



REPORT

'Fracking' Comes to Europe, Sparking Rising Controversy

As concerns grow in the U.S. about the environmental impact of hydraulic fracturing, or "fracking," to extract natural gas from shale, companies have set their sights on Europe and its abundant reserves of this "unconventional" gas. But from Britain to Poland, critics warn of the potentially high environmental cost of this looming energy boom.

BY BEN SCHILLER

Blackpool, in the North West of England, is best known as a traditional seaside holiday town, a place famous for its 518-foot tower (modeled after the Eiffel in Paris), its grand ballroom, and old-fashioned fun, like donkey riding on the beach. More recently, though, it has become known for something else: shale gas drilling.

Four miles from the seafront, in a series of farmers' fields, a company called [Cuadrilla Resources](#) is putting down some of Europe's first shale gas wells. UK-based Cuadrilla is hopeful that the Bowland Shale — the geological formation that runs through the area — will eventually yield millions of cubic feet of gas, possibly as much as 10 percent of the UK's total needs. But environmental groups are raising alarms about the potential impact on water supplies, the landscape, and the UK's wider energy policy.

Across Europe, a host of energy companies are exploring for unconventional deposits in what some are comparing to the great oil and gas rushes of the past. Exxon Mobil has bought up concessions in Germany and Poland. Shell is active in Sweden and Ukraine. Chevron is in Poland. Total is in Denmark and France. And Cuadrilla is also exploring in the Netherlands and the Czech Republic.

Though skeptical not long ago, the industry now is increasingly confident about the size of reserves in Europe, where shale deposits underlie most of the European Union's 27 states. "It's gone from people saying, 'You're crazy, why are you moving to Poland?' to 'Oh, that is the hottest play in Europe,'" says John Buggenhagen, head of exploration at Dublin-based San Leon Energy, which has several concessions in Poland.

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According to the [International Energy Agency](#), Europe could hold 35 trillion cubic meters (tcm) of so-called "unconventional gas," which is dispersed in various rock formations rather than in reservoirs. Europe's total current demand is roughly 580 billion cubic meters annually.

As the industry takes off, however, critics are raising flags about the environmental ramifications, especially at a time when Europe is supposed to be shifting to a more sustainable energy portfolio. The concerns center mainly on natural gas trapped in shale formations and a controversial technique widely used in the United States — [hydraulic fracturing, or "fracking."](#) Fracking involves pumping a high-pressure mixture of water, sand, and chemicals to break apart the shale rock and release gas to the surface. ProPublica, the investigative reporting Web site, [has documented more than 1,000 cases of water contamination near U.S. shale sites](#) in just five states. Hundreds of residents have complained about their water being polluted by fracking and rendered unfit for drinking or bathing.

It is not exactly clear how contamination has occurred, though suspicion rests on "flowback" from wells, since as much as 80 percent of the fracking mixture rises again to the surface. The storage and disposal of wastewater on drilling sites also may be a source of pollution. The anecdotal evidence has been sufficient, however, [to push states like New York to pass moratoriums on new shale development](#), and for the U.S. Environmental Protection Agency (EPA) [to begin a major investigation](#). The New York City Department of Environmental Protection (DEP) said in 2009 that shale gas development caused "invasive industrialization" and created "a substantial risk of chemical contamination, and infrastructure damage." Shale drilling and fracking represent "unacceptable threats to the unfiltered fresh water supply of nine million New Yorkers," added acting DEP Commissioner Steven Lawitts.

The *New York Times* reported on Feb. 26 that it had obtained thousands of internal documents from the EPA and other regulators showing that hundreds of millions of gallons of fracking wastewater that is being trucked to sewage treatment plants and discharged into



Getty Images
A Cuadrilla Resources drilling rig explores the Bowland Shale for gas in Blackpool, England.

rivers [contains high levels of radioactivity released from the fractured shale](#). The *Times* investigation also said that many EPA scientists are concerned that fracking poses a threat to drinking water in states, such as Pennsylvania, where drilling is widespread.

The question in Europe is whether the problems in the U.S. are a result of a particular regulatory regime (or lack of one) or whether large-scale shale gas development can be done safely given proper oversight.

Groups like WWF say UK authorities should not allow shale gas development until more research has been done into exactly what is causing the water contamination issues. "We don't have anything like the history of drilling that they have in the U.S.," says Jenny Banks, energy and climate change policy officer for WWF UK. "We don't even know that the shale rock here is suitable for drilling. So there is a massive amount of uncertainty." The UK's shale formations, which differ somewhat from those in the U.S. in their structure

and porousness, may generate their own environmental issues, she says. Apart from the impact of the chemical mixture that developers put in the ground, there is also the possibility of releasing contaminants in the rock, including benzenes and radioactive isotopes.

Unhappily for Cuadrilla, it is setting up shop just as controversy over shale gas is gaining momentum. The Oscar-nominated documentary, [Gasland](#), which shows how shale gas has affected households across the U.S., has provided a hook for TV and press reports, and the company has become a lightning rod for shale gas critics. The [Tyndall Centre for Climate Change Research](#), at Manchester University, timed [a recent report on shale gas](#) to coincide with the release of *Gasland* in Britain in January. Like WWF, the Tyndall Centre has called for a moratorium on drilling, joining the opposition Labour Party and the Green Party, which is leading protests in the North West. The UK parliament this month started an inquiry into shale gas.

For now, the British government is allowing exploration to proceed. In its submission to [the inquiry](#), the Department of Energy and Climate Change says the "safety risks and hazards associated with drilling for shale gas should be no more onerous than those associated with drilling for any other hydrocarbons by a borehole." For its part, Cuadrilla says it has cooperated closely with three government agencies, including Britain's Environment Agency, submitting all necessary information about its process, including what chemicals are in its fracking mixture. It has also submitted an extensive environmental assessment report as part of its planning application with Lancashire County Council.

Chief executive Mark Miller says Cuadrilla is avoiding many of the chemicals used in U.S. production, some of which would undoubtedly be illegal on European soil. He blames Halliburton, which developed fracking in 1949 as a way of extending the life of conventional gas wells, for failing to disclose toxic substances in its fracking fluids, and thus giving the rest of the industry a bad name. As for evidence of water contamination, Miller says the cases are either unproven, or the result of poor drilling practices.

Cuadrilla says there are "no officially documented case[s] of frac[k]ing causing leakage of hydrocarbons of frac[k]ing fluid into shallow water aquifers in the history of U.S. shale gas extraction."

The French Ministry of Ecology has called a halt to shale gas drilling throughout the country.

However, recent comments by some EPA officials and scientists indicate that they are coming to the conclusion that contaminants found in wells in Wyoming, where fracking is

widespread, are related to unconventional gas drilling. "It starts to finger-point stronger and stronger to the source somehow being related to the gas development," Nathan Wiser, an EPA expert on hydraulic fracturing, told ProPublica.

Miller says fracking itself is unlikely to cause contamination because it takes place as much as 5,000 feet below the surface, with fractures never coming higher than 300 feet from the initial fracking point. "There is nothing in shale that makes groundwater any more vulnerable than drilling in sandstone," he says. "What makes it vulnerable is poor cement jobs and poor casing design."

Despite the efforts of firms like Cuadrilla to assure the public, however, the exploration boom is sparking protests in several countries, notably in France and Germany, foreshadowing what developers could be up against in coming years. Earlier this month, [the French Ministry of Ecology called a halt to shale gas drilling](#) throughout the country while it assesses the environmental issues. Its report is due in June.

Other governments are more supportive. Ahead of a EU Energy Summit this month, Poland inserted language into the official declaration [calling for unconventional gas development](#). Poland is keen to reduce its dependence on Russian supplies, which currently account for two-thirds of its demand. And over the last three years, Poland has granted 79 concessions, becoming a magnet for energy executives and

geologists from around the world.

Ewa Zalewska, director of geology at Poland’s Ministry of the Environment, says Polish shale gas is “the gold rush of the 21st century,” while other officials have spoken of Poland as the “next Norway” and a future “energy super-power.” Poland’s reserves are estimated at 1.4 trillion to 3 trillion cubic meters. And the government is working closely with the U.S., signing on to the U.S. State Department’s [Global Shale Gas Initiative](#), which aims to “help countries seeking to utilize their unconventional natural gas resources.”

Several factors make Poland attractive to foreign energy firms, according to Grzegorz Pytel, energy expert at the Sobieski Institute, a think tank in Warsaw. Under current regulations, producers pay only a 1 percent tax on the volume of hydrocarbons produced, plus a 19-

‘It may have been a transition fuel 20 years ago, but we simply don’t have the space for it to be a transition fuel now,’ says one expert.

percent corporation tax — both low rates by international standards. Also, concession contracts are for longer periods of time than in other countries and cover larger geographical areas.

The largely unanswered question, though, is how producers are going to sell the gas once it is extracted, Pytel says. Polish demand is 14 billion cubic meters a year a year, with 10 billion of that coming from Russia’s [Gazprom](#). To export excess natural gas produced in Poland, Pytel says Polish gas companies will probably have to strike a deal with Russia, which effectively controls pipelines running through Poland.

Andrzej Kassenberg, president of the Warsaw-based [Institute for Sustainable Development](#), says shale gas could help reduce Poland’s need for coal-derived electricity (currently 92 percent of production) and serve as a “transition” energy source on the way to a more renewable future. But he is concerned that shale gas drilling could spoil the landscape and exacerbate water shortages in some areas. “There are going to be thousands of drilling towers and lots of new roads and pipelines, and that could cause social problems,” says Kassenberg.

The idea of shale gas as a transitional energy source is contentious, chiefly because of the time it takes to develop shale gas resources and build gas-fired power stations. A study by Florence Gény, a research fellow at the Oxford Institute for Energy Studies, [finds that Europe will not see “significant” levels of shale gas production before 2020](#). In other words, if shale gas is to be transitional, it will be in the next decade rather than this one.

Experts also disagree about shale gas’s role in cutting carbon emissions. Though industry officials say that burning natural gas emits just over half the CO₂ per unit of energy, compared to coal, several researchers say “fugitive” methane emissions from shale gas production offset the benefits. (Methane is a powerful greenhouse gas.) Cornell professor Robert Howarth has argued that the lifecycle greenhouse gas emissions of shale gas are worse than coal and fuel oil when considered over a 20-year period.

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government officials have shown little concern for the environmental consequences of this new fossil-fuel development boom, Journalist Keith Schneider writes.

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The Tyndall Centre, meanwhile, says there is a little evidence from the U.S. that shale gas has been used as a substitute for coal. Instead, it has been burned in addition to it. The same thing is likely to happen in Europe, according to Tyndall.

Kevin Anderson, who leads the Tyndall Centre’s research on energy and carbon emissions, also is worried about the effect on renewable energy development. “Shale gas might help with energy security and help meet climate change targets in the short-term,” he says. “But then we have the problem that we haven’t developed the renewables which we have plenty of potential for in the UK.”

To meet the UK government’s target of reducing CO₂ levels by 34 percent below 1990 levels by 2020, Anderson believes it will be impossible to include shale gas in the mix. “It may have been a transition fuel 20 years ago,” he says. “But we simply don’t have the space for it to be a transition fuel now.”

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