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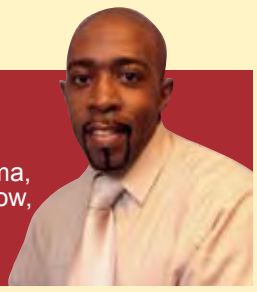
Realising renewables
Germany's government is committed to ambitious renewable energy targets for 2020. But can it realise its goals?
Page 13

A closing door
Time is fast running out for carbon capture and storage.
Page 14

Final Word
One year on from Fukushima, nuclear power is making slow, careful, progress, says Junior Isles. *Page 16*



News In Brief

European utilities under pressure
Several of Europe's major utilities are forecasting a bleak outlook as difficult market conditions continue to bite.
Page 2

Brazil leads clean energy finance
Brazil has emerged top of a ranking of the most attractive Latin American countries for investment.
Page 4

Malaysian government asset purchase criticised
The Malaysian government's acquisition of Tanjong Energy Holdings has come under fire from opposition lawmakers.
Page 5

Germany highlights network challenge
German Chancellor Angela Merkel says that the country's electricity grid remains a weak point in its plans to boost renewable energy capacity.
Page 7

ABB boosts offshore wind business
ABB says that a new engineering joint venture will help it to build up its competence in its offshore wind power integration business.
Page 9

Fuel Watch: East African gas could serve Asian markets
Gas discoveries offshore Tanzania and Mozambique have excited exploration companies and East Asian markets that see East Africa as a new source of LNG.
Page 12

Technology: A CCS project reborn
Little more than a year after going into Administration, the Don Valley Power Project, now under the ownership of 2Co Energy Ltd, is one of the most advanced CCS ventures in Europe.
Page 15

MEPs back 2050 roadmap but carbon prices still low

Teyssen: "renewables can and must face competition"

While the European Commission struggles to win unanimous support for its 2050 Roadmap, carbon prices remain too low to incentivise investment in low carbon technologies. **Junior Isles**

Carbon prices still remain too low to support investment in low carbon generation technology despite last month's strong endorsement by Members of the European Parliament (MEP) of the European Commission's 2050 Roadmap to reduce emissions.

MEPs voted by a large majority on a resolution supporting the Commission's roadmap, which was earlier rejected by Poland, and called on the Commission to prop up the EU emissions trading system (ETS).

The Parliamentary vote, however, had "no influence" on the price of EU allowances (EUAs), according to analysts at UniCredit bank in Munich. On March 15th the benchmark EUA contract settled at €8.01 ($10.56), two per cent down on the opening price.

Johannes Teyssen, chief executive of Germany's largest energy utility by market value, told reporters at a press briefing in Berlin late last month: "The Emissions Trading Scheme is crushed under the weight of member-state dirigisme, a sad remnant of what was once hoped to be a decisive marked-based policy mechanism."

He added that the existing diverse set of mechanisms in support for green technologies in the individual EU member states and low prices levels of CO_2 allowances has failed to provide incentives for investment in low carbon technology.

Teyssen believes that financial support mechanisms in the EU should be incorporated into the ETS.

"As long as renewables have competitive disadvantages [because they are more expensive than conventional energy sources], they could be supported through the awarding of carbon credits," he said.

"Renewables have grown up. If renewables are one day supposed to support the entire supply system, they can and must now face competition," Teyssen said.

The Parliamentary resolution makes several requests, one of which is that the Commission reports on how the surplus of allowances in the EU ETS is affecting incentives for low carbon investment and "adopt measures to correct the failings of the ETS".

Methods of support might include increasing the linear emissions reduction target (currently 1.74 per cent per year) from 2013, establishing a reserve price for auctioning allowances, further restrictions on offsets imported into the system, or a 'set-aside' of allowances – withholding, either temporarily or permanently, a quantity of emissions permits from the market.

A spokesman for Chris Davies, the MEP behind the resolution, said it was

Continued on Page 2

UK gears up for new CCS competition

With the imminent re-launch of the UK's competition to fund commercial scale development of carbon capture and storage, Summit Power Group, a US developer of low carbon power projects, has teamed up with UK power and gas network operator National Grid and oil services company Petrofac to develop the Caledonia Clean Energy Project.

The project in Grangemouth in Scotland will be submitted to the UK government's competition for £1 billion ($1.6 billion) funding for a CCS project.

The proposed Summit coal fired power plant will have more than 90 per cent carbon capture and also produce hydrogen gas for commercial use. The carbon dioxide captured will be transported via pipeline to St. Fergus by National Grid and then transferred offshore to be stored under the North Sea by Petrofac subsidiary CO2DeepStore.

The project site has been selected to take advantage of the potential to supply other facilities with industrial gas and to support carbon capture. The location is also close to the North Sea for both storage of the carbon dioxide and, later, for enhanced oil recovery opportunities, and enables the reuse of existing pipelines.

Summit Power is currently developing a similar project in Texas and intends to replicate many aspects of that at Grangemouth.

The UK government is seeking to develop CCS technology to help cut emissions of climate warming gases from coal and gas power plants to meet stringent EU and domestic targets for 2020 and beyond.

Last October, however, it pulled out of talks with a consortium led by Iberdrola-owned ScottishPower, after failing to agree funding terms for what was the only project left in the competition. The consortium was seeking to build a CCS project at a coal plant in Longannet in Scotland.

Last month the National Audit Office identified a series of difficulties with the competition, which was started by the former Department for Business, Enterprise and Regulatory Reform and then taken over by the Department of Energy and Climate Change (DECC), after it was formed in 2008.

The Department for Business, Enterprise and Regulatory Reform was "inexperienced at dealing with a project of this scale" said the Audit Office report, and launched the competition "without a clear strategy or timetable to secure funding".

It also said the competition was "restrictive", requiring bidders to develop only post-combustion capture technology. This "limited the number of bidders and their options and made negotiations inflexible", said the report.

Nine bidders originally took part in the competition and the government approved four but by October 2010 three pulled out leaving the ScottishPower consortium as the sole survivor in the competition.

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Continued from Page 1

now in the hands of the Commission to bring forward its proposals. "The Commission now has got the message that at least one of the two legislative bodies is on their side," he told *Environmental Finance*.

The Commission's roadmap sets the framework to reach the agreed goal of cutting carbon dioxide emissions by 80-95 per cent by 2050, against 1990 levels. The roadmap was, however, vetoed by Poland in the European Council a week before the Parliamentary vote.

It is the second time that Poland, which is heavily dependent on coal, has blocked the EU's long-term plans for cutting carbon emissions. Meeting the 2050 goal would mean radical changes in some countries' energy mix and Poland feels it economy would be aversely affected.

Danish Climate Minister Martin Lidegaard, chaired the talks

While Warsaw has not objected to the 2050 goal, it has resisted intermediate targets. Last year it vetoed the roadmap over a reference to raising the EU's reduction target to 25 per cent by 2020, from the current target of 20 per cent. When this part was removed from the latest plan put before environment ministers in March, Poland objected instead to mid-term targets of 40 per cent emissions cuts by 2030 and 60 per cent by 2040, said Danish Climate Minister Martin Lidegaard, who chaired the talks.

Poland's Environment Minister, Marcin Korolec, denied that his country is against a long-term policy for the EU, but insisted that the bloc's progress should move forward at the same time as progress in the fight to climate change globally.

"EU policy and global climate policy should go together," he said in a press briefing after the Commission meeting. "The EU as a group is responsible only for a small percentage of emissions, so if we want to achieve our goals, we need other parties to be on board and we need to act together," he said.

It is unclear how the EU's executive commission will proceed now because the EU's carbon targets require unanimous approval. The issue will have to be discussed at the next meeting of environment ministers in June, but in the meantime government leaders will likely be called in to break the impasse.

Thomas Spencer, a research fellow in climate and energy economics at the Paris-based think tank IDDRI, said Poland's veto could mean that Europe runs out of time in pinning down its post-2020 emissions targets in time for 2015, the deadline set for a new global climate pact.

European utilities under pressure

Villis does not expect to reach previous earning levels for 5-6 years

Several of Europe's major utilities are forecasting a bleak outlook as difficult market conditions continue to bite, says **Junior Isles**

The nuclear phase out in Germany, high gas prices and the economic slowdown are putting some of Europe's biggest utilities under pressure.

Germany's three largest power utilities announced losses largely due to the government's decision to close the country's nuclear power stations following the Fukushima nuclear crisis.

E.On, the country's largest utility, reported its first annual loss, reporting a net loss of €2.2 billion in 2011 down from a €5.9 billion profit in 2010. It said the government's decision cost it €2.5 billion in earnings before interest, taxation, depreciation and amortisation (ebitda) last year. Across the company as a whole, earnings were down 30 per cent to €9.3 billion, while sales were up 22 per cent to €113 billion.

The company, however, gave a positive future outlook saying that it expects profits to rise in the coming years. It said that its renewables business raised ebitda 21 per cent to €1.5 billion in 2011.

"For 2012, we expect to post an earnings increase that will continue in subsequent years," said Chief Executive Johannes Teyssen. Ebitda is expected to increase to between €9.6 billion and €10.2 billion in 2012, and to between €11.6 billion and €12.3 billion in 2013.

E.On's 2012 outlook was the most optimistic of Germany's big three power utilities.

RWE reported an 18 per cent drop in full year earnings but said it expects profits in 2012 and 2013 to be around the same level as last year.

EnBW – the German utility most reliant on nuclear energy – swung to a hefty net loss in 2011, attributing the sharp drop in earnings to the accelerated nuclear exit, which saw two of its four reactors shut down immediately and permanently.

It gave a bleak outlook for the next few years, saying that profits in the next few years will further decline.

"I expect that we will not reach the earnings levels seen before the nuclear exit decision before the next five to six years," said Chief Executive Hans-Peter Villis.

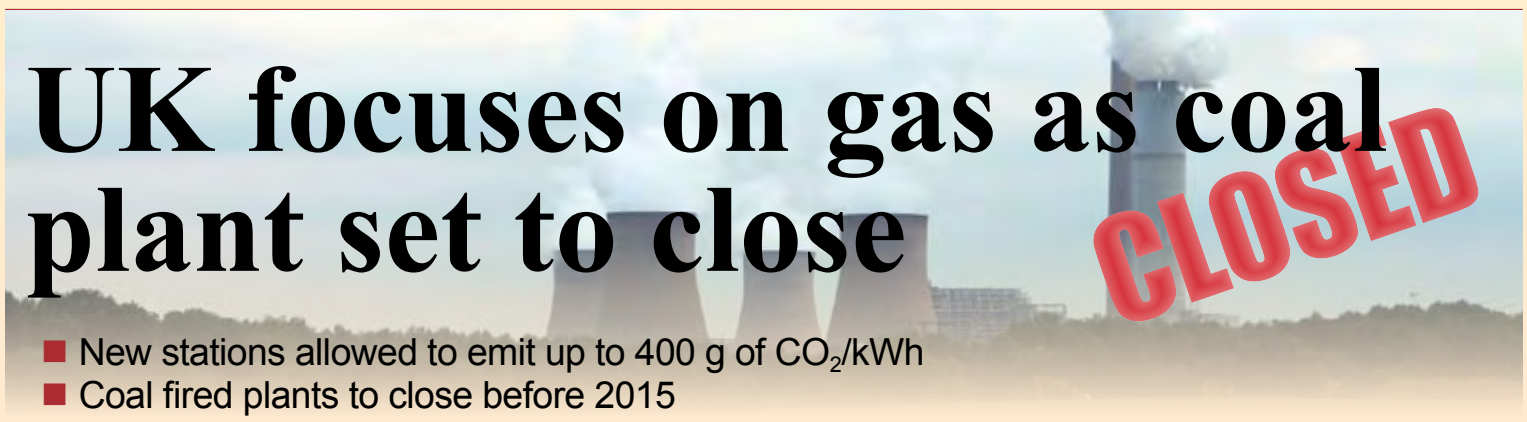
Elsewhere, Iberdrola, Spain's largest utility by value, issued a profit warning after a fall in power demand in Spain and the UK. Reporting its full-year earnings for 2011, it said that net profit fell 2.3 per cent, citing a "challenging economic environment" over the past year.

The company had expected recurring net profit to grow between 5 and 9 per cent between 2010 and 2012 but warned it would now be less than 5 per cent a year.

Meanwhile Enel, Europe's most heavily indebted utility, announced plans to cut its dividend payouts and investments over the next five years in an effort to reduce its debt and maintain its credit rating.

In February, Centrica, the UK's biggest energy supplier, said it had cut around 2300 jobs as part of its plan to deliver £500 million ($800 million) in cost savings as weaker economic conditions and higher wholesale gas prices pressured profits.

UK focuses on gas as coal plant set to close



- New stations allowed to emit up to 400 g of CO_2/kWh
- Coal fired plants to close before 2015

With fears of a looming electricity supply shortage, the UK has set out a plan a stimulate investment in new flexible gas fired generating capacity.

This is to address concerns that current and planned incentives, brought in to help the UK meet stringent emissions reductions targets, could stimulate too much renewable generation and not enough flexible capacity such as gas that can provide a reserve in times of peak demand.

Under the "grandfathering" plan, new UK power stations will be allowed to emit up to 450 grams of carbon dioxide per kilowatt-hour until 2045. Gas power plants typically emit around 400 g CO_2/kWh on an annual basis, around half that of coal plants.

Around a quarter of the UK's power generating capacity will close by the end of the decade, as aging nuclear and old coal stations are shutdown. The government wants to ensure there is enough power to keep the lights on and to fill in the gaps when intermittent renewables, such as wind and solar, are not generating.

There is concern of a looming power shortage as high gas prices discourage investment in gas fired plants. Industry experts believe the supply crunch could emerge around 2015 and last until new capacity is built. However, the economic slowdown and resulting loss in power demand in the UK may partly cushion that.

Eight coal fired plants are due to close by 2015 under the EU Large Combustion Plant Directive but several are set to close before then as companies rapidly use up their remaining EU production allowances.

Analysts are forecasting that most of the 11 GW of coal fired capacity that is due to close by 2015 will shut in 2013 or 2014.

Last month several generators announced closures. E.On said it will close its 1940 MW Kingsnorth coal fired power plant in March 2013. It is also withdrawing its application to build two new coal units at the site.

Scottish Power also said it will close its coal fired power station at Cockenzie at the end of March next year but still hopes to continue generating at the site. The company has planning permission for a new gas plant but is still evaluating its options.

Although the government has given consents for six new gas plants since May last year, it is currently not profitable to build new facilities.

Indeed, the economics are so bad for gas that companies are even closing gas power stations. Centrica recently said it was shutting one gas plant in north-east England and is considering closing a second.

The government says it will consult with industry and investors on a new gas generation strategy to be published in the autumn. It also reiterated its support for a capacity market for electricity to help stimulate more investment in capacity such as gas, but provided no new details.

The details on the capacity development mechanism are expected to be announced in the next month or two and, along with the grandfathering of the emissions performance level for power plants, will be included in the Electricity Market Reform legislation due to go before parliament in May.

Japan assesses nuclear role one year after Fukushima

One year after the Fukushima accident, the Japanese government is yet to decide on the future role of nuclear power in its generation mix.

According to reports, The Economy, Trade and Industry Ministry's research committee for natural resources and energy intends to draw up several scenarios on the percentage of nuclear energy by the end of April and select one this summer.

The committee came up with four plans, each of which proposes different ratios of nuclear power in 2030 – 0 per cent, 20 per cent, 25 per cent and 30 per cent. The committee will compile a formal proposal after incorporating variables such as electricity demand and possible effects of energy conservation.

According to *The Yomiuri Shimbun*, only one panel member called for nuclear power to account for about 30 per cent of total power supply, the same level as before the Fukushima nuclear crisis. Nine panel members were in favour of either about 25 per cent or about 20 per cent, while seven pushed for no nuclear at all.

Last month anti-nuclear protesters near the head office of Tokyo Electric Power Co., the operator of the crippled Fukushima complex called for the country to abandon nuclear power generation.

Japanese officials have also been accused of responding too slowly to the nuclear crisis, with critics saying regulators responded more slowly than their American counterparts did after the accident at Three Mile Island in 1979.

Sweeping changes by the US Nuclear Regulatory Commission (NRC) included emergency response planning, worker training and radiation protection. Some critics say the action was not enough, but the NRC got started on most of these measures within a year.

The March 11, 2011, disaster at the Fukushima Daiichi nuclear plant prompted widespread calls to make Japan's nuclear safety agency more independent by taking it out of the trade ministry. A year later, a law to make the change still has not passed.

Solar, wind set for growth in challenging market

- PTC, 1603 extensions fail
- DOC levies solar trade tariffs

Siân Crampsie

Renewable energy investment is set to continue in the USA in spite of policy uncertainty and other challenges facing the market.

Both the solar and wind energy sectors saw strong growth in 2011 and are set to continue this trend, according to new market analyses. Recent reports from the US Energy Information Administration (EIA) suggest that biomass will also play a key role in the renewables sector in the coming years.

The outlooks come as the renewables sector lobbies US Congress for extensions to key subsidy regimes. The solar industry is also grappling with the uncertainties posed by a trade dispute with Chinese photovoltaic solar panel manufacturers.

A report from the Solar Energy Industries Association (SEIA) and GTM Research indicates that 2012 will be a strong year for solar installations in the USA, following on from a record year in 2011. It predicts a compound annual growth rate of 30 per cent through 2016.

Wind energy remains the largest source of non-hydropower renewable energy in the USA and, with biomass, is expected to dominate predicted increases in renewable power generation, according to the EIA.

However the wind energy industry remains concerned about the expiry of the production tax credit (PTC) at the end of 2012. The American Wind Energy Association says that the PTC has helped the USA to develop a manufacturing industry employing 37 000 people.

Bills that included measures to extend the PTC beyond 2012 have so far failed to make it through Congress.

Nevertheless the wind industry received a boost last month when the US Department of Energy (DOE) announced a six-year, $180 million initiative to help the development of offshore wind.

The initiative is part of a new, "all-of-the-above" strategy to developing domestic energy sources in the USA announced recently by President Obama.

The offshore wind initiative will support four installations across the USA in an effort to accelerate the development of the offshore wind industry. The DOE estimates the country's offshore wind potential to be 4000 GW.

Attempts to retroactively extend the Section 1603 Treasury cash grant programme that supports the solar power sector and which expired at the end of 2011 have also failed in Congress. The expiry of this programme, together with falling costs and a shift towards large-scale installations helped the US solar industry to install a record 1855 MW of capacity in 2011, up from 887 MW in 2010, as developers rushed to get projects finished.

Cumulative PV capacity in the US now stands at 3954 MW, and a further 2.8 GW of capacity is likely to be installed in 2012, says SEIA.

The installed cost of solar PV systems fell by 20 per cent in 2011, partly due to reduced component costs. But costs could start to rise again as a result of tariffs imposed by the US government on imports of Chinese solar goods.

Last month the US Department of Commerce ruled to impose tariffs of up to 4.73 per cent on Chinese manufactured goods because Chinese firms benefit from unfair export subsidies. The ruling is preliminary and follows an investigation by the US government that was prompted by a formal complaint by SolarWorld.

The level of tariffs imposed by the Department of Commerce is lower than expected and illustrates that Chinese manufacturers do not benefit from "massive subsidisation", according to CASE, a coalition of US solar module manufacturers that are opposed to the introduction of tariffs.

The Commerce Department in May will announce whether anti-dumping duties will also be levied on Chinese imports.

SEIA has remained neutral in the trade war but in March announced a new initiative aimed at improving international dialogue over trade and competitiveness.

"The trade action against Chinese imports is indicative of a growing trend of trade conflict in the global solar energy industry that threatens to curtail the rapid growth we have seen in this market – both in the US and abroad," said Rhone Resch, president and CEO of SEIA.

"Governments and industry must recognise that while trade remedy proceedings such as anti-dumping and countervailing duty investigations are an important part of the global trade rules, so too are collaboration and negotiations.

"This is why SEIA is taking a proactive lead to create a dialogue with several leading national solar trade associations and governments from around the world."

Brazil leads clean energy finance in Latin America

A new initiative designed to encourage clean energy and sustainable development in Latin America and the Caribbean has ranked Brazil, Nicaragua and Panama as the most attractive countries for investment.

The Multilateral Investment Fund and Bloomberg New Energy Finance have released a preliminary version of Climatescope, which is designed to be an objective assessment of the investment climate for the clean-tech sector in the region.

Brazil emerged top of the ranking because of its enabling framework, climate financing policies and clean energy value chains. Nicaragua came second in the rankings, performing well on indicators such as clean energy policies, power sector structure, total clean energy investments, and availability of green microfinance.

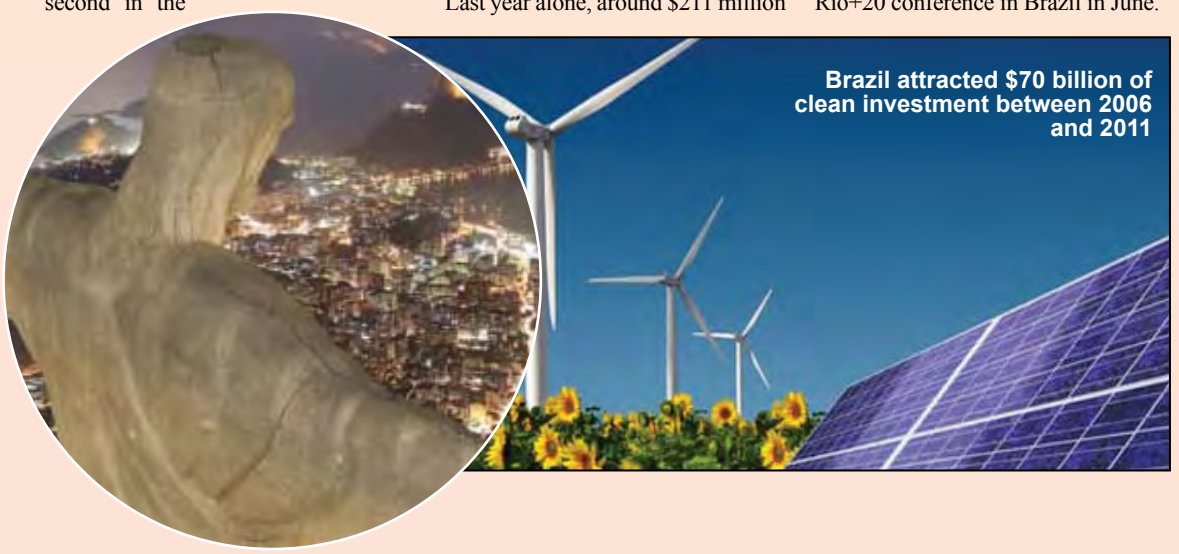
Panama came third because of its enabling framework and substantial efforts in managing greenhouse gas emissions.

Between 2006 and 2011 Brazil attracted $70 billion of clean investment and has an emerging strong wind energy sector. However, in terms of investment relative to country GDP, Nicaragua outperformed Brazil, attracting $1.1 billion of clean energy investment from 2006 to 2011.

Last year alone, around $211 million went to Nicaragua's wind and geothermal sectors, and the Central American nation has the region's most developed green microfinance sector with a total of 10 organisations.

Panama's liberalised power market has attracted investments in new clean energy generation and as a result the country has posted exceptionally high growth rates in this area.

The assessment is based on climate policies, the availability of climate finance, low-carbon businesses and clean-energy value chains, as well as greenhouse gas management activities. The full version of the report will rank 26 countries when it is released at the Rio+20 conference in Brazil in June.



Brazil attracted $70 billion of clean investment between 2006 and 2011

DOE boosts small reactor technology

The US government is hoping to attract private finance to the development of small modular reactors (SMRs) as part of a broad strategy to make the country less dependent on energy imports.

The Department of Energy (DOE) last month announced two initiatives aimed at promoting SMR technology – public-private partnerships with three SMR technology companies, and $450 million of funding to support the engineering and design certification of up to two SMR designs.

The DOE has signed agreements with Hyperion Power Generation (now known as Gen4 Energy), SMR LLC, and NuScale Power to develop deployment plans for SMR technologies at the DOE's Savannah River Site in South Carolina.

The agreements will help these private companies obtain information on potential SMR reactor siting at Savannah River and provide a framework for developing land use and site services agreements, says the DOE.

In a second initiative, the White House announced new funding to support the manufacture of SMR technology and will solicit proposals for promising SMR projects that have the potential to be licensed by the Nuclear Regulatory Commission and achieve commercial operation by 2022.

"The Obama Administration and the Energy Department is committed to an 'all-of-the-above' energy strategy that develops every source of American energy, including nuclear power, and strengthens our competitive edge in the global clean energy race," said Energy Secretary Steven Chu.

In response to the initiatives, Westinghouse said that it would apply for SMR investment funds in consortium with a group of utilities. "This federal support will provide the potential to expand the nation's options for nuclear power as well as to further the nation's competitive edge in the global clean energy race," said Dr. Aris Candris, Westinghouse president and chief executive officer.

The Westinghouse SMR is a 225 MWe, integral pressurised water reactor, with all the primary components located inside the reactor vessel. It utilises passive safety systems and proven components to achieve high levels of safety.

"Westinghouse is well positioned to be the first to market with the safest and most economical small modular reactor," said Dr. Kate Jackson, Westinghouse chief technology officer and senior vice president, Research and Technology. "Our experience, capabilities, and licensing expertise are a competitive advantage for utility partners and help to ensure a rapid deployment of operating plants."

Philippines generating capacity up

- Capacity up a third
- Trans-Asia Oil invests $770 million

Syed Ali

New generation capacity totalling 1172 MW will be added to the Philippines' main grid by 2015, according to data from the Department of Energy (DOE). It is already up by nearly a third from 886 MW added last year.

"Indicative" power projects, which are under different stages of project development and are still subject to financial closing, also jumped from last year. The DOE said these projects' generating capacity, which could start increasing available power for the main grid by 2018, grew by 7 per cent to 5023 MW from 4683 MW.

In the Power Development Plan 2010-2030, the Luzon grid would need some 11 900 MW of additional power. Some 2150 MW and 2500 MW of new generation capacity is needed for the Visayas and Mindanao grid, respectively.

DOE Undersecretary Josefina Patricia M. Asirit said the government should generate enough investor confidence in the sector to avert a power crisis. "[Investors] should be able to come in and get a return on investment that is viable for them," Asirit said.

In late March, Trans-Asia Oil and Energy Development Corp. said it is looking to invest Peso33 billion ($770 million) in new power projects over the next five years, a senior company executive said.

These new projects, which are currently under study, will allow the company to generate almost 700 MW of power by 2017, said Roberto M. Laviña, executive vice-president and chief finance officer of Trans-Asia.

Meanwhile, Texas-based Quantum International Group Inc. and the city of Surigao signed a deal to put up a power plant in Surigao. In a statement, the parties said they agreed on the development of several energy projects in Surigao in the next 5-7 years.

"These projects include a regional plasma gasification plant that will serve not only Surigao, but other Mindanao municipalities as well," Quantum International said.

"While we were originally only looking to build a small plasma facility in Surigao, after meetings with Mayor Matugas, we are moving to construct a regional plasma center that will serve the needs of all of Mindanao," said Quantum International chief executive Al Johnson. The plasma facility will process up to 5000 tonnes of municipal and industrial waste daily to produce electricity for the region.

"Once fully operational and utilised at full capacity, this new supply of clean energy will greatly reduce dependence on the normal electricity supply and will make power outages, usually common to the area, a thing of the past," Quantum said.

The Philippines will need to upgrade its transmission network to accommodate the increasing generating capacity.

At the end of February, the National Grid Corp. (NGCP) said it will spend nearly Peso100 billion in the next 10 years to establish new transmission lines and substations and expand existing facilities.

Under the Transmission Development Plan 2011-2020, the NGCP plans to spend P95.8 to 102.8 billion in six major transmission line expansion projects, said Giovanni Galang, deputy department manager of the NGCP's Transmission Planning department. Most of the projects will be completed in the next five to eight years, Galang said.

Malaysian government asset purchase criticised

The Malaysian government's acquisition of Tanjong Energy Holdings has come under fire from opposition lawmakers.

Last month the government signed a Ringgit 8.5 billion ($2.8 billion) deal to acquire Tanjong Energy Holdings in one of the country's biggest ever power asset sales. State investment company Malaysia Development Berhad said the deal is part of its strategy of ensuring the country's long-term energy security.

The deal, which is subject to financing and regulatory approvals, has been criticised, however. Opposition lawmaker Tony Pua said there was no reason for the state agency to make such a huge investment.

Pua said its entry into a crowded market with more than 20 independent power producers added little value to the government. Tanjong owns and operates three power plants in Malaysia. The agency also has no experience in the sector and the deal does not fit its aim of seeking new sources of growth to bolster the economy, he said.

Since the agency is funded entirely by debt guaranteed by the government, Pua also voiced concern this would rack up more debt for the country.

Malaysia is not short of companies willing to build new capacity. In late March it was reported that Malaysia Development Bhd and GE, along with a Sabah-based green energy company, are currently in talks to develop the country's first geothermal plant in Apas, Tawau. When completed, the plant will have a capacity of 67 MW.

In late February Alstom and its consortium partners signed a contract worth over €1 billion with Tanjung Bin Energy Issuer Bhd to build a 1000 MW supercritical coal-fired power plant at Tanjung Bin, Johor.

Combined with the new Manjung power plant also being constructed by Alstom and due to come online in 2015, the power plants will jointly provide an additional capacity of 2000 MW for Peninsular Malaysia.

The Tanjung Bin plant will have a capacity of 1000 MW

Price reforms to help China's economic development

- Reform will inevitably push up prices
- Power supply tight this year

China says the reform of its energy and resource pricing system planned for this year will let the market play a role in helping users be more economical with their energy use and protect the environment.

In an interview with *Xinhua*, Zhou Wangjun, deputy chief of the Price Department with the National Development and Reform Commission (NDRC) said: "The reform should not be simply regarded as 'raising prices.'"

He noted that it will inevitably push up prices for some energy and resource products as their rates were kept low in the past to facilitate the country's economic development. He added, however, that it would be hard to ensure domestic supply if prices of energy and resources with high dependence rates remained lower than those on global markets.

The government will focus 2012 price reforms on electricity, oil, natural gas and water, he said, with more cost controls placed on power grid companies and differential prices introduced for residential power use this year.

According to the China Electricity Council (CEC), China will continue to face a tight power supply this year due to increasing demand and stagnant growth in new power plants. The nation will face a possible shortfall of 30-40 GW this year, it said.

During the 12th Five-Year Plan period (2011-2015), CEC predicts power consumption will grow at 8.8 per cent annually, reaching 6.02-6.61 trillion kWh hours in 2015.

During the period, it predicts a sharp fall in thermal power investment, mainly due to the low profitability of thermal power projects and China's efforts to curb carbon emissions. Investment in clean energy including wind power and hydropower will, however, jump over the next few years, according to the CEC.

The fall in thermal generation will also be partly compensated by an increase in nuclear. In March, Wang Yuqing, former director of the National Nuclear Safety Administration, said about 10 approved new nuclear plants, whose construction was put on hold last year after Japan's Fukushima nuclear accident, will soon be given permission to start construction.

"The halt will soon be lifted, as a comprehensive plan on nuclear safety control has been submitted to the State Council," said Wang, who is also the deputy director of the Committee of Population, Resources and Environment of the CPPCC National Committee.

Zhang Guobao, former director of the National Energy Administration, said China needs to put major effort into developing nuclear power and new energy to ensure the country's energy security.

At the beginning of March, China took another step in localising key nuclear power equipment. Dongfang Electric Corporation said it had produced a key piece of equipment for the passive core cooling system of the AP1000 – a two-loop pressurised water reactor manufactured by Westinghouse Electric Company.

The equipment, China's first domestically produced passive residual heat exchanger, was shipped from southern Guangdong Province to the Haiyang Nuclear Station in northern Shandong Province on February 29th.

India to become world's biggest coal importer

India is set to overtake China as the world's biggest thermal coal importer as the government seeks supplies for power producers that have halted plans for $36 billion of new plants because of a fuel shortage.

Purchases from abroad may exceed 118 million tonnes in 2012, compared with China's 102 million tonnes, according to Daniel Hynes, a director of commodity research at Citigroup Inc. in Sydney. Imports may rise after the government ordered state-run Coal India Ltd. to plug a local shortfall with foreign supplies.

India's likely emergence as the world's biggest coal buyer underscores a shortage of domestic fuel that has prompted companies to mothball plans for expanding electricity capacity. India's $1.7 trillion economy grew the least in two years in July to September as power and factory output slowed. At the same time, China is adding twice as much coal-production capacity this year than in 2011, according to the National Energy Administration, reducing its import needs.

Coal burden: shortages have halted plans for $36 billion of new power plants

China committed to low carbon future

China says it is committed to a low carbon future even if it means reducing its expectations for economic growth.

"We will show the world with our actions that China will never seek economic growth at the expense of its ecological environment and public health," said Chinese Premier Wen Jiabao in a government work report delivered during China's annual legislative session in March.

Carbon emission trading will be one of the cornerstones in its carbon reduction efforts, with Wen's report pledging to start trials of a cap-and-trade scheme and move faster toward establishing "a compensation mechanism for ecological damage".

A pilot carbon trading scheme was launched last year in seven Chinese municipalities and provinces – Beijing, Shanghai, Tianjin, Chongqing, Hubei, Shenzhen and Guangdong – with a view to expanding it nationwide if the tests proved successful.

Lawmakers and political advisors have also eyed the formation of a government-led platform for international climate trading. Zhang Jiao, a political advisor from the China National Democratic Construction Association, said China should develop futures and options products for greenhouse gas emission rights that could be tradable in international markets.

"China currently has several bourses for climate trading, but they lack a standardised trading mechanism," said Zhang.

China has pledged to reduce carbon dioxide emissions per unit of GDP by 40 to 45 per cent by 2020 compared to 2005 levels.

Its energy use per unit of GDP dropped 19.1 per cent between 2006 and 2010, while energy-saving efforts helped reduce emissions of carbon dioxide by 1.5 billion tonnes and saved the equivalent of 630 million tonnes of coal.

The government recently established a renewable energy policy research centre as part of its efforts to realise sustainable growth.

The China National Renewable Energy Center (CNREC) will study and write development strategies and conduct research concerning renewable energy policies, as well as carry out cooperative programmes with the international community, government officials said at an opening ceremony for the centre in late February.

The centre will also help authorities create a "developmental roadmap" for photovoltaic power, wind power, biofuel and other renewable resources, as well as collect and analyse data to be used by energy policymakers.

"To solve the problems facing the renewable energy industry, we must come up with policies and measures that are suitable for the sector," Liu Qi, deputy head of the National Energy Administration, said.

Meanwhile China's authorities remain locked in a dispute with the US on anti-dumping allegations in the solar and wind sectors.

In March China's Ministry of Commerce said it would negotiate with its US counterpart over its probe into Chinese exports of wind towers through association channels, Vice Commerce Minister Jiang Zengwei said.

The US Commerce Department announced on January 19, 2012 that it was to launch anti-dumping and anti-subsidy investigations into wind towers from China and Vietnam. It followed a similar US probe into China's exports of solar panels.

"Wind power products from China have a competitive edge in the international market, and the United States has taken some protectionism measures against these products," Jiang said on the sidelines of the annual session of the National People's Congress.

"We have taken notice of the sanctions," the vice minister added.

S. Korea to invest in energy security and safety

South Korea will invest Won1.08 trillion ($1 billion) into research and development (R&D) in its energy industry this year in a bid to secure fresh energy resources and brace for possible accidents involving nuclear power plants.

The funds will be spent for 19 energy projects divided into four divisions, including the development of energy resources, renewable energy development, nuclear power generation and radioactive waste treatment, according to the Ministry of Knowledge Economy.

The ministry plans to reduce energy costs by improving the efficiency of energy-inefficient home appliances. It will also help local companies develop technologies such as smart grids, energy storage, solar and wind power and fuel cells.

There will also be a focus on nuclear. In addition to strengthening the safety of nuclear reactors against possible accidents such as an earthquake or tsunami, the ministry will promote nuclear technology export.

State-run Korea Electric Power Corp. (Kepco) has set a target of exporting two nuclear power plants this year as part of efforts to "aggressively" expand its overseas business.

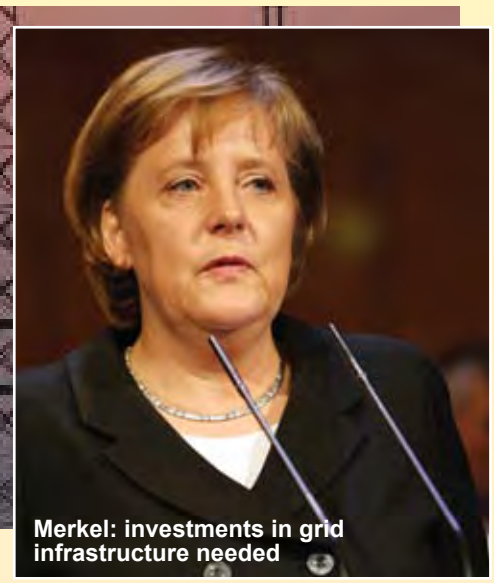
Excluding nuclear power, the company will target $1.8 billion in overseas sales, including 4400 MW of power plant projects, the state-run electricity provider said.

The company also aims to secure 650 tons of uranium and 7.8 million tons of soft coal to meet the resource-deficient country's demand for fuels.

■ Last month India's *Economic Times* reported that Kepco is likely to buy about 40 per cent of India's Pioneer Gas Power Ltd. for about Rupees5 billion ($100 million). Pioneer is setting up a 388 MW, gas-based power plant in India's western state of Maharashtra, the report

South Korea to invest in its energy industry and improve the safety of its nuclear power plants

Germany highlights network challenge


Merkel: investments in grid infrastructure needed

■ Compromise reached on FIT cuts ■ UK government loses FIT appeal

Siân Crampsie

German Chancellor Angela Merkel says that the country's electricity grid remains a weak point in its plans to boost renewable energy capacity.

Speaking a year after the Fukushima nuclear disaster in Japan, Merkel reaffirmed Germany's commitment to an early exit from nuclear energy but said that boosting transmission capacity was a priority.

Germany has outlined plans to expand renewable energy capacity – particularly offshore wind energy – to help replace its nuclear power plants. However to achieve this the ability of the grid to transmit energy from the north to the south of the country needs to be improved.

Significant new investments in grid infrastructure are needed, said Merkel, and would probably amount to additional fees for consumers. A plan laying out the grid's needs is expected at the beginning of June, with a proposed law expected by year-end.

Merkel's comments come after several weeks of debate in the offshore wind energy industry about delays in getting new offshore wind farms connected to the mainland grid.

The government is now considering legislation to address the liability issues caused by the delays.

Germany is planning to have an installed offshore wind capacity of 10 GW by 2020 but recently major energy sector companies such as E.On, RWE and Siemens have said that delays in getting connections are affecting their business.

E.On said in February that the delays would put energy companies off investing in offshore wind projects, therefore jeopardising Germany's renewable energy plans.

Siemens reported that it booked charges at its power transmission unit of around €200 million in the quarter ended December 31, 2011 related to delays in connecting North Sea wind farms to TenneT's power grid. RWE says that delays in connecting one of its large North Sea wind farms to the grid would cost it millions of euros.

The companies blame complex approval processes. TenneT, the Dutch transmission system operator that also operates part of Germany's high voltage network, says that delays are also the result of problems that subcontractors have had installing substations and cables.

The government wants legislation that would help wind farm developers, owners as well as grid companies to share the risk of connection delays.

Germany's solar power sector is also putting pressure on the government following the announcement of plans to cut feed-in tariffs (FITs) for photovoltaic (PV) projects.

In early March the German Cabinet approved a plan to cut solar FITs by 20-30 per cent, starting in March. The country's upper house objected to the severity of the proposal, however, and a compromise has been agreed on.

Cuts will now not start until April, and some types of projects will be given a period of grace to complete their plans to allow them to qualify.

In the UK, meanwhile, the government lost a legal appeal to make changes to the country's solar FIT scheme, which was burdening government finances after a strong uptake.

Homeowners and businesses who installed solar panels after a December 12, 2011 cut-off date and before March 3, 2012 will now be eligible for the previous, higher FIT of 43p per kWh of energy generated, which had been halved at just six weeks' notice by the government.

The ruling has ended a period of uncertainty for the UK solar market, but real estate firm Savills warned that with the FIT budget under greater strain, support for other technologies might be affected.

"With money tight it is odds-on that the proposed government reductions in rates, planned for later this year, will go through as drafted," said Nick Green from Savills Energy.

"Anyone proposing an energy scheme should be revisiting their financial models to stress test them against any future reductions in rates, giving careful consideration as to which schemes to take forward and when."

Germany solar companies are concerned about the impact of the new FIT policy on their business. In March, Solarhybrid became the third German solar energy company to file for insolvency in four months.

Lithuania pushes nuclear project

The Lithuanian government is hoping to conclude negotiations with its partners in the construction of a new nuclear power plant in the country by the middle of 2012.

Lithuanian Prime Minister Andrius Kubilius has visited Hitachi officials in Japan to discuss the Japanese firm's role in the Visaginas nuclear power plant, and says he wants the governments of Lithuania, Latvia and Estonia to conclude negotiations by June.

The Visaginas nuclear power plant is the cornerstone of Lithuania's energy plan and will help to secure the energy independence of the Baltic states. However, its development has been set back by the withdrawal of Poland from the project and by the construction of new nuclear plants in Kaliningrad and Belarus.

Visaginas is also important to the development of the Baltic Energy Market Interconnector Plan linking Poland to Finland and Sweden.

GE-Hitachi Nuclear Energy was chosen as the strategic partner in Visaginas last year, but it is not yet decided how much the Japanese firm will invest in the project. The output of the plant – which is likely to have a capacity of 1350 MW – also has to be divided up between Lithuania, Latvia and Estonia.

■ Switzerland's BKW Energie AG says that it will challenge a court ruling that would force it to close the Muehleberg nuclear power plant in June 2013. The utility wants to operate the plant until 2022. The court ruled that it should be closed because a three-month shutdown in 2011 revealed cracks in the reactor's core shroud.


Construction of Visaginas would supply Lithuania, Latvia and Estonia

Upgraded solar cells take shape in Spain

A solar power plant in Spain is showing how solar cells initially rejected after manufacture can be upgraded and used in commercial projects.

Innotech Solar, Jendra Power and Energie Wasser Bern (EWB) have commissioned the 4.3 MWp photovoltaic project near Grenada, Spain. It uses solar modules that have been upgraded by Innotech Solar using a laser-assisted process.

"The groundbreaking process for upgrading rejected solar cells makes ITS modules especially environmentally friendly with a particularly low CO_2 footprint," said Thor Christian Tuv, CEO of Innotech Solar, which has completed three other projects in Spain.

Norway-based Innotech tests, sorts and optimises cells from different manufacturers using industrial processes developed by its own research teams.

UK biomass policy under scrutiny

Utilities in the UK are continuing to put pressure on the government to improve financial support for biomass-fired power plants.

E.On UK said last month that it would review its plans for the construction of a 150 MW biomass plant near Bristol because of uncertainty about subsidy cuts.

The announcement came just after the government issued a permit for the project.

In February, Drax, the UK's largest coal-fired power generator, cancelled its plans to build a biomass power station due to uncertainty about proposed subsidy cuts.

The UK government is reviewing the support that renewable energy receives through the Renewable Obligation (RO) scheme, and the level of support given to dedicated biomass plants is likely to fall.

Drax, the UK's largest coal-fired power generator, says that it will go ahead with a £50 million investment to increase co-firing but that it will not go ahead with development of the proposed 290 MW Selby power station.

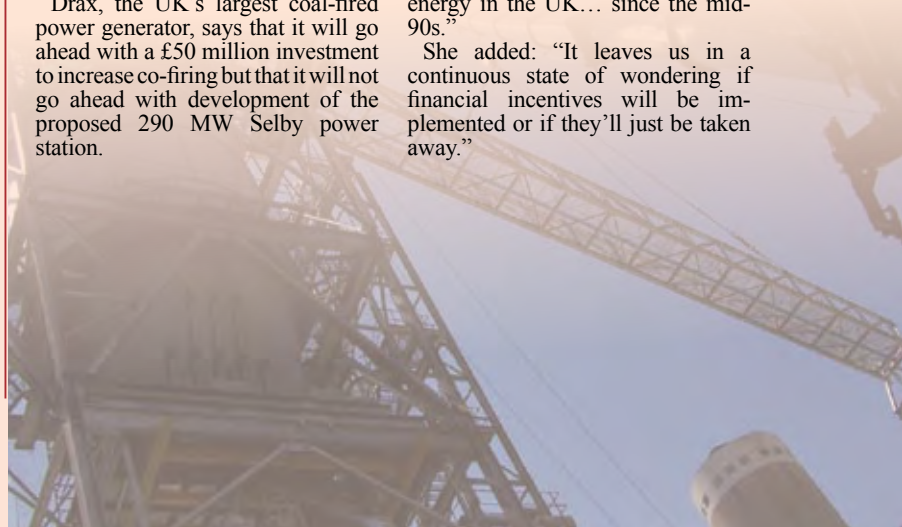
Last month it signed a contract with Shepherd Group to build new biomass storage and handling facilities at the Drax plant. These and other modifications will enable Drax to produce up to 20 per cent of its output from biomass.

Dorothy Thompson, Drax Chief Executive said: "Drax is ready to transform itself into a predominantly biomass fuelled generator, but to do so we need appropriate regulatory support, and to that end we look forward to the timely conclusion of the government's current review of the future support levels for renewable technologies."

Drax has also called for sustainability standards for biomass fuel.

Gaynor Hartnell, chief executive of the Renewable Energy Association, said: "[Biomass] has been subject to less clarity than any other renewable energy in the UK… since the mid-90s."

She added: "It leaves us in a continuous state of wondering if financial incentives will be implemented or if they'll just be taken away."



Ukraine invites shale gas tenders

- Shale gas will boost energy security
- Oil companies plan bids

Deputy Energy and Coal Minister Vladimir Makukha: the Ukraine government wants to replicate US success

Siân Crampsie

Ukraine wants to tap its vast reserves of unconventional gas in order to reduce its dependence on Russian energy resources.

The Ukrainian government has announced that it will hold tenders to award the rights to explore for shale gas in two areas of the country.

The successful exploitation of the country's resources would not only bring large amounts of revenue to the country but could also make it self-sufficient in terms of gas, and even be a net exporter.

Winning bidders in the tender will enter production-sharing agreements with state companies for the two concession areas – one in the east and one in the west of Ukraine. The government says it will auction the rights to as much as 70 per cent of production, with agreements extending for 50 years.

According to data from the US government, Ukraine has Europe's fourth-largest shale gas reserves at 1.2 trillion m^3. This fact, and the government's willingness to exploit the reserves have already attracted the interest of major international oil firms such as BP, ExxonMobil, Shell and ENI.

Poland, France and Norway also have large reserves of shale gas. Horizontal drilling techniques, known as 'fracking', have been banned in France due to environmental concerns.

The government wants to replicate the success of the US shale gas boom, where the emergence of horizontal drilling techniques have made unconventional reserves economic. The Ukrainian concession areas also hold reserves of conventional natural gas, coal bed methane, crude oil and condensate.

The Ukrainian government has set a target of producing 4-5 billion m^3 of shale gas by 2020. It currently imports around 36 billion m^3/year of natural gas – equivalent to 60 per cent of its needs.

Ukraine is thought to be well-suited to horizontal drilling techniques compared with other European countries because of its low population density.

- The Ukrainian parliament has passed a bill by a narrow margin paving the way for the privatisation of electric power plants. Privatisation will pave the way for the upgrade and conversion of power plants to run on alternative fuels, according to the Deputy Energy and Coal Minister Vladimir Makukha.

Lebanon issues tender

Lebanon is planning to boost generating capacity by issuing tenders for power projects in May.

According to local reports, the Energy and Water Ministry will seek bids for a $1.2 billion project to increase the generating capacity of three power plants by a total of 700 MW.

The tenders have been approved by the World Bank. They will help the country to overcome its power shortages.

Power demand in Lebanon stands at around 2400 MW, while production is only 1500 MW.

In March Lebanon embarked on a study to assess renewable and waste-to-energy resources in the country. With financial assistance from the government of Spain, the study is part of the Country Energy Efficiency and Renewable Energy Demonstration Project for the Recovery of Lebanon (CEDRO), which aims to promote the deployment of renewable technologies in communities in the south of the country.

Meeting demand: power demand in the Lebanon stands at around 2400 MW, while production is only 1500 MW

Kuwait joins gas flaring partnership

Kuwait has become the latest country to make a pledge to reduce the amount of natural gas that it flares from its oil fields.

The country has officially joined the World Bank-led Global Gas Flaring Reduction (GGFR) partnership, which aims to help oil companies to reduce flaring and realise the value of associated gas.

Kuwait is the third country in the Middle East to join the GGFR initiative, following Iraq and Qatar. GGFR estimates that in 2010, Kuwait flared around 1.2 billion m^3 of gas.

"Gas flaring reduction is a vital contribution to reducing greenhouse gas emissions, improving energy efficiency and mitigating climate change," says S. Vijay Iyer, Director of the World Bank's Sustainable Energy Department. Associated gas is often seen as a byproduct of oil production rather than as a valuable energy resource, and oil companies often prefer to flare the gas rather than build the infrastructure to use it.

Kuwait Oil Company (KOC) says that it has reduced flaring from 17 per cent down to 1.75 per cent of its gas production between 2005 and 2011. This reduction has increased revenues by $2.7 billion.

The GGFR now consists of 30 major oil producing countries and companies. Globally gas flaring in 2010 was estimated to be 134 billion m^3, equivalent to 360 million tons of greenhouse gas emissions.

GGFR estimates that 30 billion m^3 of gas was flared in the Middle East in 2010.

Kuwait is the third country in the Middle East to join the GGFR initiative

SA publishes wind data

South Africa's wind energy resources are on a par with those of Denmark and Germany, according to a wind resource map published by the country's energy ministry last month.

The wind atlas cost around $2.9 million to produce and is the first of its kind in the country. It will be used by developers to assess the potential for new wind power projects in South Africa, which is currently trying to boost the level of renewable energy generation.

South Africa's Integrated Resource Plan (IRP) 2010-2030 calls for renewable energy to account for 42 per cent of all new generation capacity and for the development of 8000 MW of wind energy by 2030.

"As we embark on our ambitious renewable energy programme, the need for reliable, accurate and representative data on wind becomes critical," said South African Deputy Minister for Energy Barbara Thompson.

Data for the wind map was collected over a 12-month period from ten masts. The map can be accessed through commercial wind software.

According to a recent report from the Earth Policy Institute, Africa's wind energy sector is starting to grow as governments in the region start to take advantage of wind energy resources.

Key projects in sub-Saharan Africa include the 300 MW Lake Turkana wind farm, which is expected to break ground in April 2012 in Kenya, while Ethiopia, Nigeria and Mauritania are poised to install their first wind turbines.

Global wind power capacity is projected to at least double between 2011 and 2016 as mature players build on a sizable base and as more countries enter the market, says the Earth Policy Institute.

- India's Tata Power has formed a joint venture with mining firm Exxaro Resources Ltd. to develop, manage and acquire electricity generation projects in South Africa, Botswana and Namibia. The JV company, called Cennergi Pty Ltd., will initially focus on renewable energy projects in South Africa.

US joins rare earth action

Japan has called for greater international dialogue and cooperation in order to secure a stable supply of rare earth materials.

The country is the world's largest importer of rare earth products – used in a variety of high-tech equipment such as photovoltaic (PV) cells, electric vehicle batteries and wind turbines – and is calling for better conservation and recycling, and for continued dialogue with China.

The move came in late March just two weeks after Japan, the USA and the European Union filed a complaint at the World Trade Organisation (WTO) over Chinese limits on rare earth exports.

China accounts for at least 90 per cent of global supplies but has curbed production and exports since 2009. China says that its controls on raw materials are aimed at protecting the environment.

The US Energy Department said in January that limited supplies of five rare earth minerals – dysprosium, terbium, europium, neodymium and yttrium – pose a threat to increasing the use of clean energy technologies such as wind turbines and solar panels.

Although manufacturers are finding ways of using smaller quantities of rare earth materials in their products, the overall demand for the elements is still predicted to increase with the increasing demand for clean technologies.

Wind sector disappoints UTC

Clipper is no longer core to UTC's high-tech business and has not produced the growth expected.

Siân Crampsie

Clipper Windpower is to be sold by parent company United Technologies (UTC) as part of an asset disposal programme that will help to fund a new acquisition.

UTC bought the wind turbine manufacturer in tranches between 2009 and 2010 but now wants to sell it because it is no longer core to the company's business and because it wants to raise funds for the purchase of aerospace firm Goodrich.

UTC is also selling Pratt & Whitney Rocketdyne and the Hamilton Sunstrand Industrial businesses. It has been disappointed in the performance of Clipper, which remains one of the smaller wind turbine manufacturers active in the North American market.

UTC hopes that the asset disposals will raise $3 billion towards the $16.5 billion purchase of Goodrich. An auction process for the sales is already underway.

According to UTC, the growth that it had expected at the time of its purchase of Clipper has failed to materialise.

The California-based firm manufactures the 2.5 MW Liberty wind turbine but faces strong competition from firms such as GE Energy and Vestas.

Greg Hayes, chief financial officer of UTC, told analysts that the wind industry is stagnant. However, the American Wind Energy Association (AWEA) figures show that cumulative installed wind energy capacity in the USA grew by 17 per cent in 2011 compared with 2010, and by 15 per cent in 2010 compared with 2009.

In 2011 UTC cancelled Clipper's plans to develop a large-scale offshore wind turbine in the UK. The project was designed to help reduce the costs of offshore wind power and was carried out with the support of the UK's New and Renewable Energy Centre (NaREC) at Blyth, and also gained funding from the One Northeast Regional Development Agency.

AWEA figures show that Clipper added 70 MW of capacity in the USA in 2010, and 257.5 MW in 2011.

DNV Kema given green light

Innovation in the energy sector helped DNV Kema Energy & Sustainability to maintain a strong performance in 2011, according to the newly-created energy consulting and testing company.

DNV and Kema were given the regulatory all-clear to start operating in late February and last month posted results that showed a five per cent increase in sales for 2011.

The strongest contributors to growth were energy efficiency-related consultancy activities in the US, and worldwide activities in testing, inspection, and certification of innovative industrial energy equipment. The results reflect global energy trends such as increased innovation, investment in energy infrastructure and growth in the energy efficiency market, says DNV Kema.

Oslo-based DVN announced plans to buy 74.3 per cent of Kema shares earlier this year to expand its capabilities in the energy sector.

DVN Kema will be able to offer consulting, testing and certification services in all areas of the energy value chain.

Thijs Aarten, Chief Executive Officer of DNV KEMA Energy & Sustainability said that the business had a "favourable outlook" in spite of pressure in European markets because of solid investment trends in the global energy sector.

ABB boosts offshore wind business

- Engineering JV established
- ABB targets growth in offshore wind sector

ABB says that a new engineering joint venture will help it to build up its competence in its offshore wind power integration business.

The company has signed an agreement with Inocean AS Norway to establish an engineering services joint venture specialising in offshore wind integration projects.

ABB Inocean AB will be majority owned by ABB and will be located in Gothenburg, Sweden. It will undertake design, engineering and project management activities for ABB's offshore wind connection activities.

ABB has already undertaken four major offshore wind connection projects – BorWin 1, DolWin1, Dolwin 2 and Thornton Bank – and says that its partnership with naval architecture firm Inocean will help to consolidate its leading position in the market.

"Offshore wind power is a growing business for us and this joint venture will further strengthen ABB's competence and expertise in this area," said Martin Gross, head of ABB's Grid Systems business. ABB is expecting the offshore wind energy market to install up to 100 GW of new capacity up to 2025, with Europe accounting for 70 per cent of the total.

Connecting offshore wind farms to the mainland grid entails the construction of offshore platforms that collect the energy generated by the wind turbines and transmit it to the shore via subsea cables.

"The establishment of ABB Inocean AB marks an important milestone for us and provides a unique opportunity for expanding our presence in offshore renewable energy," said Jon Erik Borgen, CEO, Inocean AS.

Portugal sells REN stake

The Portuguese government has sold 40 per cent of the country's power grid operator to two international 'strategic partners' as part of a privatisation programme stipulated in its financial rescue package.

State Grid Corporation of China is to acquire 25 per cent of Redes Energéticas Nacionais (REN), while Oman Oil will buy a 15 per cent stake. The total value of the 40 per cent stake sold is €592 million.

State Grid's acquisition illustrates the appetite for European assets of Chinese firms looking to expand overseas. In December China's Three Gorges Corporation acquired a 21 per cent stake in power company Energias de Portugal (EDP).

The sales by the Portuguese government form part of the term of a €78 billion financial rescue package agreed by the European Union and the International Monetary Fund.

State Grid offered €2.90 per share for 25 per cent of REN as well as a package of investment and credit. Oman Oil offered €2.56 per share for 15 per cent of REN, and has also made other financial commitments to help the Portuguese group refinance debt.

The Portuguese government now holds 11 per cent of REN, which it will sell in a public offering.

State grid will also help REN to expand overseas.

E.On and RWE revise renewable investment strategies

E.On and RWE, Germany's two largest energy utilities are to put a much greater focus on renewable investments.

E.On will sell stakes in its existing wind farms to help it finance future developments.

The German energy firm said in its annual results that it is planning to invest €7 billion in renewable energy over the next five years, €2 billion of which would be in offshore wind.

However it is under pressure to reduce the capital cost of wind farm developments in line with its strategy to improve operational efficiency and reduce debt. "We need to create more value with less capital," said Dr. Johannes Teyssen, E.On CEO. "This means, for example, that we'll no longer necessarily be both operator and sole owner of wind farms. Instead, we'll create value through wind farm design, planning, construction, and operation."

E.On reported results that were in line with expectations in spite of difficult trading conditions created by weak energy demand, competitive pressure in the wholesale gas business and early shutdown of its nuclear power plants. It says it is planning to continue with its strategy to focus its business in Europe, seek growth opportunities outside Europe and optimise its organisational setup.

"Going forward, we intend to commission a new offshore wind farm every 18 months and at the same time further significantly reduce the costs of building and operating these assets," said E.On. "Together with careful site selection and planning, these cost reductions will ensure that our investments yield consistently attractive returns."

Outside Europe E.On has already identified the US onshore wind market. "In North America, we're building what is already our seventeenth wind farm, and our 2.2 GW of installed capacity ranks us among the top five wind power players in the United States," said Teyssen.

An increase in installed wind and solar capacity helped earnings (before interest, taxes, depreciation and amortisation) at E.On's renewables unit increase by 21 per cent to around €1.5 billion.

E.On says that renewables earnings will be lower in 2012, as declining prices for hydropower will not be offset by increases in wind and solar capacity.

Meanwhile, RWE is to invest €4 billion ($5.3 billion) in renewable energy over the next two years, adding to the €4.4 billion it has spent since 2007, the utility said at its annual results.

However, it warned that grid constraints are threatening its renewable energy investments in Germany.

Deputy chairman Peter Terium – who will replace present CEO Juergen Grossmann in July – warned that "inadequate expansion of the grid is impeding the growth of renewables in Germany," citing a likely one-year delay in connecting its offshore Nordsee Ost wind farm to the grid. "This threatens to undermine the economic viability of the project," he said.

"For this reason, we are not only investing in electricity generation from renewables, but also making an essential contribution to integrating them into the network," he added, saying that RWE is to make some €2.6 billion of grid investments by 2014.

By 2020, RWE expects to generate 20 per cent of its power from renewables.

Germany's two largest energy utilities are putting more focus on renewable investments

Americas

Fluor selects 7FAs

GE is to supply two Frame 7FA gas turbines to a key power plant project in Texas, USA.

The engineering firm has received an order from Fluor Corporation for the Ferguson Replacement Project near Marble Falls. The 7FAs will be installed in a two-on-one combined cycle plant that will replace an existing gas-fired plant.

The new plant will enter commercial operation in mid-2014, and will be the first combined cycle plant in the ERCOT region to meet the latest Environmental Protection Agency (EPA) greenhouse gas regulations.

Mexico plans 396 MW wind plant

Marena Renovable has placed an order with Vestas for the turnkey construction of a 396 MW wind power project in Mexico.

The new wind farm will consist of 132 of Vestas' V90-3.0 wind turbines installed in the Isthmus of Tehuantepec in the state of Oaxaca, southern Mexico. Vestas will also provide civil and electrical works as well as supply, installation and commissioning services.

The order includes a 10-year service and maintenance agreement.

GE upgrades Smith Energy Complex

An advanced technology upgrade of two GE gas turbines at a Progress Energy power plant in the USA will help the site continue meeting growing energy demands through increased output, greater efficiency and lower emissions.

GE has won an order to upgrade two GE 7FA gas turbines at the Smith Energy Complex to increase the site's output by 16 MW and fuel efficiency by more than one per cent.

The upgrade will involve compressor and combustion system enhancements as well as GE's new advanced gas path technology and will extend the plant's life. It will also increase the time between scheduled outages, says GE.

The site's upgrade package also includes dry low NOx (DLN) combustion technology and the installation of an enhanced transient stability application to protect the plant against grid instability.

HVDC Light solution for Michigan

American Transmission Co. (ATC) has placed an order with ABB for a high voltage direct current (HVDC) Light system that will help to control the flow of power and enhance grid stability in the US state of Michigan.

The HVDC Light system will control the power flow between the Upper and Lower Peninsulas of Michigan and provide dynamic voltage support, thereby increasing regional grid reliability and also enabling integration of additional wind generation. The link is scheduled to go into operation in mid-2014.

Mexico plans WTE plant

The government of Mexico City has placed a call for bids to construct a waste-to-energy plant at the El Bordo Poniente dump.

The refuse dump is thought to be one of the largest in the world and was closed at the end of 2011. The city's government wants to find a developer to extract gas from the site for the generation of electricity.

Asia-Pacific

Vestas wins China order

Longyuan has placed an order with Vestas for 25 wind turbine units for a 50 MW project in China's Fujian province.

The order is for Vestas' V90-2.0 MW wind turbine unit, which is well suited to the low wind speed characteristics of the site. It is the first time that these units will have been installed in this province, says Vestas.

The order includes supply of wind turbines, installation and commissioning, a Vestas Online SCADA system and a service and maintenance agreement.

Delivery is scheduled to take place in the third quarter of 2012.

Siemens supplies Diamantina equipment

Siemens Energy has received an order from Australia for the supply of two steam turbines and four gas turbines for the Diamantina combined cycle power station.

The 242 MW power plant will be commissioned in early 2014 and will provide energy to local mines and towns in the Mount Isa area in Queensland state. It will be built adjacent to the existing Mica Creek power plant.

J series selected for Korea CCGTs

Mitsubishi Heavy Industries (MHI) is to supply ten of its J-Series gas turbines to four new combined cycle power plants being built in South Korea.

The Japanese firm has received orders for two M501J gas turbines each at the 2nd-Pyeongtaek, Yulchon 2 and Ulsan 4 power plants, and four for the Dongducheon power plant. The new plants will have a combined installed capacity of about 4750 MW.

The J-Series gas turbine has achieved the world's highest level of thermal efficiency and the highest output, says MHI.

Yulchon 2 is a near 950 MW power plant being built in Jeollanam-do by MPC Yulchon Generation Co., Ltd. The order is for two gas turbines, a steam turbine, two heat recovery steam generators and three generators.

The 950 MW 2nd-Pyeongtaek, plant is being built in Gyeonggi-do by Korea Western Power Co., Ltd. MHI has received an order, jointly with Marubeni Corporation, for two gas turbines, a steam turbine and generators.

For the near 1900 MW Dongducheon power plant, MHI received an order, jointly with Marubeni, consisting of four gas turbines, two steam turbines and generators.

For the near 950 MW Ulsan 4 power plant operated by Korea East-West Power Company, a subsidiary of Kepco, MHI received an order jointly with Daelim Industrial Co, Ltd. for two gas turbines, a steam turbine and generators.

Ovation installed at Huaneng Qinbei

Emerson Process Management has installed its Ovation expert control system at two new 1000 MW, ultra-supercritical, coal-fired power generating units at the Huaneng Qinbei power plant in China's Henan Province.

The control system will tightly control the boilers, turbines and balance-of-plant processes at Units 5 and 6 of the power plant, which is being expanded by Huaneng power Group. The new units will start operating in the first half of 2012.

Areva signs bioenergy contract

U-Thong Bio Power has selected Areva and its local partner Ensys to build a biomass power plant in northwest Thailand.

The new power plant will have an output of 9.9 MWe and will be fuelled by rice husk and bagasse. It is scheduled for completion at the end of 2013, says Areva, which is looking to strengthen its position in the fast-growing southeast Asian bioenergy market.

The total value of the order is estimated to be $17 million. U-Thong Bio Power, a Thai independent power producer, already operates a 10 MW biomass power plant.

Siemens wins solar order

Siemens has won its first order for solar receivers from India.

The German company has been awarded a contract by Shiram EPC Limited to supply Universal Vacuum Air Collector (UVAC) solar receivers for a parabolic trough power plant to be built in Rajasthan, India.

Siemens will supply over 17 000 solar receivers, which will generate all of the heat for the 50 MW Abhijeet facility. Startup for the solar plant is scheduled for spring 2013.

Europe

Alstom Grid upgrades Stedin DMS

Dutch utility Stedin has selected Alstom Grid to upgrade its distribution management system (DMS) as part of a programme to deploy smart grid technologies and integrate renewable energy resources into the energy system.

Alstom Grid will deploy its e-terradistribution solution to improve the efficiency and reliability of the grid as well as improve fault analysis and switching management.

ABB wins subsea cable order

E.On UK has placed an order worth $15 million with ABB to supply the power cables for the Humber Gateway offshore wind farm.

ABB will design and supply 2 x 14 km circuits of 132 kV three-core AC submarine cable with integrated fibre optics to connect Humber Gateway, one of the UK's largest offshore wind farms, to the mainland grid. Delivery of the cable is scheduled for 2013.

When completed in 2015, Humber Gateway array will consist of 73 wind turbines that will generate up to 219 MW of electricity.

GE expands German wind business

GE Energy has increased its foothold in the German wind energy sector with a contract from Energiekontor AG for the supply of equipment for four new wind farms.

GE will supply 41 of its 2.75-103 wind turbines for installation in the North Rhine-Westphalia and Cuxhaven areas.

The turbines will be commissioned in 2013.

Vestas wins 56 MW Italian order

Tozzi TRE SpA has placed an order with Vestas for the supply and installation of 28 wind turbines for a 56 MW wind farm in the Apulia region of Italy.

The contract is for Vestas' V90-2.0 MW machines and includes a Scada system and a 12-year service and maintenance contract. Delivery of the first turbines is expected to start in the second quarter of 2012.

Siemens equips UK WTE plant

Siemens Energy has received an order for a steam turbine generator to be used in a waste-to-energy plant equipped with combined heat and power generation in Plymouth, UK.

The 25 MWe power plant will be operational in 2014 when it will provide heat for Plymouth's naval base. It will be fuelled with household, commercial and industrial waste.

Siemens is responsible for the delivery, installation, and commissioning of a SST-400 steam turbine, including gearboxes and oil system as well as the electrical generator and auxiliary systems.

International

Follow-up order for Nordex

The Polish subsidiary of E.On Climate & Renewables has placed an order with Nordex for the delivery and installation of wind turbines for the Wysoka I and II projects.

The order is the third for Nordex from E.On and is for 22 of Nordex's N90/2500 turbines. They will be installed at a site 100 km to the south of Szczecin.

Installation will be performed in two phases, with three wind turbines erected in 2012 and 19 in 2013.

Japanese firms win Iraq contract

Iraq's Ministry of Electricity has awarded a contract to Hitachi and Toyota Tsusho Corp to supply a boiler and other components to a power plant renovation project.

The two Japanese companies will deliver the equipment to the Al-Mussaib thermal power plant near Baghdad by the end of 2013. The project is part of Japan's efforts to assist Iraq in its post-war power plant reconstruction programme.

Turkey orders Siemens wind turbines

Turkish wind turbine developer Olgu Enerji Uretim has awarded Siemens a contract to supply 22 wind turbines for the Dinar wind farm near Afyon City, southwest Turkey.

Siemens will deliver its SWT-2.3-108 type wind turbine for the project and will also provide installation and commissioning services and a five-year service contract.

The Dinar project will be commissioned in early 2013.

Voith wins Russia orders

Hydropower equipment firm Voith is to help modernise two power plants in Russia after receiving orders from Irkutskenergo and RusHydro.

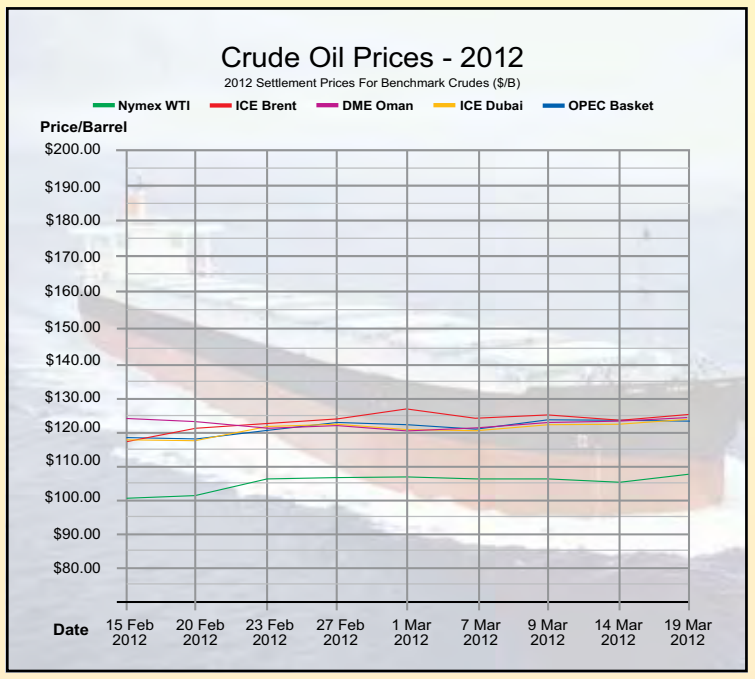
Voith is to manufacture six new Francis runners and related equipment for the Bratsk hydropower plant in eastern Siberia. It will also make two Kaplan runners and turbine governors for the Miatlinskaya hydropower plant, which is operated by RusHydro.

Bratsk hydropower station is the largest plant at the Angara River in Siberia. With an installed capacity of 4500 MW it supplies the city of Bratsk and its large aluminium foundry with electricity.

Miatlinskaya power station at the Sulak River in Dagestan has a capacity of 220 MW and is Dagestan's second largest power plant.

Oil

Crude market well supplied but high prices persist



- "Supply today, is more than demand"
- IEA concern over future shortages

David Gregory

A statement made by Saudi Arabian oil minister Ali Naimi that the crude oil market is well supplied and that Riyadh is ready to boost output if necessary has done little to bring prices under control. In late March the price of benchmark Brent remained above $125/b and West Texas Intermediate was selling for more than $105/b. During the summer of 2008, WTI reached an all-time high of $147/b.

The high cost of crude continues to threaten the global economic recovery and is for the most part driven by the confrontation between the West and Iran over Tehran's nuclear energy programme. Europe's plan to place an embargo on Iranian crude effective this summer and Tehran's threats to blockade the Strait of Hormuz have traders and investors worried that shortages will appear.

International Monetary Fund Managing Director Christine Lagarde said in New Delhi on March 20 that a sudden jump in the price of crude oil could threaten the economic recovery and warned that a hike of 20-30 per cent in oil prices could have "serious consequences," if crude disappears from the markets and suppliers take time to make up the short fall.

Speaking to a gathering of journalists that he had summoned to Doha, Qatar, Mr. Naimi said on March 20 that Saudi Arabia did not understand why prices are behaving as they are. "We recognise geopolitics… We recognise speculation," he said, but pointed out that "supply today, is more than demand, to the tune of 1 million b/d. If you look at Opec, Opec made a decision of 30 million b/d, and how much are they producing now? Over 31 million. So you know the supply side is there."

Mr. Naimi said there was no shortage of supply to the market, that Opec was meeting demand and that Saudi Arabia had additional production reserves of 2.5 million b/d. "I wonder why people question that spare capacity.

Saudi Arabia spent a lot of money on building that capacity, we finished building it in 2009 and it is there to be used."

He also made the point that each time crude oil had been taken off the market and there had been a fear of shortage, Saudi Arabia had stepped in and covered that loss of supply, the most recent being during the halt in Libyan crude oil exports last year.

Mr. Naimi's point was that should there be a shortage of supply as a result of developments with Iran, Saudi Arabia would again take up the slack.

Mr. Naimi said Saudi Arabia is currently producing crude at a rate of around 9.9 million b/d, but with inventories of more than 60 million barrels, it could supply the market with 12.5 million b/d if necessary.

But concern over future shortages appeared in the latest monthly oil market report issued by the Paris-based International Energy Agency (IEA) on March 14 which said that global oil supply declined by 200 000 b/d in February. It put global supply at 90.4 million b/d during February.

The agency reported little change in demand growth for 2012, which it forecast at 89.9 million b/d, most of which is attributed to Asia.

The report said that crude supply during February declined in all regions, mostly in South Sudan and Latin America, but North Sea production continued to slip and the uprising in Syria had impacted production there.

The IEA said Opec production rose by 315 000 b/d in February to 31.42 million b/d, its highest level since October 2008. It said inventories in the OECD countries at the end of January stood at 2.614 billion barrels and that forward demand cover stood at 57.8 days, one day above the five-year average.

The London-based Centre for Global Energy Studies (CGES), meanwhile, said in the March issue of its *Monthly Oil Report* that the global supply chain has "only a thin cushion of inventories to protect consumers from a price spike in the event of a supply shock or a sudden surge in demand."

It said commercial oil inventories in the OECD Europe and OECD Pacific were well below five-year average levels, adding that only North America was seeing inventories above the five-year average.

CGES said there is little surprise that prices have soared in the wake of price disruptions that reduced aggregate non-Opec oil production by almost 500 000 b/d between January and February. It cited loss of supply from South Sudan, Syria, Yemen and the North Sea, and questioned Opec's ability to make up the shortfall that is expected when sanctions against Iranian crude eventually kick in.

Gas

East African gas could serve Asian markets

Momentum continues to build as new gas discoveries offshore Tanzania and Mozambique have excited exploration companies and East Asian markets that see East Africa as a new future source of LNG.

Mark Goetz

Norway's Statoil announced in mid-February that it discovered as much as 5 trillion cubic feet (tcf) of natural gas at its Zafarani exploration site in Block 2 offshore Tanzania, the latest in a string of discoveries in the area. A statement released by Statoil said the discovery is an important event for the future development of the Tanzanian gas industry and that it "could potentially be a catalyst for large scale natural gas developments in Tanzania."

Statoil was awarded the 5500 km^2 Block 2 in 2007 and holds a 65 per cent working interest. It operates the license on behalf of the Tanzanian Petroleum Development Corporation (TPDC), which has the right to a 10 per cent interest if work moves to a development phase. ExxonMobil holds 35 per cent of Block 2. The Zafarani exploration well is the first drilled in the block and has a total target depth of 5100 m in 2582 m of water. Once the Zafarani well is complete, Statoil will move to the Lavani prospect, also in Block 2.

In mid-March Houston-based Anadarko announced the results of its first flow test offshore Mozambique saying that the Barquentine-2 well flowed at 90-100 million cubic feet per day (mcf/d). In January Anadarko said that its Lagosta-2 appraisal well had encountered gas. The company estimates that the Offshore Area 1 reservoir holds 15-30 tcf of natural gas. The statement released by the company last month said the reservoir meets the specifications for the partnership's LNG development plans and it would make a final investment decision by the end of 2013.

Anadarko is operator and holds a 36.5 per cent working interest in the Offshore Area 1, located in a 2.6 million acre area in the Rovuma Basin. Its partners include Mitsui, Cove Energy, Videocon and Mozambique's ENH.

Italy's Eni is also estimating that its Mamba reservoir holds up to 30 tcf of gas. In February it too reported an offshore discovery at its Mamba North-1 well that could hold as much as 7.5 tcf. Eni plans to drill at least five wells in the structure during 2012. Eni operates Offshore Area 4.

On the whole, East Africa is largely unexplored. Little is known about it geologically and seismic work is just beginning to get serious. Only 500 wells have been drilled in the area compared to 15 000 in West Africa and 20 000 in North and Central Africa. There has yet to be an oil discovery but Tanzania has proven natural gas reserves of some 7 tcf and this is expected to eventually rise to 60 tcf. Tens of billion of dollars are expected to be invested in Mozambique, one of the world's poorest countries, should Anadarko and Eni proceed with ideas to establish LNG facilities in the country.

Concern is already being expressed over whether the countries would be able to cope with the scale of money that could pour into the region, bearing in mind the example of Nigeria.

Companies are keen to develop the resources that they believe exist offshore East Africa with the intention of marketing the gas as LNG in India, China and the Far East. But both governments and companies need to jump through a good many hoops before plans of the scale envisaged – four to five LNG trains – begin to take shape.

Resource size and scale of investment has prompted London-listed Cove Energy to put itself up for sale. Cove holds 8.5 per cent of the Anadarko-led Offshore Area 1 in Mozambique.

This has brought rival bids from Shell and Thailand's PTT Exploration of Production (PTTEP), with PTTEP offering $1.8 billion for the stake. However, this was before Anadarko's latest appraisal results. It has been reported that India's ONGC and Gail have joined forces and plan to offer a rival bid of some $2 billion.

Meanwhile, Kenya has mapped out eight new blocks that will be open for licensing. Statoil, Total, Petrobras, Tullow and Apache of the US are reported to have expressed interest in them. Kenya has now identified 46 blocks onshore and offshore, with 28 of them licensed. The country has yet to show any commercial deposits but exploration, most of which now consists of seismic work, is under way.

Realising Germany's renewable future

With the decision to reverse the nuclear life extensions and revert to a nuclear phase-out plan, the German government is now committed to ambitious renewable energy goals for 2020. Frost & Sullivan assesses whether these goals can be achieved and outlines some of the potential implications.

Jonathan Robinson

Frost & Sullivan conducted a short piece of research at the end of 2011 looking at the German power generation market. Installed capacity and generation forecasts took into account capacity under construction and mandated for closure, and made a judgement on future capacity additions/retirements across a range of fuels.

The research looked at the likely development in capacity factors and also considered how much renewable capacity the German grid could accommodate and the potential import/export options with neighbouring countries.

Unsurprisingly, capacities for hard coal, lignite and nuclear are all forecast to decline by 2020. Much of this is already determined by plant closures. Approximately 12.5 GW or 8 per cent of the installed base will close by the end of 2014. However the impact of this is neutralised by the 13 GW of capacity that is forecast to come online over the same period.

Frost & Sullivan forecasts that over the decade as a whole, some 12 GW of nuclear, 11 GW of coal, 3 GW of oil and 1.5 GW of gas will be decommissioned. For coal, this decline will partly be offset by the substantial volume of plants under construction, but capacity will decline in both real and percentage terms. In the case of gas, the capacity forecast to come online over the next three years will more than offset the closures and further new plants mean that the installed base of gas will increase by 4 GW by 2020. Although the installed base of thermal will fall in percentage terms from approximately 52 per cent to 40 per cent, thermal will continue to be the most important source of electricity, declining by only 4 per cent between 2010 and 2020 to 53 per cent.

The reason for the minimal decline in thermal's share of power generation is the growth in renewable energy. Germany's installed capacity in 2011 for both wind (29 GW) and solar (22 GW) were amongst the highest in Europe. Generous feed-in tariffs introduced by the Schroder government in 2000 encouraged Germans to install panels on their roofs in large numbers, led to the development of massive wind farms, and resulted in substantial investment in bioenergy, particularly biogas.

Although the tariff regime has tightened several times in recent years, there is still strong potential growth in all three areas. Germany's Energy Concept calls for 35 per cent of its electricity to be generated from renewable energy sources by 2020 – something Frost & Sullivan believes can be achieved.

Offshore wind is viewed as a major driving force in delivering carbon-free electricity. The German government has set a 2020 target of 10 GW for offshore wind, increasing to 25 GW by 2030. To achieve these targets, it is vital that both permitting and grid connections are speeded up.

To address these concerns, the environment and economy ministries set up a working group that included a number of industry players including grid operators to discuss permitting and grid connection issues. The group was scheduled to make its recommendations by end of March 2012.

Solar power enjoyed an exceptional 2011, with the installed capacity increasing to 22 GW. This was partly driven by an announcement that subsidies would be reduced in January 2012. The reduction in subsidies is a cause for concern, but this could be offset by solar module prices, which fell sharply in 2011 and are forecast to continue declining in 2012.

Obviously if solar system costs fall, lower subsidies are required. However, further cuts cannot be ruled out. Solar subsidies are currently funded through the EEG levy and this is under pressure at a time when government budgets are squeezed. The nature of the balance between cost and subsidy reductions in the next few years could be crucial for the industry.

Frost & Sullivan forecasts that by 2020, wind and solar combined will account for 44 per cent of the installed base (it currently represents 30 per cent) and just over 20 per cent of the electricity generated.

However the challenge presented is that the capacity factor (the amount of electricity produced by every MW installed) of wind and solar is much lower than thermal energy. This means that although the size of the German installed base will increase by 17 per cent between 2010 and 2020, the total electricity generated for the same period will fall by 6 per cent.

Frost & Sullivan believes that while this decline in electricity generation is not an ideal scenario, it is not a major cause for alarm due to several reasons.

- *Investment in grid integration:* One concern that has been raised is whether Germany will be able to integrate the volume of renewable electricity generated into the grid. The current stability of the German grid is one of the highest in Europe; outages are low and because of its geographical location, the country has a wide range of inter-country grid connections.

With the current focus on liberalising the European electricity market, these should continue to be expanded. However substantial investment will need to be made in the T&D infrastructure, particularly to transport the electricity generated from the North Sea down to demand centres in western and southern Germany. According to the Federal Environment Ministry, approximately €24 billion will need to be invested in the transmission and distribution grid in Germany over the next decade, including at least 3600 km of extra high voltage cables.

- *Growth in decentralised generation:* Germany is strongly committed to boosting decentralised generation. The growth of the residential solar market is evidence of that, and despite the reduction in feed-in tariffs, further growth is forecast for the coming years.

The cost of a residential PV system is declining and regulations giving consumers a choice between taking a fixed feed-in tariff or a market premium rate should attract further interest from investors. Major German utilities are all paying increasing attention to the opportunities offered by decentralised generation.

- *Improved energy efficiency:* Energy efficiency looks like being a hot topic for 2012, with the European Union determined to pass a Directive on the subject to make reductions mandatory (unsurprisingly, the voluntary efforts have largely failed). Germany recently transposed a law relating to an earlier Directive, mandating for national energy savings of 9 per cent by May 2017. Overall German electricity consumption is still below 2008 levels.
- *Smart meter deployment:* As a member of the EU, Germany is required to outline a timetable for a nationwide rollout in order to comply with the EU's Third Energy Package which mandates that 80 per cent of consumers must have a smart meter by 2020. According to the German Ministry for Economics and Technology, meters that detected wasteful electricity use could save approximately 9.5 TWh annually, which is approximately 1.5 per cent of current generation. However this does not take into account the potential savings that could come from time-of-use pricing, which is a key benefit of smart meters.

Essentially this means that utilities can charge consumers more at peak demand times; the hope and expectation is that this will make some users reduce their capacity. Reducing peak time consumption by a relatively modest amount would also enable a reduction in peak plant capacity. This would create significant savings for utility and customers, as electricity generated by peaking plants is more expensive than those of baseload plants.

- *Potential to import and export electricity:* Germany sits at the geographic heart of Europe; it has borders with nine other EU states. Of these, several are well placed to supply excess electricity in the future. Belgium and the Netherlands are currently net importers of electricity, but substantial capacity investment in both countries should see them become net exporters by 2016, and conveniently both countries are located close to major German population centres.

In the north, Germany borders Denmark and this gives access to the Nordpool Grid (the single power grid of the Nordic region). This will give Germany access to Finnish and Swedish nuclear, Norwegian hydro and Danish thermal power. To the southeast sits the Czech Republic, which after France, is generally Europe's second largest electricity exporter. The Czech Republic is committed to investing in more baseload gas and coal, with the state electricity utility CEZ taking the lead. Finally, France has an excess of baseload nuclear that could be imported into the Baden Wurttemberg region.

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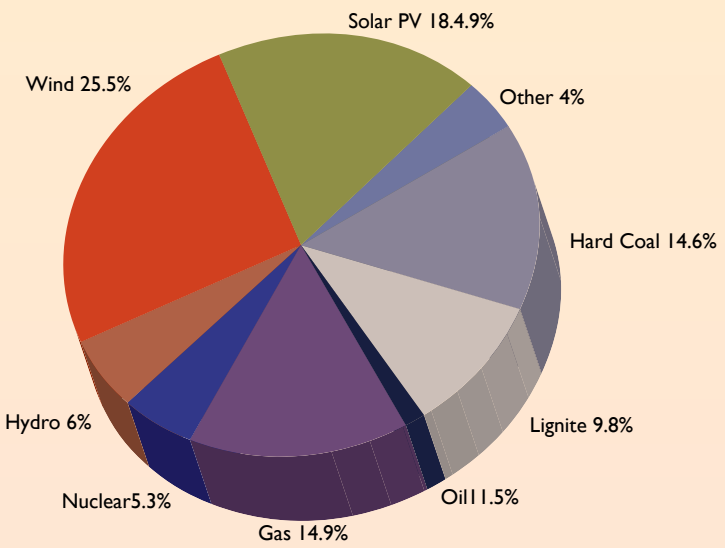
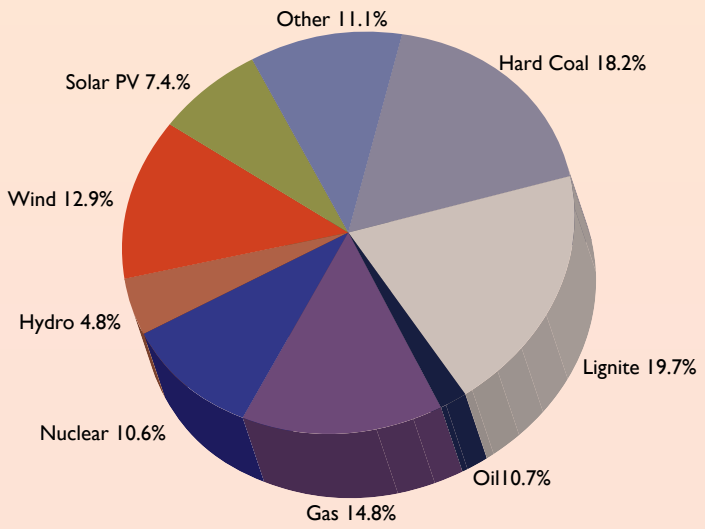
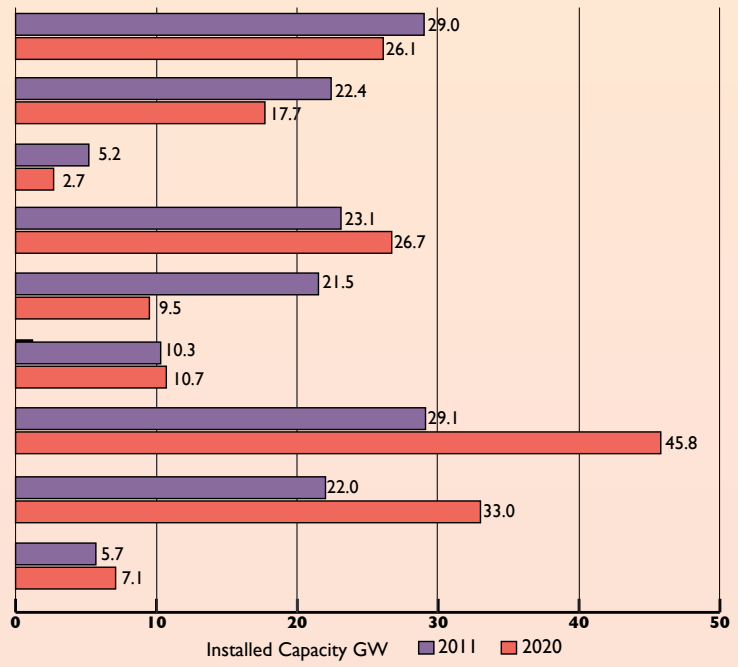
German Installed Base 2020 - 179GW



German Electricity Generation 2020 - 590TWh





A closing window of opportunity

Although carbon capture and storage is seen by many as an essential tool in the fight against climate change, time is fast running out on the industry.
Junior Isles

According to the International Energy Agency (IEA), the "2ºC door" is closing. Its current forecasts show CO_2 is growing beyond the level that would push the global temperature rise above the 2ºC limit – the level beyond which scientists say the effects of climate change will be irreversible.

In its *World Energy Outlook (WEO) 2011* the IEA says that investment in low-carbon technologies must be made by 2017 to prevent long term average global temperature rising by more than 2ºC above pre-industrial levels. More alarmingly, it says that 80 per cent of the total energy-related CO_2 emissions permitted to 2035 in its 450 Scenario (the scenario needed to meet the 2ºC limit) are already locked-in.

In the *WEO's* central 'New Policies Scenario', cumulative CO_2 emissions over the next 25 years amount to three-quarters of the total from the past 110 years, leading to a long-term average temperature rise of 3.5°C. It said if the new policies were not implemented, the world would be on track to an increase of 6°C.

With fossil fired generation, coal in particular, being a major contributor to CO_2 emissions, carbon capture and storage (CCS) is claimed to be a key tool in the fight against climate change. Without CCS, says the IEA, the cost reaching a global CO_2 reduction target by 2050 will be 70 per cent higher.

The proximity of the IEA's deadline for the need for action is cause for grave concern, as most of the speakers at the *6th Annual European Carbon Capture and Storage* conference in London, UK, agreed.

Graeme Sweeney, Executive Vice President, CO2, Shell said: "In the context of the engineering timescales for all of this, 2017 is tomorrow. We need to do the first wave of activity in a lot of these spaces now. We need to do what's doable and not spend most of our time lamenting that if things were different it would be better. We need to get the first wave of demonstration projects up and running now to enable a second wave to follow in 2020. Then it can be available for economical and general deployment thereafter."

But Sweeney warned that meeting both the energy and CO_2 challenges would be difficult. Industry will need to address the funding needs of the demonstration projects and also set "a medium- to long-term compass" to this build, operate, share process and foster investor confidence.

"If there are fewer CCS projects, the need to share becomes more intense. The key thing to focus on in the short term is getting the demonstrations into play. There won't be another opportunity to take significant public funding, so we cannot afford to delay. We need to start getting steel in the ground. We need to make CCS real and we need to make it real now."

> "The clock is ticking and the CCS window, like the door to 2ºC, is closing. It is time to be systematically urgent"

The UK has long had aspirations to be a world leader in CCS and the government remains keen to get its first commercial project off the ground. Certainly, it is well placed in terms of some of the necessary prerequisites. The North Sea has extensive storage capacity. A recent study showed that there is approximately 70 t billion of storage capacity in UK water alone.

Charles Hendry, the UK Minister of State for the Department of Energy and Climate Change commented: "We have heard about doors closing but I think that door remains open for a while. But when you go through it determines whether you are a leader or a follower. We are determined to be a nation of leaders."

The government believes CCS has the potential to be one of the most cost-effective technologies for decarbonisation of the power and industrial sectors and says it remains determined to see the technology deployed in the 2020s. It is therefore taking forward a programme of measures which "is one of the most comprehensive offered by any country in the world to support the development and deployment of CCS".

Several years ago, the government launched a competition to fund a CCS project. The failure of the competition, however, means the money is still available as the government prepares to open a revamped second competition.

The programme includes £1 billion of capital funding to support a portfolio of commercially focused projects. One of the most significant changes the government has made is to open up the programme to gas as well as coal. In addition there is £125 million as part of a four-year innovation programme (running until 2015) for research and innovation, with a focus on cost reduction. This will continue to provide support for projects such as the UK's first carbon capture pilot – a 5 MW post-combustion capture plant attached to the Ferrybridge power station – launched in November 2011.

Following the decision not to take forward the Longannet CCS project last year, the government is hoping to set out details of the new competition very shortly.

Hendry said the Longannet study contributed much to understanding the full chain of carbon capture and storage but acknowledged there were shortcomings in the old competition.

"With the best will in the world, we have to recognise that the last competition was perhaps too restricted. It was limited to only post-combustion technology, while some of the most promising technology is in other areas."

The focus of the new programme will be to reduce the cost of CCS to enable commercial deployment in the 2020s. The government is also considering opening up the new competition to "potential clusters of projects" and what Hendry called "part-chain" projects. He said these might be individual capture plants where there is a clear likelihood of them becoming full-chain in the near future.

The competition will also be open to industrial CO_2 emitters where they support cluster proposals. "The second competition is more comprehensive and more all-embracing already," he noted.

The government aims to take decisions on which programmes to support in the 6-9 months following the launch of the competition so that its efforts are synchronised with the European NER300 timetable.

The NER300 is a financing instrument managed jointly by the European Commission, European Investment Bank (EIB) and Member States, which sets aside 300 million allowances in the New Entrants' Reserve of the European Emissions Trading Scheme. The fund will be used for subsidising installations of innovative renewable energy technology and carbon capture and storage (CCS). The allowances will be sold on the carbon market and the money raised – which could be €3 billion if each allowance is sold for €10 – will be made available to projects as they operate. A total of 13 CCS projects have been submitted for NER300 funding.

Beatrice Coda, within Unit C1, DG Climate Change at the European Commission told delegates the NER300 process was on track.

"The second phase of member states submissions to the European Investment Bank of eligible projects was May 9, 2011. The EIB has completed the financial and technical due diligence assessments and provided a list of projects ranked by their cost-per-unit-performance to the European Commission on February 9, 2012. Our decisions are envisaged by the end of 2012."

In the next steps the EC will check the competitiveness of the projects and verify their eligibility. This process will last until April 2012. Letters have just been sent out to member states giving results of the competition. Member states will have until July to pre-confirm the value and structure of their portion of co-funding and complete details of funding for the chosen projects will be finalised in October this year.

With the current low price of carbon, however, Coda warned that there might be a need to delete projects as well as find a way to solve the problem of funding gaps for projects that are relying on a high level of support from NER300.

Funding will no doubt be a serious issue. Peter Radgen, Head of E.On's Innovation Centre for Carbon Capture and Storage commented that even if NER300 and national financing could provide 50 per cent of funding, it would still not be sufficient.

"While 50 per cent might be enough to trigger investment there would still be both a capital and operational expenditure gap. I don't see any projects going forward with 50 per cent funding.

"We will see projects die very soon after the NER results are published. The key might be to focus on those projects that can go, and bring one or two projects on stream," he claimed.

Lewis Gillies, Chief Executive and Co-founder of 2Co Energy, the owners of the Don Valley Project in the UK (formerly the Hatfield Project) stressed the importance of getting projects moving in Europe.

"Europe has to do something in the next 18 months or watch the US take the technology space," he said.

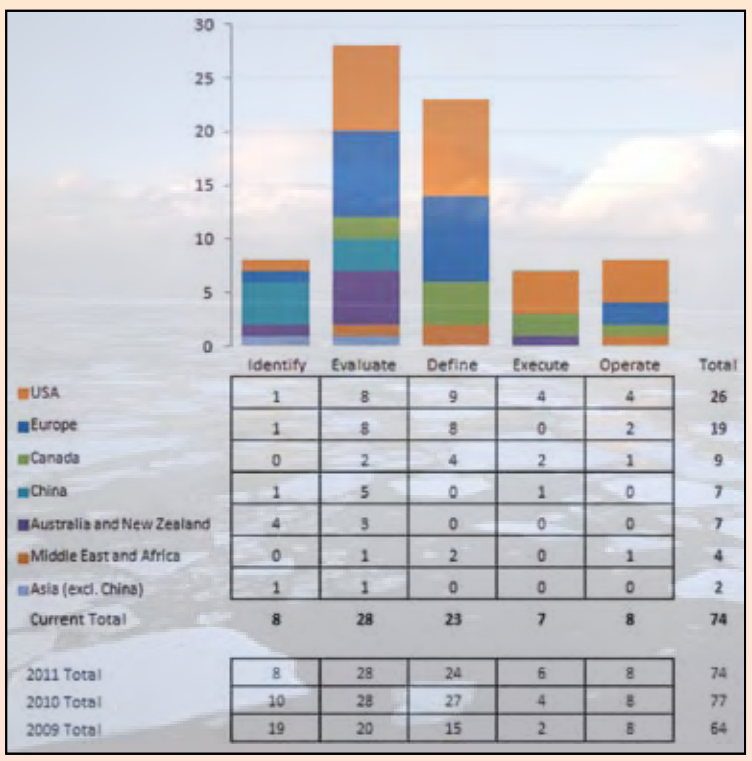
Indeed the US already seems set to occupy that technology space. Outlining how much has happened in the last two years, Joseph Giove III, Director of the Division of CCS Demonstrations in the Office of Fossil Fuel at the US Department of Energy said he believed "the US is a stronger place than any" when looking to the future of CCS.

He added: "We have three large-scale CCS projects under construction plus a number of that are very near to financial close, two large-scale geological test projects that are injecting CO_2 underground, with another two that will be injecting within the next month."

While there is progress being made in the US, Europe and China, commercialisation of CCS has to be greatly accelerated if international climate change ambitions are to be met.

Gillies believes this is make or break year for CCS. "Unless it gets the investment it needs in the next 12-18 months you can forget CCS for the next 10 years," he stressed. As Sweeney put it: "The clock is ticking and I think the CCS window, like the door to 2ºC, is closing. It is time to be systematically urgent."

Status of CCS according to the Global CCS Institute



	Identify	Evaluate	Define	Execute	Operate	Total
USA	1	8	9	4	4	26
Europe	1	8	8	0	2	19
Canada	0	2	4	2	1	9
China	1	5	0	1	0	7
Australia and New Zealand	4	3	0	0	0	7
Middle East and Africa	0	1	2	0	1	4
Asia (excl. China)	1	1	0	0	0	2
Current Total	**8**	**28**	**23**	**7**	**8**	**74**
2011 Total	8	28	24	6	8	74
2010 Total	10	28	27	4	8	77
2009 Total	19	20	15	2	8	64

Don Valley: a CCS project reborn

When Powerfuel Ltd went into administration at the end of 2010, many thought what was to be the world's first commercial scale IGCC project with carbon capture had become another failed vision. Now little more than a year later, under the ownership of 2Co Energy Ltd, the Don Valley Power Project is one of the most advanced CCS projects in Europe.

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It may be a small step, but the construction of a short piece of road on a site in Stainforth, South Yorkshire, UK, marks what could be the rebirth of a pioneering carbon capture and storage project.

In May 2011, 2Co Energy acquired the Don Valley Power Project (formerly owned by Powerfuel Power and known as the Hatfield Project) via its wholly owned subsidiary 2Co Power (Yorkshire) Ltd. It marked the start of what 2Co Energy saw as an opportunity to inject new life into the project.

The 2Co team are no strangers to CCS. The company was set up in June 2010 by bringing together former employees from Denbury Resources, a US company with experience in using CO_2 for enhanced oil recovery (EOR) and BP, which has looked at developing several CCS projects in the past. Seeing the potential, 2Co bought Powerfuel Power and the power project from the Administrators.

Jane Paxman, Director of Policy and Communications at 2Co said: "We took a look around at the CCS projects that were being worked on in the UK and countries around the North Sea and decided, that although we were interested in developing our own project, the one we thought that had the greatest potential was what was then known as the Hatfield project."

The project had several attractive aspects. One advantage said Paxman, was its scale – the project is large enough to generate the volumes of CO_2 needed for an effective EOR project. The project is capable of producing up to five million t/year of CO_2.

It is also in the heartland of what is known as the Yorkshire-Humber cluster, an area that emits about 60 m t/year of CO_2 i.e. about 10 per cent of the UK's carbon emissions. "This is seen as the region in the UK where you can really leverage off a number, or cluster, of power and energy intensive industries that emit large volumes of CO_2. With a CO_2 pipeline infrastructure in place, you can have a number of other projects tap into that infrastructure and get massive economies of scale. Don Valley enables such a large piece of infrastructure."

Equally importantly, the project already had a €180 million EEPR (European Energy Programme for Recovery) capital grant. Paxman noted that this type of funding is "very helpful for anyone trying to develop these large projects".

She sees this type of upfront funding as one of the four key elements essential to the business model for roll-out of CCS projects. Looking at other projects around the world, there are only two projects that have made it past the investment decision – Boundary Dam in Canada and Kemper County in the US. Notably, these two projects share four attributes that 2Co believes make up the recipe for success and is working to put in place with Don Valley.

Firstly they have some form of upfront capital grant for the development phase and initial capital investment. Secondly, they have government-backed debt i.e. low interest debt such as federally backed loans – loans from export credit agencies or from banks like the European Investment Bank. The third thing that is needed, according to 2Co, is a premium price for low carbon electricity, such as will be provided in the UK through the CfD (Contract for Difference). The fourth criterion is the ability to use the CO_2 to create a commodity with a value e.g. oil from EOR; instead of simply storing the CO_2 underground.

"This is the route the UK is going down," commented Paxman. "We are fortunate to have the EEPR grant; we will be looking for the government backed debt; the Contract for Difference (CFD) will create the premium power price and we are working with Talisman – the North Sea's largest oil and gas operator – as the candidate for North Sea EOR."

Paxman believes EOR is very important to the success of the project. If the project helps produce 150 million barrels of oil that would otherwise have been hard to reach, this could generate around £5 billion for the Treasury. Paxman noted: "EOR changes the dynamics of the conversation you have with the government. In return for receiving a premium price for power, you are able offer the Treasury a large cheque for the taxation on the oil produced. So net-net, the overall costs of the project to the UK [government] are close to neutral."

Another attraction of Don Valley was that Section 36 Planning Consent was already in place. Having been awarded in 2009, this meant 2Co had to "commence development" by February 2012. To fulfil this obligation, a short piece of road was constructed at the site.

Just before going into Administration, Powerfuel had also applied for a further round of EU funding under the NER300 (New Entrants Reserve 300) programme, which will provide financial support for renewable and CCS projects from the sale of EU emissions allowances. The European Commission will make the final decision on NER300 funding by the end of this year.

"With regards to the funding, there are three things that have to fall into place: EU funding through the EEPR and NER300, capital and CfD support through the new UK CCS competition, which is to be launched imminently. The UK is working to make the decision on which CCS projects to support by the end of the year, in line with the NER300 decision. This will allow us to make our final investment decision in the middle of 2013, with project completion in 2016," said Paxman.

It is easy to see why funding is so important. Don Valley has an estimated capital cost of £4.5- 5 billion. Around £1 billion will be for modification of offshore facilities. The onshore power plant and carbon capture portion will cost about £3 billion and the balance for the CO_2 pipeline. In simple terms, the financial structure 2Co is aiming for onshore is about £ 1 billion from EU and UK grants; £1 billion from government backed debt (EIB or export credit agency); and about £ 1 billion from a combination of commercial debt and equity. National Grid will fund the pipeline.

Clearly, whether the project goes ahead or not depends on all of these commercial aspects being satisfied. In the meantime, 2Co has all the resources it needs to make preparations so that all parts of the project are ready to go at the time of the final investment decision.

Much of the plant design remains the same as before. It will be an integrated coal gasification combined cycle (IGCC) power plant with pre-combustion capture to remove at least 90 per cent of the CO_2. The power plant will have a gross power output of 900 MW or net output of 650 MW, after taking into account the CCS energy penalty, mostly attributed to the air separation unit.

One difference from the original plan is that both the power and capture plants will be built, so carbon is captured from the outset. Originally, two phases were envisaged – a combined cycle plant which would operate without capture in phase 1, followed by the addition of the capture unit in phase 2, if the economics became favourable.

Most of the technology partners also remain the same. However, at the end of January this year, Foster Wheeler Energy Limited (FWEL) took over from Jacobs Consultancy as the project management contractor. Its initial role is to assist 2Co Power (Yorkshire) Ltd in preparing an engineering, procurement and construction (EPC) contract for the project build over a six-month period. It will also help 2Co manage the EPC contractor, Samsung Construction & Trading, which at the end of March agreed to take a 15 per cent stake in the power plant portion of the project.

The plant will be a two-train plant with some common process sections. It will have two gasifier units, acid gas removal unit and sulphur recovery unit. The gasifier licence will be supplied by Shell. The gasifier units will deliver the syngas, strip out the sulphur and extract the CO_2.

The hydrogen-rich syngas will then be fired through two GE 'F' class gas turbines. Nitrogen injection will be used to control the NOx from the gas turbine. Waste heat from the gas turbines will be recovered through two heat recovery steam generators (HRSGs) that will supply steam to a common steam turbine.

National Grid is handling the routing and permitting of the CO_2 pipeline running from the site to the North Sea. 2Co will also have an interest in the offshore part of the project, which will help it integrate the entire chain.

As Paxman noted: "The real challenge is to get everything lined up to start at the same time to ensure it is a bankable project. Similarly, the onshore and offshore portions have to complete construction at the same time i.e. the offshore portion has to be ready to receive the CO_2 when the power station fires up.

"The individual pieces of technology are proven at scale around the world in different industries but the complexity of these projects – the interfaces and integration of the technologies – are the challenge for CCS."

The estimated cost of electricity from Don Valley will be in the region of £135-140/MWh, before taking into account the offsetting effect of tax payments to the Treasury.

The Longannet project, the sole survivor of the first CCS competition, which the government still eventually decided not to support was estimated at supplying electricity at £190/MWh.

The economics of Don Valley instil greater confidence in the project's chances of success. "Our figures are substantially more appealing. When you take into account the economic benefits of the EOR, the cost of [power from] Don Valley is pretty close to the cost of unabated fossil fuel power (after you factor in the carbon price) and onshore wind. For a first-of-a-kind project supplying additional power to the grid, this is a fairly good place to start from."

Nevertheless, Paxman is not counting her chickens. Nearly four years ago, Richard Budge, Powerfuel's somewhat gung-ho CEO was brimming with confidence that he would make this pioneering UK project happen. Paxman is more reserved, knowing that much depends on EU and government support in terms of funding and policy. "We have every confidence in the project and hope that the government will see it similarly."

Don Valley is in the heartland of the Yorkshire-Humber cluster, an area that emits about 60 m t/year of CO_2. The captured CO_2 will be piped to the North Sea for enhanced oil recovery

Junior Isles

Playing it safe

In the April issue of *The Energy Industry Times* one year ago, I said that the nuclear industry was standing on shaky ground following the disaster at Fukushima on March 11. That statement still holds true to some degree. Yet the industry has not fallen like a house of cards and Fukushima has not turned out to be the death knell that many thought it might be.

The tragedies caused by the earthquake and subsequent tsunami that triggered the nuclear crisis remain fresh in the world's thoughts, as families affected by the events struggle to regain some semblance of normality to their lives.

To mark the anniversary of the nuclear disaster, Greenpeace launched a week-long anti-nuclear campaign in 19 countries around the world.

In terms of altering government policies on nuclear, the campaign probably had little impact. Each country will continue to follow its set path but the Greenpeace campaign did serve as a reminder that the issue of nuclear safety must remain a top priority and not lose momentum as the memory of Fukushima fades.

Apart from the most notable decisions by Germany, Switzerland and Italy to abandon nuclear power and the inevitable scaling back in Japan, most countries still appear to be pressing ahead with nuclear new build programmes.

According to the World Nuclear Association, over 150 power reactors with a total net capacity of some 177 000 MWe are planned and over 330 more are proposed. Most of these are in Asia.

China, which has the largest nuclear expansion programme, says its position remains unaltered. At the beginning of March Wang Yuqing, former director of the National Nuclear Safety Administration, said that about 10 approved new nuclear plants, whose construction was put on hold last year after the Fukushima accident, will soon be given permission to re-start construction.

India, also one of the world's most lucrative markets for future nuclear build, remains committed even in the face of public opposition. Notably, the Koodankulam Nuclear Power Plant recently received the green light to continue after mass protests stopped the plant's construction in September last year.

> The issue of nuclear safety must remain a top priority and not lose momentum as the memory of Fukushima fades

Of the other large nuclear programmes in Asia, South Korea still plans to bring seven more reactors online by 2016 and is planning its next generation of reactors. The country also aims to sell the technology overseas.

Even other countries in Asia with no current nuclear capacity such as Vietnam, Indonesia and Thailand, still appear undeterred by Fukushima.

Elsewhere in the world, there are ongoing negotiations and plans for projects in other countries that are new to nuclear. Turkey, which signed contracts for four 1200 MWe Russian nuclear reactors at one site, continues to discuss whose expertise it is likely to enlist to build another project in the Sinop region on the Black Sea coast.

In the Middle East, the United Arab Emirates has selected South Korean technology for four reactors by 2020. And in February, Jordanian energy officials agreed on a final site for the Kingdom's first nuclear reactor. The country's Atomic Energy Commission said it would start talks with bidders to provide the technology for the reactor in early 2013.

But not all countries in the Middle East are continuing down the nuclear path. In late February, Kuwait said it was no longer pursuing plans to build four reactors by 2022. Nuclear was to be part of its strategy to preserve its oil resources. It had set up a national nuclear energy committee in 2009 and had signed civil nuclear power cooperation agreements with several countries, including Japan.

For its own part, Japan still seems unsure on how important nuclear will be in its future energy mix. Clearly nuclear will play a much smaller role. In late March the Economy, Trade and Industry Ministry's research committee for natural resources and energy presented several scenarios for nuclear power's contribution in 2030, with 30 per cent being the maximum.

Indeed Japan still appears uncertain on many nuclear-related issues post-Fukushima. Immediately after the accident the government promised to crack down on how it regulates the nuclear sector. One year later, it has yet to appoint committee members to scrutinise the tradition of officials being given jobs in the very industries they regulate.

It is arguable that Japan needs a greater sense of urgency in making its nuclear industry safer. Greenpeace published a report during its global campaign, which claims that it was not a natural disaster that led to the nuclear disaster at the Fukushima Daiichi plant, but the failures of the Japanese government, regulators and the nuclear industry. The report concluded that it was a man-made disaster that could be repeated at any nuclear plant in the world.

Greenpeace does not seem to be alone on this issue. In a separate report in early March, experts at the Carnegie Endowment for International Peace in the US said: "With appropriate foresight by Japan's authority and industry, it appears that the accident could have been avoided or prevented."

Even if Japan is accused of moving too slowly at home it does, however, seem to be working hard with its international colleagues to address global nuclear safety. A joint committee of Japanese and French senior officials recently held its first meeting in an attempt to develop a set of safety measures for the use of nuclear energy by the end of this year.

French industry and energy minister Eric Besson told the meeting in Tokyo in February that he wants to create international guidelines for nuclear safety with Japan, adding there is a good future for atomic power plants as long as they meet the highest level of safety.

Over the past year, the Nuclear Energy Agency (NEA) and its member governments have been making numerous efforts to further reinforce the safety of nuclear energy worldwide. Multiple verification activities and "stress tests" have been undertaken in all NEA member countries using nuclear power, and follow-up measures are being implemented to ensure that existing nuclear energy facilities are prepared even for extreme, multiple risks.

Commenting on the OECD/NEA's work, Director-General Luis E. Echávarri said: "In going forward, particular care should be given to reviewing specific site locations and designs associated with those sites. I believe that it is the role of international organisations like the OECD Nuclear Energy Agency to help countries carry out in-depth analyses of the lessons learnt, and to apply those lessons to all existing and future reactors."

In general, countries continue to closely examine their new and existing nuclear plants. Last month, Chinese deputy envoy to the International Atomic Energy Agency (IAEA) Huang Wei said that after considering the role of nuclear in energy security, climate change and economic growth, the Chinese government adopted the policy of "developing nuclear energy high-efficiently under a safe precondition".

He said China now has 15 nuclear units in operation and 26 units in construction. He also said that preliminary results released after comprehensive examinations ended last August showed the safety of these units were guaranteed.

Also in March, Progress Energy's chief nuclear officer announced that every US nuclear plant will add an extra layer of emergency equipment this year to deal with unforeseen natural disasters – such as earthquakes, tornadoes and even meteor strikes.

With the approval of USA's first new nuclear reactors in more than 30 years at Plant Vogtle in South Georgia, it seems that the nuclear renaissance talked about before Fukushima will happen.

We may not know at what pace but it is just a matter of time.