BUSINESS

The Peterhead project would have converted an old power plant to produce clean energy.

J.J MITCHELL/GETTY IMAGES

Contest puts brakes on carbon capture

As a BP project to capture carbon dioxide from a power station bites the dust, supporters argue that a major opportunity for Britain has been lost. **Andrea Chipman** reports.

For energy giant BP, it seemed the perfect opportunity to show off its green credentials. Convert natural gas to hydrogen and carbon dioxide at a new plant at Peterhead on the north-east coast of Scotland. Use the waste CO_2 to flush the final reserves of natural gas out of the ageing Miller field under the North Sea, storing the CO_2 in the process, and use the hydrogen to generate clean energy in a second, converted, plant. Show the world that carbon capture and storage can be commercial, and that BP can be part of the solution to global warming.

Yet late last month, the scheme fell apart, after the British government published a long-awaited energy discussion document (white paper) on 23 May. The paper proposed a government competition, starting this November, that would select demonstration projects in carbon capture and storage for later subsidy. The result of the competition was expected towards the end of 2008. BP declared it could not hang around that long and announced that it was dropping the project and closing the Miller field.

Industry watchers say that although the BP project, which was unveiled in 2005, was further advanced than other UK carbon-capture proposals, its design might have made it more expensive. The project would have cost £500 million (US$1 billion) to complete, the plant would have had a capacity of 475 megawatts and it would have stored an estimated 1.8 million tonnes of CO_2 annually. BP has already spent around £30 million on the project.

"Peterhead would have been far quicker to bring to fruition," says Sarah Mander, an engineer who works for the Tyndall Centre for Climate Change in England. But "it wouldn't have necessarily" won the competition, she says.

"A government competition, starting this November, would select demonstration projects in carbon capture and storage."

The UK Department of Trade and Industry (DTI) says in the white paper that it wants to see a large carbon-sequestration plant come on stream between 2011 and 2014. But critics say that the competition is not getting under way fast enough to meet this goal.

"If the government is serious about attracting investments from big corporations, it needs to make it attractive to invest," says Stuart Hazeldine, a geologist at the University of Edinburgh and a co-leader of the UK Carbon Capture and Storage Consortium, a government-funded research group. "BP is going ahead with projects in California and Australia. It is very serious about this."

In the aftermath of the BP decision, Alex Salmond, the newly elected first minister of the Scottish Executive, accused the London-based British government of sabotaging the Peterhead plan. The Scottish Executive formally approved the Peterhead proposal on 15 June, three weeks after the company had abandoned it, saying that it was keeping the idea alive in the hope that BP might reverse its decision. A company spokesman says it has no plans to do so.

Up to ten other carbon capture and storage projects could enter the competition, says Anthony White, a director of Climate Change Capital, a specialist London investment bank. A 2006 report by the Tyndall Centre and the British Geological Survey estimated the storage potential in the Bunter Sandstone Formation, which covers the southern half of the North Sea, and gas fields to the north at 2.8 billion tonnes and 14.3 billion tonnes, respectively. The report added that a "very large

proportion" of the country's 176 million tonnes of annual CO_2 emissions from power plants could be stored in the Bunter formation alone.

"No other country has a project close to being operational on a commercial scale," says Jeff Chapman, chief executive of the Carbon Capture & Storage Association, a UK trade group. "The UK could get there first."

Small-scale demonstration carbon capture and storage plants are going ahead elsewhere. The German utility company RWE, based in Essen, plans projects in Germany and Britain, and the Swedish power company Vattenfall of Stockholm intends to have a 30-megawatt coal-fired plant operating in Germany by mid-2008. Waste CO_2 is already captured from oil and gas fields in Norway and Algeria. But no one has yet demonstrated the commercial-scale use of the technology at a power station.

Three carbon-capture technologies are on the table. Pre-combustion capture, the model for the Peterhead project, chemically splits methane or gasified coal into hydrogen, which is burned, and CO_2, which is sent underground. It is in use in oil refineries but is more expensive than the other technologies. Post-combustion capture, in which an amine solvent absorbs the CO_2 before it goes up the chimney, has been proved on a small scale and could be retrofitted to existing coal-fired plants. The third option, oxy fuel firing, separates oxygen from the air, releases nitrogen, and burns coal or gas in the pure oxygen: this approach will be used by Vattenfall.

One argument against the Peterhead proposal is that it could not be retrofitted to coal-fired plants, which are responsible for a huge slice of emissions not only in Britain but also in China and India (see page 1038). Those are the nations whose emissions are growing most rapidly, and where Western governments hope that sequestration technology could generate exports.

Whatever the technology, operators are looking for subsidies to meet the high cost of sequestration plant. By the time a prototype carbon capture and storage scheme comes on line, the British government expects to have collected a 'fighting fund' of at least £1 billion for subsidies by auctioning allowances for companies to emit carbon under Europe's emission-trading scheme.

Advocates of carbon capture say the government should concentrate on getting projects going, rather than on selecting which technology to back. Hazeldine claims that Britain has missed opportunities in the past to gain global leadership in technologies as diverse as nuclear power and wind energy. "We've got the legislation and the storage sites and this makes Britain one of the most attractive countries in the world," he says. "The competition is a distraction and a delay." ■

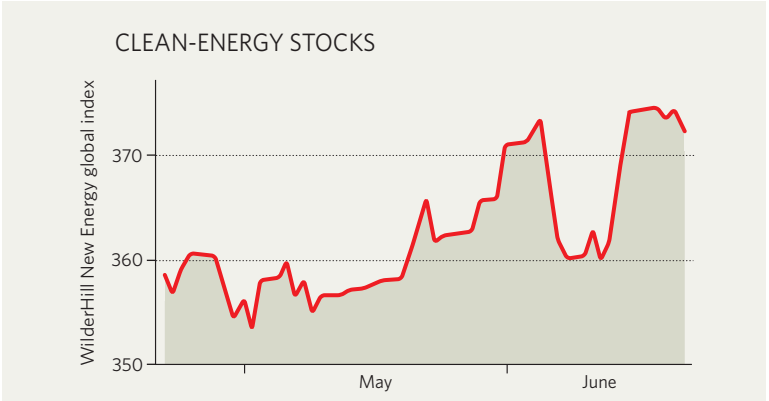
IN BRIEF

TIGHTENING UP **A congressional committee has unanimously approved legislation that would give the US Food and Drug Administration (FDA) significant new powers to police the safety of drugs that are already approved and on the market. The legislation passed by the House Committee on Energy and Commerce on 21 June is similar to a bill already approved last month in the Senate (see *Nature* 447, 247; 2007). Neither contains controversial provisions creating a path for speedy FDA approval of generic copies of biological drugs — leaving these to be considered separately, probably later in the year.**

PATENT PERMITTED **The CSIRO, Australia's main research agency, has won a landmark court case in Texas that appears to restore the rights of such agencies to claim infringement of patents. A judge in Tyler upheld the research agency's complaint against Buffalo, a Japanese telecommunications company, regarding wi-fi technology patented by the CSIRO. The case is seen as significant for other patent-holders because it dispels concerns that, after an unrelated US Supreme Court ruling last year, infringement can only be claimed by parties that are actually selling products based on their patents.**

TAKEOVER TALK **Shares in Bristol-Myers Squibb rose by 4% after a New York court ruled that the patents on its blood-thinning drug Plavix were good for another four years. The ruling on the world's third best-selling drug fuelled speculation that the company could be the target of a takeover bid (see *Nature* 446, 15; 2007). The patents on Plavix are held by French drug company Sanofi-Aventis, but Bristol-Myers Squibb has exclusive rights to sell the drug in the lucrative US market.**

MARKET WATCH



Stocks in renewable-energy companies around the world have continued to rise this spring, confounding widespread expectations of a market correction — at least for the time being.

The WilderHill New Energy Global Innovation index (symbol NEX on the American stock exchange) hit record highs again this month (see graph) and the basket of stocks it contains is now worth almost four times as much as it was in 2002. With investors reconciled to continuing high oil prices — perhaps indefinitely — and government and corporate initiatives on 'clean energy' cropping up every other day around the world, investors in the sector have never had it so good.

According to Rob Wilder, president of WilderShares, a California consultancy that co-compiles the index with New Energy Finance of London, the latest boost arrived in the shape of a fresh energy bill being drafted in the US Congress. Although its final shape remains to be seen, it is likely, Wilder says, that the measure will divert "billions of dollars" in subsidies from the oil industry to renewables.

There has been some takeover activity. On 20 June, electronics giant Philips purchased Color Kinetics in Boston, which makes lighting systems based on light-emitting diodes (see *Nature* **447,** 766–767; 2007), for US$790 million. But an unusual characteristic of the boom is the relative lack of consolidation among clean-energy companies. "There's almost the opposite, with new companies sprouting up all the time," Wilder says. "Every company thinks they have a shot to make it. If I ran a company in this sector, I wouldn't want to sell it." ■

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