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German utilities re-think business models

Teyssen: Cannot continue operating conventional plants "in the hope something will change"

German utilities are being forced to re-think their business models as they come under pressure from changing market conditions, particularly in Germany and the UK. **Junior Isles**

Germany's biggest utilities are facing significant changes to adjust to the transitioning energy market.

A strategy that has seen them traditionally focus on building coal and gas fired plants is being undermined by Germany's exit from nuclear power and a rapid transition to renewable energy. Electricity generated by solar panels on the rooftops of private households, for example, has also been incrementally replacing energy generated by utilities.

Germany's biggest utility, E.On recently slashed its profit forecast for the current year by almost one-third. It said net profit would fall to between €2.2-2.6 billion in 2013. The company

recorded a profit of €4.2 billion in 2012.

E.On said the rapid growth of renewables has made coal and particularly gas fired generation uneconomic to operate.

Johannes Teyssen, E.On's CEO said: "We can't just continue operating conventional plants in the hope something will change."

The company said it would be considering closing its Irsching power plant in Bavaria in March, and other plants could follow. Irsching is the site of one of the most advanced combined cycle gas turbine units in the world. He said utilities in France and the UK had already announced similar moves.

Germany's energy transition has also caused the country's second largest utility to fundamentally re-think its business.

In an interview at the World Economic Forum annual meeting in Davos, Switzerland, RWE AG Chief Executive Peter Terium outlined how the company will change its business model over the next couple of years, including a dramatic reduction in the size of its electricity generation business, which is the cornerstone of its operations. It will also strengthen its energy services business to cope with the consequences of the country's energy transition.

"The power generation business is

coming under pressure. We'll of course lose [revenue] here, so we have to find new business models," executive board member Leo Birnbaum said.

RWE also warned that it would significantly scale back its investment in Britain unless the government provides "desperately needed" certainty over energy policy.

In an interview with *The Sunday Telegraph*, Paul Massara, npower chief executive and RWE's UK representative, said: "I doubt that we will be investing the kind of money we have been investing unless there are propositions which attract not only us

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UK considers longer nuclear contracts

The UK government is believed to be considering longer contracts with operators of new nuclear plants in an effort to secure their investment.

According to *the Guardian* newspaper, ministers, intent on keeping the guaranteed wholesale price of electricity below £100/MWh, are proposing to extend contracts from the 20 years originally envisaged to at least 30 and possibly as long as 40 years.

Industry sources believe the likely agreed price for the first project in the pipeline to be contracted on this time-scale – two 1.6 GW reactors to be built at Hinkley Point in Somerset by EDF – will be below £100/MWh,

though not by a large margin.

EDF, which is proposing to build the Hinkley Point C reactors, is insisting on a price of £100/MWh, about twice the current wholesale price of electricity. According to *the Financial Times*, the Treasury is looking to make an opening offer to EDF of £80/MWh.

EDF has also asked the Treasury to guarantee some of the costs of Hinkley Point. The project is one of the UK's top five infrastructure projects and as such could be eligible for a state-backed guarantee.

Such talks, however, are believed to be at an early stage and formal discussions would only start once the two

sides have agreed a fixed price for electricity from the plant. A decision on the price is unlikely to be reached before the summer.

EDF originally said it expected to make the final investment decision on the Hinkley Point project by the end of 2012. The company later revised that to the end of the first quarter this year.

Hinkley Point suffered a setback last month when Centrica decided not to participate in the project, citing uncertainty over overall project costs and the construction schedule.

EDF insists, however, that its plan would not be derailed by the exit of Centrica and is in talks with a number

of Chinese groups including China Guangdong Nuclear Power, on taking Centrica's place.

The French state-controlled power group recently said it plans to cut as much as £1 billion (\$1.34 billion) in costs this year, with more to come in the next two years, as it seeks to lower its debt and get additional financial headroom for planned investments, including those in the UK.

Atkins is joining the Strategic Supply Chain Partnership for EDF Energy's Nuclear Generation business to provide additional expert engineering support as the company seeks to extend the life of its existing nuclear AGR fleet.

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but also enable other capital lenders to come into the market place.”

Meanwhile, EnBW's Chief Executive Officer Frank Mastiaux said: “The energy industry is undergoing a profound structural change, and EnBW has to go through it too.”

The market is extremely challenging, said Mastiaux, adding that the company will embark on a new restructuring programme called ‘EnBW 2020’. He did not give any specific details on the programme.

EnBW is struggling more than its competitors with the energy policy shift in Germany because it used to rely heavily on nuclear power. In 2011, around half of the power generated by EnBW still came from nuclear power.

In the face of depressed wholesale prices and weak demand all of Germany's major utilities are engaged in aggressive cost cutting measures.

Finland's Voimaosakeyhtiö SF recently purchased E.On's 34 per cent share of Fennovoima, which owns a nuclear power plant in Pyhäjoki. E.On said last October it plans to divest all of its operations in Finland.

E.On has also been seeking to cut wages and narrowly averted a vote on industrial action that was scheduled for February 10 after it struck an agreement with labour union representatives.

EU support fails to lift carbon prices

Carbon prices still fell by as much as 20 per cent last month despite a vote by the EU parliament environmental committee to strengthen the European Emissions Trading Scheme (ETS).

The committee voted by a margin of 38 to 25, with two abstentions, to support a ‘back-loading’ of carbon emission allowances. This would postpone the auction of 900 million carbon allowances in an attempt to ease the market's oversupply.

Eurelectric, the association representing Europe's utilities, welcomed the decision.

“We are relieved to see that the Environment Committee has recognised the importance of strengthening the ETS in the short term through a back-loading of allowances. The back-loading can provide a vital signal to the carbon market – and also to international observers – that the EU is committed to a long-term strategy of driving carbon reduction through a strong ETS,” said Eurelectric Secretary General Hans ten Berge.

Investors, however, doubted the vote would be sufficient to rescue the markets and the price of an allowance fell to a low of €4.09 before recovering to €4.58, still down more than 10 per cent.

Meanwhile, more than 75 environmental organisations have urged the European Parliament to scrap the EU ETS.

Instead of reducing discharges of CO₂, the ETS has “diverted attention from the need to transform the system's dependency on fossil fuels and growing consumption, resulting in increased emissions,” according to Joanna Cabello of Carbon Trade Watch.

New deals signal wind of change for shale gas

Major oil companies are testing the waters of Europe's shale gas resources in the hope that large-scale extraction will provide competition for the region's other gas suppliers.

Siân Crampsie

New-found political support for shale gas exploration in Europe has brought hope among energy companies that the region could yet undergo its own energy revolution and reduce reliance on Russian energy supplies.

Both Romania and Lithuania last month gave high-level backing to shale gas exploration. Their decisions came just two weeks after Shell signed a landmark deal with Ukraine to explore for shale gas there.

The governments of all three countries hope that large-scale extraction of shale gas will reduce their reliance on Russia for natural gas while also lowering energy costs. Both Shell's deal in Ukraine and the decisions in Romania and Lithuania signal a new momentum in the shale gas sector in Europe following moratoria imposed on drilling because of environmental concerns.

In Romania, the government has issued Chevron with a zoning certificate, allowing the US major to begin exploring for shale gas in the east of the country. The decision reverses a *de facto* freeze on unconventional gas exploration imposed last year after environmental protests in Romania and neighbouring Bulgaria.

Chevron is also pursuing shale gas exploration rights in Lithuania, which,

like Ukraine and Romania, is highly dependent on Russia for natural gas. Shell's deal in the Ukraine – the largest investment in unconventional gas in Europe to date – came as a fresh dispute erupted between Russia and Ukraine over payments for gas supplies.

The US Energy Information Administration (EIA) estimates that Lithuania and Romania, together with Hungary and Bulgaria, hold around 23 trillion cubic feet (TCF) of technically recoverable shale gas and the Ukraine 42 TCF. If test drilling proves these reserves to be commercially recoverable, then for these countries, shale gas could prove to be the ‘game changer’ that it has been in the USA, reversing declines in gas production and boosting energy independence.

Its effects could also be felt further afield than Central and Eastern Europe as increased gas supplies will heighten gas-to-gas competition. Oil-indexed gas prices – already under pressure from diversified LNG supplies – are likely to be finished, while some planned costly LNG projects may even be cancelled.

Increased gas supplies from within Europe will also dent Russia's plans for boosting exports to Europe, according to Peter Kiernan, energy analyst at the Economist Intelligence Unit (EIU). “Ukraine is a major importer of Russian gas, as well as a transit country for

Russian gas to Europe,” said Kiernan. “A significant reduction in Ukraine's reliance on Russian gas imports would impact Russia's energy export prospects, and probably hasten Russia's efforts to develop markets in Asia.”

The impacts on Europe's gas market would be heightened if Romania and Lithuania's decision to support fracking – the controversial method used to extract shale gas from underground – has a ‘domino’ effect across Europe.

Kash Burchett, analyst with IHS, said: “Romania's decision has the potential to turn the tide and give European leaders the confidence to speak up in favour of shale gas as a safe, cheap means to reduce dependency on imports and lower carbon emissions.” He also points out that developing a shale gas industry would give European governments a chance to boost industrial output and reverse economic decline.

France and Bulgaria as well as some states in Germany and Switzerland have already imposed bans on fracking, which involves pumping large quantities of water mixed with sand and chemicals into shale formations. France is estimated to hold 180 TCF of shale gas reserves, according to the EIA.

Meanwhile, test drilling of shale gas reserves continues in the UK, and in Germany the government is coming under pressure from the industrial

sector to develop shale gas reserves in order to reduce the cost of energy as the country transitions from nuclear power to renewables.

Recent analysis by Bloomberg New Energy Finance (BNEF) suggests, however, that extracting shale gas in the EU will not be as cheap as in the USA and will therefore not have the same impact on energy prices. BNEF estimates that the cost of shale gas extraction in the UK will be between \$7.10 and \$12.20/MMBtu, compared to costs in the USA of \$4.54 to \$4.83/MMBtu. “Exploitation of the UK's significant shale gas resources is unlikely to result in low natural gas prices,” said BNEF in a statement.

Part of the reason for differences in cost between the UK and US market are the different legal and planning factors, and these will also apply elsewhere in the EU. The rate of expansion of Europe's shale gas industry will also affect the impact that this energy source has on the market.

Shell and Chevron still face considerable uncertainty in their forays into shale gas in Europe, and are mindful of ExxonMobil's experience in Poland, where test well results disappointed. Chevron believes that surveying in Romania will take five years, so even if resources are proven to be viable, production is still a long way off.

Strong offshore growth despite political headwinds

■ EU budget cuts could impact energy policy ■ Global offshore capacity to hit 55 GW by 2020

Junior Isles

The wind industry is being hit by the economic crisis and austerity across Europe, and a difficult situation should not be made worse by politicians undermining investor confidence, warned industry figures at the European Wind Energy Association (EWEA) annual conference in Vienna last month.

Arthouros Zervos, President of EWEA criticised “sudden or retroactive changes to support schemes” and said the wind industry can be a driver for growth, for jobs and exports “but not if government policies drive away investors”.

Support for the industry at the pan-European level received a blow last month when EU Heads of Government agreed to fix the EU budget 2014-20 at €960 billion – a figure that is more

than 6 per cent less than proposed by the European Commission and one that EWEA believes could have a severe impact on EU energy policy.

The Commission proposed an €80 billion budget for EU Research and Innovation programme called ‘Horizon 2020’ – of which renewable energy would be one of many beneficiaries. The Heads of Government did not agree a specific budget figure for this but industry sources believe it is very likely to be reduced. A new figure is expected to be proposed by the European Commission shortly.

Funding energy networks (including electricity grids) under the ‘Connecting Europe facility’ was also cut 44 per cent from €9 billion to €5 billion.

Vilma Radvilaite, EWEA Regulatory Affairs Advisor, commented: “The EU is underfunding renewable energy

research and grid connections – which are crucial for achieving EU climate and energy policy – while leaving other budget areas largely untouched. It will open up a gulf between EU priorities such as renewable energy policy and the EU budget.”

Despite the cuts, however, the global offshore wind power market is forecast to skyrocket. According to research and consulting firm GlobalData, it will grow from a 2012 cumulative installed capacity of 5.1 GW in 2012 to 54.9 GW by the end of the decade, growing at a Compound Annual Growth Rate (CAGR) of 34.5 per cent.

Alfonso Faubel, global senior vice president for Alstom Power's wind business said that although there is a slowdown in the growth of onshore wind, “offshore is taking a larger share year-on-year”.

While the UK will account for most of the growth in the offshore wind power market, other countries such as Germany and France will be strong contributors.

Renaud Chevallaz-Perrier, Technical Director for RES Mediterranean warned, however, that transmission constraints could jeopardise offshore plans.

Commenting on France, where RES is hoping to take part in the second (3000 MW) round offshore tender, Chevallaz-Perrier said: “The main problem with the French tender is timing. For example, 20 per cent of the wind farm has to be commissioned at the beginning of 2018 but the grid connection will not be available until 2019. The question is what to do with 20 per cent of the wind capacity [with no connection]?”



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Chile attracts international investment

- SunEdison to build Latin America's largest PV plant
- Courts proposed for environmental disputes

Siân Crampsie

Chile is succeeding in attracting international investment to its power sector to help it boost production capacity in the face of rapidly rising demand.

The South American country wants to double its electricity generating capacity over the next decade in order to maintain its strong economic growth.

US-based SunEdison and China's Sky Solar have both outlined project plans in the few weeks, while the government has put forward proposals to streamline the planning approvals process for new power projects.

SunEdison last month announced a deal with Chilean mining firm CAP to build a 100 MW solar power plant in the Atacama Desert. The project is touted as the largest of its kind in Latin America and will meet 15 per cent of CAP's energy needs.

Meanwhile Sky Solar said it was investing \$1.36 billion in Chile. The firm last year started construction of an 18 MW ground-mounted solar photovoltaic installation in Chile's northern

Arica province.

Mining operations in Chile's north are leading the country's economic boom. UK-based power developer Rurelec, which is building a 40 MW diesel power plant in Arica province, said last year that Chile's northern transmission system (SING) requires the addition of 3000 MW of new generating capacity over the next seven years.

SING's current power capacity is 4000 MW.

The Chilean power generator is building a 154 MW coal-fired power plant in northern Chile, while Mainstream Renewable Power has announced plans for two wind farms in Chile totalling 100 MW of capacity and Enel Green Power is building 99 MW of wind capacity there.

However a number of power projects in Chile have been held up over environmental concerns and the government has recognised the need to improve clarity in the planning system.

It has proposed establishing special courts to hear environmental disputes. Coal fired power projects and hydro-

power plants in particular have been delayed and their hold-up is hindering development of the mining industry.

Last year Chile's Supreme Court halted construction of the 2100 MW Hacienda Castilla coal fired plant in northern Chile after the local community opposed the project's planned port. The court's ruling forced developer MPX Energia to submit a single environmental impact study for the power plant and port.

Under the new proposals, courts would consist of three judges, one with a background in environmental issues, and would rule on a project's environmental impact.

Chile is trying to diversify its fuel sources for power generation so that it is less dependent on hydropower. As well as building conventional thermal power plants, it also wants to develop its geothermal energy sector and other renewables sector.

It has set a target of generating five per cent of electricity from renewable energy sources, excluding hydropower, rising to ten per cent by 2024.

Green light for Canada's biggest wind farm

EDF EN Canada is to go ahead with the construction of a 350 MW wind farm after the project was approved by the government of Quebec.

The 350 MW Riviere-du-Moulin wind power project will be the largest wind energy facility in Canada with a single power purchase agreement when commissioned. It is one of seven projects awarded to EDF EN Canada in 2008 and 2010 through a call for tenders issued by Hydro-Quebec.

In January 2013 EDF EN commissioned two 150 MW wind power plants in Quebec, which has set a target

of reaching 4000 MW of installed wind power capacity by 2015.

It is also planning to add 4500 MW of new hydropower capacity to its grid.

By the end of 2015, EDF EN Canada will have developed and built a total of 1003.2 MW of wind capacity in the province.

Turbines for the Riviere-du-Moulin project will be supplied by REpower Systems SE, a long-term partner of EDF EN in North America. The first 150 MW phase of the project is expected to be commissioned in late 2014.



Betting big on wind: Canada's planned Riviere-du-Moulin wind power project will be the country's largest

Utilities oppose FutureGen finance plans

The FutureGen 2.0 project is set to enter its next phase of development but could yet be scuppered because of opposition to financing plans for the \$1.6 billion initiative.

The US Department of Energy (DOE) last month gave the go-ahead for phase two of the clean energy

project to start, entailing detailed design and engineering and work to secure environmental permits.

However in late February power suppliers in the state of Illinois, which will host the near-zero emissions power plant, have challenged a state-approved plan to finance the project.

Under current plans, the FutureGen project will involve refitting an existing coal fired power plant in Meredosia, Illinois, with oxy-combustion and carbon capture technology.

The DOE has pledged \$1 billion of funding but the remaining \$600 000 must be met by FutureGen's owners,

whose financing plans hinge on recouping costs through a payment surcharge on consumers' bills.

Illinois utility Commonwealth Edison has challenged the proposed surcharge, however, arguing that the FutureGen 2.0 project is unnecessary. Regulators estimate that the project

would add an estimated \$1-\$1.40 per month to residential consumers' bills.

FutureGen 2.0 is expected to start operating in 2017. Last year it chose Morgan County as its preferred location for the permanent storage of carbon dioxide captured at the plant.

Shale oil boom increases flaring

The US oil industry has come under criticism for wasting resources by flaring gas produced from oilfields.

The amount of gas flared – or burned off – from oil wells has increased over the last five years as extraction of shale oil from fields in the USA has boomed. The low price of natural gas in the USA means that it is not cost-effective for oil companies to install the equipment needed to capture and pipe the associated gas to processing plants.

Environmental groups are concerned about the impacts of flaring on the environment, while shareholders and investors believe that flaring represents a considerable risk to oil companies because of the potential impact on air quality.

The World Bank says that the volume



of gas flared in the US has tripled in the last five years and the country stands fifth in the world in terms of gas flaring behind Russia, Nigeria, Iran and Iraq. The USA and several US oil majors, including Chevron, ExxonMobil, ConocoPhillips and Marathon Oil, are all partners in the World Bank's Global Gas Flaring Reduction (GGFR) initiative.

According to GGFR, the volume of gas flaring associated with oil production worldwide fell by 18 per cent between 2005 and 2011 but then started to rise because of increased hydrocar-

bon production in Russia and shale oil operations in the US state of North Dakota.

In Texas, enough gas to provide electricity to more than 40 000 homes is flared in the state.

Last year the World Bank called on oil producing countries to step up efforts to tackle gas flaring but there are few incentives to cut flaring in the US.

However in North Dakota, a bill has been introduced to the legislature that would provide tax incentives to bring gas to market.

PTC extension boosts wind purchases

More US utilities than ever before are buying wind power because the federal production tax credit (PTC) makes it cost-effective, says the American Wind Energy Association (AWEA).

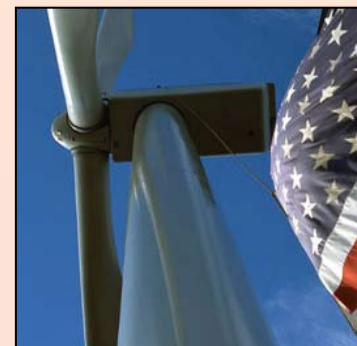
AWEA reported last month that 66 utilities in the USA now either own wind power capacity or buy the output from wind farms under fixed price contracts, while other types of consumer – including industrial firms, schools and towns – are becoming more active in the market.

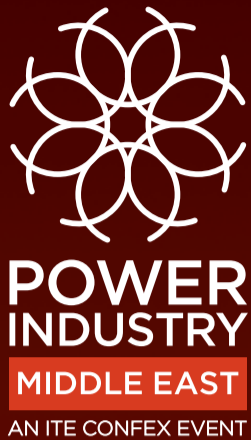
A year ago 42 utilities were active in wind ownership or purchasing.

The trend is largely down to the existence of the PTC, which pays wind farm owners for the energy they generate. The PTC was extended for one year at the beginning of 2013.

Major utility companies that are

active in the wind sector include Xcel Energy, which said in February that it was considering adding more wind generation because of the PTC extension, and MidAmerican Energy, which owns more wind generating capacity than any other US utility.





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China ready to explore nuclear opportunities

- CAP1400 could be ready end of 2013
- First AP1000 unit to produce electricity in October 2014

Syed Ali

The nuclear reactor being developed by China – the CAP1400 – will be ready for export this year according to Gu Jun, an executive of China's State Nuclear Power Technology Corporation (SNPTC).

"The exploration of business opportunities on the world market will begin in 2013," Gu told the *China Daily* newspaper, adding that the technology "is currently being evaluated by the

National Energy Office." Once granted a permit by that office, the reactor can be ready by the end of 2013, he said.

With regard to possible sales of the reactor, the vice president of SNPTC, Ma Lu, said the hunt for markets would be carried out jointly with Westinghouse but that "in certain areas such as South Africa for example, the Chinese partner can take the initiative and promote the CAP1400".

The third-generation reactor has been

developed as the result of a 2008 agreement between SNPTC and US firm Westinghouse Electric Company.

China decided to use Westinghouse technology to build four reactors, two in Sanmen in the eastern province of Zhejiang, and another two in Haiyang in Shandong province. They will be the world's first third-generation reactors.

At the start of February, Westinghouse, its consortium team member The Shaw Group Inc. and China's State

Nuclear Power Technology Corporation (SNPTC), marked a significant milestone with the announcement of the successful setting of the AP1000 containment vessel top-head for the nuclear island of Unit I at Sanmen.

SNPTC expects that the first AP1000 unit at Sanmen will start to produce electricity in October 2014.

The company had previously planned to bring the reactor online in 2013, but construction slowed after an

earthquake and tsunami crippled the Fukushima Daiichi nuclear power plant in Japan in March 2011.

Slowing down construction allowed time for design adjustments and to meet stricter construction requirements, according to the company.

Meanwhile, the Hongyanhe nuclear power station, the first nuclear power plant and largest energy project in northeast China, started operation in mid-February.

Calls for choice prompt talks of market reform

A lack of customer choice and the desire for greater system flexibility could bring the most significant changes to Japan's electricity sector in decades. **Syed Ali**

Complaints that consumers in the Tokyo area have no option but to accept electricity rate hikes by Tokyo Electric Power Co. (Tepco) have prompted discussions on reforming the Japanese electricity sector.

Tepco is the owner of the crippled Fukushima Daiichi nuclear power plant and the hikes are the result of the utility's need to finance increasing fuel costs for non-nuclear thermal power generation following the Fukushima accident in March 2011.

Ministry of Economy, Trade and Industry (METI) minister Toshimitsu Motegi and officials are keen to press ahead with reforms and a revised Electricity Bill setting the overarching legal framework will be submitted to the current Diet session. This would allow detailed design discussions of the new market in the summer.

An expert panel under the industry ministry is proposing to separate power generation and transmission units of utilities between 2017 and 2019. The panel is also proposing the introduction of three different licenses to operators engaging in power generation, transmission and retail, while spinning-off part of the ministry's authority for supervising utilities and transferring them to an upcoming new organisation to pay closer attention to electricity transactions.

Japan's electricity market is dominated by ten regional monopolies, which own generation, transmission and distribution. They are not set up to transfer electricity between regions even in a crisis – east (50 Hz) and west

(60 Hz) Japan run on different frequencies. The Fukushima disaster exposed this lack of flexibility. Experts say post-earthquake rolling blackouts in Tokyo could have been averted with better connectivity.

Reform has been blocked in the past by vested interests but the new LDP government has signalled broad support for market reform, to help minimise the risks of insufficient power supply and increase competitiveness in the electricity market.

METI is keen to learn from practice elsewhere. During a recent UK visit, it looked at UK regulator Ofgem as a model. It has also shown interest in the Contracts for Difference and the Capacity Mechanism elements of the UK Energy Bill. However, METI is believed to be in favour of 'liberalisation' along the lines of the French model, at least initially.

According to a draft report, the reform process will commence with the creation in around 2015 of an independent entity that will be in charge of coordinating power supply and demand nationwide.

In the next stage, new entrants will be allowed into the electricity retail market for households around 2016, making it possible for consumers to choose power suppliers.

In the third and final stage, major utilities will separate their power generation and transmission businesses around 2018 to 2020.

The current electricity pricing system for household customers, in which utilities pass on personnel expenses

and other costs for supplying power, will also be abolished when power generation and transmission are separated, or later.

The report also noted that the timing for the abolition of the pricing system might be reviewed, depending on progress on competition in the market and other factors.

After the report is compiled, the Economy, Trade and Industry Ministry plans to submit a bill to revise the Electricity Business Law during the ongoing Diet session to push for the reform.

Japan began liberalising its electricity market in the 1990s, allowing businesses to supply electricity to major utilities as well as to large consumers such as industry and commercial companies.

The process, however, ended up as a partial liberalisation and new entrants only accounted for about 3.6 per cent of the power sold to large-scale users in fiscal 2011, amid high costs for them to access the existing power grid. The retail market for households has also been left dominated by the major utilities.

■ Prime Minister Shinzo Abe says Japan will review its pledged goal for cutting greenhouse gas emissions in light of its reduced reliance on nuclear power going forward. Abe has instructed Environment Minister Nobuteru Ishihara and other Cabinet members to revise the goal of cutting carbon dioxide emissions and other greenhouse gases by 25 per cent from 1990 levels by 2020.

Loans will boost Bangladesh power sector

A series of recently secured loans will help Bangladesh ease its crippling power shortages.

Last month the government decided to borrow loans worth nearly \$1.5 billion from export credit agencies (ECAs) for setting up five big power plants, officials said. It also signed separate deals with Japan for loans to implement four projects, including two deals for the development of its power transmission network.

The Power Division officials said they have already selected bidders for setting up the plants to be mobilised with the ECA loans.

"We have already selected the contractors. They have come up with loans from the ECAs. The contractors will ensure funding and setting up of the plants," said a senior official.

The Power Division said the government has approved \$622 million ECA credit for the state-owned Ashuganj Power Station Company Ltd (APSCL) for two gas-fired power plants – the 225 MW combined cycle gas turbine (CCGT) power plant at Ashuganj and a 450 MW CCGT plant at the same site.

The Ministry of Finance (MoF) also approved borrowing from the ECAs to set up three other power plants, including Bibiyana III (450 MW), Shahjibazar (300 MW), and Barapukuria-III (250 MW).

The proposed Bibiyana plant will require funds of nearly \$400 million, the Shahjibazar plant \$350 million, and the Barapukuria plant nearly \$250 million.

Meanwhile the deal signed with Japan will see the Japan International Cooperation Agency (JICA) provide \$208 million to upgrade and enhance the capacity of the national grid through the construction and expansion of transmission lines as well as substations in Chittagong, Comilla, Lakshmipur, Mymensingh, Barisal, Shariatpur, Jessore, Bogra, Rajshahi and Nilphamari districts. A further loan of \$460.5 million will be used for the construction of a 360 MW power plant project launched in 2010.

In a separate move, the country recently said it would soon generate power from municipal solid waste after securing a foreign direct investment (FDI) worth \$300 million from Italian firm, Management Environment Finance S.r.l. Ltd.

The project – the first of its kind in the country – is targeted to produce 100 MW of electricity along with organic fertiliser in phases under two projects that will be implemented at Aminbazar and Matuail of Dhaka North and Dhaka South City Corporation, respectively.



Bangladesh: borrowing to ease power shortages

Indian eyes reforms to combat power shortages

India's latest move to combat crippling power shortages has seen the setting up of a panel of senior industry executives to advise the government on reforms in the power sector.

The construction of many new power plants is being delayed by tight supplies of coal and natural gas, along with reluctance by banks to lend more to highly leveraged power producers. The resulting power shortages are threatening to derail industrial growth.

A power ministry official told *The Wall Street Journal*: "The group will discuss and deliberate periodically on issues pertaining to the power sector

and suggest reforms in different areas relating to the sector."

The 22-member panel, headed by power minister Jyotiraditya M. Scindia, would include industry leaders such as: Tata Group Chairman Cyrus Mistry; Reliance Group Chairman Anil Ambani; State Bank of India Chairman Pratip Chowdhary; as well as the managing director and chief executive of ICICI Bank Ltd., Chanda Kochhar.

According to government estimates, India plans to increase power generating capacity by 44 per cent to 288 GW in the five-year period through March 2017, at a cost of around Rupees 13 trillion (\$244 billion).



Motegi: keen to press ahead with reforms



Crippled Fukushima Daiichi nuclear power plant

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Renewable vision faces uphill struggle



Anderson believes the EU has "untapped potential"

- WWF calls for ambitious climate, energy targets
- Power plant emissions rising

WWF believes that the European Union could get itself on track for achieving 100 per cent renewable energy use by 2050 if greater political will were put behind upcoming climate and energy plans for the post-2020 period.

The environmental group says that the EU could reach a fully renewable energy system by 2050 if it cut energy use by 38 per cent and generated 40 per cent of energy from renewable resources by 2030.

The measures would reduce greenhouse gas emissions by 50 per cent over 1990 levels, boost the economy as well as cut the region's €573 billion external fossil fuel bill.

The measures are set out in a report which was released as the European

Commission prepares to debate energy and climate policy for post-2020. It is also currently reforming the EU's Emissions Trading Scheme (ETS), the main mechanism used to cut greenhouse gas emissions in the 27-nation bloc.

Greenhouse gas emissions from the power sector are thought to be rising at present, partly due to an increase in the use of coal and partly because of a fall in renewable energy investment.

Coal use has increased in the EU's power plants because of an increased availability of cheap coal imports from the USA, where natural gas production has boomed, low carbon prices in the ETS, and a rush by some coal-fired power plant operators to take advantage

of the strong 'dark spread' before looming environmental restrictions on coal operators take effect.

However WWF believes that the EU should implement an ambitious package of post-2020 measures with targets for energy efficiency, renewable energy and emissions. "It would not only help reduce the impact of climate change, including huge health and environmental costs, but it would also help to generate up to 5 million jobs, significantly boosting the economy," said Jason Anderson, Head of Climate & Energy at WWF European Policy Office.

WWF's report is based on a vision published in 2011 for deriving the entire plant's energy needs from renewable sources by 2050. It argues that this could

be achieved by limiting energy use while scaling up renewable generation technologies.

WWF says that its 2050 vision is still attainable and that in Europe, strong political will is required to stay on track.

"Our report clearly shows that the EU has untapped potential for cutting energy use, taking full advantage of renewable sources that could deliver cheaper and more secure energy, and ensuring that a 100 per cent renewable European energy system by 2050 remains within reach," said Anderson.

WWF is one of several pressure groups calling for Europe's ETS to be reformed in order to boost carbon prices, which since the start of 2013 have

been languishing around the €5 mark.

Low carbon prices make it cheaper for power plants to emit greenhouse gases and provide little incentive for energy companies to invest in clean, low-carbon technologies.

WWF is in favour of European governments 'backloading' 900 million emission allowances in the ETS, a move that is designed to cause the carbon price to rise. However other environmental groups have called for the ETS to be scrapped altogether.

According to Bloomberg New Energy Finance, greenhouse gas emissions from Europe's coal-fired power plants rose by around 17 per cent in 2012, while Europe's total power plant emissions increased by three per cent.

UK warned of supply crunch



Energy prices are set to rise sharply in the UK due to a looming era of tight natural gas supplies and a shortage of electricity generating capacity.

The UK is preparing to close its ageing coal fired power plants due to EU-imposed environmental restrictions, including the Large Combustion Plant Directive, and new nuclear and wind capacity will not come on line quickly enough to fill the gap.

Gas-fired power plants will be needed to help fill the energy gap but the country will increase its reliance on natural gas just as a forecast period of tightness in the liquefied natural gas market starts.

The result will be a 22 per cent rise in energy bills by 2020, the country's regulator, Ofgem, has warned.

"It's horrendous serendipity that just at the time we have a squeeze on our power station capacity and turn

to gas, the global markets may have a squeeze on their LNG," said Alistair Buchanan, CEO of Ofgem. "Things are going to be very tight in three years' time."

UK gas firm Centrica added fuel to the fire at the end of February when it said that it would not build any new gas fired power plants in the UK for four years. Sam Laidlaw, the company's chief executive said new plants would only be built once the government's energy bill was implemented. He said Centrica would only make a final investment decision on a new gas fired plant if it wins a capacity auction, the first of which are expected to take place in 2015.

The UK government is introducing a raft of reforms to the electricity market that are designed to attract £110 billion of investments in low-carbon generation, including nuclear power.

But although the bill has been welcomed by investors, new nuclear power plants are unlikely to start operating until 2020.

"Coal stations will be closing at a time when coal prices are low and gas prices higher," said Dr. Simon Harrison from the Institution of Engineering and Technology (IET). "Gas is plentiful in the world, but the pipeline and/or liquefaction infrastructure do not exist to allow it to be freely transported from its source to the UK... Other options such as new nuclear are some time from being available, and renewables in the UK are mostly relatively costly at present."

Harrison added: "A stable policy regime and confidence around decarbonisation targets is required to bring this investment forward."

Several organisations have called for decarbonisation targets to be included in the UK's electricity market reform bill, which is currently going through parliament. Such a move would secure the investment needed in the UK's energy system as well as make the country a world leader in clean energy technology, argue the groups, which range from environmental organisations to energy companies, investors and NGOs.

According to Ofgem, about ten per cent of the UK's generating capacity is set to be retired this month, causing the reserve margin to fall from its current level of 15 per cent. The reserve margin could fall to as low as five per cent in three years' time.

OL3 hit by further delays



Areva's Luc Oursel says the reactor will cost about €8 billion

Regular electricity production from Finland's Olkiluoto 3 nuclear power plant is unlikely to start until 2016, according to Teollisuuden Voima (TVO), the plant's owner.

The Finnish utility has reported that the latest progress reports from the Areva-Siemens consortium that is building the EPR reactor showed that the project would be completed seven years behind schedule.

It blames Areva-Siemens, with whom it is already locked in a dispute over setbacks and delays that have plagued the project. "We have not yet received an adequate schedule update. Additionally, the I&C design has not proceeded as planned, and therefore

the plant completion may be further delayed," said Jouni Silvennoinen, head of the OL3 project at TVO.

However, Areva wants TVO to take its share of the blame for the delays and has accused the Finnish firm of not participating fully in the design of the I&C architecture. It notes that its EPR projects in China are proceeding "twice as fast as the Finnish project".

Areva's Chief Executive Officer Luc Oursel has said the reactor will ultimately cost about €8 billion, the same amount as a similar reactor the company is building in northern France. The construction of the Olkiluoto reactor was originally estimated to cost about €3 billion.

Bulgaria asks nuclear question

The Bulgarian government says that it will not go ahead with the construction of a new nuclear power plant in spite of a majority vote in favour of the project in a recent referendum.

Bulgaria's Electoral Commission said that just over 60 per cent of voters in the referendum voted in favour of the Belene nuclear power plant, but that the turnout of 20.2 per cent was

below the 60 per cent threshold needed to make the referendum binding.

The vote was called by the opposition Socialist party to try to force the center-right government to reverse its decision to cancel a deal with Russia's Atomstroyexport for the plant.

The issue has been seen as a barometer of Bulgaria's relationship with Russia.



Africa, Middle East embark on wind and solar projects

Major wind and solar energy projects in Africa and the Middle East will provide templates for the expansion of the region's renewables sector.

Siân Crampsie

Morocco is set to double its wind energy capacity with the construction of a 300 MW project by GDF Suez and its local partner Nareva Holding.

The Tarfaya wind farm will be the largest wind farm in Africa and the largest ever constructed by GDF Suez. It will make a major contribution to Morocco's renewable energy goals and illustrates the growing importance of Africa in the wind energy market.

The latest data from the Global Wind Energy Council (GWEC) shows that while Africa saw just 102 MW of new wind power capacity built in 2012, a number of major projects are about to get underway in key markets such as South Africa.

"This is just the beginning of the African market," said Steve Sawyer, Secretary General of GWEC. "And with construction started on 500+ MW in South Africa, we expect Africa to be a substantial new market, where clean, competitive energy generated with indigenous sources is a priority for economic development."

Africa's total cumulative installed

wind power capacity now stands at just over 1000 MW, including 291 MW in Morocco, says GWEC.

GDF Suez will develop the Tarfaya project on a build, own, operate and transfer (BOOT) basis, selling energy from the wind farm to Moroccan state utility Office National de l'Electricité et de l'Eau Potable (ONE) under a 20-year power purchase agreement.

The French firm, which wants to diversify its operations away from Europe's stale energy markets, says that Tarfaya will yield a load factor of 45 per cent.

The company is also planning to build a 94 MW wind farm in South Africa.

Economic turbulence and policy uncertainty in Europe has forced wind energy companies to look further afield for opportunities, including South America and the Middle East North Africa (MENA) region.

Last month Jordan's energy minister unveiled plans for the country's first private sector renewable energy projects – a 117 MW wind farm and a 10 MW solar plant.

The wind farm will be built by the Jordan Wind Power Company on the

outskirts of the southern city of Tafileh at a cost of JD205 million (\$289.5 million) and will come on line by 2014.

Jordan is aiming to develop up to 1000 MW of small and medium-sized renewable energy projects over the next five years in order to reduce dependence on imported energy. The solar power plant will be built in the northern city of Mafraq by the Philadelphia Solar Power Company.

In February Saudi Arabia said the completion of its largest ground-mounted solar photovoltaic plant marked an important milestone in the development of its solar power sector.

The Kingdom is planning to generate one-third of its electricity from solar by 2032 in order to reduce oil consumption. The 3.5 MW facility was developed by Germany's Phoenix Solar AG using panels from Suntech Power Holdings and inverters from SMA Solar Technology.

Globally, solar PV capacity will more than triple by 2020, according to research from GlobalData. Cumulative installed capacity will climb from 97 GW in 2012 to 330 GW by 2020 – a compound annual growth rate of 16.5 per cent.

Risk guidance for CCS

DNV Kema says that the use of comprehensive risk management practices in the carbon capture and storage (CCS) sector will help to improve public confidence that projects can be delivered and operated safely.

The risk management firm has developed a set of comprehensive guidelines for the CCS industry designed to help the development of clear and effective carbon dioxide (CO₂) risk management policies across the entire CCS chain, from capture facilities to underground injection.

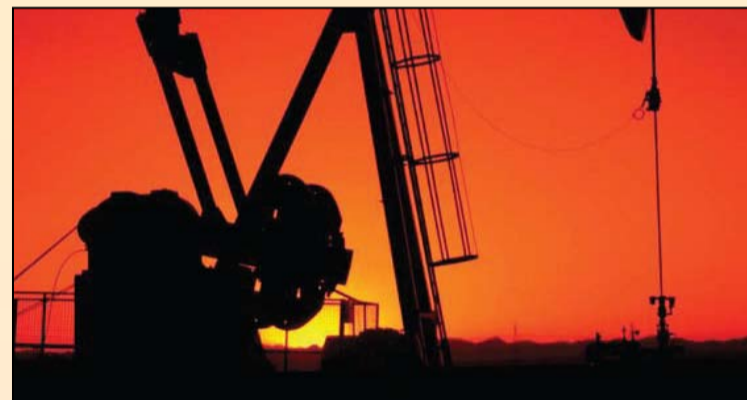
CCS is a promising technology for limiting greenhouse gas emissions from power plants burning fossil fuels, but there are concerns about the impacts that a large leak of CO₂ would have on populations and the environment.

DNV Kema says that "there is little experience of handling very large quantities of CO₂ outside the US, where CO₂ is used to enhance oil production" but that this will change as CCS projects are brought on-line. "CCS engineers, project manage-

ment, system operators, hazard management specialists, and others who have a key role in delivering a safe operation need to have adequate understanding of the potential CO₂ hazards so that they can effectively manage the associated risks," explained Hamish Holt of DNV Kema.

"Aspects of CO₂ such as the rapid corrosion that can occur if water enters a CO₂ system, the very cold temperatures that can occur if a CO₂ system is depressurised, the effect of impurities, the difficulties associated with modelling leaks, and the toxicological effects on humans when air with a high CO₂ concentration is inhaled, all need to be adequately understood."

DNV Kema developed the guidance in conjunction with industry partners such as Amec, Chevron, Air Liquide, E.On, Gassnova and National Grid. Last month the firm also launched a project learning service for the CO₂ management and CCS industries to improve global levels of competency in the CCS field.



There are concerns about the impacts a large leak of CO₂ would have on populations and the environment

Canada appeals WTO ruling

Canada has appealed a case at the World Trade Organisation brought by Japan and the European Union over local content clauses in tenders for renewable energy projects in the province of Ontario.

Both Japan and the EU allege that local companies are given preferential treatment and their claims were upheld late last year by the WTO's dispute settlement body.

The dispute is the latest in a raft of international trade disputes to hit the renewable energy industry.

In February the US government initiated processes at the WTO to challenge India's treatment of US solar equipment manufacturers.

The complaint says that India's national solar programme requires solar energy producers to use Indian-

manufactured solar cells and modules, putting foreign solar products at a disadvantage.

Under India's national solar power programme, solar energy developers receive a subsidy for energy produced, provided that they use Indian-made equipment.

Last year US authorities put trade tariffs on imports of Chinese solar goods after a complaint by US solar firms over anti-competitive behaviour, and another investigation is underway in the USA over Chinese wind turbine towers.

The EU has also launched an investigation into Chinese solar panels, while Beijing has retaliated with a complaint of its own to the WTO about renewable energy subsidies in Italy and Greece.

Ukraine faces \$7 billion gas bill

- Moscow rejects Kiev appeals
- Shell signs shale gas deal

Tensions between Ukraine and Russia have once again flared up because of a dispute over natural gas supplies.

Russia has sent Ukraine a \$7 billion bill for failing to import agreed amounts of gas last year and has rejected an appeal by Kiev to renegotiate its gas supply contract.

Ukraine relies on Russian natural gas to meet around 70 per cent of its own natural gas needs, and is also an important transit route for Russian natural gas supplies to Europe.

It wants to improve its own energy security by reducing reliance on Russia and at the end of January signed a landmark deal with Shell to explore for shale gas reserves.

The \$7 billion bill from Russia is the result of Ukraine importing less gas

than stipulated in its 'take or pay' contract with Gazprom, which has already had to renegotiate contracts with major customers as gas prices come under pressure from LNG supplies and the indirect effects of the American shale gas boom.

The Russian gas company is also under investigation by the European Commission over anti-trust issues.

Under its 2009 deal with Gazprom, Ukraine's Naftogaz is obliged to buy 42.5 billion cubic metres (bcm) of gas a year from Gazprom. But last year it purchased only about 60 per cent of that.

The drop in gas demand in Ukraine is a result of the economic recession as well as a switch from gas to coal in some industries.



Ukraine's deal with Shell could result in the oil major investing \$10 billion in Ukraine to extract shale gas reserves. The country is thought to hold the third-largest reserves of shale gas in Europe and could meet its own domestic needs as well as provide exports to other countries.

Since 2006 Russia has twice cut off natural gas supplies to Ukraine during natural gas pricing disputes.

GE, Siemens rise in global wind rankings

Turbulent markets have muddied the waters of the global wind turbine sector.

Siân Crampsie

Policy uncertainty in key markets and economic turbulence have altered the global leader-board of wind turbine manufacturers.

Preliminary data from BTM Consult shows that GE has now replaced Vestas as the world's largest wind turbine manufacturer.

The US firm was boosted by a rush of orders in late 2012 as US developers raced to get projects underway before the expiry of a crucial wind energy subsidy at the end of the year.

Meanwhile Chinese firm Goldwind and Spain's Gamesa have been pushed out of the top five rankings by Siemens and Suzlon. Goldwind's

market position was affected by strong competition from other Chinese firms – a factor that also led to falling market shares for other Chinese OEMs, including United Power, Sinovel and Mingyang.

Gamesa's fall from the top five has been driven by the moratorium on renewable energy subsidies in its home market of Spain, says BTM, which plans to publish final data at the end of this month. Germany-based Siemens has seen considerable success in the European offshore wind energy market.

Vestas has held the top spot in the global rankings since 2000 but last month warned that 2013 would be a difficult year in which it would ship

just 4-5 GW of capacity.

It is also coming under scrutiny from investors after a shareholder rights group requested that an independent auditor examine the company's accounts.

Investors are concerned that Vestas used an accounting change to boost revenues in 2010 and also changed its profits warnings disclosure policy. They say they have lost confidence in the way that the company is being run, according to the *Financial Times*.

The Danish firm is in the throes of a major restructuring plan to help it adjust its business to the turbulent market and an ill-timed expansion programme at the start of the global economic recession. Orders in 2012

amounted to 3.7 GW, their lowest since 2009, and the firm posted profits warnings in both 2011 and 2012.

Last month, Vestas laid-off more employees at its Weld County blade factories. It stated that it laid off 10 per cent of the remaining 1100 workers in Colorado, just a month after warning that it would be laying off 2000 more people worldwide this year.

According to BTM's data, GE now holds a 15 per cent share in the global market for wind turbines and has risen from third place in 2011 to first. Siemens stands in third place behind Vestas, up from ninth place last year, while both Enercon and Suzlon both rose one position in the rankings to take fourth and fifth place, respectively.

While 2012 was a turbulent year for the wind industry in terms of policy, key markets such as China and the USA helped to drive a record number of installations. Growth was also helped by a fall in wind turbine prices and improvements in capacity factors for wind energy.

BTM notes, however, that challenges still remain in the market and turbine vendors are being forced to take on more risk to grow their business. Asian markets such as China and India have been impacted by delayed payments that have affected cashflow through the entire supply chain, while the resurgence of natural gas in some markets is also a threat to the uptake of wind energy.



AES believes that the sale of two of its distribution assets in the Ukraine will help it simplify its operations.

The USA-based power company has signed a deal to sell its equity interests in the two power distribution utilities to VS Energy International.

AES will sell its 89.12 per cent equity interest in AES Kyivoblenergo, which serves 881 000 customers in the Kiev region, and its 84.56 per cent

equity interest in AES Rivneoblenergo, which serves 412 000 customers in the Rivne region.

"We continue to exit markets that are not part of our strategic vision," said Tom O'Flynn, AES Executive Vice President and Chief Financial Officer.

"This transaction represents another step in the process to simplify our structure so we can focus on creating value in markets where we have a

compelling competitive advantage."

The transaction is expected to close by mid-2013 and is subject to local regulatory approval. Both AES Kyivoblenergo and AES Rivneoblenergo will continue operations, supplying energy to customers and working constructively with all stakeholders. AES plans to provide additional detail on the transaction in its fourth quarter 2012 earnings call materials.

Alstom, Capgemini offer cloud services

Alstom Grid and Capgemini say that the use of cloud-based network management systems will help utilities to reduce operating costs.

The two companies have signed a global alliance agreement to pursue joint commercial opportunities in the smart grid sector, including the launch of the industry's first real-time, cloud-based Integrated Distribution Management System (IDMS) and a new cloud-based Demand Response Management Systems (DRMS).

Cloud-based applications run on remote computers that are owned and operated by others and that connect to users' computers via the internet. The availability of such services will help electric utilities to become more efficient by improving services while reducing costs.

"We want distribution utilities and their customers to benefit from our advanced smart grid applications in an easier and more cost effective way, based on the latest private cloud-based solutions from Capgemini,"

said Karim El Naggar, VP, Network Management Systems, Alstom Grid.

The two companies say that their joint solutions will reduce the cost of ownership for distribution utilities and enable them to perform progressive roll-outs of mission-critical and smart grid technologies such as SCADA and distribution management systems.

According to data from Bloomberg New Energy Finance, investment in smart grids globally grew by 7 per cent in 2012 to \$13.9 billion. The USA and China are the two largest markets and globally smart grid investment is expected to grow by ten per cent per year for the next five years.

About half of the total (\$7.1 billion) was spent on smart metering and related infrastructure and services. The next biggest category was distribution automation, followed by integrated demonstration projects in areas such as demand response, home energy management and smart electric vehicle charging.

Voith adds Vortex Hydro

Voith is expanding its business with the acquisition of Vortex Hydrosystèmes Inc., a Canada-based firm offering specialised products for the hydropower industry as well as consulting services.

The Germany-based hydropower company says that the purchase of Vortex Hydro will add to its product range and complement its existing aftermarket business.

"Vortex Hydro will bring its exemplary auxiliary mechanical systems,

specialised hydropower products, and expert consulting services to the product lines and services that Voith already offers in North America," said Voith Hydro Inc. (Canada) President and CEO Denys Turcotte.

Vortex Hydro offers balance-of-plant solutions for hydropower applications, which are now utilised by an increasing number of users and manufacturers of gas and steam turbines, as well as for several industrial process applications.

"I am pleased to announce Vortex Hydro's new status as an operating unit within Voith," said Vortex Hydro founder and President Richard Evoy, who will retain his position. "We will continue to offer reliable and competitive products coupled with unmatched service, but our network and reach will be much larger."

Vortex Hydro will retain its name and continue as an operating unit within Voith Hydro. It will remain at its current location in Granby, Quebec.

SSE sells wind farms

SSE is selling four of its wind farms in the UK as part of plans to optimise its generating portfolio.

The Scotland-based utility has agreed to sell four wind farms with a total generating capacity of 79.5 MW to a new fund managed by Greencoat Capital, an investment management firm.

The £140 million (\$210 million) deal will only go ahead if Greencoat's pending listing on the London Stock Exchange is a success. SSE will continue to operate and manage the wind farms, and says that it will invest £43 million of the cash it receives in the deal in the

new Greencoat Capital fund.

Greencoat is planning to raise £205 million from its listing and has also signed agreements to acquire two wind farms owned by RWE, including a stake in the Rhyll Flats offshore wind project, off the coast of north Wales.

After the sale, SSE will be left with 1351 MW of onshore capacity in the UK and Ireland. Proceeds from the sale will support investment in new renewable assets, said the firm. SSE currently has 277 MW of new wind farm capacity that is in construction or pre-construction.

Tenders, Bids & Contracts

Americas

Montana-Dakota selects peaking unit

Montana-Dakota Utilities Co (MDU) is to add a GE 7E-3 series gas turbine based power plant to its generating portfolio in order to boost electricity generating capacity and help it meet peak demand.

The 7E 3-series, formerly known as the 7EA, will be installed at a site adjacent to the Heskett coal-fired power plant in North Dakota and will generate 88 MW of power when it enters operation next year.

Siemens SGT6-2000E selected for peaking generation

Siemens Energy has won a contract to deliver an SGT6-2000E gas turbine to Kay County, Oklahoma, in the USA.

The gas turbine will be deployed in the Charles D. Lamb Energy Center, a simple cycle power plant near Ponca City. The turbine, which is fired with natural gas, will have an installed capacity of 103 MW.

The customer is the Oklahoma Municipal Power Authority (OMPA), which serves 39 cities and towns throughout the state.

Celilo HVDC link upgrade

ABB has won an order worth around \$260 million from the US utility Bonneville Power Administration (BPA) to upgrade the existing Celilo HVDC (high voltage direct current) converter station in Oregon, USA.

The Celilo converter station is located at the north end of the Pacific DC Intertie, also known as Path 65, which has a capacity of 3100 MW and originates near the Columbia River.

This Intertie is 846 miles long and connects to the Sylmar converter station in the south.

Key components of the station upgrade include valves, controls, transformers as well as switchgear and cooling equipment. In addition to modernising the converter station, the upgrade will also make it feasible to boost capacity up to 3800 MW. ABB carried out a similar upgrade of the Sylmar converter station in 2004.

Wärtsilä to supply 220 MW plant

Wärtsilä has received an order to supply the generating sets and related auxiliary equipment for a new power plant being built near Clatskanie in the state of Oregon, USA.

The Port Westward Unit 2 plant is being built for Portland General Electric Company, an investor owned utility. It will be powered by 12 Wärtsilä 50SG natural gas fuelled engines with an electrical output of approximately 220 MW, and is scheduled to be fully operational by 2015.

Renova, Alstom sign €1 billion agreement

Alstom Renewable Power has signed a memorandum of understanding (MOU) with Renova Energia, a leader in wind power generation in Brazil. Under the MOU, Alstom will supply, operate and maintain around 440 on-shore wind turbines in the country.

The €1 billion deal could see at least 1200 MW of new wind generating capacity being added to the Brazilian grid. The units will be installed in the state of Bahia with delivery starting in 2015.

Asia-Pacific

Alstom-Sumitomo group wins Thai contract

A consortium of France's Alstom and Japan's Sumitomo Corporation has been awarded a contract to build an 850 MW combined cycle power plant in Thailand.

The North Bangkok power plant is owned by the Electricity Generating Authority of Thailand (Egat). It will supply electricity to meet fast-growing demand in the Thai capital.

This will be Alstom's first combined cycle plant contract with Egat and the first globally that features Alstom's upgraded GT26 gas turbine. Alstom will supply two GT26 gas turbines, turbo generators, heat recovery steam generators, steam turbines and a distribution control system.

Alstom also supplied equipment to Rayong, Thailand's first combined cycle power plant.

Ten turbines for Kawazu wind farm

Alstom has signed a contract with Eurus Energy Holdings Corporation for the supply of ten wind turbines for the Kawazu wind farm in Japan.

Alstom will provide its ECO 74 wind turbine units for the project, located on the east coast of Izu Peninsula in the Kamo District, Shizuoka, Japan. The project will contribute to Japan's goal of sourcing ten per cent of its 2008 electricity demand from wind power by 2050.

The 16.7 MW project will be operational by February 2015.

Alstom Bharat Forge secures India order

Alstom Bharat Forge Power Ltd. (ABFPL), the joint venture company between Alstom and Bharat Forge, has secured an order worth more than €350 million for the supply of turbine islands for a new coal fired power plant in India.

ABFPL will supply three units of 660 MW supercritical coal turbine islands to Nabinagar Power Generating Co. Pvt Ltd, a joint venture between NTPC and Bihar State Electricity Board in Nabinagar, located in the state of Bihar. Alstom's share of the contract amounts to around €185 million.

ABFPL's scope of work includes engineering, manufacturing, supply, erection and commissioning of three 660 MW supercritical units. This order is part of the NTPC bulk tender for the supply of eleven 660 MW turbine generator islands. This award follows the €250 million order won by ABFPL in April 2012 for the supply of two 660 MW supercritical units to NTPC Limited's Solapur site in Maharashtra, India.

Europe

Construction starts at Todmorden Moor

Glennmont Partners has begun construction on its five-turbine wind farm project in West Yorkshire, northern England.

The Todmorden Moor project will use five Nordex N90/2500kW turbines, designed for high wind speeds. Glennmont has signed a turnkey contract with Nordex to manage the construction and commissioning of the project.

Glennmont – formerly BNP Paribas Clean Energy Partners – acquired Todmorden Moor in late 2011 soon after planning permission was granted. It says that the site has “exceptional” wind speed and that partnering with Nordex will reduce risk.

VEMAB orders Metso plant

Vimmerby Energi & Miljö AB (VEM-AB) has placed an order with Metso for a biomass power plant for combined heat and power production at Tallholmen in Vimmerby, Sweden.

Metso's delivery will include a power plant utilising bubbling fluidised bed combustion technology. The plant automation will be based on Metso DNA technology and Metso will also supply a flue gas condenser.

The new plant will provide competitive district heating for the city of Vimmerby and will also reduce the city's CO₂ emissions. Delivery will include installation, training and commissioning, says Metso.

The boiler plant will have a thermal output of 26 MWth and an electrical output of 7 MWe. In addition, the flue gas condenser will produce 4.5 MWth of heat.

Siemens wins €700m offshore wind contract

Siemens has been awarded a contract by Germany's wpd group to supply, install and service 80 wind turbines for the Butendiek offshore wind farm in the German North Sea.

Siemens will supply its SWT-3.6-120 wind turbine unit to the project, which will have a total generating capacity of 288 MW when it comes on line in 2015.

The agreement also includes a ten-year maintenance contract, under which Siemens will introduce a new logistics concept that includes a service operation vessel specially developed for offshore wind facilities.

Butendiek is the eighth offshore wind power plant order that Siemens has won in German waters and the second in Europe with an equity stake from Siemens Financial Services.

ABB wins LitPol link order

ABB has won an order worth about \$110 million from Litgrid AB, the Lithuanian state owned electricity transmission system operator, to supply and install a high-voltage direct current (HVDC) converter station in Lithuania.

The 500 MW back-to-back HVDC converter station will help connect the 330 kV Lithuanian grid to the 400 kV Polish grid, integrating the networks of the Baltic states with the continental European power grid.

ABB will design, engineer, supply and install the converter station including high-voltage equipment, such as power transformers and thyristor valves. The station will be built near the city of Alytus in Lithuania and is expected to be operational in 2015. A 160 km-long 400 kV AC overhead line will link the HVDC station in Alytus with a substation close to the city of Elk in Poland.

The new link will also bolster the NordBalt HVDC connection with Sweden, currently being built by ABB.

Centrax wins in Italy, France

Centrax says it has won major orders for its gas turbine products in Italy and France.

In France, contract energy management company Dalkia has ordered a Centrax CX501-KB7 package for a district heating plant near Cenon, Bordeaux. The 5 MW cogeneration unit replaces an older generator set that has reached the end of its 12-year contract.

In Italy, Fenice has placed an order for the recently launched CX400, which is powered by the 12.9 MW Siemens SGT-400 gas turbine. The CX400 will provide heat and power

for the Huntsman Tioxide plant in Scarlino, 100 km south of Florence, which produces titanium dioxide for use as a pigment in paint.

GE wind turbines power Romania

Energia Verde Ventuno has selected seven 2.5-103 GE wind turbines to power its Cerna wind park in Romania's Tulcea region.

The 17.5 MW deal includes equipment supply and service contracts totalling nearly \$30 million. GE will supply, erect and commission the wind turbines for Bester Generation, the project's engineering, procurement and construction contractor.

The project is co-financed by the European Union through the Sectoral Operational Programme for the Increase of the Economic Competitiveness, underscoring the strategic importance of green power generation in the region. The financing for the construction of the wind park has been provided by a leading European commercial bank and Quercus Assets Selection.

International

TNB JV wins Kuwait contract

Malaysia's Tenaga Nasional Bhd (TNB) and its Kuwaiti joint venture partner have received a letter of award to operate and maintain a power plant in Kuwait.

Kuwait's Central Tender Committee has issued a letter to the joint venture of TNB and Kharafi National of Kuwait to operate and maintain the Shoaiba North cogeneration power and desalination plant.

“The contract valued at about RM1 billion (\$323 million) is for seven years. It is expected to be signed soon,” said TNB in a statement.

TNB said the plant, owned by the Kuwaiti government, is in the Shoaiba industrial authority area, 40 km from Kuwait City.

The power and desalination plant is able to produce around 780 MW of power and 45 million gallons per day of desalinated water.

SEC awards SR435m contracts

The Saudi Electricity Company (SEC) has awarded two power contracts, worth SR435 million (\$ 16 million), to Alstom Grid.

The projects, based in Madinah, involve the construction of a new 380/110/13.8 kV bulk supply point (BSP) called Al-Salam BSP and its associated 380 kV circuits.

The projects are aimed at meeting the rapidly growing electricity demand in Madinah. The project will cover the interconnection between Al-Salam BSP and other 380 kV BSPs in the national grid network.

Metso wins Russia contract

Metso has announced it will supply Russia's supply Bioenergeticheskaya Kompaniya LLC with a complete biomass-fired combined heat and power plant for a site in Syktyvkar, the Komi Republic, Russia.

The power plant will utilise bark and wood residues from the Syktyvkar sawmill and other biomass and will generate 4 MWe for the local grid.

Heat from the plant will be utilised in the sawmill's belt dryer.

Metso's delivery will include process equipment and technical advisory services for installation, commissioning and training. A Metso belt dryer and a Metso DNA automation system will also be included in the delivery.



Oil

Global economy continues to struggle with crude prices

- Europe to spend €500 billion on oil imports
- Opec crude oil production at its lowest in a year

David Gregory

The first half of February saw a further boost in crude oil prices. West Texas Intermediate (WTI) was in the \$95-97/b range and Brent moved in the range of \$116-118/b.

The International Energy Agency (IEA) said in its monthly Oil Market Report, released on February 13, that prices reached a nine-month high in early February because of improved economic signals from China and the US, "robust financial activity" and colder temperatures in the northern hemisphere.

But while the economies of the US and China might be sending better signals, other parts of the world still appear to be having difficulty.

"Prices are very high," Fatih Birol, chief economist at the IEA said on February 19 during an interview with Bloomberg. He said the current oil

price levels are acting as a brake on the global economy, having "a major impact... especially on Europe."

Birol said Europe would spend as much as €500 billion on oil imports during 2013, about €200 billion more than average, if oil prices remain near current levels. He also said the world will see more delays from new production projects because more than 80 per cent of them have been set back due to technical challenges and security issues.

Weak macro-economic conditions will keep global oil demand growth at around 840 000 b/d during 2013, at around 90.7 million b/d the Paris-based agency forecast.

On the supply side, global crude supplies fell by 300 000 b/d during January to 90.8 million b/d, the agency said. Non-Opec production declined by 190 000 b/d from December to 54.2 million b/d but is expected to rise by 750 000 b/d during the first quarter of

this year. For the whole of 2013, non-Opec supply is forecast to increase by 1 million b/d to 54.4 million b/d.

Opec crude oil production was at its lowest in a year in January, according to the IEA, with output down by 100 000 b/d to 30.34 million b/d. It reduced its forecast for Opec natural gas liquids (NGLs) production for the first quarter of this year because of the terrorist attack in Algeria. And it forecast the call on Opec crude for the first quarter 2013 at 29.7 million b/d, down by 100 000 b/d from the previous report.

According to Opec, the high crude prices seen during January stemmed from the US managing to avoid the government's fiscal cliff, it said in its *Monthly Oil Market Report*, adding that it sees improving confidence in the global economy.

Opec's forecast for demand on its crude output was near to the IEA forecast. Opec said the call on Opec crude during 2013 would average

29.78 million b/d, 130 000 b/d more than it had projected in its last monthly report. However, demand for the first two quarters is forecast at 29.22 million b/d and 29.63 million b/d, below current Opec production.

The organisation projected growth in world oil demand between 2012 and 2013 as 840 000 b/d, most of which will go to China.

Opec said January crude production for all members, including Iraq, averaged 31.71 million b/d compared to 31.61 million b/d in December, based on figures that were directly communicated by members to the secretariat.

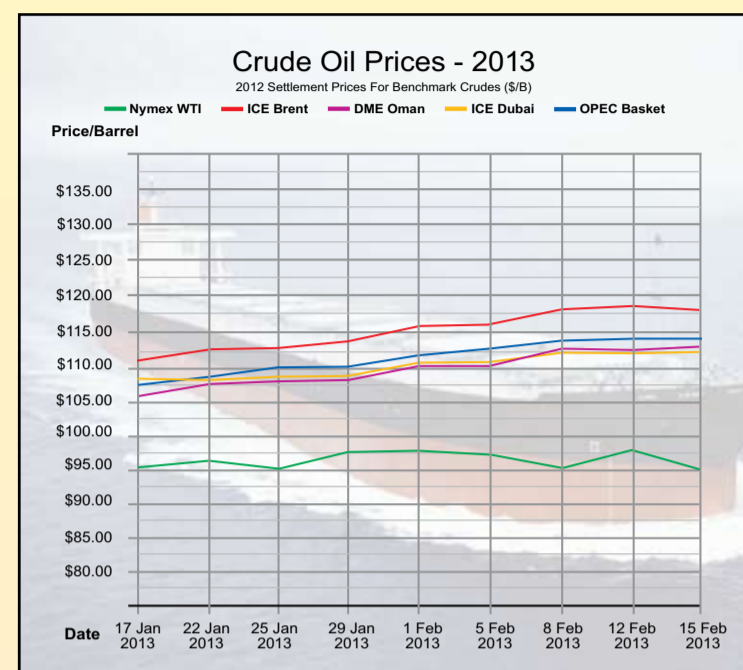
The US Energy Information Administration (EIA) said market fundamentals and expectations strengthened in January because of earlier than expected cutbacks in Saudi crude oil production and "greater optimism about economic growth, particularly in China, which have supported higher oil prices."

The EIA said it expects Brent crude, which averaged \$112/b in 2012 to average \$109/b in 2013 and \$101/b in 2014.

The administration said in its latest *Short Term Energy Outlook* that it expects oil markets to tighten during the first quarter of 2013, "but increasing global supply more than offsets higher global consumption" through the rest of the year. It projected that world supply would rise by 1.1 million b/d in 2013 and 2.0 million b/d in 2014, with most of the increase in supply coming from non-Opec sources.

"North America will account for much of this growth," the EIA said.

World liquid fuels consumption is projected to grow by an annual average of 1 million b/d in 2013 to 90.2 million b/d and by 1.4 million b/d in 2014 to 91.6 million b/d, the EIA said. Most of the increase in demand will come from countries outside the OECD.



Gas

East Mediterranean moves into new phase

Exploration and development of hydrocarbon resources in the East Mediterranean are moving into a new phase.

Mark Goetz

The recent signing of five production-sharing contracts (PSCs) in Cyprus and the farm-in to Cyprus Block 12 by Israel's Delek Group illustrates the fact that a hydrocarbon sector now definitely exists on the island.

In Israel, the offshore Tamar gas field is due to come on-stream in April with supplies to the domestic market. Tamar's 9.1 trillion cubic feet (258 billion cubic metres) will be sufficient to meet Israeli demand for decades. The Leviathan field, with a gas resource of 17 tcf (481 bcm) and possibly more, is likely to figure prominently as the country considers a hydrocarbon export policy. Leviathan is tentatively scheduled to come on-stream as early as 2016, but a decision about how to monetise the gas has yet to be made.

Lebanon in mid-February invited international companies to participate in a pre-qualification round prior to

the launch of the country's first offshore licensing round scheduled for May 2. Reports on seismic data acquired on offshore Lebanon say the country may have at least 25 tcf of natural gas resources in its territorial waters, and perhaps oil too.

Cyprus has seen some major developments in the last two months. At the start of January, the newly formed Cyprus National Hydrocarbon Company, known by its Greek Acronym KRETYK, opened its offices in Nicosia. In late January, Cyprus signed three PSCs with the Italian/South Korean joint venture comprised of Eni and Kogas for Blocks 2, 3 and 9.

Eni/Kogas are reported to be planning an aggressive exploration campaign that will have them acquiring more 2D and 3D seismic and drilling one well during the first three years of each of the PSCs. If the first well is successful, they are obliged to drill a second well.

Blocks 10 and 11 were awarded to Total in early February. The French major also plans more seismic work in both blocks and has said it will be drilling for gas and oil.

This brings the total number of blocks Cyprus has under contract to six. No further blocks are expected to be awarded resulting from the 2012 licensing round and it will likely be several years before Nicosia decides to hold a third round.

Noble Energy will begin during the first half of this year appraisal drilling in Block 12, where it discovered the Aphrodite field in December 2011. Houston-based Noble is also in talks with KRETYK over the development of the field and the government-backed plan to build an LNG export facility at Vassilikos on the island's south coast.

As Noble is partnered with Israel's Delek Group in the main discoveries offshore Israel, there is a chance that

some natural gas from Leviathan might be routed for export through the proposed Cyprus LNG plant. This will depend on the decision that the Israeli government makes regarding export policy.

In early February, Delek farmed-in to Block 12 for a 30 per cent interest, leading to further speculation of Israeli involvement in the Cyprus export scheme. Furthermore, Australia's Woodside Petroleum, well established as a LNG producer, late last year joined the Leviathan project as a strategic partner.

Also in February, the Cypriot government announced the creation of an Energy Policy Council that is to act as an advisory body for the government and political parties.

Meanwhile there has been an interesting development between Israel and Turkey. Talks are reported to be taking place concerning the export of Israeli natural gas to Turkey through

an underwater pipeline that would run along the Levantine coast.

Talks are preliminary due to the bad politics that currently exists between the two states, but it has been clear for some time that Turkey is keen to gain access to East Mediterranean gas. Until now it has been trying to halt exploration in the region, but has realised that the countries in the southeastern Mediterranean intend to proceed.

A gas deal between Ankara and Tel Aviv could prove problematic for Cyprus, but it would not prevent the island's energy exploration and development programme from being carried out. During the last two years Cyprus and Israel have signed several energy cooperation agreements, and while its own LNG export project does not depend on Israeli gas being exported through Cyprus, Cypriot officials have stated that Israeli gas would be welcomed.

GLOBAL INSTALLED WIND POWER CAPACITY (MW) – Regional Distribution

	End 2011	New 2012	Total (End of 2012)
Africa & Middle East			
Tunisia	54	50	104
Ethiopia	-	52	52
Egypt	550	-	550
Morocco	291	-	291
Iran	91	-	91
Cape Verde	24	-	24
Other ⁽¹⁾	23	-	23
Total	1033	102	1135
Asia			
PR China**	62 364	13 200	75 564
India	16 084	2336	18 421
Japan	2536	88	2614
Taiwan	564	-	564
South Korea	407	76	483
Pakistan	6	50	56
Other ⁽²⁾	109	-	108
Total	82 070	15 750	97 810
Europe			
Germany	29 071	2439	31 332
Spain	21 674	1122	22 796
UK	6556	1897	8445
Italy	6878	1273	8144
France**	6792	404	7196
Portugal	4379	145	4525
Denmark	3956	217	4162
Sweden	2899	846	3745
Poland	1616	880	2497
Netherlands	2272	119	2391
Turkey	1806	506	2312
Romania	982	923	1905
Greece	1634	117	1749
Ireland	1614	125	1738
Austria	1084	296	1378
Rest of Europe ⁽³⁾	3815	1106	4922
Total Europe	97 028	12 416	109 237
of which EU-27 ⁽⁴⁾	94 337	11 566	105 696
Latin America & Caribbean			
Brazil	1431	1077	2508
Argentina	113	54	167
Costa Rica	132	15	147
Nicaragua	62	40	102
Venezuela	-	30	30
Uruguay	43	9	52
Caribbean ⁽⁵⁾	271	-	271
Others ⁽⁶⁾	229	-	229
Total	2280	1225	3505
North America			
USA	46 929	13 124	60 007
Canada	5265	935	6200
Mexico	569	801	1370
Total	52 763	14 860	67 576
Pacific Region			
Australia	2226	358	2584
New Zealand	623	-	623
Pacific Islands	12	-	12
Total	2861	358	3219
World total	238 035	44 711	282 482

** Provisional Figure

1 Israel, Jordan, Kenya, Libya, Nigeria, South Africa

2 Bangladesh, Indonesia, Philippines, Sri Lanka, Thailand, Vietnam

3 Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Finland, Faroe Islands, FYROM, Hungary, Iceland, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Norway, Romania, Russia, Switzerland, Slovakia, Slovenia, Ukraine.

4 Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, UK

5 Caribbean: Aruba, Bonaire, Curacao, Cuba, Dominica, Dominican Republic, Guadalupe, Honduras, Jamaica, Martinique

6 Colombia, Chile, Ecuador, Peru

Please note: Project decommissioning of approximately 263 MW and rounding affect the final sums

Offshore (MW)	Total 2011	New 2012	Total 2012
UK	2093.6	854.2	2947.9
Denmark	874.3	46.8	921.1
Belgium	195.0	184.5	379.5
Germany	200.3	80.0	280.3
Netherlands	246.8	0.0	246.8
Sweden	163.7	0.0	163.7
Finland	26.3	0.0	26.3
Ireland	25.2	0.0	25.2
Norway	2.3	0.0	2.3
Portugal	2.0	0.0	2.0
PR China	262.6	127.0	389.6
Japan	25.2	0.1	25.3
Total	4117.3	1292.6	5410.0

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A blueprint for the 'trilemma'

Government intervention in the energy sector is increasing as decarbonisation becomes an important policy objective alongside security of supply and affordability. But is a new market model blueprint required for the energy policy 'trilemma'?

Joscha Schmitz
of Baringa Partners
shares his thoughts.

Energy policy aims to deliver a wide set of objectives including affordability and security of supply for an essential service, as well as to serve national security and strategic economic interests. Energy market arrangements therefore need to reflect and deliver these wider energy policy goals, effectively encouraging private sector investment that is in the public interest.

In the past energy security and affordability have been the primary policy objectives in the sector (termed the energy 'dilemma' because of their often competing nature). However today there is no question that the policy landscape has fundamentally altered. For example in the UK, for the first time since energy markets were liberalised, the dilemma has expanded to a 'trilemma' and the official UK government objective for the sector is secure, clean and affordable energy. The increasing focus on decarbonisation and sustainability in energy policy is prevalent across many countries.

In the 1990s the primary focus was on promoting competition and reducing energy prices, while maintaining security of supply (coinciding with a time when generator profits were high). In more recent times decarbonisation has emerged as a policy objective, made explicit with the 2008 Climate Change Act. There is now a confluence of the three policy objectives with the UK's Electricity Market Reform project.

Yet in the UK and across Europe, the question of whether competitive energy markets can deliver a consistent solution to the trilemma in the long term has not been fully answered. An

underlying question is defining the role of government in determining outcomes versus relying on market forces. In short, what model of energy markets and government policy can deliver the trilemma? It is likely that in ten years we will look back on today as a time of transition. But what is uncertain is what model for the industry we are actually transitioning to.

History shows that the balance between markets and government in the energy sector is by no means static. With privatisation and liberalisation in the electricity and gas markets, monopolies were broken down driven in the belief that market forces could deliver government objectives and address the energy dilemma. The role of markets was strengthened to aid security of supply by attracting capital based on the risks and rewards provided by market price signals. Competitive markets were also effective in delivering efficiency through the value chain thus driving down costs to consumers.

Now, across Europe, the balance appears to be shifting towards further government intervention in determining the risk and reward balance for investors and therefore the outcomes. These interventions are a response to concerns that the prevailing market design does not adequately value decarbonisation, thus leading to market failure.

Examples of government interventions include:

- Economy-wide carbon prices (e.g. EU Emissions Trading Scheme);
- Renewable support mechanisms to incentivise low-carbon technologies outside existing market structures (a recent study by dena, the German energy agency, found that more than 80

countries have introduced support frameworks for renewables);

- Payments for flexible capacity outside wholesale energy markets or via capacity mechanisms, recognising the increased risks to new investment in thermal plant posed by intermittency;

- Advanced EU environmental legislation and initiatives such as the Large Combustion Plant Directive (LCPD), Industrial Emissions Directive (IED) restrict the development of certain technologies;

- Energy efficiency policies, smart metering and innovation stimuli have also been pursued on the demand-side.

While government intervention to reach climate targets is important and necessary where markets cannot guarantee policy objectives are met, in practice it has been difficult to strike the right balance in terms of the level of intervention, and as a result such intervention may bring unintended consequences.

The lack of multilateral coordination can create inefficiencies across markets. For example the lack of a global consensus on climate change has eroded a meaningful carbon price, leading individual governments to adopt 'second-best' policies to promote decarbonisation. Further, national security of supply and renewable policies have been established in most European countries, which can undermine the EU-led full market integration being rolled-out under the 3rd Energy Package. There are also many challenges in co-ordinating a profound energy transition. In Germany, incentives for renewable-friendly grid investments are lagging behind the faster-than-planned ramp up of renewables. In Ireland, the System Operator is looking to procure new flexible services to help manage a system with increasing intermittency.

Sometimes the economic fundamentals just do not align with government objectives. A global recession has slashed demand forecasts in several countries and led to a questioning of previously set renewable targets (consider Spain and Portugal's *de-facto* moratoria on new projects). Recessionary demand has also temporarily driven down carbon emissions, and carbon prices collapsed to the point that they do not provide a signal for long-term investment. Added to this, the rise of shale gas in the US and the resulting lower international coal prices has led to challenging conditions for gas generators in Europe, and has done little to encourage the fuel switching away from coal that policy makers desire.

These examples demonstrate that intervention to deliver one policy objective can have knock-on effects to the delivery of other objectives. One current concern focuses on how liberalised markets remunerate generators for selling electricity in wholesale markets. As low-carbon plant with zero variable costs replace conventional plants in the merit order, lowering wholesale prices and reducing run-times of thermal plants, investment in flexible plants is increasingly discouraged. This effect is potentially exacerbated to the extent that the low carbon subsidies themselves feed directly into the merit order creating negative prices in some periods. In addition, these low carbon subsidies have launched affordability debates in many European countries on how the costs are distributed between taxpayers, households and industrial users.

These bumps in the road have then led to further corrective interventions proposed by governments. The partial

nature of the intervention has in itself created uncertainty (and increased the costs of managing these risks) and further challenges. In short, there remains unfinished business.

Across Europe, governments need therefore to produce a blueprint for the future model for the electricity market. This model needs to clearly allocate risks and responsibilities between stakeholders – government, consumers and industry – in reaching energy policy objectives.

A blueprint should set out both the role of governments in the energy markets and the form and design of energy markets to deliver against the trilemma. If governments are to play a central role in coordinating energy markets, will they legislate to remedy all market failures? Will competitive energy markets/tendering, or direct government action be the mechanism that allocates risk between the three stakeholder groups? Are risks allocated in a clear, transparent way with long term commitment to maintaining that model?

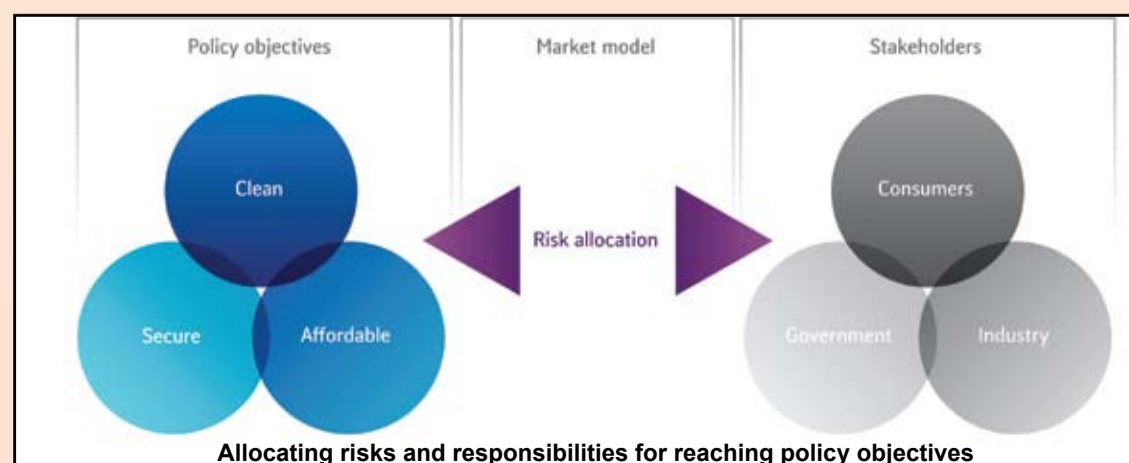
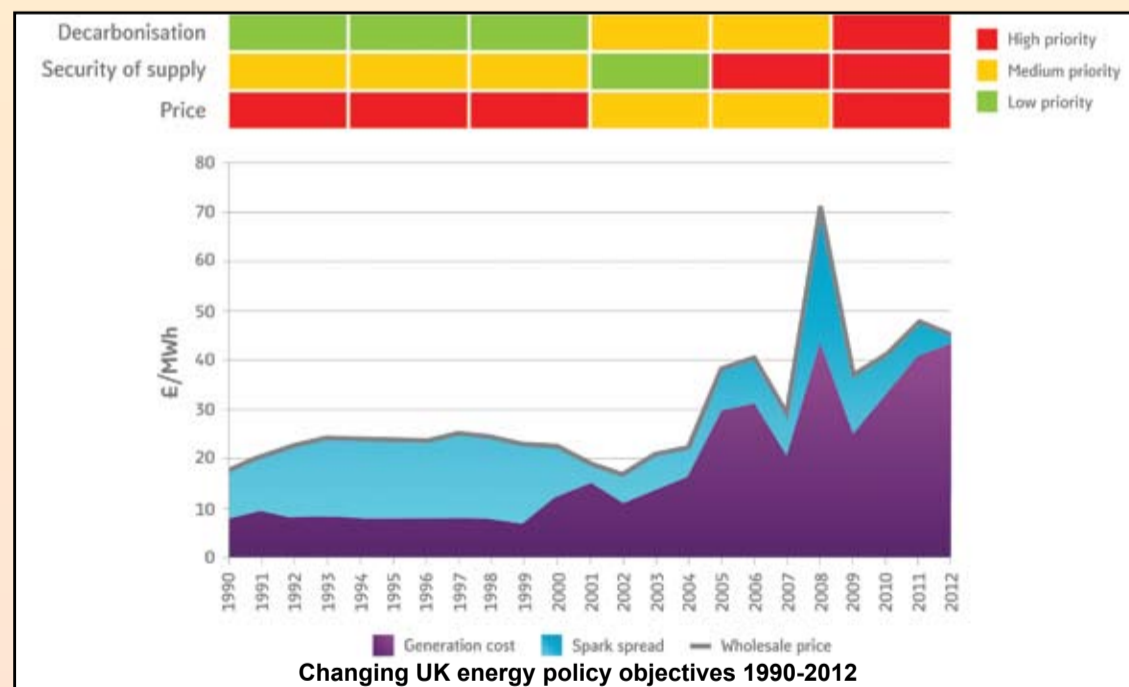
Currently this risk allocation is uncertain. For example it is not known if capacity markets to incentivise investments into flexible plant are a transitory fix or whether they spell the death of the energy-only market. For meeting carbon targets, what is the relationship between the power sector and the wider energy sector? Should government or market participants decide the generation mix and in each case how? How is technology risk and construction risk allocated, for example for potential nuclear new-build or carbon capture and storage? How important is industrial strategy and job creation in the energy policy debate (i.e. are we moving towards a 'quadrilemma')? What is the future approach to project planning and development in the context of local opposition (the 'not-in-my-backyard' problem)?

Uncertainty about risk allocation and responsibilities discourages investment and potentially endangers security of supply. It can also lead to inefficient outcome (e.g. low capacity margins, high capital costs and rent-seeking behaviour). Without a clear understanding of where we are headed and what the costs are, a public mandate for this transition is hard to attain.

Government support for decarbonisation has achieved remarkable results in a short period of time. But it has also unbalanced the existing market model and created unintended consequences. The resulting uncertainty harms consumers and undermines new investment. From this perspective governments have either intervened too little or too much. Now governments have to decide: are we reaching a new status quo, a new business as usual with current arrangements? Or are we on an evolutionary path leading to a specified market model?

A key decision will be whether the solution lies within or outside the liberalised market model. Existing models could be rearranged. A more centralised model would not have to exclude market forces, for example a competitive tendering system for new low-carbon capacity could be introduced on a technology-neutral basis. Increasing European cooperation, including more cross-border trading of energy and carbon and renewable credits, would also advance a market-based solution.

Discussion on a blueprint market model to cope with the energy policy trilemma, and indeed the emerging 'quadrilemma', needs to take place at a European level sooner rather than later.



Invest in Europe? No thanks

Investment in the liberalised power sector – both into existing assets and new capacity – is key for getting the low carbon transition right, and keeping the lights on. For the past year, Eurelectric and its members have been studying the current investment climate, consulting with investors, bankers, and utilities across Europe. **Susanne Nies**

Utilities and investors overwhelmingly rated regulatory risk as the greatest impediment to investing in the European power sector today. Although the sector is used to dealing with risks, regulatory risk such as retroactive changes to support schemes or the sudden introduction of new taxes cannot be hedged and ultimately lead potential investors to ‘go elsewhere’, be it to other sectors or beyond Europe.

Customers rightly expect to have access to electricity at the flick of a switch. In contrast to other goods, electricity has to be available at all times; it must be secure and resilient to sudden changes in demand and supply, or to external events like storms. Moreover, Europe’s ambitious climate agenda requires electricity to play a significant role in mitigating climate change – currently one quarter of the global carbon emissions are due to power generation.

Power must also be affordable: especially in times of recession households take a close look at the costs of what they believe should be freely available. Electricity is seen by many as a right, as a basic need that should be at their disposal like air or water.

But this gives rise to one big question: how can Europe reconcile the justified quest for affordable prices on the one hand and the need to stem the huge costs of an energy system in transition on the other? How can we ensure that we develop and master new – and initially expensive – technologies and systems, in order to benefit from a learning curve, which will ultimately make the energy transition more affordable and sustainable?

The energy transition, which is first and foremost an electricity transition, will accompany us at least for the next two decades. It will mean taking advantage of unprecedented technical opportunities: ‘big data’, but also disruptive technologies like photovoltaic

or smart grids and smart meters, i.e. activities relating to what is being called the new downstream.

Yet it will also build on the advantages of the current system, most notably its security and potential for flexibility. It is a long road fraught with obstacles: setting up the new system risks destabilising the old one and could, if carried out incorrectly, threaten power generation adequacy. Keeping the stability of the system in mind is key for every step of the way.

A secure electricity supply can only be maintained if an appropriate generation level exists and if reserve capacities and flexibility are available to balance the increasing share of variable renewables in the electricity system. How much power generation capacity do we need to keep the lights on? Normally, the market would deliver an answer to this question. Yet this mechanism is not working as smoothly as it should.

Unexpected changes have taken place: the recession has hit European economies, and electricity demand has dropped. Existing power plants are experiencing a profitability challenge: subsidised renewables generation is shaving peaks, thereby destroying the business cases of conventional plants that remain crucial to delivering the flexibility needed to keep the lights on. In certain cases, running a plant today may even mean losing money through the new phenomenon of negative prices – truly an upside-down world.

Do we have an appropriate level of generation in Europe today? The answer is yes – if Europe were a copper plate. Potentially, we are producing enough electricity in Europe to balance south German – and soon British – deficits with Nordic surpluses. However, the necessary interconnections and integration are often missing. During the cold days of February 2012, Europe experienced some unforeseen constraints.

In 2013, the temporary shutdown of two nuclear power plant reactors in Belgium led ENTSO-E to describe the country’s status as potentially critical. A look around Europe confirms that these concerns about future generation adequacy are not limited to single countries.

In the UK there have been recent warnings from the regulator, Ofgem, of a generation shortfall around 2015, as spare capacity would fall from 14 per cent today to 4 per cent due to earlier than expected closures of coal-fired power plants. About 12 GW of coal and oil capacity is to be closed by 2016, as a result of having opted out of the Large Combustion Plant Directive (LCPD).

On top of the LCPD, the effects of the Industrial Emission Directive (IED) will become clearer in the years

ahead. In addition to fossil-fuelled plant retirements, about 7 GW of existing nuclear plants is likely to be taken off the grid by the end of the decade – though several analysts believe that lifetime extension and long-term operation of some of those plants are possible.

In Germany, 20 GW of nuclear capacity is to be phased out by 2022 and a phase-out of an additional 6.5-10 GW of conventional capacity is expected, principally for reasons of economic viability. German association BDEW assumes a capacity gap of 4-8 GW under these conditions. The problem is primarily regional, affecting mainly southern Germany.

Similar to the UK, the LCPD will lead to the closure of 3.6 GW of coal and 4.8 GW of oil-based power capacity by the end of 2015 in France.

Meanwhile, other countries are experiencing overcapacity. In Italy, gas-fired generation alone reached a total installed capacity of 54 GW at the end of 2011. In the same year, the registered peak load stood at 56.5 GW. In Austria, the installed capacity of gas-fired plants and conventional (i.e. non-pumped storage) hydro plants together corresponded to the country’s peak load of 9.7 GW.

In Spain, combined cycle gas turbines (CCGTs) have boomed in the last decade, going from no CCGTs in 2000 to 28 GW of CCGTs in 2010, which is above the minimum load of about 21 GW. Along with the boom in gas-fired generation, the country has seen a massive increase in renewables – mainly wind, which reached 20 GW at the end of 2010 – and has a nuclear fleet of 7.5 GW and a coal fleet of 11 GW. In the same year, the peak load stood at 45 GW.

All in all, there is a need to fix the above mentioned generation adequacy issues in some regions. Connecting oversupplied to insufficiently supplied regions would be in tune with the single market, illustrating also the interlinkages between transmission and generation investments. Considering the huge delays in setting up new interconnections, however, there is a more immediate need to maintain the system in balance, especially as the share of renewables continues to rise.

Renewables are a promising set of low-carbon technologies that will help Europe achieve its decarbonisation objective by 2050. Yet their development, as that of all other technologies, must be cost-efficient, market-based, and European rather than national. A system approach to their expansion must ensure that generation capacity is added based on demand and market signals, not subsidies.

Worryingly however, Eurelectric’s recent work paints a dismal picture of the overall investment climate. It shows that investment decisions in



Nies: We need long-term policy frameworks for long-term investments

the European electricity industry are much more difficult than they should be. Indeed, 44 out of 45 energy leaders surveyed said the unprecedented investment volumes that the IEA regards as necessary (€1 trillion by 2020) would not occur.

They cited volatile national and European regulation as the most significant barrier to investment, which is putting future generation adequacy at risk. Other reasons for the troubled investment climate include higher borrowing costs as a result of the sovereign debt crisis, continued distortions in wholesale and retail energy markets, and various national ad-hoc taxes on utilities.

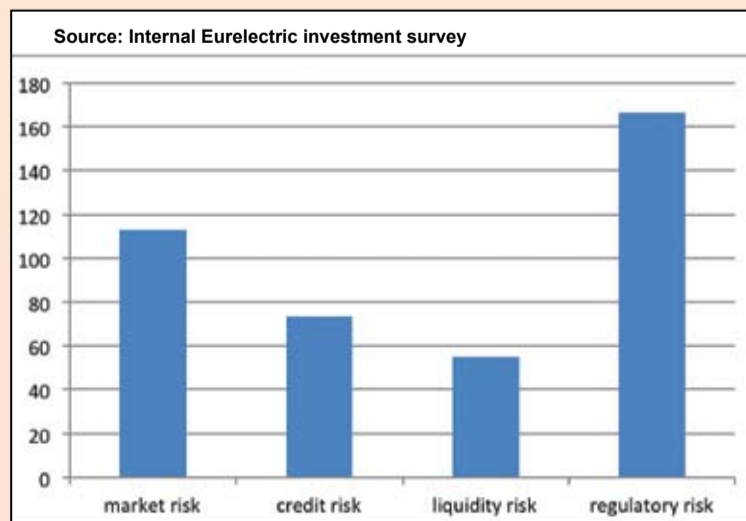
Contradictory policies, windfall taxes, retroactive changes to energy policies and support schemes all lead would-be investors to prefer other regions of the world to Europe. Yet the most important obstacles to investment could be overcome if policymakers provide greater policy consistency and prioritise long-term strategic thinking over short-term interventionism.

The low carbon transition needs public and private stakeholders to team-up. This is not about blaming policymakers or asking them to shoulder the investment burden alone. But they have to assume their responsibility in such a way that allows the private sector to take up its own responsibility. They must deliver a reliable and stable framework that will give investors the confidence to invest in the low carbon transition.

A clear commitment to the European internal energy market is one part of the puzzle, as is a commitment to the EU ETS as a predictable driver of low-carbon investment for the decades until 2050. Renewable technologies and energy efficiency will also have their role to play – but with a consistent framework integrating the various tools under a common heading entitled ‘road to the low carbon economy’. We need long-term policy frameworks for long-term investments – national and European policymakers should take action now.

Susanne Nies is Head of Eurelectric’s Energy Policy & Generation Unit. Eurelectric is the association of the electricity industry in Europe. The results of the study, as well as a summary of findings, have now been published in a full report. (www.eurelectric.org/investment).

Survey results: Regulatory risk ranks highest



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A broader approach to smart grid communication

The successful testing of broadband power line technology at a project in France is being seen as an important step in paving the way for real-time information management in secondary networks – a critical factor in deploying smart grids.

Junior Isles

One of the central challenges of the smart grid is how to achieve greater connectivity between the distributed energy resources on the grid and the control system managing the network.

One popular communication technology for transferring information between the city and regional control rooms managing the distribution grid and these energy resources is based on an RF (radio frequency) mesh network. RF mesh networks are able to access information across the distribution network, as far down as the smart meter.

One of the main drawbacks of the technology, however, is its limited geographical coverage in remote areas such as the countryside. Further, a dedicated radio antenna is required for underground locations in cities.

One alternative technology to cover these remote pockets is power line carrier technology. Essentially, power line communication (PLC) carries data on a conductor that is also used for AC electric power transmission or electric power distribution to consumers.

PLC technologies have historically been developed in high voltage applications using narrow band slower speed communication over power lines. More recently broader communication bands have been tried over power distribution networks targeting higher data transfer rates and longer communication distances. The technology takes advantage of the progress made in low voltage home environments.

Work is therefore underway for field trials of broadband over power line (BPL) to allow data transmission and collection at higher frequencies and over longer distances. One ongoing project in France recently further demonstrated some of the possibilities of the technology on a real distribution network.

At the end of last year Alstom said it

had validated new BPL technology for medium voltage power grid applications. A pilot project saw the company install communication points in about 50 grid nodes to allow the integration of a wide range of services over 20 kV networks.

According to Alstom, BPL opens new broadband communication capability within each of the equipped grid nodes, offering free bandwidth of dozens of Mbps over complex grid topologies. Notably, the technology could facilitate the deployment of smart grid solutions to better support distribution network reliability while allowing the integration of intermittent renewables and management of active demand.

Commenting on the trial and prospects of BPL, Laurent Schmitt, Alstom Vice President, Smart Grid solutions said: "We have been working on the technology for the last two years and have reached a good level in terms of bandwidth availability

to have to rely on a telecoms operator to manage the data.

Schmitt says: "The utility does not have to pay a telecoms carrier for the operation of the network and also maintains ownership of the telecoms infrastructure."

Another advantage of BPL versus RF mesh, according to Schmitt, is the robustness of the technology. "Wireless networks from telecoms operators use antennas that are usually backed up by power supplies that can provide power for 1-2 hours only, which is too short for grid disaster recovery in the case of a significant event such as a hurricane. With power line carrier you are linked to a substation with battery capacities that can last much longer than four hours. Therefore the infrastructure is much more resilient to a major outage."

The results of this pilot, conducted jointly by Alstom Grid telecommunication teams and SICAE technicians have exceeded expectations from both

While Schmitt sees no real limiting factors to the widespread commercial deployment of its BPL technology, he believes there is a commercial analysis that needs to be done.

"There is no problem with scaling the technology. It can communicate over medium voltage substation voltage up to high voltage, where there is fibre optic backbone. So theoretically you could cover the entire smart grid space. So it's just a matter of cost of deployment," he said.

According to Schmitt, the SICAE project was deployed within budget in terms of target pricing, which he says means the technology is in the range of deployment costs that are "competitive" with other technologies.

He added: "It is a question of how efficient this infrastructure is against the cost of rolling out antennas and possibly having to buy [RF] spectrum. It is an op-ex cost that has to be looked at."

Building on the success of this first experience, Alstom and the SICAE will extend their collaboration to include several new sites this year. This will see the project expanded to increase the number of control and communication nodes. The open-ended agreement with SICAE will see the two companies look at what new services can be delivered around the communications infrastructure.

Schmitt explained: "There will be milestones for new services. For example, we want to deliver new services related to demand-side response within the next 12 months. Utilities want to improve management of load curves and demand. In current smart grid deployments, such as in the US, the industry is able to retrieve information every 15 minutes. The ultimate goal is to reduce this to the one-minute range. Large end-users, meanwhile, want to have real-time information on their consumption. It's about utilities using their infrastructure to go down to real-time."

SICAE says its partnership with Alstom in deploying this new technology will help it become a leader in the integration and utilisation of autonomous telecommunication solutions for electric power distributors, while helping it prepare for optimal integration of renewable energy.

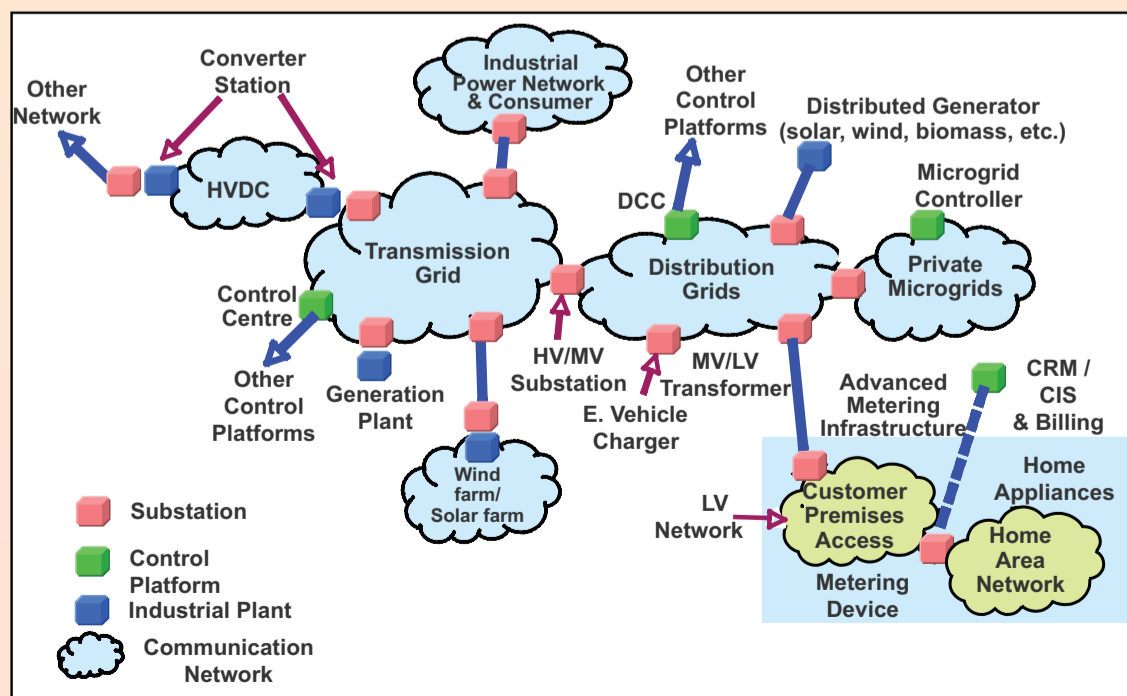
Meanwhile, Alstom is continuing to develop and prove the technology elsewhere. Similar demonstration projects are under way in New Delhi, India, and Rio, Brazil. These will provide experience in rolling out the technology in networks that may be managed differently or are more complex. The company is also working on several other demonstration projects in France for EDF, which is considering the technology for its smart grid deployment.

While utilities have been focusing on installing smart meters, these pilot projects will help demonstrate the value of smart grid deployment for new distribution automation services. They will also pave the way for what Alstom believes will be the start of commercial roll-out of the technology in 2015-16.



Schmitt: we want to deliver new services related to demand-side response within the next 12 months

New smart grid communication architecture



"We have reached a good level in terms of bandwidth availability over several kilometres and have gone into places where RF mesh is not available"

over several kilometres of feeders and have been able to go into places where RF mesh is not available."

Alstom has been working on the pilot project with SICAE de la Somme et du Cambrasis (a power distributor of French rural communities) for the Somme and Cambrasis region (Northern France) since 2011.

So far, results have been promising. The project has enabled SICAE to integrate services such as telephony, video surveillance, remote meter reading and real-time data exchange with grid controls and active demand response management.

Apart from the technological benefits, one beauty of the project, says Alstom, is that the utility does not

partners in terms of performance, quality of service improvements, and operational costs optimisation.

Early power line carrier technology was affected from electromagnetic interference but according to Alstom there was no evidence of this in the trial. "The [interference] issue has been resolved. We deployed our power line carrier with all the necessary coupling equipment, such as capacitors, which allowed us to keep within the necessary parameters in terms of signal disturbance."

The pilot project, which has been in operation for more than a year, was deployed in various stages. Schmitt noted: "We have been able to combine various services – some services are related to smart metering data acquisition, some to video camera within the substation, and others to the migration of phone from analogue to digital IP networks."

Over the last year, Alstom was able to develop an entire grid that enabled the testing of various scenarios for different lengths and type of feeders, repeaters, etc. "We managed to keep a suitable level of bandwidth under various network conditions," said Schmitt.

According to Alstom, the feeder was tested over distances of up to 5 km and the goal was to achieve data bandwidths of up to 500 kbit/s. "This is around ten times higher than is achieved using narrow band power line carrier on the low voltage network," noted Schmitt, "but we actually managed to attain bandwidths of higher than 1 Mbit/s."

Schmitt also noted that although they were primarily looking at delivering telephony services and smart meter data collection, it was demonstrated that the technology could also be used for video camera in some cases.



Junior Isles

Caterpillars and butterflies

In nature, one of the most incredible sights is to witness the metamorphosis of a caterpillar to a butterfly. The European power sector could be witnessing a similarly startling transformation.

For a century power utilities have been the bastion of the sector, stalwart companies with the sole responsibility for building, operating and maintaining generating assets and selling the power. Market liberalisation over the last two decades or so may have seen these companies privatised and the wholesale and retail energy markets opened to competition. Yet broadly speaking, the European market remains monopolised by a clutch of large integrated energy companies, predominantly operating fossil fuelled assets – with the exception of EDF.

The operating model of these utilities has served them well for many years, providing sufficient profits for shareholder pay-outs and re-investment in building or refurbishing assets. However, current government policies or

in many cases unclear policies, are threatening the age-old order.

Commenting on the changing electricity market and the pressure that many utilities are coming under, Mark Powell, Head of A.T. Kearney's UK Utilities Practice said: "There is a big question here, which is not really being asked yet. Are we at the beginning of what I think is the end of the utility model?"

Historically, big power companies have been the sole owners of power plant assets. However, the industry has increasingly seen a transfer of ownership of assets outside of traditional utilities.

"There has been a huge transfer of assets to banks and infrastructure funds, which have been buying-in [to the sector] heavily," noted Powell, "Fortum is looking at selling networks in Europe; most network businesses have been sold; the water sector is half-owned by Canadian pensioners."

He added: "You are also seeing a huge transfer of value from the traditional

utilities to the distributed sector such as renewables. However you look at it, we are seeing a huge, huge change in the sector, and I am not sure this is being properly reflected in the policy situation. Certainly if you went to somewhere like Germany and asked E.On, they would tell you that the government is destroying their businesses."

In the past, government electricity policies were aimed purely at guaranteeing supply and ensuring the sector operated efficiently. Attempting to make those same policies now address climate change as well makes life far more complicated.

"In the UK, we are moving away from [a policy focused on] efficiency and security of supply to more of a trilemma model. This will by definition take value from the existing utilities and transfer it elsewhere, while still looking to the traditional utilities to do a big part of the funding for the re-build," said Powell.

This is bad news for markets such as the UK, which needs £200 billion to rebuild its electricity infrastructure. It is a huge sum of money, which the utilities do not have.

Citing E.On as an example Powell said: "E.On has been selling assets all over the place and is not the same company it was a few years ago because they don't have the cash."

through wide-ranging electricity market reforms.

Berenberg Bank, Germany's oldest bank and one of the oldest in the world, recently published a report entitled 'European utilities: The limping wounded'. The report made interesting reading.

It noted that the integrated energy utility sector has been "battered and bruised" by collapsing power prices, falling demand and the "disruptive" technology of renewables. It cited this as the prime reason the sector has declined by 50 per cent since its peak in 2008. It also said sector earnings have fallen by 30 per cent over the same time period.

The report stated: "Longer-term, we think the continued penetration of renewables has structurally broken the market opportunity for traditional thermal generation and we find it difficult to see much recovery in central European power prices before the end of the decade. We find it hard to believe in a credible demand/supply tightening scenario for the foreseeable future."

Berenberg Bank believes E.On's generation assets put it at a disadvantage versus its peers. E.On has built around 16 GW of gas fired combined cycle plant in recent years, which Berenberg says looks set to earn negative spreads for the foreseeable future. It also says E.On does not have

You are also seeing a transfer of value from traditional utilities to the distributed sector such as renewables... we are seeing a huge, huge change in the sector

The company has been on a massive cost-cutting mission which has seen it sell €17 billion in assets. This will improve its cash position but still may not be enough. It will have to find other ways of making the business more profitable. "My expectation is that E.On will be cutting huge costs out of the UK market," said Powell.

It is a similar story in Germany where the government's decision to close its nuclear plant and massively increase the amount of renewable energy is hitting EnBW, RWE and E.On hard.

"E.On will be shutting a lot of stuff down," noted Powell. "The sudden transition to renewables and distributed energy has forced gas plants down the merit order, which has made them less and less profitable. Also from the optimisation of fleet perspective, they need to cut costs. They are trying to optimise their cash position as much as they can; they are not in a very good position. So the obvious thing to do is to save costs where they can, they are not making enough on gas fired plant to make them worth running."

Talk of the closure of the Irsching power plant in Germany, possibly Europe's most advanced gas fired power station indicates just how difficult the situation is for E.On and other operators of gas fired power stations.

Reduced electricity demand due to the recession and a large increase in renewables has reduced power prices in Europe. German wholesale power prices have more than halved since 2008 as the economic crisis cut demand and wind turbines and solar panels increased supply.

And unless we see a return to the ice age it is unlikely that there will be much of an increase in power demand and prices in the near future – with the possible exception of the UK, which is facing an imminent supply shortage and will support baseload generation

a material lignite fleet like RWE and noted that renewables have dramatically reduced the peak to base-load spread.

The bank did not limit its bleak outlook to just E.On. It said that RWE is also fighting headwinds and ultimately has "too much debt and too little flexibility in a market where the outlook is dismal". GDF Suez, while not as exposed to Europe as some of its peers, remains open to ongoing weakness in power and gas markets in Europe, said the bank. Conversely utilities such as Enel Green Power and EDP Renováveis, which have a purely renewable portfolio, have exciting growth possibilities.

Obviously there are factors, apart from the makeup of a utility's generating portfolio that will determine its outlook. But one thing is clear, apart from state-owned EDF, the days when the big utilities could be relied on to invest in large baseload plant may soon be a thing of the past.

Indeed the traditional utility model is increasingly becoming an outmoded concept. The industry is moving to a scenario where there will be much more varied technologies, with many more smaller companies. The green path is transferring value away from traditional utilities and while they have tried hard to be part of that green value chain, there has been collateral damage.

In a world where the information and data that enables management of the system in the most efficient way in a cash-constrained world becomes more vital, companies that can understand and manage data will become much more powerful in the energy world.

As the industry enters a new phase, some of Europe's biggest utilities will need to transform into completely different creatures. As in nature, the caterpillars of today must metamorphose into the butterflies of tomorrow, or become extinct.

