ICF CONSULTING Perspectives™

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Is the United States Running Out of Natural Gas?

Common Perceptions are Misleading

Natural gas is on the minds of almost everyone today. *The Wall Street Journal*, *Time*, and *USA Today* have all reported extensively on high prices and the apparent crisis in natural gas supplies. Since the late summer of 2002, natural gas prices have risen steadily, peaking briefly in February 2003 at $19/MMBtu, with the average price for this year at approximately $6.67/MMBtu. This represents an increase of around 50 percent, relative to prices in 2001. (Please see the graph on page 4.) Federal Reserve Chairman Alan Greenspan has twice testified to Congressional committees on the dangers such high natural gas prices pose for the economy. Hardest hit are the petrochemical and fertilizer manufacturing industries, where natural gas is the prime feedstock. High prices have forced some domestic petrochemical producers to shut down in the face of cheaper imports, and many are considering offshore locations where gas is cheaper.

The perception is that the gas production in the United States has plateaued—as evidenced by the apparent lack of supply response to recent drilling, an accelerated depletion of reserves, and the belief that there are no more large fields to find. The decline in supply is exacerbated, in the minds of some, by the growing use of gas for power generation.

Natural Gas Prices Since 1999

A natural gas platform in the Gulf of Mexico.

ICF Consulting has reviewed these short-term developments in the context of longer-term gas supply. The common perceptions are misleading. Despite the problems besetting the industry (please see sidebar on page 5), the intermediate and long-term supply will be adequate to meet the higher demand for gas from all sectors, at prices well below current levels, albeit at higher prices than have prevailed in the last decade.

How much natural gas resource is available?

Total gas supply is an elastic concept, since knowing the amount of gas-in-place is highly dependent on technology and scientific insight. Twenty years ago, total future technically recoverable resources in the United States were estimated at around 600 trillion cubic feet (Tcf). Today, the consensus figure is just over 1280 Tcf, with Canada having another 630 Tcf—a huge number compared to the annual consumption of approximately 26 Tcf in the United States and Canada.

While there is plenty of natural gas in the ground, the traditional low-cost, conventional fields in the West Texas, Gulf Coast, and Mid-Continent basins have matured. The majority of the remaining conventional resources, approximately 60 percent of the resource base, are located in more complex, deeper, and smaller fields where extraction is more costly. A significant portion (more than 35 percent) of the resource base is located in unconventional settings where special, more advanced technologies are required to produce the gas: deep onshore gas (>10,000 ft), tight gas, coalbed methane, and shale and deepwater Gulf of Mexico. These unconventional resources often are found in very large Tcf-sized fields.

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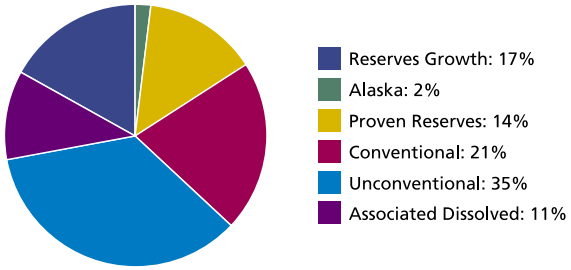
Additional resources (conventional and unconventional) are located on restricted federal lands in the Rockies and in near-shore Atlantic and Pacific settings currently under a drilling moratoria. These account for an additional 100 Tcf of potential resources. Alaska remains a large source of potential supply, where approximately 32 Tcf are found on the North Slope, awaiting a pipeline to bring the gas south. Canadian conventional production is in decline, like much of the United States' conventional production. Nevertheless, it is estimated that large untapped coalbed methane resources (more than 75 Tcf) exist in western Canada.

United States Natural Gas Resources



Producers will have to look further afield and spend more money to drill, develop, and produce natural gas to meet increasing demands. Much of the production from these settings is dependent on technology advances needed to characterize, find, and develop the resource.

For some time, ICF Consulting has forecast that natural gas prices would rise in the near term because of strong demand growth and constrained conventional supply. But we expect that technology investment and expanded drilling will tap into the massive remaining resource base and moderate the long-term price outlook.

The signs pointing towards a moderation in natural gas prices are already appearing. Spot gas prices have declined by more than $1.50/MMBtu since the beginning of 2003. In addition, recent higher prices are having an effect on drilling. The average natural gas rig count for 2000-2003 has increased to more than 785 active rigs, compared to an average of only 440 for the 1990-1999 time-period. Reserve additions have increased as well. In 2000-2001, the latest year for which complete data is available, reserve additions exceeded production by approximately 8 Tcf.

Higher prices and the perceived bullish longer-term outlook also have brought forth a renaissance in base load, imported liquefied natural gas (LNG). Greenspan recently noted in Congressional testimony the need to access more LNG from those parts of the world where there are no local markets for large gas production. Much of this resource can be imported for under $3.50/MMBtu. All of the U.S. LNG terminals have been reactivated, four new terminals have been proposed, and 15 more are in planning phases. LNG could account for up to 5 percent of the United States' future supply.

Episodes of price volatility will continue to characterize the gas industry since so much of demand is determined by weather. The combination of increased drilling, improved exploration and production technology, enhanced resource accessibility, and imported LNG will make natural gas more economical over the long run, well below recent highs.

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The Roots of Today's High Natural Gas Prices

The following issues have impacted the price of natural gas over the last few years:

- Low prices in the 1990s (averaging $2.30/MMBtu) led to reduced exploration. For 10 years, exploration drilling averaged 570 wells per year, compared to 10,000 development wells per year in earlier years.
- Exploration budgets were cut in the 1990s, while the workforce shrunk by 27 percent.
- The loss of liquidity in markets after the fall of Enron and the financial crunch in the industry have made producers less able to respond to price increases.
- Major oil and gas companies sold assets to independents who lack expertise and research for capital-intensive exploration and production efforts.
- Independents have targeted low-risk, quick-return, infill and recompletion drilling—not higher-risk, higher-return, exploration drilling.
- The winter of 2002-2003 was the coldest in years over the eastern half of the country.
- New technologies allow producers to drain fields more quickly. These rapid decline rates have been misinterpreted as a sign that the United States is running out of gas.