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The Facts About Fracking

The real risks of the shale gas revolution, and how to manage them.

The U.S. is in the midst of an energy revolution, and we don't mean solar panels or wind turbines. A new gusher of natural gas from shale has the potential to transform U.S. energy production—that is, unless politicians, greens and the industry mess it up.

Only a decade ago Texas oil engineers hit upon the idea of combining two established technologies to release natural gas trapped in shale formations. Horizontal drilling—in which wells turn sideways after a certain depth—opens up big new production areas. Producers then use a 60-year-old technique called hydraulic fracturing—in which water, sand and chemicals are injected into the well at high pressure—to loosen the shale and release gas (and increasingly, oil).

The resulting boom is transforming America's energy landscape. As recently as 2000, shale gas was 1% of America's gas supplies; today it is 25%. Prior to the shale breakthrough, U.S. natural gas reserves were in decline, prices exceeded \$15 per million British thermal units, and investors were building ports to import liquid natural gas. Today, proven reserves are the highest since 1971, prices have fallen close to \$4 and ports are being retrofitted for LNG exports.

The shale boom is also reviving economically suffering parts of the country, while offering a new incentive for manufacturers to stay in the U.S. Pennsylvania's Department of Labor and Industry estimates fracking in the Marcellus shale formation, which stretches from upstate New York through West Virginia, has created 72,000 jobs in the Keystone State between the fourth quarter of 2009 and the first quarter of 2011.

The Bakken formation, along the Montana-North Dakota border, is thought to hold four billion barrels of oil (the biggest proven estimate outside Alaska), and the drilling boom helps explain North Dakota's unemployment rate of 3.2%, the nation's lowest.

All of this growth has inevitably attracted critics, notably environmentalists and their allies. They've launched a media and political assault on hydraulic fracturing, and their claims are raising public anxiety. So it's a useful moment to separate truth from fiction in the main allegations against the shale revolution.

- *Fracking contaminates drinking water.* One claim is that fracking creates cracks in rock formations that allow chemicals to leach into sources of fresh water. The problem with this argument is that the average shale formation is thousands of feet underground, while the average drinking well or aquifer is a few hundred feet deep. Separating the two is solid rock. This geological reality explains why EPA administrator Lisa Jackson, a determined enemy of fossil fuels, recently told Congress that there have been no "proven cases where the fracking process itself has affected water."

A second charge, based on a Duke University study,



Getty Images

A drilling team from Minard Run Oil Company pull out steel pipe during a fracking operation at a 2100 foot natural gas well in Pleasant Valley, Pennsylvania in 2008.

claims that fracking has polluted drinking water with methane gas. Methane is naturally occurring and isn't by itself harmful in drinking water, though it can explode at high concentrations. Duke authors Rob Jackson and Avner Vengosh have written that their research shows "the average methane concentration to be 17 times higher in water wells located within a kilometer of active drilling sites."

They failed to note that researchers sampled a mere 68 wells across Pennsylvania and New York—where more than 20,000 water wells are drilled annually. They had no baseline data and thus no way of knowing if methane concentrations were high prior to drilling. They also acknowledged that methane was detected in 85% of the

wells they tested, regardless of drilling operations, and that they'd found no trace of fracking fluids in any wells.

The Duke study did spotlight a long-known and more legitimate concern: the possibility of leaky well casings at the top of a drilling site, from which methane might migrate to water supplies. As the BP Gulf of Mexico spill attests, proper well construction and maintenance are major issues in any type of drilling, and they ought to be the focus of industry standards and attention. But the risks are not unique to fracking, which has provided no unusual evidence of contamination.

- *Fracking releases toxic or radioactive chemicals.* The reality is that 99.5% of the fluid injected into fracture rock is water and sand. The chemicals range from the benign, such as citric acid (found in soda pop), to benzene. States like Wyoming and Pennsylvania require companies to publicly disclose their chemicals, Texas recently passed a similar law, and other states will follow.

Drillers must dispose of fracking fluids, and environmentalists charge that disposal sites also endanger drinking water, or that drillers deliberately discharge radioactive wastewater into streams. The latter accusation inspired the EPA to require that Pennsylvania test for radioactivity. States already have strict rules designed to keep waste water from groundwater, including liners in waste pits, and drillers are subject to stiff penalties for violations. Pennsylvania's tests showed radioactivity at or below normal levels.

- *Fracking causes cancer.* In Dish, Texas, Mayor Calvin Tillman caused a furor this year by announcing that he was quitting to move his sons away from "toxic" gases—such as cancer-causing benzene—from the town's 60 gas wells. State health officials investigated and determined that toxin levels in the majority of Dish residents were "similar to those measured in the general U.S. population." Residents with higher levels of benzene in their blood were smokers. (Cigarette smoke contains benzene.)

- *Fracking causes earthquakes.* It is possible that the deep underground injection of fracking fluids might cause seismic activity. But the same can be said of geothermal energy exploration, or projects to sequester carbon dioxide underground. Given the ubiquity of fracking without seismic impact, the risks would seem to be remote.

- *Pollution from trucks.* Drillers use trucks to haul sand, cement and fluids, and those certainly increase traffic congestion and pollution. We think the trade-off between these effects and economic development are for states and localities to judge, keeping in mind that externalities decrease as drillers become more

efficient.

- *Shale exploration is unregulated.* Environmentalists claim fracking was "exempted" in 2005 from the federal Safe Water Drinking Act, thanks to industry lobbying. In truth, all U.S. companies must abide by federal water laws, and what the greens are really saying is that fracking should be singled out for special and unprecedented EPA oversight.

Most drilling operations—including fracking—have long been regulated by the states. Operators need permits to drill and are subject to inspections and reporting requirements. Many resource-rich states like Texas have detailed fracking rules, while states newer to drilling are developing these regulations.

As a regulatory model, consider Pennsylvania. Recently departed Governor Ed Rendell is a Democrat, and as the shale boom progressed he worked with industry and regulators to develop a flexible regulatory environment that could keep pace with a rapidly growing industry. As questions arose about well casings, for instance, Pennsylvania imposed new casing and performance requirements. The state has also increased fees for processing shale permits, which has allowed it to hire more inspectors and permitting staff.

New York, by contrast, has missed the shale play by imposing a moratorium on fracking. The new state Attorney General, Eric Schneiderman, recently sued the federal government to require an extensive environmental review of the entire Delaware River Basin. Meanwhile, the EPA is elbowing its way into the fracking debate, studying the impact on drinking water, animals and "environmental justice."

Amid this political scrutiny, the industry will have to take great drilling care while better making its public case. In this age of saturation media, a single serious example of water contamination could lead to a political panic that would jeopardize tens of billions of dollars of investment. The industry needs to establish best practices and blow the whistle on drillers that dodge the rules.

The question for the rest of us is whether we are serious about domestic energy production. All forms of energy have risks and environmental costs, not least wind (noise and dead birds and bats) and solar (vast expanses of land). Yet renewables are nowhere close to supplying enough energy, even with large subsidies, to maintain America's standard of living. The shale gas and oil boom is the result of U.S. business innovation and risk-taking. If we let the fear of undocumented pollution kill this boom, we will deserve our fate as a second-class industrial power.

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