Natural Gas Expected to Play Increasing Role in Asia, U.S.
Findings Reported by Energy Forum, Baker Institute for Public Policy at Rice University
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Natural gas is expected to play an expanding role in meeting rising Asian energy demand, and liquefied natural gas (LNG) will be traded under more flexible, market-linked pricing terms and arrangements, concludes a new study by the Energy Forum of the James A. Baker III Institute for Public Policy at Rice University.

The study, "New Energy Technologies in the Natural Gas Sectors: A Policy Framework for Japan," was completed over 18 months and was led by Baker Institute senior energy adviser and project coordinator Amy Myers Jaffe. Undertaken as a joint venture with the Petroleum Energy Center of Japan, the study was co-sponsored by the Baker Institute and the Center for International Political Economy.

The study will be available online at <www.rice.edu/projects/baker>. Click the Research link on the menu at left, follow links to Foreign Policy, Energy Forum, and scroll to "Baker Institute Study Number 18."

The study notes that use of natural gas as an energy source in Asia in 1999 was 10 percent of total primary energy use, which was substantially lower than the world average of 23 percent, suggesting tremendous room for growth.

Recent technical innovations have made LNG processing and shipping more affordable, resulting in increased sales in both Asian and Atlantic Basin markets. The end of the Cold War also created new natural gas pipeline opportunities in Northeast Asia.

Natural gas is mainly used in Asia for electricity generation and petrochemical feedstock. The report finds that if natural gas can be imported after converting it into ordinary-temperature liquid fuels, the use of gas in the transportation sector could increase substantially. The authors conclude that because 70 percent of the increase in international oil use is expected to come from the transportation sector over the next decade, the ability to utilize plentiful natural gas supplies in manufacturing transportation fuels would greatly contribute to enhanced energy security and environmental protection.

An expected surplus in Asian gas supplies is spurring an interest in other supplemental technologies for other uses of natural gas. This study investigated the prospects for

increased LNG and natural gas pipeline shipments to Japan and the policy framework that is needed to promote augmented utilization of natural gas there.

The study also forecasts increased demand for natural gas in the United States market, and a natural gas supply deficit that could grow in the coming decade to as much as 6-7 trillion cubic feet in 2010 under high demand growth scenarios. The study suggests that the U.S. will have to turn to more pipeline imports from Canada and LNG from a variety of Atlantic Basin or Pacific Rim producers to meet the projected rise in natural gas demand. To fill the supply gap, the U.S. may be looking at importing up to 4 trillion cubic feet or in terms that the producers use, 80 million tons of LNG per year under high-growth scenarios. However, the study concludes that even at the most optimistic U.S. demand rate, a surplus of LNG on global markets will remain, leaving plenty of supply to make its way to Asia and avoiding the kind of buyers' bidding war that could substantially raise prices.

The report authors also predict that the Asian market and Western markets will begin to look more alike over time. Already Japanese customers are asking for more flexible terms in their arrangements with traditional supplies. U.S. gas consumers and marketers are beginning to sign long-term agreements rather than depend solely on spot and short-term arrangements. The authors predict that eventually both will adopt portfolio strategies, assembling a blend of supply and transportation arrangements that fit all needs.

Japan, in particular, will be looking for more flexible terms, to include both spot and term contracts, to offset unexpected disruptions in supply and help build markets there.

The full report includes legal, regulatory, and infrastructure changes that must be made to facilitate increased market penetration of natural gas in Japan, including new supplies from the Sakhalin Islands. It also covers innovative technologies that might broaden the sectors in which natural gas can replace other fuels.

The study concludes that Japan's energy security and environmental goals would benefit from increased use of natural gas in its energy mix. A combination of LNG and pipeline gas imports would enhance natural gas trade in smaller volume increments, increasing the number of sectors that might use natural gas. It would also increase competition and likely lower costs without jeopardizing supply stability and security. Government support of research in emerging natural gas technologies could also help spread use of gas to new sectors in Japan.

Study recommendations include:

- In order to facilitate the augmentation of gas markets, regulatory changes to Japan's existing Gas Law are needed. The preparation of new laws, regulations, and procedures should not be allowed to impede the efficient introduction of new fuels and the expansion of natural gas pipelines.
- The introduction of new fuels such as GTL and DME and the construction of international pipelines were not considered in the formation of existing laws and

regulations. An effort to adapt these products and the building of pipelines to existing laws will likely result in a good deal of confusion and many delays. Thus, adjustments to these laws, regulations, and procedures should be made quickly to enhance the introduction of new fuels and facilities.

- Administration of laws and regulations should be made in a nondiscriminatory manner where all market players, including new entrants into a liberalized market, compete on equal terms. New entrants should be allowed access to gas infrastructure but at a price that includes a fair return to investors for access to infrastructure. Market transparency and agreed network codes can then maintain the level playing field between players.
- All prices, of both natural gas as well as its competitive fuel alternatives, need to be market-based and transparent such that inter-fuel and gas-to-gas competition will establish the most competitive delivered price to the end-user.

In addition to Jaffe, members of the research team are Dagobert Brito, the Peterkin Professor of Political Economy, Rice University; Peter Hartley, professor of economics, Rice University; Ed Jones, coordinator, Lawrence Livermore National Laboratory; Robert Schock, nuclear physicist, Lawrence Livermore National Laboratory; Barbara Rhines Shook, Houston bureau chief, Energy Intelligence Group; and Ronald Soligo, professor of economics, Rice University.