of environmental adders or penalties to compensate for the higher SO₂, CO₂ and NO_x emissions associated with coal and other hydrocarbon fuels. While this may benefit gas by making it more competitive relative to coal & fuel oil, it also penalizes gas relative to renewable technologies.

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subtleties or basic provisions of natural gas contracts, or the assumptions that underlie producer pricing strategies. Their lack of comfort with the fuel makes them slow to embrace it as their fuel of the future. Yet, they acknowledge that once some of their counterparts at other utilities have success with the fuel, it will be more eagerly adopted.

- It is not tangible. (EU)
- We lack experience with the fuel. (EU)
- Well, generally, there's a resistance to change. I think what ends up happening is that somebody experiments. There are some of us that wouldn't want to experiment with Powder River Basin [coal], but I think there's at least one in the audience here who has experimented with that kind of coal. All of a sudden, you find out you can. Then, that spreads. There's like a learning function. So although there is initial inertia, there's probably going to be a learning function. We've got some set plans of what we want to do. Now people are starting to say maybe there's some other things we can do. In that vein, you may start seeing some of this other [gas use]. (EU)

The electric utility industry might become comfortable with natural gas more quickly, the participants suggest, if gas suppliers make a greater effort to understand their needs as a customer class. Each utility's environmental, operating and regulatory concerns are different and the gas industry's tendency to apply generic solutions is counterproductive. Suppliers and transporters need to be more sensitive to the needs of power generators in order to overcome this obstacle.

- Producers just seem to have a mindset that if we get a cold winter, sales will be up and then [they will] make their money [and] be happy. But they're just not working together to think of what the customer might need that would increase their sales. (EU)
- These problems cannot be broadly applied, and you just can't [find a simple solution]. You have to go on an individual utility basis. Economic dispatch is on an individual utility basis. Everybody has his own little quirks. It's up to the utility and the supplier to understand each other's business better, to see where

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the common fits are. At least I get the sense from the gas guys that they don't quite understand that. (EU)

Regulation. State and federal regulations are also seen as impediments, primarily because they create uncertainty. On the state level, prudence reviews, by which fuel prices are allowed or disallowed, are seen as working against the use of natural gas. The participants believe that because of questionable reliability, price and regulatory environments, gas price assumptions are inherently riskier than similar assumptions regarding coal. Accordingly, they fear that it will be much more difficult for them to prove the decision was prudent at some undetermined time in the future should gas prices rise precipitously or shortages result. State commission rules are also seen as too inflexible, preventing utilities from running combustion turbines as efficiently as they were designed to operate.

- The biggest concern the utility manager has would seem to be the issue of prudence. Gas gets to be a very difficult fuel to evaluate in that respect, for all the reasons we said [deliverability, economics, operational procedure]. That's generally the common denominator in all our decisions: which one's going to be the easier one to demonstrate prudent decision[s]. (EU)
- I know, being a dual utility, the state utility [commission] is very careful about how we price our gas to electric generation. They also put restrictions operationally on us, in which units we can actually burn natural gas. In the past, it really worked out very well. We had a unit that was baseloaded and it wasn't really part of the [tri-state] grid. The electric side was able to tell us, okay, we'll guarantee we're going to take, let's say, 10,000 [MMBTU] a day and if the combustion turbines don't run, then we'll just take it at another plant. We were guaranteed we were going to take that gas, so that was nice. We'd have the supply there for them. they could use it anywhere they wanted to, in the more expensive peaking units or the less expensive baseloaded unit that uses kerosene. Now the state commission has told us that we have to tell on a monthly basis which actual units are going to be burning on gas, and that we can't sway between the two. I think they're worried that we're giving some kind of preferential pricing to ourselves. (EU)

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At the federal level, the continual stream of regulatory changes is cited as a major cause of confusion and uncertainty. The participants hope that Order No. 636 will be the final set of rules from the Federal Energy Regulatory Commission (FERC) because gas customers as well as suppliers and transporters need stability to develop more efficient operating procedures and improved communications. The IPP participants also indicate that the changing nature of federal regulation creates fragmentation and uncertainty that makes planning difficult. They also believe that the uncertainty undermines the confidence of risk-averse lending institutions on which they depend.

The primary regulatory impediment faced by the IPP participants is the issue of who will pay for new pipeline capacity that is needed to connect their plants to the interstate pipeline or distributor grid. They generally prefer that the cost of pipeline capacity expansions be "rolled" into the existing fixed costs of the pipeline. Regulators at the state and federal level have objected to this approach, forcing the new plant developer to bear the entire cost of the new pipeline capacity. The participants indicate that, in many cases, these costs will render projects uneconomic.

- One example, without throwing names out, is a pipeline that comes up through the northeast...if it had available capacity on it, [it] would cost you maybe 65 or 70 cents to transport from South Texas or South Louisiana, to Boston. Now, if you want them to build new capacity, they want to charge you between \$1.50 and \$2 for that capacity. That takes a dollar or more out of what the producer can get to stay in line with the coal price because the [delivered] price isn't going to change. The market is not going to change because of the coal price. And so it won't work unless we get some help from that standpoint. (IPP)
- The specific [problem] with regulatory uncertainty today is rolled-in [prices]. If we get incremental rates, let us know ahead of time, not after we build the plant because we probably won't build the plant. So we need at least...the very least, certainty. Then if you don't get certainty, first, rolled-in rates and then certainty. (IPP)

The Public Utility Company Holding Act (PUCHA) is also cited as a federal law that impedes the development of the IPP business. PUCHA requires extensive oversight by the SEC of electric power generation facility owners. Proposed reforms would significantly loosen these restrictions, making participation in IPP projects

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more appealing to electric utilities and non-electric utilities alike. Presumably, this will make it easier to attract capital and secure financing for IPP projects.

Attitudes of the Provider Groups

Within the various provider focus groups, projections of growing demand by power generators are significantly less unanimous. Most of the pipeline and marketing group participants and about half of the producer group participants express a similar expectation that power generation markets will grow. Again, the environmental, cost and efficiency advantages of gas are cited as the market drivers.

On the other hand, about half of the producer group members and a minority of participants in the pipeline and marketer groups indicate that they do not believe that the power generation market will grow. These skeptics recognize many of the same obstacles addressed by the electric utility and IPP participants, including the same inconvenient aspects of natural gas purchasing that are described by the power generator groups: the intangible nature of gas, the confusion associated with transportation procedures, and pricing.

- I put [as an obstacle] the perception of lack of credibility for natural gas to serve as a stable energy source for electric generation. (PIPE)
- No [the electric markets do not view the gas industry as being flexible], not at all. (PIPE)
- Someone mentioned earlier, you can pile the coal up and you've got two months of coal out there in the yard, and you know what it cost. (PROD)

In addition to the obstacles they share with the power generators, the skeptics are also concerned with the power of the coal lobby, incentives to use coal inherent in the electric utility regulatory structure and a lack of government directive mandating use of natural gas.

The power of the coal lobby. In response to the 1990 Clean Air Act Amendments, legislative action taken in Illinois required Illinois Power and Illinois Public Service to install scrubbers and continue to burn local high sulfur coals. This Act is cited as an example of how regulators will act to counter the implicit bias toward the use of gas as a compliance strategy. The coal lobby is viewed by these participants as very strong in many states, aggressively acting at the state level to obtain legislation that will thwart growth of natural gas as a utility fuel.

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For example, the people that have the power in Washington basically come from coal-producing states, and coal provides jobs. I'm seeing it happen right now with the states subsidizing scrubbers to maintain that part of the industry base. So the Clean Air Act is being subverted right at the state level, and by Wendell Ford. (PROD)

Rate base bias. The Public Utility Commission's (PUC) regulation of electric utilities is viewed as providing incentives to add to the rate base, which favors development of coal-fired plants. Coal-fired facilities are substantially more costly; thus, when incorporated into the rate base, allow the utility to earn substantially more money.

There's a PUC emphasis that rewards them for their capital investment base. It says, invest in more expensive capital, which means coal versus gas. So there's all kinds of incentives for the electric utilities to stay with coal. (PROD)

Lack of a National Energy Policy. Many of the provider group members lament the lack of a national policy that favors natural gas. Such a policy is warranted because of the relative cleanliness of the fuel and its domestic nature. Without developing a clearly-stated national policy that favors natural gas, these participants believe that natural gas cannot reach its true potential.

- I think it was said earlier that we're just going to have to realize the nature of the product that we have. My view of that [national energy policy is needed] is, if natural gas is going to be the Clean Air Act type [fuel of choice] [we must] carry that forward and take that to the nation, that this is the fuel that we're going to be pushing. This is the fuel that we're going to be spending dollars on in the future. (MKTR)
- I don't think it [environmental benefits] is translated into the commodity cost of natural gas; the price of natural gas. We all agree that natural gas is an environmentally premium fuel over other competing fuel. There's no way to convert that without some regulations and adding more to the price. (PROD)

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Whereas the power generators view the impediments as transitory and expect to purchase increasingly larger amounts of natural gas, the skeptics from the provider groups are far more pessimistic. They fatalistically believe that they are powerless to overcome the obstacles.

The perspectives of the provider and power generator groups also underscore one of the major impediments mentioned by the electric utility fuel buyers: the insensitivity and lack of understanding by the providers of the power generators' needs. Contrasting the statements of power generators and providers on long-term contracts and rate bias illustrate their concern.

Long-term contracts and the power generation market. The producer group focuses a significant portion of the discussion on the difficulties that they have providing long-term contracts to power generators. They explicitly assume that power generators, whether IPP or electric utilities, want, and must have, long-term contracts in order to buy natural gas.

I think the area that we can really grow a market is the electrical generation area. We've got a lot of problems with the mentality of getting access to that market. By that I mean you're going to have to write long-term contracts in order to gain a share of that market, and that's difficult for producers to do now. Even if you want to write a long-term contract, it's difficult for the investors to look at putting the money with those kind of projects [and] with the particular gas suppliers that are willing to do that. (PROD)

In contrast, the electric utilities focus much of their discussion on the need for pricing structures that allow natural gas to compete with coal for dispatch. In order to operate a gas-fired plant, its variable costs must be able to compete favorably with the other plants in the dispatch pool. Long-term contracts with a fixed price or an escalated price mechanism typically will not provide a pricing scheme that will enable an electric utility plant to dispatch frequently.

Historically, IPPs and cogenerators required long-term contracts in order to obtain financing. One of their impediments pertained to the inability to obtain longterm contracts with fixed price provisions. The fact that producers are increasingly willing to provide long-term contracts, is seen by the IPP participants as a sign that producers are being more sensitive to them as customers.

There is another passage in the IPP discussion that providers should note, as it may signal a change in this attitude. The IPP participants indicate that they

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increasingly expect that their plants will be dispatched in a manner similar to electric utility plants.

One of the things that is very critical in putting these things together, I think, and we think, is that most new units are going to at least be partially, if not 100 percent, dispatchable. That means that the electric company can turn you on or off whenever they want to depending on their load. (IPP)

As IPPs become more dispatchable, their needs will change; long-term contracts with fixed price provisions that are above the market clearing gas price will become far less useful.

Rate base bias. Participants in the pipeline and producer groups indicate that they believe that the rate base bias discussed above encourages electric utilities to build coal-fired plants. (See discussion on page 22.)

- So you're sitting here as [an] electrical utility, saying, I could go to gas, get the hell second-guessed out of me or, in today's environment, I can very easily go with scrubbers and justify that investment, and I'm going to earn on that investment. I mean, it's a no-brainer. If you were a utility executive, which would you do? You'd take the money. (PIPE)
- We're all asking, why don't people invest in gas burning equipment for electric power generation? We want them to make an economic decision based on cradle-to-grave economics. They look at what they are rewarded [for] by the PUC, which is capital asset base. That means coal. That means scrubbers. (PROD)
- There's investment base. It says, invest in more expensive capital, which means coal versus gas. So there's all kinds of incentives for the electric utilities to stay with coal. (PROD)

The utility fuel buyers and regulators hold a contrary view on the subject. To them, the cost of the coal plant is substantially more expensive than the natural gas alternative. Not only is the additional cost problematic for the regulators, it is also problematic for the utilities as well.

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Assuming you're going to look at coal straight up, and you're going to look at gas straight up -- I don't think anybody's going to look at nuclear at this point -- you tell me what you prefer to take to the board of directors to get approved: \$600 per installed kilowatt of capacity on a gas turbine and worry about what happens with the damn gas contract down the road, or a higher dollar cost [option], particularly coming out of some of the rate cases that we've come out of on coal and nuclear plants? I mean you can at least sleep a few more nights before you have to take those [contract problems] back into the boardroom. I think hands down that decision's going to go in favor of natural gas. (EU)

The rate base bias argument, even though theoretically sound, is not consistent with the operating environment of the electric utility customer.

Regulators and Non-Power Generation Demand Groups

The other demand groups, the regulatory groups and some members of the provider groups also expect that demand from the power generator market will increase in the years ahead. Their reasoning is similar to the power generators': the environmental, economic and efficiency advantages of natural gas are sufficiently great to motivate growth.

- I don't think there's any question about it. I don't think there's going to be any state that can escape some of the reactions and some of the consequences of the Clean Air Act, and natural gas as a generation fuel in the co-firing scenario, without a doubt, is going to increase the consumption of natural gas. (STCOMM)
- I think I would agree to a great extent. I mean, as we look at finding cleaner ways to generate electricity, you're going to be looking more at natural gas. (STCOMM)

Participants from the industrial equipment group mention an additional factor: they believe that electric utilities are being forced to rely on what they term "distributed" power plants, small increments of new capacity typified by IPPs. As IPP projects tend to be natural gas-fired, the trend will lead to increased gas demand. To these participants, this shift in generation ownership will result in a higher probability that gas demand from power generators will, in fact, rise.

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What's going to happen is the pie [the natural gas market] is going to get sliced up a lot differently than it is today and so you're going to lose gas load in some areas. But I think in electric utilities, the electric utility business [will be] completely altered over [the next] couple of decades. Distributed power and IPPs is the way power is going to be made over the next 10 or 20 years. And it is all going to be gas-fired, in my opinion, and so [gas] is going to take up a lot of load over there in that area but it is going to be [widely] distributed, no more 1000 megawatt this and 500 megawatt that, it's going to be 100 megawatt this and 10 megawatt that and maybe [only] 10 kilowatt [projects]. (IGE)

Conclusion

Participants in all groups agree that the power generators will increase their use of natural gas in the years ahead. The power generation groups clearly state their expectation of increased power generation demand for natural gas. They acknowledge that problems and impediments will certainly be encountered, but they expect them to be overcome resulting in increased demand. The providers are less unanimous. Some agree with the power generators. Others see the same obstacles, but conclude that the industry will not be able to overcome them; thus, growth will be minimal. The other demand and regulatory groups express the expectation that power generators will burn more natural gas.

Natural Gas-Fired Vehicles Market

Natural gas-fired vehicles are potentially a second source of incremental demand for the natural gas industry. Recent work by the American Gas Association (AGA) and others conclude that VFMs could add as much as one TCF to natural gas demand by the year 2000. Participants from the various groups made numerous comments on the viability of this emerging market.

VFM Fleet Operators

The focus group participants suggest that the potential for VFMs depends heavily on the type of vehicle. Participants that purchase cars and vans indicate that the market is moderately favorable; however, participants that purchase heavy trucks indicate that natural gas applications are not available for them and they express great skepticism about their potential in the future.

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The primary driver behind the VFM light vehicle market, according to the participants, is the increasingly stringent air quality regulations. Natural gas vehicles are viewed as being able to meet the evolving requirements. In addition, VFMs are viewed as promoting a domestic energy resource. However, based on economics, the natural gas option does not command a decisive edge over competing alternative fuels.

> I don't think there was that much of a margin of difference. It is cheaper, but it's not a lot cheaper.

Moderator: It's not a lot cheaper?

No. So if I see the price go up dramatically, then it's not going to be as advantageous. (VFM)

Reasons cited for the lack of economic advantage for natural gas include the costs of refueling stations, necessity to maintain backup capabilities and an attitude among local distributors that the costs of refueling stations should be immediately borne by the first VFM operators.

It was interesting at the meeting we had with the gas company about a week ago, two weeks ago, and they quoted what the going rate for gas was. I almost fell off my chair. There's not much advantage, there isn't any. He said, "We have already put in a fueling station, we have school buses, so we have to start amortizing on our investment." (VFM)

The participants suggest that the public sector and private sectors have different motivations for purchasing VFMs. The public sector, motivated by a desire to see the industry grow, bases its potential on reducing air emissions. Accordingly, they do not appear to be as concerned with cost issues. On the other hand, cost is the overriding focus for the private fleet operators.

Personally, I think it's going to slow down in the private sector because cost, while it's an important criteria for all of us, [is] weighted a little more heavily in the private sector. I think you'll see a lot of pressure from the public and from governmental leaders to use it. The public sector is a loss leader, if you will; cost is not quite as important. Let's just say that the cost of doing it is the price you pay for forcing the technology to be developed. So yes, I think it will slow down in the

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private sector, but probably not as much in the public sector and both will move ahead. Additionally something we deal with a lot is that there's, I think, gross misperceptions about light duty compressed natural gas (CNG) technology for cars, trucks and vans. It's basically a converted spark ignition engine. The technology is mature, it's been around for a long time, anybody can use it *versus* heavy duty engine technology development which. I would say, is still in the late R&D phases. The engines are out there. There's a clear leader in the industry in providing class A sized natural gas engines. Others are starting to pick the ball up. But the technology is still unreliable, it's costly, and it's questionable, in our opinion, whether or not now is the right time to move to it. (VFM)

In a number of instances the private respondents indicate that "clean diesel" would be a more desirable alternate fuel particularly for the heavy truck and bus market segments. Their definition for clean diesel includes a cleaner fuel, on-board emission control technology and more efficient engines. The participants believe that this combination of technologies exists today and will prove to be better suited to their needs.

- Our industry defines clean diesel a little more broadly. It is the sum of a more highly refined diesel fuel plus a state-of-the art diesel engine. Typically, [this means] more product controls, plus some form of exhaust after treatment for diesel engines, either a particulate trap or catalytic converter. The emission statistics are so close if you take the cleaner fuel, state-of-the-art engine, [and] add a particulate trap in the four categories [where] the Clean Air Act regulates emissions, they're very, very close and in fact, exceed the emission levels of natural gas in some categories. (VFM)
- It ["clean" diesel] is available in Southern California because of California EPA requirements, or [rather], I should say, to my knowledge, when you buy diesel fuel in Southern California, in the last five years, what you've been buying is "clean" diesel, and for the rest of the country I think that's going to roll-out to meet the '94 standards. You're going to see the oil companies providing [it].

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All over the country?

[Yes], [they will be] selling clean diesel all over the country. (VFM)

As economics do not particularly favor natural gas in the VFM market, there is a suggestion that rather than promote natural gas as a national solution to environmental problems, market niches may exist that call for regional alternative fuel solutions.

> Ethanol may continue to make sense in the midwest, where you can make it from leftover corn, and liquified natural gas (LNG) will continue to make sense in Texas where they have a lot of liquified fuel. Electricity will make a lot of sense in Seattle where hydro-electric power is three and a half cents a kilowatt hour. So maybe we shouldn't be thinking in terms of adopting one [alternative fuel solution] and building one infrastructure. But take [his] niche comments, and be prepared to use a lot of different alternatives. (VFM)

Nonetheless, if policy continues to promote the natural gas option, several formidable barriers need to be overcome. Two impediments to the development of the VFM market require a simultaneous solution. They are the development of an infrastructure, including refueling stations, mechanics, maintenance facilities, in tandem with the refinement of dedicated gas engine technology by the automobile manufacturers or original equipment manufacturers (OEMs). Concurrent development is seen as necessary in order to avoid the Catch-22 situation where there are gas-fired vehicles with too few refueling stations or refueling stations without natural gas-fired vehicles.

> The gas company doesn't want to put in an infrastructure because there's no demand, there's no vehicles running.

Moderator: [It's like a] chicken and egg thing of what comes first.

Yes[, that's right]. (VFM)

Part of the solution in developing the market lies in the communication and subsequent cooperation between OEMs and LDCs, both of whi^ch are looked upon by

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the respondents as shouldering the responsibility for making the VFM market viable. Yet in some cases, the LDCs do not place a priority on VFM market development.

We're a huge customer for these utility companies. But they've made great effort nationwide to approach us on a mobil source, fleet area to say, "Well, we supply you in the plant, we help heat your plants." But they haven't made any big overtures, to say, "Well, how can we help you to turn you fleet over into CNG?" [One utility is a] shining example of the utility company that has actually come to help convert vehicles. They have... done a real good job. We have one large company that [has] completed changing almost all their vehicles to CNG based on [the utility's] ability to locate fueling centers, areas that would be convenient. The other end of the state is a whole different story. The other end of the country, one or two [utilities] are helping out with one of our companies. But in the middle, [with one exception], there is not much. (VFM)

Although there is a significant effort on the behalf of Ford, Chrysler, and General Motors with respect to a market-based approach to product development, there are lingering reservations about the products that are being developed.

• We haven't talked about this -- vehicle weight.

Moderator: All right.

Right now, compressed natural gas adds 3000 pounds to the weight of an already overweight transit bus. It will add the same amount of weight to any kind of a vehicle that you stick it on. For the private sector, that's payload. For us it's exceeding the 20,000 pound axle limit by 6000 instead of 4000.

Moderator: How much did you say?

Three thousand pounds.

We were figuring 1800, but it's 3000 pounds.

Well, that technology is developing as they figure out how to make lighter weight tanks, but on a recent

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delivery of transit buses in a neighboring company, the weight penalty was 3000 pounds.

In the tractor trailer operation, 3000 pounds would be significant.

If you're looking at payload.

Big payload bucks. (VFM)

Another significant impediment is simply the perception that natural gas vehicles are unsafe.

See, my assumption is that growth isn't going to be very rapid because I think there's at least another ten years of huge obstacles. Can I just relay a quick story? We went through a major..., I guess you'd call it public relations with the [city], who is not for this project at all. We brought in the Gas Research Institute (GRI) and a whole host [of other participants]. It was an allday meeting. I don't know if anybody is familiar with [city], but we have one tunnel that you get from the airport to the city and then we have a major tunnel that goes through downtown and we're building another one: and our whole thrust was we needed to be able to take these trucks through this area because this is key [to VFM use]. And, I thought they were just outstanding From any engineering aspect they presentations. documented the safety and the odds, and plus [another city] they've okayed all of this. After a good nine hours of meeting, the fire chief got up and said: "Well, I have never been [as] impressed with a meeting like this ever. but your damn trucks ain't going through my tunnel." So that, to me, said it all. (VFM)

One participant points out an impediment that is typically not recognized, but that could create a significant barrier: that of labor unions.

Well, I was going to bring something up. We have unique problems with certain fleets. Our drivers, for example, in certain areas, cannot fuel their vehicles because of collective bargaining agreements. So, if they're out on the road, and they run out of CNG or any

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other fuel, under their type of bargaining agreement they cannot stick a fueling device in their truck to refuel their vehicle. They have an oiler, that works on premise. But they call a service truck and the service truck has got to bring a guy out to do it -- under that contract they're not permitted to do it. Now [that] we're looking at alternative fuels, the labor relations people are trying to negotiate that provision. Some of the unions look at it as a job issue -- taking somebody's job away -- so you got a problem if you're in a CNG vehicle and you run out of fuel and you're stuck in the middle of a freeway or you're stuck at a street corner where there is a CNG guy...

Full service!

Full service, right, and the company will get you for paying extra cost for the CNG. You run into that problem. It sounds weird, but it is a problem with our industry and others as well. (VFM)

Participants also express significant frustration and displeasure with the marketing efforts of the gas industry. They perceive that the industry is trying to force the VFM option on them, with little regard for the problems that conversion creates.

In the public sector, they have hurt themselves terribly. I think this view is widely held in our industry. I know it's shared at home. Little or no sensitivity to the customers they are trying to serve. But their strategy has been to build a strong legislative lobby to force the fuel on [us]. They have little or no stake in the outcome. They may or may not be reliable; it may or may not cost more, but generally speaking, the investorowned utilities that provide the gas are somewhat monopolistic. (VFM)

Poor marketing skills, specifically insensitivity to customers within the gas industry, counteract efforts to develop the VFM market.

My opinion is that historically their industry [gas] has been regulated and they haven't had to sell their product, they simply had to provide it at a price that's

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set by a local utility commission usually. My guess further is that they haven't developed very good marketing skills, therefore, and they ought to do that. They ought to come out and ask us what's important [and] figure out how to try and provide it.

Moderator: You don't feel like they know this right now?

I think they're just beginning to understand it. I mean we heard a lot of examples, (LDC) for example, the shining star, cooperation, joint partnership. (VFM)

- They are just now starting to come out and talk to us. As far as I know, they have but one technical rep and about fifteen lobbyists. That gives you some sense of where their priorities are. When their technical rep talks to us, we say things like, "Well, we need a fast fueling station that will refuel a bus that is 75 percent empty in five minutes." The response is not, "How can we do that?" The response is, "Oh, you don't really need to refuel that fast. Why don't you just take ten minutes?" and then we say, "The highest horsepower engine available in the industry is 240 horse. That won't provide an adequate acceleration or hill climbing capability." Their answer is not, "What are your needs and how can we develop an engine that will meet them?" Their answer is, "Oh, you don't. Operators want a bus that will stand on its hind legs and you don't need that kind of horsepower, why don't you just drive slower?" (VFM)
- They are not trying to satisfy me as a customer, they are trying to shove a product down my throat by getting regulations passed and having lots of lobbyists. (VFM)

Provider Groups

The participants from the provider groups generally ignore or otherwise say very little about the potential of the VFM market. The producers do not mention it even when they are asked about new technologies that might increase demand. The pipelines mention VFMs only in the context of a discussion on the gas industry's ineffective marketing efforts. Marketing companies only mention VFMs as an example of how the industry is unwilling to invest in new technologies to make the

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market grow. The local distributor focus group participants indicate that they perceive VFMs as a significant growth market, but say nothing more about them. The lack of discussion of VFMs by these participants suggests that VFMs are not a major focus for the supply side of the industry.

Regulators and Non-VFM Demand Groups

The consumer advocates, state commissioners and state commission staff focus group participants mention VFMs slightly more often. Their comments are generally rather specific, breaking down as follows:

- Participants from all three groups indicate that they expect VFMs to become a significant new market because they provide a relatively clean burning option to the internal combustion engine. They believe that VFMs will be most successful in non-attainment areas.
- Consumer advocate participants suggest that the gas industry is not distributing sufficient information on VFMs to stimulate demand. On the other hand, they are concerned that if more information is forthcoming, demand will increase rapidly and there will not be sufficient gas reserves and refueling capabilities to meet demand.
 - It's a Catch-22 situation. If there was too much information going out to the consumer right now and there was great demand, they can't supply the demand at the moment. (CONADV)
- Consumer advocate participants indicate that they believe it is inappropriate for ratepayers to subsidize research and development for VFMs. Ratepayers do not get any of the profit that might result from the effort so they should not be forced to contribute to the effort. On the other hand, they believe that it is permissible for ratepayers to pay for LDC fleet conversions because they receive part of the benefit through cleaner air.
 - Our stand on natural gas and natural gas vehicles is that it's not fair for the ratepayers to be financing the research that will of course benefit [the utility]. Unless the ratepayers are involved somehow in any of the profit that they make as a result of the project. That's one point. However, we would be in favor of having the money used to subsidize the conversion of the [utility's] fleets or their vehicles, because that would benefit our environment. (CONADV)

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- Consumer advocate participants believe that VFMs should be developed in a free market. Producers and others involved in the industry should not be regulated.
 - One of our biggest concerns is using ratepayer dollars to fund these things [VFMs]. (CONADV)
- State commissioner participants are sharply critical of the gas industry for its weak efforts to commercialize new technology. VFMs are cited as a vivid example of this failure.
 - They aren't running natural gas vehicles. In State X, ...last year, only 13 percent of the vehicles that the LDCs bought were natural gas vehicles. Thirteen percent. That means that 87 percent were not, and so if anybody should be leading the charge for natural gas vehicles it should be the utilities themselves. (STCOMM)
- State commissioner participants believe that local distributors are unwilling to invest their own money in technologies like VFMs. State commission staff participants echo the same sentiment, saying that the gas industry pursues research and development on a "someone other than me do it" basis and use VFMs as an example.
- State commissioner participants also indicate that they believe people, in general, have significant fears about the safety of VFMs. At one level, they believe that people are scared of the technology. At another, they believe that people may "think" that the technology is safe, but its novelty precludes sufficient confidence to actually purchase VFMs. The participants suggest that more widespread use of VFMs by the industry might help overcome this obstacle.

Conclusion

VFMs constitute a potential incremental market for natural gas. At the moment, the primary driver for VFMs appears to be regulatory; specifically, provisions of the 1990 Clean Air Act amendments and numerous state and local air quality directives. Major impediments to the development of this market are identified. The most significant are lack of clear economic advantage, safety perceptions and insensitive and inadequate marketing.

Gas-Fired Cooling

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Gas-fired cooling is generally regarded as a third source of incremental demand for natural gas. The market appears to be driven by life cycle cost advantages as well as environmental considerations of gas-fired technologies over electrically powered alternatives.

Cooling Equipment Manufacturers

The cooling equipment manufacturers believe that there is tremendous potential for gas-fired cooling equipment. One participant estimates the size of the domestic market to be approximately 170,000 units per year of commercial size with revenues totaling about \$2 billion. While the potential for the industry is large, the participants are extremely frustrated with the commercialization efforts made by the gas industry to date. Unless the gas industry becomes more aggressive, the participants suggest that the promise of gas-fired cooling will pass largely unmet.

The key impediment discussed by the participants is the up front cost of gasfired cooling equipment. Gas-fired coolers are initially two to three times the expense of electric options, but are far cheaper to run on an ongoing basis. Accordingly, the participants estimate the payback period for gas coolers to be about five years, too long for most buyers to accept.

The novelty of the technology is the primary cause of the high initial cost. None of the participants are producing their products at a scale that allows them to drop the per unit price to a competitive level. A potentially lethal paradox results: they need to sell more units to lower their costs, but the present high cost precludes their ability to sell more units.

> Typically, the [gas-fired] product is twice as expensive as the electric power [equipment]. (COOL)

This situation is exacerbated by demand-side management programs. One of the participants describes a situation where the electric utility is able to offer a subsidy for high efficiency elective cooling 25 times greater than the gas utility because it is able to incorporate the subsidy into its rate base as part of a demandside management program.

> My competition is the electric units and I'll give you an example. I was in [city] last week. Twenty-seven hundred tons of possible gas cooling and we get a \$15,000 rebate for these 2700 tons because that's the max the LDC can go. And the electric company walks in with a \$400,000 rebate for thermal storage. We've got to get parity before we can sell more equipment. And if we

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can't [get parity] that's not going to cut it, you know. (COOL)

[First-cost] that's one of the biggest things. But if we could have some method of accelerating the sales of units, and if not, [if] he could sell 2000 units a year, we could do some interesting things with the cost of our equipment. But our small company can't have a major impact on the cost of the prime movers if we're only buying a few at a time. But if we could do much more [volume]...we could do some interesting things with the cost of the equipment. We could be more competitive. A chicken and egg thing. (COOL)

Poor marketing is an associated aspect of the first-cost conundrum. According to the participants, with the exception of four pipelines and 10 local distributors, the gas industry does not help them. The participants indicate that before they can begin to sell their product, they must persuade the prospect that natural gas can provide a solution to his need. This "concept selling," they suggest, is difficult and expensive for them to do, as it results in additional costs which makes the first-cost problem worse. They state that if the industry and the local distributors did a better job of concept selling, the first-cost penalty might be slightly reduced.

- They certainly help with the concept. They can't sell the end product but they can certainly get you into that stage two where you can go and sell and get it specified. If there's an unfamiliar name or product, it's more difficult to get [the sale]. Without the help from the gas companies, we have a terribly difficult time. (COOL)
- You're going in there with something that they've never seen before and don't know which is the front end or which is the back end. And it's very hard to get there early enough without the local gas companies to actually make a presentation that helps get the sale. (COOL)
- Selling gas air conditioning is real tough, because it's a two-tiered sale. First, you sell the concept, then you get a chance to talk about the equipment. What we need the gas industry to do is to do step one because it takes too much time for a typical salesman to sell the concept before he gets to talk about the equipment. And certain LDCs do an okay job; other's don't. (COOL)

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In addition to marketing support, the participants emphatically state that more subsidies are necessary to successfully compete against electric technologies. From their perspective, it is important for more distributors, pipelines and producers to become involved in development of a subsidization pool that can be used to compete with electric utility offerings.

- We still need a subsidy to get it in. Then we can make enough to start lowering the price. But still, it's to the benefit of all the gas industry to work towards a common goal to help get machines out there. I think initially that would mean incentives. There have got to be incentives because, our company...we're not going to be able to build enough units to knock down the price dramatically. But as we get more opportunities to sell more units, then there may be less rebates required unless, again, the electric utilities continue to provide the incentives. I don't think this business should be predicated on incentives, but, right now it has to be. (COOL)
- We've got to go all the way to the wellhead and see what we could do in terms of [getting] the entire gas industry [to recognize] that there have to be incentives out there to move more gas. (COOL)

If subsidies are made available to the degree that they can develop more demonstration plants, more service infrastructure and produce more units, then the participants believe that the first-cost impediment can probably be eliminated.

Provider Groups

As was the case with the VFM markets, the provider groups say very little about the potential for gas-fired cooling even when directly asked about their potential. Local distributor participants indicate that they believe gas-fired cooling could increase demand for natural gas and that distributors have started a coalition to build air conditioners. Otherwise, they do not mention gas-fired cooling. Similarly, participants in the pipeline and producer groups do not mention gas-fired cooling. Marketing group participants discuss cooling in two contexts. First, use of gas-fired cooling equipment as part of demand-side management (DSM) programs for electric utilities is an example of how stronger gas-oriented regulation could help the industry. Second, one participant believes that the required subsidies could be reduced through packaging of spot gas, rather than LDC system supply.

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Regulators and Other Demand Groups

The regulatory groups make only limited mention of the potential of gas-fired cooling technologies. Consumer advocate, state commissioner and state commission staff participants believe that cooling is one of the probable drivers of new demand. Other comments regarding cooling include:

- Consumer advocates recognize that gas-fired cooling requires subsidies to be successful. They are willing to allow them because cooling will enable the local distributor to increase its load factor and thereby lower its overall gas costs.
- State commissioners use cooling as an example of the failure of local distributors and the gas industry to market. Electric utility efforts to promote cooling technologies are cited as examples of the efforts that gas utilities should be making.
- State commission staffs discuss cooling as an example of the need in the gas industry to develop a capital pool to finance subsidies and new product development.

Conclusion

The potential of gas-fired cooling, according to the cooling group participants, is estimated at approximately 170,000 units per year. However, the barriers are very significant. The first-cost penalty paid for gas-fired cooling is very high and constitutes the most significant barrier. Unless subsidization mechanisms can be worked out, the first-cost penalty may preclude the chance for cooling technologies to be successful. The various provider segments do not appear to be taking an adequate interest in the opportunity to insure that a solution to this dilemma is found.

Industrial Markets

The industrial consumers constitute the largest market for natural gas in the U.S. In 1991, industrial markets burned approximately 7.3 TCF, or nearly 40 percent of all the natural gas consumed in the country. The industrial sector is also the most dynamic, growing at over five percent annually over the past five years. Fuel switching to natural gas from fuel oil accounts for most of the gain, as manufacturers have taken advantage of lower gas prices and face tighter environmental restraints. Many industry observers, however, do not expect this growth to continue, as fuel switching opportunities diminish and conservation efforts in this sector increase. Participants in the various groups hold widely differing views on this supposition.

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Industrial Consumers

Participants from the industrial consumer focus group are relatively ambivalent toward increased use of natural gas. Most of the participants view the fuel positively; some are process users, thus highly dependent on the fuel. These participants cite current prices, supply availability, its domestic nature and environmental attributes as the most significant benefits encouraging increased consumption.

- Oh, 50 percent of our oil [is imported], so if you were to replace with domestically produced natural gas or North American natural gas it seems like it makes lots of sense. (IND)
- These days, I guess the price of it is right. One can't argue about that. I would expect [from] looking at the resource base and the like, it's going to remain pretty decent for a long period of time. (IND)

At the same time, however, the participants are adamant in their belief that natural gas is only one of several fuels they could burn. Accordingly, they do not believe that natural gas should be accorded favored status.

- I think gas is important, but put in perspective, there [are] other fuels we should be using for the generation of power and other sources. Coal is one of them. I think for fertilizers, gas is their feedstock, but it's not the magic wand that's going to solve all our problems. It could cause some problems, too. (IND)
- I guess I see natural gas these days as being one of many fuels you can select. I understand the concern that some people have with the feedstocks where gas is really the only thing that will do the job. I think in a bigger picture that's a relatively small amount. Most of the gas goes into the kind of processes that we run in manufacturing where gas is really substitutable. (IND)

This attitude is underscored by the participants' concerns that increased use of natural gas by power generators and other consumers might reduce its availability for industrial uses. These participants indicate that natural gas resources are "finite" and therefore will become tighter at some point in the future. Accordingly, more

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thought should be given to allocating gas suppliers to their most efficient uses, and again, the potential contribution of other fuels should not be ignored.

Ironically, while the participants do not believe that they should be dependent on the natural gas industry, they regard the gas industry as dependent on them. The higher gas consumption levels of the 1970s and early 1980s are attributed to a more prolific manufacturing base in the country; and the load loss associated with reduced manufacturing. Continued shrinkage of the nation's manufacturing base, the participants surmise, will lead to reduced demand for natural gas. (See page 8.)

While the participants are generally bullish on the likelihood of expanding their use of natural gas, they identify numerous impediments to growth, which focus on three themes:

- Regulatory obstacles to improving efficiency
- Reliability
- Poor industry marketing

Regulatory obstacles. The participants sharply criticize their treatment by local distributors and state regulators as counter-productive to manufacturers' efforts to reduce costs and become more competitive. They suggest that improved gas service could be a significant aid to help them in their efforts to compete globally. However, rate structures and the lack of service provided by local distributors inflate the cost of gas service; it does not aid them in their efforts to reduce costs.

- LDC cross-subsidization. LDCs need to recognize that there is an industrialized America that is fighting for its existence. And they're sort of playing around in this very cushy environment of guaranteed returns. Some place there's some balance. (IND)
- Undistorted market signals. In order for capitalism to work you have to have undistorted market signals. You got to understand what the supply is, what the demand is and that translates into price. It sort of all comes back to this fact that we're deregulated increasingly from the wellhead all the way to the burner tip. By the time you get to our end of the world through an LDC, you have this incredible distortion of market signals, which is the key and it's mucking up the works. (IND)

Regulators are viewed by the participants as having little experience managing competitive enterprises, and thus are insensitive to the participants' plight. The

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political and short-term nature of commissioners is also cited as contributing to the commissioners' lack of sympathy.

One other comment I want to make regarding LDCs: some of those folks [are] clearly Neanderthals to work with. However, they also have some constraints that we need to recognize because to a large extent they respond to their regulators because they need to operate with a state regulator all the time. I think it's really, in many cases, the regulator that drives them to be less than accommodating because if the regulator doesn't want to lose the power. They [the regulators] want to maintain power over the subsidization over the rate setting and all those kind of things. They don't want to lose the power that they would lose once you [the industrial] get off the system. I think they provide a lot of the reason why some LDCs won't cooperate. (IND)

Reliability. Reliability appears to be a major obstacle to greater industrial gas consumption. Like the power generators and others, the industrial group participants remember the shortages of the 1970s, and those memories continue to undermine their confidence in the gas industry.

Concern for reliability also derives from the participants' historical inability to acquire access to reasonably priced firm transportation and storage. As a result, they have been relegated to interruptible service, which they view as unreliable. Many acknowledge that they can and do maintain alternative fuel capabilities to cover their needs during interruptions; however, they note that alternative fuel capability is expensive to maintain and its use is being increasingly restricted due to environmental regulations. Reasonably priced firm service, they conclude, is much more desirable. In fact, they suggest, access to reliable transportation will allow them to conclude longer term supply agreements, which interruptible service renders useless.

Interruptible transportation is just that -- it's interruptible. The control of the firm capacity - they can take capacity back from interruptible anytime - normally, it still is held by LDCs. It sort of makes our ability to contract long-term supplies with any security very untimely. The issue before us in the restructuring process is how can we firm up our transportation in order to be able to enter into long-term contracts with producers as an alternate supplier to firm up that

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reliability at the burner tip. That has to be done both at the interstate and the local LDC level. (IND)

Even with greater access to firm transportation, the participants remain leery of the curtailment powers of regulators. Again, they remember the 1970s and fear that if shortages arise, history will repeat itself, and they will be curtailed regardless of contract provisions. In this sense, reliability is a vestige of the regulation.

> If you do talk to a producer and say, "Okay, I'm perhaps willing to pay you a bit of a premium to get more reliability," [the problem becomes] how do I get that? I mean how am I assured that I'm going to get anything for my money? If you recall, back in the '70s we in fact paid a substantial premium. Everybody paid firm service rates. We had the expectation that there [were] the supplies there, and those supplies would be delivered to us when we needed them. It turned out when [the LDC] went a little short, we didn't get [the gas]. Firm rates didn't mean diddly damn. When it got right down to it, we got cut off. The same argument applied for quite some time on the gas inventory charges. Absolutely everybody resisted providing any sort of guarantees that after you paid all this money into a gas inventory charge that you, in fact, would get the product when you needed it. It seems to me that that's just too many people that can influence that. There are regulators in the states and Washington. Everybody can have their hand in that pie. So even if you're willing to pay a premium today to get gas 10 years from now, I think, based on our past experience, we're convinced that that's a loser because we're not going to get the gas. If it's not there [generally short], it's not going to come to us. It's going to go to the residences and the commercial buildings and the hospitals and the schools, every place else, but it's not going to come to us. So, in the final analysis it makes very little sense for us to pay any sort of premium with producers to help them out to get them more secure in the long-term future because we can't depend on those supplies reaching us when we need them. (IND)

Poor industry marketing. The participants believe that the gas industry either ignores their needs as customers altogether, or at best, is disrespectful. They

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perceive themselves as routinely excluded from deliberations between pipelines and local distributors on the one hand and regulators on the other that determine capacity allocation and operation policies. As a result, their interests are infrequently served and they incur additional costs.

- And the pipelines need to recognize that we are the customer. Right now we're not a customer even though we're at the end of that pipe and we're the one that's consuming their product. They need to be the transporter. (IND)
- Now, to answer the question, how has it been exhibited that we haven't been able to work closely with the pipelines to have them exhibit to us that we are their ultimate end user? Well, it's been shown in the recent past that when the pipelines want to enter into negotiations to restructure their services, we're the last people they come to talk to. The pipelines and the LDCs, the two jurisdictional monopoly entities get together, they decide how the system is going to work in the new environment, then they come and they lay the end product on us. That has been shown in several instances recently. I'm afraid unless that pattern is broken, that we as end user are going to be on the short end of the stick once again on the very issue that is most important to us, which is comparability: the ability to have reliable resources available to us -- the ability to enter into a gas contract with alternate suppliers; the ability to have control of the capacity of the pipeline, both at the interstate and the local utility level [so that we can] get the commodity that we're entering into contracts with producers to our burner tips. If we're not allowed into that process, we're going to find ourselves at the short end of the stick. (IND)
- [This] issue is selfish, but I think it's meaningful: a recognition and understanding of the customers' needs, and in some cases, the customers' costs. This is one point that has not come up this morning that I think is important. We've talked about the degree of difficulty in regulations. Objectively looking at it, not only do we have to pay to go in and defend ourselves, we also pay the bill of the utility of the pipeline that we're going in

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to argue with. So any time we're in a regulatory proceeding, we're paying at least twice. And I think some of that has to change. (IND)

Distributors are also harshly criticized because they appear to the participants as unwilling to help. The participants recount several instances where distributors were unwilling to work with them on pipeline expansions and other efforts to increase reliability or reduce costs. The net result of their perceived treatment by distributors is an overwhelming desire to eliminate the local distributor from their supply chain. Most of the participants believe that direct connection to pipelines would result in far fewer problems.

> I can see some states that they have a small muni that represents about 25 or 30 percent of the load. We're there, day in and day out, they come to November one, off the line. We have to go to propane. We talk about increasing compression on the station, you talk to a certain pipeline that was mentioned. [They say] no, we're too small for a bypass. Well, we [the LDC] don't have the money. We're [willing to] pay for it, and they just don't want to deal with you. They got you now. The only way you can do [change] that is, as a state commission told me once, I don't believe you until you pick up and move. And that's going happen, pick up and move; not to the next state.

It already [happened]. It could be to the next country. (IND)

- When I think about our problems, I don't think about the problems in [state] where we have a market-based system. When I think of our problems, I think of the problems that all the plants connected to LDCs. Does everybody feel that way? (IND)
- Yeah. That's really where the problem is. In fact, I was thinking last night if I had to do one thing, if there were only one thing I could wish for, [if I] had a little genie that would improve our ability to use gas, I would get rid of all our LDCs and have direct connection. (IND)
- Yes, for what we pay. I mean we pay an awful lot of money, almost as much, in some locations...for moving

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through their pipe as you pay for wellhead supply, and there's no risk associated with it; they provide no service. They don't supply the gas supply. They don't provide balancing. They don't nominate. They don't do anything. They only bill. (IND)

The Provider Groups

The marketer, local distributor and producer groups do not specifically discuss potential growth from industrial markets. Members of the pipeline group indicate that they believe the industrial market to hold significant potential for increased demand, but otherwise do not direct specific comments toward the sector.

Regulators and Non-industrial Demand Groups

Participants from the non-industrial demand groups have few comments on the potential for greater industrial growth. However, the regulator and manufacturing groups have several noteworthy comments including:

- Consumer advocates believe that service for industrial end users is subsidized by the captive ratepayers. However, they believe that there is little that can be done to make the system more equitable. Industrial end users have alternatives such as alternative fuels and the ability to bypass the LDC, which give them a much stronger ability to use competition to reduce their costs. They also believe industrials can obtain lower cost interruptible service, but never suffer interruptions.
 - They contract for the potential of being interrupted, and they pay less. But their argument is that it's not that they should pay less in terms of the fixed cost of the pipeline; their argument is, they shouldn't have to pay any fixed costs. The pipeline was constructed to serve peak usage. Peak usage by definition is heating customers. We are not heating customers; we are industrial customers. We have a high load factor and use the same amount all year long. And so why should we have to pay any of the pipeline costs? We're doing them a favor by moving gas across their pipeline. (CONADV)
 - The cost of service, again. Now, where there are interruptions, the interruptible rate is fine. But where there are no interruptions, which is our experience, then they've been benefiting for a rate for lesser service when

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lesser service was never there. It was there in contract only. But in reality it isn't there. (CONADV)

- State commissioner participants indicate that they believe the industrial customers are able to hire lawyers and other experts to effect cost reduction. They appear frustrated by manufacturers' continuing efforts to reduce their energy costs, as they believe that this often results in more costs being shifted to the captive ratepayer.
 - The biggest threat that we have in this whole area is that we have 25 or 30 industrial customers. We have three or four of them that are very aggressive. Large gas users have energy managers on board and legal talent and unlimited resources of money. We're faced with a problem of it wouldn't be the fairness issue of them...and in one case the pipeline goes across the man's property, so he wants to be able to bypass. [STCOMM]
 - A skilled and unskilled user. The big industries in our state are all ready to bypass the pipeline. Do everything. They have an energy consultant. They have a law firm, they have everybody backing them. Their opportunities to get gas cheaper is not an opportunity that the small commercial, middle-sized commercial, or the residential person has, so we've got to balance that act. And it goes across state lines, it goes even across lines of the pipelines, it goes across the LDCs. [STCOMM]
- Industrial gas equipment participants believe that natural gas has a bright future because of its environmental and domestic nature, price and availability. They also suggest that natural gas can improve the efficiency of industrial equipment and improve product quality.

The industrial gas equipment participants also identify numerous impediments to greater use of gas by industrial consumers. One of the most important is poor marketing. The participants believe that the gas industry makes an inadequate effort to understand their customers. This results in missed opportunities to attract new customers and increase load. They also suggest that the gas industry must take a stronger role in the sale of new gas-fired equipment. As manufacturers, they make electric and gas equipment and have as their primary concern consummating a

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deal, not the sale of one type of equipment over another. Accordingly, the gas industry, particularly LDCs, must become more aggressive in technology sales in order not to lose load.

- There are two classes of LDCs. [There are those that] recognize they have problems [with markets] and we are talking about the good ones here. [But] I still think the majority don't understand. They get to the end of the gas meter and that's it, for the most part. (IGE)
- So, if the gas industry is going to succeed, it is going to have to become more competitive, more sensitive to its customers, responding much more quickly, paying attention inside the plant. (IGE)
- In our case, it's simple. I mean they [the gas industry] has to give us the data that's available, what the real cost of gas is and they need to do their homework to see what they're up against competitively, and then also go in with our salespeople to help sell that item. We'll sell a dual fuel system, we'll get the sale for the plant. But we might have it on coal, we might have it on oil, we might have it on gas. And it's usually a customer's preference, not ours. We're not pushing it. (IGE)

The participants also believe that the sales information provided by the gas industry is relatively weak. They believe that gas sales are inhibited by a lack of information regarding reserve availability, total cost advantages of gas (including externality considerations) and the benefits of gasfired technologies. Additionally, they believe that the industry's advertising campaigns are directed at residential customers and are inappropriate for the industrial customer.

- Right. It's, what are you really selling? You're selling confidence. It's like selling perfume, you're really selling hope. So, to a certain extent, the gas industry's got to sell confidence and it hasn't done it very much. The solution is [to make sure] more information's available, better quality, uniformity of the information that's available. (IGE)
- I think more statistics or maybe more information should be readily available maybe beyond reserves and

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availability so people would have a greater peace of mind if they were to rely, say, solely on gas. (IGE)

- How much do you think those ads with the little blue flames saying clean natural gas are going to promote gas? (IGE)
- It's great if I want to cook with gas or I want to heat my house, but I am talking about large consumer, industrial people -- that doesn't mean a thing to them. I mean, they don't make a little flame like that; they've got a big flame. (IGE)

Perceived reliability issues are an additional factor that impede industrial consumption of natural gas. The industrial equipment manufacturers participants reiterate many of the same concerns identified by the industrial participants, including historical experiences with curtailments, mixed messages that cause confusion among prospective gas buyers and present pipeline deliverability constraints.

Conclusion

The participants generally agree that industrial consumers will continue to be a major market for the natural gas industry. Environmental quality, price and efficiency advantages, its domestic nature, and its ability to improve product quality are the primary benefits attributed to natural gas. While most participants believe that the advent of more efficient equipment will reduce demand from the sector, members of the pipeline, industrial and industrial equipment manufacturers groups believe that the industrial market could grow substantially. Improved reliability and better marketing will be critical for this to happen.

Commercial/Residential Markets

The commercial/residential market is the largest population of natural gas users in the United States. However, despite its size, this market is the most challenging to serve due to the small per customer volumes and wide load swings. This market segment is represented in this study by the consumer advocates participant group who view their role as guardians of the captive customer.

While the needs of the commercial/residential market will grow along with housing starts and opportunities for small business and service companies, the effects of conservation and demand-side management will continue to mute growth in demand from this sector. These factors may make the commercial/residential market the least promising market for gas growth. Yet, the ability to effectively and

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economically serve these consumers, so that they embrace natural gas over electricity, is imperative to maintain the existing load and pave the way for increased consumption.

Attitudes of Consumer Advocates

Participants from the consumer advocates group look favorably upon natural gas due to its environmental, economic and domestic advantages. However, they do not necessarily favor gas over alternate fuels. They believe that market economics, rather than political or regulated mandates, should dictate fuel selections. Within this orientation, they nevertheless believe that gas will compete well with other fuels, based on its own merits.

- If it's for efficiency, and if it's for economics, I think some of those things are already happening. If it's for just promoting the economical well-being of natural gas, then I think there's a lot of walls existing out there that aren't going to fall down because somebody comes up with a policy. (CONADV)
- It would seem to me that if someone's going to make an argument to try and market the energy as the most efficient and the most beneficial energy, any type of tax breaks and/or tax penalties on another form of energy kind of belies that argument. I mean, if indeed natural gas is correct, then why don't you tax oil and electricity? It's an unfair advantage. And I think people would look at that and wonder, well, wait a minute, if this is so great, then why is this necessary? We do not need these false economies. (CONADV)

As the watchdogs for the average consumer, the consumer advocates see many impediments to allowing gas to achieve its logical place in the commercial/residential sector. They list the following among their concerns:

Poor marketing. The consumer advocates feel that the gas industry, particularly the local distribution companies, fail to effectively promote gas-fired products and attract new residential customers. Some of this failure results from historic problems associated with the regulatory prohibition to attach new customers during the 1970s. Referred to as the "doughnut" or "rings" problem, the utility must now pass through these urban rings to reach new growth areas, a costly exercise. Some states still allow favorable "grandfathered" rates for all electric users.

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I think demographics is also a problem. However, the urban markets seem to be set. It's a very difficult thing, as least as far as we are seeing, for gas companies to make any kind of penetration within the urban areas. People with electric heat in a lot of cases are locked in. People with oil like oil, they've always used oil. And then I think you're basically looking at trying to move into suburban/rural areas. And then I think it's a dicier problem. We have a lot of competition among utility types in subdivisions. They kill each other trying to offer incentives to developers, which obviously presents a problem for us. I mean that's just a rate matter, really, as to how many things you can let go. But, at least in our state, there's a problem. There were some grandfathered all-electric rates. It goes back into the '70s. That hurt natural gas penetration. Some companies were actually "ringed." They almost had to fight their way up to get to the developing areas. (CONADV)

The advocates feel there are two key barriers regarding LDC expansion into these markets. One barrier is the perceived bias among combined utilities which promotes electric service over gas and results in more restrictive expansion policies. The second barrier is lack of interest on the part of the gas utility to increase service to the residential and commercial customer base.

- I think the main extension policies are antiquated. But, companies, once again, just don't seem to have that drive necessarily to go out and really extend, or in some cases, it's hard. You know, we say if there's not enough population they can't be dependent to test. But the marketing, I think, is a problem. I mean, we have a gas company -- they don't even sell appliances anymore, which is their choice. You know, we weren't real thrilled with them selling appliances but if they're more efficient, who knows? But I don't know. There's kind of an inertia there. (CONADV)
- [To improve itself the gas industry should] be more aggressive in promoting your product, primarily on the LDC level and I guess all the way through. (CONADV)
- In our state, most of the straight gas utilities will install 100 feet of main free of charge. The combination utili-

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ties will install 50 feet of main. I don't think we see the lack of incentive to install natural gas in our state. The lower cost of the operation [of gas] is and has been very significant, and so there's a lot of demand for it [gas]. So even if it might cost a developer a little more, it's going to make the homes more marketable. (CONADV)

However the industry chooses to overcome the problems of attracting new customers, the advocates insist that the captive customer, as the ratepayer, must not be made to subsidize that growth. The costs of reaching out to new customer bases, introducing new efficient, gas-fired products and providing incentives to attract new customers, they believe, should be borne by the shareholders or new customers.

> Basically everything I had to say is related to clean air and doing the best for the consumer. A thought that I had as a solution might be providing a low cost or rebate program to consumers for converting from this electric system over to gas and doing so without affecting the rate base [by] having that absorbed because of the expanded customer base that the company would have. I think it's very important to develop clean air technologies and to continue to do so, subsidizing research, development, education of natural gas use and applications again, without passing that cost on to the ratepayers. (CONADV)

Economics. The consumer advocate participants, while favorable towards natural gas, express concern that spikes in gas prices undermine captive customers' confidence in natural gas as a fuel source. This, they believe, translates into a lower likelihood that the customers will invest in gas-fired furnaces and other equipment.

[I would be happier] if it [gas prices] were stable and lower, but not higher. Higher prices, I think, will turn anyone off. Stability, I guess, if it's higher and stable, maybe the public will accept that. But if they're just wild fluctuations, they'll shy away from it. (CONADV)

In addition to price uncertainty, the commercial/residential customer is seen by the advocates to be increasingly subsidizing large users' non-gas costs. While they understand the benefits of keeping the large users on the system to absorb some portion of the costs, this issue is a growing irritant as more industrial users switch from full to transportation-only service, seek discounted services, or leave the system entirely. As the services provided the industrials change, the captive customer is left

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to absorb their non-gas costs. In the participants' mind, this cost shifting, or crosssubsidy, is too one-sided and appears to be increasing as the large users push to purchase greater volumes of gas from third party suppliers.

- I understand that they are trying to make money and reduce their costs. But guite frankly, they've been the beneficiaries of competition. I mean they are the ones. they are the dual-fuel customer. They are the ones that come to the LDCs and say, "I was looking at your retail service rate here, and geez, it's \$5.42 an MCF." Well, I have #6 oil, which I can run for an equivalent price of \$3.25. So see va! And the state is faced with a logical argument of what do we do? Either we save this margin by giving them a rate of \$3.25, a competitive rate, or we lose it. And it doesn't matter whether they could pay \$5.42 because they had to have the power to say, "Well, why should we do that? It's uneconomic." And so that's where the cost gets shifted. Quite frankly, a lot of the costs have been shifted to the residentials and the commercials. And that's just simply the way of the world, but this isn't good enough for them. I mean they never stop, which is okay, it's understandable. But to suggest that we haven't paid the freight and that they have been the ones who have been the dispossessed in this whole process over the last 12 years is really not true. (CONADV)
- Moderator: How do you balance the economic development versus residential rate conflict?

Over what the balance is now? I don't know. The balance now is you try and maximize as much margin recovery from them and keeping them as customers. In other words, keeping them at \$3.25 is better then losing all of \$5.42. But, unfortunately, somebody's got to pay the difference or absorb the difference, and so either ratepayers pay the difference or the company absorbs part -- the utility. I'm not sure what else one can do. (CONADV)

Regulation. As discussed earlier, DSM, because of the social benefits, is strongly supported by the consumer advocates. However, any growth envisioned for

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the small user market must be adjusted to address the impacts that DSM will have on gas consumption.

Another aspect of regulation that may hurt gas growth comes from the federal level. The advocates feel that actions by the FERC hurt marketing efforts to expand into the core markets. This issue is closely coupled with the poor marketing efforts seen by the consumer advocates at the LDC level in commercial/residential markets.

> Well, you got to wonder what's left. If the [FERC Order No. 636] goes through, then a large part of their business in essence will not be subject to rate-of-return regulation. So, then why are we so worried about the evils of rate-of-return regulation, especially if we give them a straight fixed variable which basically makes them risk-free? Well, I think the point is that pipelines have become severely depreciated. Rate based regulation doesn't help them anymore as far as the bottom line goes. In other words, there's no rate base to apply the return to. Their earnings, by definition, will not be that big. They may be 13 percent but cash flowwise it's not going to help you if it's only \$10 million. So I think that really the drive behind it is to give them some way, if they can cut some costs, earn some more money. It seems to me [that] they fully expect the pipelines to expand to serve these new markets that you folks are looking at and provide more employment. [They should] become more efficient as they cut costs [and] expand their rate base increases. I mean don't think anybody at FERC has actually sat down and thought this thing through. I mean they have a lot of economists that run around there and say that everything will work out fine, just on basic economic principles, but I'm not sure. I'm really confused about it because they seem to be going in different directions at the same time. And I don't see any of those directions necessarily benefiting the average customer per se. (CONADV)

New Product Development. The consumer groups support development of new technology for natural gas, particularly those technologies that increase efficiency. While the small user markets are seen to benefit from new products, the consumer advocates stress that subsidization of product development and introduction by the commercial/residential sector is inappropriate.

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Either the shareholders [should finance or the LDCs should] become more creative about raising money from other areas or [develop] joint ventures with free enterprise. You know, have them pay for it. They're going to realize the profit. (CONADV)

Provider Groups

The participants from the provider groups rarely single out the commercial/ residential market in their discussions. The LDCs allude to the captive customer base when describing how regulation impedes their ability to help economic development within their franchise area. They rely on the need to emphasize ratepayer benefits when discouraging bypass and seeking flexible rates at their commissions. However, overall attention to the residential and commercial sector as a growth area is fleeting, if at all.

The marketers and pipelines see growth potential in areas that historically have not been served by pipelines or that have changed their perceptions on the reliability of gas supply.

- I think on the residential side, it's amazing. In fact, Kansas City is fairly saturated. But I know, for example, in [the] New York market area, three out of every four households that have gas don't have space heating, in the New Jersey, New York area. One, they don't have a high saturation generally. What homes do have gas, amazingly don't use it for heating. So there's a large untapped market right there. (CONADV)
- I don't think that the home owner has a reliability problem. [If the homeowner did,] we wouldn't be converting the mainline customers as fast as we are to all of the gas usage as quick as they are on the east coast. They wouldn't be capturing the disproportionate share of that market. They're [capturing marketshare from] electricity, and, of course, #2 fuel. You wouldn't have that tremendous pent-up demand for natural gas in the northeast if we had a reliability problem with [the residential] market. (CONADV)

Regulators and other Demand Groups

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Of the other participant groups, little is said about the potential of the commercial/residential other than by the regulators. These participants discuss that opportunities to extend pipeline and utility franchises should be encouraged. They recognize that expansions are costly; however, they suggest that this obstacle can be overcome if distributors and other concerned parties approach the problem creatively.

Additionally, participants from the cooling group point out that DSM programs in the electric industry contain opportunities. Gas-fired equipment, they believe, provides a means to help electric utilities peak shaving efforts.

Conclusion

The commercial/residential market holds the potential for growth. Although participants believe that conservation will continue to reduce the growth potential, significant opportunities remain to attach new customers and increase the consumption of gas by existing customers. Marketing and a stronger commitment to distributor system expansion are key to growth in this sector. DSM programs of electric utilities also hold potential opportunities for gas suppliers.

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PART II

IMPEDIMENTS TO GROWTH

The consensus among the participants is that primary natural gas demand will grow, but they also believe that the potential growth may be retarded or stifled altogether by a variety of impediments. The 15 focus groups identify many present and potential obstacles. Some of the impediments that they define directly prevent gas from being consumed; others reduce the value of natural gas to market segments, while still others reduce the potential benefits associated with natural gas to the point where they compare unfavorably with substitute products.

Each of the groups naturally emphasizes the impediments that most directly affect it. For example, the electric utility and industrial participants are primarily concerned about reliability. Participants from the gas-fired cooling equipment manufacturers speak of the first-cost hurdles. Independent power producer participants worry about incremental pipeline rates. Nonetheless, pulled together, they weave a tapestry that reveals much about the present state of the gas industry and the challenges it must overcome if it is to realize significant growth.

The impediments raised by the participants are discussed in relation to five general themes:

- Marketing
- Reliability
- Regulation and the political environment
- Economic issues
- Research, development and commercialization
- Attitudes toward the gas industry

The following chapters analyze each of these themes. The discussion for each theme will commence with a review of its dimensions followed by the ways in which different participant groups define the theme. Subsequently, the origins or factors to which the participants attribute cause will be reviewed.

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Impediments to Growth

MARKETING

Among all of the focus groups, no one praises any element of the gas industry for its marketing efforts: indeed, all are highly critical. Many state that the industry simply fails to market its product and services. Others say that the industry's efforts are misdirected. Consider the following comments:

- Pipelines do not offer a lot of services that are attractive to the electric side. (EU)
- To use the word "customer" is a misnomer. We are just dollars that get whipped everyday. We are not customers. (IND)
- The industry has not thought of us as a customer group and developed a product that fits. (IPP)
- LDCs are not aggressive promoters of gas. (CONADV)
- In the past, we usually did not sell the product. We really did not care too much about the nature of the customer. (LDC)

IMPEDIMENT DEFINITION

All of the groups discuss multiple dimensions of poor marketing as fundamental obstacles to increased growth. Aimed at all marketing sectors of the business (producers, marketers, pipelines, distributors and their respective trade associations), their criticisms takes many forms and focus on many symptoms. Seven of the most extensively discussed are described below.

Lack of a market-driven mentality. Participants in the demand-oriented and provider focus groups discuss how the industry either does not understand their needs or, to the degree that it does understand their needs, it does not package its services in a manner that provides a solution. Comments by local distributor participants demonstrate the lack of sensitivity portrayed by the demand groups.

> Pipelines [understand the needs of electric generators]. Whether they want to [understand] is something else. They understand because they've been the ones we've been dealing with. The producers, I'm not sure they worry about it at all. They just want to pump. (EUCEO)

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- They haven't thought of us as a customer group and developed a product that fits. (IPP)
- I have never had an LDC approach me proactively. Of the 20 LDCs we have, no LDC has ever approached me that way. It is discouraging. (IND)
- We do that with the transporter [lower rates] too. We encourage transportation to avoid losing the customer. The Commission has got to allow us, number one, to flex the rate as much as the local oil company that's coming in. The Commission has to give us a better bottom and a higher top, so that we're willing to come down on the bottom when we have to be competitive, but let us go up on the high end when we're not competing with oil to balance. They don't understand that because they're politically motivated. The three commissioners we have had served less than a year apiece. (LDC)

Some groups are more critical than others. The industrial participants and the equipment manufacturers who sell to the industrials are the most critical in this regard. The electric utility and IPP participants express similar sentiments, but indicate that they have recently seen some specific companies incorporate their needs more explicitly into the suppliers' product and service offerings.

The industrial consumer group's discussion of contract term and the IPP group's discussion of price are excellent examples of how supply-driven strategy misses the needs of each customer group and reduces their commitment to gas. The industrial participants generally express a desire to purchase gas supplies under three to five and, in some cases, ten year contracts if reliability can be assured. Currently, suppliers do not, and in most cases cannot, assure reliability; so, the industrials purchase spot supplies and maintain expensive alternative fuel capabilities. Were the suppliers able to meet their needs, these participants would prefer to become long-term baseload gas consumers.

Similarly, the IPP operators must be able to demonstrate to their financiers the reliability and stability of their fuel supply and cost. This requires that they obtain long-term contracts with fixed or highly predictable and stable fuel prices. Past difficulty in obtaining these types of contracts has inhibited use of natural gas for their facilities. Recent evidence that suppliers are more willing to meet these needs encourages the participants to believe that natural gas will be a more viable alternative in the future.

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Persistence of reliability concerns. Virtually all of the groups discuss reliability issues. While the reliability issue will be more fully discussed in a subsequent chapter, one dimension of reliability concerns reflects a serious marketing failure. Participants from virtually all of the demand and regulatory groups express a concern over reliability and base their concern, to some degree, on the supply short-falls in the mid-'70s and the events of December, 1989.

- I go back quite a few years, and I can't get the 1970s out of my mind. I remember the charts and the projections for natural gas and the scare tactics that were used. And we went out and built a lot of oil facilities. (IND)
- The fact that we are concerned that [gas service] will be cut off when we want it. (EUCEO)

The marketing impacts of historical delivery problems are underscored and exacerbated by the mixed messages provided by the industry. Several demand group, regulatory group and manufacturer group participants cite producers' statements that the U.S. is running out of supplies and states' prorationing efforts cause them to question reserve adequacy.

- The [major producers] that talk to us are increasingly aware of the fact that it's not a very good message to say that the bubble is almost over and the price is going to go up, you better lock in now. You still hear some of that from some of the smaller producers. At the Phoenix meeting, for example, they had an independent producer that was complaining that everybody was going to go bankrupt and they had to have higher prices [he] seemed to almost be sympathetic to prorationing. But I think that's to the long-term detriment of that market. You're just going to scare people away. (STCOMSTF)
- The industry is its own worst enemy in the sense that it keeps saying it's going to run out of gas. Who is going to install equipment if the supply is going to disappear? (STCOMSTF)
- What I keep hearing here and what has been evident to me is the insecurity of not having the gas when you need it. That [fear] is being exacerbated now when we

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have states becoming parochial in holding us ransom. It takes me back to the [seventies] in OPEC. I mean Texas and Oklahoma starting to say, "Well, this is our gas, and we're going to play some games with it." It doesn't do a lot to increase our sense of security in gas as a supply. (IND)

Reluctance on the part of local distributors to expand their systems. Members of the state regulator, state regulatory staffs, consumer advocates and industrial groups indicate that many local distributors are either unwilling to extend their systems to attach new customers or unwilling to cooperate with industrials that are willing to pay for the extension.

- LDCs are not aggressive promoters of gas. Main extension is one area. We have tariffs where they deliberately lowball the potential revenues from a service expansion to avoid building the load. (CONADV)
- Probably a week does not go by that some consumer doesn't call the commission and ask us to assist them and their neighborhood in getting gas out there. I think people understand that natural gas is a cheaper way to heat your home. If the LDCs would aggressively market their product and get it out there to the new homes and existing homes that want natural gas...[then demand will rise]. (STCOMM)

Weak or ineffective advertising. Several groups discuss the advertising and information dissemination efforts of the gas industry. The primary feature that they identify is its bias. Information received from each sector solely reflects the interests of the disseminating sector and, therefore, is, to varying degrees, jaded. Virtually all of the groups call for more accurate, comprehensive, and unbiased information from the industry.

- I get a lot of information from the gas industry [but] because it's from the gas industry I am not betting my future on it. (IGE)
- The electrics are much more aggressive, and quite frankly, their ads are much better than natural gas companies. The LDCs basically take an ad they get from the AGA or whomever, [showing] the little blue flame and you know, gas is cleaner. Quite frankly, in

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most of the companies that I've seen and most of the comparisons they have a good gas price-wise. But they let the electrics in particular submarine them on the price ads for a heating source that doesn't seem to make sense to begin with. I mean, why take a fuel that you can burn and use for energy and turn it into another type of energy, [and] then sell? I mean, you know, efficiencies should be looked at. (CONADV)

 I think they [each segment] are doing a good job. The problem is that everybody does a good job. It's just that they are all biased. (STCOMM)

Ineffective advertising is also identified by the equipment manufacturer groups as a contributing factor to their initially high "first-costs." These participants indicate that they must spend significant efforts to persuade potential customers that natural gas is a sufficiently reliable fuel to be a viable option before they can address the benefits of their particular equipment. Better, more appropriately directed advertising, they believe, will enable them to market their technologies more productively, helping to reduce the "first-cost."

Inability to overcome the "first-cost" penalties associated with new technologies. This issue is raised most adamantly by the gas-fired cooling and industrial equipment manufacturers, the VFM and the various regulatory groups. Most of the participants in these groups acknowledge that initially, the new gas-fired technologies are significantly more expensive than alternatively-fueled technologies. While to varying degrees the participants believe that the life-cycle cost of the gasfired options are lower, they believe that the "first-cost" penalty is too high to successfully introduce their products. Accordingly, they need subsidies from the industry to offset the "first-cost" penalty until enough units have been placed to allow them to lower their production costs to a competitive level. The purveyors of the gasfired equipment believe that the industry must take a more aggressive role subsidizing their efforts.

- Typically the [gas-fired] product is twice as expensive as the electrically powered product. (COOL)
- It seems that the gas industry provides products that cost 20 or 30 percent more than alternative equipment. And yes, there's a payback but that payback is five years. So basically natural gas [equipment manufacturers] don't necessarily provide a natural gas-based technology [that] offers [a] cost-effective, advantageous

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means of making the customers' products [in the short-term]. (IGE)

- What I see, as a manufacturer, is the support that I have gained from outside sources, primarily funneled through GRI, is about to disappear. [This is] because of three warm winters, two pipelines pulling out of GRI, [and] a reduction in the price of the wellhead, all of which is beyond this poor manufacturer's control. (COOL)
- Specifically, in my state, I don't believe the developers are given major incentives to utilize natural gas in the building of homes. And that's why we are so electrified. (CONADV)
- There needs to be more support not only from the GRI but [from] the individual gas companies in trying to get new products out. I still think they could share in that. I know a lot of them got together in terms of consortiums and sponsoring additional units after GRI field-tested units; but, I think there needs to be more support in that area, whether it's help through the end user customer -- [perhaps] giving him a break. But nobody wants to be the first in his area to try this new equipment. (IGE)

Unwillingness of the gas industry to aggressively adopt natural gasfired technologies themselves. The natural gas industry, according to the regulatory groups and the equipment suppliers, is far too slow to embrace gas-fired options themselves. Examples that are cited include the low numbers of natural gasfired vehicles that are used by gas producers, pipelines and distributors, and the failure of producers, pipelines, distributors and oil field companies to use natural gasfired cooling when they build their own buildings. Widespread and well publicized use by the industry of these technologies is viewed as a relatively easy means of instilling more confidence in not only the technologies but the industry as well. (See also page 35.)

> [Major oil company] just built a new corporate headquarters. I guarantee you they didn't put in gas air conditioning. I bet they didn't even think of that. (COOL)

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Associated with this symptom is the industry's apparent unwillingness to rely on its own equity for market expansion-related ventures. The regulatory groups express dismay and frustration over what they see as excessive reliance on rate base subsidization of new technologies such as gas-fired automobiles. These participants view the local distributors as very reluctant to invest their own money to grow the market, particularly since they view LDCs to be relatively fiscally strong.

- I see LDCs as being highly profitable and I wish they would take on more risk such as going into more areas, because if you look at rate-of-return on equity on all of ours, it's fairly high. Two of our gas utilities seem to be among the companies that are promoted as far as stocks that investors should buy. (CONADV)
- I think the industry is unwilling to risk their own money to try and bring [to the markets] or to assist manufacturers, retailers[and] dealers, in bringing to the market some of the products that GRI has developed. (STCOMM)

Safety. The attitudes expressed about safety issues related to natural gas also help define the sorry state of the industry's marketing efforts. The state commissioners and the fleet operators are the most concerned about safety issues. They believe that concerns about safety are one of the key impediments that must be overcome if natural gas is to become a major fuel for automobiles. They recount several experiences with state fleet and school bus operators who they have attempted to persuade to acquire natural gas-fired busses, only to fail because of the operators' fear that a mishap would result and they would be held responsible. Even though they themselves believe natural gas to be safe, many of their constituents are less convinced.

- For some reason, knowledge about natural gas is not out there like it should be. For instance, in our state a whole lot of people think it [gas use in automobiles] is terribly dangerous, and that's just not the case. (STCOMM)
- I have been trying to encourage the Superintendent of Public Instruction to look at school buses throughout the state and convert as quickly as they can to natural gas. Within the Superintendent of Public Instruction's office they have someone in charge of school buses on a statewide basis. He believes that natural gas in school

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buses is unsafe. He fears the wrath of God descending upon him the first time there is an accident on the school bus. (STCOMM)

UNDERLYING CAUSES

The various groups identify five factors that combine to explain why marketing has been slow to develop in the natural gas industry. The industry's fragmented state and the evolving nature of the marketing function are the most extensively discussed. The vagaries of the industry's regulatory environments, the sudden need for new, unfamiliar skills and the effect of integrated electric and gas utilities are suggested as additional factors.

Fragmentation and the evolving nature of the marketing function. From the early days of the natural gas industry until the mid-1970s, marketing was the responsibility of the local distributors. Pipelines supplied the distributors and producers supplied the pipelines. The curtailments of the 1970s and the subsequent legislation designed to "correct" the shortage caused market distortions that shattered this structure. National policy required certain industries to switch from natural gas to other fuels, and state commissions precluded utilities from expanding their distribution networks. Local distributors abandoned their sales role, focusing instead on maintaining service for their existing customers.

The 1980s brought yet another policy reversal. As a result of the Natural Gas Policy Act of 1978 (NGPA), gas prices rose and demand fell, culminating in the movement at FERC and some state commissions to use competition as a means of price discipline. During the decade, prices declined precipitously and electric utilities and industrials were allowed once again to consume natural gas. Meanwhile, producers gained access to markets, marketers emerged and pipelines split their merchant function from transportation. All of these sectors moved to compete with the local distributor for sales to end users. Producers and marketers came to compete with the pipelines for sales to local distributors, and producers, marketers and pipelines, through their affiliates, came to compete with distributors for industrial and commercial end users.

Participants in virtually all focus groups indicate that with the advent of competition, the providers have focused more on taking market share from one another. This focus diverts attention from efforts to increase demand.

Everybody sees that golden egg out there. They are so busy trying to cut up what they may have in the future that [they're] really not taking advantage of what's here right now. (STCOMM)

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 The gas industry has not joined together as a whole [to promote natural gas]. (IGE)

This transitional process and the competition that it fosters is also encouraging an "everybody do it but me" mentality toward marketing. Participants in each of the local distributor, marketer, pipeline and producer groups -- the supply groups -appear to recognize this transitional process and question their marketing role, given the effects of the process on their sector.

> There is some question as to the ability of the LDC to provide these [gas supply] services. Most of us are small. [The markets] would rather deal with the big producers or the big pipelines. (LDC)

One local distributor participant questions whether local distributors even have a marketing responsibility.

We talk like we sell gas. But for the most part, we do not. If we are going to really be sellers of gas, that means a significant change for most of us. If we are just going to be transporters, we should not try to talk like marketers if we really are not. (LDC)

Similarly, the pipeline participants indicate that one of the likely results of FERC Order No. 636 is the eventual transference of the entire merchant function to their non-regulated marketing entity. As a transporter, their marketing role is questionable. The pipeline participants believe they no longer have marketing responsibility. Rather, marketing now falls on the producer.

- The answer is yes [the pipelines are part of the problem]...Because pipelines, I'm afraid, and justifiably so, are somewhat taking the position that it [marketing] ain't my problem anymore. If you put it in, I'll deliver it to you. (PIPE)
- The producer takes no interest in marketing, in terms of kind of a macro marketing. He'll take whatever market is there but he's not going to put in money or time or people basically. (PIPE)
- An observation that troubles me [is that] when you really step back and say, who's market is this? It isn't the pipeline's market. It isn't the LDC's market. Who

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has the product? The producers are the ones that have the commodity. It really should be their market. They ought to sort of provide the leadership to solve these issues to get their products to market. (PIPE)

However, the producers are also unsure of their responsibility. The participants in the producer group suggest that their management is, to varying degrees, still trying to determine the extent to which they should participate in gas marketing. Furthermore, the marketing function among producers is still so nascent that they are focused primarily on sales to existing markets. Because of this focus, they are not yet able to pursue efforts to attract or cultivate new markets.

- I see other companies looking to add the highest value to their shareholders' assets and reserves, and they do that through the things that another participant mentioned. They hire people to do gas control, they hire people to give an accurate invoice to the customers, to do all these things that add value to the reserves. Sometimes you wonder whether or not you might just put one guy in a room and sell to a marketer and cut your cost and not net value. (PROD)
- We are not to the point that we've been able to really swallow the market itself, much less look where the future growth is in our organization. So the focus of many of our folks has been on how can we integrate into the existing market? How can we get more for our natural gas? How can we move more of our natural gas? How can we get higher prices? [We are] not focusing on market growth. I'm starting to hear some things where people are starting to set up organizations within their organization that look to those opportunities. I just don't think we're equipped as producers, at this point, to really address that question. (PROD)

Finally, the marketers understand the need for increased marketing. However, they appear to believe that their potential market is currently so limited that they cannot afford to invest in efforts to increase demand:

 But I think the inefficiencies of that monopoly, the way that the inefficiencies can be dealt with, is to provide

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access to the market, to people in this room, to gas marketers. (MKTR)

But the guy who's really in the driver's seat on this, whose front line troop is the LDC, he really has the distribution system in place now to drive that. He's also got the rebate situation so he can recover that in his rate base as well. And I would love to piggy back in there and be the supplier at the LDC, because I think he's probably in a better position to reach that customer than I am. He can bring that on-line right now where the return for me at this point isn't there. But I'd like to be able to work with it, and work with the [manufacturers], who are not aware of what the cost alternatives are to LDC at this point. (MKTR)

The outgrowth of this search for purpose is a lack of marketing, according to the demand, regulatory and equipment manufacturer group participants. They express their frustration in terms of the inter-sector competition for markets.

- But the gas industry, as far as I can see, hasn't really been marketing products themselves. They're leaving it up to the manufacturers of those products to do that. (STCOMMSTF)
- The gas industry has a much different thing because it is fragmented. It's got to figure out how it can market gas as a total package if it wants to compete against electricity, and get back to what we were a long time ago. (STCOMMSTF)
- But all this fussing around over open access and battling independent versus the other gas suppliers. They're spending a lot of energy on the political side, instead of getting the story out, [and] getting the product in the marketplace, especially efficient ones. (STCOMMSTF)
- They're fractionalized. They need to take that energy, unify their story, and then go out there and take a unified approach to the marketplace because they're going to get killed [lose to the competition] just by fighting with each other. (IGE)

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Fragmentation and the regulatory environment. Participants in all of the groups mention fragmentation in the context of the regulatory environment as the key cause of poor marketing by the industry. The adversarial nature of the regulatory environment dictates the public clashing of conflicting statements promoting narrow parochial interests, usually at the expense of other industry sectors. Often these statements, while properly promoting a position, leave the customer (an unanticipated audience), at best, confused and concerned about such key issues as reliability and reserve base. At worst, the participants indicate, they send the absolutely wrong message.

- When you listen to the gas industry, you've got one spokesman on one side saying that next winter is going to be awful and [the] next guy will say don't worry about it, the resource base is huge, the price of gas is just going to keep on rolling into the plant. Seems to me you get people confused when that happens. I think that's really a significant problem for the gas industry because the prices are really right. What people do then is put gas into those applications where [an] alternate fuel is the easiest to put in. It strikes me that it's precisely the wrong thing that the gas industry wants to do because the gas industry wants to build long-term markets, and what they're doing is building markets that are readily replaceable with alternative fuel. It's precisely the wrong thing for the industry to be doing. (IND)
- We're right now in a rate restructuring case with one of our interstate pipelines, and the producers and the pipeline and LDCs are at complete loggerheads. I can't believe those people could ever come to an industry position. I mean all they can agree on is that maybe more is better. But that doesn't get you there. (STCOMM)
- We spent a lot of time fighting the regulatory group in Washington. In so doing, we have made arguments that have been counter to what we should have been making to the customers. For instance, we spent a lot of time trying to show Washington how short [on reserves] we were in order that they help us along. The customer, on the other hand, has received that and concluded that they can't rely on us. You're here today and gone

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tomorrow. And therefore, we can't rely on your supply. (PROD)

The regulatory groups and some of the demand groups discuss a second manner in which the regulatory environment undermines the efforts by companies to increase demand. They refer to several instances where one pipeline decides to expand, but before the necessary permits can be obtained, "Johnny Come Latelys" file competing plans which result in delays and additional confusion for the customers.

Here is a case in point. You've got an existing pipeline that has been working on new capacity for three or four years at least down there. And they have finally put most of it together. They got people to sign the contracts. They really have almost got it done. Then, I will call them Johnny Come Lately's -- they are really pipeline people -- have come up with another project that would just parallel that [the original project]. Both of them don't need to get built, probably. But here's a guy that comes in at the last minute. The first thing he does is file something at the FERC claiming all kinds of who knows what. Whether it's right or wrong, it slows it [the decision process on the first project] down. It just makes it very hard to get anything done very quickly. (IPP)

The nature of regulated utilities. The nature of regulated utilities also inhibits aggressive sales behavior, according to the participants in the industrial and equipment manufacturer groups. Participants state that distributors see their customers as the regulators, not the consumers. Additionally, the participants believe that the protected nature of local distributors leads to bureaucratic risk-averse entities, not aggressive marketing companies.

> [LDCs] are in a non-competitive business -- I don't think they compete anywhere. The marketing people are more hand-holding, nursemaid account, keep 'em happy with what he's got and do five percent a year growth. They're not that aggressive when it comes to selling another [product] because the overall picture and the overall mentality of their top management is not necessarily [to] inflate growth by selling more gas. (COOL)

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- The gas utilities, [and] the gas supplier industries are large, and, for a long time, [have been] protected, monolithic, bureaucratic and slow-responding types of operations. They are going to have to change, and that is a difficult challenge. (IGE)
- They should [hire more from outside], but [that] probably [will] not happen because there's this mentality that you've got to start off as a student engineer coop and work your way up through this industry to understand what the problems are. (IND)

Lack of marketing skills among provider companies. Participants in the provider groups indicate that the evolving nature of the marketing function has forced them to take on new responsibilities and learn new skills. Most of the producer group participants, for example, came from the exploration and production areas of their companies and had little reason to be sensitive to or think about the needs of natural gas consumers. Initially, the participants state that they did not know who the customer was, much less how they burned gas and why. Given the production-orientation of their training, it is not surprising that they do not immediately adopt a market-driven approach to gas sales.

- Having spent 19 years on the E&P side, I can tell you that there was no sense of customer. It was sort of me against the rocks. But now the producers have control of their marketing. Now that sense of customer and service is something new. (PROD)
- First of all, we had very little expertise in there. We didn't even know who the customer was. Who was at the other end of the pipe? Who they are? What they do? What they do with gas? Do they use it as a feed stock or as a fuel? Why do they use it? We're still trying to figure out. (PROD)

Similarly, the pipelines and distributors have had to make a difficult transition from a regulated sales environment to a partially competitive environment. With the concerns about depleting reserves which were typical of the 1970s, "sales" were discouraged and the sales function de-emphasized. The shift toward competition in the 1980s meant that many of the marketing and sales skills had to be relearned.

> [Now], we're into segmenting the market. We're into setting up account managers for specific customers.

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Doing a lot of things differently than what we did before. Most importantly, we have had to step back and try to figure out what it is the customer wants. Not what we think the customer wants, but really finding what the hell the customers really want. (LDC)

Bias of integrated companies. This theory takes two forms. The regulatory, equipment manufacturer and demand groups suggest the theory that integrated utilities are less inclined to aggressively market natural gas. Integrated utilities typically derive the vast majority of their revenues and profits from the electricity division; thus, they have little incentive to allow the gas division to aggressively compete for the same load.

- Electrical and gas, the gas is kind of in a stepchild program. It hasn't really been fully developed. (STCOMSTF)
- We have dual utility companies that concentrate on the revenues from electricity, not that much from natural gas. (STCOMM)

Expressing the bias theory in its second form, one participant in the state commission staff group suggests that companies that manufacture both gas and electric equipment may favor electricity-fired products. Similarly, participants in the equipment manufacturer groups indicate that either they themselves or their affiliated companies manufacture competitive equipment fired by other fuels. Accordingly, they are less concerned with moving gas products than in getting a sale. As long as the supplier wins the sale, he is essentially indifferent as to the implicit fuel choice:

> The third one gets back to the basic research and development of natural gas at the user end. [Once] the product['s] out, you're going to be able to do it. I think it's difficult for me to see that company A and the rest of them are going to go out and do a hell of a lot of development on natural gas air conditioning when they're selling electric air conditioners. They're doing all the research and improving electric air conditioners. Why should they go out and develop a whole new set of gas air conditioners? Why should they do it? (STCOMSTF)

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- In our case, it's simple. I mean they [the gas industry] have to give us the data that's available, what the real cost of gas is, and they need to do their homework to see what they're up against competitively, and then also go in with our salespeople to help sell that item. We'll sell a dual fuel system, we'll get the sale for the plant. But we might have it on coal, we might have it on oil, we might have it on gas. And it's usually a customer's preference, not ours. We're not pushing it. (IGE)
- It depends on what [customers] want [but we are going to sell what is easiest]. I mean, that's our business. We're talking about \$165 million installation. We're not going to worry about whether they buy a gas pump or whether they buy a little coal mill. It's their decision. (IGE)

CONCLUSIONS

To increase the demand for natural gas, the industry must improve its marketing efforts. The participants identify several areas where the industry's information dissemination efforts need to be strengthened, including promotion of reliability, safety, price and the efficiency benefits inherent in the consumption of natural gas. Failure to present strong positions on these issues undermines the industry's ability to receive the full value of the commodity and diminishes interest in its consumption.

More important than the need of the industry to improve its message is the need to unify its historically warring factions under the banner of marketing. The participants in virtually all groups express frustration with the degree of discord between the natural gas industry supply segments. The factiousness results in the conveyance of mixed messages about issues such as reliability, which, at best is terribly distracting and confusing, and, at worst, forces them to utilize other fuels. To improve the comfort of markets with natural gas as a fuel, the industry must resist the impulse toward infighting and develop a unified approach to incremental demand creation.

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ATTITUDES TOWARD THE GAS INDUSTRY

The gas industry is viewed with mistrust and suspicion. Participants from several of the non-provider groups make statements that reflect this attitude.

In part, the participants caricature the industry as Cadillac-driving, wealthy individuals from Texas or Louisiana.

When you take a look at the institutional problem, when you take a look at every time somebody says, "Well, let's do something for basic research on the gas side," everybody has the mind set: well, that's going into the pockets of this guy sitting down in Texas or Louisiana. He is going to use it to drive a bigger Cadillac or something like that. So there's a perception problem. (STCOMMSTF)

In other respects, participants' attitudes reflect deep-seated mistrust of large oil companies and big business in general, and their potential for abusing market power. The fact that utilities and pipelines are regulated to curb this abuse underscores this basic mistrust.

- The problem I foresee in the future is basically the major producers, and I think we're up pretty up front about that. We have a great concern for vertical integration. And we have a great concern with their ability simply to take the market power that exists in the pipeline systems and use it. And be unregulated and historically they've been much better monopolists when they had a chance than pipelines ever were. (CONADV)
- Quite frankly, we'd be as worried about natural gaspowered vehicles, I suppose. Going back to the debate on whether it should be deregulated, totally competitive, whether indeed the LDCs should still be regulated, whether it's a subsidiary, an affiliate, or what, because depending upon the economics, the drive is always going to be there to take the cheapest gas they can find. And to funnel it into compressed natural gas for vehicles and away from the captive customer. It's just by definition, especially if gasoline all of a sudden starts to become

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more efficient and starts to come down, so that's not going to go away. (CONADV)

The industry has got to somehow deal with its reputation for being profiteers and making huge sums of money on the back of the consumer or the world. In fact, historically as an industry it's got one of the lowest returns on capital for some of the highest risks. It represents the largest use of capital as a single industry worldwide. It has I won't say undeserved, but it has a bad reputation among those that make the decisions, and therefore, dictate a lot of its fate. So, that government intervention is not likely to be something that will lead to good things. (FIN)

Actions of the industry appear to encourage these attitudes. Participants use the phrases like "holding us [industrials] ransom" to describe prorationing efforts in Texas and Oklahoma. Clearly these actions do not build a positive image for the industry.

> I think the solution to that, again, is either education or public relations or something that would enhance the industry's image in some way. So there isn't a perception out there that there's going to be [a] bunch of guys in Texas or Oklahoma that are going to try to soak everybody else. I really think that's a problem. (STCOMMSTF)

CONCLUSIONS

The relatively negative image of gas industry presented by some participants, appears, in part, a marketing problem. In the previous chapter, the industry's lack of market-orientation is discussed and the image of the gas industry expressed here reflects that reality. As individual companies and the industry begin to become more market-oriented, offering services and fairly priced natural gas to customers, this poor image will improve. As long as the industry continues to treat the customer as the enemy, however, little improvement is likely.

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RELIABILITY

Nowhere is the statement "Perception is Reality" more descriptive than when discussing the role that reliability concerns play in shaping attitudes toward natural gas consumption. Virtually all of the demand groups state succinctly that reliability problems plague the gas industry, inhibiting the alacrity with which they commit to the fuel. When pressed to define reliability, however, consensus evaporates, and the respondents identify a myriad of factors that underpin their beliefs.

IMPEDIMENT DEFINITION

History plays the strongest influence on the participants' perceptions. Members of all demand groups, most of the provider groups, the regulatory groups, the manufacturers and the financial analysts identify experiences during the cold spells of the mid-1970s, reinforced by difficulties of December, 1989, as bases for their present concerns about the reliability of natural gas. They worry that if a persistent cold spell occurred today, curtailments similar to those of the mid-1970s would result.

- As an industry, we have a perception problem. We had a supply shortage that people have not forgotten. It wasn't a physical supply shortage. It was a shortage caused by federal regulation. People do not believe that we will be able to provide a long-term supply because they think back to the days of the supply shortage. They [think], and I think it's a real honest-to-God mental block, that we cannot provide this service. (LDC)
- It's kind of the negative aspects [of using gas] that the industry has projected due to past performance. People being curtailed or cut off. (IGE)

History, however, is an incomplete answer to the reliability dilemma. While the participants worry about reliability because of history, they simultaneously recognize that the industry and its operating environment have evolved substantially since the mid-1970s. Many of the factors that exacerbated supply and deliverability problems no longer exist. Why, then, do they remain concerned? Five factors appear to undermine their faith in the reliability of natural gas:

- Supply deliverability
- Pipeline deliverability
- Price volatility
- Regulatory environment

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Before discussing the five factors, it should be noted that supply availability is <u>not</u> among them. The participants are not concerned with supply availability. Participants from all of the groups believe that natural gas is an abundant resource. For example, reserve life estimates ranging from 20 to 70 years are given by participants from the demand and regulatory groups.

Supply deliverability. While all of the groups are bullish on the estimate of adequate reserves, supply deliverability is far less certain. For example, regulatory groups hold some of the most bullish forecasts for reserve life, but are concerned that the forecast production levels will only result if prices rise substantially, reaching the point where it becomes too expensive for the residential and other captive markets. If this occurs, the regulators appear to be less likely to encourage growth, while the electric utilities will be unable to dispatch their plants. (See also Outlook for the Future, page 7.)

- I'm assuming the price will go up, at least to some extent, if the demand stays there. (STCOMM)
- Supply may certainly be there if you want to pay enough. The issue is, how much can the folks pay? (STCOMM)
- [The] perception is, short-term people are going to be trying to convert to gas. [I am] hedging [my] bets with the expectation of its price going up rather dramatically after everybody jumps on the bandwagon. Then they'll be stuck with some facilities that [they] can't use. (EUCEO)

Today's low prices are also viewed by participants in the regulatory groups as discouraging the exploration necessary to maintain a strong reserve base. They express concern that the low prices are driving small producers out of business, which will diminish the exploration capacity of the industry.

- I think there's much less drilling going on and there's greater technology now in recovering the natural gas. But the pricing is such that it's driving competitors out of the marketplace as well. (STCOMM)
- But they're all just clinging on, and the service, and the infrastructure that supports [production] are also

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clinging on. There are just less rigs drilling and less development being done, less exploration. (STCOMM)

The provider group participants concur with the state commissioner's assessment that current exploration is not sufficient to maintain the present reserve life. Not only is drilling activity too low, according to the pipeline participants, but drilling personnel and infrastructure cannot be brought on-line quickly enough to meet rising demand without short-term disruptions.

- It's more serious in the drilling producer level than it is in the transmission level. We can probably put pipe down faster than they can drill wells and have the support groups necessary to find the resource base and bring it to the pipe. Because, you see, all the majors, as I said before, are taking resources -- capital, manpower, drilling rigs -- out of the country and we have fewer drilling rigs. Even if we're much more efficient at finding the resource and much more efficient at drilling for it, we're not 400 percent more efficient and you don't just build that infrastructure back up. Some of the people that ran drilling rigs and ran the drilling services are now running McDonald's for ten years and you don't get all that back instantly. So I think we do have a potential for short-fall deliverability. I won't say a short-fall in gas [supply]. (PIPE)
- I think there is a danger to our industry of some deliverability short-falls in a short time frame given [the need] to gear up, drill, put pipe together and so forth to get additional supply to an expanding market. (PIPE)

Other participants from the regulatory groups and the demand groups do not agree with these projections of supply deliverability problems. These participants believe that, while prices are low, they are adequate to maintain deliverability. Rather, they foresee problems with pipeline deliverability.

- I would expect, [from] looking at the resource base and the like, it's going to remain pretty decent for a long period of time. (IND)
- You have a North American source of gas at this point in time. (IND)

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- I think the common denominators of some other statements here is that it's really transportation-limited, as compared to supply-limited. (EUCEO)
- Well, I guess I would look at reliability as more concerned about the capacity to have it delivered and not necessarily relative to basic resource. (STCOMMSTF)
- Moderator: Do you think the price of gas is so low that it endangers the supply?

Nah.

No. (CONADV)

- It [gas supplies] hasn't stopped flowing. What it [price] does is, it endangers the financial health of some of the small, independent producers. (CONADV)
- I'm convinced that they're making a reasonable profit or they wouldn't be doing it. For eight years I've heard producers cry about how poor they are. (STCOMM)

Some members of the producer group are divided in their opinion regarding supply deliverability. Some indicate that several factors, including government policy -- which works against the interest of the producer -- low prices and newly-opened oil frontiers are leading the majors to focus their exploration efforts overseas. These producers believe that as they leave, the nation's capacity to explore will decline and shortages will result.

> Because I think all of us can see our capital budgets for gas going down because we're putting it in oil in other countries. And ultimately you're going to end up with supply shortages sooner or later, if the petroleum industry isn't put on some sort of reasonable basis with respect to taxes, and some of the other legislative shackles that they have right now. (PROD)

Other producers are sharply critical of this "shrinking industry theory." Advocates of the counter approach believe that as the majors move overseas, other companies with lower cost structures will purchase the departing companies' properties and develop their prospects. In so doing, they perpetuate the nation's supply base.

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I don't really subscribe to the shrinking industry theory myself because I guess I have more faith in the free market. There will be some players who are going to be unwilling to live in a new environment. As they exit, other players are going to come in, they're going to consolidate. If you can learn to play the game, which is tough, you're going to be able to win. Those who are unwilling are going to get out. So I don't really subscribe to the fact the industry is going to shrink. I think the players will change, and the relationships will change, but there's too much gas available. The resource base is too rich to have the industry shrink due to lack of activity. That's just my own view. (PROD)

The demand, manufacturer and regulatory group participants sense the conflict between the provider factions and cite this as another factor that undermines their confidence in the reliability of natural gas. In some cases, they cite direct evidence, whereby conflicting messages emanate from producers and other industry groups. In response to the ensuing uncertainty, the demand groups install alternative fuels.

- We have plants that use propane or butane or jet fuel, depending upon which plant you're talking about, during gas supply interruption. (IPP)
- I went to the GRI annual meeting about four weeks ago and the consensus there is [that] they are stopping their development [of gas reserves], they've stopped looking because the price is too low. So it's a Catch-22. It's there but they're not going after it because the price is low; if you get the price too high then it's not competitive against other fuels. Somebody has to pull it all together and then find out what the real world is in each fuel, and that's still my big push. (IGE)

Although alternative fuels have functioned as a reliability backstop historically, the Clean Air Act Amendment may reduce their potential. One electric utility CEO points out that new environmental compliance regulations may limit the acceptable use of backup fuels, thereby inhibiting this type of strategy.

One concern with gas with compliance strategies is, what happens when you get curtailed on gas? If you've got a facility that is permitted to burn gas and you get curtailed, you may be forced into an unforeseen

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situation. Even number two [fuel] oil, which is pretty low sulfur, makes some sulfur emissions and we don't know yet what kind of monitoring we require for combustion turbines. It's possible that the fuel switch that you have to make just to deal with curtailment may cost you clean air compliance problems. (EUCEO)

To participants in the demand and regulatory groups, actions supported by some producers, such as prorationing, send a clear message that supplies will tighten.

- [One obstacle] I thought of was the current sort of irrational fear of curtailment recurring. [There is] recent talk about prorationing in Texas and Oklahoma, elsewhere I guess. I personally don't think that there is a gas supply problem. But I think there are an awful [lot] of people that think there is or there could be one created artificially. (STCOMMSTF)
- We don't have any problems with gas supply, but I guess one thing that worries me is that if we continue this warming trend, there may be an over-abundance of gas and we may find that less gas is placed through the pipelines. I read an article yesterday or the day before. There's some real concern in Louisiana and some of the gas producing states to put some clamps on the amount of gas that's actually produced because the prices are so low. The demand is down. Well, I know demand is down. It's just an extremely warm winter. (CONADV)

In other cases, the mixed message is more subtle. Producer reluctance to sign long-term contracts at a discount, for example, is mentioned by demand group participants as reflecting producers' unwillingness to bet that supplies will remain abundant, and prices will remain relatively flat. Similarly, local distributors use questions about reliability to justify their purchases of system supply gas, according to the consumer advocate participants.

> I thought what you were going to say in the advertising is the one where the gas producers are saying on one hand, "Hey, sign up for a long-term contract;" and then on the other hand they're out belly-aching, saying that if the prices don't go up, we're going to run out. [This] kind of reduces the motivation for somebody to sign a long-term contract. (EUCEO)

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The LDCs' basic response through testimony the whole time was, if you force us into these spot supplies, we just can't guarantee that on these coldest days anyone's going to get gas. They come up with these cataclysmic events which you can have, for example, a major explosion [where] they would have to go around relighting pilots. That appeals to commissioners; no commissioner is going to want to be the one to say, "Well, I'm responsible for your city blowing up," because of lack of gas supply. (CONADV)

Members of the provider groups seem to be aware that their messages create the problems cited by the demand groups. Unfortunately, the evolving nature of gas regulation and the reorganization of the industry marketing practice (see page 86) are forcing companies to compete in the regulatory environment as well. Until the regulatory transition is "complete," the producer participants do not believe that the fragmentation and mixed messages which result can be eliminated.

> I guess I have maybe just a jaded view on all this, but I think until deregulation is complete and everybody knows what their role is, it is going to be very hard for the gas industry as a whole to go out and promote natural gas. I just think there's too much money at stake between the sectors to believe that we'll be able to cooperate before everybody determines what their role is. That's sort of a pessimistic view, but we're sorting out new commercial roles and responsibilities and all this, and everybody is trying to dig their heels in and maintain whatever they can. And until the final cards are played on the roles, and who does what [is defined], I just think it's going to be very hard for the industry as a whole to go out and be a united front. (PROD)

Pipeline Deliverability. Similar to the overall question of reliability, pipeline deliverability concerns are rooted in present and past experiences with interruptibility. Participants in all of the demand and regulatory groups note experiences where they have been interrupted as interruptible customers during past years.

Many of the participants attribute the interruptions to capacity limitations, which they see improving with construction of new capacity in the northeast and California markets. The need to rely on storage and alternative fuels, and the inability to acquire firm transportation is viewed by these participants as manifestations of capacity shortfalls.

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Participants from virtually all groups see regulatory obstacles preventing solutions to capacity expansion. Industrial, IPP and electric utility participants question whether the new FERC construction rules encourage capacity expansion. Similarly, these participants fear that strict adherence to incremental rate structures will make installation of new gas service too expensive and uncompetitive.

FERC is struggling with whether to roll-in [costs]. In other words, whether or not a pipeline can add \$100 million worth of facilities on a system that's already 25 or 30 years old, [by] roll[ing] that [cost] in, which means everybody on the system will have to pay a little more for more throughput capacity. I don't think you can argue with the fact that the guy who gets in last is getting a break on price. If he went out and built a new pipeline, it'd cost him a whole lot more to do it. But I think that's the only way that you're going to be able to have gas compete with coal. (IPP)

On the other hand, participants from the regulatory groups suggest that it is unfair to strap "ratepayers" with the costs of pipeline expansion as they have already contributed adequately to the capital costs of the total system. Efforts to force the ratepayers to subsidize new construction efforts – whether or not the new customer is local or located in another region of the country -- are inappropriate and should be disallowed. (See page 93.)

Operating procedures of the pipelines are a second dimension to the deliverability issue. Participants in the industrial, IPP and electric utility groups suggest that pipeline operating procedures work counter to their needs. The most dramatic example of this is the conflicting need by pipelines for 24-hour nomination notice and use of combustion turbines by electric utilities. Many electric utilities throughout the eastern half of the country plan to install these turbines over the next five years. The turbines are designed to service electric peaking needs, which are usually associated with relatively unpredictable weather changes. When a heat wave hits, air conditioners turn on and, within a matter of hours, the combustion turbines are generating. The 24-hour nomination period and the prior planning that it requires effectively prevents the electric utility from using the turbine in this, their designed role. Failure to alleviate this requirement, according to participants in the electric utility group, will result in fewer turbines being installed.

> Transportation doesn't work well with one to two hours dispatching on the electric side. You need a lot of prior notice [for pipelines] -- 24 hours prior notice -- whereas

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electric generation often really does not give us any notice. (EU)

Operating rules, which I view as not being a function of either deliverability or price [are an obstacle]. I think operating rules are a function of regulators' or people's own personal views with respect to how systems should operate or how they would like them to operate. That's why we're in a very critical time. Again, to the extent that operating rules are tightened significantly, there's a lot of potential gas consumption on the east coast that won't be realized because it's in the summer. When you talk about gas utilization on the east coast, there is a big difference in summer and winter, particularly when you look at peaking turbines and baseload or combined cycle units. Generally there's a lot of combustion or peaking turbine capacity going in on the east coast. If that's the incremental market the gas industry's looking for, they're going to have to be very flexible in order to maximize that market for them [the electric utilities]. (EU)

The financial health of the pipeline industry is a third dimension to the pipeline deliverability concerns. Participants in the regulatory, demand, pipeline and financial groups discuss, with strong concern, the financial state of the nation's pipeline industry. Take-or-pay settlements and the transition costs associated with FERC Order Nos. 436 and 636, according to these participants, severely undermine the financial health of pipelines and will make the investments needed to alleviate bottlenecks more difficult to finance.

- What's missing in the situation is capital. I saw somebody the other day who had some forecast of potential gas markets in this country over the next ten years and what it would take to realize those markets in terms of capital. It was a huge amount. (PIPE)
- Take-or-pay, Order 500 I heard somebody say. He said he got this from INGAA or somebody, wiped out half of the equity in the industry. It's pretty tough on the balance sheet. (PIPE)
- [We are] a very highly capital intensive industry. Take half the equity away, I mean you're stretched pretty

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thin. If we have something that causes us to give up the other half we're in a hell of a mess. So I think you got everybody basically, with the exception of probably two or three companies, who are teetering on the investment grade ratings, and that has a tremendous impact on us. I mean you lose your investment grade rating, that has a tremendous impact on us. So I think financially, yes, we're at a [weak] point. (PIPE)

Price Volatility. Price volatility is another source of reliability problems for participants in some of the groups. Participants in the consumer advocate group suggest that recent volatility of price in gas markets makes consumers less certain about whether to make gas-fired equipment purchases. Participants in the pipeline group identify price volatility as a major factor behind conclusions that gas is an unreliable fuel. Finally, participants in the electric utility group discuss the unpredictability of gas prices, given the perceived uncertainty about resource and deliverability.

> But again, I think part of the problem is, it appears that we're going through a period of some price fluctuations with natural gas, and a number of people probably shy away from it. (CONADV)

Regulatory Environment. Uncertainty associated with the regulatory environment in which the gas industry functions is another major source of perceptions that the industry is unreliable. Fundamental here is the evolving nature of regulation: FERC Order No. 636 is only months old and many states are in the process of modifying parameters of their local distributor oversight. Participants in all of the groups mention that old regulations and oversight principles are being tossed, in favor of untried approaches, which causes uncertainty and raises the prospect of unreliability. (Regulatory impediments to increased gas consumption are discussed more fully in the *Regulation and the Political Environment* section of this chapter. See page 89.)

Some participants believe that actions and attitudes of regulators exacerbate the feeling of uncertainty. Open-ended prudence reviews and regulators' failure to respect the sanctity of contracts are mentioned by local distributors, industrials, electric utilities, IPPs and state commission staffs of actions and attitudes that are particularly troublesome. These participants believe that companies can, in good faith, structure deals, which, given today's operating environment, look good, only to find in the future that the rules have changed and that they are forced to abrogate the arrangement, suffering financially in the process.

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But my feeling is, wherever you have contracts in place, whether they be a contract with your company to move gas or [with] an LDC throughout the term of that service agreement, you have to respect those contracts, because without the contracts, you will have disorder. Projects can't be financed. So, my feeling is the FERC can't interfere with existing arrangements. But once existing arrangements terminate, you have to effectively deregulate them with open access and unbundled services and costs. (IPP)

Participants in the provider groups indicate that long-term contracts would add stability and predictability to the industry, and therefore promote reliability. On the other hand, regulatory group participants believe that long-term contracts entail too much price risk for the captive customers; thus, they should not be allowed under prudence review. The two positions appear to be irreconcilable, and both the customer and the providers are forced into the 30-day market.

Marketing Companies. During the last 10 years, marketing companies have emerged as major suppliers to local distributors and electric utilities. As many of these marketing companies are relatively small and have small capital bases, participants in the regulatory and electric utility groups question their financial viability. The fact that so many natural gas purchasers rely on these entities for supply creates the perception among these participants that the industry is unreliable.

- And I would add, the market's here. The gas is probably going to be there and the capacity, probably in many cases, will be there too. But I have great concern with my small municipals that try to buy on their own and don't know who they're dealing with. (STCOMMSTF)
- But if I need capacity to serve those because it isn't provided and I haven't got it under contract, and [if] I have to go out and buy from a marketer unregulated, I have no idea what I'm going to be able to pay for it. He may have the only capacity that there is on the system, and I will have to have it. Is there a competitive market out there with capacity? Not necessarily so. Getting capacity out of the regulatory framework or the FERC and putting it in [the] hands of marketers, whoever they are, whether they're affiliates or non-affiliates, bothers me considerably. (STCOMMSTF)

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CONCLUSIONS

The perception that natural gas is an unreliable fuel source is a particularly intractable impediment to growth. At the core of the impediment is uncertainty stemming from the vast micro and macro level changes that are underway in the industry. As has been discussed, part of the reliability problem is attributable to actions being taken by regulators to promote regulatory objectives; the industry has little control over this aspect of the problem. However, some of the impediment is self-imposed. Participants identify marketing strategies by pipelines and local distributors that use reliability concerns to promote system supply sales; while others participants indicate that some producers' own messages suggest that reliability is far from certain.

Participants from the demand group clearly state that lack of faith in reliability reduces their interest in purchasing natural gas. Even the process users, believed to be the most captive customers, have the alternatives. They can move a plant to another distributor's territory, bypass, or move to another country. For the non-process user, concerns for reliability translate into bet hedging: install and be able to use alternative fuel capacity. For the electric utility, whose purchase calculus is discussed more fully in the section *Outlook for the Future* (see page 13), reliability concerns undermine the economic, environmental and efficiency advantages that they attribute to natural gas.

On the positive side, participants in the industrial group believe that demonstration of reliability will not only increase growth, it will also result in higher margins for suppliers. While the participants from this group do not believe that long-term contracts for the commodity are worth a premium over the spot price, they suggest that the same end result can be achieved by packaging a reliable service with the commodity. Suppliers can charge an indexed or discounted rate for the commodity, plus add a "service fee" which covers the cost of providing storage, reliability or other services.

> And longer term contracts. Most of ours are one year in duration and we've looked at longer term contracts, but I think what we find at any rate is that when you begin to talk in terms of longer than a year, everybody wants to index, indexing becomes the standard, and the only thing to argue about then is which particular index do you use, and if I'm going to use an index, I might just go out and buy [a] 30-day. I mean that's what I'm going to pay anyway. Why bother with long-term contracts if I'm going to pay index?

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Unless you could get additional reliability or flexibility.

Exactly. There's price flexibility and there's peaks and valleys, and the reliability and administrative help [all services]. (IND)

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REGULATION AND THE POLITICAL ENVIRONMENT

Regulation and politics are the most pervasive impediments to the natural gas industry. Participants from all focus groups discuss at great length various aspects of federal and state regulation and their effects on the supply, transmission and marketing of natural gas. Some participants discuss the issue broadly: how the regulatory and political process shapes regulations and influences the behavior and management practices of affected companies. Others focus on specific existing or prospective regulations. In some instances, regulations are seen as having positive effects on the industry. In most cases, however, the impact is viewed negatively.

This chapter will analyze the participants' attitudes toward these issues. Initially, the general and specific impacts of regulation will be defined. Subsequently, the underlying causes of those actions, as stated by the participants, will be discussed.

THE IMPACTS OF REGULATION

The participants identify numerous ways in which regulation affects natural gas demand and the ability of various organizations in the supply chain to find and deliver the commodity.

At its most fundamental level, regulation is the chief source of uncertainty. Since the late 1970s, the industry has faced a seemingly continuous progression of regulatory actions. The NGPA of 1978, the self-help rulings, FERC Order Nos. 436, 497, 500 and, most recently, Order No. 636 have propelled the industry through, what seems to the participants, as never-ending and radical change. Corporate planning and the development of stable, predictable business practices is precluded in this environment.

Participants in the pipeline, producers, IPP and cooling equipment manufacturer groups suggest that the resulting uncertainty undermines the confidence of lenders and inhibits the development of stable markets.

- You're finding the lenders being more and more conservative because of regulatory uncertainty in this industry. (IPP)
- If you could get rid of some of the regulatory uncertainty at all levels, both the state and the national level, you'll be able to bring some kind of market base stability to our industry. (PIPE)

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- The biggest problem that I perceive deals with [the] regulatory scene. We need regulatory certainty so we can make investments and know where to spend our money. (PROD)
- The money to see the embellishment, if you will, of the engine and the system isn't there because the utilities live in fear of regulators. (COOL)

Participants in nearly all of the groups believe customers are confused by the changes. The industrial participants indicate that the difficulty in long range planning leads them to focus on a 30-day horizon.

The business, because of some of the regulatory rules and changes, has turned into being a 30-day business. It's particularly difficult for a lot of the users sitting around this table [to] operate their hot operations 24 hours a day, seven days a week. Obviously you have to stop and rebuild furnaces and so on, but it's 365 days out of the year, and the furthest out that you're sure [of] your supply price is 30 days. (IND)

Even the manufacturing groups in the industry who are responsible for R&D have a difficult time defining the future environment for which they are targeting their efforts.

- It's a double-edged sword. We all have opportunities for selling equipment to clean up the environment. I think the thing that bothers me the most is the utter chaos. This whole regulatory structure -- the federal government structure -- is one of the worst ways to administer an environmental program because it keeps getting delegated down. The most extreme case is California. They have thirty-two different air quality districts and every one of them can set up a different standard for NO_x and carbon monoxide. (IGE)
- It's almost a matter of pride with them, if they do something different. I've seen highway standards regulated the same way. And as a result, from a manufacturing standpoint, if somebody's trying to devise a solution to these problems, they don't know what the hell to do. Now how can you get your R&D program on

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track when not only are you trying to hit a bunch of diverse targets, but they're also moving all the time. (IGE)

Many aspects of change are identified as causing the uncertainty. The evolving nature of FERC and environmental regulations is most frequently cited by participants in nearly all groups.

 I have a phrase with regard to FERC -- the fat lady never sings at FERC. That is the most terrifying - and I use the word intentionally - aspect of federal regulation. You never have a deal. (LDC)

The consensus breaks down, however, when other factors are considered. The regulators believe that changes may have happened too fast. Many providers believe the opposite: changes are occurring too slowly. Participants from the industrial, local distributor and gas equipment manufacturers state that in addition to pace, inconsistency across the states and among different regulatory agencies within a given state is also problematic. The inconsistency results in a widely varying range of working environments which complicates the planning process within their companies.

- But like in the [FERC Order No. 636], what concerns me is the speed of the implementation that they want. I mean, can we take a chance that this isn't going to work? You know, with incremental implementations we have a chance to work through some of the problems, rather than just, boom, here it is. (STCOMM)
- Things have been changing so fast, you finally think you're starting to understand what the ground rules are and they change again. (LDC)
- You get the federal government and the states [in here] and at certain times they're opposed to each other's thrusts and views. (IND)
- They're arguing so much among themselves, [the regulators] can't put a common message into the marketplace. (IGE)

Some of the participants from the demand, provider and the regulatory staff groups believe that the ease with which regulators violate the "sanctity of contracts"

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further compounds this problem. These participants fear that they may incorrectly guess the future, and take some action that is counter to a goal formulated in the future. In such an event, even if they acted in good faith, they believe that either state or federal regulators will force at least one party to break the contract in order to gain compliance.

- But my feeling is wherever you have contracts in place, whether they be a contract with your company to move gas or [with] an LDC throughout the term of that service agreement, you have to respect those contracts, because without the contracts, you will have disorder. Projects can't be financed. So, my feeling is the FERC can't interfere with existing arrangements. But once existing arrangements terminate, you have to effectively deregulate them with open access and unbundled services and costs. (IPP)
- I suggested to one of the commissioners that we need to have sanctity of contracts. He said, "Oh no, we can't have that. There is no way we can move forward worrying about contracts." (LDC)
- If the FERC interferes with existing contractual arrangements, then it could be a great disservice to the industry and the ability of the industry to finance projects. So, I would concur, the best thing the FERC can do is respect the sanctity of existing contractual arrangements. (IPP)

The participants identify a number of specific regulatory actions that impede growth in natural gas demand. The most widely mentioned concern is treatment of local distributor and pipeline expansion by regulators. The debate focuses on who should pay the cost of the new capacity. The providers and demand groups are unanimous that the costs associated with expansion should be "rolled" into the existing rate base. One participant from the IPP group indicates that incremental treatment of new pipeline capacity added approximately \$.70 per MMBTU to the total delivered fuel cost, enough to kill the economic viability of a proposed plant. Some participants from the regulator groups agreed. They recognize that the other ratepayers will benefit from the investment through increased throughput.

> I don't think you can argue with the fact that the guy who gets in last is getting a break on price. If he went out and built a new pipeline, it would cost him a whole

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lot more to do it. But I think that's the only way that you're going to be able to have gas compete with coal. (IPP)

One other obstacle I see is [financing] LDC growth, and perhaps it also goes for pipelines. I think regulators have [to] focus on the longer-term benefits of growth, the increased throughput, the yields average cost and the industry itself. The pipelines and LDCs have to propose fair, creative funding solutions. (STCOMMSTF)

Other participants from the regulatory group disagree. These participants believe that the existing ratepayers have already paid for the existing pipeline and should not be forced to pay for the capacity brought on by the addition of individual plants or new subdivisions. This feeling is particularly strong when a new pipeline is needed to attach a market in another state or region of the country.

> Who should pay the freight? If they're moving...that's another thing, bottom line again. If they're moving through state X to go east, then you got some pricing problems. We, in state X, don't want to pay for extensions into New England. (STCOMM)

Several aspects of regulation are viewed as a positive force, helping to stimulate demand growth. The participants identify several specific regulatory initiatives or political actions in this vein, including promotion of VFMs, DSM initiatives, PUCHA reform, promotion of new technology, and the emergence of externality concerns.

Encourage VFMs. Members of the regulatory groups indicate that they believe their recently passed regulations would promote VFMs. They refer to regulations which allow producers to sell natural gas for automotive vehicles without regulation.

Demand-side management encourages growth. Members of the consumer advocate and equipment manufacturer groups perceive opportunity for the gas industry in regulators' efforts to promote DSM. Gas technologies -- for example, gasfired air conditioners -- are one of the tools available to reduce the projected growth in electric demand. Moving peak load demand from electricity to gas, these participants believe, will enable the electric utility to forego building new capacity.

> Why build an infrastructure of big power plants that means big capital dollars when you can utilize an

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existing infrastructure of natural gas that's primarily used in the wintertime, and now you can use it in the summertime? I mean, thermal users in this country why don't we make them gas? And for baseload electric why don't we -- for lighting and the other things -- use electric plants? I think you can get a good balance for the country energy-wise, but I don't hear anybody talking about that. I was at AGA a couple of weeks ago, I asked them about integrated resource planning, and all they could do is basically hold their heads and say, "Oh, my God, the electric guys have so much more money to put into this, and they have stronger positions with the utility commissions...we're getting clobbered." (COOL)

PUCHA reform. Members of the IPP focus group praise provisions of the proposed energy bill before Congress. The specific provisions that they discuss allows companies to own IPP facilities without being regulated by PUCHA. The 1938 Act requires that any company owning more than 10 percent of a public utility is subject to regulation by the SEC, and imposes significantly burdensome reporting requirements.

That [PUCHA reform] affects the gas industry in that there are less and less steam hosts available right now that can handle large-sized power, so you're building the 40 to the 100 megawatt plants here and there. There may be plants where there's a big steam host, but no need. So in order to really get the IPP into it and start buying a lot of gas, that has got to be changed. (IPP)

Promotes new technology. Members of the equipment manufacturer focus group indicate that much of the impetus for the new technologies that they are developing come from regulatory efforts. This rings particularly true with respect to implementation of the Clean Air Act amendments and state air quality laws which mandate lower emissions.

> I was just going to say [that] I see [regulations] of the EPA on NO_x starting to impact the industry.

And the flip-side of that is we see that [EPA regulations] as an opportunity. (IGE)

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Externalities. Members of the provider, demand and equipment manufacturer groups believe that the move underway by utility commissions to mandate consideration of externalities in new capacity planning will lead to greater gas use. The externality considerations will penalize coal and oil more than gas for SO₂, CO₂ and NO_x emissions, and thereby encourage the use of gas.

Other participants suggest, however, that benefits gained by natural gas from externalities will be short-lived. True externality calculations will penalize gas, although less than coal and oil. Therefore, the real beneficiaries of the externality argument are DSM programs and renewable energy technologies such as wind and solar.

> [Gas] doesn't enjoy nearly so favorable [a] reputation in my state. I mean, we've gotten rid of oil which was the basic thing. We have very little burning of coal. They're increasingly turning to wheeling to bring in electricity, so that the state border is irrelevant to the industry. If you burn natural gas, the air quality board will tell you that you are contributing to the pollution problem; and so demand-side management is where we think we're going to get 70 percent of the growth for the next 10 years in my state. (STCOMM)

The participants identify several other specific characteristics of regulations or regulatory actions that they believe damage the gas industry's ability to grow and compete with electricity and coal. They include the following: diverting the focus of industry executives from the customer; providing disincentives to increase throughput for pipelines and distributors; permitting inadequate flexibility in rate structures; promoting coal; inhibiting reliability; causing fragmentation; driving exploration activities away from the United States and promoting inefficient management.

Diverts focus. Industrial participants believe that regulation is such an overreaching force that utility executives tend to treat the regulators as the customer. Accordingly, utility executives focus their attention on the regulators and ignore the true customers, the industrials.

> One utility president told me his customer is in the state capitol. And he was straight-faced. He says he knows if he doesn't toe the mark, [the regulators] are going to get him. So he [the industrial] pays the bill. But that's my customer [the regulator] there. If he says jump, I jump. (IND)

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 Well, the gurus will tell you that the LDCs look upon their major customer as their public service commissioner. We always look at FERC. (PIPE)

Pipeline and distributor disincentives. Electric utility and industrial fuel buyers indicate that they are concerned that under FERC Order No. 636 rules, pipelines will have all their fixed costs recovered through demand charges and therefore will have no incentive to market throughput. If this happens, participants believe that obtaining swing, storage and other needed services will be difficult.

> Because obviously, the one thing I am concerned about is FERC right now. FERC seems to be making it very easy for the pipelines to put their feet up on their desk and not really care how much gas moves through the pipeline. And if that ever happens, then I think we will not see the industry develop as far as it could otherwise. And I think the producing segment of the industry and the end users should be very concerned about that prospect. (EU)

Similarly, participants in the marketer and pipeline panels indicate that state commissions provide inadequate incentives for distributors to promote natural gas.

- The way that ratemaking is done at the LDC level and, to some extent, the interstate pipeline level. You go straight fixed variable -- what real incentive do you have to push more throughput through that pipeline? You go the LDC level and you're recovering all your costs and earning your allowed rate-of-return, what incentive do you have to take a risk? A new home builder wants to put in a new subdivision and what do we do in this industry? We make them pay for the line to connect to their system. We ought to be taking some risks like that where we extend the main to get a new subdivision on natural gas. (PIPE)
- As long as LDC regulation is based on allowed rate-ofreturn, they have no incentive to build throughput. Because if they build throughput in this rate case, [and] go to the next rate case, they have a higher threshold where they don't need it, they've lost money. You take away every incentive at the very point where is has to

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be created to build load in this industry. It's absolutely stagnated the industry. (PIPE)

Here you got the producers who support this industry by drilling and making the product available, whose economics are based on being able to produce [natural gas]. The throughput company, at the very end, where the rubber meets the road, the person selling their product has no incentive to increase their throughput. In fact, is scared in many cases to increase their throughput because that becomes the basis for the next rate case. If they don't make it, they won't earn their allowed rate-of-return. (MKTR)

Participants from the state commissioner group concur that they do not allow many promotional activities. Several indicate that they question whether disallowance of promotional efforts constitutes good policy.

- The same people provide the electricity and the natural gas, so there really isn't any competitive type of advertising. We do allow any safety advertising. [We allow] some public service notices. We encourage them every time we have a chance, and we require them to do bill stuffers on efficiency and insulating and weather stripping and that type of thing. (STCOMM)
- We make [a] distinction between customer service and economic development, and we allow anything that's considered customer service. Nothing that's considered economic development is passed through. (STCOMM)
- I definitely think it's in the public interest to encourage the aggressive marketing of natural gas, and it's certainly in the national best interest as well. (STCOMM)
- I'm not certain, to be honest with you. I know that we don't allow "load building," which is a term we use. The attempt, I think, [is] to increase the base of use. We don't allow that [promotional expenses] to pass through, and in my own mind that doesn't make a whole lot of sense, but that is the Commission's policy as I understand it. (STCOMM)

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Local rates too inflexible. The local distributor participants believe that utility commissions do not permit adequate flexibility in their rate structures to enable the local distributor to compete with other natural gas marketers. Their commissions allow them to flex their rates to meet the challenge of fuel oil, but not other marketers.

> Everybody is different -- especially on the LDC side -- as far as different climate, different creditors. In [state], the LDCs are severely threatened by brokers and marketers who are cherry-picking customers. The brokers are not regulated and they're not subject to the same constraints that we are on a regulated basis. I'm not going to use the term "level playing field," but that only seems a fair way to approach it. We're battling something we don't have the tools to effectively combat. (LDC)

Promotes coal. Participants from the pipeline and producer groups perceive that some utility commissioners favor coal. For example, one pipeline participant indicates that he believes that utility commissions evaluate delivered coal and gas prices based on the commodity costs; the environmental and waste disposal costs are not included. (This conflicts directly with the attitudes of the regulators. See page 101).

- The state regulators, in particular, view the incremental decision between gas and coal purely on the price of the fuel cost, the commodity itself. They don't look at scrubbers, they don't look at the overall economic cost to the consumer of running on coal versus gas. They're myopically focused just on the fuel component. (PIPE)
- There's a PUC emphasis that rewards them for their capital investment base. It says, invest in more expensive capital, which means coal versus gas. So there's all kinds of incentives for the electric utilities to stay with coal. (PROD)

Hurts reliability. Members of the state commissioner focus group believe that federal regulation, particularly FERC Order No. 636, will reduce the overall reliability of the gas industry. Their attitudes are grounded in their fear of marketing companies' abusing capacity ownership, fear of distributors having to be responsible for their own supply and a general fear of the unknown.

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- I think [as a result of the [FERC Order No. 636]] you're going to see a whole bunch of new niche players move in as far as the regulatory environment. There's going to be brokers, there's going to be capacity brokers, they're going to be guys trying to make spot market purchases. They're going to try and tie up firm transportation and they may be very good at this, but there is going to be some empty time on those pipelines. I just think when they have to commit to upstream capacity, somebody is going to have to hedge in order to make that commitment be deliverable and there will be less volume in those pipelines. Whether they are going to put the money into it or not, I don't know. (STCOMM)
- But if I [LDC] need capacity to serve those because it isn't provided and I haven't got it under contract, and [if] I have to go out and buy [capacity] from [an unregulated] marketer, I have to have it and I have no idea what I'm going to pay for it. He may have the only capacity that there is on the system, and I will have to have it. Is there a competitive market out there with capacity? Not necessarily so. Getting capacity out of the regulatory framework or the FERC and putting it in hands of marketers, whoever they are, whether they're affiliates or non-affiliates, bothers me considerably. I'd like it in a regulatory area under FERC, and it is really under the control of the pipeline and FERC tariff rates. (STCOMMSTF)

Causes fragmentation. Members of all of the provider groups plus members of the electric utility group state that they believe that the regulatory process promotes fragmentation. The adversarial nature of the hearing process at FERC and the state utility commissions, encourages the distribution of materials, which promote one sector at the expense of the others. Each side presents its own views, usually quite effectively, but from the commissioners' perspectives, none of the material should be completely believed.

> So we're dealing with first-class people. And you've got to give them grade A's on what they've come to do. You've got to be careful about doing it in most instances, in some instances. (STCOMM)

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- I find the information in the gas industry more fragmented than other industries. You either get it from the producer or from the pipeline or from the LDC. It's not a question of bias, you just get a piece of it. (STCOMM)
- I think they are doing a good job. The problem is that everybody does a good job. It's just that they are all biased. That's the way they have to be. There is no consistent policy that I can read, as a new commissioner, from which I can determine what's out there. (STCOMM)

Drives drilling overseas. Several members of the producer focus group indicate that what they perceive as "neglect" of the oil and gas industry by federal and state governments is driving the industry overseas. Through unfavorable tax treatment, lack of a strong national energy policy and priority treatment for environmental concerns over oil and gas interests, the domestic oil industry is being shabbily treated by government. Accordingly, the oil industry is moving overseas.

I think what everyone has said is accurate...since we don't have [regulatory certainty] and we never will -- I have not seen it in my lifetime -- we are seeing our capital being spent overseas drilling for oil. There will be less money spent in the United States, we'll be importing more oil, and all the by-products. Natural gas deliverability will probably go down. The very people we've been telling "we can meet your demand," they'll probably find they're short of gas. (PROD)

Promotes inefficient management. The most extensively discussed negative impact of regulation is the manner in which it distorts economic decisions and efficient management practices. The participants describe how regulation affects the behavior of regulated utilities and non-regulated customers.

Regulated Utilities

Participants from all of the groups assert that regulation, particularly at the state level, alters the manner in which local distributors and electric utilities deploy their resources. Given a range of choices on a particular issue, regulated and non-regulated companies will choose differently. Six examples are cited:

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- 1. **Prudence reviews.** Participants in the electric utility, pipeline and producer groups state that prudence reviews alter the fuel procurement decisions of electric utilities. Prudence reviews, these participants believe, impose an open-ended and retrospective review process on their decisions. Decisions, made in the best of faith today, may at some distant time in the future look bad based on events that transpire in the interim. Since many of the participants believe that the pricing, transportation and supply aspects of buying natural gas are inherently more risky than that which is associated with coal, the prudence review process steers the participants away from gas. The lower cost of gas, from a simple economic standpoint, fails to overcome this drawback.
 - So you're sitting here as an electrical utility, saying, you know, I could go to gas, get the hell second-guessed out of me or, in today's environment, I can very easily go with scrubbers and justify that investment and I'm going to earn on that investment. I mean it's a no-brainer. If you were a utility executive which would you do? You'd take the money. (PIPE)
- 2. **Fuel selection and cost.** In addition to the influence of prudence reviews, the participants suggest that other aspects of regulation alter their fuel purchasing decisions. State commissions typically, according to the participants, make electric utilities balance their fuel portfolios in order to mitigate risk. By maintaining a diversity of fuel options, utilities are less subject to the vagaries of any individual fuel market. Again, maintenance of a balance may, the participants believe, drive utilities to purchase fuels that are more costly than would otherwise be the case.
- 3. **Rate base bias.** Participants in the provider and cooling groups believe that the regulatory process injects a fuel bias among electric utilities. Their reasoning suggests that because utilities receive profit (return) on their rate base, they have a predilection toward capital intensive solutions. For example, they will construct a scrubber and continue burning coal rather than install natural gas capability which generally is far less expensive. Participants in the electric utility and regulatory groups do not support this theory, stating flatly that electric utilities are averse to making large capital intensive decisions. (See discussion on page 98.)
- 4. **Rate-of-return.** Members of the local distributor focus group suggest that their allowed returns are too low to prompt them to embrace the added risk associated with FERC Order No. 636 and the increasing demands for effective marketing.

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- Our industry has been undergoing some revolutionary changes. Every one of them has had the effect of substantially increasing the risk of doing the business of an LDC. I think the returns allowed - and I'm not a student of returns - have actually decreased. That's counter-economic. (LDC)
- Our major competition is electric. In a good year, our local electric company has earnings that are 10 times our earnings. Well, their promotional advertising is also disallowed. But who is in a better position to do a lot of advertising? The guy with the bucks. (LDC)
- 5. **Demand-side management effects.** Members of the cooling equipment manufacturers group cite examples of how electric utility DSM allowances are being used in ways that make natural gas-fired equipment very uncompetitive. DSM programs in some states allow the electric utility to treat the investment in DSM (for example, subsidies to consumers to purchase new equipment) as part of the rate base. Accordingly, an electric utility can offer rebates and other subsidies that are much larger than their gas counterparts that do not have the same capability. Ironically, the participants indicate that this quirk in the system (i.e., the subsidy), renders some of the gas technologies that offer the highest DSM savings uneconomic. (See page 36.)
- 6. **Discourages new plants.** Members of the electric utility CEO panel decry utility commissions and planning agencies for their reluctance to site new plants. These state organizations, the participants indicate, make it too difficult to develop any new facility, regardless of its economic merit.
 - Of course, when you go before your commission, you need advance approval for a generating unit. Those who insist on demand-side management as an alternative are going to attack whatever it is you propose. If you propose combustion turbines with natural gas-firing, then they're going to bring up all the arguments against natural gas. If you had proposed something else, they would marshall all the arguments, whatever else you proposed. (EUCEO)

Unregulated Gas Customers

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Participants from many of the groups believe that not only does state regulation affect the behavior of the regulated utilities, it affects the behavior of nonregulated entities as well. The participants sharing this general opinion start from the proposition that manufacturers face intense global competition and that energy costs constitute a relatively large component of total operating costs. They believe that state regulation places an unduly high economic burden on these companies through added costs. They cite seven examples.

- 1. Alternative fuels. Members of the industrial and equipment manufacturer focus group panels inveigh against transportation and sales rate structures of local distributors for requiring installation of alternative fuel capabilities to receive the most economical rates. In addition, maintenance of alternative fuel capabilities is expensive, and reduces the economic benefits that the industrials would otherwise gain from directly purchasing their natural gas supplies.
 - I worry about tariffs. We sell gas only products. If somebody needs a dual-fuel motor, to get the tariff that I may need -- even though I may never burn oil -- I need to have an oil-capable installation in order to get the low price from the gas company. I have lost the sale, so, from my perspective, I have a lot of customers, prospective customers who say, you know, I want to use your product, I see a lot of the benefits, but right here in black and white are the tariff structures associated with the PUC's stand. (IGE)
 - It [the question of alternative fuel use] really addresses one of the key problems of the industry. Fortunately, I'm not involved just in buying energy. My chemical suppliers don't come to me and say, "Well, if [you] run out, what else can you run your facility on?" They also don't come to me and say, "Well, I'm going to sell you gas, but if you really want to get the low price, you're also going to have to invest in this fuel oil storage or this propane storage." (IND)
- 2. **Taxes.** Members of the industrial focus group express extreme frustration with the tendency among state governments to place taxes of all varieties on natural gas consumption.
 - AGA, GRI -- you can name them down the line. You have some states now with a privilege tax moving gas

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in. New York had the famed 51-cent tax. They still have to tax a privilege tax. That's 4.5 percent of a heavy month's usage, and everyone just sees gas as something you can put another tax on for something else. [It's] not just the regulators, it's the state legislatures, it's the federal legislature. [Natural gas] is the big piggy bank. We just keep dipping in there. A penny here, penny there. (IND)

- 3. Adversarial process. Many members of all panels suggest that increasing responsibility for regulatory structures will fall on state commissions. One ramification, which is lamented by members of the industrial and manufacturing groups, is the need to monitor a vastly expanded number of proceedings. Where once a gas consumer could monitor FERC and thereby keep a pulse on the regulatory panel, now he/she must monitor proceedings in numerous states. Again, this adds significantly to overhead costs.
 - The major problem we're going to have, I think, in the future is the fact that you've got 50 different jurisdictional entities that are going to define the rules at the individual state level. Those individual state public utility commissions are going to be able to define their roles differently for each one of our plants to the extent we have plants in multiple states. It's going to be very difficult for us to plan long-term gas supply strategies across our entire demand because of that, and we've seen great differences of current direction at the various PUC levels. (IND)
- 4. **Diversity and inconsistency.** A second aspect of the shift of regulatory oversight from the federal to the state level, according to participants from the industrial, LDC and cooling equipment manufacturer groups, is the diverse and occasionally conflicting state regulations. Solutions that work in one state context fail in another. Procedures established to facilitate operations under one state's laws can be a source of significant problems in another. This inconsistency results in added costs for the company operating in more than one jurisdiction.

Participants also note that this problems exists within a single state's jurisdiction as well. Frequently, the utility commission and environmental agency or the utility commission, local environmental agencies or siting

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boards do not agree on policy directives. The waiting and uncertainty inherent in these situations also translates into higher costs.

5. **Pipeline construction.** Members of the IPP group criticize the FERC and state agencies for their insistence on incremental treatment of new pipeline capacity. As discussed earlier under *The Impacts of Regulation* section, such treatment added, in one example that was given, approximately \$.70 per MMBTU to the delivered price of fuel to a plant. The participants state that such treatment will render many IPP projects uneconomic, or undispatchable.

A corollary to the participants' beliefs that regulation adds to their manufacturing costs is their other belief that regulation prevents them from achieving the maximum cost reduction. Again, given the manufacturers' efforts to compete internationally, this impediment looms large, making the companies investigate moving plants. Two examples of this concern are given:

- 6. LDC bypass. Members of the industrial group see LDC bypass as a rate issue. Bypass issues only arise when the local distributor is unwilling or unable to flex its rates sufficiently to prevent end users from attaching competing pipelines. When commissions or FERC interfere with that decision, they are preventing the end user from the highest fuel economy possible.
- 7. **Prevents efficiency.** Members of the industrial group vehemently believe that the rate base reward system, inherent in most regulatory oversight processes, impedes utilities from becoming efficient. The rate base reward system prevents distributors from lowering their cost structures sufficiently to reduce the non-gas cost of service. During the past decade, they have striven to lower their operating costs in order to compete more aggressively. However, the participants believe that until the local distributors undergo a similar catharsis, significant energy cost reduction is impossible.
 - The difficulty is that most of us are dealing with increasingly competitive business environments. A lot of our products are becoming global commodities -whether or not it's chemicals, steels, or automobiles -and so much of a, what you'd call, deregulated commerce is downsizing, rightsizing, trying to compete in a world market. Such a significant portion of our variable costs are energy costs, and those energy costs are predicated on a system that started at the wellhead as

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deregulated and becomes increasingly regulated as you get to the burner tip. The regulated monopolies are getting in the way of an unregulated commerce trying to do business on a global basis. (IND)

An additional, general distorting effect of regulation is raised by participants from the producer group. It relates to a perceived neglect of the domestic oil and gas business by Congress and the political system and expands on the theme "Drives Drilling Overseas" mentioned initially on page 100. Several members of the producer focus group believe that changes over the past decade in the manner in which the industry is treated from a tax standpoint, by environmental regulation and by the state political processes is sufficiently shabby to make it more appealing for producers to focus their exploration efforts overseas. According to one group of producers, this trend toward a shrinking domestic industry will result in deliverability shortages. Other producers on the same panel indicate that the trend will have no impact on deliverability, because other smaller companies purchase the properties and continue their development.

> But there's one point that people haven't touched on, and that sort of moves back to Washington. In looking at the petroleum industry, what's happening today is that our capital is moving overseas. And it's moving overseas because of the tax structure and the almost total disregard that Washington has shown for the petroleum industry. Whether we see domestic petroleum now -- whether it be gas or oil -- be a success is strictly a function of price. Whereas if you go overseas it's a function of price. Whereas if you go overseas it's a function of volume because you have net-back pricing. It's very logical for the capital to move overseas. While it's moving, it's going to hurt the gas business. (PROD)

UNDERLYING CAUSES

Numerous causal factors exist behind the various manifestations whereby the political and regulatory environments impede growth. Five general themes leap from the comments made by the participants:

- Lack of consensus for regulatory objectives
- The inherent nature of the regulatory process
- The behavior typified by regulators
- Actions of the gas industry
- The political strength of competitive industries

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Members in slightly over half of the focus groups make statements that suggest a cause for the regulatory malaise described above. Members of the regulated segments, the local distributors and pipelines and the regulatory staffs are the most analytical in their criticisms. The impact of each of the five themes is not mutually exclusive and, as will be discussed, they are addressed to varying degrees by each of the focus groups.

Lack of consensus for regulatory objectives. Comments made by participants in the various groups suggest that there is absolutely no consensus as to what the objective or goals of utility regulation are or should be. The most widely held belief, which is expressed by members of seven of the panels, is that the goal of regulatory action is to protect the interest of the captive customer. The second most frequently mentioned objective is to promote clean air. The third objective is to encourage competition. Eight additional objectives were mentioned:

- 1. **Conservation.** The consumer advocates and state commissioners suggest that one of their goals is to promote the efficient use of natural gas and other resources.
- 2. **Price control.** One electric utility member and members of the regulatory commissioners' panel believe that the goal of regulation should be to maintain prices.
- 3. Social objectives. Members of the state regulatory and industrial consumer groups state that another objective of regulation is the promotion of social goals such as income redistribution. Others suggest that these types of objectives are inappropriate.
- 4. Self-preservation. Members of the industrial and equipment groups indicate that they view job preservation as one of the objectives of regulators.
- 5. Increase throughput. Members of the state commission staff panel suggest that they believe one of their goals is to increase throughput.
- 6. **Place limits on competition.** Members of the industrial panel believe that local distributors are natural monopolies and therefore their actions must be reviewed. In other words, the goal of utility commissions should be to limit the exercise of market power.
- 7. **Promote non-utility generation.** Members of the IPP group suggest that one of the goals of regulators should be the promotion of NUGs. These participants indicate that they are concerned that their ultimate role will

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be to define the upper cost limit faced by electric utilities when they need to build additional capacity.

8. **Promote local distributor rates-of-return.** Local distributor participants make statements that suggest that they believe the regulatory commission's role is to preserve and protect their profit margin.

The range of opinions described above underscores the difficulty that regulators have in reaching a consensus with which to craft regulation. Obviously, many of the objectives described above reflect strong self-interest and any group may share parts of more than one objective. IPPs believe that a goal should include promoting NUGS and local distributors believe that preservation of their profit margin is part of the objective. Fragmentation is a major result of the conflict over which objectives are most appropriate.

Even among members of the regulatory commissioner group, there is a strong sense of conflicting outlooks. Several commissioners speak of the dangers of moving too fast into a "competitive" world. They are very uncomfortable with the belief that unfettered competition will prove to be as judicious an arbiter of price as their benevolent directives:

Frankly, I'm not a big proponent of regulation [by] government. I do believe in the private enterprise system. But I do not believe within a regulated industry that competition should be a goal. I think the goal is to promote better service, reliable service, at a just and reasonable price. I would agree with everything said about the fact that we've moved rapidly, perhaps too rapidly, in promoting competition as our goal, and that is not my goal. (STCOMM)

Other commissioners have almost the opposite perspective. These participants clearly state that competition can replace regulation, freeing price, supply and demand signals in the process.

- That [capacity allocation by supply region] is no longer going to be physically necessary, and so market share is something they're going to have to compete for. (STCOMM)
- We are attempting to allow competition to move in, by giving the men and women who run those industries

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that which any other business person has, pricing signals. (STCOMM)

State politics extract their own price on the ability of commissioners to develop a unified regulatory framework or objective. One participant from the commissioner group describes the evolution of regulatory policy in his state by using an example from his state's telephone industry:

> We make a decision. For example, we made a decision just last week on the telephone issue, and in a particular area of the state, it was the best decision for the state at large. [However], it's going to affect three communities [differently. In two communities,] the rates will go slightly down and in one community they will go slightly up as a result of that decision. A key legislator has that particular community in his district. He has already introduced a bill that will cap and freeze the rates for his particular community. That's what sets the policy. (STCOMM)

I would not consider the legislature to set energy policy. I don't know who does. The governor has some council to set energy policy, but I don't think the legislature looks at the overall picture. It [the legislature] really looks at very particularized issues, so I don't think that they say, all right now, let's make energy policy and have legislation which follows that.

But that's how it's made.

Exactly.

Piece, by piece, by piece. (STCOMM)

As this example shows, the articulation of gas industry regulatory objectives emerges in a series of small, seemingly minute, only vaguely related steps. Development of consensus in this type of environment is extraordinarily difficult, particularly in light of the industry's inherent tendency toward fragmentation which is documented in several other sections of this report.

The inherent nature of the regulatory process. The participants mention six characteristics of the regulatory process itself that create or exacerbate impediments.

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- 1. The regulatory process is not market-driven. Throughout this research project, interviews with members of each of the gas industry market segments, except residential customers, were held. One commonality that runs through all focus group discussions is how regulations are aimed at solving the needs of the pipeline, distributor or producer, but rarely address the needs of the actual gas consumer. Members of the industrial group are the most vocal in this respect. They state that if they are consulted in the pipeline settlement conferences, it is only after the local distributors, and even then they have little say in policy formulation. Electric utilities hold the same attitude.
 - Even the commissions don't know that. I was in one meeting [with] one commissioner, chairman of the commission [and] some of his staff. He was surprised that I sold aluminum to company A and that company B sold glass products to company A and company C sells them stuff. But the problem was even at the commission level they still don't realize that we have to sell products. (IND)
 - I think a regulatory piece would kind of fall in line with that [communication]. If you had the markets and the pipelines getting together and saying, okay, this is what we need, I think that the regulation part of it would come into place, especially where the markets are involved. Supposedly the regulations are in place to protect the markets. (EU)
- 2. Adversarial nature. Members of the producer, pipeline and commissioner groups note that the regulatory process is founded on adversarial principles. To obtain goals, one has to do combat with ones colleagues, regardless of the long-term implications.
 - The regulatory history that we have had and the current situation creates an adversarial relationship. The only way you can win in a regulatory environment is with an adversarial relationship. (PROD)
 - In my opinion [the regulatory environment] created the mistrust because everybody was trying to pursue their own agenda, which was, of course, open [to the public]. I don't think we'll get over that mistrust until we are able to have deregulation. (PROD)

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- That's why they come into our cases many times because they're protecting themselves and we've had our customers say it doesn't really pay. We're going to come in and bash you, but we've got to because when you get such and such out of your case we've got to go back to our PUC and say that we tried. We don't think we can beat you, but, all these games that are going on that have nothing to do with growing the product, marketing natural gas or increasing our market share as an energy base. (PIPE)
- 3. **Fragmented nature.** As discussed above, policy evolves out of a series of small, frequently unrelated, or at best, tangentially related events. The federal regulators inject some; state commissions inject some; state legislatures inject some. Sometimes the respective injections coincide; frequently they do not. Lasting policy only emerges where those and other factors intersect. Accordingly, it is very difficult for a company or group of companies to really shape a single, clearly articulated objective.
- 4. Speed. Participants from the IPP and LDC panels decry the slow speed and unpredictability with which the process works. This is particularly difficult for the IPP participants in the context of FERC's deliberations regarding rolled-in *versus* incremental rates. The IPP participants complain that they need to make decisions today that hinge on how new pipeline capacity is treated. If it is rolled into the existing rate structure, then the project works financially. If they are treated incrementally, many of the projects will not work financially. At one time, they believed that they knew how FERC would rule on the matter. However, the Great Lakes decision eliminated that certainty. Now, the participants just want to know which direction the decision will take so that they can focus on new projects.
 - When do you know whether [the rates] will be rolled-in or be incremental? I think the importance of certainty is critical. We're trying to put together a [power generating] entity that's going to be based on long-term contracts. To go into something and not know whether it's rolled-in or incremental until a couple of years down the road is not possible. (IPP)
- 5. Archaic underlying principles. Members of the local distributor focus group speak extensively about the need for new constructs from which to evaluate such issues as appropriate rate-of-return, pipeline expansions,

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marketing and supply portfolios. Their complaint with the present paradigm is that it does not give them adequate flexibility to address operational and competitive issues.

- [We could live with the federal regulations imposed on us if we had] adequate flexibility in our own marketing. But we don't have that much flexibility in our rates to begin with. (LDC)
- We have trouble getting legitimate economic development. [With competitive rates] there's a benefit obviously to everybody within our state because we're going to attract new business and be able to compete with the electrics. That makes a better deal for someone looking to relocate industry in the state. (LDC)
- We don't have the flexibility to deploy our resources in order to grow the markets. In our jurisdiction, for example, everybody talks about how wonderful gas is but they disallow anything that's considered promotional advertising. That's not recoverable. (LDC)
- 6. Imbalance of risk. Members in several of the focus groups discuss the fact that gas emerges from the ground in a relatively unregulated state, but is consumed after going through entities that are extensively regulated. This imbalance places enormous conflicting strains on the companies according to the participants:
 - It [the regulatory climate] has been a problem. It continues to be because at one end of the spectrum you have the producers who are fairly unregulated. At the other end of the spectrum are the LDCs who are completely regulated. In the middle, the pipelines don't know who they are. They [the pipelines] must deal with an unregulated entity like a producer. On the other hand, [they] have to deal with the LDCs...and I believe that's what causes the mistrust and the difficulty doing business. (PROD)
 - Get rid of the differences in industry, in terms of regulation, where one part of the industry is unregulated and one is completely regulated because I

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think it creates bad relationships and makes it very hard to do business. (PROD)

One of the most significant areas of conflict mentioned by the participants involves risk. Ironically, participants from most of the groups believe that their group bears the risk burden. Producers think that their decisions to explore and develop natural gas properties represent enormous risk, and that the more regulated companies, particularly electric utilities, are too risk-averse.

- Because we [producers] go in expecting [that] if we take risks, we ought to make profits. Whereas on the other end, they are risk-averse and they don't understand risk; they don't want risk. It's very hard for them to deal with people who are used to taking risks. (PROD)
- Why should we risk all of our capital when we're only going to get the downside, and we're not going to take part of the upside? Historically it's happened time and time again. So until there's some mechanism that allows some sort of a sharing of risk, [and] talk about trust, we don't believe in trust. (PROD)

Participants in the electric utility, IPPs and industrial groups also believe that they bear the risk burden, because they invest enormous sums in manufacturing processes based on natural gas-fired technologies. If gas turns out to be unreliable or overly expensive, they have made poor investment choices and their shareholders suffer. By comparison, they believe the producers' investment to be less significant.

- The feeling is that if there's going to be an investment made for the future, for example, a long-term contract for supply, the utility is going to somehow assume the major part of that risk. There is going to be a commitment through whatever the financial arrangement...the demand charges and the rest, that, yes, the risk will be covered. I don't think the utility has a problem with that, assuming that all the other things will fall in place as it's been represented by the gas supplier, pipeline, whatever it might be. (EU)
- We're seeing that too. I can't think of an example where somebody has figured out this development risk yet. One way to think about the development period side of our business is that we are all sort of placing \$5 million

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bets out there over and over. We bet on this one, bet on that one. It's big money on each one. And some of them come in and some of them don't come in. The ones that come in have to pay for themselves and the ones you didn't get, otherwise you basically go out of business. But that particular issue hasn't been dealt with that I can tell. Maybe you guys have different experiences. But I think we have to figure out a way to get the gas guys to understand that and then figure out a way to solve that. I think that's a tough one for them. (IPP)

- This is very unique for the United States. Our facilities in Canada have no backup fuel oil facilities whatsoever, so they'd be horrified at the thought of even doing it. Each person obviously speaks for [himself], but as [we are] talking huge numbers [in plant investment], I know there's a big investment in producing oil and gas. But there is a big investment on the other end of that pipeline. If somebody puts it in with a 20-year operating life, and the first winter the supplier comes in and says, "Oh, by the way, you gotta get off and go to fuel oil." You say, "Wait. Where were you when this thing started?" (IND)
- It is not just how we're going to run that plant next week; it's the viability of that industry, that business, that plant and that state. These are some pretty big dollar signs. There's a lot of people around the table that I think are spending a lot of dollars on energy. There's a huge amount of dollars being spent to use that energy. I think that is often overlooked. (IND)

The behavior of regulators. Participants from most of the provider groups as well as the industrial consumer group discuss the behavior and background of regulators as another explanation for the regulatory malaise. They mention three aspects of regulators' behavior:

1. Lack of industrial experience and knowledge of the gas industry. Participants from the industrial group firmly believe that one of the primary reasons that the regulators are not more sympathetic to their needs is their lack of non-legal experience in business. The participants could only identify one commissioner that held a non-legal business background, and the performance of the commission he lead was noticeably

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better, in their opinion. Without having had that experience, the participants do not believe that regulators can understand the magnitude and intensity of the competition they face.

- We talk about the utilities hiring from within -- the commissions feast upon themselves, too. If they hire anyone [from] outside, it's from another state commission or from the utility. It's difficult to deal in that environment. (IND)
- I think the flip-side of that, though, [isn't that] the utility regulatory commissions [are] really supposed to be proxies for the competitive market that doesn't exist. I think they don't do that job at all. By and large it's a very much a situation where both utilities and regulatory agencies sleep in the same bed and I think that traditionally is what happens when you have a group that regulates another group. They get closer and closer together as time goes on. (IND)
- 2. **Political nature of commissioners.** Participants from most of the provider groups and the industrial group indicate that the political nature of the commissioners' job is another factor that inhibits their understanding of the industry. As a political appointee or elected official, the loyalty and motivation of commissioners is political. Commissioners, the participants believe, generally only serve a short time (two to three years), and are more responsive to political factors than markets.
 - They come and go -- the commissioners. (IND)
 - But when you get into the market, the thing you see is the PUCs, which are regulating the bulk of the customers. [The PUCs] are very short-term focused. As politicians. their life span is anywhere from 18 to 23 months. (PROD)
 - They're never there long enough. Every time the governor gets elected you get a different political authority in, [and] out go the regulators... (PIPE)
 - It [gas industry] is about the fifth priority for the PUC to begin with. (PIPE)

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- 3. Lack of information upon which to base decisions. Participants from the commission and commission staff focus groups identify lack of information or biased information as an explanation of why the gas industry is more difficult to regulate than the electric industry. The commission staff participants are frustrated by the difficulty obtaining information from local distributors, particularly in the area of alternative contract terms. They also indicate that the complexity of the gas industry makes it much more difficult for them to second guess local distributors than electric utilities.
 - It depends on, for instance, the LDC -- how much information they want to give you and what type of time restraint. For instance, when I get something in and it's stamped into my agency, I have 30 calendar days, or the agency has 30 calendar days to get that out. I only have 15 calendar days to get a recommendation up to the board. (STCOMMSTF)
 - I think we look [at] electric fuel procurement in a fairly detailed fashion. We [tended] not to look at the gas contracts in anywhere as much detail. I was trying to figure out why. It may be [for] two reasons: first, up until five to 10 years ago, we could rely on FERC for setting prices. Then there was nothing to do. But then around the time I joined our commission, about five years ago, the commission was just getting into dealing with transportation and a few other things. We were very unstructured and had turnover on the gas side. We had many more people assigned to electricity and we had a continuity of work assignments. I've been wondering whether gas didn't fall between the cracks for, really, for about three years. We still don't put the resources in gas as we do on electricity. (STCOMMSTF)
 - Just on gas-purchase contracts, we know much less [than we do about coal and other electric utility supply contracts]. We know much less about the alternative terms and conditions that are out there than we do on the electric purchases of coal or oil. We have a much better feel for the [electric] supply market. That may be because I've consciously been [on] the electric side and much of the gas, and an accountant does some of the gas. I've had specific assignments to monitor the fuel

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procurement of electricity. On gas, we required the gas companies to submit annual gas-supply plans and staff to look at them. The accountant has more work than he has time for on his traditional audits and other work. I had more work than I was comfortable with on the electric fuel procurement. So gas tended to fall through the cracks in that respect. (STCOMMSTF)

As discussed above, participants from the commissioner groups, on the other hand, believe that they have plenty of information. Rather, their problem is credibility. They believe that each side represents its case well but only represents its particular side. They would like to have an "impartial" information source to help them integrate the biased data.

Actions of the gas industry. Participants from the regulatory and provider groups suggest that the gas industry itself also impedes the regulatory process. Three specific examples are mentioned, one of which, fragmentation, has been discussed in other contexts earlier throughout this report.

- 1. **Fragmentation.** As described in earlier sections, participants discuss how fragmentation hurts marketing efforts and undermines reliability. Participants in each of the provider groups indicate that the industry's fragmented structure also hinders the development of regulatory policy. The arguments become somewhat circular, however, because they also see the regulatory structure as promoting fragmentation. Nevertheless, the industry's inability to present a consistent, uniform story to regulators undermines its credibility.
- 2. **Trade associations.** Participants in the pipeline group identify trade associations as an element of the problem as well. Trade associations are depicted as promoting fragmentation, rather than contributing toward a solution to problems. The outcome, according to the participants, is the need to increasingly undertake more work in *ad hoc* groups.
 - We're a very fragmented industry. Even our trade associations are fragmented. It's a frightening thing. (PIPE)
 - The legislative process, I think, is the perfect example. Just trying to get the trade associations to the point where they can come up with a consensus position on the legislation was a futile process. I don't know how to describe it. And then as companies went and lobbied

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themselves, they created the impression on Capitol Hill that the natural gas industry, especially the pipeline industry didn't know what it wanted. (PIPE)

- I think our trade associations developed during a period of very heavy regulation and I think they've had trouble dealing. For now, we're a bunch of competitors sitting in a room. We've had trouble taking those associations and moving them over and still be effective in a competitive marketplace. (PIPE)
- The interesting thing we found when we put the *ad hoc* group together [is] that when we got to the end, the producers couldn't get [the] Natural Gas Supply Association (NGSA) to back the position, even though we had the major producers involved. When it came to trade associations, they didn't want to back the *ad hoc* group position because it wasn't their own. Maybe we kind of have to look outside the parameters of the trade organizations and start putting more of these *ad hoc* groups together where we just, and I don't want to say bypass the trade associations [because] I think they serve a useful purpose, but maybe we take more of the accountability as business people to go out there and do it ourselves. (PIPE)
- The other problem is, to put that ad hoc group together, it took some real concerted effort and full time work on a lot of people's part, and that's the other thing, we're all fighting these rear guard battles. I don't think we're taking enough resources and throwing it at this kind of problem, because this takes a lot of time and a lot of effort and we're all fighting our own 636 restriction and our own take-or-pay litigation. I just think we need to marshall some resources and make this a priority or it's not going to happen. (PIPE)
- 3. Lack of creativity. Participants in the regulatory group strongly state that they do not believe that local distributors and the industry, as a whole, take a sufficiently motivated, creative or pro-active approach to overcoming problems. More creativity, they maintain, may lead to the solutions to such problems as pipeline expansion financing and inflexible rate structures.

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A lot of the times you get in the situation [where we hear], "Well, the commission won't let us do that." We let the utilities do a hell of a lot that we didn't in the past, so we're changing our regulation. If you're coming in with something that looks pretty doggone reasonable, you're probably going to say, "Well, if that's [the way] the market is going to go, why should we say no to it? Go forward and do it." As long as we're assured that somebody else isn't going to be subsidized. (STCOMMSTF)

CONCLUSIONS

Regulation at the state and federal level is the most widely discussed impediment to increased demand. The participants generally recognize that many specific regulatory issues can have negative impacts on new load creation. The effects of rolled-in *versus* incremental pipeline rates, and the limited allowance by PUCs of promotional expenses exemplify this type of regulatory impact.

Participants also have a number of other more general examples of the negative impacts that regulation has on demand. Rate inflexibility is viewed as limiting the ability of distributors to compete with marketers. The adversarial nature of proceedings exacerbates factiousness. Regulatory proceedings divert the attention of senior executives from satisfying the needs of customers. Regulatory incentives encourage the use of coal and promote inefficient management of utilities.

Behind most of the participants' concern for these issues, however, is the fact that regulations are changing and that the change creates uncertainty. The evolutionary nature of FERC Orders and state efforts to promote competition, according to the participants, has resulted in sweeping changes in the gas industry business environment. While many participants believe that the direction of change is positive, they express considerable frustration at the speed, inconsistency and lurching nature of the change, saying that it undermines confidence in reliability of natural gas.

A key factor implicit in the participants' concerns is the lack of consensus regarding the objective of gas industry regulation. Participants identify eleven different regulatory objectives. Some are compatible, other are directly in conflict. Usually the direction promotes the interests of the advocating party. Until those interests more closely converge, it is unlikely that the regulatory environment will stabilize and promote demand.

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ECONOMIC ISSUES

NATURAL GAS PRICES

Natural gas prices are discussed either directly or indirectly in all of the focus groups. Not surprisingly, participants from many of the groups see present (mid-spring 1992) low prices positively. In fact, many participants credit the present and prospective low gas prices for their bullish outlook for natural gas consumption.

Why, then, are natural gas prices an impediment? They constitute an impediment because the attractiveness of gas prices is in the eyes of the beholder. What a market sees as an attractive price may be (and currently is) unacceptably low to the producer. Historically, the gas industry has framed debate on this difference of perspective acrimoniously, predicting that low prices, while good for the consumer, lead to reduced exploration and drilling. Reduced drilling leads to tight supply, which, in turn, leads to high prices and regained control of the market for the producer. Natural gas prices are an impediment because the participants in many groups are concerned that such a cycle could happen. This section discusses the comments made by participants from the various groups about natural gas pricing and their concerns about the future.

Impediment Definition

Participants from all of the manufacturing, regulatory and demand groups identify low gas prices as fundamental for market growth. Many attribute the present rising demand to low prices.

- In the conventional cement plants now, a good number of plants have converted back to gas because of the pricing structure. (IGE)
- These days, I guess the price of it is right. (IND)
- It's price [reason for natural gas plants]. (IPP)
- Moderator: What is pushing the increased interest?

I would assume price. The price of gas compared to electricity. (STCOMM)

The key question is, what will gas prices look like in the future? Many participants from the same groups suggest that they expect prices to rise along with

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rising demand. Carried too far, this trend is perceived negatively. If price rises are more moderate most seem to be less concerned.

- I think that higher prices will flow from increased usage. (CONADV)
- Your question was, would it [gas] be disproportionately priced? I feel that eventually it will be a market-based price, and it will be produced more efficiently. I don't think that just because the demand will be higher, the price will be higher. (IND)

It [gas prices] will even itself out. (IND)

Price concerns are perhaps gravest among the electric utility fuel buyer participants. They are selecting new gas-fired generation technologies based on lifecycle cost and dispatchability projections. Should prices rise rapidly, their new base and intermediate gas-fired plants will be too expensive to operate and their investments squandered.

- If you believe that things [gas prices] will change as time goes on, the amount of gas that we use will depend to a large extent on how competitive gas is with our other generations [fuels]. (EU)
- [The] perception is, short-term people are going to be trying to convert to gas. Hedging their bets with the expectation of its price going up rather dramatically after everybody jumps on the bandwagon. Then they'll be stuck with some facilities that you can't use - even now they can't use some year round. But later on they'll probably say, "Oh my God, what did I do?" (EUCEO)

Participants from the IPP, consumer advocate, industrial consumer and state commission staff panels are optimistic that rapid price escalations will not occur for two reasons. First, they believe that customers generally have substitute fuel options if prices rise sufficiently. Industrials and electric utility customers will switch to alternative fuels -- primarily fuel oil -- with modest price increases. Residentials can and will switch to electricity for more of their needs if prices rise too much. This substitution effect, the participants believe, will serve to control gas prices.

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- I think [if there is] an obstacle with a big industrial user, [he/she] will probably be able to switch to a number of different sources of energy, and price will probably dictate which choice that industrial customer makes. (CONADV)
- You know, the price is kind of a mindset. There's also a mindset in the producing area that they've been hearing for years, that there's going to be a ski jump out there; the prices are going to go up. It has not happened. I really think that you've got a free market for gas and down the road it's going to be a lot harder for gas prices to react. There's a ceiling out there, and most big users can go to oil now. If the price gets close to oil, they will use oil. (IPP)

Reserve availability is the second reason why participants believe that price is not likely to rise dramatically. Members of many of the panels suggest that reserves are adequate to prevent a supply-related price hike from occurring in the near term.

> I think the underlying important point is that gas is much more abundant than it has ever been. That affects the price. (STCOMM)

Some participants from the IPP, state commissioner and manufacturer groups have mixed emotions about today's low prices. While acknowledging their benefits, they also see negatives. First, some believe that low prices inhibit drilling, which, if it continues for a long enough period of time, might, in fact, result in higher future prices. Second, they believe that today's low prices prevent producers and other gas companies from adequately financing market growth opportunities such as cooling subsidies, VFMs and pipeline expansion projects. Failure to pursue those investments, they believe, could prevent natural gas from meeting its potential as an energy source.

> Yeah, I think there's much less drilling going on and there's greater technology now in recovering the natural gas. But the pricing is such that it's driving competitors out of the marketplace as well. (STCOMM)

On the other hand, several participants from the state commissioner panel are adamant that low prices will not affect drilling activities. These participants are convinced that producers will continue to drill and produce at today's prices. Possibly

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some of the smaller entities will be forced out of business, but the larger companies, they believe, will remain.

- First of all, I disagree [that producers are hurting and supplies will be reduced] on the cost factor. Frankly, I think everybody acts in their own best interest, and I don't think producers [are] any different than anybody else. If they are out there drilling, producing, it's not because they want to be good to somebody, it's because they're going to be making money. So I don't cry any crocodile tears over them. Now, they'd like to make more money, but wouldn't we all? (STCOMM)
- I've very, very optimistic [given] what I [know] about geology and the ability to transport [gas] and to liquify it and so on. I think we don't really need to worry at the present time. The industry will take care of the supply, and it's here on this globe. (STCOMM)

Participants from the electric utility, industrial, IPP and consumer advocate panels are relatively unanimous about another aspect of natural gas price trends: the volatility of price undermines consumers' confidence in the fuel. Price uncertainty makes consumers less likely to make substantial investments in gas-fired equipment or make commitments to long-term fuel supply arrangements.

- I think the outlook [for natural gas] is good if we could stabilize gas prices. I think we're getting ready to go through a period of some wild fluctuations...We're just seeing wild fluctuation in the consumer bills. They don't quite understand...the mechanics of the adjustment and what's going on in the market. If there was a better understanding, I think there would be more peace and confidence. But I think right now there isn't much confidence. (CONADV)
- It's key to the planning issue. How the hell do you plan your business when you don't know what you're going to get, what it's going to cost you, how much you're going to pay for the other guy and what the results are going to be? The frustration, I think, [is that] you know the system works. It can work easily because it used to. I mean, prior to us getting involved in this kind of thing, we didn't tell anybody monthly nominations or daily

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nominations, we just turned our valves on and gas flowed. Everybody handled that. (IND)

But I think when you start looking at pricing issues -coal versus gas -- certainly, utilities will have much greater comfort with their coal price projections than they will with gas. Someone who is uncertain about gas, either because of transportation or because of the ability to contract for secure supplies, can quickly reflect that in the form of a price escalation. (EU)

While the participants suggest that the challenge of rising prices would be dealt with via substitution, members of the IPP, consumer advocate, cooling, electric utility, VFM, and industrial panels are troubled by what they see as attempts by the gas industry to legislate higher prices and/or demand. These participants believe that market economics should be allowed to determine the fuels that should be consumed in any given instance. If natural gas is the best choice as the gas industry (and they) believe, then the market will eventually make it the fuel of choice. On the other hand, if other options provide sufficient benefits at a more competitive price, the markets should be able to select accordingly.

- It seems like natural gas, from a policy matter, is probably worth promoting, but I'm not sure that we would go overboard on it necessarily saying yes, this is something that has to be done. What we've tried to do is basically take away artificial benefits and let the types of energy compete on their own merits. (CONADV)
- On the other level, kind of the macro level, I suppose. I think what you try and do is just set up the best playing field that you can. I think that's fair to all types of energy. And let the best man win. (CONADV)

Prorationing is identified as an example of an artificial attempt to raise prices; thus, it violates the spirit of allowing the market to work. Given time, the participants suggest, prices will rise sufficiently without resorting to prorationing-like techniques:

> All of a sudden, price regulation [is] coming back in to artificially force the price back again on gas, which would benefit people like myself but not the consumer. (COOL)

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Consumer advocate, electric utility, VFM and industrial panel members indicate that attempts to legislate fuel choices through passage of laws that promote one fuel over another are also unnecessary and counter-productive. Again, they want to be able to make their own selection.

- In fact, I was surprised that was not raised as an obstacle because it would certainly have been [number] four on my list. It probably gets in the way of our getting on with the use of natural gas. We still got people out there trying to pass promotional hype as opposed to sitting down, trying to deal seriously and honestly and straightforward with some of these problems. (EU)
- They've created an extremely effective lobby at the national level. They're promoting a technology. They've got a wonderful product to sell. Air quality [and] energy policy -- two significant issues -- can help us. Their actions suggest they're more interested in a profit, [rather than] in air quality or energy [conservation], or they would show some concern, and try to deal with the adverse impact of implementing the fuel. We don't see that at all from that industry in general. (VFM)

Participants' Solutions

The participants from the industrial groups make a suggestion for reconciling the price paradox.

Their solution emanates from their concern with delivered price, not wellhead prices. In general, they believe that delivered prices should not rise. However, they also believe that producers should gain a higher portion of the delivered price.

I think it's important to note, though, that when you talk about a \$1.06 price, I don't pay \$1.06. I'm paying \$2.06 or whatever it is. This is a net-back business, and if the producer wants a buck and a half, then he's got to help us get that transport charge down from \$1 to 50 cents. (IND)

As a result, they tend to focus their comments on local distributor transmission and sales tariffs, which are viewed as being, in some cases, inexcusably high.

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Local distributors are seen as being unable to address this concern. While some of the consumer advocate participants believe that distributors have made their gas purchase efforts more efficient, they generally do not believe that they have made any efforts to reduce their non-gas costs of service. Participants from the state commissioner group are divided on whether their actions create incentives that work against efficiency among local distributors. Some participants believe they are part of the problem; others do not.

FINANCIAL STRENGTH OF INTERSTATE PIPELINES

The financial strength of the industry is another form of economic impediment. Participants raised the issue in several ways.

The state commissioner, financial and pipeline groups indicate that the interstate pipelines are generally in poor financial health. This state reduces their ability to attract capital and finance expansions.

- I think they [pipelines] are going out of business now. (STCOMM)
- You got some very poor pipelines. You got a couple of pipelines that are on the verge of going under. And I'm not sure of all the reasons. One of them, of course, had to be the take-or-pay. (STCOMM)
- I think you have an industry that's stretched pretty thin right now. After the decade of the '80s and because of take-or-pay.

Take-or-pay, wiped out half of the equity in the industry. And that, it's pretty tough on the balance sheet.

[We are] a very highly capital-intensive industry. Take half the equity away, you're stretched pretty thin. If we have something that causes us to give up the other half, we're in a hell of a mess. So I think you got everybody, basically, with the exception of probably two or three companies who are teetering on the investment grade ratings. And that has a tremendous impact on us. I mean, you lose your investment grade rating that has a tremendous impact on us. So I think financially, yeah, we're at a [weak] point. (PIPE)

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Producers are also identified as being in poor health by the financial group. However, among other groups, the financial state of producers is viewed as mixed. Some believe that producers are suffering from low gas prices; others are less certain. Generally, the smaller producers are seen as being the most damaged. Most participants believe that the larger producers are doing reasonably well. (See *Reliability*, page 77).

Local distributors, on the other hand, are perceived as being in good financial health. Participants from most other groups note their relatively sound financial condition.

- If I had to rate them on a financial level, I would say the most secure [are the] LDCs; they, at least in my state, have been allowed to pass through all their take-or-pay costs and they're doing very, very well. (STCOMM)
- Look who's in good shape basically. The LDC, who's been least affected up until now? It's a no brainer. (PIPE)
- Coming out of '85 we've got declining rates, if they [LDCs] couldn't get healthy during that period of time. When the hell were they going to get healthy. (PIPE)

CONCLUSIONS

Natural gas price trends comprise what appears to be the most intractable impediment to increased gas demand. Participants from most of the demand groups express the belief that while prices may rise with increased consumption, the rise will not be dramatic. They also clearly state that substitute fuels are available for many consumption uses and will displace natural gas if such a price rise does occur.

The attitudes expressed by the provider and financial groups send a contradictory message. These participants suggest that prices must rise substantially to provide incentive for exploration and reserve additions. Without a substantial price increase, they project supplies will tighten and prices will rise sharply. While there are also provider group participants that believe supplies will remain adequate at today's price levels, most participants appear to hold the shortage view.

Financial Strength of Interstate Pipelines

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RESEARCH, DEVELOPMENT AND COMMERCIALIZATION

New products are projected to play a major role in efforts by the natural gas industry to increase consumption of gas. New demand by the power generation market is a function of the advent of new, more efficient and cost-effective gas turbines and combined cycle power systems. The technology is currently available to fuel automobiles with natural gas. However, acceptance of the technology is largely a function of recent safety-related innovations in natural gas storage tanks. Continued research and development will be needed to insure that VFM operational costs give it clear economic benefits to accompany its superior environmental character. Similarly, while gas-fired cooling holds promise, additional research, development and commercialization efforts will be needed to make it an economically and environmentally attractive reality.

A strong research, development and commercialization effort is clearly essential to the industry. Participants in most of the focus groups recognize this critical need, but, generally, they lament the success of past efforts and the present direction. This section discusses the participants' perceptions about the present state of research, development and commercialization in the gas industry and its role as an impediment to increased gas consumption.

IMPEDIMENT DEFINITION

A strong consensus emerges from the comments made by members of the various focus groups regarding research, development and commercialization. The participants believe that research and development efforts have been reasonably successful. GRI is complimented for the new products it has developed.

- I think it [GRI] fills a very important function. (COOL)
- Correct me if I'm wrong; I'll state this to the group and then you guys can yell at me. I don't think there's a beef here today about the R&D side of the effort. (COOL)
- I think everyone would agree that GRI is one of the better things that they do. (STCOMM)

On the other hand, the participants believe that the commercialization efforts of the industry have been far less successful.

 There's no hand-off between a GRI and an AGA. (COOL)

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- You go to an AGA Gas Cooling Center (AGCC), they say, "Man, we'd really like to support you and help you, after you've got X amount of prototypes running and they're operating and you feel real good about them, then we'll help run out to the marketplace with them." (COOL)
- There doesn't seem to be that many [groups], through existing organizations in the industry, to make [initial product introduction] happen. AGA I don't think does it. AGCC doesn't do it. (COOL)
- The LDC sits there and says, "Ah, we're happy doing what we're doing -- selling Mrs. Hughes a barbecue or selling somebody a gas light." They have a subsidy of \$100 per gas market. The target is to sell 300 of these. That same subsidy given to a couple of our [chiller] units would triple, if not more, the gas sales. Because how much gas does a barbecue burn versus how much does a chiller or a DX system or anything else burn? But it's very, very difficult, both to us as a manufacturer, and the frustrated pipeline to convince the LDC to change their mentality. (COOL)

New, natural gas-fired technologies, according to participants from the manufacturing and provider groups, have several problematic characteristics. First, and most importantly, they tend to have high up-front costs. Typically, gas-fired options cost between two and five times more than electrical alternatives. Yet, because natural gas prices are considerably lower than electrical rates in most places, the life-cycle cost for gas-fired equipment is favorable. According to the manufacturer participants, at some time in the future, the volume of sales will be sufficient to allow manufacturing costs to fall. To overcome this obstacle, which the cooling group participants believe to be potentially lethal, the participants suggest that first-cost subsidies are needed.

> The other thing I'm confronted with is that there's a premium price to be paid for gas-fired cooling equipment. I have a gun pointing at my head that says you aren't going to be able to sell your unit to any of these people unless it is competitive with an electricallydriven heat pump. Especially [on] the residential side. (COOL)

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- [The obstacle] is the number of units out there. The more units we get out, the more competitive we could be on first-cost. So I go back saying the same thing that most of you mentioned, that we are going to have to have some kind of incentives for the equipment so the first-cost is not such a shock. That's just the way it is.
- It seems that the gas industry provides products that cost 20 or 30 percent more than alternative equipment. And yes, there's a payback but that payback is five years. So basically natural gas [equipment manufacturers] don't necessarily provide a natural gas based technology [that] offer[s a] cost effective advantageous means of making the customers' products [in the shortterm]. So he has to want to buy the natural gas, [first]. (IGE)

Second, the natural gas-fired technologies being pursued by the manufacturing group participants are relatively novel. Whether gas-fired cooling or new kilns for cement plants, the participants in these groups state that their products generally are designed to replace equipment that is currently powered by other fuels, which implies greater risk on the part of the purchaser. The buyer must be made confident that the new gas-fired device will function at least as reliably as the old equipment; otherwise, the sale is impossible. Strong selling of the merits of existing and emerging gas technologies and the ability to demonstrate projects at local demonstration facilities are also critical to their successful introduction.

- One of our problems is that we don't have a lot of our machines out there. Engine-driven machines. When a customer has an interest and you show them the benefits, in all cases they save money. I've not seen a case yet where they won't. [But] you can't point out a unit in their particular area that they can look at, touch and feel. (COOL)
- We saw it emphatically with the product, at least in the Chicago area. We'd been working on it nationally, but to get an absorption machine into Chicago, the engineers were like, "Show me." We took them to New York where we could find a unit. It was really expensive and difficult, and [it took] a great deal of time. A couple of years [ago], we got some in. [It let] the engineers go in

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locally. The rebate was there. It did proliferate and [the market] really [grew]. (COOL)

 You are in the heart of the guy's [equipment buyer] process.

Right, right in the middle. And he [new equipment seller] says, boy, it's like trust me, I've got this new mechanical heart...

They don't know the situation, [they think] they're going to die. [The seller says:] "Trust me!" But here this guy has [used] a long-term technology for 30 or 40 years. Why take the risk? (IGE)

UNDERLYING CAUSES

While participants from most of the groups identify poor commercialization as an impediment, participants in only a few groups discuss the underlying causes. Two specific factors are identified:

Lack of funding. Participants from the gas equipment and local distributor groups believe that the level of financial commitment made by the industry is far too low.

- As a fraction of sales, the amount that the gas industry spends on R&D is appalling! If you take a look at energy industries in any other country of the world, [for instance], Mexico, they spend more as a percentage of sales on R&D than the United States. We are at the absolute bottom of the hole. (IGE)
- [The product development budget as a percent of gas industry sales should be] one or two [percent]. (IGE)
- GRI really doesn't raise that much money: \$150 million or something like that nationwide [annually]. (LDC)

Fragmentation. Fragmentation is the factor most frequently cited by participants as the root of the commercialization problem. Their comments take many forms. Most significant is the effect of fragmentation on the industry's ability to provide adequate financing of commercialization efforts.

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Unanimously the participants in the manufacturing groups believe that a united front comprised of marketers, producers, pipelines, and local distributors is necessary to adequately finance the subsidization of new technologies.

> It needs to be a unified effort of the entire industry, not just the LDCs, because they're working, and working hard in many cases. A unified effort [is needed] to make this work throughout that industry. I really think that's the most important thing. (COOL)

Unfortunately, from the manufacturer participants' perspective, very few pipelines and local distributors participate or care, and producers and marketers are simply uninvolved.

- I don't know how many pipelines there are in this country, but there's a lot. There are four that I know that have been on the commercial [side] for two years that are visibly supportive. Beyond that, to the best of my knowledge, every LDC that I have talked to says, "No." There are no matching funds [from] the pipeline that they buy it [gas] from. (COOL)
- I can't say that I've ever had a conversation of any substance with [major producer A, major producer B] or any [major producer]. (COOL)

Fragmentation also affects the willingness of the various industry segments to pay for R&D. Participants from the pipelines suggest that the industry holds a "you do it" attitude toward research, development and commercial financing. The consumer group participants suggest that they receive little benefit from the R&D efforts conducted by GRI; thus, they should not pay for it. The provider group participants generally believe they are paying adequately now through their GRI surcharges. Some of the marketers suggest that the equipment manufacturers and other "industry" participants will pay for it based simply on their ability to see a profit on the result; thus, there is little need for the GRI.

- That [social programs] is a state issue, although I can look at one cost, the GRI surcharge, that certainly aggravates all of us here at the table. Welfare going the other way. (IND)
- With the major public utility out there, we've already heard them saying, "We can't support that [gas product

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development], not because we don't want to, but because we live in fear of our lives from the CARB. The California Air Regulation Board." They [the utility] live in fear. They're eunuchs, because they live in fear of what CARB will do. There is no law that governs stationary engines under 50 horsepower; mine happens to be 40 horsepower, but I'm still tied to the same [issue]. because it is perceived that in 1994 it will not meet the regulations that California will impose at that time, the NO_x especially. This is true, unless we do something to [modify] it or make a catalytic conversion system or a combination, which we're prepared to do. But the utility sits there and [tells us they] basically, don't want to support the technology now because we don't think we can make that number [meet the standard]. And if CARB tells us what we're going to project, how can you, as a manufacturer, push a product that you know you can perfect to meet those regulations when they're imposing 1994 in 1992? That's the mentality, oneseventh of the country, written off! (COOL)

Moderator: Who should pay for the commercialization efforts? What part of the industry?

Right now everyone says, "Not me." (PIPE)

- I think it's very important to develop clean air technologies and to continue to do so, subsidizing research, development, education of natural gas use and applications again, without passing that cost on to the ratepayers. (CONADV)
- But the question [regarding the financing of refueling stations] is, is it going to be a competitive enterprise? Or are they going turn to the ratepayers, the way they're doing with the Gas Research Institute, and say, "Here, you guys pay for it!" (CONADV)
- They [pipelines] think that it's important that we have this kind of work done; they just don't want to pay for it. They don't want to impact our markets - our throughput. So what they'd really like to do is get GRI converted to a demand charge that would be billed to the

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distributors. Therein lies a problem. The producers all think that just hits my netback. The producers are taking a fairly parochial view on what's not a lot of money. (LDC)

 One was a need for R&D in new areas. It strikes me that this is an industry in which R&D is conducted on a "you do it" basis. (STCOMMSTF)

Participants from the state commissioner and manufacturer groups suggest that competitive pressures force pipelines from supporting GRI:

- Now we have an instance where somebody isn't contributing to GRI because the industry is more competitive. They're looking to cut their price to margins and they don't want to contribute to GRI. (STCOMM)
- Three warm winters in a row. We don't have any money because we haven't made any money for three years. Therefore, we can't afford to support this industry. Again, Catch-22. I face that every day.

They can't. They don't have the money. Why don't [they] have any money? Because they didn't sell anything. (COOL)

Because of two pipelines pulling out of GRI; because of a reduction in the price of the wellhead -- all of which is beyond this poor manufacturer's control -- he's out there trying to produce a product that needs temporary subsidies. (COOL)

Participants from the state commissioner, manufacturer and LDC groups believe that low natural gas prices and weak markets make the industry less willing to support R&D and commercialization efforts.

- Nowadays, I suspect that [poor funding] it's part of the general industrial malaise. That nobody, [or] relatively few large companies, seem to take the type of risk necessary to develop the market. (STCOMMSTF)
- But you have a short-term problem that the producers are alluding to. You can't pay them under a dollar for gas and expect them to be at all optimistic about

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developing load. They're not recovering their costs right now. We're in a terrible economy. Until they can see gas being bought at the wellhead at a price that encourages them to make more investments or to recover their costs, you're not going to see them contribute to anything. So right now I think you've got to step back and see we've got a short-term problem. (LDC)

Members from the gas equipment manufacturers also question whether pipelines cease their support because of old-fashioned, pork barrel politics.

> You know, I keep asking myself if the list of projects selected by GRI, for example, or AGA for commercial development, is that driven by what is perceived to be the most useful technology pork-barrel? In a lot of respects it's like Congress. Well, not necessarily, but you got somebody who's putting some money and some effort into it, you want something back from your constituency. (IGE)

Lack of an institution for commercialization. Participants in the manufacturing group indicate that they believe that no institution has clear responsibility for commercialization. They perceive GRI as being statutorily precluded from commercialization, AGA to be uninvolved and the AGA Cooling Center and Industrial Gas Commercialization Center to be under-sized and underfunded.

- GRI has to pull out of the picture [commercially], rightly so by charter, at a point where nobody else steps in to pick up the gap. (COOL)
- To have it as an arm of AGA, the way it operates now, is to me ineffectual, whereas [if] the marketing or commercialization arm of GRI and GRI's charter were changed so that GRI's mentality of "Hey, I got a finished product" could lap over and they could take it and run with it." (COOL)
- The Center is starting to do that -- they're starting to do more of it -- and I have to say they've been very, very helpful getting my product commercialized. (IGE)

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- Industrial Gas Technology Commercialization Center (IGTCC) is being a big help in the LDCs that have active industrial load in their territories. They've been very helpful getting commercialized as well. (IGE)
- IGTCC certainly has been very helpful. (IGE)

Reliance on integrated utilities and developers. Members of the state commission staff and manufacturer focus groups suggest that integrated electric and gas utilities favor the electric division at the expense of the gas division. Accordingly, the integrated companies are less likely to aggressively commercialize gas-fired technologies that reduce their electricity demand. (See page 72.)

The same theory is suggested relative to the technology development companies. Many manufacturers, according to participants from the state commission staffs, develop gas-fired and alternative fuel based equipment. Usually the electrical side is larger than the gas-based side, which makes them less aggressive relative to gas.

> The electric was twice as big as gas, easily, so you can tell who controlled who. (COOL)

Participants in the industrial equipment group acknowledge that they do develop equipment that uses competing fuel sources and are relatively indifferent as to which they sell as long as they make the sale. This is a key reason why the gas industry needs to improve its efforts to subsidize and otherwise commercialize gas-fired equipment. (See page 73.)

Industry commitment. Participants in the manufacturer groups and in the state commissioner group sharply criticize the industry, as a whole, for its apparent lack of commitment to commercialize new technologies. Failure to place large numbers of VFMs in their fleets and to insist on gas-fired air conditioning in their owner-occupied office buildings are cited as examples of how little commitment local distributors, pipelines and producers have to the emerging technologies.

- [A major oil company] just built a new corporate headquarters. I guarantee you they didn't put in gas air conditioning. I bet they didn't even think of that. (COOL)
- There's a whole service industry out there. Company X and people like that survive on oil and gas wells. You need to get pipelines, LDCs, producers and service or-

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ganizations involved in looking at natural gas cooling in their buildings. (COOL)

 I don't think that the industry's prepared to put it's own money out there. (STCOMM)

Lack of market-driven focus. Past technology development efforts of the gas industry are generally technology-driven, not motivated by the needs of the customers, according to the participants in the manufacturer groups. This emphasis must change, these participants believe, in order to make the equipment more saleable to the users.

- I think the one way that it [prioritizing new products] could be done better is through a better marketing effort. I think too many times we go into programs and we don't have enough information [from the customer to tell us] does it have a good chance for success? (IGE)
- Absolutely. [And manufacturing market-driven products] is a very healthy direction to go in. (IGE)

A member of the cooling group recounts a development experience with GRI that shows the results of not paying sufficient attention to the needs of the customer. The experience implies that reduced development costs and quicker development efforts are benefits that are associated with taking a more market-driven focus.

> [GRI] gave us a set of goals for a residential heat pump. We built it. We met the goals. But, then they looked at it and said, "How much is that going to cost?" And that particular unit was going to cost about five times higher than an electrically-driven heat pump. And they said, "Oh, okay," and we said, "But you can reduce the cost." At that point they didn't want to participate. DOE continued to carry it. We've now cut the cost down by a factor of five. (COOL)

Poor lobbying. Participants in the provider, regulatory, manufacturing and demand groups state that the gas industry should receive a larger share of the government research and development investment. They place responsibility on past weak lobbying efforts, which they believe are improving.

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- AGA, as I see it -- and I speak for a manufacturer -- is useless as an organized support for gas and coal. I don't mean AGCC but AGA itself. (COOL)
- One of the big problems with gas cooling that I see is visibility in Washington. You got the methanol people. You got nuclear people. You got coal people that cover DOE like a wet blanket. There has not been the lobbying effort, presence or power of the gas industry in Washington DC doing an effective lobbying job. (COOL)

PARTICIPANTS' SOLUTIONS

The manufacturer groups offered a solution to address the commercialization impediment. They believe that the resources are too diffused; thus, they should be concentrated. Their suggestion is to somehow combine the resources of the AGA, its commercialization centers and the GRI into an organization that is expressly focused on commercialization. Implicit in their statements is a shifting of research and development dollars from GRI into commercialization efforts.

CONCLUSIONS

To increase the demand for natural gas, the industry must improve its ability to commercialize new technologies. Currently, participants from many of the groups maintain that new gas-fired technologies carry a significant "first-cost" penalty. Additionally, they believe the industry fails to invest sufficient money in R&D and commercialization efforts. It fails to utilize new gas-fired technologies such as cooling and vehicles in sufficient numbers. Furthermore, the participants believe that none of the industry's institutions adequately pursue commercialization efforts.

To overcome this impediment, several of the regulatory and manufacturer group participants suggest that the industry develop a venture capital fund or some other shared mechanism for financing development. Members of the cooling group also suggest that the AGA and GRI research and commercialization efforts be combined under the GRI. The surviving organization should then focus its efforts on commercialization.

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ACRONYMS AND ABBREVIATIONS

ACE	adjusted current earnings	CERCLA
AFUE	Average Fuel Utilization Efficiency	
AGA	American Gas Association	CERI
AGCC	American Gas Cooling Center	070
AGS	Alberta Geological Society	CFC
AMT	Alternative Minimum Tax	CLEV
ANGTS	Alaskan Natural Gas Transportation System	CNG
ANWR	Arctic National Wildlife Refuge	CNR
API	American Petroleum Institute	CO2
ATEPD	Alternative Tax Energy Preference Deductions	COPAS
BCF	billion cubic feet	CWA
BCF/D	billion cubic feet per day	
BCM	billion cubic meters	D&C
B/D	barrels per day	DCF
BLM	Bureau of Land Management	DFI
BOE	barrels of oil equivalent	DOE
BTU	British thermal units	DOI
CAA	Clean Air Act of 1967	DRI
CAAA	Clean Air Act Amendments of 1990	DSM

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CERI	Canadian Energy Research Institute
CFC	chlorofluorocarbons
CLEV	California Low Emission Vehicle Regulations
CNG	compressed natural gas
CNR	Columbia Natural Resources
CO ₂	carbon dioxide
COPAS	Council of Petroleum Accounting Societies
CWA	Clean Water Act of 1977
D&C	drilling and completion (costs)
DCF	Discounted Cash Flow
DFI	Decision Focus Inc.
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DRI	Data Resources Incorporated
DSM	Demand Side Management

E&P	exploration and production	IDC	Intangible Drilling Costs
		IEA	International Energy Agency
EEA	Energy and Environmental Analysis, Incorporated	IGTCC	Industrial Gas Technology Commercialization Center
EEI	Edison Electric Institute	INGAA	Interstate Natural Gas
EIA	Energy Information		Association of America
EMF	Electric and Magnetic Field	IOGCC	Interstate Oil and Gas Compact Commission
EOR	enhanced oil recovery	IPAA	Independent Petroleum
EPA	Environmental Protection Agency	IPP	Association of America
EPACT	Energy Policy Act of 1992	IRP	integrated resource planning
EPRI	Electric Power Research Institute		
ERCB	Alberta Energy Resources Conservation Board	JAS	Joint Association Survey
FPM	Enhanced Recovery Module	KW	kilowatts
Lidvi	of the Hydrocarbon Model	KWH	kilowatt hours
EUR	estimated ultimate recovery		
FFRC	Federal Energy Regulatory	LAER	lowest achievable emission rate (controls)
ILKO	Commission .	LCP	least cost planning
FPC	Federal Power Commission	LDC	local distribution company
FRB	Federal Reserves Boards' Index	LNG	liquefied natural gas
Index	of Total Industrial Production	lpg	liquefied petroleum gas
G&G	geological and geophysical (expenditures)	MAFLA	Mississippi, Alabama, Florida onshore
GATT	General Agreement on Tariffs and Trade	MCF	thousand cubic feet
GEMS	Generalized Equilbrium	MCF/D	thousand cubic feet per day
CPI	Modeling System	MECS	Manufacturing Energy Consumption Survey
GM	Gas Research histitule	MMBTU	million British thermal units
HDD	heating degree days	MMCF	million cubic feet
HSM	Hydrocarbon Supply Model	MMCF/D	million cubic feet per day
HVAC	Heating, Ventilating, and Air Conditioning	MMS	Minerals Management Service, Department of Interior

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MOPPS (I&II)	Market Oriented Program Planning Study	NMS National Marine Sanctuary Program		
MPRSA	Marine Protection, Research and Sanctuaries Act, 1972	NORM	naturally occurring radioactive material	
MW	megawatts	NOx	nitrogen oxides	
MWH	megawatt hours	NPC	National Petroleum Council	
NAAQS	National Ambient Air Quality	NPDES	National Pollutant Discharge Elimination System	
	Standards	NRRI	National Regulatory Research	
NAECA	National Appliance Energy Conservation Act	NUG	non-utility generator	
NAFTA	North American Free Trade Agreement	NYGAS	New York State Gas Association	
NARG	North American Regional Gas Model	O&M	operating and maintenance (expenses)	
NARIIC	National Association of	OCS	Outer Continental Shelf	
MAROC	Regulatory Utility Commissioners	OGIFF	Oil and Gas Integrated Field File	
NED	National Energy Board of	OPA	Oil Pollution Act of 1990	
	Canada	OPEC	Organization of Petroleum Exporting Countries	
NEPA	National Environmental Policy Act of 1969	PEMEX	Petroleos Mexicanos national	
NEPOOL	New England Power Pool		oil company of Mexico	
NERC	North American Electric Reliability Council	PGC	Potential Gas Committee of the Colorado School of Mines	
NES	National Energy Strategy	PIFUA	Powerplant and Industrial Fuel Use Act of 1978	
NGA	Natural Gas Act of 1938	PMA	Federal Power Marketing	
NGL	natural gas liquids		Agencies	
NGPA	Natural Gas Policy Act of 1978	PSC	Public Service Commission	
NGSA	Natural Gas Supply Association	PUC	Public Utility Commission	
NGV	Natural Gas Vehicle	PUCHA	Company Act	
NGVC	Natural Gas Vehicle Coalition			
NGWDA	Natural Gas Wellhead Decontrol Act of 1989	QBTU	quadrillion British thermal units	
NIMBY	Not In My Back Yard	RACC	Refiners Acquisition Cost of Crude Oil	

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Resource Conservation and Recovery Act of 1976	SO2	sulfur dioxide
	SOx	sulfur oxides
research and development	SPP	small power producer
research, development, and demonstration		
Residential Energy Consumption Survey	TAGS	Trans-Alaska Gas System
	TAPS	Trans-Alaska Pipeline System
rate of return	TBTU	trillion British thermal units
	TCF	trillion cubic feet
Superfund Amendments and Reauthorization Act of 1986	TRC	Texas Railroad Commission
	TSCA	Toxic Substance Control Act
standard cubic feet		of 1976
Safe Drinking Water Act of 1984		
Securities and Exchange	UDI	Utility Data Institute
Commission	UIC	Underground Injection
State Energy Data System		Control program
straight fixed variable	USGS	United States Geological Survey
Standard Industrial Classification	voc	volatile organic compounds
State Implementation Plan		
special marketing program	WCSB	Western Canada Sedimentary Basin
	Resource Conservation and Recovery Act of 1976 research and development research, development, and demonstration Residential Energy Consumption Survey rate of return Superfund Amendments and Reauthorization Act of 1986 standard cubic feet Safe Drinking Water Act of 1984 Securities and Exchange Commission State Energy Data System straight fixed variable Standard Industrial Classification State Implementation Plan special marketing program	Resource Conservation and Recovery Act of 1976SO2 SOxresearch and developmentSPPresearch, development, and demonstrationTAGSResidential Energy Consumption SurveyTAPSrate of returnTBTUSuperfund Amendments and Reauthorization Act of 1986TRC TSCASafe Drinking Water Act of 1984UDI UICSecurities and Exchange CommissionUDI UICState Energy Data System straight fixed variableUSGSStandard Industrial ClassificationVOCState Implementation Plan special marketing programWCSB

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ABANDONMENT

When an interstate pipeline closes facilities, stops transporting gas in interstate commerce, or stops sales of gas for resale with permission of the Federal Energy Regulatory Commission.

ALASKA NATURAL GAS Transportation (ANGTS)

A proposed pipeline to transport gas from Prudhoe Bay, Alaska, to the lower-48 states. Portions of the line were "prebuilt" prior to the flow of Alaskan gas, with the rest of the system awaiting sponsors and economically viable gas prices.

ALLOWABLE

The maximum amount of gas a specific field, lease, or well is permitted to produce.

ALTERNATIVE MINIMUM TAX (AMT)

Under the Tax Reform Act of 1986 the minimum tax was reformulated as the AMT and expanded to the point where it became the *de facto* corporate income tax for many capital-intensive firms. The AMT is imposed at 20 percent rate (24 percent non-corporate) on a broader income than that used for regular income tax, and the taxpayer pays the higher of the two taxes.

American Gas Association (AGA)

The gas utility industry trade association.

ANTRIM SHALE

The Antrim shale is a formation of primarily Devonian age located in the Michigan Basin.

Associated Dissolved Gas

The combined volume of natural gas that occurs in crude oil reservoirs either as free gas (associated) or as gas in solution with crude oil (dissolved).

BACK HAUL

A contractual form of natural gas transportation service, where natural gas is delivered to the shipper at a point on the pipeline system which is upstream of the point where gas is received into the system. Contractually, the natural gas is transported against the direction of natural gas flowing in the pipeline system. In most cases this type of service can be provided without the need to construct new facilities, and in operation may actually reduce the variable costs (fuel) incurred by the pipeline to provide transportation service. It also has the effect of increasing the effective capacity of the pipeline system.

Base Gas

(See Cushion Gas.)

BASE LOAD GENERATING UNIT

Those generating units at electric utilities that are normally operated to meet electricity demand on a round-the-clock basis.

BASE RATE

That portion of the total electric rate which covers the general costs of doing business unrelated to fuel expenses.

BCF

Billion Cubic Feet. A volumetric unit of measurement for natural gas.

BLANKET CERTIFICATE (AUTHORITY)

Permission granted by the Federal Energy Regulatory Commission (FERC) for a certificate holder to engage in an activity (such as transportation service or sales) on a self-implementing or prior-notice basis, as appropriate, without case-by-case approval from the FERC.

BRITISH THERMAL UNIT (BTU)

A standard unit for measuring the quantity of heat required to raise the temperature of 1 pound of water by 1 degree Fahrenheit at or near 39.2 degrees Fahrenheit.

CAPACITY BROKERING

A process where an existing natural gas shipper sells or leases its contractual capacity rights to transport natural gas on a pipeline to someone else.

CERTIFICATED CAPACITY

The maximum volume of gas that may be stored in an underground storage facility certificated by the Federal Energy Regulatory Commission or its predecessor, the Federal Power Commission. Absent a certificate, a reservoir's present developed operating capacity is considered to be its "certified" capacity.

CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY

Certificates required under the Natural Gas Act and issued by the Federal Power Commission/Federal Energy Regulatory Commission prior to construction or expansion of an interstate pipeline; after the pipeline showed the existence of market demand and attendant gas supply.

CHRISTMAS TREE

The values and fittings installed at the top of a gas well to control and direct the flow of well liquids.

CITYGATE

A point or measuring station at which a gas distribution company receives gas from a pipeline company or transmission system.

CITYGATE SALES SERVICE

Interstate pipeline natural gas sales service where the title to gas sold changes at the pipeline's interconnection with the purchasing local distribution company.

COAL GASIFICATION

The process of placing coal steam and oxygen under pressure to produce gas.

COFIRING (REBURNING)

The process of burning natural gas in conjunction with another fuel to reduce air pollutants and/or take advantage of lowest available fuel prices.

Cogeneration

The sequential production of electricity and another form of useful thermal energy such as heat or steam and used for industrial, commercial heating or cooling purposes. There are basically three types; boiler steam turbine, combustion turbine with waste heat recovery steam generator, and combined cycle.

COKE OVEN GAS

The gaseous portion of volatile substance driven off in the coking process after other coal chemicals are removed.

COMBINED CYCLE

An electric generating technology in which electricity is produced from otherwise lost waste heat exiting from one or more gas (combustion) turbines. The exiting heat is routed to a conventional boiler or to a heat recovery steam generator for utilization by a steam turbine in the production of electricity. This process increases the efficiency of the electric generating unit.

COMMERCIAL CONSUMPTION

Gas consumed by nonmanufacturing establishments or agencies primarily engaged in the sale of goods or services. Included are such establishments as hotels, restaurants, wholesale and retail stores, and other service enterprises; gas consumed by establishments engaged in agriculture, forestry, and fishers; and gas consumed by local, state, and federal agencies engaged in nonmanufacturing activities.

CONVENTIONAL RESOURCES

Resources included in this category are crude oil, natural gas, and natural gas liguids that exist in reservoirs in a fluid state amenable to extraction employed in traditional development practices. They occur as discrete accumulations. They do not include resources occurring within extremely viscous and intractable heavy oil deposits, tar deposits, oil shales, coalbed gas, gas in geopressured shales and brines, or gas hydrates. Gas from lowpermeability "tight" sandstone and fractured shale reservoirs having in situ permeability to gas of less than 0.1 millidarcy are not included as conventional resources.

COST-OF-SERVICE RATES

A method of rate making used by utilities under which the original cost of facilities are depreciated for an expected life, and the annual costs and the operating and maintenance costs are allocated to each service offered according to a test year and projected volumes.

CROSS SUBSIDIES

Subsidies among customers or customer classes so that one group carries a disproportionate share of the costs of providing service.

CURTAILMENTS

The rationing of natural gas supplies to an end user when gas is in short supply, or when demand for service exceeds a pipeline's capacity, usually to an industrial user and/or power generator.

CUSHION GAS

The volume of gas, including native gas, that must remain in the storage field to maintain adequate reservoir pressure and deliverability rates throughout the withdrawal season.

CYCLING

The process of injecting or withdrawing a percentage or all of a reservoir's working gas capacity during a particular season.

CYCLING UNIT (INTERMEDIATE UNIT)

Units that operate with rapid load changes, frequent starts and stops, but generally at somewhat lower efficiencies and higher operating costs than base load plants. These units are generally either former base load units regulated to cycling units, or newly built units of a lower megawatt rating which require less capital investment per unit of output than required for base load units.

Decatherm

Ten therms, or 1,000,000 BTU.

DEEP GAS DEPOSITS

Deposits of gas below 15,000 feet, where the porosity and permeability are reduced by the deeply buried sediments.

DELIVERABILITY

The rate at which gas can be withdrawn from an underground reservoir. Actual rates depend on rock characteristics, reservoir pressure, and facilities such as wells, pipelines, and compressors.

DELIVERED

The physical transfer of natural, synthetic, and/or supplemental gas from facilities operated by the responding company to facilities operated by others or to consumers.

DEMAND CHARGE

A charge levied in a contract between a pipeline and local distribution company, electric generator, or industrial user for firm gas pipeline transportation service. The demand charge must be paid whether or not gas is used up to the volume covered by the charge.

DEMAND SIDE MANAGEMENT

Programs designed to encourage customers to use less natural gas or other fuels or less electricity and to use it more efficiently (i.e., conservation) or to reduce peak demand (i.e., load management).

DESIGN DAY CAPACITY

The volume of natural gas that a pipeline facility is designed to transport during one day, given the assumptions used in the design process, such as pressures, pipeline efficiency, and peak hourly rates.

DESIGN DAY DELIVERABILITY

The rate of delivery at which a storage facility is designed to be used when storage volumes are at their maximum levels.

Developed Operating Capacity

That portion of operating capacity which is currently available for storage use.

DEVONIAN SHALE

Any body of shale (a fine-grained, detrital, sedimentary rock with a finely laminated structure) formed from the compaction of clays and/or silts and/or middays that were deposited during the Devonian period of the Paleozoic era, from approximately 400 million to approximately 345 million years before the present.

DISPLACEMENT

A method of natural gas transportation/delivery that is similar to a back haul (see above). In a displacement service, natural gas is received by a pipeline at one point and delivers equivalent volumes at another point, without necessarily transporting the natural gas in a line between the two points. Displacement service may contain elements of forward haul, back haul, and displacement to effect delivery.

DRY NATURAL GAS PRODUCTION

Marketed production less extraction loss.

ELECTRIC GENERATORS

Establishments that generate electricity. These include traditional electric utilities; independent power producers; and commercial and industrial establishments that generate electricity for their own use, often using cogeneration facilities, and which may sell some of the electricity to an electric utility for resale. In the NPC report, commercial and industrial generators of electricity are included in the commercial and industrial sectors and all other generators are dealt with under "electric generation."

ELECTRIC UTILITIES

Establishments primarily engaged in the generation, transmission, and/or distribution of electricity for sale or resale.

ELECTRIC UTILITY CONSUMPTION

Gas used as fuel in electric utility plants.

END-USE SECTOR MODELS

Energy and Environmental Analysis, Inc.'s process-engineering models used in the NPC Gas Study and include the Residential, Commercial, Industrial, and Electric Utility Demand Models.

END USER

Anyone who purchases and consumes natural gas.

ENERGY OVERVIEW MODEL

Energy and Environmental Analysis, Inc.'s forecasting model, which simulates the natural gas supply/demand balance through the use of 3 sets of model components (End-Use Sector Models, the Pipeline Model, and the Hydrocarbon Supply Model) and used in the NPC Gas Study.

Exchange

A method of natural gas transportation/delivery among two (or more) parties. Where one party has a natural gas supply at one point, convenient to one pipeline system, and another party has gas at another point, convenient to another pipeline system, a swap is arranged. The two pipelines do not necessarily have to interconnect. Essential to the concept is that both parties receive mutual benefits. Exchange agreements usually contain some form of balancing mechanism requiring either the delivery of natural gas, in kind, or payment.

Exports

Natural gas deliveries from the continental United States and Alaska to foreign countries.

EXTERNALITY

A side effect that can create benefits or costs in a transaction and which fall upon those not directly involved in, or who are external to, the transaction.

EXTRACTION LOSS

The reduction in volume of natural gas due to the removal of natural gas liquid constituents such as ethane, propane, and butane at natural gas processing plants.

FEDERAL POWER COMMISSION (FPC)

The predecessor agency of the FERC, which was created by Congress in 1920 and was charged with regulating the interstate electric power and natural gas industries.

FEDERAL ENERGY REGULATORY COMMISSION (FERC)

A quasi-independent regulatory agency within the Department of Energy having jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, oil pipeline rates, and gas pipeline certification. Five members are appointed by the President of the United States and, upon confirmation by the Senate, serve fixed terms. This independent agency is administered by the Chairman of the fiveperson commission. No more than three of the five members may belong to the President's political party.

FERC Order 436

An order issued October 9, 1985, by the FERC, which created a voluntary blanket certificate transportation program. Under this program, participating pipelines were authorized to provide firm and interruptible transportation to any willing shipper without prior case-specific FERC approval. Pipelines providing this service are required to serve on a non-discriminatory basis any shipper willing to meet the terms and conditions of the pipeline's tariff. Participating pipelines were also subject to a requirement that they allow existing firm sales customers to convert their sales service to firm transportation service.

FERC Order 451

Order 451 was issued in 1986 and eliminated old gas "vintaging" pricing, which was based on the date of first production of the gas reserves. The Order established a new ceiling price for all vintages of old gas, which a pipeline purchaser could purchase or release under a procedure called "good faith negotiations."

FERC Order 500

In Associated Gas Distributors vs. FERC, Order 436 was remanded back to FERC. In response, FERC issued Order 500 in August 1987, which restated Order 436 with two major changes: elimination of the customer contract demand reduction option, and creation of a take-or-pay crediting mechanism. This mechanism was designed to affect take-or-pay obligations of interstate pipelines caused by Order 436 transportation.

FERC Order 490

Order 490 was issued in 1988 and established an expedited abandonment procedure for gas under expired or terminated contracts.

FERC ORDER 636 (SEE ALSO UNBUNDLING)

An order issued April 8, 1992, by the FERC, requiring open-access interstate pipeline companies to unbundle their transportation delivery services from their natural gas sales services. Order 636 also required other changes designed to enhance the access to gas supplies, no matter who owned or sold them, on an equal basis.

FIELD

A single pool or multiple pools of hydrocarbons grouped on, or related to, a single structural or stratigraphic feature.

FINDING RATE

Some measure of "added proved reserves" divided by some measure of either time or the physical or investment effort expended to generate them. There are many different specific formulations in use.

FIRM GAS

Gas sold on a continuous and generally long-term contract.

FIRM SERVICE

Service offered to customers (regardless of class of service) under schedules or contracts that anticipate no interruptions. The period of service may be for only a specified part of the year as in off-peak service. Certain firm service contracts may contain clauses that permit unexpected interruption in case the supply to residential customers is threatened during an emergency.

FLARED

Natural gas burned in flares at the base site or a gas-processing plants.

FRACTURING

Improvement of the flow continuity between gas-bearing reservoir rock and the wellbore by erecting fractures which extend the distances into the reservoir.

FUEL CELLS

A fuel cell, configured like a battery, combines natural gas and oxygen in an electrochemical reaction that produces electricity, heat, and water (often in the form of steam).

GAS BUBBLE

Surplus gas deliverability at the wellhead.

GAS CONDENSATE WELL

A gas well producing from a gas reservoir containing considerable quantities of liquid hydrocarbons in the pentane and heavier range, generally described as "condensate."

GAS WELL

A gas well completed for the production of natural gas from one or more gas zones or reservoirs.

GATHERING SYSTEM

Facilities constructed and operated to receive natural gas from the wellhead and transport, process, compress, and deliver that gas to a pipeline, LDC, or end user. The construction and operation of gathering systems is not a federally regulated business, and in some states is not regulated by the state.

Generating Unit

Any combination of physically connected generator(s), reactor(s), boiler(s), combustion turbine(s), or other prime mover(s) operated together to produce electric power.

GENERATION (ELECTRICITY)

The process of producing electric energy by transforming other forms of energy; also, the amount of electric energy produced, expressed in watthours (WH).

Generator

A machine that converts mechanical energy into electrical energy.

GENERATOR NAMEPLATE CAPACITY

The full-load continuous rating of a generator, prime mover, or other electric power production equipment under specific conditions as designated by the manufacturer. Installed generator nameplate rating is usually indicated on a nameplate physically attached to the generator.

GREENFIELD

A "new" site for the construction of an electric generation plant; in other words, a location that did not previously have a generation unit.

GREENHOUSE EFFECT

The increasing mean global surface temperature of the earth caused by gases in the atmosphere (including carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbon). The greenhouse effect allows solar radiation to penetrate but absorbs the infrared radiation returning to space.

GRID-TYPE SYSTEM

This term describes a natural gas pipeline company that operates facilities which physically interconnect at numerous points within its service area. Typically such a system receives gas from a variety of sources from both ends of its system and is characterized by gas flows which are difficult to trace in a linear fashion.

GROSS WITHDRAWALS

Full well-stream volume, including all natural gas plant liquids and all nonhydrocarbons gases, but excluding lease condensate.

HEATING VALUE

The average number of British thermal units per cubic foot of natural gas as determined from tests of fuel samples.

Hub

A hub is a location where gas sellers and gas purchasers can arrange transactions. The location of the hub can be anywhere multiple supplies, pipelines, or purchasers interconnect. "Market centers" are hubs located near central market areas. "Pooling points" are hubs located near center supply production areas. Physical hubs are found at processing plants, offshore platforms, pipeline interconnects, and storage fields. "Paper" hubs may be located anywhere parties arrange title transfers (changes in ownership) of natural gas.

Hydrates

Gas hydrates are physical combinations of gas and water in which the gas molecules fit into a crystalline structure similar to that of ice. Gas hydrates are considered a speculative source of gas.

HYDROCARBON SUPPLY MODEL

Energy and Environmental Analysis, Inc.'s model of the U.S. and Canada's potential recoverable resource base. This model seeks to show the impact of technological advancements and exploratory and development drilling activity and was used in the NPC Gas Study.

IMPORTS

Gas receipts into the United States from a foreign country.

IN-PLACE GAS RESOURCE

The total in-place gas is the summation of gas already produced, the technically recoverable resource, and the remaining inplace resource.

INCENTIVE REGULATION

An alternative to, or modification of, cost of service regulation, which is used in markets that lack sufficient competition (examples include price caps, zone of reasonableness, bounded rates, sharing of efficiency gains, and incentive rates of return).

INDEPENDENT POWER PRODUCERS (IPPs)

Wholesale electricity producers that are unaffiliated with franchised utilities in their area. IPPs do not possess transmission facilities and do not sell power in any retail service territory.

INDUSTRIAL CONSUMPTION

Natural gas consumed by manufacturing and mining establishments for heat, power, and chemical feedstock.

INDUSTRIAL CONSUMERS

Establishments engaged in a process that creates or changes raw or unfinished materials into another form or product. Generation of electricity, other than by electric utilities is included.

INTEGRATED RESOURCE PLAN (IRP)

A plan or process used by utilities to evaluate both supply-side and demand-side measures when seeking to prepare for meeting future energy needs and to do so at lowest total costs. ("Least cost" or "best cost" planning is sometimes used synonymously with integrated resource planning.)

INTERMEDIATE LOAD (ELECTRIC SYSTEM)

The range from base load to a point between base load and peak. This point may be the midpoint, a percent of the peak load, or the load over a specified time period.

Interruptible Gas

Gas sold to customers with a provision that permits curtailment or cessation of service at the discretion of the distributing company or pipeline under certain circumstances, as specified in the service contract.

INTERRUPTIBLE SERVICE

A sales volume or pipeline capacity made available to a customer without a guarantee for delivery. "Service on an interruptible basis" means that the capacity used to provide the service is subject to a prior claim by another customer or another class of service (18 CFR 284.9(a)(3)). Gas utilities may curtail service to their customers who have interruptible service contracts to adjust to seasonal shortfalls in supply or transmission plant capacity without incurring a liability.

INTERSTATE PIPELINE COMPANY

A company subject to regulation by the Federal Energy Regulatory Commission pursuant to the Natural Gas Act of 1938 because of its construction and/or operation of natural gas pipeline facilities in interstate commerce.

INTERSTATE NATURAL GAS ASSOCIATION OF AMERICA (INGAA)

Trade group that represents interstate pipeline companies.

INTRASTATE PIPELINE COMPANY

A company that operates natural gas pipeline facilities which do no cross a state border.

KILOWATT

One thousand watts. (See Watt.)

LARGE DIAMETER PIPE

High pressure natural gas pipeline is constructed, typically, of steel, in different sizes from one inch, outside diameter (O.D.) to 42 inches. Typically "large diameter pipe" is larger than 20 inches, O.D.

LEASE AND PLANT FUEL

Natural gas used in well, field, and lease operations, (such as gas used in drilling operations, heaters, dehydrators, and field compressors), and as fuel in natural gas processing plants.

LIGHT-HANDED REGULATION

Regulation characterized by reliance on market forces where they are available to help ensure fair access and stable prices. Generally, under such a scheme, companies are given significant discretion to enter and leave a particular service, and over what rate it charges. While such activities are not "deregulated" in the normal sense of the phrase, regulatory scrutiny is usually generic and compliance oriented, rather than intrusive.

LINE PACK

The volume of natural gas contained, in a point of time, within the pipeline. Also, a technique to fill a pipeline to its maximum capacity in anticipation of high demands, or hourly fluctuations in demand.

LIQUEFIED NATURAL GAS (LNG)

Natural gas that has been reduced to a liquid stage by cooling to -260 degrees Fahrenheit and thus sustains a volume reduction of approximately 600 to 1.

LOAD (ELECTRIC)

The amount of electric power delivered or required at any specific point or points on a system. The requirement originates at the energy-consuming equipment of the consumers.

LOCAL DISTRIBUTION COMPANY (LDC)

A company that distributes natural gas at retail to individual residential, commercial, and industrial consumers. LDCs are typically granted an exclusive franchise to serve a geographic area by state or local governments, subject to some requirement to provide universal service. Rates and terms and conditions of service are typically (but not always) subject to regulation.

LOOPING

A method of expanding the capacity of an existing pipeline system by laying new pipeline adjacent to an existing pipeline and connected to the existing system at both ends.

LOW PERMEABILITY

Gas that occurs in formations with a permeability of less than 0.1 millidarcy.

MANUFACTURED GAS

A gas obtained by destructive distillation of coal, or by the thermal decomposition of oil, or by the reaction of steam passing through a bed of heated coal or coke. Examples are coal gases, coke oven gases, producer gas, blast furnace gas, blue (water) gas, carbureted water gas. BTU content varies widely.

MARKET CENTER

• A place, located near natural gas market areas, where many gas sellers and gas buyers may arrange to buy/sell natural gas. See "Hub."

MARKETED PRODUCTION

Gross withdrawals less gas consumed for repressuring, quantities vented and flared, and nonhydrocarbon gases removed in treating or processing operations.

MCF/D

"Thousand cubic feet of natural gas per day." A volume unit of measurement for natural gas.

Megawatt

One million watts of electric capacity. (See Watt.)

MINIMUM BILL

A distributor's obligation to take or pay for the gas volumes specified in its firm service agreements with the pipeline.

MMBTU

"Million British Thermal Units." A unit of measurement of the heating content, as measured in BTU, of natural gas.

MMCF/D

"Million cubic feet of natural gas per day." A volume unit of measurement for natural gas.

NATIONAL ENERGY BOARD

The agency of the Canadian federal government which regulates international and inter-provincial and natural gas trade with(in) Canada. The "NEB" is the Canadian counterpart to the FERC, and like FERC also regulates electricity.

NATIVE GAS

The gas remaining in a reservoir at the end of a reservoir's producing life. After a reservoir is converted to storage, remaining gas becomes part of the cushion gas volume.

NATURAL GAS

A gaseous hydrocarbon fuel. Primarily made up of the chemical compound methane, or CH₄. Natural gas is found in underground reservoirs, often in combination with oil, and other hydrocarbon compounds.

NATURAL GAS, WET AFTER LEASE SEPARATION

The volume of natural gas remaining after removal of lease condensate in lease and/or field separation facilities, if any, and after exclusion of nonhydrocarbon gases where they occur in sufficient quantity to render the gas unmarketable. Natural gas liquids may be recovered from volume of natural gas, wet after lease separation, at natural gas processing plants.

NATURAL GAS ACT OF 1938

Act passed by Congress which regulates the transportation and sale of natural gas in interstate commerce. This statute is administered by the FERC.

NATURAL GAS COUNCIL

Formed in 1992 through the four major U.S. gas industry trade groups to promote awareness of the potential of natural gas and to develop a unified gas industry.

NATURAL GAS POLICY ACT OF 1978

An act of Congress which effected the phased decontrol of certain categories of natural gas wellhead prices.

NATURAL GAS SUPPLY ASSOCIATION

Trade group that represents natural gas producers, whether integrated or small.

NATURAL GAS WELLHEAD DECONTROL ACT OF 1989

This Act fully decontrols natural gas wellhead prices effective January 1, 1993.

NETBACK PRICE

The price for natural gas the producer receives "at the wellhead" as determined by subtracting the cost of all delivery services from the price received "at the burnertip" for natural gas. In a competitive end-use market, it is presumed that a producer would receive no more than the netback price for its gas.

New Fields

A category of the resource base which represents gas that is yet to be discovered. This category is quantified based on risked assessments attributing geologic similarities from known areas, defined as those resources estimated to exist outside of known fields on the basis of broad geologic knowledge and theory.

NO-NOTICE TRANSPORTATION SERVICE

A term used in FERC Order 636 to describe firm transportation service equivalent in quality to the delivery service provided as an integral part of traditional firm pipeline natural gas sales services.

NONCONVENTIONAL GAS

Resource that includes shale gas, coalbed methane, and tight gas as these are in a relatively early stage of technical development.

NONHYDROCARBON GASES

Typical nonhydrocarbon gases that may be present in reservoir natural gas, such as carbon dioxide, helium, hydrogen sulfide, and nitrogen.

NORM

"Naturally Occurring Radioactive Material" in exploration and production operations originates in subsurface oil and gas formations and is typically transported to the surface in produced water, both onshore and offshore.

OFF-PEAK

Periods of time when natural gas pipeline facilities are typically not flowing natural gas at design capacity.

OFFSHORE RESERVES AND PRODUCTION

Unless otherwise indicated, reserves and production that are in either state or federal domains, located seaward of the coastline.

OIL-EQUIVALENT GAS

Gas volume that is expressed in terms of its energy equivalent in barrels of oil (BOE). One BOE equals 5,650 cubic feet of gas.

OPEN-ACCESS TRANSPORTATION

Interstate natural gas transportation service, available to any willing, creditworthy shipper, subject to the availability of capacity, on a non-discriminatory basis. (See FERC Order 436).

OPERATING CAPACITY

The maximum volume of gas an underground storage field can store. This quantity is limited by such factors as facilities, operational procedure, confinement, and geological and engineering properties.

OUTER CONTINENTAL SHELF (OCS)

The undersea area offshore from the coastline of a continent. This area may stretch for many miles from the coastline and be covered by shallow ocean. The Gulf Coast adjacent to Texas, Louisiana, Mississippi, and Alabama is an OCS area with substantial natural gas fields currently providing a significant source of natural gas supplies for the United States. The federal offshore usually starts 3 miles offshore (e.g., Louisiana), but starts 10 miles offshore of Texas.

Peak Day

The day of maximum demand for natural gas service. In any given area, the "peak day" usually occurs on the coldest day of the year, when demand for natural gas for heating is at its highest. Because each part of the country experiences different weather conditions, the peak day for each region or area is usually different. In some parts of the country, such as the Southeast and the Southwest Central regions, the peak day may occur on the hottest day of the year, when demand for space cooling drives electric generation demand to its highest levels.

PEAK-DAY DELIVERABILITY

The rate of delivery at which a storage facility is designed to be used for peak days.

PEAKING UNIT

An electric generation unit that is only run to serve "peak" demand. An electric generation unit is normally operated during the hours of highest daily, weekly, or seasonal load. Some generating equipment may be operated at certain times as peaking capacity and at other times to serve loads on a "round-the-clock" basis.

PHILLIPS DECISION

In 1954, the U.S. Supreme Court in *Phillips Petroleum Company v. Wisconsin* interpreted the Natural Gas Act as requiring wellhead price of interstate gas to be regulated by the Federal Power Commission.

PIPELINE FUEL

Gas consumed in the operation of pipelines, primarily in compressors.

PIPELINE

A continuous pipe conduit, complete with such equipment as valves, compressor stations, communications systems, and meters, for transporting natural and/or supplemental gas from one point to another, usually from a point in or beyond the producing field or processing plant to another pipeline or to points of use. Also refers to a company operating such facilities.

PIPELINE MODEL

The EEA (Energy and Environmental Analysis, Inc.) model used in the NPC Gas Study, which simulates gas flow from U.S. and Canadian producing regions to consuming regions.

PLAY

A group of geologically related known accumulations and/or undiscovered accumulations or prospects generally having similar hydrocarbon sources, reservoirs, traps, and geological histories.

POOLING POINT

Production area pooling points are areas where gas merchants aggregate supplies from various sources, and where title passes from gas merchant to pipeline shipper. "Paper" pooling areas are places where aggregation of supplies occurs and where pipeline balancing and penalties are determined. (See FERC Order 636; Hub.)

POWER POOL

An arrangement used in many regions whereby all dispatchable electric generation is under the operational control of a dispatching center controlled by the power pool, not the individual company that owns the generating equipment.

POWERPLANT AND INDUSTRIAL FUEL USE ACT OF 1978

This Act was enacted as part of the National Energy Plan and prohibited the use of oil and gas as primary fuel in newly built power generation plants or in new industrial borders larger than 100 million BTU per hour of heat input. PIFUA also limited the use of natural gas in existing power plants based on fuel used during 1974-76, and prohibited switching from oil to gas.

PREBUILD

The "Prebuild" System was authorized in 1977 and provides natural gas from Alberta, Canada, to markets in California and the Midwest. The "prebuild" system is Phase I of the Alaska Natural Gas Transportation System.

PRODUCTION, WET AFTER LEASE SEPARATION

Gross withdrawals less gas used for repressuring and nonhydrocarbon gases removed in treating or processing operations.

PRORATION POLICY

Policies within some gas-producing states that set production limits in order to protect the correlative mineral rights of producers and royalty owners and to prevent physical waste.

PROSPECT

A geological feature having the potential for trapping and accumulating hydrocarbons.

PROVED RESERVES

The most certain of the resource base categories as they represent estimated quantities which analysis of geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.

RATE BASE

The value established by a regulatory authority, upon which a utility is permitted to earn a specified rate of return.

REFINERY GAS

Noncondensate gas collected in petroleum refineries.

REGULATORY LAG

Length of time between occurrence of a cost by a regulated entity and the reflection of that cost in the actual rates.

RENEWABLE ENERGY SOURCES

Sources of energy, usually for electric generation, that include hydropower, geothermal, solar, wind, and biomass.

REPRESSURING

The injection of gas into oil or gas reservoir formations to effect greater ultimate recovery.

Reserve Appreciation

The portion of the conventional resource base that results from the recognition that currently booked proved reserves are conservative by definition and will continue to grow over time. This component represents the growth of ultimate recovery (cumulative production plus proved reserves) from known fields that occurs over time.

Reserve Growth

Composed of new reservoirs, extensions, and net positive revisions.

Reserve-to-Production Ratio

Used as an indicator that measures the relative size of ready inventory of gas supply to the current production rate.

Reservoir Pressure

The force within a reservoir that causes the gas and/or oil to flow through the geologic formation to the wells.

RESIDENTIAL CONSUMPTION

Gas consumed in private dwellings, including apartments, for heating, air conditioning, cooking, water heating, and other household uses.

Resource Base

Composed of proved reserves, conventional resources (reserve appreciation and new fields), and nonconventional resources (coalbed methane, shales, tight gas).

Resource Cost Curve

A curve that portrays estimates of the wellhead gas price required to develop a certain volume of the resource base and yield a minimum rate of return to the investor.

RESOURCES

Known or postulated concentrations of naturally occurring liquid or gaseous hydrocarbons in the earth's crust which are now or which at some future time may be developed as sources of energy.

RIGHT-OF-WAY

Either a permanent or temporary (during construction) right of access to privately held land for the purpose of constructing and locating pipeline or related facilities. Although ownership remains, in many cases, with the original landowner, the pipeline purchases the right to locate a pipeline under a specific piece of property and the right of access to that land for inspection and maintenance activities. Pipeline right-ofway may be anywhere from 25 feet to 100 feet wide. Typically, at least 75 feet is desired for construction activities. while only 25 feet to 50 feet are maintained as permanent right-of-way.

RISKED (UNCONDITIONAL) ESTIMATES

Estimated quantities of the volumes of oil or natural gas that may exist in an area, including the possibility that the area is devoid of oil or natural gas are risked (unconditional) estimates. Estimates presented in this report are of this nature. For this study, the estimated conventional resource values were used in the model as certain quantities (occurrence probability of 1.0), and the sensitivity of the model results to higher and lower resource estimates was evaluated without quantifying the occurrence probabilities.

ROYALTY

The gas producer gives the mineral owner a royalty in the form of a share of the gross production of gas from the property free and clear of any production costs or sells the royalty share of gas and gives the owner the gross proceeds in cash.

SECTION 29 OF THE INTERNAL REVENUE CODE

Under this section, income tax credits are available to producers of "nonconventional" fuels, such as gas produced from geopressured brine, Devonian shale, coal seams, tight gas. To be eligible for the credit, gas from nonconventional sources must come from wells drilled before January 1, 1993, and must be produced before January 1, 2003.

SOUR GAS

Natural gas with a high content of sulfur and this requires purification before use.

SPECIAL MARKETING PROGRAMS

The FERC permitted pipelines to implement programs that allowed large industrial consumers to arrange purchases of cheaper spot market gas from producers, marketers, and pipelines, with the pipelines serving as only the transporter. These programs were ruled discriminatory by the court and ceased in 1985.

SPOT PURCHASES

A single shipment of gas fuel or volumes of gas, purchased for delivery within 1 year. Spot purchases are often made by a user to fulfill a certain portion of gas requirements, to meet unanticipated needs, or to take advantage of low prices.

STEADY STATE FLOW

A method of designing natural gas pipeline facilities to meet daily volumetric requirements. Under this method, it is assumed that the same quantity of natural gas flows during each of the 24 hours during a day.

STORAGE ADDITIONS

Volumes of gas injected or otherwise added to underground natural gas reservoirs or liquefied natural gas storage.

Storage Field

A facility where natural gas is stored for later use. A natural gas storage field is usually a depleted oil- or gas-producing field (but can also be an underground aquifer, or salt cavern). The wells on these depleted fields are used to either inject or withdraw gas from the reservoir as circumstances require.

STORAGE VOLUME

The total volume of gas in a reservoir. It is comprised of the cushion and working gas volumes.

STORAGE WITHDRAWALS

Volumes of gas withdrawn from underground storage or liquefied natural gas storage.

STRAIGHT FIXED VARIABLE (SFV)

An interstate pipeline transportation rate design that includes all of the fixed costs as part of the reservation change. Under the Modified Fixed Variable (MFV) rate design, costs are divided and some of the fixed costs are allocated back to the demand change.

SUNSHINE ACT

Act passed by Congress with the intent to prevent decisions from being made outside the protection afforded by exposure to public scrutiny.

SYNTHETIC NATURAL GAS

A manufactured product chemically similar in most respects to natural gas, resulting from the conversion or reforming of petroleum hydrocarbons or from coal gasification. It may easily be substituted for or interchanged with pipeline quality natural gas.

System Supply

Gas supplies purchased, owned, and sold by the supplier or local distribution company to the ultimate end user. System gas is subject to FERC or state tariff and is generally sold under long-term (contract) conditions.

Take-or-Pay

A clause in a natural gas contract that requires that a specific minimum quantity of gas must be paid for, whether or not delivery is actually taken by the purchaser. Contracts entered into currently do not generally include a take-or-pay clause.

TECHNICALLY RECOVERABLE RESOURCE

Is composed of proved reserves and assessed resources. Assessed resources are that portion of the in-place resource which is estimated to be recoverable in the future at various assumed technology and price levels.

THERM

One hundred thousand British thermal units.

TIGHT GAS

A component of nonconventional resources which is gas found in low permeability formations (0.1 millidarcy or less).

TOP GAS

(See Working Gas.)

TRANSIENT FLOW

A method of designing natural gas pipeline facilities to meet the hourly fluctuations in demand.

UNBUNDLING

On April 8, 1992, the FERC issued Order 636, requiring interstate natural gas pipelines, operating under the FERC's open-access transportation program, to unbundle natural gas sales services from the transportation/delivery service. In practice, this requires affected pipelines to sell natural gas at the pipeline's physical receipt points where natural gas enters the pipeline's facilities, or at designated pooling points. The transportation service necessary to affect delivery of this gas to the customer would be provided under a separate contract. Pipelines would also be required to provide unbundled, separate, storage services. In theory, this will allow all firm customers of the pipelines to purchase natural gas from anyone, with assurance that the delivery service provided by the pipeline will be the same.

UNDERGROUND STORAGE

The storage of natural gas in underground reservoirs at a different location from which it was produced.

UNDERGROUND STORAGE INJECTIONS

Gas from extraneous sources put into underground storage reservoirs.

UNDERGROUND STORAGE WITHDRAWALS

Gas removed from underground storage reservoirs.

UNDISCOVERED CONVENTIONAL RESOURCES

Conventional resources estimated to exist. on the basis of broad geologic knowledge and theory, outside of known fields. Also included are resources from undiscovered pools within the areal confines of known fields to the extent that they occur as unrelated accumulations controlled by distinctly separate structural features or stratigraphic conditions. For the purposes of this study, undiscovered conventional resources are a portion of the total resource base. Conventional resources are those recoverable using current recovery technology and efficiency but without reference to economic viability. These accumulations are considered to be of sufficient size and quality to be amenable to conventional recovery technology.

UNIFORM CODE

The establishment of a consistent code of regulations that is available to all jurisdictions.

UNIFORM SYSTEM OF ACCOUNTS

Prescribed financial and accounting rules and regulations established by the Federal Energy Regulatory Commission for utilities subject to its jurisdiction under the authority granted by the Federal Power Act.

Vented

Gas released into the air on the base site or at processing plants.

VINTAGING

A method for pricing gas at the wellhead that was committed to interstate commerce prior to the passage of the Natural Gas Policy Act of 1978. Price was determined in part by the year in which the gas was dedicated to interstate commerce or the year in which drilling of the well actually commenced. Vintaging was eliminated by FERC Order 451 in November 1986.

WATT

The electrical unit of power. The rate of energy transfer equivalent to 1 ampere flowing under a pressure of 1 volt at unity power factor.

WATTHOURS

The electrical energy unit of measure equal to 1 watt of power supplied to, or taken from, an electrical circuit steadily for 1 hour.

Well Workover

Work done on a well that improves the mechanical condition of the well or work that treats the reservoir in order to improve gas flow.

WORKING GAS

The volume of gas in reservoir above the designed level of the cushion gas.



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ORDER FORM

UNDERSTANDING BARRIERS TO AND OPPORTUNITIES FOR INCREASING NATURAL GAS CONSUMPTION

Individual Focus Group Reports

As input to the NPC Natural Gas study, BENTEK Energy Research was retained to conduct and report on a series of 15 focus group discussions. The Summary report on all 15 discussions is reproduced in the NPC final report as Appendix C of Volume V – *Regulatory and Policy Issues.* Copies of the contractor's reports on the individual focus group discussions are being reproduced as NPC working papers in the public interest, and may be obtained from the National Petroleum Council using the order form below. These reports were utilized by the consultant in preparing the summary report and by the NPC study participants in the course of the NPC study. The NPC **does not** necessarily endorse all of the specific conclusions reached by the consultant, and the consultant reports **do not** constitute the advice and recommendation of the National Petroleum Council.

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