

The IEA Gas Security Study

By Bjorn P. Saga*

When the IEA was founded in 1974, the security concern was paramount. It was oil-fused and emphasized self-sufficiency. Perceptions of scarcity of natural resources, especially oil and gas, underpinned a near consensus that prices were bound to rise forever, and that governments had to do something about it, that oil was too important to be left to industry and markets alone. Since then IEA countries have succeeded as a group in reducing both the level of oil consumption and the share of imported oil. However, imports of natural gas from non-IEA sources have grown. Therefore, in 1993, IEA Ministers requested the IEA Secretariat to undertake an analysis of the future of natural gas supply and demand in the three OECD regions (Europe, North America and Pacific), and the regional security issues that might arise from increased dependence on external supplies. Ministers had in mind, not only the growing interest in natural gas as a clean fuel, but the prospect that IEA gas supplies will be increasingly sourced from countries outside the IEA region, progressively distant from consuming centers, traversing countries whose reliability as transit states is in question.

The results of the study were presented to Ministers earlier last year and have now been published. Starting from the dictionary definition of security as "*the state of being safe against adverse contingencies*," such as disruption or non-availability of supply, the study identified three broad classes of risk:

- **Technical Risk.** Owing to an accident, terrorist incident or natural catastrophe, a major supply facility is put out of action, but at worst, for only a few months.
- **Failure to mobilize long term supply or ensure deliverability.** This refers to "non-availability" of supply where sufficient capacity for consuming, delivering or producing gas does not materialize. In Europe and the Pacific, gas tends to be developed in large tranches: it requires long lead times, and is predicated on uncertain growth projections.
- **Political Risk.** This includes long-lasting disruptions for politically motivated reasons, or economically available supplies from a particular source are not mobilized because political risks are too high.

While it may be impossible or too costly to ensure absolutely against all of these risks, a number of measures can be taken which will either reduce the chances of disruption occurring, or at least reduce its impact if it does. First of all, basic principles apply for bolstering supply security of any input: maximize diversity and flexibility among suppliers and geographic sources; develop responsive emergency systems; introduce free and open trade and a secure framework for investment (in new supply); and, cooperate among all energy market participants to improve transparency of market infor-

*Bjorn P. Saga is Principal Administrator, Natural Gas at the International Energy Agency, Paris, France. He was project coordinator for the IEA study on gas security which was published by the OECD in October 1995 under the title, "The IEA Natural Gas Security Study."

mation. These principles are in fact all found among the IEA's "Shared Goals" – its mission statement, agreed by IEA Ministers in June 1993.

How do these principles relate to gas security? Approaches differ but diversity is key. In North America, where the natural gas industry has been in existence for more than a century, diversity comes from the great number of producers and transport options. In Europe, it refers to the number of supplying countries and supply routes. In Japan, it is the number of LNG supply trains and source countries.

Emergency response measures are especially important in the gas sector: they include the use of surge production capacity, storage, interruptible contracts, demand restraint and supply sharing under contingency planning agreements among gas companies, or, in extreme cases, intervention by governments.

But who is responsible for implementing these arrangements? In free markets, individuals look after their own risk using a variety of tools and tactics. Gas markets, however, tend to be imperfect mostly because of monopoly in transmission and transport and the lack of transparency of market information. Ensuring security of supply – risk management – especially technical and market risks, is the domain of the gas companies who, after all, make the large capital investments. Governments, however, have a role in setting the framework within which risks can be managed, ensuring that market mechanisms serve as the basis for security decisions. Governments might also have a role in ensuring that what is acceptable risk for smaller customers is defined and accounted for in industry operations and business practices.

In assessing the outlook for Western Europe, we used a simple approach to assess the long term security of supply of natural gas. We gathered forecasts from all IEA member countries in Europe. Because the assumptions used by each country were not the same, we compared the aggregated results with those of our own regional econometric model: the one used in the IEA World Energy Outlook that we published in April 1995. The forecasts are very similar. The most conspicuous feature is the projected strong growth in demand for gas in power generation, accounting for nearly 50 percent of total gas demand growth, of about 70 percent, out to 2010.

Our analysis also indicated that at a gas price corresponding to an oil price of US\$ 28 per barrel, there would be in principle no problem in meeting this supply. At a supply price corresponding to an oil price of US\$ 18 per barrel, it might be more difficult to bring the needed gas volumes to market. But costs are not static. As an aside here, it may be noted that in June 1995, the IEA organized a workshop on gas security where a number of key representatives from the European gas industry were invited to give their feedback on the draft of the study. The discussion at that meeting was lively, but at least there was one point on which all the participants agreed: there is scope for cost reductions all along the gas chain. Recent reduction in production costs in North America and the North Sea have demonstrated this very clearly. The major challenge faced by the gas industry, however, is to reduce transportation costs.

Risk reduction which, in turn, could contribute to cost reduction, is another key point when discussing future supply

(continued on page 24)

Sustainable Development (continued from page 22)

cally sound and technologically feasible limits to be imposed on emissions – depending on the level of knowledge achieved in the ecologically oriented natural sciences. This process leads to the formation of prices for environmental goods which have to be made mandatory upon all those concerned. It is on this basis that a calculable eco-efficiency appears to be possible at all.

In terms of politics, we are moving in an area between “random walk” and parametric regulations. A combination of advanced growth theory allowing for continuous increase in knowledge, non-linear dynamics and institutional theory will bridge the gaps between natural sciences, economics, and politics. This is the way to increase our scarcest good, the scarcest of our resources – our capability of making political use of our knowledge via the internalization of scientific results. This is the chance of reaching economic and ecological convergence. As Lubbe is right in observing, nature is threatened not by economization but by romanticization. Making prudent use of nature and of ecological systems does not harm the environment but rather creates the basic conditions for achieving an ecologically sustainable economic growth.

We still have a long way to go. A noticeable improvement of both the regional and the global environmental situation is not to be expected unless population stabilization is reached. The level at which this stabilization is realized is far less important than the point of time of its realization. The earlier this stabilization is achieved, the greater is our chance to improve the situation of the people living in the developing countries of the Third World without adding to environmental hazards. Only then can we ensure an ecologically sustainable economic growth. Only then can we hope that man is in a position to solve the three conflict areas: his conflict with nature, his conflict with his fellow men, and his conflict with his own inner world. Only then will mankind be capable of entering a new phase of cultural evolution.

The IEA Gas Security Study (continued from page 23)

projects. Risks can be reduced, for example, in supply contracts for power generation by de-linking gas and oil prices. Also, the perceived political risk could be reduced by

putting in place a stable legislative and institutional framework for investment. The Energy Charter Treaty offers a basis for such a framework. Since Russia will be the swing supplier of gas to Western Europe, and its gas must transit other Treaty signatories, progress in the Treaty’s implementation is important. The IEA has, by the way, recently published its first energy review of Russia where aspects of the Russian gas sector have been dealt with in addition to those included in the gas security study.

No European OECD country has ever been hit by a major disruption in gas supplies. Nonetheless, various disruption scenarios around disruptions of Algerian and Russian supplies were developed. These examples were chosen because they involve sufficiently large volumes to test the system, more so than, say, a future disruption of supplies from the Troll platform.

The analysis tried to answer the following question: How long could the gas companies go on supplying their firm customers if either Russian or Algerian supplies were interrupted, under reasonable assumptions about the use of storage, interruptible contracts and other response tools? The main message is that, in the event of a cut-off of supplies, France, Germany and Italy, the largest importing countries, are able to supply their firm customers for quite some time – more than 24 months in some cases. Countries such as Spain and Turkey, still with limited storage capacity, would run into problems very quickly, although both these countries are rapidly strengthening their contingency systems.

Looking at energy security from an IEA perspective also involves an examination of the effects on other fuels stemming from disturbances in gas supplies. The analysis in this area concluded that the heavy fuel oil market would be significantly affected by a major gas supply disruption. If Russian gas supplies were cut off, heavy fuel oil demand could increase by half a million barrels per day, which is slightly (15 percent) higher than the increase in demand caused by the U.K. miners’ strike in the mid-eighties. That event had major price effects. Carrying the scenario forward, it is likely that fuel oil would be pulled across the Atlantic by the buoyant European fuel oil market. With natural gas filling in behind this displaced fuel oil, the North American gas market would feel the effects of a Russian gas disruption.

The increase in use of gas for power generation in some

Conference Proceedings 18th IAEE International Conference Washington, DC, July 5-8, 1995

The Proceedings from the 18th International Conference of the IAEE held in Washington, DC, are now available from IAEE Headquarters. Entitled *Into the Twenty-First Century: Harmonizing Energy Policy, Environment, and Sustainable Economic Growth*, the proceedings are available to members for \$55.95 and to non-members for \$75.95 (includes postage). Payment must be made in U.S. dollars with checks drawn on U.S. banks. To order copies, please complete the form below and mail together with your check to:

Order Department, IAEE Headquarters, 28790 Chagrin Blvd., Suite 210 Cleveland, OH 44122, USA

Name _____

Address _____

City, State, Mail Code and Country _____

Please send me _____ copies @ \$55.95 each (member rate) \$75.95 each (nonmember rate).

Total enclosed \$ _____ Check must be in U.S. dollars and drawn on a U.S. bank, payable to IAEE.

countries does not seem to have jeopardized security of supply so far, either from a gas or an electricity point of view. Some of the reasons are spare capacity in the electricity generation system, import possibilities, multifiring possibilities in power stations and wheeling of power.

The security implications of the increased reliance on gas in power generation in the future, approaching more than 30 percent in some gas importing countries by 2010, need to be closely monitored. Prudence might argue in favor of requiring dual firing capability and backup fuel storage in such areas.

It is sometimes argued that gas markets should not be liberalized, deregulated and opened to competition, because security of supply would be threatened. While the European market is not as evolved as the North American, the pressure for more liberalization of the former will likely continue. Our examination of the North American experience with deregulation is that gas deliverability, infrastructure development and price responsiveness have not been negatively affected. Moreover, the North American market was put to the test by the severe weather conditions of 1994 and passed it very well.

We fully realize that the North American and European markets are different in many respects, but we believe that a liberalization of European gas markets need not be incompatible with a high level of security of supply.

In conclusion, IEA countries rely on a mix of measures, appropriate to their individual circumstances, to bolster gas security and are generally well placed to withstand major supply disruptions. But gas supply security protection should be carefully monitored as gas demand grows and those

countries still developing their gas infrastructure need to consider how to improve their security of supply.

The projected growth in demand does not pose a major concern, at least out to beyond the end of the century. Provided that a stable framework for investment and trade is established, supply security for the period beyond should be reasonably assured, although this could be more problematic at gas prices related to current oil prices.

Corrections and Amplifications

IEA Survey of Russian Energy Policies

Guy Caruso of the IEA has advised that his original text for the above article which appeared in the Fall 1995 issue of this *Newsletter* contained an omission. The third paragraph of the article should have read:

"The IEA Russian survey is one of a series of surveys on non-IEA Member Country energy issues (others include Hungary, Poland, the Czech Republic, Romania and South Korea). It is based on the methodology we use for our Member Country surveys. Our goal is not to make technical recommendations, but to *concentrate on getting the policy framework right*, so that the most rational technical decisions could be made. There is no doubt that in the process of reforming its energy sector, Russia is increasingly integrating its energy economy with the international one. A recent concrete step in that direction is the political commitments Russia developed and accepted under the European Energy Charter Treaty. This momentum of reform in the energy sector should be maintained."

GAS & ELECTRICITY TRADING SUMMIT

April 25 & 26, 1996

Sheraton World Resort ■ Orlando, Florida

SOME CONFERENCE TOPICS INCLUDE:

- How to build the forward curve for electricity
- Using technical analysis as a hedging tool
- How to implement successful energy risk management strategies
- Assessing gas and electricity arbitrage opportunities
- How to price options in power markets
- Understanding BTU trading in the emerging market
- Why gas and electricity commoditization are not the same
- Basis trading in practice

For further information about registration or exhibiting contact:

GLOBAL CHANGE ASSOCIATES

20 Harwood Avenue ■ White Plains, NY 10603

Phone: (914) 949-6798 or Fax: (914) 948-5301

Sponsored by

