Regulation: an acceptable cost for frackers

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Fracking companies must accept their environmental responsibilities if the world is to reap the benefits of shale-gas development, says David Zetland*

RECENT advances in hydraulic fracturing (fracking) technologies and techniques promise to unlock vast reserves of natural gas. Additional shale-gas supply will reduce energy costs, carbon emissions and, for many countries, dependence on foreign energy producers.

Not surprisingly, fracking is now subject to massive media and political attention. Unfortunately, that interest is mostly negative: there's a risk and perception that fracking threatens to deplete and pollute water supplies.

Fracking can affect freshwater in four ways. First, fracking injects a large volume of water underground; this water has to come from somewhere. Second, chemicals mixed with water before it's injected pollute the water, which can mix with other waters. Third, fracking fluids that escape the injection well and shale formations can mix into aquifers or reach the surface through unexpected routes. Fourth, fracking can release methane that pollutes local aquifers and the water being pumped to the surface.

The public don't like water pollution, and politicians and regulators are listening to them. Consequently, the fracking industry risks being shut down before it gets started. Not because it's inefficient, technologically complex, or unprofitable, but because of its real or imagined threat to freshwater supplies.

The French government has banned fracking. The Polish government wants to encourage fracking, but worries about adverse side effects. The situation in the US varies from state to state, but federal officials at the Environmental Protection Agency are preparing a report that will have significant impacts.

The industry must take responsibility in promoting sound fracking practices that protect the environment if it wants to avoid a premature death by legislation or regulation. Inaction or opposition may result in the death of a goose that's only just begun laying golden eggs.

Technology is not so important

Anyone in the oil business knows the produced water resulting from oil drilling and production carries heavy salt loads and petroleum residues. Produced water is often reinjected into wells (simultaneously disposing of an unwanted substance and increasing oil yield).

Producers in Canada's oil sands use vast quantities of water to remove and upgrade heavy oil. They recycle a large portion of that water, but they also draw on freshwater supplies and discharge dirty water into holding ponds that are so large that migrating birds mistake them for natural lakes.

In most cases, however, water consumption is not the problem. Producers in Canada's oil sands divert less than 1% of local river flows. A single frac can use as much as 5 million gallons of water (around 18 million litres), but a farmer would be pleased to sell that water to a fracking crew; he might charge $2,000 for water that cost him $200 to pump from the ground.

The problem is water pollution. Produced water must be disposed of without polluting other water supplies; water from oil-sands operations must be held, reused or cleaned. Fracking water that returns to the surface needs to be handled; the water that stays underground cannot mix with freshwater in aquifers (even if this is a remote possibility).

Pollution can be prevented or removed with technology. According to Global Water Intelligence's (GWI) Produced Water Market Report, Canada's oil sands use about 14 million barrels a day (b/d) of water to produce 1.8 million b/d of oil. US energy companies are producing about 57 million b/d of water from all types of output (mostly oil). But the North American market for handling produced...
Water has an annual turnover of only $5 billion; that's only a few days of oil-sands production. The low price of cleaning water won't keep industry from looking for cheaper ways of meeting clean-water regulations or prevent environmentalists from claiming industry cuts corners while discharging too much dirty water, but it can help both sides find a common ground for compromise.

For frackers, there’s good news: because gas’s regulatory environment is still developing and based on regional markets, the sector has a better chance of solving the problem - maintaining water quality while protecting profits - than the globally interlinked oil industry.

**Paying the cost of clean**

GWI provides a useful survey of the techniques the industry uses to handle and clean its water. First, minimise diversions; then maximize reuse; and, finally, treat and discharge what's left. Treatment costs that depend on the volume of pollutants to be removed can result in capital expenditures ranging from $300 to $3,000 a barrel and operating expenditure of $1 to $5/b.

Local regulators determine two critical factors: the fee and quality standard for discharged water. Regulators try to balance the economic, environmental and social interests of citizens who want jobs, tax revenues, clean water and cheaper energy. Many people describe this balancing act in terms of polar opposites - 100% clean water and zero jobs or many jobs and water armageddon – that are driven by an underlying logic: stiff regulation will force industry to go elsewhere.

That logic is strong in the oil industry but weaker in the gas business. The relatively high cost of transporting gas over large distances means it is usually distributed locally. It is, therefore, possible to establish and apply local regulations to match distribution networks, so that all fracking operations are compelled to use the technology that does most to protect local water supplies. This requirement can be guaranteed by performance bonds that pay for the clean-up of any pollution that occurs during operations and for a period after.

Such a regulatory burden will result in higher costs, but these can be passed to customers if all producers incur them. Consumers will pay higher prices if gas is still cheaper than alternative energy sources. They may accept higher prices if they see cleaner operations in their region. Unfortunately, some operators are gaming outdated regulations and pursuing lowest-common-denominator practices.

**Consolidating operations and profits**

The number of players in the fracking industry makes it difficult to co-ordinate actions to address pollution, but wildcats have been herded in the past. In the 1930s, the Texas Railroad Commission (TRC) used its local regulatory authority to impose order on numerous oil-drilling operations. The TRC set pumping quotas that slowed supply expansion and put a floor under falling prices. Some thought the TRC's actions favoured bigger operators, but there's no reason why regulation and consolidation of fracking operations wouldn't help small businesses. They need only reasonable competition among bidders for their permits and/or operations.

Regulation will turn forced pooling on its head: instead of forcing landowners to participate in shale-gas drilling, drillers in a watershed will have to meet the same standards for spill prevention and discharge quality. (Recall the bonding requirement; insurers responsible for damages will police operations.) Operators will be free to innovate and improve their technologies and techniques for fracking and producing gas. They will need to do so only within the constraint of protecting freshwater. It's easy to predict that maximising profits while maintaining quality would drive innovation in clean production. It will also lead to consolidation, as less-sophisticated firms are forced to merge with larger players capable of meeting standards.

Most economists tend to oppose regulations that concentrate industries, slow innovation and reduce competition, but regulation as a second-best option makes sense if the alternative free-for-
all produces spills and pollution, a political backlash and premature death of a promising, nascent technology. Consider how lax regulation has set back deep-water drilling (Deepwater Horizon) and nuclear power (Fukushima-Daiichi).

The bottom line

Fracking will deliver more natural gas, at cheaper prices, from more-reliable parts of the world. It can do so without adverse effects on water supplies, but only with strong regulation. The industry should embrace and promote useful regulation as an acceptable cost of doing business. The alternative – weak regulation, or industry opposition to clean fracking procedures – is more likely to destroy the industry than increase profits.

*David Zetland* is a senior water economist at Wageningen University, Netherlands. He is the author of *The End of Abundance: economic solutions to water scarcity* and blogs regularly at aguanomics.com

Well, technological breakthrough always come with a cost. Through regulations and innovation there is the hope that this industry will grow and bring down the price of gas globally. I strongly agree with your view Mr.David.

oliver ubah | Jul 15, 2011

This article promotes the use of common engineering standards, which is normal is all industrial processes involving waste water. They are rarely the subject of hot media flashes, however. The amount of treatable water is modest. Fracking is not new; Texas has hundreds of wells where it has been used for decades.. The only novel aspect is that gas has been recently discovered in areas of the US where environmentalists have held power. This presents a political challenge: how to get all that dirty money, while being pure as snow? I have every convenience a politician can do it.

Mr. R. L. Hails Sr. P.E. | Jul 11, 2011