

# Flaring puts heat on US oil shale boom

## Energy

Useful gas is being wasted through lack of investment in infrastructure, write **Ed Crooks** and **Ajay Makan**

America's oil boom is now so big it is visible from space. In night-time satellite images North Dakota's Bakken shale, the oilfield that has transformed US production in the past five years shines almost as brightly as Chicago.

The lights are flare stacks: towers burning off natural gas from oil wells 24 hours a day. They highlight a less than sparkling side of the US shale boom: how development has outpaced investment in infrastructure to manage the unwanted associated gas that is released alongside oil production.

Gas flaring has been a problem for decades. Flares blazing in the Niger Delta or the deserts of Iraq have epitomised the pollution and disruption caused by oil production in developing countries. It is only recently that they have been a concern in the US.

Under pressure from shareholders, environmental groups and the World Bank, oil companies cut their worldwide flaring by 20 per cent from 2005-10. In 2011, however, there was an increase, caused in part by a steep rise in the US.

Andrew Logan of Ceres, a network of large investors that works on environmental issues, argues that the surge in flaring is a threat to the industry's growth. "Excessive flaring is not only environmentally damaging but also a waste of a valuable resource," he says. "The industry's lack of aggressive action threatens its licence to operate."

Advances in horizontal drilling and hydraulic fracturing – pumping water, sand and chemicals into wells at high pressure to open cracks in a reservoir – have caused a boom in US shale oil production, reducing the country's dependence on oil imports and

creating thousands of jobs. The same techniques have also unlocked abundant supplies of gas, driving US prices down to just \$3.40 per million British thermal units, compared with a 2008 peak of more than \$13. That means gas found in oilfields is often seen as a nuisance to be disposed of, rather than a useful resource.

At 15,000 square miles, almost twice the size of Wales, the Bakken is one of the largest continuous oilfields in the world. But hundreds of miles from any large cities, it is almost among the most remote. The pipelines and processing plants needed to make use of the gas have to be installed from scratch.

Oil production from the Bakken shale is doubling every 18 months, and the field is now responsible for 10 per cent of total US output, but pipeline connections have failed to keep pace. More than 1,000 wells

'Excessive flaring is environmentally damaging and a waste of a valuable resource'

were connected to the gas-gathering system in 2012, but that has not been enough to cut the proportion of the gas being flared, which has remained stuck at about 30 per cent.

"The situation in the shale oilfields is similar to the early days of the US oil industry," said Adam Brandt, a Stanford academic who studies greenhouse gas emissions from fossil fuels. "Companies are competing to develop the resource, which means there is little incentive to delay production to reduce flaring."

The problem is being repeated across the country. In Texas, where production from the Eagle Ford shale rose almost 30 fold from 2010 to 2012, the number of flaring permits increased sixfold over the same period. By last spring, gas sufficient to provide electricity for more than 400,000 homes was being

flared in the state. Flaring has a significant effect on greenhouse gas emissions. Although emissions for US-produced crude are often lower than for imports from countries such as Saudi Arabia, much of that advantage is lost for North Dakota's oil once flaring is taken into account, although its emissions remain well below those associated with production from Canada's oil sands.

Regulators such as the Texas Railroad Commission and North Dakota's Industrial Commission (NDIC) can require companies to lower oil production to reduce flaring.

But state governments, which are enjoying windfalls from oil and gas royalties, are reluctant to curb production. North Dakota is forecasting surplus revenues of more than \$1bn in its 2013-2015 budget.

"If we restricted oil production to reduce flaring, we would reduce the cash flow from oil wells five-fold," said Alison Ritter, a spokesperson for the NDIC. "As well as cutting waste, we are mandated to increase production, which we would not be doing."

The latest attempts to curb flaring in the state involve carrots rather than sticks. A bill currently being considered in the state legislature would provide tax incentives to bring gas to market. State agencies are also encouraging the use of gas-fired generators to power drilling equipment at oil wells.

Justin Kringstad of the North Dakota Pipeline Authority is optimistic that more gas pipelines will be built, as it becomes clear that Bakken gas does have economic value, thanks to the concentration of natural gas liquids such as propane and butane, which are used as feedstocks in the petrochemical industry.

That will take significant additional investment. So far about \$4bn has been spent on gas gathering infrastructure, and the Pipeline Authority forecasts that another \$10bn is required in the course of the next decade.



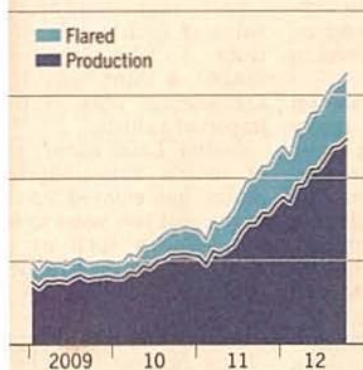
Turning off



A worker adjusts a drill pipe on a gas rig at the Eagle Shale field in Texas

Bloomberg

North Dakota gas production  
billion cubic feet (m)



World's largest natural gas flaring countries  
Cubic feet (bn)



Greenhouse gas emissions required to refine a barrel of diesel in the US from various crude oils (kg CO<sub>2</sub> equivalent per barrel)



Sources: North Dakota Industrial Commission, Department of Mineral Resources, Oil and Gas Division; US National Oceanic and Atmospheric Administration satellite estimates for World Bank; International Energy Technology Laboratory (of US Department of Energy); FT calculations