

Diversified imports can help stabilize natural gas supplies, new study finds

25 July 2007

The findings of a working group at Stanford's Energy Modeling Forum may surprise policymakers, who often think that energy independence is the only way to secure energy supplies.

In a report released Tuesday, July 24, and available on the Energy Modeling Forum's website, the group finds that increasing international interdependence on natural gas may help to stabilize supply and moderate future price increases.

"Many countries will be importing more natural gas," said Hillard Huntington, executive director of the Energy Modeling Forum and the study's coordinator. "Connecting their markets to a number of suppliers may be a better strategy for securing supplies than producing more expensive domestic resources. With several different sources, countries can buffer themselves from the whims of a single supplier."

The forum was established in the School of Engineering in 1976 to help improve the use of modeling for understanding complicated energy and environmental public policy problems.

The 51 working-group participants represent government, industry and academic interests from Europe, North America and Asia. They met four times over two years to plan and discuss the results of eight international natural gas models. The study focuses on North American, European and Asian markets and provides background for corporate and policy decisions surrounding the development of natural gas resources and infrastructure.

Supply and demand

Natural gas use has begun to outpace production in many countries, including the United States. In 2006, natural gas supplied 22 percent of U.S.

energy needs, with imports accounting for 19 percent of domestic consumption, according to the U.S. Energy Information Administration. In Western Europe, imports exceeded production in 2006, with former Soviet states supplying 32 percent of all imports, according to a report released in April by the International Energy Agency.

According to forum projections, even if worldwide demand for natural gas rose 7 percent more than expected, prices to the consumer would change relatively little. For every 1 percent increase in demand, prices would increase 1.2 percent in the United States and 0.8 percent in Europe. These projections are based on a well-integrated U.S. or European market with multiple, international gas suppliers. Competition between multiple suppliers would help to ensure a constant supply and would buffer the market from wild fluctuations in price.

Although the number of producing wells in the United States has grown significantly, from approximately 270,000 in 1990 to more than 425,000 today, annual gas production has remained fairly stable, according to the Energy Information Administration. This is because many new wells tap into low-quality reservoirs in shale, low-permeability sandstone and coal beds, said Don Gautier of the U.S. Geologic Survey, who was not involved in this study.

"It seems that the U.S. gas industry is working much harder to maintain production, let alone increase production, even as prices rise and demand increases," he said. Demand will continue to rise as the world economy grows and if environmentally based policies to shift energy production from coal to cleaner-burning natural gas are enacted, Huntington said.

Liquefied natural gas

Natural gas is easily transported through pipelines from Canada to the United States and from former

Soviet states to Western Europe. The development of an international market, however, cannot rely on pipelines alone; oceans separate some countries with large reserves of natural gas from countries that want to import gas.

Gas can be traded between such geographically isolated partners by chilling it to minus-170 degrees Celsius, loading the liquefied gas onto tankers and shipping it to re-gasification terminals in the importing country. Liquefied natural gas (LNG) accounted for 13 percent of all U.S. imports and exports in 2006, according to numbers available from the Energy Information Administration. This LNG is processed at four domestic re-gasification plants.

Moderating the expected increase in natural gas prices will require the construction not only of more re-gasification plants in the United States and in other importing countries, but also of natural gas extraction and chilling facilities in gas-exporting countries, according to the forum's study. Two major hurdles face the development of this infrastructure. On the exporting end, corporations must be convinced that the political and legal climate of the exporting country will allow them to recoup their investment in expensive extraction and chilling facilities. On the importing end, construction of re-gasification facilities faces stiff opposition in some areas of the United States, including New England and California, according to Huntington. Opponents frequently cite health, safety and environmental concerns. (The current study focused on market forces and did not evaluate safety issues.)

According to the study, canceling construction of one re-gasification terminal would not cause severe price fluctuations in a well-integrated market with many interconnections. However, in the face of increased demand, policies that curtail the construction of several plants would hamper the international gas trade and lead to permanent price increases of an additional 0.8 percent for every 1 percent of total marketed production lost by 2020.

"These projections are useful because they provide a range of longer-term fundamental market views for the future of natural gas," said Robert Stibolt, a

study group participant who recently joined Bear Sterns as senior managing director and chief risk officer of Bear Energy LP. "This perspective is invaluable for firms that use financial instruments to insure against the risks of massive investment projects."

The summary report and a complete list of study participants are available on the web at www.stanford.edu/group/EMF/ .

Source: by Jesse Boyett Anderson, Stanford University

APA citation: Diversified imports can help stabilize natural gas supplies, new study finds (2007, July 25) retrieved 27 September 2020 from <https://phys.org/news/2007-07-diversified-imports-stabilize-natural-gas.html>

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