

Energy

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Volatile climate puts billions at risk

Christopher Adams finds a sector preparing for a painful adjustment

Ask anyone running a global energy company how far the oil price will fall and you will probably get a wry smile in response.

Little wonder when the market has turned on its head. Opec's unexpected decision in November not to cut output in the face of a US supply glut and weakening demand in China triggered a crash nobody predicted.

Saudi Arabia, Opec's de facto leader, has said it will no longer play its traditional role of swing producer. "Whether it goes down to \$20, \$40, \$50, \$60, it is irrelevant," said the kingdom's oil minister Ali al-Naimi in December. The effect of those words has been to remove any implicit price floor. Since then, internationally traded Brent crude has hit a six-year low of \$45 a barrel. It is down 50 per cent from last summer's peak and within touching distance of the financial crisis nadir of 2008. A return to \$100-plus levels looks remote.

The repercussions of the slide are only now starting to be felt. A wave of corporate takeovers could reshape an energy industry battered by the price fall. Royal Dutch Shell's agreed £55bn offer this month for UK-based BG Group, the biggest energy deal in more than a decade, may usher in further consolidation.

The winners are likely to be the world's big consuming economies: the US, Europe and China. Households will enjoy greater purchasing power and the



Pipeline: US crude has almost filled tanks in the country's Cushing storage hub in Oklahoma — Daniel Acker/Bloomberg

fall could boost overall growth in the global economy. But the regions that produce oil will be hit hard.

Countries that rely heavily on oil export revenues, those with limited foreign exchange reserves and sizeable populations — Iran, Iraq and Venezuela,

for example — will struggle. Russia's position looks increasingly precarious, with its vast energy sector also affected by western sanctions because of the conflict in Ukraine. Thousands of workers linked to the Canadian oil sands industry, one of the highest cost produc-

ing regions, have lost their jobs. Cities such as Calgary in Canada and Aberdeen, home to businesses operating in Britain's North Sea, face a bleak 2015.

Bob Dudley, chief executive of BP, has likened the collapse in prices to the slump that crippled the industry in

1986. Then, Opec decided to switch from a policy focusing on prices to one focusing on market share, in effect a decision to allow crude prices to fall.

"This is a supply-led crisis," Mr Dudley says, warning that companies should be prepared for several years of lower prices.

Indeed, rising stocks of US crude, the product of America's "shale revolution", have almost filled tanks in the country's storage hub in Cushing, Oklahoma. And, even as the smaller, independent producers which have led that revolution cut sharply the number of drilling rigs used in exploration, there is no sign of a reversal in US production. It continues to glide higher.

The world's biggest oil companies are reacting. Exploration budgets for this year are expected to be cut by 30 per cent, according to Wood Mackenzie, the energy consultancy, as the so-called supermajors axe capital spending.

Emma Wild, head of upstream oil advisory at KPMG, says shareholders are demanding the majors become "leaner and more efficient" after years of soaring costs have eroded returns on capital. Now, following the fall in prices, as much as \$1tn of investment is at risk, says Goldman Sachs.

The oilfield services industry is bearing the brunt of a wave of cost-cutting, as rig contracts for costly deepwater exploration are pared back or abandoned. Rates for offshore rigs have tumbled 20 per cent from year-ago levels.

Except for Shell, which is pressing ahead in Alaska, drilling plans for the Arctic, the next big oil frontier, have largely been put on hold. But the scale of the cuts varies widely, with some explorers such as Tullow slashing their

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Japan's aggressive push on renewable energy after the 2011 Fukushima nuclear disaster has stalled

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Total is the world's 2nd largest solar company with SunPower

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Renewables ride wave of success as prices fall and spending jumps

Market share Contracts in oil-rich regions show solar and wind can compete, reports *Pilita Clark*

The past five months have been full of heartening news for the renewable energy industry, which has grown used to the opposite.

Instead of the subsidy cuts, bankruptcies, trade rows and investment dips that dominated the sector three or four years ago, there have been record levels of installations, surprising price falls and a welcome surge in spending.

Global investment in renewable energy bounced up for the first time in three years last year to \$270bn, a 17 per cent rise from 2013, the UN Environment Programme reported last month.

A \$75bn boom in solar power installed in China and Japan drove part of the surge, along with a record amount of offshore wind farm investment in Europe.

But the more interesting aspect of the \$270bn spent last year, that does not include investment in large hydropower plants, is the record amount of so-called modern renewables it helped fund.

At least 95 gigawatts of wind and solar generating capacity was installed last year, far more than the 70GW built in 2011, the only year when the dollar amount invested was higher – at \$279bn.

That also illustrates the rate at which costs are falling, especially for solar panel technology, a shift some green power companies claim will cause a profoundly disruptive shift.

"Solar and wind are about to gobble up market share around the world," says Thierry Lepercq, chairman of Solairedirect, a fast-growing French

company that has 57 solar parks built or under construction around the world. "We're generating power at lower prices than other energy sources in Chile, India and South Africa," he says.

Among the industry milestones of the past five months was a contract that Dubai's state utility awarded for a solar power plant to the ACWA group from oil-rich Saudi Arabia that will sell electricity for less than 6 US cents per kilowatt hour. That is at least 2 to 3 cents cheaper than generation from gas in Dubai, according to Adnan Amin, head of the International Renewable Energy Agency. Solar panel prices have dropped 75 per cent since 2009 and the total installed costs of big, utility-scale solar plants fell by as much as 65 per cent between 2010 and 2014, according to the agency.

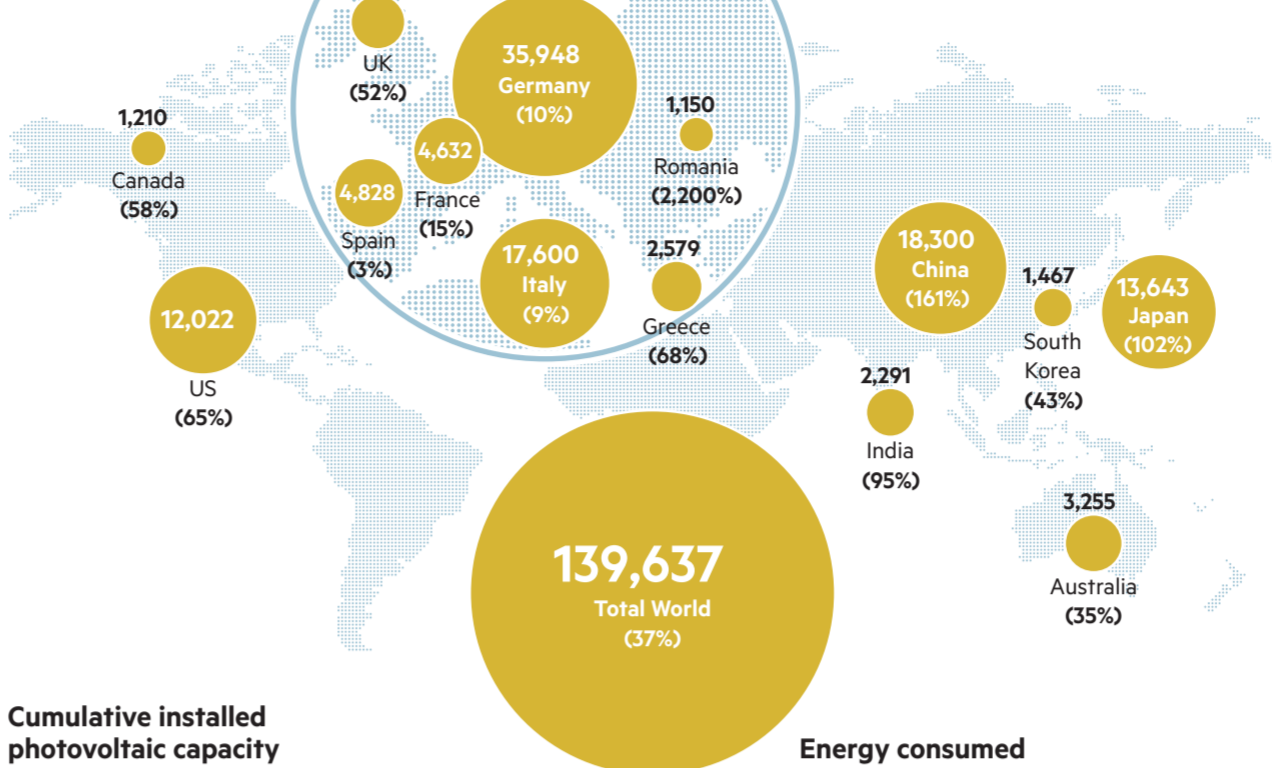
Those lower prices are one reason the city of Georgetown in Texas, also famed for its oil wealth, declared in March it was going to become the first city in the state to get all its electricity from solar and wind farms by 2017.

Jim Briggs, interim city manager, says: "Georgetown Utility Services isn't required to buy solar or other renewables. We did it because it will save on electricity costs and decrease water usage [used in conventional power generation]."

When the industry's history is written, today's chapter will be called "renewable energy reaches adulthood," says Neil Auerbach, chief executive of the US private equity group Hudson Clean Energy Partners. "It's a young

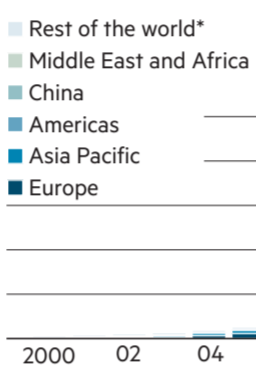
Consuming energy

Solar megawatt capacity
Selected countries, 2013
(Figure in brackets is % change 2012-13)



Cumulative installed photovoltaic capacity

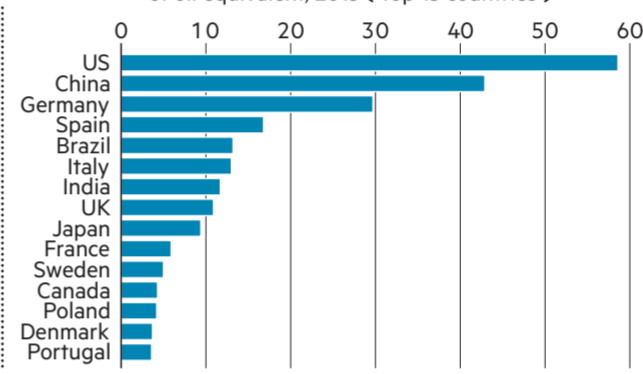
Gigawatts



FT graphic Sources: Epia; BP * Methodology used for RoW data collection changed in 2012 ** Renewables includes solar, wind, geothermal, biomass, biofuels and waste

Energy consumed

Generated by renewables**, million tonnes of oil equivalent, 2013 (top 15 countries)



adult, but it is still an adult," he adds, explaining the sector is now less reliant on the government subsidies that propelled its early growth.

"Also, the size and quality of the biggest players is more meaningful," he says, pointing to the larger companies

'Solar and wind are about to gobble up market share around the world'

emerging in the sector. They include the US groups SunEdison, a solar and wind park developer, and First Solar, a solar-panel maker, both of which have a market value of more than \$6bn.

Still, the recent fall in oil prices has dented some forms of renewable energy. One of the UK's biggest biofuel plants, the Ensus factory on Teesside, was temporarily closed in February amid a sharp fall in biofuel prices, which mirror the oil price.

But oil accounts for a small percentage of electricity generation in most countries, and is only about 1 per cent in

nations such as the US, so it is not clear that lower crude prices will have a big impact on renewable power generation.

Even so, the sector's recent growth has to be seen in context.

In the past seven years, renewable power (not including large hydroelectric plants) as a percentage of global electricity generation has only grown from 5 to 9 per cent, according to the Bloomberg New Energy Finance research group.

At current rates of growth, it will take until 2030 for renewables to reach 20 per cent of global power generation.

Offshore fields use power sent from land

Extraction costs

Extracting and delivering oil and gas offshore uses a lot of fuel, but some companies are working to change that, writes *Michael Kavanagh*

Offshore oil and gas fields supply much of the world's energy, but it is not always appreciated that the very platforms extracting and delivering supplies to shore are themselves considerable consumers of fuel.

Larger platforms deployed in the North Sea can typically consume power at a rate of 50 to 100 megawatts across a large range of processes – including oil separation, gas compression, wastewater treatment, gas lifting, and the ultimate export of oil and gas to shore.

One study suggests that more than a quarter of Norway's total carbon dioxide emissions could be attributed to North Sea oil and gas platforms operating in its waters at the beginning of the decade.

However, a combination of environmental lobbying, engineering problem-solving and economic calculations have prompted the oil-rich nation to raise its game.

Statoil, Norway's oil industry champion, announced last month the award of a \$155m contract to engineering company ABB for initial work on the first stages of a land-based power supply for the development of the Johan Sverdrup field – the biggest North Sea oil discovery of recent years.

In total, partners backing the scheme are budgeting more than five times that amount to send power from Norway's grid system, which is normally fully supplied by the country's abundant hydroelectricity, via a high-voltage, direct current cable to help fuel oil and gas extraction from 2019 onwards.

A 200km long submarine cable should have the capacity also to power adjacent fields scheduled for development from 2022, in line with commitments demanded by a coalition of Norwegian political parties last year to secure public backing for the launch of production from Johan Sverdrup.

The four platforms that make up the first phase of the development are planned to be entirely powered from shore by a 100MW HVDC link, with planned production of 550,000-650,000 barrels of oil equivalent per day expected to account for a big jump in the country's offshore production.

Other hydrocarbon operators appear to be learning that tapping grid supplies can make reputational as well as economic sense – particularly when these supplies are derived in part from renewable or low-carbon sources not always fully exploited by other industries.

The first power-from-shore oilfield cable was installed in Saudi Arabia's Abu Safah development 50km into the Persian Gulf in 2003. Since then, two Norwegian platforms – Statoil's Troll and BP's Valhall facilities – have also tapped electricity from land rather than rely solely on gas turbines on board.

But in spite of growing pressure from environmental lobbies and economic self-interest, such energy-saving measures remain the exception rather than the rule.

Pressure builds on US to ease crude export ban

Oil

Lobbyists warn of glut in domestic supplies and falling prices, says *Gregory Meyer*

The US may be the world's largest crude oil importer, but one of its main energy policy tussles is over oil exports.

Liberalising the 40-year-old US ban on exporting most domestic crude oil has become the subject of congressional hearings, intense lobbying and a multitude of studies.

The debate seems curious, because the US still has gross crude oil imports of 7m barrels a day. But the volume has been dropping thanks to resurgent domestic production. Supplies of "light," low-sulphur domestic oil from US shale formations have replaced most imports of similar quality.

Opponents mobilising against the ban warn these supplies will saturate the

market, depress domestic prices and slow down further output gains.

The ban was passed in 1975 after the Arab oil embargo crippled US fuel supplies. At the time, economic policy included price controls, and crude export restrictions were needed to effect these controls, according to Columbia University's Center on Global Energy Policy. The ban restricts exports to everywhere but Canada, with few exceptions. For decades, the law was little more than cocktail-party trivia for policy specialists. US crude oil imports climbed steadily along with domestic fuel consumption to a peak above 10m b/d in 2005, making the question of exports irrelevant.

But it has come back into focus as oil supplies climb from states such as North Dakota and Texas. Last year, US production rose by 1.2m b/d, the largest increase in records dating to 1900. Commercial crude inventories this spring were at their highest for 84 years.

"For most of the past 40 years, the

thought of exporting crude oil was not an issue. Folks had pretty much forgotten that when we lifted oil price controls in the early 1980s, we forgot to lift the ban," says Robert McNally, president of The Rapidan Group, a Washington-based consultancy.

The ballooning supply is reflected in prices. US benchmark West Texas Intermediate has fallen to a discount to Brent, the global marker. Keeping the export ban will widen this discount and result in "lower US crude oil production and higher prices for global crude oil and gasoline", says IHS, a consultancy, in a report sponsored by energy companies.

The refining industry, the primary consumer of crude, says there is no glut and is investing \$5bn to process an additional 730,000 b/d of light crude by 2016. Opening the floodgates for US crude exports would be unfair, it argues, unless Congress also repeals a 1920 law requiring all tanker and barge shipments to go on US-flagged, US-built vessels. The law, called the Jones Act,

makes it more expensive to ship Texas oil to Pennsylvania than to some foreign refineries.

US refiners may freely export petroleum products, such as petrol and diesel, and are doing so in record volumes. They have enjoyed fat profit margins by refining relatively cheap US crude feedstock into products sold at global prices.

The White House cracked open the door to additional exports last year, when the Department of Commerce said crude oil processed through a simple distillation tower would qualify as having been refined enough for export. In practical terms, the announcement applied to condensate, a type of ultra-light oil prevalent in the Eagle Ford shale of Texas. Since then, several com-

Jake Dweck:
Several companies have received classifications to export processed condensate



panies have received classifications to export processed condensate, says Jake Dweck, a partner at Sutherland, the law firm. Others are relying on these classifications as a precedent to export condensate without explicit approval.

Exports of processed condensate so far have been modest. Yet even these volumes were sufficient to help drive Brent oil below \$75 a barrel in the second half of 2014, says Colin Fenton, managing partner at Blacklight Research and a fellow at Columbia.

The White House has some scope to open the door wider under current law. One option is to allow US producers to swap their light oil with equal amounts of heavy oil from Mexico. In late March, according to Reuters, Mexico's state oil company Pemex was awaiting approval to swap some oil. A group of senators has urged the White House to go further and allow unfettered exports to Mexico.

Ending the ban would take an act of Congress. But lawmakers are sensitive to being blamed for higher petrol prices.

Volatile climate puts billions at risk

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expenditure by up to 80 per cent to conserve cash, while Shell is keeping this year's spending broadly steady.

Arthur Hanna, managing director for energy at Accenture, says that much of the industry had expected a market reaction to Opec's November decision but that many executives were surprised by the rapidity of the price fall.

"That has led to a lot of activity to shore up balance sheets for 2015. The supermajors are looking at ways shared service co-operation could be extended: financial services, pay, treasury and back office functions."

At the same time, billions of dollars in assets have been put up for sale amid expectations of a wave of mergers and acquisitions. Some operators are looking to reduce their exposure to higher-cost producing regions, such as the North Sea and the Gulf of Mexico.

So far, notwithstanding the BG takeover, predictions of transformative deals comparable to the takeovers of the 1990s that created today's supermajors look overheated. Mergers on this scale are rare – and some argue – rarely deliver promised savings.

More likely is consolidation among

smaller US explorers that borrowed heavily to finance their part in the shale boom and which now find themselves struggling to meet bond repayments or are at risk of breaching covenants on reserves-based bank loans. Others remain insulated from the effects of the slide in crude, having hedged their output well into this year by selling barrels in advance at higher prices. But those hedges will soon expire.

When they do, the high levels of borrowing could have a decisive influence on what happens next. The stock of debt issued by oil and other energy companies accounts for some 15 per cent of leading US investment grade and high-yield debt indices. Yields on the bonds issued by riskier energy groups, which move inversely to prices, have risen as oil prices fell, reflecting investors' concerns. That pushes up companies' refinancing costs. All this could spur consolidation. Sarah Wiggins, a M&A partner

at Linklaters, estimates there is \$180bn of "dry powder" ready to be deployed by funds including distressed equity investors. Ms Wiggins points to \$8bn recently raised in the bond markets by Exxon-Mobil, the US giant, which has said it is "alert" to bolt-on acquisitions.

Other possible buyers include private equity groups such as Carlyle and Blackstone, while Russian billionaire Mikhail Fridman has launched a \$10bn fund, run by former BP chief executive Lord Browne, to hunt for acquisitions.

However, the fierce cost-cutting and scale of the corporate debt burden is also likely to constrain production. The reason US oil and gas output has continued to grow is that producers have focused on their most productive and profitable wells. In time, reduced investment and slower growth in output should put a floor under the market.

Standard & Poor's forecasts a recovery for Brent to about \$75 a barrel by 2017. By then, say some analysts, it will be the "Lower 48" – the home of US shale – that has turned global swing producer, able to turn on and off the taps to meet demand.

Expect a volatile ride on the way, and a painful adjustment for the industry.

It's a jungle out there

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The amount of
investment at
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Goldman Sachs

Energy

Oil rout forces companies into radical policy rethink

Liquefied natural gas

Projects under construction and those in low-cost regions are better prospects, reports *Anjali Raval*

Brent crude at half the level of last June has made the production of expensive oil — from the Arctic to Brazil — unattractive. And the liquefied natural gas (LNG) industry could become another casualty.

This is because the LNG market is dominated by long-term contracts whose pricing is linked to oil. Existing projects, many of which came on stream recently to meet Asian demand, have seen lower revenues, while expectations for what can be earned on new projects have been reduced.

The oil rout — prices are hovering at \$62 a barrel — has also meant developers of big projects have less money to spend. Energy companies have been forced to retrench, re-evaluating investment plans, reassessing cost structures and cutting expenditure.

Trevor Sikorski of Energy Aspects, a consultancy, says: “Most integrated LNG developers are also oil majors and

do not report separate capital expenditure for LNG projects.” The companies that are big LNG suppliers, from Exxon-Mobil to BP and Statoil, have announced cuts totalling \$45bn this year — close to a 20 per cent year-on-year reduction.

The timing is not ideal. LNG prices had already fallen as the rise in global energy demand slowed on weaker economic growth and milder weather. At the same time supplies were increasing. By mid-March 2015 spot LNG prices delivered into Asia, for example, had fallen by more than 50 per cent year on year. This has wiped out the price advantage of US LNG projects.

In the next four years about 150bn cubic metres of new LNG supply is expected to come on stream, as a wave of predominantly Australian and US projects under construction become operational, says the Oxford Institute for Energy Studies. This raises the volume of global LNG trade by nearly half.

Jonathan Stern, director of gas research at the Institute, says: “Not only are these new projects coming on to the market in a lower price environment than was expected, but the pace of LNG demand growth, particularly in Asia, appears to be weakening.” The drop in the price of crude has only compounded matters.

For showcase LNG projects across the

globe, the impact of lower oil prices as well as a drop in gas prices will not be uniform. For those projects that have already been financed Hogan Lovells’ energy lawyers, specialists in the area, say banks might sit tight as they await an oil price recovery in the next 18 months. However, if the price looks likely to remain low for longer, restructuring of financing arrangements may be required for some projects.

Gas analysts say projects that are already under construction are likely to continue as planned. By 2018, Australia will see new capacity come online from roughly \$180bn in investments, which will result in a 25 per cent increase in global liquefaction capacity, according to Moody’s Investors Service. Meanwhile, the US is poised to become a net LNG exporter by the end of this year.

Although much of this LNG supply has buyers already secured, the remaining portion may struggle to find them. Initially destined for Asia, it may be more likely to land in Europe, given the shorter shipping distances. It may also be harder to achieve the expected return on investment.

In the US, those projects expected to be completed on schedule include Cheniere Energy’s Sabine Pass terminal on the border between Texas and Louisiana, the Freeport terminal in Texas

and the Cameron terminal in Louisiana, according to Boston Consulting Group.

Moody’s says Cheniere Energy’s Corpus Christi project will most likely move forward this year, since it is “among the very few projects in advanced development that have secured sufficient commercial or financial backing to begin construction”.

Simon Ashby-Rudd, head of oil and gas investment banking at Standard Bank, sees better prospects in low-cost regions such as Mozambique and Papua New Guinea that are still economical in a lower oil price environment. But Dan Tyrer, energy lawyer at Linklaters, stresses that the pool of buyers is limited. “Mozambique is proceeding as planned with final investment decisions expected this year,” he says. But “Tanzania, which is geologically similar, may get delayed further”.

Projects elsewhere could be deferred or cancelled altogether. Final investment decisions for large, capital-intensive greenfield projects, such as in Australia and Canada, are likely to be put on hold. The Pacific Northwest project in British Columbia is a sign of this.

Moody’s says low LNG prices will result in the cancellation of the majority of the nearly 30 liquefaction projects currently proposed in the US, 18 in western Canada, and four in eastern Canada.

LNG long-term contracts which have pricing that is linked to oil have been under fire

Battle lines drawn as Obama moves to cut greenhouse gas emissions

US nuclear The country’s largest generator of low-carbon energy fights back, writes *Ed Crooks*

Five years ago, the talk was of a renaissance in US nuclear power. Today, the sector is battling to avoid a slide back into the dark ages. Threatened by competition from plants fuelled by cheap natural gas, the nuclear industry is at risk of being forced into further retreat.

Over the past year, the threat to nuclear generation has risen up the agenda for utilities and regulators.

As President Barack Obama’s administration moves to cut US greenhouse gas emissions, with detailed regulations of its plan for power generation due in the summer, supporters of nuclear power have become increasingly vocal in urging policy to support the country’s largest source of low-carbon generation.

The argument is far from over, however. Proposals for regulatory changes that would help nuclear generators have been attacked as a “bailout” for the industry at the expense of consumers.

The industry argues that nuclear power is an essential part of the energy mix that will fade away without greater financial support, but regulators and politicians are yet to be convinced.

For now, the decline of nuclear in US electricity supply is moving slowly. It accounted for 20 per cent of the country’s power generation in 2009, and will be about 19 per cent this year, according to the government’s Energy Information Administration.

This year is even expected to bring some positive news for the industry with the start-up of Watts Bar 2, sched-

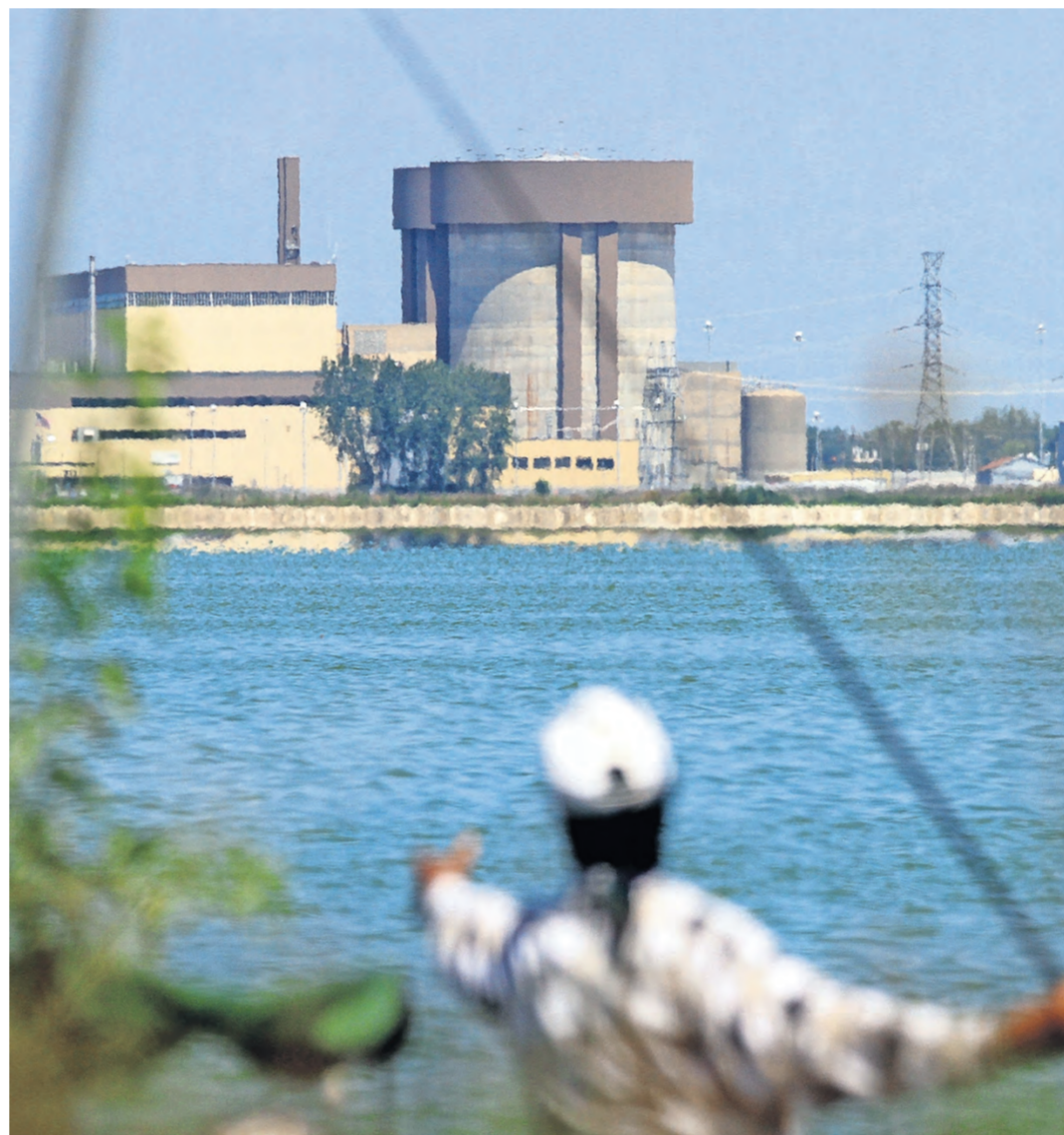
uled to be the first nuclear plant to come on line in the US since 1996. The project was launched by the Tennessee Valley Authority in the 1970s, and construction was stopped in 1985 but restarted in 2007. Its completion will add about 1.1 gigawatts to US nuclear capacity of about 104GW.

However, the long-delayed arrival of Watts Bar 2 is being offset by shutdowns of other US reactors. Duke Energy’s Crystal River plant in Florida and Edison International’s two reactors at San Onofre in California were shut down after they were hit by technical problems that would have required heavy expenditure to put right.

There have also been a couple of plants closed as a result not of technical problems, but of the economics of their local markets. Dominion’s Kewaunee plant in Wisconsin was shut down in May 2013, and Entergy’s Vermont Yankee ceased operating at the end of last year.

Exelon, the Chicago-based electricity group that has the largest number of nuclear plants in the US, has warned that five of its reactors at three plants in Illinois are uneconomic, and are at risk of closing, unless the structure of the power market that includes the state is reformed.

Some US regulators have begun moves in that direction. Late last year the Federal Energy Regulatory Commission held workshops to discuss reforms to market design and pricing structures. It has also been studying the reliability of power supplies.



Risky waters: Exelon has warned that five of its reactors in Illinois are at risk of closing

Chuck Bernini/Chicago Tribune

Marvin Fertel, president of the Nuclear Energy Institute, the industry group, said in February that the cold weather in the US early in 2014 had woken regulators up to the importance of the reliability of energy supplies.

When coal piles and handling equipment froze, and gas production was disrupted by the extreme cold, nuclear plants were unaffected.

That lesson, Mr Fertel says, was being acknowledged by generators, regulators and grid operators.

PJM Interconnection, which runs the grid covering a large section of the northern and eastern US, including Illinois, has set out proposals for a plan, called Capacity Performance, to reward companies that supply guaranteed flows of power when needed. Nuclear generators would be among the principal beneficiaries.

Another proposal to help nuclear generation is the plan for a 15-year power purchase agreement in Ohio put for-

ward by FirstEnergy, the Akron-based electricity group. The state’s regulators are now assessing the idea, which would commit utilities to buying power from one nuclear and two coal plants owned or part-owned by FirstEnergy.

Carol Browner, who led the US Environmental Protection Agency during Bill Clinton’s presidency and was Mr Obama’s top adviser on climate and energy policy during 2009-11, last year joined the leadership council of Nuclear Matters, a group backed by Exelon, Dominion, FirstEnergy and other companies that works to raise awareness of the threat to the industry. She supports the campaign, she says, in part because of the role nuclear power plays in holding down US carbon emissions.

“Climate change is the biggest problem the world faces, and we can’t just get rid of these carbon-free sources of energy while we figure out how to manage this over not just the next five years, but over the next 25, 50, 100 years.”

Carbon capture China’s interest in innovative scheme grows



Success: Boundary Dam

A lack of early-stage proposals for carbon capture and storage schemes could hamper the rate of uptake of the technology, a key tool for radically reducing industrial emissions.

The number of carbon capture and storage (CCS) schemes doubled in 2014 to 22 globally — 13 in operation and nine in construction — with another 14 projects in advanced planning and 18 in early development, says Brad Page, chief executive of the Global Carbon Capture and Storage Institute.

“While we are seeing projects that should reach the stage of making a financial investment decision in the next 12 months, what we’re not seeing is projects coming in at the bottom of the process . . . The pipeline is not full,” says Mr Page.

A difficult financial climate and uncertainty about global commitment to addressing climate change have slowed the pipeline of projects after a significant increase in 2014.

CCS schemes, which capture carbon dioxide emissions produced by burning fossil fuels and store them deep underground, are often found in the power sector but are starting to make headway in other heavy emitting sectors, such as steel and cement.

The world’s first CCS in iron and steel, backed by a joint venture between the Abu Dhabi National Oil Company (Adnoc) and the Abu Dhabi Future Energy Company, is expected to come online in 2016 in the emirate.

Mr Page says there has also been a lot of interest concerning cement, but no projects are confirmed.

“Without CCS, the cost to avoid a global warming of more than two degrees Celsius would more than double [rising] by 138 per cent,” he says.

The US and Canada are leading the world in developing CCS, and are

home to the bulk of operational schemes. China and the UK also plan significant projects. “Three and a half years ago, China did not rate a mention in our annual report. In 2014, they’ve hit number two in the world,” says Mr Page.

“ . . . They are not climate change deniers.”

At Boundary Dam, Canada’s groundbreaking CCS coal power plant scheme, SaskPower executives attest to the level of Chinese interest. “We have a Chinese delegation here every two or three weeks,” says Mike Monea, president of CCS initiatives at SaskPower, a Canadian utility. “They’re watching what’s happening at Boundary and learning from us. China is just gathering information right now. When it moves, it will be significant. I think that’s where the next projects of size and number will be happening.”

The Boundary scheme, the world’s first commercial-scale CCS on a coal power plant, has captured an estimated 200,000 tonnes of CO₂ since it opened in October last year.

The captured emissions travel down a 66km pipeline to either an enhanced oil recovery facility for the oilfields, or a saline reservoir 3.2km below the earth’s crust for permanent storage.

The company will make a decision in the next 12 months on building two more CCS schemes.

With the engineering experience gained from the first scheme, costs would be reduced by 30 per cent.

Mr Monea says: “We’ve got all the expertise of building a carbon capture plant — but nobody wants to build one, unless they’re forced to”.

Naomi Mapstone

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Industry hopes there is still an enduring market for the black stuff

Coal

Failure to transition to a low-carbon economy offers big mining companies respite, reports *James Wilson*

Coal is the most abundant and obvious energy source in the world, but opponents to its use are more vocal than ever.

It is not just concern at coal’s role in creating carbon emissions — and hence climate change — that is a problem for demand. Economics also play a part, with coal’s competitiveness against other types of fuel having fallen.

In the US, for example, the emergence of shale gas has meant some coal output has been priced out of the market. Peabody Energy, the US’s largest coal miner, says falls in the price of natural gas will

cut US coal demand by 60m-80m tons this year. US coal demand last year was close to 920m short tons, says the US Energy Information Administration.

Coal still provides about 30 per cent of global primary energy needs and generates more than 40 per cent of the world’s electricity, according to the World Coal Association, the coal miners’ industry body. In the world’s most populous countries, China and India, the percentage of energy needs met by coal is even higher at about 70 per cent.

The International Energy Agency estimates coal demand will grow by only 0.5 per cent a year up to 2040, compared with 2.5 per cent annually over the past three decades. In the US, coal use will fall by one-third during that period, and even in China — whose voracious demand for coal kept the market buoyant for much of the past decade — a peak could come by 2030, the IEA says.

India Ambitious targets may boost demand

With years of strong growth in China’s coal use seemingly slowing, India is emerging as the coal industry’s great hope to take up the slack.

India has the world’s second-largest population and its economy still relies heavily on coal, which meets well over half of energy demand. The election of Narendra Modi as Prime Minister, seen as a reformer wanting to step up economic growth, is seen as positive for coal use. “The Indian growth story is starting to gain traction,” Mike Henry, a senior BHP Billiton executive, told investors last year.

The International Energy Agency (IEA), expects India to become the second-largest coal consumer by 2020, overtaking the US. It also

expects that India will overtake China to become the largest importer of thermal coal, used for generating power. How beneficial this is for global coal exporters is likely to depend on how quickly India can improve its domestic coal mining industry.

Coal India, the state-owned miner, is being asked to double output over the next five years — an ambitious target. India may therefore become a much more important global market.

The IEA puts India’s rise in coal demand in the next five years at 250 megatons. That is more than is currently consumed by any country other than China, the US and India itself. Yet, as the agency says: “There is no other China out there.” **JW**

Indeed, coal consumption in China fell in 2014, with imports down 11 per cent, the first fall in a decade. Economic growth has slowed, while China is also making strenuous efforts to cut coal use to reduce pollution. Coal-fired electricity plants are running at little over half their installed capacity and, combined with abundant supply, this has pushed down global coal prices. Benchmark export thermal coal prices have fallen about 60 per cent from a 2011 peak.

If China is committed to reducing coal use, it will mirror the efforts being made in developed markets. In the US, new rules known as Mercury and Air Toxics Standards, or MATS, are expected to lead to the withdrawal from service of about 60GW of coal-fired generating capacity by 2018. That is about one-fifth of the installed capacity. Even tougher US rules are in the pipeline in the shape of a “Clean Power Plan” by the Environ-

mental Protection Agency. Aimed at cutting carbon emissions from power generation, they could cut US coal demand by a quarter by 2020, but coal companies are fighting hard against the measures, with Peabody saying they are a “major over-reach” by the EPA.

Where does this leave coal miners? Growth in developing countries is still the great hope. Glencore, one of the largest coal miners, points out that Asia’s annual demand for coal is still expected to rise by more than 1bn tonnes by 2025 — more than current total global demand for maritime traded thermal coal — with half the expected increase coming from outside China.

Much depends on the pace of transition to a lower-carbon economy. If all the policy changes that have been announced to cut carbon emissions do not take place, demand for coal is expected to be stronger still.

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