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The shale revolution: Fracks and figures

Singapore Management University

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The U.S. shale revolution could yet make a difference in controlling climate change

In June 2014, the U.S. Environmental Protection Agency (EPA) proposed new regulation to cut U.S. carbon pollution from power plants by 30 percent from 2005 levels, with 2030 being the deadline. Much of this is targeted at some 600 of the country's coal-fired power plants, which account for 39 percent of the energy produced in America.

"If it wasn't for the shale gas revolution," said **Scott Sheffield**, Chairman and CEO of energy exploration and production (E&P) company, Pioneer Natural Resources, "I don't think President Obama could put as much pressure on the coal companies as he has. Since 2009 he has put out stricter rules for compliance for coal plants."

Separating frack from fiction

The shale gas revolution was made possible by two things: horizontal drilling and hydraulic facturing (fracking). Neither technology is particularly new, with horizontal drilling first utilised in the 1930s and hydraulic fracturing in the 1940s.

The practice of hydraulic fracturing, where a mixture of water and sand is used to fracture seams of sedimentary rocks – shale – containing natural gas and oil gained public attention following the premiere of the documentary *Gasland*. Its director, Josh Fox, claimed that fracking caused methane gas to seep into groundwater and polluted water supplies. Although many experts have come forward to rebut Fox's claims (see here and here), other misconceptions regarding water linger on.

"Some people believe we use up too much of the world's water resources," Sheffield told *Perspectives@SMU*. "We need 250,000 to 300,000 barrels of water per day. Although our industry uses less than one percent of the freshwater in the state of Texas, Pioneer is committed to innovative water stewardship in our operations. Several important initiatives aimed at decreasing Pioneer's fresh water usage include using brackish, non-drinkable groundwater, water recycling and using industrial and municipal wastewater.

He adds, "To date, Pioneer has hydraulically fractured over 13,000 wells, and we've had no contamination. The U.S. has hydraulically fractured half a million wells and there is no contamination.

People need to be educated on the facts. We go to great lengths to make sure there is no contamination because it will hurt our industry."

Demand and (over)supply

What has hurt the natural gas industry is oversupply. Between 1999 and 2011, the number of gas wells in the U.S. went from just over 300,000 to more than 500,000. Towards the end of that time period (2005-2013), U.S. production of natural gas jumped by 33 percent from 18 to 24 trillion cubic feet (tcf) per year.

Shale accounted for a big part of that supply glut, going from 0.75 to 8.5 tcf per year. As a result, shale gas that sold for US$6-8 per million cubic feet (mcf) is now sold for US$3.50 to US$4 per mcf. "We found too much gas, and the market collapsed," laments Sheffield. "The rest of the world is paying $12-16 for natural gas."

While cheaper natural gas has somewhat lowered the cost of electricity in the U.S. (see here), supply still outstrips demand. The U.S. currently produces around 70 billion cubic feet (bcf) of natural gas per day, but it has more than enough capacity to produce 100 bcf per day. Some of it has been exported to other countries.

"The U.S. will become one of the major ethane exporters," Sheffield claims. "The first shipments have already been signed up by India. Ethane production in the U.S. has gone up from 700,000 barrels a day to 1.3 million barrels a day, and that figure should double within the next five to 10 years."

Catching on

While renewable energy sources of energy such as solar, wind, and geothermal heat are the ideal long-term alternatives to fossil fuels, natural gas is a good bridge fuel as it is much cleaner than coal. Question is: Is there enough natural gas to go around until a reliable way to harness renewable energy sources can be found?

"Enough hydrocarbons exist to keep the world going for 300-400 years," Sheffield says. He explains that natural gas as a source of energy hasn't developed as quickly outside of the U.S. "due to a high cost structure, a lack of midstream infrastructure, and a lack of abundant water resources to frack with. It will take another 20-30 years before horizontal drilling and shale gas to catch on worldwide."

Sheffield adds, "If the U.S. can be a provider of LNG to the rest of the world, it has a good chance of helping reduce emissions in China. China is trying to replace coal with something else, and they are looking for LNG themselves. I think they should just import a lot more LNG instead of looking for it. "The shale gas revolution will help lower emissions. Hopefully they'll find their own shale gas."