

European Energy

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EU stuck on horns of 'trilemma'

Energy supplies need to be secure, affordable and not raise emissions, reports *Pilita Clark*

The Volkswagen pollution rigging scandal has cast an unsettling light on one thing Europe was supposed to be good at: being green.

So it comes at an awkward time for the union's energy industry as the EU prepares to host a December UN conference in Paris where a global climate change accord is due to be struck.

Europe has long had some of the world's most ambitious climate change targets, giving the EU authority in the long-running UN climate talks.

The Paris meeting stems from a 2011 UN climate conference in Durban, South Africa, that might have collapsed if not for the dogged diplomacy of then EU climate chief, Connie Hedegaard.

Much of the EU's authority on climate has stemmed from VW's home of Germany. The German government's *Energiewende*, or energy transition away from nuclear and fossil fuels towards renewable power, has been held up as a model for how the world can shift to a low-carbon economy.

The Paris climate accord is supposed to deliver precisely this type of global transformation. If it fails, some leading business figures fear profound implications for the bloc's energy sector.

"The biggest risk for European industry and also European energy producers is that what comes out of Paris is not ambitious enough," according to Markus J Beyrer, director-general of the



Out with the old, in with the new: power plant, solar panels and wind turbines sit together in Germany — Alamy

BusinessEurope lobby group. "It's very clear that Europe has been by far the most ambitious on climate change," he adds. If the rest of the world does not follow its lead in Paris, that will obviously be bad for the climate, Mr Beyrer argues. But it will also exacerbate what

he claims are "alarming signals" of competitive distortions in the chemical and aluminium industries.

"We need to bring the others in the boat. We need the commitment of all major economies because otherwise it distorts competition and at the same

time, the climate cannot be saved by 9 per cent of the emitters."

There is little sign the Volkswagen crisis, provoked by deception over emissions from some of its diesel vehicles, has had a direct impact on the UN climate negotiations themselves.

But it has clearly shaken assumptions about the environmental credentials of the EU countries that brought the world its biggest carbon market, largest offshore wind farms and first solar-powered aircraft. That has added to demands for Europe to toughen its environmental regulatory systems in the lead up to Paris.

"European carmakers have to make up for lost time," says Jos Dings, director of the Transport and Environment campaign group. "And on the road to Paris, politicians have to restore Europe's credibility with international partners in combating climate change."

This comes at a time when energy companies across the EU have been faced with a series of problems as countries struggle with what has become known as the "energy trilemma". The term sums up the difficulty of trying to make sure energy supplies are secure, affordable and do not raise greenhouse gas emissions.

Tumbling oil prices have added a troubling dimension to the picture, not least in countries such as the UK, which this year marked 50 years since drilling for oil and gas began in the once bountiful North Sea.

Lower oil prices have forced North Sea companies to slash jobs and capital expenditure, just as warnings multiply that the basin's supplies could run dry sooner than some had expected.

The UK has been struggling to bring to life a huge new source of low-carbon electricity, the Hinkley Point nuclear power plant, which has suffered a series of delays.

It is being developed by the EDF Energy group in France, a country that has long led the global nuclear industry.

Continued on page 3

Inside

French pride tested over nuclear failures

Cost overruns and delays sour state's love affair with atomic power
Page 3

State of the union

David Buchan and Malcolm Keay comment on what needs fixing
Page 2



German policymakers score own-goal on coal

Stresses on supply force up use of polluting fuels despite best intentions
Page 2

Manufacturers fight their corner over costs

Companies fear exodus of heavy industries to cheaper destinations
Page 3

Norway turns screw on divestment debate

Campaigners adopt two-pronged approach to fossil fuel producers
Page 2

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European Energy

Coal resurgence darkens Germans' green image

Emissions

Europe's leading economy might no longer be able to claim moral high ground, reports *Josie Le Blond*

Germany has long led the way in global green energy innovation. But ahead of UN climate talks this December, some say the country's new reliance on coal means it has lost the moral high ground on emissions.

Europe's leading economy still flaunts its virtuous climate track-record abroad. It was on show during recent state visits by Angela Merkel, the chancellor, to Brazil and India, two of the world's biggest greenhouse gas emitters.

Yet back at home, observers warn Germany's powerful coal lobby is frittering away the nation's reputation as a green *Wunderkind*.

"The coal problem must be solved if Germany wants to be celebrated once again as a leading voice on climate change," says Claudia Kemfert, head of the energy, transportation and environment department at the German institute for economic research.

Germany's dilemma dates back to its pledge to shift from nuclear power to other forms of renewable energy following Japan's Fukushima disaster. The nuclear phase-out has resulted in the country falling back on one of the most polluting forms of fuel, coal. This goes against the grain of Germany's *Energie-wende*, part of the intention of which is to cut the use of fossil fuels.

Panicked by the disaster in Japan, German politicians began shutting down the country's oldest nuclear plants in 2011, with a view to going completely uranium-free by 2022. The plan is for renewables eventually to take centre stage in Germany's energy mix. However, coal, in particular carbon-intensive lignite, has been filling the gap.

Germany generated 44 per cent of its electricity from coal last year, more than any other EU member state. That compares with 26 per cent from renewables and 16 per cent from its eight remaining nuclear plants. This coal renaissance is undermining the government's efforts to reduce greenhouse gas emissions and casting doubt on Germany's green credentials. In 2013, German emissions rose by 1.2 per cent, defying a decade-long downward trend.

"In Germany we're living with a

paradox resulting from the energy transition," says Ms Kemfert. On the one hand, the country is investing in renewable energy helping to bring emissions down, while on the other the increased use of coal acts to force them up.

Germany now looks set to miss its voluntary target of a 40 per cent reduction in emissions on 1990 levels by 2020. Ministers point out Germany has already met its binding Kyoto target of a 20 per cent reduction. However, that achievement predates the decision to abandon nuclear.

Even before the recent Volkswagen emissions scandal sent Germany into a flurry of soul-searching, policymakers were desperately looking for ways forward to meet the 40 per cent target and re-establishing the country at the top of the international pecking order on climate change.

But Ms Merkel's government had not reckoned with the power of the coal lobby. Plans this year to slap a levy on emissions from the dirtiest plants powered by lignite had to be abandoned after they met opposition from industry, unions and local politicians.

This coalition, led by RWE, Germany's second biggest power provider and the operator of most of the coun-

try's lignite plants, said the levy would threaten 100,000 jobs in industrial regions and would push up costs to industry and consumers.

Talks in July led to a compromise. Sigmar Gabriel, Germany's energy minister, promised to compensate RWE and others for gradually retiring a number of the oldest lignite plants as "reserve capacity".

"Since our plans affect many jobs, we altered course," the energy minister said.

The compromise demonstrates the kind of tensions that exist between Germany's coal-dependent energy providers and the state's declared environmental goals. Politicians in Germany and beyond, however, need eventually to resolve such tensions in order to achieve a carbon-neutral economy by the end of the century – a goal activists hope will be accepted for all countries in a binding agreement at the December climate talks in Paris.

As Barbara Hendricks, German environment minister, said last month: Germans "cannot go around heralding the climate neutral global economy and at the same time act as if that does not apply to the coal regions in our own country".

Plans to slap a levy on emissions from the dirtiest plants powered by lignite were abandoned

Ambitious cable projects prove vital to Europe's energy security

Super grids Plans to exchange power across north-west Europe are under way, writes *Jeevan Vasagar*

When grid operators agreed a deal to build a 500km underwater cable from Tonstad in Norway to the German state of Schleswig-Holstein, it marked the latest link in a chain of planned connections that will allow power to be exchanged across north-west Europe.

The NordLink cable, a collaboration between Norway's grid operator Statnett and Tennet, which operates in Germany and is owned by the Netherlands state, is due to enter commercial operation in 2020, with a capacity of 1,400MW.

Tennet is also working with Denmark on a 300km underwater link from Eemshaven in the Netherlands to Endrup in Denmark, scheduled to be completed in early 2019.

Meanwhile, the UK and Norway have agreed to build the 730km NSN Link, which will be the longest underwater interconnector in the world when it is operational in 2020.

Such projects are increasingly vital to Europe's energy security. As the continent seeks to reduce CO₂ emissions, curb fuel imports and expand renewable power, countries that were once largely self-sufficient in energy must find ways to trade power with one other.

With such intermittent renewable sources as solar and wind energy, there are few cheap and reliable ways to store the power they generate. As countries shift more of their power supply to such renewables, they must look for ways to export surplus electricity and, in turn, import power when it is needed.

Increasing the network capacity by building more connections makes the grid more efficient. If Norway can provide a back-up for the German grid, and vice versa, less standby power generation is required in each country. This is ultimately advantageous for customers as it should lower costs but it can eat into individual utilities' revenues.

Stephen Woodhouse, a director at Pöyry, a consultancy, says: "More networks mean more competition. You allow the generators in one country to compete with the generators in another."

Having interconnections across countries can reduce the impact of a lull in power generation. There are occasions when the same weather conditions apply across a swathe of Europe – a strong area of high pressure across the region, for example – which can lead to the stalling of wind turbine rotors in many countries at the same time. When countries with different power generation methods link up, the alternative systems can balance each other.

For Germany, where about a quarter of electricity comes from renewables, Norway is a natural partner. The Scandinavian country generates 99 per cent of its electricity from hydroelectric power. Tennet says: "When there is high demand in Germany we can receive electricity from Norway. When Norway has a dry spell, or there is high wind and solar production in Germany and high demand for energy in Norway, we can transfer this to Norway."

The subsea connections make sense as part of a broader series of power links



All at sea: cable-laying off western France
Jean-Sebastien Evrard/AFP/Getty Images

both within and between European countries. Tennet, whose operations in Germany cover an area from the North Sea to Bavaria, is also building an additional Suedlink cable linking the north and south of the country. When completed, it will allow solar power from Bavaria to be transmitted to Norway and for Norway's hydroelectric power to flow the other way via an extended grid system to smooth demand and supplies.

The slow pace of onshore grid construction in Germany, however, poses a more local problem for grid operators. It is easier to get planning permission to install renewable power than it is to get permission for new power lines, which residents frequently regard as an eyesore. So the extension of the grid has lagged behind the growth of renewables.

At times when the sun shines or there are high winds in Germany, which pushes down the wholesale price of such renewable sources, German electricity has been snapped up by other countries.

But the resulting flows have caused operational problems for the German grid. High loads of intermittent wind power have led to unplanned flows of electricity into Poland and the Czech Republic, straining grids that are not designed for such variable inputs.

The problem was highlighted in August when a heatwave in Germany led to Hungary, Slovenia, Italy and Austria all buying German power. Volker Kamm, a spokesman for 50 Hertz, which operates the grid in northern and eastern Germany, says it became clear that smooth balancing of power transmission was under threat. "We had to intervene intensively to keep the grid stable," he says. "We finally also had to reduce the input from renewables."

Europe, then, has set out a futuristic vision of cables under the sea to link and smooth supply across national power markets. But on dry land, there are more basic problems of ensuring grid resilience that have yet to be solved.

A union in search of a solution

OPINION

David Buchan and Malcolm Keay

This year the EU has launched its "energy union" project to give its energy and climate policies a reboot.

For the programme the EU set itself in 2009 – with emission, renewable energy and efficiency targets – proved to be founded on misguided assumptions about the compatibility of market liberalisation with climate policy, misguided hopes about the ease with which renewables could be incorporated into the single market and a misplaced faith in existing energy security arrangements.

How the 28 member states react to the detail of the energy union project will not be clear until the European Commission lays out all its proposals over the coming year.

So far, the EU-28 are paying more than lip service to the energy union concept because it responds both to most eastern European states' energy security fears and to most west European states' desire to resolve the contradictions between energy and climate policy to produce a credible EU contribution at December's UN climate talks.

Last year's Ukraine crisis was a wake-up call for the majority of EU leaders, who had long been asleep to the increased risk to energy security as a result of enlarging the union to eastern European states with a mono-dependence on Russian energy.

The crisis was the immediate trigger for the energy union proposal from Donald Tusk, then Polish prime minister and now president of the European Council. Mr Tusk coupled it with the suggestion that the EU, or groups of its gas importers, should negotiate gas deals collectively with Russia, and possibly other gas suppliers. That proposal was never going to get off the ground: allowing such buyers' arrangements would have undone years of energy market liberalisation.

Subsequent proposals to improve energy security by the EU developing "strategic relationships" with non-Russian energy suppliers display a similar degree of wishful thinking. Europe, as the EU or as its commission executive, is not a buyer of gas or any other commodity, and never will be.

Fortunately, EU policy is also centred on a sensible self-help approach to energy security by promoting Europe's internal resilience to external energy shocks, such as a Russian gas cut-off. A task complicated by the difficulty of not knowing where and when such a cut-off might come because, for a variety of reasons, the proposed route for a new Gazprom pipeline to Europe keeps changing. First, the South Stream pipeline project to reach the EU via Bulgaria, then the Turkish Stream to reach the EU via Greece, and now an expanded Nord Stream to bring more Russian gas down the Baltic to Germany.

But the flexibility of Europe's energy system is being improved through the building, inside the EU, of more two-way cross-border gas connections and more gas storage. The big advantage of a resilient energy system is that it guards against external shocks, from whatever quarter.

The other main spur to the energy union project is a growing recognition that Europe's electricity markets have been broken by the influx of renewable investment, driven by targets and subsidies, into a market with flat or falling demand. The sale of electricity in the market no longer covers operating and capital costs. In the absence of large-scale electricity storage, wind and solar power flood on to the market when conditions are right for generation and tend to cut their own commercial throat by driving the price down.

The energy union plan, rightly, promotes the idea of flexible electricity demand to match intermittent renewable supply. This reduces the need for conventional power as a back-up for renewables at times of cloud or calm, though some conventional power plants will need to stay on standby to generate and be paid for doing so. But the supporting proposals put forward by the commission in July on electricity market reform and demand response do not solve the problem of how renewable generators can earn a living, and be incentivised to expand, without subsidy.

The commission, at least, understands the broken nature of the electricity market – though not yet how to piece it together again.

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Oil-rich Norway in vanguard of fossil fuel divestment argument

Investing and the environment

Campaigners are adopting a two-pronged approach to tackling polluting industries, says *Richard Milne*

What do Leonardo DiCaprio, the Rockefeller family and Norway's oil fund have in common? All are involved in the growing campaign to encourage fossil fuel divestment.

"We must transition to a clean energy economy that does not rely on fossil fuels, the main driver of this global problem," the Hollywood actor said when he backed the divestment campaign in September.

In total, investors representing \$2.6tn of assets have backed calls to dump various forms of companies using fossil

fuels from coal to oil and gas, according to a report by Arabella Advisors, a Washington, DC-based consultancy.

Foremost among them is Norway's \$857bn oil fund, the world's largest sovereign wealth fund. The Norwegian parliament this year decided that the fund should withdraw from any company in which coal represents more than 30 per cent of the business.

The parliament, acting on behalf of the Norwegian people who are the ultimate owners of the fund, had even asked an expert committee to study whether Norway should stop investing in oil and gas companies too – a remarkable thing for an investor funded entirely by petroleum revenues.

Yngve Slyngstad, chief executive of the oil fund, rejects claims that the divestment of coal companies represents a politicisation of the fund. "If you run a sovereign wealth fund in a democ-

racy and there are limits to what the population wants to make money on, those limits have to be put up by the political establishment that's representative of the population," he says.

"That they [politicians] first removed tobacco and certain types of weapons and now have removed coal is of course a reflection of the Norwegian population's sentiments and instincts with regard to where we want to make money for our grandchildren," he adds.

Other investors from US pension funds to the heirs of the Rockefeller oil fortune have backed the divestment movement.

But another group of company owners thinks there is a different way. Frederic Samama, deputy head of institutional and sovereign clients at Europe's largest fund manager, Amundi, is one of those leading this alternative approach.

He argues that the debate has focused

on two approaches: engaging with companies or divesting from them. Both have pros and cons, with the engagement approach suffering from a lack of a hard sanction and demands for divesting being often judged as too much of a blunt instrument.

Instead, Mr Samama argues for a middle way: creating low carbon indices for investors to follow. In any given index, the most polluting companies from every industry are excluded. Thus the index places a bigger weighting on those companies that pollute the least and no industry is excluded (unlike in divestment). "It's not to save the planet, it's risk management," he says.

This approach allows investors to shift from merely looking good to doing their normal work as an investor, he argues. About one-fifth of the worst companies in any industry are excluded, leading to a 60 per cent reduc-

tion in the carbon footprint and an 80 per cent drop in the risk of stranded assets, according to Mr Samama. Exclusion is not permanent: companies are allowed to rejoin the index so have an incentive to improve.

So far the amount of assets following this approach is relatively modest with \$4bn under management but several big names are involved including Amundi, Sweden's AP4 and FRR, the French pension reserves fund.

Another backer of the approach is Lord Stern, the climate change expert. He told a hearing at the Bank of England this year: "It's a more intelligent way of motivating behaviour than directly divesting out of oil... Divesting out of oil is a bit like a blunderbuss – it doesn't give any incentives for companies."

Debate rages about which approach is best. For some investors, such as the oil fund, publicly owned pension funds,

and religious investors, it can make sense to have restrictions on what to own if the ultimate beneficiaries have strong views.

Even then, some are sceptical about the broad brush approach of divestment. "The problem of selling out of all coal companies or all oil companies is that somebody else will still own them and there will not be a sufficient carrot to motivate these companies to change their behaviour to go along with the stick of possible divestment," says an adviser to Norway's oil fund.

Mr Samama believes that more shareholders will look at his middle way as they realise the dangers of their current approach.

"It's only the beginning of the journey," he says. "It's more and more difficult to be sceptical about climate change. Investors are realising they have risks."

European Energy

Heavy manufacturers warn over burden of costs in EU policy

Competitive advantage

Opinion is divided on what risk green policies pose to jobs, writes *Michael Pooler*

When Voestalpine decided to build a €550m plant producing sponge iron to feed its steelmaking blast furnaces in Europe, a natural location might have been the company's Austrian base in Linz.

Instead it chose the Texan city of Corpus Christi, some 5,700 miles away. This was estimated to save €200m a year – mostly because of the cheaper supply of natural gas, but also due to lower logistics and electricity prices.

It highlighted how higher energy prices are making the EU – compared with its leading trading partners – a

comparatively expensive place for heavy manufacturers to do business.

Industries, ranging from aluminium to glass and cement to ceramics, that consume large amounts of energy, point to the EU's ambitious plan to decarbonise its economy, which they say threatens to put them at a competitive disadvantage.

They argue that the financial burden of environmental policies and renewable subsidies not faced by rivals in other regions risks accelerating the decline of economically important sectors.

"European manufacturers are running out of reasons to invest at home," says Wolfgang Eder, chief executive of Voestalpine. "It is not our competitors who are slowing us down, but European industrial and climate policies."

Between 2008 and 2012, industrial electricity prices in the EU rose by 11 per cent, driven by a doubling of taxes and

levies. Industrial users in Europe's 15 most advanced economies paid an average of 10.17 pence per kilowatt-hour last year, against 4.26p/kWh in the US.

One frustration, is the Emissions Trading Scheme (ETS), Brussels' flagship policy for achieving a 40 per cent reduction in greenhouse gas output by 2030 compared with 1990 levels. Spanning 11,000 power stations and industrial plants, it sets a decreasing limit on the total permitted annual emissions in the EU. Polluters buy and sell allowances to cover each tonne of CO₂ they produce.

According to a review of academic literature by the OECD, there is no evidence the scheme has yet had any significant impact on employment, output or profits. Part of this is probably down to counterbalancing measures. Sectors deemed at risk of carbon leakage – where companies move country to

avoid onerous climate rules with the result that emissions are simply shifted elsewhere – receive free permits. "Almost all manufacturing sectors have been oversupplied with free allowances," says Damien Morris of Sandbag, an environmental think-tank. "There was a fixed supply that didn't respond to changes in [industrial] production following the financial crisis."

This glut saw the price of a tonne of carbon collapse to €2.81 per tonne in 2013, compared with nearly €30 when the scheme was launched in 2005. Critics say this removed the incentive for companies not to pollute.

In response, the European Commission intends to support the carbon price through intervention in the market with the cost estimated to average €25 in the decade to 2030, up from about €8 today. It also proposes to narrow the carbon leakage list and reduce the free

credits for eligible sectors. But several industries warn the reforms imperil their future in Europe.

Carbon costs for steelmakers have been relatively modest until now due to unused credits from the downturn. But the upwards trajectory could "wipe out" profit margins in a sector already struggling with low prices and cheap imports, says Axel Eggert, director of public affairs at Eurofer, a trade association.

A number of other observers argue that, without the confidence of financial returns, companies in energy-intensive industries are unlikely to make long-term investments and make them more environmentally-friendly.

This endangers the commission's vision of the bloc achieving its industrial competitive edge through efficiency improvements. Despite higher energy prices, Brussels claims that average energy costs per unit of output in the EU

are already similar to the US, and considerably lower than China and Russia.

Detractors also argue that the ETS fails to take into account – and therefore reward – sectors that have made strides towards reducing pollution.

"In the 1980s we replaced solid fuel with cleaner natural gas," says Renaud Batier, director-general of the European Ceramic Industry Association. The organisation says that losing carbon leakage status is the biggest risk for Europe's ceramics industry, which makes bricks and roof tiles.

This echoes a similar criticism that the EU's approach does not recognise the contribution some industrial goods make towards environmental protection. Double-glazed windows cut energy usage, while steel can be indefinitely recycled – helping to create a circular economy where resources are reused and environmental impacts minimised.

Tale of woe in nuclear sector

Reactors French industry has created problems for politicians to solve, explains *Michael Stothard*

Broken government promises, multibillion-euro delays and a key national champion rescued from the brink of failure: it has been a torrid year for the proud French nuclear industry.

Problems came to a head in August when Areva, the designer and builder of nuclear reactors around the world, was forced to strike a multibillion-euro rescue package deal with rival group EDF and the French government.

It had been hit by foreign competition, the downturn in global nuclear demand following the 2011 Fukushima disaster and cost overruns. It had not sold a new reactor since 2007.

It urgently needed to be put back on a "sound footing" to keep nuclear a "strength for our country," said Manuel Valls, French prime minister, before the deal to sell much of the company to EDF.

The French nuclear sector is one of the biggest and most advanced in the world thanks to its 58 reactors, producing 75 per cent of the country's electricity, built following the 1973 oil shock.

It has been pioneering a third-generation reactor technology, called the European Pressurised Reactor, which with a hefty 1,700MW output is being touted as a revolution in nuclear power.

The country is also a torchbearer for nuclear power as part of the European energy mix when many countries have retrenched following Fukushima.

"There's no doubt the global nuclear industry, including in France, is challenged and it is asking itself some profound questions since Fukushima," says Jean-Marc Ollagnier, chief executive of Accenture's resources operating group.

But for French nuclear the past five years have been a tale of technical problems and cost overruns that brought Areva to its knees and called into question the country's ability to deliver on next generation technology.

In Finland, the Areva-built Olkiluoto 3 reactor, the first EPR to be commissioned, is 10 years behind schedule and €5bn over budget. It is expected to start up in 2018.



Delays: the reactor at Flamanville where flawed steel was found
Charly Triballeau/AFP/Getty Images

In September EDF announced delays for the EPR reactor in Flamanville, Normandy: initially expected to cost €3bn and start operations in 2012, it will not start until 2018 at a cost of €10.5bn.

Flamanville and OL3 are early attempts in a new technology. EDF says the next EPR to be started at Hinkley Point in the UK will go smoothly due to valuable lessons learnt. Two EPRs in China, where there is greater expertise in large civil projects, appear to be on track for the 2017 launch.

The final problem came in April when the French nuclear regulator discovered flawed steel in EDF's reactor in Flamanville, prompting EDF to carry out tests.

"I have reviewed the Flamanville EPR project in detail, and I am absolutely confident it will be a success," says Jean-Bernard Lévy, chief executive of EDF.

"It is a priority for EDF and of critical importance for the French nuclear industry and its success internationally," he says.

France should make sure it can be involved in supplying the enormous Chinese nuclear market

These construction problems highlight the complexity of the EPR projects, and have led some to question if there is demand for these larger reactors, given their cost and size. The questions come at the same time as internal political ones, as France attempts to reduce its reliance on nuclear power.

President François Hollande, due to a deal struck between the anti-nuclear Green party and his ruling pro-nuclear Socialist party, has promised to reduce nuclear in the French energy mix from 75 to 50 per cent by 2025.

This could lead to power plant closures, which presents a conundrum. It is not clear what will replace them and as existing nuclear is by far the cheapest energy source it could mean higher energy bills.

"The cost of achieving the 50 per cent target in 2025 is likely to be huge," says François Lévêque, economic professor at l'École des Mines in Paris and author of *The Economics and Uncertainties of Nuclear Power*. "It could mean shutting down a dozen profitable and safe reactors which is just throwing money out the window," he says.

Even if no plants are shut down for political reasons in the lead-up to 2025 there are still decisions to be made, all of which are likely to be expensive.

The *grand carénage*, increasing the life expectancy of the 30-year-old plants from their current 40 years to 50 years, is expected to cost EDF around €55bn, should it ever win political approval.

Closing one nuclear plant has already proved difficult. Decommissioning Fessenheim, France's oldest reactor on the German border, was promised by the government to happen by 2016. This year it was delayed until Flamanville comes online in 2018, leaving the government accused of breaking its promises.

Whatever the political decisions, the coming years will be hard for the French nuclear industry. It will have to win projects abroad. There are potential plants in South Africa, Brazil, UAE and Poland. But the big hope is China, which wants to have 58,000MW of nuclear by 2020.

"France should make sure it can be involved in supplying this enormous Chinese nuclear market. It's critical for growth," says Mr Ollagnier, adding that in the end nuclear is "still the only available source of carbon-free baseload power that's scalable".

North Sea operators stung by turn in tide

Oil and gas

Companies are struggling to protect the basin's economic appeal, says *Kiran Stacey*

It is 50 years since drilling for oil and gas began in the North Sea. But despite the longevity of Europe's most prolific basin, experts think commercial oil in the area could soon run dry.

Production was never easy, not least because of the weather. But as the oil price rose, so did costs. In 2000, it cost \$6 to lift a barrel of oil out of the UK North Sea; it now costs \$18. In Norway, costs have risen from around \$4 to \$10.

Inflation happened because oil is more difficult and expensive to produce in a mature field, wages have risen and companies spent heavily on equipment to gain advantage over rivals.

Last summer, when oil was \$115 a barrel, this was not a problem. But now the price is less than half that, assets are uneconomic and costs are being cut, with 5,500 job losses in the UK industry and 65,000 across the wider oil-dependent workforce. In Norway an estimated 10,000 job losses have been announced.

For those who still have jobs, pay and conditions are worse. Large companies are moving from a "two weeks on, three weeks off" shift pattern for offshore work to "three-on, three-off". Those companies have also cut pay of contractors by up to a third.

Many believe the worst is yet to come. Amjad Bseisu, chief executive of EnQuest, an independent explorer in the UK North Sea, said he believed the region was a third through its job cuts. Menon Business Economics, the Oslo-based consulting firm, says the same is true in Norway.

Companies are improving efficiency: France's Total for example, gives workers a permit to do more than one type of work in a day, in case a scheduled task is impossible or finishes early.

In equipment, companies talk of sharing data and creating standardised equipment.

The savings could be vast. Ian Silk, vice-president of deep water projects at Royal Dutch Shell, says operators use 28 shades of yellow paint on subsea equipment. Others point to the 250 sizes of



Oseberg A gas platform

valve stems used by the industry – each 1/1,000th of an inch different.

Collaborations could prove difficult. In the UK, the Oil and Gas Authority has been recently established by the government to encourage companies to work together. In Norway, where the state has always been more involved in the oil industry, the structures already exist to allow this.

But experts worry the message is not getting through. John Pearson, Europe president at oilfield services group Amec Foster Wheeler, recently upbraided colleagues.

He told an industry breakfast in Aberdeen: "It is like trying to be captain of the football team while also being the goalkeeper, both of the wingers and taking the penalties. We've got to start working as a team."

Andy Samuel, head of the OGA, warned of a "domino effect". Companies often share responsibility for big infrastructure so the departure of one could leave others unable to shoulder maintenance costs, and hasten their departures.

Some executives have urged the UK government to look to Norway, where the tax regime, although more onerous, has been more stable and offered bigger tax breaks for exploration.

Luca Corradi managing director of Accenture's energy business in Aberdeen, says: "Both UK and Norway are mature oil and gas producers, but in recent years the UK's production performance has struggled compared with that of Norway."

But the worry on both sides of the North Sea is that a low oil price will lead to faster decommissioning: once assets are out of use, they cannot be reopened.

EU strains on solving its power 'trilemma'

Continued from page 1

However, in the wake of rising international competition, the aftershock of the 2011 Fukushima disaster in Japan and other woes, one of France's nuclear champions, Areva, was this year forced to strike a multibillion rescue package with EDF and the French government.

Meanwhile in Germany, power utilities previously dependent on fossil fuels have been struggling with consequences of the growth in renewables spurred the country's *Energiewende*. But the companies facing some of the most significant pressure, especially as the Paris climate meeting nears, are fossil fuel producers.

In the lead-up to the December meeting, pressure on Europe's coal, gas and oil companies has increased as a campaign, which initially swept through university campuses in North America and Europe, urging investors to sell their holdings in fossil fuel companies, has spread.

In May, the French insurance company, AXA, said it would sell €500m of coal assets. In June, Norwegian politicians decided that the country's \$857bn oil fund should no longer invest in companies whose businesses rely at least 30 per cent on coal. In July, the UK's Aviva

insurance group put 40 coal companies on notice that it would sell its shares in their businesses unless they could demonstrate they are serious about tackling climate change. In September, divestment campaigners claimed that investors controlling holdings worth \$2.6tn in fossil fuel companies had agreed to sell or reduce them.

At the end of September, the governor of the Bank of England, Mark Carney, warned that investors faced "potentially huge" losses if tougher climate action made fossil fuel assets "literally unburn-

\$26tn
Assets investors plan to sell in fossil fuel companies

€500m
Coal assets to be sold by AXA, the French insurance company

able". His comments coincided with a report by the bank on risks climate change posed to the insurance industry.

Coming some 10 weeks before the Paris meeting, Mr Carney's comments inevitably sharpened a debate about how fossil fuel companies might be affected by a global agreement to transform energy systems. Some companies

have tried to address this by urging the UN to let them help countries devise a strategy.

The chief executives of six European oil and gas groups, including Royal Dutch Shell, the UK's BP and Total in France, have asked for a dialogue with UN officials and governments on designing an international carbon pricing framework. The UN welcomed the move, although some companies behind it acknowledge that it is unlikely to affect a final accord.

"It won't influence the outcome of Paris," says David Hone, chief climate change adviser at Shell, and author of a recent book, *Why Carbon Pricing Matters*.

But he adds that it might help boost efforts to ensure that an agreement in Paris recognises the need to accelerate the use of carbon markets nationally and internationally.

This is important, he argues, because, in the absence of carbon pricing, countries could opt for regulatory measures that might be worse for both companies and the climate. "You leave yourself open to two things," he says: "Less certainty that you will solve the [climate] issue and almost certainly a higher cost if you are able to solve the issue."

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