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The Natural Gas Revolution

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Abstract (Summary)

Yet even as we endlessly debate U.S. energy and climate policy in the wake of the BP gusher, we aren't spending enough time considering what's on the horizon -- particularly natural gas's transition from a dwindling to an abundant resource. According to the Energy Information Agency (EIA), natural gas could become a much more important fuel for the U.S. in the coming decades.

Full Text (1060 words)

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Even energy experts tend to forget the enormous impact unanticipated events can have on markets and public policy. Today there are two developments that have the potential to cause dramatic change: the existence of enormous reserves of natural gas and the BP spill.

As recently as two years ago, we had no idea that there were vast natural gas resources in unconventional reservoirs like coal seams, tight sand and shales in the United States and elsewhere. That's the positive surprise. On the negative side, the severity of the oil spill in the Gulf of Mexico could well turn the global public against oil and natural gas exploration.

If the past is any guide, accidents in the energy sector profoundly affect this country's energy outlook. Reactor incidents at the nuclear power stations at Three Mile Island in Harrisburg, Pa., in 1979 and in Chernobyl, Ukraine, in 1986 interrupted nuclear power plant construction in the U.S. and Europe for two decades. The 1973 oil embargo by OPEC and the 1978-79 oil crisis caused by the fall of the Shah in Iran permanently changed expectations about the security of the oil supply and the long-term price trend.

The BP spill will certainly lead to a major review of the risks involved in offshore drilling. Re-examining operating practices and regulations will likely take more than a year, during which time new deepwater operations will be curtailed. The danger is that public attitudes and government policy will lead to an extended period of reduced investment and licensing.

Some observers will characterize the blowout as an exceptional case due to chance or negligence. Others will see it as evidence of general inattention. Few will recall the facilities in the Gulf survived Hurricane Katrina in 2006, an unusually stressing event, without appreciable problems.

Yet even as we endlessly debate U.S. energy and climate policy in the wake of the BP gusher, we aren't spending enough time considering what's on the horizon -- particularly natural gas's transition from a dwindling to an abundant resource. According to the Energy Information Agency (EIA), natural gas could become a much more important fuel for the U.S. in the coming decades.

In its 2010 International Energy Outlook, the EIA predicts growth in natural gas production principally from shale in Latin America, China, Australia, North Africa and the former Soviet Union. Global unconventional gas production is projected to increase to 7.9 trillion cubic feet in 2035 (1/3 of total natural gas production) from its 2008 level of 3.5 trillion cubic feet (about 1/6 of total production). The 2010 EIA projection of world-wide production of unconventional gas increases at 5.2% per year between 2008 and 2035, compared to 1.4% for total gas production.

What will this mean? In the short run, natural gas will displace coal in the electricity sector. This will significantly lower carbon emissions. In terms of renewable energy, low-cost natural gas will make hybrid solar plants that use both sunlight and natural gas to make electricity more economically attractive.

As oil gets more expensive and natural gas cheaper, there will also be an enormous incentive to use far more natural gas

in the transportation sector. Compressed natural gas can power buses, medium-duty trucks and light-duty vehicles that operate in urban environments close to fueling stations.

But the U.S. is far behind the rest of the world in using this source of energy for transportation. As of 2009, Pakistan led the world with 2.4 million vehicles fueled by compressed natural gas and over 3,000 fueling stations. By comparison, the U.S. had about 100,000 such vehicles and 1,300 stations, consuming 0.1% of the 12 million barrels of oil per day devoted to transportation.

The penetration of natural gas into the U.S. market will be determined by the cost of kits to convert gasoline-fueled vehicles to natural gas. That cost should decline sharply with scale, new vehicle offerings, the availability of fueling stations, and, of course, continuation of the favorable cost of natural gas compared to motor gasoline.

Even 10% penetration in the next decade or two would displace 1.2 million barrels of oil per day. This may not be decisive, but it certainly could have as big of an impact as other proposals to reduce import dependence, like gasohol (a mixture of motor gasoline and ethanol from corn).

Natural gas can also be transformed into liquid fuels, such as methanol, for transportation or industrial use at a production cost that I estimate to be approximately \$45-\$60 per barrel of product. This is expensive, but lower than the likely price of crude oil and the anticipated cost of synthetic liquids from coal or shale (plus it has less carbon emissions).

The continued expansion of gas pipelines around the world, as well as the expanding trade of liquefied natural gas, indicate a movement toward a global market for natural gas similar to oil, and ultimately with a single world price. A global price implies major changes in patterns of gas trade between the North American market, where gas is priced to coal, and the Asian market, where gas is priced to oil. Because coal is cheaper than oil on an energy efficient basis, this means that current natural gas prices in North America are \$4 per thousand cubic feet compared to \$10 per thousand cubic feet in Asia.

That's where things seem to be heading now, but our thinking should remain agile. There undoubtedly will be other energy surprises that will disrupt conventional thinking.

Political instability or military conflict in the Persian Gulf could create a lengthy supply disruption, while a resolution with Iran could lead to welcome additions to world supply. An extended global economic downturn would reduce demand but also reduce energy investment critical for the future. Unexpected advances in photovoltaics, batteries or biofuels likely will change the affordability of new technologies.

The U.S. should have a comprehensive, long-term energy strategy. But when unforeseen events arise, we should adjust as necessary to take advantage of unexpected opportunity.

Mr. Deutch is a professor at MIT and former under secretary of the Department of Energy. He currently serves on the board of directors of Cheniere Energy and was formerly on the boards of Schlumberger, CMS Energy and Citigroup.

(See related letters: "Letters to the Editor: Is Electricity or Natural Gas the Fuel of the Future?" -- WSJ Aug. 2, 2010)

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