The Economics of Appalachian Wet Gas: Unique Opportunities for Commerce

INTERVIEW WITH Dr. Douglas Southgate, Co-Director THE OHIO STATE UNIVERSITY'S SUBSURFACE ENERGY RESOURCE CENTER

As an associate director of the Subsurface Energy Resource Center at Ohio State University, Dr. Douglas Southgate has an insightful perspective on shale development in and around Ohio. In this Q&A interview he speaks to Amber Scorah of Oil & Gas IQ to discuss the broad trends in the market for natural gas and other hydrocarbons and the economic consequences of the Appalachian shale development.

Amber Scorah: Natural gas is currently being bought and sold for about $2.50 per thousand cubic feet (mcf). Will gas prices stay at this level?

The answer is no. This is because a worldwide market for natural gas, which has never existed, seems to be gradually taking shape.

Gas prices used to be closely tied to the value of petroleum, spiking when oil prices spiked for example. But the creation of a nationwide market for natural gas in the United States, thanks to deregulation dating back as far as the 1970s, has encouraged the private sector to make technological improvements – most notably, the combination of hydraulic fracturing and horizontal drilling required to exploit deep shale formations and other unconventional resources. Commercial extraction of gas from shale formations, which began in northern Texas around the turn of the twenty-first century and has since spread to other parts of the country, has greatly increased gas availability and caused the gas market to decouple from the oil market.

Few countries have deregulated the gas sector the way the United States has done. In countries that have not undergone deregulation and that import most or all of their gas, prices tend to be tied to the market value of oil, which is much higher. In Japan, for example, imported gas changes hands for more than $15 per mcf.

However, differences between U.S. prices and, say, Japanese prices cannot persist, and certainly will not persist as a worldwide market for that fuel emerges.

Amber Scorah: What direction will gas prices head as we move toward a worldwide market for the fuel?

Invariably, international trade causes prices to converge, going up in countries that are net-exporters and coming down in net-importers. The differences that remain mainly reflect transportation costs, with prices in net-exporters consistently lower than prices in net-importers.

As a worldwide market comes into existence, prices in nations such as Japan will surely fall. But prices will rise in countries that produce more gas than they consume and export the surpluses, as will probably be the case in the United States beginning a few years from now.

The combined expense of liquefying gas, transporting it across the sea, and converting the fuel back to gas at the end of the voyage amounts to $4 to $6 per mcf. Among other things, this expense reflects the capital cost of a liquefaction plant, which comes to $5 billion or so for a facility capable of exporting 8 million tons a year.

If this cost-estimate is accurate, equilibrium would be reached in a worldwide market if prices in Europe or East Asia, which are importers, are about $4 to $6 per mcf higher than prices in the United States, where prices are expected to rise gradually toward $4 per mcf according to *The Economist* magazine.

Amber Scorah: What are the implications of these price trends for natural gas production in the United States?

The reduction in domestic gas prices that has occurred since 2008, when prices briefly rose above $10 per mcf in the wake of supply-disruptions caused by Hurricane Ike, basically reflects the decline in the cost of extracting gas from shale formation that has resulted due to technological improvement – to repeat, the combination of horizontal drilling and hydraulic fracturing.

The price-reduction has perhaps been excessive, in the sense that the current value of $2.50 per mcf or so may be below the level required to maintain normal profitability for energy companies.

But regardless of whether prices are too low in this economic sense, there has been a noticeable migration of drilling rigs from formations that mainly yield dry gas (i.e., methane), which is used to heat homes and businesses and generate a growing share of the nation's electricity supplies, to formations with a higher content of liquids – that is, ethane and other natural gas liquids (NGLs) as well as petroleum.

The most important liquid-rich shale formations currently being exploited are the Bakken in North Dakota and the Eagle Ford in southern Texas. The portion of the Utica shale deposit underlying the eastern third of Ohio appears to be another source of NGLs and petroleum.

Amber Scorah: Everyone understands the significance of petroleum deposits, but why are NGLs important?

Ethane and other NGLs are the basic raw material used by the chemical and polymer sector. As explained in a March 2011 report issued by the American Chemistry Council, ethane is converted into polyethylene, which in turn is manufactured into a wide range of household and industrial products.

As highlighted in the same report, the availability of cheap methane (an energy source at many industrial facilities) and inexpensive NGLs gives the chemical industry in the United States an enormous cost-advantage over its competitors in other industrial nations. The chemical industry in Germany, for example, uses Naptha as a feedstock. Naptha is a petroleum-derivative and is priced accordingly.

In Ohio, shale development has created business for manufacturers of steel pipe, compressors, and other goods used in the upstream segment of the energy sector. Likewise, increased availability of NGLs from the Utica is expected to benefit chemical plants and the polymer industry, which employs 130,000 workers in the state.

Dr. Southgate is a speaker at the upcoming Shale Petrochemical Manufacturing Summit, November 7 to 9, 2012, in Philadelphia, PA. For more information or to register, visit www.shaletopetrochemicals.com or email info@IQPC.com.

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