

# European Energy

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## Integration takes a blustery path

Red tape dogs the increased utilisation of renewable sources, reports *Guy Chazan*

Spain sometimes produces so much renewable energy – well in excess of domestic demand – that its wind farms have to be shut down. A similar phenomenon occurs in Scotland. When it is a blustery day and windmills are generating more power than the system can handle, National Grid gives “constraint payments” to operators to temporarily power down their turbines.

Those problems could be solved with one simple fix: the construction of more interconnectors to link up Europe’s electricity markets.

“We’re not taking advantage of all the power that’s available,” says Nick Winser, president of the European Network of Transmission System Operators for Electricity, or ENTSO-E. The answer, he says, is to “get transmission links in place as quickly as possible, all over Europe”.

Mr Winser’s vision is part of a push by the EU to create an internal energy market. It is an incredibly ambitious, and expensive, enterprise. The European Commission says €200bn will have to be spent on transmission lines, interconnectors and new storage facilities across Europe by 2020.

Without it, the commission says, some member states will remain “energy islands”, cut off from their neighbours by a lack of infrastructure connections.

Energy is one of the EU’s main concerns. Its targets of reducing carbon emissions by 20 per cent, increasing the share of renewables in the overall energy mix to 20 per cent and boosting energy efficiency by 20 per cent by 2020 are embedded in the national policies of the member states.

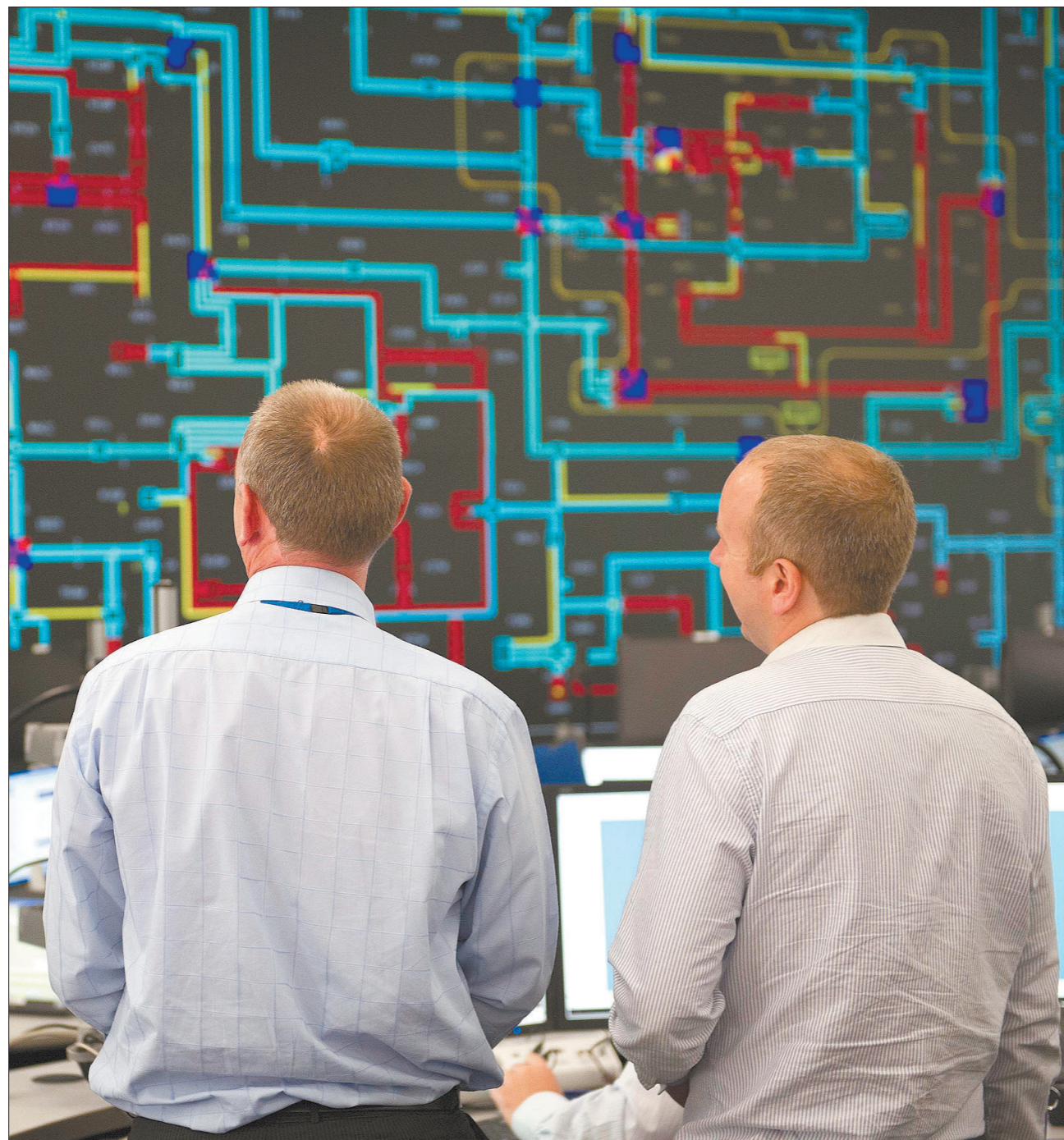
But creating a fully integrated energy market is a Herculean task. To achieve it, says Omar Abbosh, senior managing director at Accenture, key steps are needed: interconnecting infrastructure will have to be upgraded to allow for better management of supply and demand across all Europe, instead of by country; market coupling must be introduced to create a deeper and more liquid power market; and regulatory regimes will need to be harmonised to create a stable regional framework.

That is hard to imagine when each member state has its own system of renewables subsidies and green levies. “While technically feasible, all these things would require a degree of political alignment and drive on energy and industrial policy that is not evident today,” Mr Abbosh says.

Meanwhile, power is becoming more expensive in Europe. The International Energy Agency says real electricity prices increased by 37 per cent in the most advanced economies of Europe between 2005 and 2012.

In the US, where an abundance of cheap shale gas has reduced energy costs across the board, prices fell by 4 per cent over the same period.

The hope for Europe is that more grid connections could mitigate this, and ultimately moderate prices for consumers.



Power demand: National Grid employees manage UK electricity distribution from a control centre in Warwick

At the moment, there are large differences in the wholesale price of power. For example, the price in France per megawatt hour can sometimes be much lower than in the UK. More extensive links to the continent would mean the UK could tap cheap German wind power and French nuclear-generated electricity.

“If there was more interconnection, the UK price would come down,” says Mr Winser.

In fact, the UK is an excellent example of the potential benefits of integration. Mr Winser, who is also executive director of National Grid, says Britain is the “worst-connected country in Europe in terms of electricity”.

Only three gigawatts of power can be delivered through its two interconnectors – one linking to France, the other to the Netherlands. That represents only 5 per cent of peak demand.

This contrasts with natural gas. Thanks to the extensive network of pipelines to Norway and continental Europe, as well as terminals to receive cargoes of liquefied natural gas, the UK can import 70 per cent of its natural gas needs.

That is set to change. Britain is planning interconnectors with Belgium, Norway, Denmark, Iceland and Ireland, and a second one to

‘The challenge is to make this integrated energy system work without a long-term, Europe-wide price of carbon’

**Nick Winser, president, European Network of Transmission System Operators for Electricity**



Nick Winser: links are vital

France. Help could come from the EU. It has put these plans on the bloc’s list of “projects of common interest”, meaning that they could qualify for cash support. Building only half of them would increase the UK’s import capacity to 10 per cent of peak demand.

Member states are working on common technical rules – or grid codes – for the integrated electricity market as well as on a common set of trading arrangements.

This could help to ensure that power flows across the continent’s wires and pipes from the cheapest sources to markets with the highest prices. A regional approach is emerging, with one hub being created in northwest Europe, which could ultimately link up with others, reducing national barriers and ultimately cutting costs to consumers.

The European Commission has estimated that the annual costs savings from electricity integration – as opposed to national self-sufficiency – could be up to €35bn.

“Having more interconnection really improves security of supply, especially when more intermittent renewables are coming on to the system,” says Colette

Lewiner, head of energy, utilities and chemicals at consultancy Capgemini. “It also improves price alignment.”

Building the infrastructure takes a long time. A recent study by ENTSO-E showed that 27 per cent of projects under Europe’s ten-year network development plan have been delayed – largely because of “difficulties in gaining permits and seeking public consent necessary for building new infrastructures”.

Only about half have been commissioned on time.

The European Commission has said about €100bn of investment might not be realised, largely because of delays in permitting procedures and accessing finance. Capgemini said very few interconnectors were commissioned in 2012 and the first half of 2013, while investments by Europe’s transmission systems operators in new gas infrastructure fell by 17 per cent in 2011 to €4.3bn, and stayed flat in 2012.

Europe has tried to speed the process. Developers of cross-border infrastructure such as pipelines or power grids have to wait as long as 12 years for permits. In March the European Parliament adopted rules that should cut that to four.

Even with the correct permits, such projects can take years to build. One example is the new Spain-France interconnector. The €700m line, which will connect Santa Llogaia in Spain to Baixas in France, and run through an 8.5km tunnel underneath the Pyrenees, will double the electricity exchange capacity between Spain and the rest of Europe from 1,400MW to 2,800MW. Once it is completed in 2014, it will have taken two years to build.

Of other potential problems, linking electricity markets can have unintended consequences. Poland and the Czech Republic have long complained about the surplus solar and wind power generated in Germany on sunny, windy days that can overload their grids.

PSE, the Polish transmission network, says it is co-ordinating a response with grids in Czech Republic, Slovakia and Hungary to the unplanned German flows through their systems.

Another serious problem lurks in the idea of linking electricity markets. Much attention is focused on the market distortions created by renewable energy in places such as Germany. Here solar and wind power is growing fast and suppressing the wholesale cost of power. The danger is that these distortions could proliferate.

The European Commission recently drew attention to the problem: “Where markets are linked, public intervention affects prices not only nationally but also in neighbouring markets.”

The commission said resulting distortions could affect system stability, spot market prices and electricity production – and, in the long term, crowd out investments in new capacity.

There are questions as to how a truly unified energy market can be created when the European trading scheme, Europe’s flagship policy to tackle climate change, is in such dire straits. A glut of permits issued under the ETS has helped to push carbon allowance prices down to record lows this year.

“The challenge is to make this integrated energy system work without a long-term Europe-wide price of carbon,” says Mr Winser.

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## European Energy

# Future brightens for unsubsidised home solar

### Photovoltaics

Falls in price for PV create opportunities, writes *Sylvia Pfeifer*

This month executives from more than a dozen British solar-energy companies flew out to Saudi Arabia led by Greg Barker, minister for energy and climate change. Their objective was to capture a slice of the Islamic kingdom's \$109bn push into renewable energy.

Saudi Arabia, the world's biggest oil exporter, says it hopes to generate 41GW of solar power by 2032 to help meet its growing domestic energy needs and reduce its reliance on oil reserves.

Although at an early stage, its ambitious plans have the attention of the renewables industry and start-up companies from the UK. These include Naked Energy and Oxford Photovoltaics. Guildford-based

Naked Energy has developed a hybrid solar technology that generates both heat and power from the same glass collectors.

Christophe Williams, managing director, hopes the trip will lead to a partnership in the country. He argues that Naked Energy's technology addresses two key problems facing the kingdom: dust and heating.

Conventional photovoltaic panels lose about half a per cent of their efficiency with every degree rise in temperature above 25C. Naked Energy's design transfers that heat away from the cells, increasing the electricity output from the solar cells and providing hot water, he says.

Its technology is still in development – pilot production is expected to start next year – but Naked Energy is among a handful of small players in Europe that are prospering despite high-profile victims of the solar boom, such as Conergy and Q-Cells, and a glo-

bal supply glut. "There has been enormous consolidation in Europe," says Mr Williams, "but I think there is still plenty of growth and sustainability here". While it was "not easy" to secure initial funding, the company has benefited from British expertise and know-how, he adds.

'Most countries are on track [to hit] or have exceeded their 2020 targets'

Europe is still "a hub for research and development into solar", says Jenny Chase of research group Bloomberg New Energy Finance. Much of the focus is on small improvements in the materials and processes used in solar manufacture to keep driving down costs. The world's cumulative photovoltaic

capacity surpassed 100GW of installed electrical power last year – capable of producing as much annual electrical energy as 16 coal plants, according to the European Photovoltaic Industry Association.

While about 31GW of capacity was commissioned around the world in 2012, the amount of new solar power installed in Europe fell sharply for the first time in more than a decade, says the association. This was a "turning point in the global PV market that will have profound implications in coming years".

"Europe does not need more solar," says Ms Chase. "Most countries are well on track for or have exceeded their 2020 solar targets."

The market for large-scale new build solar is almost done, she adds, with the market moving to focus on households and small and medium enterprises (SMEs). The group expects total PV new build in Europe this year to total 9.2GW, of

which 2.8GW is residential, 3.5GW commercial buildings and 2.9GW utility scale. Last year, total European build was 16.9GW. The slack, says Ms Chase, is being made up by Japan and China, with a combined total of 16.3GW this year, up from just 6.1GW in 2012.

Government subsidies helped drive rapid growth in Europe. Holger Rubel, senior partner and global head of Boston Consulting Group's green energy and sustainability sectors, says that, in Germany, "it was good to have subsidies for solar PV to help it get off the ground but the industry was over-subsidised and it needed to be corrected."

The key focus, he says, will be on "self-consumption, with homeowners and SMEs installing panels on roof tops, rather than a subsidised market". Module prices have fallen by more than 80 per cent since 2008. This is creating opportunities for unsubsidised solar amid increasing examples

where solar has achieved grid parity – the point at which electricity from PV is as cheap as conventional power.

In Germany, says Mr Rubel, electricity retail prices are near €0.30 per kWh, compared with the "levelised cost" of energy using roof-top PV of €0.11 to €0.15 cents per kWh: "The more energy you can consume yourself, the better."

BCG expects installations in Germany to fall as the market shifts from one driven by feed-in tariffs to one driven by "self-consumption". By 2016, the market should see an installations pick-up, with about 4GW-5GW by 2020, fully driven by self-consumption.

Europe has done a great job to build solar into an industry, says Ms Chase, "but it is not necessary that Europe continues to bear the burden – in terms of the cost of energy – to increase the installation numbers."

# EU list of failings on low carbon is getting longer

### Commentary

JULIAN POPOV

Common economic sense tells us that reducing CO<sub>2</sub> emissions to mitigate climate change is expensive because it requires new energy sources and they cost a lot. This is why many regard the carbon-reduction effort as a game played by rich governments, Brussels bureaucrats and green bullies.

Many EU politicians and incumbent industries fear anything that would put further restrictions on emitted carbon would chase businesses out of the EU.

There is little hard evidence that this is happening. Industries do move around but for many reasons – low wages, labour skills, proximity to growing markets, lax labour regulation and other reasons unrelated to carbon.

While we sit debating the desolation that climate policies might bring, it is the low-carbon industries that are leaving or, rather, not arriving.

Take the solar panel industry. According to the European Commission's photovoltaic status report for 2013, of the 20 biggest PV manufacturers in 2012, only three had production facilities in Europe. China and Taiwan together account for 70 per cent of PV manufacturing. The story goes beyond solar panels. Last year China installed a third of the world's new onshore wind capacity. It plans to build 1,000GW of wind-powered generating capacity by 2050, says Bloomberg New Energy Finance.

Investment in renewables in the EU and the US declined last year, while in Asia and Oceania it rose to €77.7bn. China increased its investment by 20 per cent to €50.1bn and became the sector's largest investor.

Applications for energy industry patents have increased dramatically in the past decade, mostly driven by research and development in the field of renewable energy. A recent paper by MIT and the Santa Fe Institute shows that Japan comfortably leads the race in solar power patents (7,398), followed by the US (5,246) and China (2,063). Europe has 1,951 patents.

In wind energy, an industry that was born out of European innovation, China is moving into second place after Japan and leaving the US behind in the number of patents. Europe is clearly losing the renewable energy innovation battle.

The first country in the world to fully install smart meters is in Europe – Italy. However, the EU looks set to lose the smart grid competition as well. Bloomberg New Energy Finance says last year the US led smart grid investment (\$4.3bn), closely followed by China (\$3.2bn), which is likely to become the largest smart grid investor next year. The EU lags far behind with only \$1.4bn of investment. This

is despite the economy of the EU being roughly twice the size of that of China.

As a World Economic Forum report on smart grids says: "New skills and knowledge need to be injected into an ageing industry workforce."

The significantly higher levels of investment in smart grids in China and the US will inject new skills and knowledge into their workforces and further erode the competitiveness of EU labour. The US and Asia are not the only competition. Africa leapfrogged headline telecommunications to rapidly develop mobile coverage in areas not expected to have cable infrastructure for decades to come. The same is about to happen with electricity. The market for off-grid lighting in Africa is growing fast and reached 4.4m users at the end of last year. This is still a comparatively tiny figure. There are 600m Africans with no grid access to electricity, a figure expected to surpass 700m by 2030.

It is likely that innovations in off-grid and community grid power will run ahead of the development of traditional power supply. Africa could become the leader in innovative power solutions. Most of the components for that revolution are produced in China but a growing share is being made in Africa. South Africa became the country with the most significant increase in renewable energy investments last year, moving into ninth position in the world with investments of €4.2bn. The African low-carbon current will, yet again, bypass Europe. Even Gulf states are accelerating their

'Europe is clearly losing the renewable energy innovation battle'

renewables revolution and are reportedly planning to install 84GW of renewable power generation by 2017. Saudi Arabia recently upgraded its plan to install 41GW in the next 20 years to 54GW. This scale of investment will inevitably bring innovation, production and high-tech employment. Most likely Europe will not benefit much from this development.

The list of the EU's low carbon economy failures goes on and on. They might not be that visible for two reasons. First, the EU is losing something it does not have. Second, the army of climate sceptics is fighting hard. They paint an epic canvas of Europe fighting a bureaucratic conspiracy. The truth, however, is much simpler. Europe is losing.

The writer was Bulgaria's minister of environment, and writes on European policy issues

# Wind power hits bombs at sea and nimbyism in the Rhineland

Germany Efforts are being made to speed the planning process as the country moves to renewable energy, reports *Jeevan Vasagar*

Before Germany's big shift to renewable energy, electricity for industry was produced where it was needed; near the manufacturing heartlands of the Ruhr and greater Stuttgart.

But now that nuclear reactors are being switched off, and renewables are taking priority over energy generated from fossil fuels, the country's energy is being generated a long way from its heavy industry.

From wind farms mainly in the north, more than 4,500km of additional extra-high-voltage lines will snake across the country by the end of this decade, to supply the areas of highest demand.

Germany's lengthy planning process and lack of co-ordination between the federal states has snarled up the line building programme. Of the 1,900km designated by law as priority projects, less than 300km is built.

Lex Hartman, a member of the management board at Tennet, Germany's biggest high-voltage grid operator, says that in some cases it has taken up to a decade to secure a licence to build power lines.

"These extremely long approval procedures have to change," Mr Hartman says. "There are some improvements being made by the government."

In April, the Bundestag passed legislation to speed up the planning process. The new law identified 36 lines as "urgent need", and made the federal administrative court responsible for legal cases. Previously, legal challenges could be brought in local or regional courts.

But public opinion in Germany is frosty towards the extension of the grid. A poll for the environment ministry last August showed that while 87 per cent of those asked were in favour

of offshore wind parks, only 42 per cent would accept new power lines.

Plans for the Rhineland to build a giant converter station at Osterath, near Düsseldorf, have provoked an outcry from residents who fear exposure to noise, traffic and electromagnetic radiation. Under Germany's energy plans, Osterath will be a vital junction in an "electricity autobahn" linking north and south. Tennet is hosting hundreds of meetings to win over the public. "I think that building infrastructural projects such as grids is only possible with the agreement of the people," Mr Hartman says. "Therefore, we are going, in the regions where power lines will be built, to talk to the locals, include them in the planning."

Nimbyism is not the only difficulty. There are technical challenges in hooking up wind farms far out in the North Sea into the German grid. Some are as far as 100km from the coast.

Power is transferred over long distances as DC, to minimise losses, then converted to AC to be fed into the



Economies of scale: Germany's wind power project is a huge undertaking

Alamy

onshore grid. The process involves undersea cables and converter stations onshore. Because of the expense, several wind farms are bundled through one DC connection.

Peter Heinrich, managing director of Fichtner Wind Energy, a consultancy, says: "At these distances from the coast, direct current is the only possible technique. But few companies have done this in the North Sea. This is a technical challenge, [which must be met] under pressure of time."

At Riffgat, north of the island of Borkum, Tennet hit a further obstacle: almost 30 tonnes of wartime munitions on the submarine cable route, which took 18 months to clear.

The offshore wind industry is young; but if Germany is to achieve its goal of at least 35 per cent of energy from renewable sources by 2020, it forms a vital part of the mix.

Out at sea, the wind blows for longer and more consistently than on land, though the risks and associated costs are greater.

Mr Heinrich, of Fichtner, says: "Because of the burden of wind and waves, you need to be securely founded. There are factors relating to the establishment of turbines, the technical equipment [you need], special ships, with proportionate costs. There's an enormous weather risk."

Costs will go down as the industry chalks up experience, achieves greater economies of scale, and there is more competition. As the industry learns to manage its risks, cheaper credit will play a part in bringing down costs, Mr Heinrich predicts: "A fifth of the reduction in price [that we foresee] is a reduction in financial costs."

"Today, offshore projects suffer from more expensive credit than onshore. When offshore receives cheaper credit, it will be cheaper."

In talks to form a governing coalition in Germany, negotiators have agreed to contain the ballooning costs of the country's shift to renewable energy. The target for offshore wind turbines has been reduced from 10GW to 6.5GW by the end of this decade. The offshore target for 2030 has been reduced from 25GW to 15GW.

The proposals, part of a programme that includes reducing subsidies for offshore wind farms, aim to tackle the costs of Germany's transition to sustainable energy. The reforms have been welcomed as setting more realistic goals.

Mr Hartman, of Tennet, says: "That is good news. It seems that they are getting more realistic. If that is the case, it would be a good step. The new targets are much more likely to be met."

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Return to the public domain  
Germany's grid is moving back to municipal, writes  
**Jeevan Vasagar**  
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# Britain and Norway prepare for costly exploits in deep waters

### North Sea

Improved oversight recommended as way to optimise investments, writes *Michael Kavanagh*

Record investment in the UK's North Sea waters this year, alongside exploration success in the Norwegian sector, have bolstered hopes that declining output in the basin can be reversed.

EnQuest is to invest £4bn in the Kraken field after receiving the go-ahead from the British government. The heavy oil development has been bolstered by UK tax allowances which are designed to encourage

spending on deposits that are harder to extract. Meanwhile, Statoil of Norway plans to invest \$8bn in the Johan Sverdrup field, one of the largest discoveries on the Norwegian shelf since the mid-1980s. The development is scheduled to come on stream by late 2018.

At first glance, things could not look rosier. Although the UK is estimated to have exhausted two-thirds or more of its oil and gas reserves, new investment in the sector is expected to hit a record £13.5bn this year.

In Norway, which is in the fortunate position of having more than half of its estimated reserves remaining, spending is predicted to rise from \$35bn to a record \$36bn next year, according to estimates by

the Norwegian Oil and Gas Association released this month.

But, beneath the surface, concerns remain about the ability of both countries' governments to maintain investment in a basin where discoveries are becoming smaller, more technically complicated and more expensive to exploit.

The long-term challenges facing North Sea operators were set out this month in a report commissioned by the UK's Department of Energy and Climate Change. Sir Ian Wood, the former head of John Wood Group, an Aberdeen oil services provider, says in his report that improved co-ordination of exploration and production efforts in UK waters could deliver 3bn-4bn additional barrels

of UK production over the next 20 years. That is a prize worth £200bn at today's prices – and Sir Ian's estimate is conservative. But his interim report, which was broadly welcomed by Ed Davey, the UK energy minister, suggests the conditions for maximising recovery of remaining resources are fragile.

With 41bn barrels of oil equivalent drawn from the UK's continental shelf, there remains a wide variation – from 12bn to 24bn boe – in the forecasts of what might yet be produced. Sir Ian's report clearly points to failures of practice that threaten efforts to maximise the affordable recovery of remaining hydrocarbons. Presenting his report, Sir Ian drew attention to a move away from shared

infrastructure in hubs or clusters of smaller fields. Such decisions had enabled developments to proceed, but commonly led to higher production costs. He noted the failure of some operators to invest in ageing assets and a reluctance to adopt new techniques.

Sir Ian suggested the UK authorities had been unable to confront this wasteful approach because of their own workload constraints.

As expected, the report stresses the role of fiscal stability and tax allowances in improving production. One of Sir Ian's key recommendations is the creation of a better resourced watchdog, with greater powers to force reluctant operators into improved co-ordination and stewardship of assets. A policy of delegating

tougher powers to better-resourced regulators had worked in Norway and the Netherlands, he argues.

Malcolm Webb, the chief executive of Oil & Gas UK, the industry lobby, backs the report's calls for improved co-ordination "to maintain high investment in this basin and prevent premature decommissioning of infrastructure".

The upswing in investment on new field developments masks a sharp contraction in UK oil and gas output as costs continue to escalate. Production has declined by nearly 40 per cent in the past three years, costing the UK exchequer £6bn in lower tax receipts. This year, Britain's oil and gas output is expected to be 1.2m-1.4m boe a day. Low production levels

are expected to persist into next year, as maintenance concerns over ageing infrastructure in the North Sea delay a resurgence in production. However, Oil & Gas UK remains hopeful of a return to 2m boe/d in the second half of the decade.

In spite of concerns about cost pressures threatening some field development plans and the long-term depletion of reserves in Norwegian waters, a resurgence there is likely to be realised sooner.

"After almost a decade of declining production from the Norwegian continental shelf, we're at another turning point where output has again begun to rise," says Bjorn Harald Martinsen, the economics manager at the Norwegian Oil and Gas Association.

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Rhum return  
Scots gasfield is up and running again, writes  
**Michael Kavanagh**  
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## European Energy

# Road from coal destined to be long

### Poland

While the country is under international pressure to move to alternatives, few are immediately available to satisfy its power needs, writes *Jan Cienski*

Less than six months before Poland hosted more than 10,000 delegates for the UN's climate talks, Donald Tusk, the prime minister, was in the south-western city of Opole showing where his priorities really are.

He was there to shepherd through an agreement to spend 11bn zlotys (\$3.5bn) building an enormous 1.8GW coal-fired power station that Polska Grupa Energetyczna, the country's leading utility, was so reluctant to build that Mr Tusk had to browbeat Krzysztof Kilian, then chief executive, into going along with the project.

"We are now in the process of shaping the energy mix in which coal will again find its place," Mr Tusk said during the signing ceremony. "It is important that coal produces energy, that people have work and that Poland has enough energy."

Poland is under growing pressure from the European Union and elsewhere to move decisively away from coal, which provides about 90 per cent of the country's electricity. However, there are few immediate alternatives.

Natural gas, a much cleaner fuel, is unpopular because most of it has to be imported from Russia. Meanwhile, hopes of a native shale gas industry have failed to materialise until now because of financial, regulatory and geological hurdles.

The Polish government is still planning on building a nuclear power plant but the original plan to have it running by 2023 looks optimistic. About 10 per cent of Poland's electricity comes from renewables.

"Coal will be present in Poland's energy mix for decades to come," says Agata Hinc, managing director of DemosEuropa, a Warsaw-based think tank. "The road away from coal will be a long and difficult one."

The country's ties to coal were put on international display during the UN climate summit, when the Polish capital also hosted an international coal summit, to the fury of environmental groups.

"Organising the coal summit at the same time that delegates are negotiat-



**Brown and dirty:** Belchatow, about 160km southwest of Warsaw, is Europe's largest thermal power plant and burns lignite

AFF-

ing reductions in greenhouse gases shows where the Polish government's priorities really lie – it is much more committed to coal than to combating climate change," says Katarzyna Guzek of Greenpeace Polska.

The effort to shift from coal has been negligible. In fact, driven largely by price, the country is moving away from hard coal to even more polluting brown coal, or lignite.

In Belchatow, about 160km southwest of Warsaw, enormous excavators rip into soft brown coal, sending lignite mixed with the remnants of 20m-year-old wood flying as it pours on to a high-speed conveyor belt at the bottom of the enormous open pit mine.

The conveyor ends in the maw of Europe's largest thermal power plant which produces 20 per cent of the country's electricity, while dumping about 32m tonnes of carbon dioxide a year into the atmosphere. This equates to almost 10 per cent of Poland's total greenhouse gas output.

While Poland continues to rely overwhelmingly on coal, the industry itself is in a crisis. Poland's hard coal mines dug 79m tonnes of the fuel last year, 3.5m tonnes less than in 2011.

More than 8m tonnes is piling up unsold, while utilities increasingly

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**Red tape blocks move to shale Poland faces a long slog to create a viable industry, writes Jan Cienski**

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turn to significantly cheaper imported coal. Poland has been a net importer since 2008 and last year bought 10m tonnes on international markets.

"It's not possible to compare Polish coal to other coal sources," says Tomasz Konik, a partner at Deloitte central Europe, the consultancy. "The mines here are deep – more than 1km underground. When you look at the danger and the cost, it is a lot higher than largely open pit extraction from Russia and Australia."

# Trapped in a fog of confusion

### Italy

Electricity bills are high while 90 per cent of gas and oil is imported, writes *Guy Dinmore*

High and rising electricity bills for consumers, over-reliance on imports of hydrocarbons, bottlenecks on the grid and near paralysis at the political level – Italy's energy sector faces a legion of problems that risk stifling recovery from the country's longest recession since the second world war. "There is great confusion in this country," says Davide Tabarelli, head of the Nomisma Energia think-tank, noting that Italy seems unable to match bold strategic decisions taken in the UK on nuclear power and in Germany on coal and renewables.

Six years ago, at the peak of economic output before a double-dip recession ensued, Italy's utility executives fretted that electricity capacity would not keep up with demand.

Investments in power stations were stepped up, mainly in gas. Bold plans for new gas pipelines were hatched to expand supplies from Algeria, Russia and central Asia. Incentives for renewables were increased to the highest levels in Europe, with the cost passed on to consumers.

Since then recession has cut industrial output by 25 per cent and GDP has fallen by 5 per cent. Renewables have boomed while utilities have been locked into high long-term contract prices for gas, which still accounts for some 50 per cent of electricity output.

Nomisma Energia estimates that electricity demand this year will fall a further three per cent, with total capacity close to 130GW while peak demand will not exceed 54GW. Gas

powered plants are idling. Some utilities find it cheaper to import electricity than produce their own.

Italy is left importing over 90 per cent of its gas and oil needs. Potential development of its own resources – it has the largest onshore oilfield in western Europe – is blocked by environmentalists and local governments.

The central government in Rome has said no to exploitation of Italy's modest reserves of shale gas.

Italy's small and medium-sized companies, the backbone of the economy, paid some 40 per cent more for their power last year than the EU average. Enel, Italy's largest utility, says energy bills for industry rose 14.8 per cent in 2012.

Germany is moving away from nuclear power and towards more renewables and greater exploitation of coal, its price driven down by the shale gas boom in the US.

Italy's reliance on gas has limited the uptake of coal, with plants running at close to full capacity. Enel last year said its use of coal as a percentage of thermal output rose by about 11 per cent to a total of 70 per cent, while use of gas fell by 26 per cent. Its worldwide CO2 emissions rose slightly as a result.

This was in part because a lack of rain cut hydroelectric output. This year the contribution of coal to total output, including renewables, has fallen by about four percentage points.

Other utilities remain much more reliant on gas and, like Enel, are renegotiating long-term contracts.

Assocarboni, the coal industry lobby, has said Italy's imports of steam coal are expected to be 19m tonnes this year, little changed from 2012.

"If Italy continues to ignore the contribution of coal to the production of competitive electricity, its envied industrial base will soon be at risk," com-



**Negotiations: Enel**

mented Andrea Clavarino, Assocarboni chairman. "Italy is the second biggest manufacturing country in Europe but it also holds the negative record for having the highest electricity bills."

Charting a way forward, Mario Monti's former technocratic government launched a detailed national energy strategy, the country's fourth.

Its first priority was to reduce the cost of energy, with an emphasis on energy savings, developing domestic resources of oil and gas, pursuing renewables with reduced but still considerable incentives, shunning nuclear power and limiting coal use.

Italy's future is seen as a gas hub, importing from north Africa, Russia and Azerbaijan and re-exporting to Europe.

With Italy led by Enrico Letta's fragile coalition government, analysts question how much of the national energy strategy will be realised in legislation and investment.

Nicolo Sartori, researcher at Istituto Affari Internazionali, a Rome think-tank, says the strategy is ambitious because of the combination of unbalanced generation towards gas and the incentives scheme for renewables.

"The [national energy strategy] and energy policy in general completely disappeared from the Letta government's radar," says Mr Sartori. "It is clear that the government is strongly concerned by its own survival," he adds, and energy "remains out of the debate".

But, he continues, recent disruptions to supplies from Libya could put the debate back on the table.

# Mood cools on question of nuclear generation

### France

Budget overruns, the spectre of accidents and lack of flexibility influence choice, says *Michael Stothard*

The oil shock of the early 1970s prompted a revolution in the French energy sector. With few natural energy resources of its own, the country vowed to never again be reliant on expensive foreign oil and launched its nuclear experiment.

The 58 nuclear power plants built in the ensuing two decades supply three quarters of the country's energy, giving it almost the lowest electricity costs in Europe and one of the lowest per capita carbon dioxide emission levels.

France is the world's largest net exporter of electricity because of its low cost of generation. It has a powerful set of companies, led by state-owned EDF and Areva, exporting expertise by building nuclear plants abroad.

But the nuclear sector is facing a challenging future, as much of the world looks to wean itself off nuclear power in the wake of the Fukushima disaster in Japan two years ago and a string of problems with the latest nuclear technology.

Since Fukushima, Germany has decided to phase out nuclear power and Italy has scrapped its planned nuclear programme. Meanwhile, the shale gas revolution in the US has sharply reduced the desire for new

**Philippe Crouzet: export reliance**

plants there.

"Fukushima has made an impact on new build demand of course," says Philippe Knoche, chief operating officer at Areva.

He adds that this has come amid a general fall in spending by western countries on energy infrastructure since the financial crisis.

The great hope of the French industry, the third-generation European pressurised reactor, has been beset by problems. The two projects involving the reactor in Europe are suffering cost overruns and building delays. EDF's nuclear power plant in Flamanville, the first to be built in France for 15 years, was expected to cost €3.3bn and be in operation last year. Costs have more than doubled and it is scheduled to be operational by 2016.

The second project, a European Pressurised Reactor being built in Finland by Areva, has seen similar cost overruns and had its operational launch date put back from 2009 to about 2016. Years of bickering have ensued about who is to blame.

The next big test will be the £16bn third-generation reactor in the UK at Hinkley Point. Its success would prove the technology can be employed on budget and on time in western Europe. Similar Chinese plants were built smoothly.

EDF Energy, the UK arm of the French utility, insists that there is no parallel between past European projects and Hinkley Point, saying that cost estimates given to the UK "include the lessons learnt from Flamanville".

Another obstacle facing the French nuclear industry is that Paris is looking to

reduce its reliance on nuclear energy and focus more on renewable alternatives. EDF and Areva are making a push into renewable energy, mirroring this move.

There is a fierce debate about how fast and how far the government is going to move towards renewables, particularly given the large investment and the likely rise in energy costs for already price-sensitive consumers.

"The problem is that we know that whatever we do, it is going to be more expensive," says Jean-Marc Ollagnier, chief executive of Accenture's Resources operating group. "I cannot see us going anywhere near as fast as Germany has."

One problem for France is that a nuclear plant does not sit as well alongside renewable energy as a gas power plant. Nuclear cannot be turned on and off to back up intermittent wind power the way a gas plant can, for example.

The fall in nuclear investment in the western world – potentially France included – has made China all the more important for the industry.

China is building nuclear power plants at a pace unparalleled in the rest of the world. Mainland China operates 17 nuclear reactors, with 29 under construction, and the country is planning a fourfold increase in capacity by 2020.

"The future of the French nuclear industry will be to rely more on exports and partnerships for the construction of new nuclear units than on demand from western Europe," says Philippe Crouzet, chairman of Vallourec, a supplier of tubes for the energy sector.

"The markets are moving east," says Mr Knoche, adding that Areva, which does business with 360 of the 430 nuclear plants worldwide, has been in China for 30 years. "We are developing our presence there over the long term," he says.

# Overcapacity sees majors divest assets

### Refining

Squeezed margins hurt the big oil companies but some spot opportunity, writes *Sylvia Pfeifer*

JR Ewing made his fortune striking big deals and finding big oil in Texas. That is the glamorous face of the oil industry. Its less talked about stablemate is refining, a complicated, industrial process that turns Ewing's oil into petrol, diesel and the feedstocks for making plastics. Refineries are national strategic assets yet largely ignored by the general public – unless foreclosures run out of petrol.

Refining has now been dragged into the spotlight – but for the wrong reasons. Tight global margins, overcapacity and weak demand in western economies are hurting the world's top players, including Royal Dutch Shell, Total and ExxonMobil. All blamed poor third-quarter earnings on a decline in their downstream businesses.

"Refining is a tight margin industry, highly competitive where everyone competes on cost and fuel specifications," says Daniel Lopez, partner and managing director at Boston Consulting Group.

The main reason for today's predicament is overcapacity at a time of weakening demand. Giant new refineries are being built in Asia and the Middle East, putting pressure on older plants in mature markets.

According to the International Energy Agency (IEA) global crude oil distillation capacity is set to have risen from 86m barrels a day in 2005 to 101m b/d by 2017 once all the planned new capacity is in operation.

"We've seen a rate of investment in new refining capacity in recent years that is more than triple what we saw in the early 2000s or even the late 1990s," says Mr Lopez. The average annual new refining capacity added to the market between 2003 and 2008 was 670,000 b/d. Between 2013 and 2016 the figure is expected to be 1.6m b/d.

The situation is acute in Europe where, despite recent closures, demand is stagnating. The trend away from gasoline to diesel has had one of the biggest impacts on the industry.

Just a few years ago, European refineries would have exported the surplus gasoline to the US and west Africa. But with higher refinery outputs in the US today, in part due to rising North American crude oil supplies, it is importing less gasoline and actually starting to compete with Europe in the export markets.

IEA figures showed European demand for refined products will average 13.5m b/d this year, almost 2m b/d less than in 2008.

Most of the world's majors, including BP, Royal Dutch Shell and Total, have responded by selling their European refineries to focus on a smaller network of strategic plants and put resources into more profitable operations such as exploration and production.

Shell announced its latest divestment in November, the sale of a stake in a

Czech Republic refinery. It said the sale was "consistent with Shell's strategy to concentrate its global downstream footprint and businesses where it can be most competitive".

In October MOL, the Hungarian oil and gas company, said it would close its 55,000 b/d Mantova refinery in northern Italy in January, citing an "unfavourable economic environment" for refining in Italy. It will convert the site into a storage and terminal.

Other groups are shifting focus to countries with higher demand growth. Total has built a refinery in Jubail in a joint venture with Saudi Arabia, which shipped its first cargo last month. The French company approved a €1bn modernisation of its Antwerp refining and petrochemical plants in Belgium, to meet demand for greener products and be able to convert heavy fuel oil into de-sulphurised diesel and ultra-low sulphur heating oil.

The excess capacity has sharply depressed refining margins – the profit from processing oil. Total said recently refining earned it \$10.60 a tonne in the third quarter, compared with \$51 a tonne a year earlier.

The benchmark refining margin, according to Wood Mackenzie, the consultancy, was negative \$1.30 per barrel on average for October this year. There will be some refineries in Europe losing money on each barrel of gasoline they produce, says Jonathan Leitch, Wood Mackenzie analyst.

It is not all gloom. As the

"When you focus you get to optimise better than somebody who is integrated"

major has retreated, some nimble entrants have come in, buying up selected refineries around Europe. Gunvor, the Swiss-based commodity trader, bought two from Petroplus, the collapsed independent refiner, seeing synergies between its logistics and storage capability and refining.

Gary Klesch, the US financier whose Klesch Group, focused on industrial commodities, bought a German refinery from Shell in 2010 and is in the hunt for more. The group's aim is to invest in refining assets and build its trading business around them.

"The economic theory is when you focus you get to optimise better than somebody who is integrated," he told the Financial Times last month. "There is some proof in that. Whenever you disaggregate the chain ... your focus is such that you are free of constraints."

Boston Consulting's Mr Lopez says he expects margins to recover at the end of the decade but "this will depend on real economic recovery and whether some of the planned projects are stopped."

A further challenge is impending environmental legislation to reduce carbon emissions which could hit the industry hard.

Boston Consulting says as much as 20 per cent of Europe's refining industry could close in a high-price carbon environment.

## Contributors »

**Guy Chazan**  
Energy Editor

**Guy Dinmore**  
Rome correspondent

**Michael Stothard**  
Paris correspondent

**Jeevan Vasagar**  
Berlin correspondent

**Jan Cienski**  
Poland correspondent

**Sylvia Pfeifer**  
Special correspondent

**Michael Kavanagh**  
Energy sector correspondent

**Ian Moss**  
Commissioning editor

**Andy Mears**  
Picture editor

**Steven Bird**  
Designer

For advertising details, contact: **Liam Sweeney** on +44 (0) 20 7873 4148. [liam.sweeney@ft.com](mailto:liam.sweeney@ft.com), or your usual FT representative.

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