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**Shale gas extraction**

# The need to be seen to be clean

**Natural-gas production is booming, but its green image is in question**

May 12th 2011 | AUSTIN, TEXAS AND GOLDEN, COLORADO | from the print edition

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DRILL rigs tower over the silos on farms in Pennsylvania. Once-empty mesas in western Colorado, where mule deer and sage grouse ranged freely, now look like a neural network from a bird's-eye view, with well-pads connected by dirt roads scattered across the landscape.

These are the signs of America's natural-gas boom. Thanks to new drilling technology, and in particular a controversial process called hydraulic fracturing or "fracking," the size of the proven reserves is growing. At the end of 2009 the United States had estimated reserves of 283.9 trillion cubic feet (8 trillion cubic metres) of natural gas, up 11% from the year before. In 2010 the country produced 22.6 trillion cubic feet of natural gas, up from 18.9 trillion cubic feet in 2005. The price at the wellhead has dropped from \$7.33 per thousand cubic feet to \$4.16 during the same period.

Natural gas is cheap and plentiful. That makes it an appealing alternative to wind and solar power, which are relatively expensive and erratic. And plants powered by gas emit far less carbon dioxide than those powered by dirty coal. Nearly half of America's electricity is generated by coal, and electricity generation accounts for 40% of America's carbon-dioxide emissions. In 2009, the most recent year for which data are available, the country's greenhouse-gas emissions were at their lowest level since 1995. That was partly due to the bad economy, and partly to the increased use of renewables and natural gas.

But some question whether natural gas is really as green as all that. For one thing, fracking uses

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a tremendous amount of water, a severely undervalued resource inland. And the process gives off methane, a potent heat-trapper. A study led by Robert Howarth of Cornell University found that greenhouse-gas emissions over the life cycle of natural-gas production could actually be considerably higher than those of coal per unit of energy provided. Greater care about methane venting would, of course, reduce that problem.

And fracking raises other concerns. In the process, a mix of sand, water and chemicals is pumped deep underground at ferocious pressure. That breaks up shale formations, releasing the gas trapped inside so it can be pumped to the surface. But fracking is almost entirely unregulated, because of a 2005 statutory exemption from the Safe Drinking Water Act. Three members of Congress recently released a report on fracking, saying that oil and gas companies used more than 2,500 fracking products containing 750 chemicals between 2005 and 2009. Some ingredients were benign, such as citric acid and instant coffee. Others, though, were extremely toxic, such as benzene and lead. Only five states require public disclosure of the chemicals used, and only to limited and varying degrees. That is making landowners, locals and environmentalists edgy, particularly in big production states like Colorado, Pennsylvania, and Texas, the nation's largest natural-gas producer, where an enormous reserve—the Barnett Shale—sits under a big city, Fort Worth.

The chief fear is that the mystery slurry could get into the water supply. In some fracking towns, people have been able to set their tap water on fire. And there have been troubling safety incidents. In late April a big company, Chesapeake Energy, suspended its fracking in Pennsylvania after one of its natural-gas wells blew out and spilled toxic drilling fluid into a nearby creek. France has placed a moratorium on fracking and is close to a full ban.

Activists and scientists reckon that if the process is safe, the companies should come clean. "If they've got nothing to hide, why is the industry so paranoid about disclosing their chemicals?" asks Steve Torbit, executive director of the National Wildlife Federation's Rocky Mountain region. They may have to. The Environmental Protection Agency is studying the process. In 2009, House Democrats proposed legislation that would force the industry to disclose the chemicals it uses in fracking. Several states, including Texas and Colorado, have similar legislation pending.

In the meantime public concerns are growing. Late last month 200 people packed a Bureau of Land Management hearing in Golden, Colorado. Dave Cesark, an executive at Mesa Energy Partners LLC, tried to reassure, saying that fracking chemicals constitute "just a drop in the bucket": only 0.5% of the total fluids, including water, that the company uses to drill natural gas. The crowd did not, strangely enough, find that entirely reassuring. Some producers will grumble that any regulation of fracking is an unwarranted constraint on their business. But if natural gas is not produced cleanly, it will not prove to be so cheap, either. Full disclosure is a price worth paying.

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