

Executive Summary

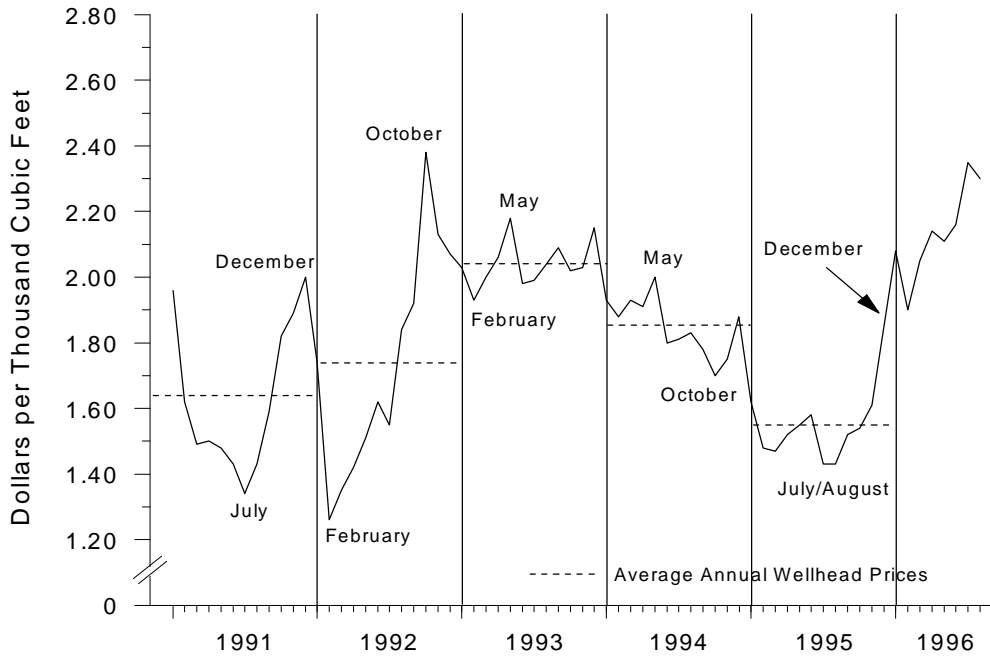
Natural Gas 1996: Issues and Trends focuses on the increasing choices available to participants in the natural gas industry, from suppliers to consumers, at a time when regulatory restraints increasingly are removed from the sale and transport of natural gas. The industry faces significant challenges, such as how to deal with price volatility. In addition, cost-conscious suppliers, marketers, distributors, and consumers now pay increased attention to inventory levels and reducing excess capacity and stocks. Highlights of recent trends and developments in the industry include the following:

- Wellhead prices in 1995 averaged \$1.55 per thousand cubic feet (Mcf), a steep decline of 16 percent from 1994 (Figure ES1). Monthly average prices rose sharply to \$1.84 per Mcf in December 1995 in response to cold weather and have continued higher than the December level throughout 1996. The particularly high price for July 1996 of \$2.35 per Mcf was in part due to strong demand from storage customers who found their stocks at record lows after the cold winter of 1995-96.
- Residential and commercial gas consumption during the first 11 months of 1996 was 9 percent higher than during the same period of 1995 in response to cold weather that extended into the spring. Electric utility consumption was down 9 percent during this period, in part because the average price to this sector through July exceeded that of 1995 by 35 percent. Overall end-use consumption through November 1996 averaged 3 percent above the level for the same period in 1995, continuing the general upward trend since 1986. For the year 1995, overall end-use consumption of natural gas was 19.7 trillion cubic feet, an increase of 4 percent above the 1994 level.
- Natural gas production, which declined slightly in 1995 to 18.6 trillion cubic feet, is expected to reach the highest annual level since 1981 by the end of 1996. Production for the year through November 1996 exceeds levels for the comparable period in both 1994 and 1995.
- Working gas storage levels at the end of March 1996 reached a record low of 755 billion cubic feet. As a consequence, storage refill activity from April through September 1996 was 20 percent higher than during the same period in 1995. Preliminary estimates indicate that working gas stocks at the start of the 1996-97 heating season (November 1) were about 2.8 trillion cubic feet, 7 percent lower than at the same time last year. Nevertheless, this level appears sufficient since net withdrawals during the past three heating seasons ranged from 1.8 to 2.3 trillion cubic feet.
- New and expanded storage facilities added 1,395 million cubic feet to daily deliverability in 1995, an increase of 2 percent over the 1994 level. High-deliverability salt cavern storage dominated the additional deliverability, accounting for 65 percent of the increase.
- Differences between the eastern and western supply markets are evident from the different price movements for two natural gas futures contracts: the New York Mercantile Exchange (NYMEX) contract at the Henry Hub in southern Louisiana; and the relatively new Kansas City Board of Trade (KCBOT) contract at the Waha Hub in West Texas. Prices for the nearby contract (for delivery the next month) on both futures markets rose from August through December 1995, but prices for the Henry Hub contract almost doubled while prices for Waha Hub contracts increased about 50 percent.
- Several recently completed and proposed pipeline expansions reflect the need to eliminate bottlenecks between western supply areas and eastern markets. During 1995, several intrastate pipeline companies in Texas increased capacity between the West Texas Waha area and market centers located in eastern Texas and Louisiana. This, and the planned expansion of 350 million cubic feet per day from the San Juan Basin (New Mexico) to the Waha area, should help to move production from western to eastern markets.
- The capacity release market has grown steadily since its inception in 1993 and has generated nearly \$1.2 billion in revenue to releasing shippers. But average rates for released capacity are still well below maximum tariff rates. In the 1995-96 heating season, rates were discounted an average of 65 percent from the maximum, while during the 1995 nonheating season, rates were discounted 83 percent.

The Industry Continues to Adjust Inventory Practices and Test Adequate Storage Levels

With significant price volatility in the spot and futures markets, the inherent risk in holding large storage inventories is great for distribution companies and other major users of conventional storage reservoirs, especially as energy markets have become increasingly competitive and cost conscious. In response, many companies have reduced the amount of gas

Figure ES1. Wellhead Prices Are Very Volatile



Notes: All prices are in nominal dollars. The labeled months are the month of the maximum and minimum prices in each year.

Sources: Energy Information Administration. 1991-1992—*Historical Monthly Energy Review*, 1973-1992. 1993—*Natural Gas Monthly* (March 1996). 1994-August 1996—*Natural Gas Monthly* (November 1996).

they hold in reserve at storage sites. This movement is illustrated by the use of underground storage during the past heating season. At the start of the 1995-96 heating season, the level of working gas in storage was below 3.0 trillion cubic feet (Tcf) for only the second time in 15 years. By the end of December, working gas in storage was at a 20-year low of 2.2 Tcf for the month as record withdrawals of 1,002 billion cubic feet occurred during November and December. Preliminary monthly data indicate that 2.7 Tcf of gas was withdrawn from storage during the 1995-96 heating season, the highest total ever recorded. By the end of March, storage levels were at record lows and were only 20 percent of total working gas capacity.

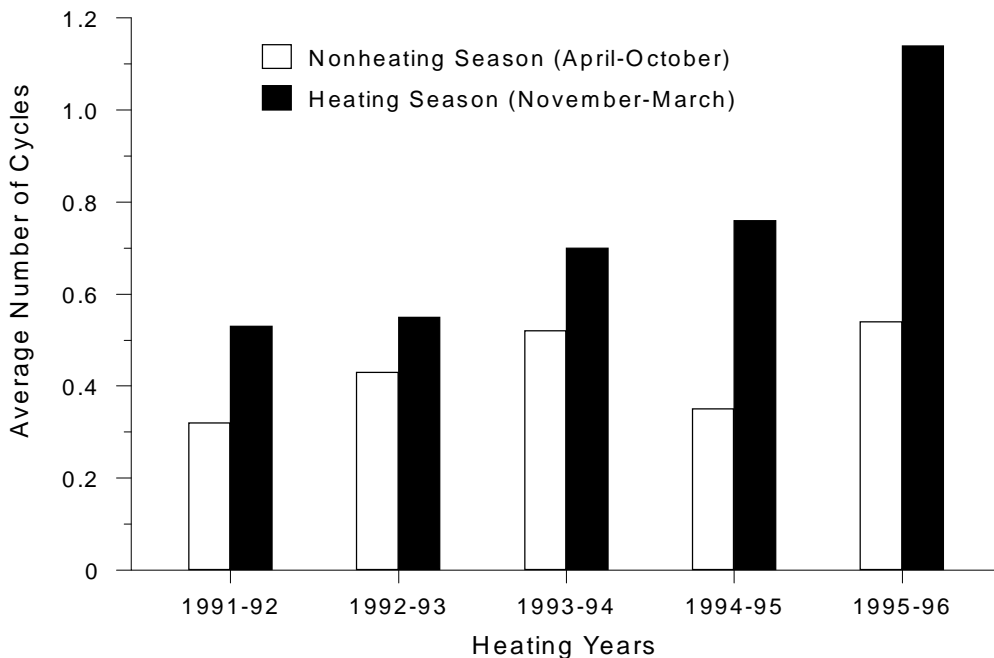
The industry, operating with lower storage levels, was able to provide reliable service during the past heating season. One reason is that new technologies, such as horizontal drilling in conventional oil/gas storage reservoirs, have enabled the industry to bring larger amounts of incremental supplies of gas to market more quickly than in the past. Another reason is the greater use of salt cavern or high-deliverability storage facilities, which can be cycled numerous times throughout the year. The industry is increasingly taking advantage of this type of storage facility. About two-thirds of the storage deliverability brought on line in 1995 was high-deliverability

storage. In addition, storage operators cycled salt cavern storage about 1.14 times in the past heating season, up from 0.53 in 1991-92 (Figure ES2). At sites associated with market centers, cycling of storage was at a much higher average of 1.45 during the past heating season, reflecting the strategic value of storage sites, particularly salt cavern, associated with hubs and market centers. Before 1993, this type of storage was often marketed like conventional storage and used primarily as seasonal backup supply rather than as peaking or short-term swing supply.

Hubs and Market Centers Are a Key Aspect of an Increasingly Integrated Delivery System

The development of market centers and hubs is one of the most recent innovations in the natural gas marketplace. At least 39 centers are operating in the United States and Canada, providing numerous interconnections and routes to move gas from production areas to markets. Another 6 are expected to begin operations during the next several years. The market center segment of the industry is still in its formative years; 27 of the centers have been operating only since the beginning of 1994. Many of the recently opened market centers are gradually developing their business, concentrating their major marketing efforts on the services that are reflected

Figure ES2. Salt Cavern Cycling Has Increased



Notes: A heating year is from April of one year through March of the next year; for example, heating year 1991-92 is April 1991 through March 1992.

Source: Energy Information Administration (EIA), Form EIA-191, "Underground Gas Storage Report."

in the physical capabilities of their supporting systems. For instance, those with associated storage, in general, provide significant short-term parking, gas loans, and storage capacity brokering. In fact, storage is vital to the operations of most market centers; 47 percent of working gas storage capacity in North America is directly or indirectly accessible by market centers. Furthermore, market center operations are connected to practically all the high-deliverability storage facilities in North America.

Market centers, with their access to multiple pipeline interconnections and supplies, provide a natural platform for gas trading, risk management, and opportunities for arbitrage. More than 17 centers offer access to electronic trading while others provide a trading staff. Trading at market centers provides a means of reducing price risk exposure and gives traders access to lower cost supplies available at one site that can be transported and sold at another location offering higher prices. Very active trading at several centers has benefited from and/or has complemented the growth in the natural gas futures contract market, for instance, at the Henry Hub (NYMEX) and West Texas market center areas (NYMEX and KCBOT). More than 25 pipeline systems have access to these market centers.

At this point, it would appear that most market centers are not operating near their full potential even though they have

expanded the number of services they offer and are doing increasing business. For instance, salt cavern storage sites associated with market centers are frequently less than 40 percent full (Chapter 3), and the amount of withdrawals at these sites is rarely near upper limits from one week to the next. If these facilities were constantly being recycled (inventory turnover), they would be much closer to being filled and the percentage amount full would change from one week to the next. The recycling capability of these storage facilities could allow customers to take advantage of trading opportunities provided by the great daily volatility in gas prices and demand and by the daily and weekly imbalance situations experienced by many companies.

Significant Price Divergence Continues Between Supply Regions

The growth of market centers has created a more competitive environment for natural gas. In regional markets, gas prices are a signal of relative demand and supply conditions in those markets, and they also can indicate the degree of competition between markets. If gas markets are supported by an efficient infrastructure, such as the transmission network and institutional systems, regional demand and supply conditions will be interrelated, causing similar movements in prices, although price levels are not expected to be uniform. Analysis of spot market prices at selected locations across the United

States for months between November 1993 and May 1996 indicates that the relatedness of markets varies widely. Markets within the western, central, and eastern regions seem well interconnected even for locations that are considerable distances apart, such as the Henry Hub location (south Louisiana) and Eastern Canada. Competition among the three broad regions is significantly weaker, especially between the western and eastern regions.

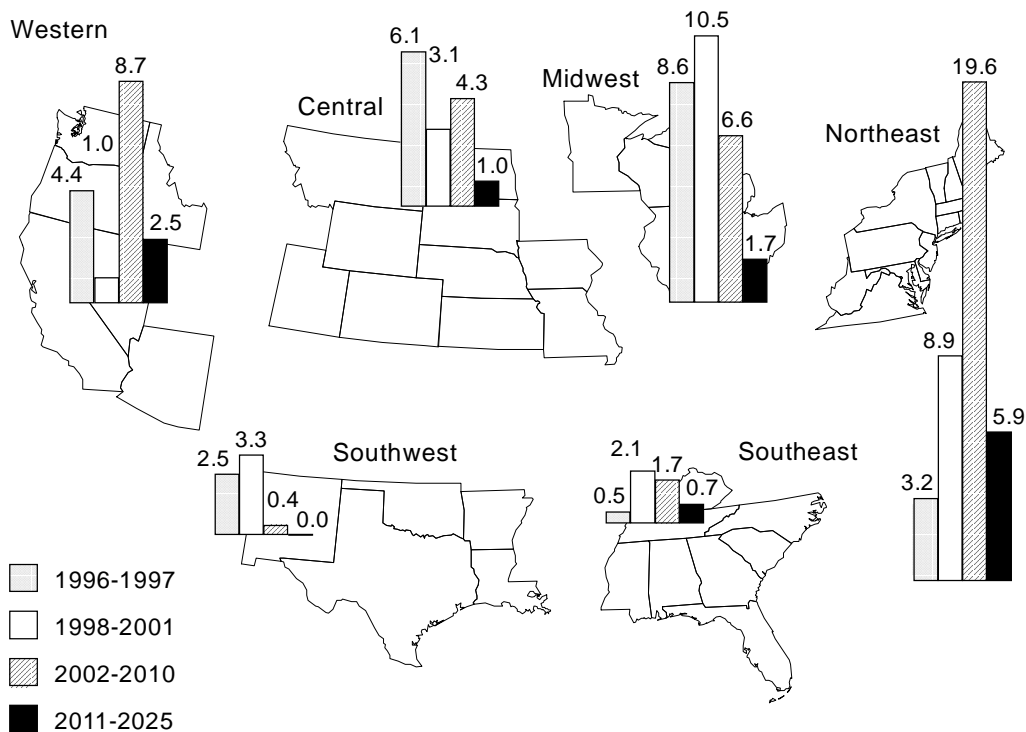
Market integration apparently improved in recent years, and regional clusters of markets across certain broad areas seem to be highly competitive, even between U.S. and Canadian markets. It is probably premature, however, to conclude that a true North American market for natural gas has emerged in light of the seeming separation in competition between the eastern, central, and western markets. Some of the market separation relates to capacity bottlenecks in parts of the country, and there is significant activity underway to address these capacity constraints. Several intrastate pipeline projects were completed in 1995 and more are proposed to expand capacity to move gas from the Permian and San Juan Basins to eastern and midwestern markets. Overall proposed capacity additions could increase interregional capacity as much as 7 percent by the end of 1999.

Expiration of Contracts for the Reservation of Interstate Pipeline Capacity Concerns Many in the Industry

Some shippers are “turning back” all or part of their capacity commitments when transportation contracts come up for renewal. The extent and implications of a reduction in capacity reservations is an emerging concern for the transportation industry. In monetary terms, the potential impact of turnback is significant. By December 31, 2001, contracts covering half of current capacity reservations will expire. If 20 percent of this capacity would remain unsubscribed, it would represent a \$686 million reduction in annual pipeline company revenues. Cost recovery by pipeline companies is a major concern in this circumstance.

The amount of capacity under expiring contracts varies by region and by pipeline company, but the outlook for extensive capacity expirations (85 to 100 percent) by 2010 is the same for each of the regions (Figure ES3). Cumulative expirations in the United States will total 51 percent by 2001 and 89 percent by 2010. The Southwest, Central, and Midwest regions have the greatest potential for significant turnback through the mid term (April 1996 through 2001), whereas the

Figure ES3. Extensive Expirations of Firm Capacity Contracts Will Occur in All Regions by 2010 (Trillion Btu)



Source: Energy Information Administration, Office of Oil and Gas, derived from Federal Energy Regulatory Commission (FERC) Index of Customers data for April 1, 1996, FERC Bulletin Board (August 28, 1996).

Northeast and West have the least because of the predominance of 20 to 30 year contracts. Between 2002 and 2010, more than 50 percent of current reservations will expire in the Northeast and West, increasing cumulative expirations to 85 percent in both regions. Today, in the market for pipeline capacity, long-term contracts may not be flexible enough to keep pace with changing market conditions. Capacity turnback may signify a period of adjustment for the transportation market similar to the transition from long-term to short-term and spot contracts that occurred in the wellhead gas market in the 1980's. Over the long term, the current changes may lead to the development of alternatives to current transportation services. Other possibilities include a spot market for transportation, increased commoditization of capacity, and the development of financial instruments for the transportation segment of the gas industry.

Service Choices Are Increasing for All Customers

Although the restructuring of the natural gas industry started more than 10 years ago, it is far from complete. By 1995, large segments of the gas industry had measurable cost reductions as a result of the introduction of competitive market forces into the industry's operations. Average inflation-adjusted gas prices have fallen for all types of consumers. Electric utility purchases show that prices to this group have fallen by more than a third between 1990 and 1995. However, residential and commercial customers, most of whom still purchase bundled gas services from regulated franchised distribution companies, on average experienced relatively modest real price declines of about 10 percent.

These residential and small commercial customers are only now beginning to have the benefits of competitive supply choices. State efforts to provide smaller residential and commercial customers service choice by providing access to unbundled gas services are gaining momentum. Many States are actively examining or implementing some form of small customer unbundling program, which will give smaller customers of local distribution companies (LDCs) access to

competitive gas markets already enjoyed by their larger customers. Some regulatory agencies have begun to reduce the threshold volume of gas consumption needed to qualify customers for LDC transportation-only services. They are initiating experiments to encourage smaller customers, even residential users, to aggregate into groups and exercise choice in gas markets.

Electric Power Restructuring Will Change the Market for Natural Gas

With the issuance of Order 888 in April 1996, regulatory oversight of the electric power industry is changing and, like the restructuring of the natural gas industry, will provide more choice for buyers and sellers of electric power. As in the gas markets, the first retail electricity consumers to have choices of suppliers will be high-volume customers. If market pricing significantly lowers electricity prices to these users, it could lead to the substitution of electricity for gas in industrial processes and undercut gas sales to manufacturers. In many other uses such as residential service, however, electricity is about four times more expensive than gas before adjustments for conversion efficiency. Opportunities for electricity to attract new customers or to displace existing gas sales in these markets are less likely given the wide gas-price advantage.

Other aspects of electric restructuring may imply a closer relationship in the future for both industries. Innovative developments in the gas industry during the past 10 years foretell some of these changes. Gas marketers have reformed gas supply relationships. Many of these same marketers are moving into the new electricity markets. In an effort to create integrated "energy" markets, as opposed to continuing separate, isolated markets, gas and electric companies are forming mergers and strategic alliances to give customers menus that allow buyers to bridge the differences between the industries. The electric business also appears to have caught the attention of the financial community. The development of financial instruments already used in the gas industry, such as spot, forward, futures, and options contracts, are being taken as models for electricity. These financial markets may help integrate the energy markets.