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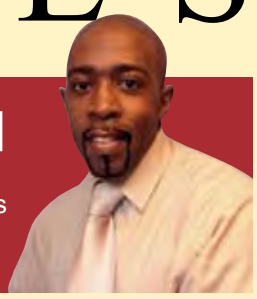

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MHI, Areva paint different nuclear picture


Areva's Chief Executive Luc Oursel

The outlook for nuclear power equipment sales remains unclear post-Fukushima, writes **Junior Isles**

Leading Japanese heavy equipment manufacturer, Mitsubishi Heavy Industries (MHI) Ltd, and Areva, the world's largest manufacturer of nuclear reactors, each have a different outlook for the sale of nuclear equipment following the Fukushima disaster.

MHI presents an improved outlook for equipment, expecting sales related to nuclear safety measures to top Yen100 billion ($1.3 billion) in the coming three years. The company believes that sales will be boosted as power companies adopt measures such as backup power systems to improve safety at nuclear plants.

Shigero Masamori, an Executive Vice President at MHI said its sales in the nuclear power generation segment are highly likely to far exceed a projected Yen200 billion for fiscal 2011 through next March.

He said that MHI would support the safety efforts of Japanese utilities such as Kansai Electric Power Co. and Kyushu Electric Power Co., to which it has supplied pressurised-water reactors. He added that it would also promote talks with Jordan, Vietnam and other countries to market its reactors.

Meanwhile, Areva says that it is "extremely difficult" to assess the long term impact of the disaster. In his first statement since taking over from Anne Lauvergeon as Areva's Chief Executive, Luc Oursel said almost €200 million ($290 million) of orders have been cancelled since March when the disaster struck. The cancellations were for uranium fuel from customers in Japan and Germany.

The company, which disclosed the size of its order book at the end of June, said that orders were €1 billion lower than before the event. However, Oursel said the company's order book remained robust at €43.1 billion, some €1.1 billion lower than at the end of last year.

"The fundamentals underpinning the development of the nuclear market are unchanged," he said, noting there would be "strong growth in demand for electricity in the coming decades, diminished fossil resources, the search by many countries for energy independence and the growing need to address climate change."

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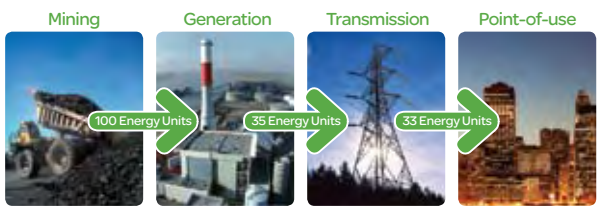
The only good watt is a negawatt



Due to intrinsic inefficiencies, 1 kWh consumed at the point-of-use requires 3 kWh of primary energy created at the power plant

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Oursel also said the company was analysing the long-term implications of Fukushima, which will be incorporated in a new strategic plan over the next few months.

The Fukushima disaster has had a direct impact on an alliance that was being pursued by MHI and Areva. The two companies currently have a business tie-up in nuclear power generation but in August, MHI decided to freeze negotiations on a capital alliance with Areva until further notice.

Mitsubishi originally aimed to acquire a stake of about 3 per cent of capital in the French company. However, it will now freeze the investment plan and cancel negotiations due to an unclear outlook for the Japan's nuclear-related businesses.

MHI and Areva have partnered on the development of a mid-size nuclear reactor and also established a joint venture in 2006 to produce nuclear fuel. They had been negotiating over the capital alliance since 2009 in an attempt to strengthen the partnership.

According to reports, French equipment manufacturer Alstom, which has close ties with Areva, has lobbied Areva to reject MHI's investment on the grounds that MHI is Alstom's rival in building turbines for nuclear reactors. Mitsubishi deemed it difficult to continue negotiating with Areva under the circumstances.

MHI and Areva have pitched to sell reactors to Jordan as that country plans its first nuclear power plant.

The Fukushima crisis is having an impact on other companies in the sector. Last month, Britain's Nuclear Decommissioning Authority (NDA) said it will close a facility in Sellafield, one of only two commercial plants in the world producing mixed oxide nuclear fuel. The NDA said the shutdown of the reactors in Japan eliminated its only customers for the plutonium-based fuel.

"The reason for this [closure] is directly related to the tragic events in Japan and their ongoing impact on the power markets," NDA head Tony Fountain told *Nature Magazine*.

Japan's new five-year science and technology programme approved by the Cabinet last month excluded references to an earlier draft that promoted next-generation nuclear technologies, reflecting the government's change of heart on its nuclear power policy.

Meanwhile, Tokyo Electric Power Co., the operator of the stricken Fukushima Daiichi nuclear power plant, is expected to report a group net loss of about Yen600 billion for the April to June period due to costs to deal with the ongoing crisis and increases in fuel expenses for power generation.

The International Atomic Energy Agency (IAEA) remains upbeat on the future of nuclear power.

Yukiya Amano, director general of the IAEA), told a United Nations conference on Disarmament Issues at the end of July that nuclear power "will remain an important option for many countries".

Amano said the agency is devising an action plan to enhance nuclear safety around the world that is scheduled to be implemented from summer 2012 and will especially address contingencies such as natural disasters and power blackouts.

US to probe shale gas production process

- US panel makes recommendations
- South Africa extends fracking freeze

South Africa's Mining Minister Susan Shabangu

Junior Isles

The US government is looking at ways to increase transparency of the shale gas production process and share best practices.

The hydraulic fracturing (fracking) process used for extracting gas from shale has come under fire from environmental groups. Fracking pumps water, sand and chemicals deep underground at high pressure to free gas from rock, but has sparked controversy in several countries because of its alleged impacts on water resources and its carbon footprint.

A high level advisory panel to the US Secretary of Energy recently released its preliminary recommendations on the issues surrounding production of shale gas. The report is expected to be finalised by November 18, 2011.

The subcommittee report does recommend that measures should be taken to reduce emissions of air pollutants, ozone precursors and methane as quickly as practicable. It urges adoption of a systems approach to water management based on consistent measurement and public disclosure of the flow and composition of water at every stage of the shale gas production process.

The subcommittee shares the prevailing view that the risk of fracturing fluid leakage into drinking water sources through fractures made in deep shale reservoirs is remote. Nevertheless the subcommittee believes there is no economic or technical reason to prevent public disclosure of all chemicals in fracturing fluids, with an exception for genuinely proprietary information. While companies and regulators are moving in this direction, progress needs to be accelerated in light of public concern.

The development of shale gas in the US has been very rapid. Natural gas from all sources is one of America's major fuels, providing about 25 per cent of total US energy. Shale gas, in turn, was less than 2 per cent of total US natural gas production in 2001. Today, it is approaching 30 per cent. But it was only around 2008 that the significance of shale gas began to be widely recognised.

Environmental concerns have seen shale gas production banned in France and put on hold in South Africa. At the end of August, South Africa extended its freeze on shale gas prospecting, saying more investigation was needed on the process.

Mining minister Susan Shabangu announced a six-month extension to an existing moratorium, saying interim study reports had been sent back for further details and that the public would also be consulted.

The decision was welcomed by the World Wide Fund for Nature (WWF). Saliem Fakir, head of WWF South Africa's Living Planet unit said: "It is critical that we consider shale gas with caution and carefully evaluate what is happening elsewhere in the world so that we can learn from these experiences."

The group said in a statement: "WWF views the extension as a wise step given that there is currently insufficient, independently-reviewed scientific data around the environmental consequences of shale-gas exploration and extraction to support a decision to proceed with exploration in South Africa."

It added: "In addition, several economic and social arguments in favour of shale-gas extraction remain, at best, weakly supported."

G20 to act on 'green growth'

Former British Prime Minister Gordon Brown urged China to open up

The head of the G-20 advisory panel for 'green growth' says that this year's Group of 20 summit will be asked to adopt national action plans and set up a public-private financing arm to boost investments in renewable energy and tackle climate change.

Shi Zhengrong, head of the panel and CEO of Suntech Power Holdings Co. Ltd., said the G-20 advisory panel expects to issue a set of recommendations around the end of September on how world leaders can shift to solar, wind and other alternative energy sources – even in difficult financial times.

"At the moment there's a lot of talk about green growth, there are some actions – but not enough," Shi told the *Associated Press* at the World Economic Forum's Geneva headquarters, where CEOs of major companies and former world leaders gathered privately to discuss plans for the G-20 summit to be held in Cannes, France, November 3-4.

He said there are a lot of barriers, such as traditional economies that lobby against green growth, adding: "And politicians and governments are short-sighted. It's only when the economy is good, they all say they're for green growth."

Former British Prime Minister Gordon Brown, also taking part in the Geneva meeting, said China should open up its markets as it tries to take the lead on alternative energy technology.

China has overtaken the US as the largest emitter of carbon dioxide, though on a per-capita basis its output is much smaller. Sulphur pollution from China's predominantly coal fired generating installed base is also having a huge impact on the nation's environment and its citizens' health. Its coal fired generating capacity doubled between 2003 and 2007 but in an effort to curb pollution the government is now investing heavily in solar and wind power.

"What we discussed today should protect the environment, provide sustainability and save resources," Shi said, adding that even "clean coal technologies could be used, if they are proven years from now".

UK 'big six' under scrutiny

- BDO to investigate how profits are calculated
- Chris Huhne denounces utilities price increases

With growing public criticism of the profits being made by the 'big six' UK energy suppliers, regulator Ofgem has appointed forensic accountants to scrutinise how the companies calculate their profits.

The appointment was made in light of growing concern that the companies may be attempting to appear less profitable in their retail divisions as they look to justify higher prices. The new investigation by BDO will investigate the hedging practices, trading profits and wholesale prices paid by the companies.

Chris Huhne: refuses to "stand and watch"

In March, Ofgem published a review of the retail market and later queried the transparency of five of Britain's biggest utility companies – Scottish and Southern, Scottish Power, RWE npower, EDF and EOn – in financial information provided to the regulator.

The utility companies have all strongly denied any suggestions of opacity in their reporting, saying they gave a "true and fair representation of retail margins".

Politicians recently went beyond routine condemnation of the utilities, floating ideas that if implemented would destroy their integrated business model.

Chris Huhne, Britain's Energy Secretary last month denounced price increases between June and August of 16-19 per cent for electricity and 10-16 per cent for gas. "Britain's consumers are being buffeted by the violent and unpredictable winds of global fossil fuel prices. I refuse to stand and watch this happen."

In a move to enhance competition, Ofgem is planning to force the companies to auction up to 20 per cent of their electricity on the wholesale market, enabling independent suppliers to buy it and and then sell it to households at lower prices.

Shadow Energy Secretary Meg Hillier went further, saying that Ofgem should look at forcing utilities to auction all of their electricity.

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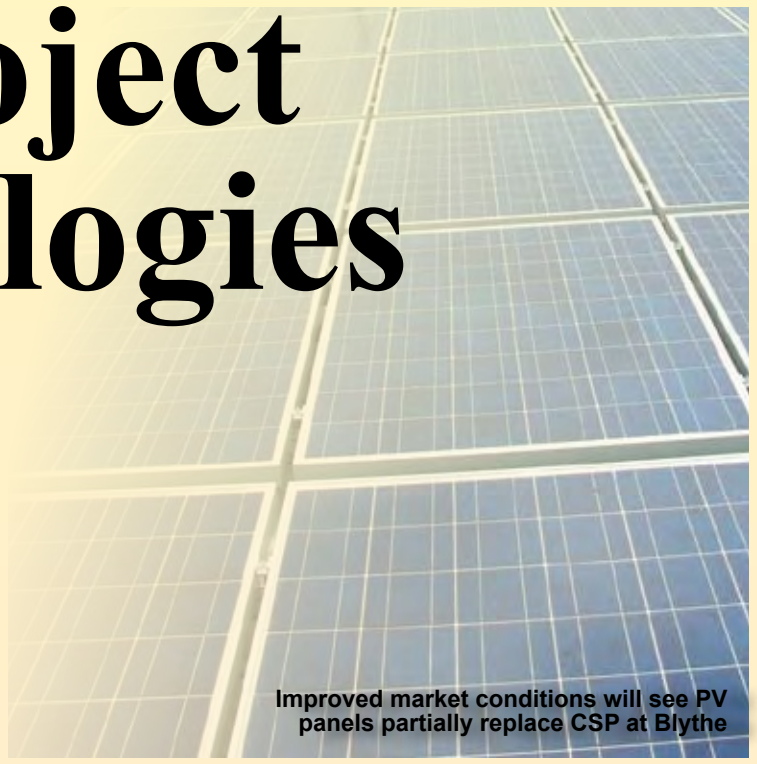
Blythe solar project switches technologies



Improved market conditions will see PV panels partially replace CSP at Blythe

Falling prices for photovoltaic panels has led the developer of a major solar project to change tack.

Siân Crampsie

Changing market conditions in the solar sector have caused Solar Trust of America to switch part of a 1 GW project in California from concentrating solar power (CSP) to solar photovoltaic (PV) technology.

Solar Trust of America says that its decision to use PV technology for the first 500 MW phase of the Blythe project is a reflection of "improved PV market conditions". The decision will also give the company greater flexibility during the construction of the facility as it will be able to build in phases.

Blythe is the largest solar power facility under development in the world and will form a key part of California's plans to use increased levels of renewable energy. It was to have consisted of four 250 MW CSP units.

PV panel prices have fallen sharply this year because of a glut in solar panels on the world market caused by a reduction in demand in Europe. Panel manufacturer First Solar in August reported a 62 per cent drop in second quarter profits in spite of increased sales.

Solar Trust of America says that it remains committed to CSP technology but is obliged to maximise the potential of its sites by "deploying the right technology at the right time," according to CEO and Chairman Uwe T. Schmidt.

First Solar announced last month that it was ready to start construction of the 550 MW Desert Sunlight PV project in California after the US Interior Secretary issued an approval for the solar farm. The company will supply thin-film photovoltaic solar panels, as well as build and operate the project, but is looking to sell it to a new owner.

First Solar is one of the world's largest solar panel manufacturers. It earned $61.1 million in net income on $532.7 million in revenue in the second quarter, down from $159 million in net income on $587.8 million in revenue during the same period last year.

In the longer term, lower PV panel prices are good news for the industry as it will allow solar energy to compete with conventional forms of electricity generation. First Solar says that it is on track to build solar systems that produce power at 10 to 12 cents/kWh over the life of the system, by 2014.

But there are continued concerns in the USA that the solar energy and clean energy sector in general will fall foul of federal budget pressures after a deal was sealed in early August to raise the country's debt ceiling.

After a bitter partisan dispute, Congress agreed to raise the USA's debt limit by at least $2.1 trillion in return for spending caps that would help to reduce the country's massive deficit.

A committee has been appointed that will determine where spending cuts are to be made, and programmes such as tax credits and loan guarantees for renewable energy projects could be targeted.

- The wind industry installed some 2.2 GW of generating capacity in the US during the first half of 2011, up 72 per cent from the 1.3 GW installed during the same period in 2010, according to the American Wind Energy Association. In the second quarter of 2011, 1 GW of capacity was installed, an increase of 46 per cent from the 709 MW in the second quarter of last year.

Canada cracks down on coal

Heavy handed: the end for conventional coal plants

The Canadian government is planning to introduce tough new emission performance standards for coal fired power plants as a means of reducing greenhouse gas (GHG) emissions from the country's power sector.

The proposed new regulations would force coal-fired power plant owners to reduce their GHGs to levels comparable to high efficiency natural gas fired power plants and signal the end of conventional coal-fired power generation in Canada.

The proposals are part of wider government plans to drastically cut GHG emissions in Canada.

"Our strategy to lower our emissions is based on making improvements sector by sector to sustain our economy and protect our environment," said Canadian Environment Minister Peter Kent. "We are taking action in the electricity sector because we recognise the potential for significant emissions reductions."

Canada's electricity sector currently accounts for around 16 per cent of the country's GHG emissions.

Environmental campaigners have warned that GHG emission reductions achieved through federal and provincial government policies will be negated by the country's vast oil tar sands operations.

The regulations are designed to divert investment away from coal as a source of electricity generation and into cleaner fuel sources such as natural gas and renewable energy. They contain exemptions for carbon capture and storage (CCS) demonstration plants and emergency facilities, but if adopted would effectively ban the construction of new coal-fired power plants that do not feature CCS.

The Canadian Electricity Association (CEA) said that the proposed regulations were "a step forward in encouraging non- and lower-emitting technologies." However it said that they were "incomplete" and left "important issues" unresolved.

Canada's government estimates that 33 of the country's 51 coal-fired power stations will come to the end of their lives by 2025. The regulations are due to come into effect by 2015.

It also estimates that these proposed regulations, together with other measures taken by the federal and provincial governments, will reduce GHG emissions from the electricity sector by 31 megatonnes between 2005 and 2020.

The government wants to reduce the country's total GHG emissions by 17 per cent from 2005 levels by 2020 – equivalent to a reduction of 124 megatonnes.

Other measures taken by Canada's government to reduce emissions include implementing renewable fuel regulations, limiting emissions from the automotive sector and investment in clean energy technologies.

Emissions from Canada's oil tar sands currently stand at around 49 million tonnes of CO_2-equivalent, according to Environment Canada. While the oil industry is committed to reducing the carbon intensity of its operations, plans to increase the output of the oil sands regions will lead to a significant increase in GHG emissions, says environmental groups such as WWF and Greenpeace Canada.

Wind mapping study starts in Jamaica

Jamaica is to study wind blowing patterns across the island as part of plans to increase levels of renewable energy generation.

The country's government has commissioned a wind mapping study that will determine the best points for establishing wind farms. The study could also attract private developers to the island.

The study is to be undertaken by Wigton Wind Farm Limited, an agency of Jamaica's Ministry of Energy and Mining. It will be critical to the country's efforts to increase generation from wind power and reduce dependence on fossil fuels.

Jamaica currently operates one wind farm. Oil accounts for 95 per cent of the island's power generation.

Jamaica's National Energy Policy calls for renewable energy to account for 20 per cent of the energy mix by 2030.

Utilities warned of cyber attacks

Warnings from researchers that power plant control systems are highly vulnerable to cyber attacks has prompted the North American Electricity Reliability Corporation (NERC) to issue a warning to utilities.

An official alert from NERC in early August preceded presentations at a Las Vegas computer security conference that illustrated how programmable logic controller (PLC) systems can be hacked into by relatively simple programmes.

PLCs are used in power plants and other industrial plants to control equipment such as motors and valves. These have previously been ignored by hackers because they are often not connected to the internet and rely on proprietary software.

However research presented at the Las Vegas conference shows that these systems can be easily accessed – in some cases by text messages from a mobile telephone – and prompted NERC to advise utilities to improve defences.

The trend in recent years towards "open" standards that allow control systems from different manufacturers to communicate with each other has increased power plants' vulnerability to attack, according to security experts.

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Japan moves to put nuclear house in order

The disaster at the Fukushima Daiichi nuclear plant has prompted Japan to overhaul the sector

In the wake of its worst nuclear accident, Japan has begun a major overhaul of the sector, writes **Junior Isles**

The approval of a plan to set up a new agency in charge of nuclear safety under the Environment Ministry marks the first concrete step in the overhaul of Japan's nuclear power sector following the disaster at the Fukushima Daiichi nuclear power plant in March this year.

Eyeing a major restructure of the nuclear regulatory framework, Prime Minister Naoto Kan has been calling for the separation of the current Nuclear and Industrial Safety Agency (NISA) from the Ministry of Economy, Trade and Industry, which promotes the use of nuclear.

The plan, to be launched in April next year, will see NISA integrated with the Nuclear Safety Commission, an independent panel of experts under the Cabinet Office. The new agency, run by the Environment Ministry, will be a more independent entity distanced from the nuclear industry and other promoters of nuclear power.

Kan told a parliamentary session in August that "someone who is not a blind advocate of nuclear safety or promoter of nuclear energy but is fully aware of the problems of nuclear power" should head the new regulatory agency.

The government plans to set up a preliminary panel shortly and submit related legislation during the ordinary parliamentary session starting in January.

The current setup of NISA has been criticised for lax government supervision of nuclear facilities and its slow response to the Fukushima crisis.

Last month outgoing nuclear safety agency chief Nobuaki Terasaka said the crisis at the plant showed Japan's nuclear regulation was inadequate, but insisted he did his best to deal with the world's worst nuclear accident in 25 years.

The embattled Kan, who has signalled his intention to step down, has vowed to contain the nuclear crisis by early January, overhaul the country's nuclear regulatory framework and scale down Japan's dependency on nuclear energy.

Meanwhile Tepco, the operator of the damaged Fukushima Daiichi plant, is building a huge tent to cover one of the worst hit reactors. Officials said they hope the cover will keep radioactive materials that have already leaked from spreading, prevent rainwater seepage and offer a barrier from possible leaks or blasts in the future.

A study released last month by an expert in nuclear safety, claims that fuel inside one of the reactors, which was believed to have been kept cool at the bottom of the pressure vessel after its core suffered a meltdown, has possibly breached the vessel after melting again at the bottom of the vessel.

The study said most of the fuel at the No. 3 reactor may have fallen into the containment vessel underneath, and if so, the current method used to cool the reactor would need reviewing, which could force the plant operator to revise its schedule to contain the disaster.

Bangladesh diversifies energy resources

Bangladesh is to build four large coal fired power plants as part of a drive to diversify its energy sources against a backdrop of dwindling natural gas reserves.

Bangladesh Power Development Board (BPDB) chairman ASM Alamgir Kabir said it has already completed evaluation of the planned coal fired power plants and sent the report to the power ministry for final approval.

He said contracts would be awarded to the bid winners immediately after their approval by the power ministry. The power plants with a total output of 2400 MW will be implemented on a build, own and operate (BOO) basis by international independent power producers (IPPs).

Bangladesh has been leaning heavily on IPPs to help meet its chronic power shortages. At the beginning of August local steel conglomerate BSRM Group said it will establish a 190 MW merchant power plant to support its expansion in Chittagong. At the end of July, Baraka Patenga Power signed a deal with BPDB to build a 50 MW furnace oil-fired power plant in Chittagong. BPDB has signed a 15-year power purchase agreement with the company.

In August the Asian Development Bank announced that it is extending a $300 million energy infrastructure loan to help Bangladesh address critical power shortages which are undermining the economy and slowing poverty reduction efforts, the Manila-based lender said.

Despite ongoing problems with gas availability, the government recently announced that it will construct another large gas-based combined cycle power plant at Bibiyana that will run on gas from the Bibiyana gas field.

The project is to be the biggest power plant in the country to be built on a turnkey basis. The BPDB will receive bids until October 18, 2011.

Japan to continue nuclear exports despite crisis

Japan is to continue with its policy of exporting nuclear power generation technology despite the crisis at the Fukushima Daiichi nuclear power plant.

The Cabinet has approved a document that said it believes Japan should provide nuclear technology to countries that wish to have it and ensure that the technology's safety meets the highest international standards.

The move effectively gives priority to maintaining good diplomatic ties with countries with which Japan has already entered negotiations to export such technology.

The document said Japan would proceed with negotiations with other countries on nuclear power cooperation, which had been stalled since the disaster, so as not to damage bilateral trust. It also said the government will continue to call for Diet approval of nuclear energy cooperation pacts with four nations – Jordan, Vietnam, Russia and South Korea.

In August, Vietnam commissioned a safety study on the site planned for its first nuclear power plant. It has asked Japan to help build a second nuclear power plant, but the deal is pending Tokyo's approval of a nuclear cooperation treaty.

Looking further afield, Japan's Atomic Energy Agency discussed non-proliferation and other issues with Mongolia during a two-day meeting last month.

A senior Japanese nuclear engineer said Japan would be glad to provide technology and safety control support for Mongolia's peaceful use of nuclear energy.

Ts. Damdinsuren, a senior Mongolian nuclear official, said Mongolia has plans to begin construction of a nuclear plant next year that is expected to be operational in 2017.

Mongolia, which is rich in uranium resources, is also eyeing closer co-operation with India on nuclear energy.

FIT may signal solar boom

Last month's announcement of a national feed-in tariff for solar projects in China could mark the start of a long-awaited boom in solar development in the country.

Under the new scheme, solar power projects approved by 1 July or completed by the end of the year will be eligible for RMB1.15 ($0.18)/kWh and those approved after 1 July will receive RMB1/kWh.

It was expected that the FIT would be introduced only when solar photovoltaic (PV) costs reached the level of China's wind tariffs i.e. RMB 0.51-0.61. However, Ma Lingjuan, deputy general manager of China Renewable Energy Industries Association (CREIA), said that pressure from local governments, PV manufacturers and developers, combined with declining European demand for Chinese-made panels, appear to have motivated the National Development Reform Commission to introduce a FIT ahead of schedule.

It is also believed that China's failure to achieve its 2010 renewable energy target of sourcing 10 per cent of energy from renewables, has convinced many that a rapid ramp-up of the solar sector is needed to hit the 2020 target of 15 per cent.

Calls to redo expert modelling

Australia's opposition Coalition is questioning the credibility of Treasury modelling that shows the planned introduction of the Labor government's carbon tax will have no impact on the electricity sector this decade.

With a parliamentary debate on the tax planned for this month, the Coalition and business groups are intensifying a campaign to discredit modelling that shows its impact on household prices to be modest.

The Labor government is attempting to pass legislation that would see a tax of A$23 (US$24) put on every tonne of CO_2 from July next year.

In the face of opposition, the Treasury recently commissioned a study to assess the impacts of the new tax on the electricity sector.

Expert modelling – done for the Federal Treasury by SKM MMA, part of the Sinclair Knight Merz group, and Brisbane-based energy modelling experts ROAM Consulting – found that household electricity prices would rise by just 10 per cent as a result of the tax.

The models also showed that until 2020 most change in electricity generation would be due to the existing 20 per cent renewable energy target, with the carbon price cutting a further 11 per cent from power sector emissions through a small shift away from brown coal fired generation and reduced consumer demand.

Both modellers found that some regions producing coal fired power, particularly the Latrobe Valley and Gippsland in Victoria, would not shrink economically as power production changed, because they were well positioned to shift to new sources of generation.

NSW, hardest hit by the carbon price with job losses and reduced economic output according to separate modelling conducted for the state government, is shown in the federal government modelling to steadily increase its generation capacity.

According to the ROAM results, the state's generation capacity would double by 2050, with wind, new coal generation with carbon capture and storage, and gas fired power gradually taking over from hard coal plants.

Regarding Latrobe Valley and Gippsland, the MMA analysis said "the level of generation with brown coal falls with a carbon pricing regime. However… [the] region has close proximity to a major natural gas resource and parts of eastern Victoria have access to good wind, biomass and potentially geothermal resources.

"This leads to increased investment in generation exploiting these resources, particularly natural gas resources. The exploitation of these resources under carbon pricing means that the overall level of electricity generation may not fall."

However, both MMA and ROAM base their calculations on a $20 carbon price, not the agreed $23 price. It also did not include the government's announced policy to pay for the early retirement of one or two brown-coal generators.

The Coalition is now calling for the modelling to be scrapped and redone.

Last month more than 2000 protesters gathered outside Parliament House to protest against the tax.

They complained that Prime Minister Julia Gillard had promised not to introduce a carbon tax when her Labor Party was narrowly re-elected last year. Some called for a new election.

China finishes nuclear inspections

China's nuclear inspectors have completed a tour of existing nuclear reactors and construction sites aimed at strengthening emergency preparedness and improving safety measures, according to a report by the China Nuclear Energy Association.

China's nuclear regulators said in June that safety reviews of 28 reactors under construction were to be completed by October. The report, however, did not say how many sites were inspected.

The report said China has drawn on the experiences of Japan's incident to improve safety measures and to promote a healthy environment for nuclear power.

Beijing is promoting energy sources such as nuclear, wind and solar to curb demand for imported oil and gas and to reduce environmental damage from its reliance on coal. However, government officials said that its nuclear policy would stress safety over rapid development following the crisis at Japan's Fukushima Daiichi nuclear plant.

Meanwhile, Ling Ao Unit 4, the second unit of Ling Ao Phase II nuclear power plant in Guangdong province, entered commercial operation on August 7. Key components for the plant's conventional island were supplied by Alstom and its partner Dongfang Electric Corporation, Ltd.

At the end of July, Westinghouse Electric Company, along with its consortium team member The Shaw Group Inc., China's State Nuclear Power Technology Corporation (SNPTC) and Sanmen Nuclear Power Company Ltd., said the first AP1000 nuclear reactor vessel arrived at the Sanmen nuclear plant.

Geothermal funding for Indonesia

The World Bank has agreed to lend $300 million to state geothermal producer PT Pertamina Geothermal Energy (PGE) to build two geothermal power plants in Ulubelu, South Sumatra, and Lahendong, North Sulawesi.

The financing package is made up of a $175 million loan from the International Bank for Reconstruction and Development – the World Bank's lending arm for middle-income countries, and a $125 million concessional loan (lower interest rates and longer grace periods than normal) from the Clean Technology Fund on the basis of the project's positive impact on climate change.

"This important project is the first approved Clean Technology Fund operation in the East Asia Region," said Stefan Koeberle, World Bank country director for Indonesia.

The projects, scheduled to be completed by 2015, will see the addition of 110 MW at Ulubelu and 40 MW at Lehendong. This will displace an equivalent capacity of coal-based power generation, which will reduce local and global environmental pollution.

"We appreciate the World Bank's support to PGE to contribute to efforts to utilise clean energy in meeting Indonesia's growing power demand," said Abadi Poernomo, President Director of PGE.

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Offshore wind whets bankers' appetites

Christian Kjaer, EWEA Chief Executive Officer sees "several positive trends"

■ Meerwind closes financing ■ UK faces grid bottlenecks

The offshore wind energy sector in Europe is set to continue growing thanks in part to an increased appetite for investment from the financial sector.

The European Wind Energy Association (EWEA) says that offshore installations grew by 4.5 per cent in the first half of 2011 compared with the first half of 2010, and notes that the number of banks providing capital for investment in the sector is growing.

The trade body also says that the installed capacity of offshore wind in the EU could reach 55 GW by 2020, up from its current level of around 3 GW. The UK currently dominates offshore wind activity in Europe.

In a recent analysis, EWEA forecast that banks will lend €3 billion to offshore wind projects in Europe this year, suggesting that total investment in the sector will reach €5 billion when equity is taken into account. This compares with around €2 billion of investment in 2010.

"While I see several positive trends for the European offshore wind power industry, we are not home and dry yet," said Christian Kjaer, chief executive officer of EWEA. "The sector is coming out of the financial crisis but is still facing a potential worsening of the general economic crisis."

EWEA expects several wind farms in Germany and the UK to reach financial close in 2011. It also says that developers are taking new approaches to financing such as selling equity stakes in existing projects in order to initiate new ones.

In August the developers of the 288 MW Meerwind offshore wind farm in Germany announced that they had closed €1.2 billion financing on the project. Backed by private equity group Blackstone, the 80-turbine project is the first to close under the German development bank KfW's €5 billion offshore wind programme.

Affiliates of Blackstone will provide most of the equity for the project, while a group of seven commercial lenders are providing debt financing totaling €822 million. KfW launched its programme to support offshore wind development in June this year.

In the first half of 2011 the UK connected 244.8 MW to the grid, installed the foundations for 129 turbines and installed a total of 108 turbines. Its closest competitor, Germany, installed six turbines in the first six months of the year.

In total, 2.8 GW of offshore wind turbines are in the pipeline in Europe, of which 2.2 GW will be in UK waters.

Progress in the UK has been held up by bottlenecks in grid connection, however. In the first half of the year, only two-thirds of the turbines that were installed in UK waters were connected to the grid.

Offshore wind farms in Europe are also facing opposition. In August the Trump Organization announced that it would formally oppose an 11-turbine project proposed by Vattenfall and Technip off the northeast coast of Scotland. Trump is planning to develop a $1.6 billion golf and hotel complex along the coastline and says that the offshore turbine will destroy the "magnificent" coastline.

In France, meanwhile, a proposal to erect an array of wind turbines off the coast or Normandy has appalled war veterans.

Westinghouse bolsters Czech supply chain

■ GEH signs Poland deal
■ Sellafield plant closure

Westinghouse is signing up local partners as it prepares to submit a bid to construct a new nuclear power plant in the Czech Republic.

The Toshiba-owned firm has just announced the signing of a memorandum of understanding (MOU) with Czech company I&C Energo a.s. relating to the provision of instrumentation and control systems for new reactors.

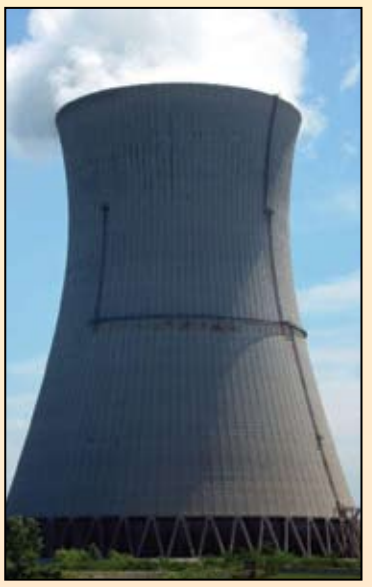
The deal is in line with Westinghouse's supply chain policy of 'buy where you build'. It outlines an exclusive cooperation between the two companies and is a key step forward in Westinghouse's plans to submit a proposal to CEZ for the construction of an AP1000 reactor at Temelin.

Nuclear reactor firms are now focusing on countries that have affirmed their commitment to the construction of new nuclear power plants following the disaster in Japan in March this year.

GE Hitachi is hoping to build new reactors in Poland and has signed a number of deals to bolster its supply chain in the country.

In July GE Hitachi signed an MOU with Warsaw-based engineering firm Energoprojekt Warszawa, S.A. (EW) to discuss the feasibility of partnering on future reactor projects. The MOU allows the firms to explore how EW could provide specific engineering services to GEH in any new nuclear power plants it undertakes in Poland.

■ The Sellafield nuclear fuel recycling plant in the UK is to close because it is no longer financially viable, says the country's Nuclear Decommissioning Authority (NDA). Sellafield recycles plutonium into mixed oxide fuel but its only clients are in Japan, where operations have been put on hold following the accident at the Fukushima Daiichi plant.



Firms are making preparations for countries committed to nuclear

RWE pulls out of Siadar wave scheme

Siân Crampsie

Voith Hydro Wavegen is seeking a new partner to help it develop the world's largest wave energy scheme after RWE pulled out of the project.

The 4 MW Siadar wave energy scheme on the Isle of Lewis in Scotland is a landmark project for Wavegen as well as the Scottish government, which last year awarded it £6 million of government funds to put towards development.

RWE npower renewables, the renewable energy arm of the German utility, says that it will shift its focus to marine tidal current technology and that it would continue to work closely with Voith. RWE has not said how much money it had committed to Siadar, but it is thought to have been the principal investor, according to the *Financial Times* newspaper.

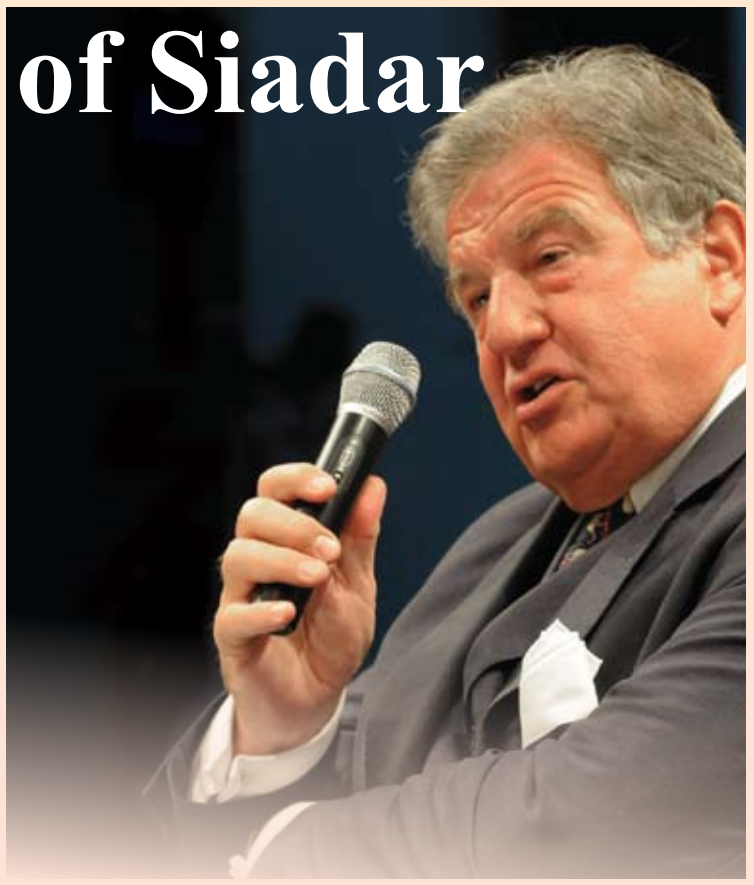
Siadar was approved by the Scottish government in January 2009 and its design features Wavegen's oscillating water column technology. It is thought that RWE wants to focus on tidal technologies because they are faster and cheaper to develop.

RWE has already established a joint venture with Voith known as Voith Hydro Ocean Current Technologies through which they are planning to deploy a commercial-scale tidal current turbine in Scotland.

RWE also has plans to develop a 10 MW tidal energy scheme in North Wales in partnership with Marine Current Turbines.

The German company is currently evaluating its business strategy following the German government's decision to close down the country's nuclear power plants early. RWE says that Germany's policy on nuclear has resulted in significant financial burdens.

The utility last month reported a 39 per cent drop in first half profits to €1.7 billion. It said that revenues were flat at €27.5 billion but a new nuclear fuel tax and Germany's decision to phase out nuclear power early had cost it €900 million from January to June.



RWE Chief Executive Jurgen Grossman. The company is evaluating its business strategy

Germany gives green light for CO_2 storage

Carbon capture and storage (CCS) demonstration projects in Germany will be able to store carbon dioxide (CO_2) underground after the German parliament approved new legislation.

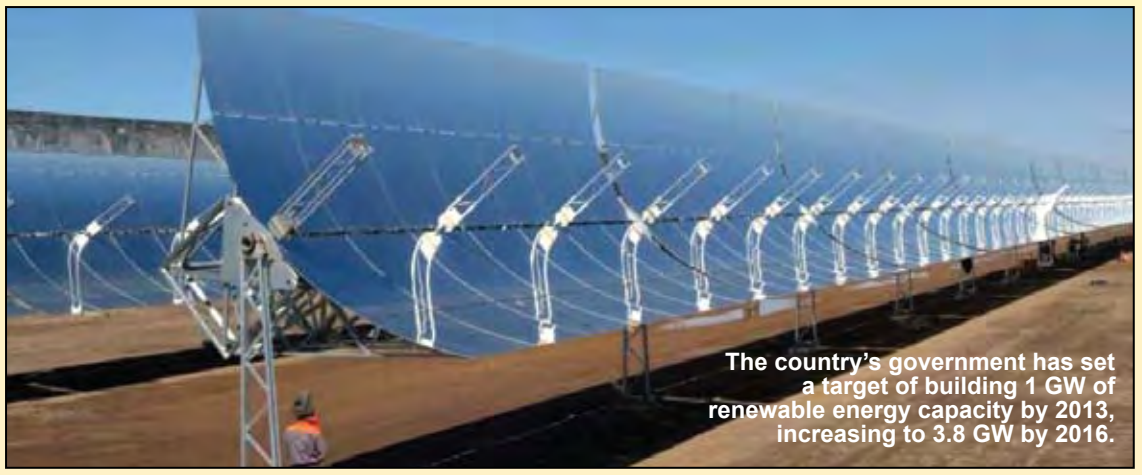
Most CCS demonstrations currently in operation around the world – such as Vattenfall's 30 MW project at Schwarze Pumpe in Germany – have to release captured pollutants to the atmosphere, but the new law in Germany would allow such projects to pump emissions underground until 2016.

The law has divided opinion between CCS proponents who see it as a good solution to climate change and those that are concerned about the safety and environmental impact of storing large quantities of CO_2 underground. Residents' groups in several German regions have campaigned against the technology for several years.

Crucially, the new law includes an opt-out for states that do not want to develop CO_2 storage sites.

The legislation was passed in the Bundestag by 306 votes to 266. It has yet to be passed by the Bundesrat, Germany's second legislative chamber.

South Africa embarks on renewables programme


The country's government has set a target of building 1 GW of renewable energy capacity by 2013, increasing to 3.8 GW by 2016.

South Africa has finally called for proposals for the construction of renewable energy capacity, but industry groups are disappointed that the feed-in tariff system has been abandoned.

Siân Crampsie

The long awaited procurement process for renewable energy projects in South Africa has started with the publication by the government of a request for proposals (RFP).

The country's government has set a target of building 1 GW of renewable energy capacity by 2013, increasing to 3.8 GW by 2016.

The programme is designed to boost generating capacity with sustainable resources alongside the large conventional power plants that are already under construction in South Africa.

The selection criteria outlined by the South African Department of Energy (DOE) is a competitive bidding process with tenders assessed on price as well as other factors such as economic development. Winning bidders will develop and operate projects as independent power producers (IPPs) with energy sold to national utility Eskom under power purchase agreements (PPAs).

The government had originally outlined a system of feed-in tariffs to encourage the development of renewables. The switch to a PPA system has caused concern among industry groups that investor confidence would be dented by changes in policy, and that a PPA system would be less effective than feed-in tariffs.

The RFP calls for the development of 1850 MW of wind power, 1450 MW of solar photovoltaics (PV), 200 MW of concentrating solar power (CSP) and 75 MW of small hydropower. It also calls for the development of biogas, biomass and landfill gas projects, as well as the construction of small-scale (1-5 MW) projects using wind, PV, biomass or biogas technologies.

The government is hoping that the projects will also help to improve the electrification rate in South Africa, where 3.7 million people do not have access to electricity.

Overall, 3725 MW of capacity is to be developed under this RFP, requiring a total investment of around R100 billion ($13.8 billion). Projects are expected to be on-line by mid-2014, except CSP projects, which are granted an additional 12 months of construction time.

South Africa's Integrated Resource Plan (IRP) calls for over 17 GW of renewable energy capacity to be deployed between 2010 and 2030. This would require investments of around R350 billion, says the South African Wind Energy Association.

It was initially thought that prices determined for the proposed feed-in tariff scheme, known as Refit, would act as an upper limit on prices for the IPP bids, according to law firm Norton Rose. However, the actual price caps are R1150/MWh for wind; R2850/MWh for solar PV; R2850/MWh for CSP; R1070/MWh for biomass; R800/MWh for biogas; R600/MWh for landfill gas; and R1030/MWh for small hydro.

A bid will be 'non-compliant' and automatically rejected during the qualification phase if the price cap is exceeded.

Industry associations including the South African Wind Energy Association (SAWEA), South African Photovoltaic Association (SAPVIA) and the Southern Africa Solar Thermal and Electricity Association (SASTELA) expressed concerns over the switch away from the Refit model to PPAs, and called for an industry consultation. They said in an open letter in July that systems based on feed-in tariffs were "the internationally proven best way to quickly build a renewable energy industry".

South Africa is expected to add a total of 50 GW of generating capacity to its grid by 2030.

Bio-CCS hope for negative emissions

Combining biomass with carbon capture and storage (CCS) technology would take carbon dioxide (CO_2) out of the atmosphere as well as reduce emissions of the gas, says a new report.

Consultancy Ecofys has carried out a study on 'Bio-CCS' for the International Energy Agency (IEA) and concludes that up to 10 gigatonnes (GT) of CO_2 could be removed from the earth's atmosphere by 2050.

However it says that there are presently no clear economic incentives for coupling biomass for electricity production with CCS technology.

"The combination actually removes CO_2 from the atmosphere," said Joris Koornneef from Ecofys. "The biomass extracts CO_2 from the atmosphere during photosynthesis and the CCS takes out the CO_2 released in the energy conversion process."

The potential to remove 10 GT of CO_2 by 2050 is huge given the world's current energy-related emissions of CO_2 in 2010, says Ecofys, whose study identified sustainable biomass production as a potential limiting factor.

"In most regions, the sustainable supply of biomass, rather than CO_2 storage potential, is likely to be the limiting factor," said Koornneef. "But worldwide, there is ample sustainable biomass available to achieve negative emissions."


Green and clean: combining biomass with CCS may actually remove CO_2 from the atmosphere

Ecofys also warns that clear economic incentives for CO_2 storage are required, and says that the regions with both sustainable biomass production and CCS potential should be identified.

Ecofys identifies six promising technology routes in the power and transport sectors, including biomass combustion and gasification for power production, and biomass conversion to bio-ethanol and biodiesel. Taking only technical limitations into account, the maximum annual potential is approximately either 10 GT of negative emissions in the power sector or 6 GT in the biofuel sector.

In the short term, bio-ethanol production is the most promising option as it allows CO_2 capture at relatively low cost.

Iraqi Minister resigns over phantom deals

Deals signed by an Iraqi government minister for the construction of new power generation plants have been called into question by other members of the country's government.

Deputy Prime Minister Hussain al-Shahristani alleges that two deals – worth a combined $1.7 billion – violated government guidelines. Electricity Minister Raad Shalal has been fired over the matter, according to the *Associated Press*.

Earlier this year Shalal signed a $1.2 billion contract with the Canadian Alliance for Power Generation Equipment (Capgent) for the construction of 1000 MW of power generation capacity. He also signed a $500 million contract with German firm Maschinenbau Halberstadt.

Al-Shahristani says that neither company qualifies as a manufacturer as required by Iraqi government guidelines. An ombudsman that oversees the Electricity Ministry said in August that it had concerns about the financial and legal status of the two firms.

Reports indicate that Maschinenbau Halberstadt filed for insolvency in January last year. The ombudsman says it believes that Capgent is a fake company, according to reports.

TEI Times was unable to reach Capgent for comment.

The government in Iraq has been keen to boost power generating capacity since daily power outages led last year to demonstrations. Peak electricity demand in Iraq stands at around 15 000 MW but the grid is thought to supply less than half of this.

Russia blamed for latest Bushehr delay

Iran suffered a further setback with its nuclear energy programme when the Bushehr nuclear power plant did not start up by late August as planned.

Iran blamed the latest delay in the 1000 MW plant's schedule on Rosatom, the Russian contractor that is building the project. The latest delay follows problems experienced earlier this year when fuel rods had to be removed from the plant because of contamination concerns.

The head of the Atomic Energy Organization of Iran (AEOI) Fereydoun Abbasi Davani was quoted in media reports in mid-August as saying that the plant would start feeding electricity to the national grid in September, with full operation expected in December.

The plant was also affected last year by the discovery of the Stuxnet computer worm on computers at the site.

Tepco posts quarterly loss

Making provisions: Tepco President, Toshio Nishizawa

Japan's Tokyo Electric Power Company (Tepco) has started making provisions for compensating the people affected by the accident at the Fukushima Daiichi nuclear power station in March.

The embattled utility has posted net losses of ¥571.1 billion ($7.1 billion) for the first quarter of 2011 due to charges relating to restoration costs, compensation payments, emergency work and fuel costs between April and June.

The quarterly figures come after annual losses of ¥1247 billion reported for the year ending in March. The company has allocated ¥800 billion for bringing the Fukushima Daiichi nuclear power plant under control, and set aside ¥398 billion for compensation claims.

Compensation payments for victims of the tsunami-crippled nuclear plant will be made from a fund seeded with ¥2000 billion of taxpayers' money under a plan approved by the Japanese government in early August. Tepco and other Japanese nuclear energy companies will make annual contributions to the fund.

The plan has helped to save Tepco from bankruptcy as it enables the utility to spread out its compensation costs over time. The utility has promised to restructure and sell assets in order to help meet its financial obligations.

Tepco says that electricity sales in the first quarter decreased by 12 per cent compared with the same quarter last year as a result of electricity saving measures and a decline in production activities. Ordinary expenses increase by 1.7 per cent over the same period in 2010 due to the increase in fuel costs caused by the need to replace lost nuclear capacity.

The utility has not provided earnings estimates for the fiscal year ahead because of the difficulties it faces in assessing electricity supply and demand following the March 11 earthquake and tsunami. It has not yet brought the Fukushima Daiichi nuclear plant fully under control, and estimates that it will not achieve this goal until early 2012.

Claims resulting from the nuclear disaster are expected to run into billions of dollars. Some 80 000 people living within 20 km of the Fukushima Daiichi nuclear plant have been forced to abandon their homes.

GE boosts eSolar plans

Solar thermal company eSolar says that a strategic investment in the firm by GE Energy will help it to enhance the cost competitiveness of its technology.

The California-based company has announced that GE has agreed to invest up to $40 million to help fund the development of the next generation of its concentrating solar power (CSP) products.

The two companies already have a licensing agreement that allows GE to use eSolar's technology in its integrated solar combined cycle (ISCC) power plants. As part of the latest deal, Paul Browning, President and CEO of thermal products for GE Energy, will join the eSolar board of directors.

"Our partnership with GE moves our innovative technology to the next stage. Together, we are able to bring to market a power plant solution that drives down the cost of solar and meets the growing demand for renewable energy generation," said John Van Scoter, President and CEO of eSolar. "Building on our proven technology, this investment will fund the development of next-generation, modular solutions that enhance the cost competitiveness of solar, such as molten salt storage technology."

GE is keen to develop its expertise in CSP technology because it has the potential to site well with natural gas fired power plants – the solar thermal technology can boost the output of natural gas fired power plants without using up natural gas, while natural gas plants help reduce the cost of CSP plants by providing the steam turbine and generator that they need.

GE recently unveiled its ISCC power plant offering to the market and says that it is capable of delivering fuel efficiencies of over 70 per cent. It is already working with eSolar on developing an ISCC plant with 50 MW of CSP capacity in Turkey.

"As renewable uptake increases around the world, we recognise the need for combined cycle gas turbine technology that delivers both flexibility and world class efficiency." Said GE's Browning. "We believe that this combination of flexible and efficient gas with renewables can help meet near and long term global targets for climate change, cost and reliability. It is the future of power generation."

Siemens restructures renewable energy divisions

- New venture planned with Power Machines
- Siemens expands HRSG business

Siemens Energy is to create a new business division devoted solely to wind power in order to capitalise on the growth it has been experiencing in the wind sector in the past few years.

The Germany-based engineering firm has announced plans to separate its wind energy business from the rest of its renewable energy activities. The move will allow it to continue its "success story" in the wind power business, while moving forward with research and development in other areas.

"We're separating solar and wind power because these two markets are at very different stages of development," said Michael Suess, CEO of Siemens Energy Sector. "We'll be moving forward with research and development in the field of solar power to further increase our competitiveness. In our established wind power business we'll be forging ahead with industrialisation and internationalisation."

Since 2004 Siemens' wind power business has increased its workforce ten-fold to around 7700 employees, while revenues have increased by a factor of 12 to €3.2 billion. It is making major strategic investments in the wind sector in Asia, Europe and the USA, and wants to focus on the industrialisation of manufacturing and logistics in order to reduce the costs of wind power generation.

Siemens will bundle its solar power, hydropower, marine energy and energy storage activities into a new division known as Solar & Hydro. This will include its stakes in Voith Hydro and Marine Current Turbines.

Siemens has an order backlog of almost €11 billion in the wind sector and is the world market leader in offshore wind farms. It is already producing nacelles in a continuous flow manufacturing process and is planning to introduce automated rotor blade production.

In another move aimed at boosting growth, Siemens has announced a strategic deal with Power Machines in the market for gas turbines in Russia and CIS countries.

The two companies are planning to establish a joint venture company based in St Petersburg that will perform engineering, manufacturing and servicing of gas turbines. Siemens will hold a 65 per cent stake in the new company, and in return will hand over its 25 per cent plus one share stake in Power Machines to the Russian firm's majority shareholder, Highstat Ltd.

The deal will strengthen Siemens' position in Russia as well as provide it with access to Russia's low-cost manufacturing environment.

"We're investing in Russia to build up production capacity for leading-edge power plant technology," said Seuss. "We want to make our contribution toward modernising the power industry in the region, and our target is to strengthen our position as market leader. For us it is extremely important to be active in Russia as a local player."

Michael Suess: "forging ahead with industrialisation and internationalisation"

At the end of July Siemens also announced plans to boost its competencies in the combined cycle power plant market with the purchase of Dutch sister companies NEM B.V. and NEM Energy Services B.V.

The two companies design and service heat recovery steam generators (HRSGs) for combined cycle plants. HRSGs account for 15 per cent of the value creation in the construction of these plants, says Siemens.

Verbund sells Poweo stake

Direct Energie prepares to take advantage of new competition rules in the French electricity market.

Siân Crampsie

Verbund says that a deal to sell its stake in French electricity supplier Poweo will allow it to complete the restructuring of its activities on the French electricity market.

The Austrian utility has signed a deal to sell 46 per cent of Poweo to Direct Energie, another French electricity supplier, for around €36 million. The transaction will leave Verbund with one operational gas-fired power plant in France and another under construction.

The purchase of a stake in Poweo by competitor Direct Energie creates a new integrated electricity supplier in the French market with over 1 million customers. Direct Energie will make an initial payment to Verbund of €18 million when the deal is approved by the French competition authorities, and a final payment in July 2013.

The French electricity market is dominated by state-owned EDF, making it notoriously hard for smaller suppliers to compete. Direct Energie hopes that the acquisition of Poweo will allow it to take advantage of new regulations in the country that require EDF to sell some of its electricity production to competitors.

Americas

E.On places 200 MW wind order

E.On Climate and Renewables North America has placed an order with Vestas for wind turbines with a total capacity of 201.6 MW.

Vestas will supply E.On with 112 of its V100-1.8 MW type wind turbines. The contract includes delivery, commissioning and a five-year service and maintenance agreement.

The project name and location has not yet been disclosed, says Vestas.

GE wind turbines head for Midwest

GE and Wind Capital Group have inked deals for 228 wind turbines and the accompanying operations and maintenance services for projects in Oklahoma and Kansas.

GE will supply 94 of its 1.6-100 wind turbines for the Osage project in Oklahoma, which will provide power to Associated Electric CoOps Inc. (AECI), and 134 of its 1.5-82.5 wind turbines for the Post Rock project in Kansas, which will supply power to Westar. The GE wind turbines for both projects are scheduled for delivery in the first half of 2012.

The two new projects will increase Wind Capital Group's US wind power footprint to more than 500 MW.

El Paso expands Rio Grande

El Paso Electric Company is to expand the Rio Grande power plant in New Mexico with GE's aeroderivative gas turbine technology.

GE will provide an 88 MW LMS100PA aeroderivative gas turbine with 43 per cent energy efficiency in simple cycle application. GE also will supply a control building and emissions control equipment that includes a selective catalytic reduction (SCR) system for control of nitrogen oxides and a carbon monoxide reduction system.

The new turbine will run on natural gas and will add operational flexibility to the less efficient steam turbines that are currently in use at the plant.

Asia-Pacific

China Ming Yang Wind signs EPC

China Wind Power International Corp. has awarded an EPC contract for a 198 MW wind power project in China to China Ming Yang Wind Power Limited.

The Phase III wind farm in Du Mon County, Heilongjiang Province, will consist of 132 of Ming Yang's 1.5 MW wind turbines divided between four sites. Ming Yang will deliver and install the wind turbine generators as well as provide engineering and construction management services.

"The commencement of Phase III, along with the signing of an EPC contract with Ming Yang, is a critical next step towards our objective of fully developing our wind resource in Du Mon County," said Mr. Jun Liu, Chief Executive Officer of China Wind Power, which indirectly holds the exclusive rights for the development of wind energy in Du Mon County.

Siemens to supply 500 MW coal gasifiers to China

Siemens Energy has received an order from China to deliver eight coal gasifiers. The units, with a thermal rating of 500 MW each, are for a coal gasification plant in Yili City in Xinjiang province. The plant converts locally mined sub-bituminous coal into synthetic natural gas (syngas) with the aim of reducing imports of natural gas for power and heat generation.

In its first stage of completion, the plant is to produce around two billion m^3 of synthetic natural gas per year. The customer is the power provider CPI Xinjiang Energy Co. Ltd, a subsidiary of China Power Investment Corporation, one of the five biggest power generators in China. The coal gasification plant is scheduled to go on line by the end of 2014.

Suzlon wins repeat order

Indian business conglomerate Malpani Group has awarded Suzlon a repeat order to set up, operate and maintain wind energy projects with a total capacity of 29.7 MW.

The order is the sixth awarded to Suzlon by Malpani and includes the wind turbine manufacturer's S95, S88 and S82 wind turbine generators. It will take Malpani's total wind energy capacity to more than 125 MW.

Siemens, Marubeni win EGAT orders

The Electricity Generating Authority of Thailand (EGAT) has awarded a Siemens-Marubeni consortium orders for the construction of two new combined cycle power plants.

The two partners are to build the Chana Block 2 power plant in the province of Songkhla and the WangNoi Block 4 power plant near Bangkok. Chana Block 2 will be the first single-shaft power plant built in the country.

The two power plants, each with an installed capacity of 800 MW, are scheduled to come on line in the summer of 2014. The total investment volume amounts to approximately $1 billion, more than half of which is attributed to Siemens' scope of supply.

Powerica orders Vestas turbines

Powerica Limited has placed an order with Vestas for the supply of 26 wind turbines for the Vandiya Power wind farm project in the state of Gujurat, India.

The 47 MW wind farm will use Vestas' V100-1.8 MW wind turbine, which is designed for high energy production in low wind speed sites. Powerica already uses Vestas' V82-1.65 MW wind turbines at sites in Tamil Nadu and Gujurat.

The contract comprises supply and commissioning of the turbines, a VestasOnline Business SCADA system and a 10-year service and maintenance agreement. Delivery of the turbines is scheduled to begin in the third quarter of 2011.

EVN signs contract with Chinese firms

Electricity of Viet Nam (EVN) has signed a contract worth more than $1.3 billion for the construction of a thermo-electric power plant with China's Chengda, DEC, SWEPDI and ZEPC.

The Duyen Hai 3 power plant will have a capacity of 1245 MW and will be built in Dan Thanh Commune, Duyen Hai District in the southern province of Tra Vinh.

The investment capital for the project will be provided by China's banks and EVN.

Construction of the new plant will begin this year and it is expected to go into operation by the third quarter of 2015.

Europe

MW Power to supply German CHP plant

Metso-Wärtsilä joint venture MW Power is to supply German firm Heizkraftwerk Zwickau Süd GmbH & Co. KG with a modularised biomass power plant for combined heat and power production in the municipality of Zwickau in Germany.

The €20 million order is a turnkey solution that includes the entire plant as well as all on-site installations and training. The plant will be connected to the grid in late 2012 and will use forest residues and wood-based landscaping material for fuel.

The plant will generate 10 MW of district heat and 5 MW of electricity for the grid.

Canadian Solar wins French order

Canadian Solar is to supply 8 MW of solar modules to Eosol Energies Nouvelles' ground-mounted solar power plant in southwest France.

The order is the fourth for Canadian Solar from Eosol EN. The new power plant will have a total capacity of 10.7 MW and will consist of 39 500 modules installed on an area of 180 000 m^2 in Saint-Leger.

Siemens to supply Meerwind turbines

Siemens is to supply 80 wind turbines for the Meerwind Süd and Meerwind Ost offshore wind farms in Germany.

WindMW GmbH is developing the two wind projects, which will have a total combined capacity of 288 MW and supply energy for approximately 400 000 households. The order is the sixth for Siemens for offshore wind power plants in German waters.

The Meerwind Süd/Ost projects will feature Siemens' 3.6 MW turbines installed 23 km north of the island of Helgoland in water depths of 22-26 m. Construction and commissioning is planned for 2013.

According to the latest World Market Update by BTM Consult, Siemens is the world's largest supplier to the offshore wind market. At the end of 2010, there were almost 700 Siemens wind turbines with a capacity of over 1900 MW in operation offshore.

ABB to connect Germany's offshore projects

ABB has won a contract worth $1 billion to connect wind farms in the German North Sea to the mainland grid.

Awarded by grid operator TenneT, the contract calls for the installation of the world's largest offshore high voltage direct current (HVDC) system that will connect 900 MW of wind capacity to the grid. The project will be completed by 2015.

ABB will also install around 135 km of underwater and underground cables.

Eolia opts for Nordex

Nordex has obtained an order from Eolia Renovables to supply 15 of its N100/2500 wind turbines for a project in the Spanish region of Catalonia.

Eolia, one of Europe's leading independent renewable energy generators, is calling in the turbines from a master agreement signed with Nordex in 2007. In addition to the delivery of the machines, the order includes the turnkey installation of the 37.5 MW Sant Antoni wind farm. Sant Antoni will be the first N100/2500 project in Spain and one of the largest Nordex wind farms there.

Enel buys Greek wind farms

Gamesa has sold two wind farm projects in Greece to Enel Green Power.

The projects were developed and built by Gamesa and have a total combined installed capacity of 38 MW. The 24 MW Zoodochos Pighi plant and the 14 MW Panaghia Soumela plant are located in the Macedonia region.

International

Hanwha awards Saudi substation contract

Korea's Hanwha Engineering and Construction Corp. has awarded ABB a $17 million order to extend an existing substation at the Yanbu power plant in Saudi Arabia.

Extending the gas-insulated switchgear (GIS) substation will enable the integration of additional power capacity from two new generation blocks of the Yanbu steam power plant, which is owned and operated by the regional power and water utility, Marafiq.

ABB will design, supply, install and commission the extension of the existing 380/115 kV substation. Key products to be supplied include high voltage gas-insulated switchgear, a range of circuit breakers, and the control, protection and telecommunication equipment.

FW selects Polaniec control system

Foster Wheeler has chosen Emerson Process Management to supply the automation and control system for the boiler of the Polaniec power station in Poland.

Emerson will supply its PlantWeb digital plant architecture with the Ovation expert control system and AMS Suite predictive maintenance software for the 190 MWe circulating fluidised bed (CFB) boiler island. When operational in 2012, it will be the world's largest 100 per cent biomass-fired boiler.

Emerson's Ovation system features embedded advanced algorithms and proven control routines that continually adjust the combustion process to account for the varying characteristics of biomass fuels.

The boiler island and biomass handling plant will be built next to the existing units at GDF Suez's 1800 MW coal-fired power station, which already uses an Ovation control system. The boiler will burn wood chips in combination with 20 per cent of agricultural derived fuel such as straw pellets or crushed briquettes, sunflower pellets, fruit husk pellets and crushed palm kernel shells.

Alstom signs Tzafit O&M contract

Alstom has signed an operation and maintenance contract worth around €330 million with Dalia Power Energies Ltd for the 835 MW Tzafit power plant in Israel.

The scope of the contract includes complete day-to-day operation and maintenance of the plant's two gas-fired combined cycle units, located 40 km south-east of Tel Aviv. Each unit is based on Alstom's GT26 gas turbine, steam turbine, generator, control system and heat recovery steam generator (HRSG).

The Tzafit power station is expected to enter commercial operation in 2014. It is the largest project ever to be executed in Israel by an independent power producer.

Consultation outside the box

As UK project developers assess the opportunities for developing wind and other low carbon energy projects, PPS Group's **Leander Clarke** details the ins and outs of securing permissions and the importance of community consultation.

The UK's Electricity Market Reform process is seeking to attract substantial investment in low carbon generating technologies such as renewables and nuclear.

However, one of the biggest challenges that many of these projects will face is gaining planning consent – an area that requires careful consultation.

The days of tick box consultation processes are behind us. With the introduction of the localism agenda and the formalisation of planning for major infrastructure projects through the rigorous and process driven Infrastructure Planning Commission/ Major Infrastructure Planning Unit (IPC/MIPU), planning consent is, and will continue to be, intrinsically linked to consultation best practice.

For something so vital to the success of the planning process it is also one of the easiest (and normally the most consistent) processes to get wrong; even with the rigorous application of tried and tested consultation methodology, developers can and continue to fail.

Whilst good consultation cannot guarantee consent, poor consultation can almost certainly guarantee failure.

The most common mistake is for developers and those instructed to support consultation to assume they know who their audience is without thoroughly doing their homework. This might be obvious in terms of statutory consultees but when it comes to the community it is not always clear who that is.

Communities can be defined in many ways depending on the scale, type and location of the proposed energy infrastructure project and the types of developments existing or already proposed within an area. In the case of an onshore wind farm, the community can be defined as those bordering the proposed site, or it can be the visual impact zone.

The community might also include a community of interest; if the proposed site borders a key tourist destination for instance, main roads or transport links or other area of perceived importance. A community might also be defined as anyone with a vested interest in the land being proposed for development for instance local farmers or where it might border common land.

For an offshore wind farm development the community will inevitably involve local sea users such as fishermen or surfers as well as those with view of the site, the connection route and wind farm.

How each of these communities will receive proposals depends on many factors tied into the political, economical, social, historical and environmental connections with a site. These factors must be identified alongside the communities and stakeholders a developer actually wishes to consult with.

Finally, a community might also include neighbouring areas where impacts are perceived in terms of environmental impact or where a local community or council area feels that there has been over-development. Take for example a region that has seen proposals for a multitude of energy infrastructure projects over a short period of time. Whilst each project individually might only impact visually on a small part of the region, for instance a neighbouring town, taken collectively the region may feel it is shouldering disproportionate impacts compared to other places in the UK. This must be accounted for in any future consultation work.

Identifying early on who the community might be, its motivations and drivers and importantly the expectations it might have of a developer is key to ensuring that consultation hits the mark and not a brick wall of opposition.

For developers where many sites are being considered, site risk analysis can provide an excellent and cost-effective method of identifying areas of high receptiveness to development proposals and those that would provide more of a challenge even with consultation best practice. Site risk analysis can identify other recent development proposals and the success/failure of these; any vociferous opposition groups and their motivations; local political and business appetites for development and finally the motivations of the communities involved in the site; all of which can determine a strategy for consultation before pen is put to paper.

The next opportunity for consultation to flounder is failing to adequately explain the parameters of the consultation and the level of influence actually held by the communities and stakeholders being consulted. In many cases, energy infrastructure projects provide little room for negotiation in terms of both site and technologies involved in for instance nuclear new build projects.

> Failure to manage expectations from the start will only fuel the fire of opposition

Some developers therefore take a 'decide, announce, defend' approach to consultation presenting communities with what feels like a *fait accompli*. Whilst in the past this might have done no more damage than to provide ammunition for the local objection group, localism has changed this with even the smallest of communities expecting some influence over an infrastructure or land use project that they perceive will affect their day-to-day life.

This does not mean developers should hand power to consultees to make decisions beyond their level of understanding and experience of the project or technology. Often however, communities have a level of knowledge and understanding of the site that can actually improve the project being proposed.

If consultees feel they are genuinely being asked to participate and influence, and understand the nature of that influence, even at the smallest level such as how a community benefits package might be managed, a community is more likely to engage with a developer and consultation begins from a more positive stand-point.

Most developers understand the importance of being able to demonstrate that they have listened to consultee concerns. In fact the IPC requires extensive evidence that this has taken place. This evidence is usually presented as a log of concerns and the (often stock) responses from the developer to show that these concerns have been 'listened to'. A community helpline is cited as a tool enabling consultees to really be listened to, as are public exhibitions and town hall meetings. However the perception of being listened to is far harder to engender than merely evidencing that developers have provided a forum for, and responded to consultee feedback.

If a developer has been thorough with its stakeholder and community mapping and has adequately set the parameters for consultation it is very easy to plan how to respond to common and expected concerns and issues, with stock responses and consultation materials that contain the answers its preparation has identified as being needed. This is a valid form of consultation and will perhaps satisfy a majority of those being consulted.

However, this planned approach does not eliminate the need to really listen to unexpected or unique concerns or requests. Responses that do not adequately deal with the matter being raised and feel as if they have come from a stock of prepared answers will only reinforce a community's perception that the consultation is a done deal and they are not really being listened to.

Community hotlines work well when those answering the phones actually listen properly to the person who has taken the time to call. Offering an individual response to the concerns raised will pay dividends in terms of developer trust and perception.

One of the biggest benefits of getting all of the above right is that a developer is more likely to meet or manage the expectations of consultees and therefore garner trust and support (or at least ambivalence) to the proposed development. It is important that expectations should not be misunderstood.

Expectations might be a simple case of the level of influence a community actually has over a proposal but might also include an expectation of benefits on offer, timescales in which a development will operate and the associated infrastructure required and the impact of these plans. A nuclear power station for instance is likely to provide long-term employment opportunities; an onshore wind farm is not.

If the community is expecting employment benefits for a substantial onshore wind development then failure to manage expectations from the start will only fuel the fire of opposition. In this case the answer might be providing a community benefits package that includes training to help local people into sustainable employment or simply explaining what other benefits the site offers beyond employment. This should be done before employment opportunities becomes a perceived truth, fuelled by misunderstandings.

Understanding and matching, or at least managing the expectations is just one part of the expectation equation. Developers must also consider what they are expecting from consultees – NIMBY-style opposition or a genuine exchange of ideas and opinions? Consultation has to be a two-way dialogue about a proposed development. Developers should always prepare for views and opinions that do not match their own. This does not mean that consultees are merely demonstrating a 'NIMBY' attitude or are being difficult, by making that assumption developers will base responses on the idea that a community is misguided or uneducated rather than welcoming the participation of those being consulted.

Good consultation – properly conducted is now a prerequisite for helping ensure that developments get a fair hearing, and in due course, a planning consent. There are any number of concerns that can be raised about a development and in order to get the right decision taken for the right reasons, time spent on good consultation is time well spent.

Leander Clarke is Associate Director at PPS Group, which specialises in contentious land use communications and public consultation as part of the project planning process.

Lofty ambitions: Wind farm developers have to be diligent in the consultation process

Clear and present danger

The UK's Electricity Market Reform is focusing on 'contracts for difference' as a key tool in attracting the investment needed to promote renewables. However, in terms of policy risk in the immediate future, renewables might be worse off with these contracts than they were with the Renewable Obligation Certificates.

Francesca Tedeschi

There are stretching European environmental targets, both for renewable energy and carbon emissions, and the electricity sector is seen as crucial in delivering these goals. Therefore, governments across the EU are looking at the design of their electricity markets and support schemes to see if they are adequate to deliver a decarbonised generation sector, including a high renewable penetration.

In the UK, this review has been undertaken through the Energy Market Reform (EMR). This is designed to balance a number of objectives, as decarbonisation is just one of the key challenges the UK electricity market will be facing in the mid to long term. Ensuring security of supply, meeting electricity demand growth and delivering an affordable level of prices to be paid by final consumers are all challenges for the energy sector that the government is trying to address.

Viewed by some as an undesirable regulatory intervention in the market, by others as a long-needed change to the rules of the game, the EMR will be in the end a business opportunity for the whole industry.

Renewable electricity is important for hitting the UK's 2020 renewable energy target. Under the National Renewable Energy Action Plan, 49 per cent of this target is expected to be delivered by the electricity sector, with 30 per cent from heat and cooling and 21 per cent from transport. This translates into the need for 30 per cent of electricity coming from renewable sources by 2020 or around 117 TWh compared to the 25 TWh produced in 2010. Renewable electricity is also important for decarbonising electricity generation, which will imply further increases in renewable penetration by 2030.

Renewable electricity has been growing by an average CAGR of 10 per cent over the last decade. Despite this, it could be considered as an immature industry in some respects. Renewable projects are still quite exposed to construction and development risk. Supply chain or grid infrastructures may not be geared up to sustain the desired growth. On the commercial side, barriers may materialise if inefficient financial or fiscal support schemes lead to insufficient access to funding. The focus of the EMR is on this last aspect. By providing effective support to renewable projects, the government aims to unlock the necessary funding.

The current principal incentive scheme for renewable electricity is the Renewable Obligation (RO), which places a legal obligation on licensed suppliers to meet a specified proportion of their electricity supply with Renewable Obligation Certificates (ROCs) or pay a penalty price. ROCs are issued to renewable generators that can then trade those certificates to realise the value of support.

In its EMR consultation the government judged that the RO would not attract sufficient capital to meet the 2020 targets as new sources of funding may be less comfortable with the market risks associated to the RO. Therefore, the EMR proposes to phase out the RO in favour of a Contract-for-Difference (CfD) scheme, which is perceived to better isolate projects from market risk, reducing the cost of financing and improving the incentives to undertake investments.

Under this arrangement, renewable generators (as well as other low carbon technologies, such as nuclear) benefit from a long-term contract setting a fixed tariff (the 'strike price'). Revenue will be received from the sale of electricity through the wholesale market and from a reconciliation payment equal to the difference between the market price index and the strike price.

The EMR White Paper specifies the new CfD form of support, but the details that will determine whether or not the CfD will make projects bankable and attract additional sources of investments are as yet undecided. Key issues are, among others, the definition of the market price index and the ability of generators to capture that index, the level of strike price, the basis of volumes for payment and the counterparty risk. It is worth noting that CfD arrangements are about price risk, not volume risks. Renewable generators will still have to sell their electricity into the market and are exposed to shortfalls in production (i.e. volume risk).

Meeting ambitious renewable targets will require high growth in the deployment of both biomass and wind. Given the differences in their operational profiles – biomass is typically baseload, while wind is intermittent – the CfD structure is expected to vary depending on technology type: baseload, intermittent or flexible. Initially, all CfDs will be baseload or intermittent with the flexible one as a longer-term option.

Biomass is expected to be eligible for the baseload CfD, where the market index is a seasonal or year-ahead index of electricity prices with an inflation-indexed strike price. The main challenges for biomass are the exposure to variable fuel costs against a fixed price income stream and the ability to capture the annual reference price.

> "If anything, renewable projects will be exposed to a higher degree of uncertainty"

Under current proposals, the strike price will not be linked to fuel prices for biomass plant. Long-term supply contracts for biomass, in particular for large-scale plants, are still to be tested for bankability. The cost of biomass is expected to fluctuate over time, and could face upward pressure from increasing demand from the energy sector.

This may squeeze biomass generators' margins should higher biomass prices feed into fuel supply contracts or could push fixed-price contracts out-of-the-money at the expense of suppliers creating the conditions for potential contract renegotiation. In either case, exposure to those risks requires sufficient rewards in the eyes of an investor. Whilst there were unsolved issues under the RO scheme, the EMR proposal does not offer any mitigation measures. Neither the CfD, nor the alternative Premium Feed-in Tariff (FiT) option, would introduce flexibility provisions to adjust support levels. Fuel price and volume risk remains in the hands of developers, feeding into the cost of financing.

CfDs are also open to another source of risk, the so-called 'basis' risk, where the index used as reference for the calculation of the CfD payments is not representative of the value captured by the plant. Basis risk arises when generators cannot access the market index against which their income is determined – either because of illiquidity in the index, structural barriers in the market or incompatibility between generation patterns and the chosen index. We would not expect investors to be immediately comfortable with this new form of market risk, therefore cost of financing or contracting would necessarily factor in this element.

Tedeschi: 'resolved' CfDs will boost investment levels

Under the intermittent CfDs, this basis risk to wind generators could be potentially enhanced by cannibalisation effects. With increasing quantities of wind generation on the system, market prices will likely become increasingly, and negatively, correlated with wind production patterns. The generation-weighted average prices captured by wind farms are expected, over time to be at discount to average annual or even day-ahead prices. Intermittent CfDs have been designed to reduce this exposure by setting the reference price much closer to delivery, most likely at the day-ahead point.

However, if these CfDs leave generators exposed to within-day volatility in principle, it does not completely protect wind projects from cannibalisation effects, illiquidity imbalance costs and the transaction costs associated with market access and hedging contracts.

Until these effects become more familiar and assessable, we would expect potential mis-pricing of hedging strategies in off-take contracts (e.g. overpaying suppliers for bearing cannibalisation risk) or in the cost of financing. In the long-term these extra costs may reduce. Compared to CfDs, the alternative support schemes – the current RO regime or the secondary proposal of Premium FiT – do not offer any level of protection against cannibalisation effects.

Projects in theory are more exposed to price risk. In reality, the ROC revenue offers a fairly certain (and bankable) income to projects and some of the electricity market risks can be mitigated through appropriate measures in off-take agreements, such as floor type structures, or compensated by allowing potential upside.

Intermittent generators will also be increasingly exposed to higher imbalance charges if the cost of balancing supply and demand rises because of both more unpredictable and inflexible capacity on the system and the cash-out reform. None of the proposed schemes – RO, CfD or Premium FiT – mitigate this risk, which will be necessarily priced into the terms of the power purchase agreement (PPA) or the cost of financing.

CfDs may appear to offer the revenue security that financiers aspire to. As proposed, strike prices will be granted to projects at financial close eliminating the revenue uncertainty in the initial phases of the project and reducing the cost of debt. However, it potentially introduces new regulatory and basis risks. The level of support will, like in the case of the RO, rely on policy decision.

For the time being, the strike price will be assessed in the same way the RO bands are currently determined. Therefore, in terms of policy risk, renewables are not better off with CfDs than they were with ROCs. If anything, they will be exposed to a higher degree of uncertainty should strike prices not be set well in advance to allow for project planning approaching the 2017 deadline.

Some changes to the design of off-take agreements may also be needed, for instance a price indexation mirroring the CfD, and financiers will need to reassess the criteria for bankability, such as gearing levels or built-in debt protection layers.

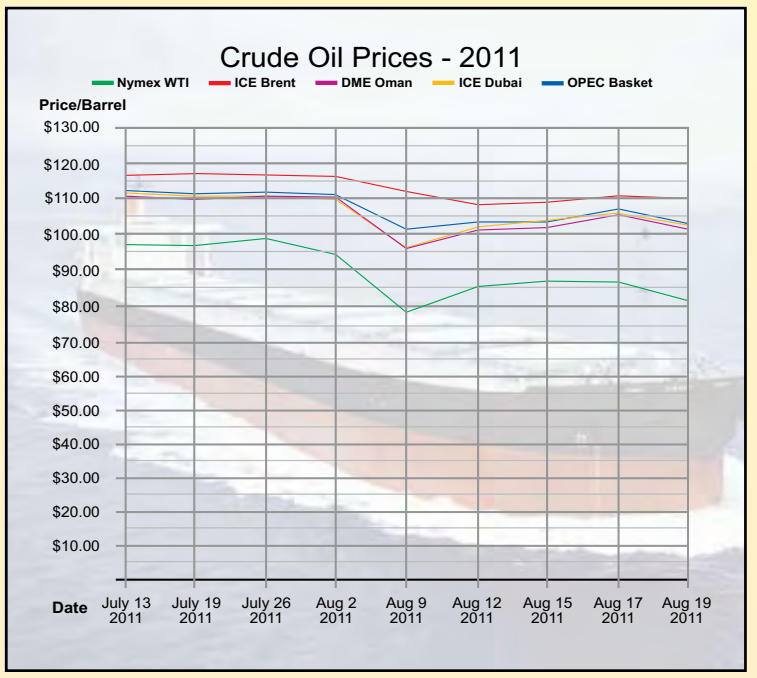
There are plenty of issues to be resolved under the CfD, which may lead to initial delays in investments as developers and financiers wait for details. During this time, the EMR will be providing a sufficient fall-back option to support the bulk of investments needed as the RO will be still available to projects commissioning out to 2017. Once the 'resolved' CfDs kick in, we would expect a boost in the investment levels. CfDs will play a key role in delivering the marginal volumes required for 2020, and in delivering post-2020 carbon targets.

Francesca Tedeschi is a Senior Consultant at Pöyry Management Consulting.

Oil

High oil prices contribute to economic woes

- Return of Libyan crude could lower prices
- Uncertain fiscal picture saps consumer confidence



David Gregory

Crude oil consumers saw some respite during August as prices of West Texas Intermediate (WTI) crude traded as low as $82/b and Brent crude went under $110/b. The melodrama of the debt ceiling debate in Washington and the subsequent downgrading of US treasuries contributed to a general unease about the world's efforts to crawl out of global recession. But the price of retail petroleum products is also seen as playing a role in holding back global economic growth.

The overthrow of Muammar Qadhafi in Libya and the seizure of power there by the National Transitional Council (NTC) have led to speculation that Libyan crude oil production and exports could soon begin to make a comeback and thus put more oil on the market and lead to lower prices.

Early reports on the state of Libya's oil industry say that most production and export facilities escaped the six months of fighting with little damage, but much will depend on how quickly the NTC will be able to put in place an effective oil sector administration and how quickly the many foreign oil firms that were operating in Libya are able to return and resume their activities.

Despite the optimism of some, a number of market analysts have forecast that it will take a year before Libya can return to its 1.5 million b/d pre-revolution production rate. And it is expected to take six months before Libya can move much beyond the 60 000 b/d that it is now thought to be able to produce. Yet already the market is beginning to question how Opec will respond to a return of Libyan crude oil to the market.

Gulf producers Saudi Arabia, Kuwait and the UAE boosted production in recent months in order to make up for the Libyan outage, but there are predictions that those Opec members will begin to back away from those increases as Libyan output gradually comes back on-stream.

Opec member countries, like others, have found themselves facing economic constraints during the last two years. This has made them more dependent upon crude oil prices in the neighborhood of $100/b – considerably more than the $75/b that was once considered perfect when crude was in the $40/b range in 2009.

But unlike the run-up to the 2008 global financial meltdown, high crude oil prices are being identified as a significant obstacle to improving the global economy.

In its monthly *Oil Market Report*, released on August 10, the International Energy Agency (IEA) cited "increased evidence of economic slowdown" and pointed out that sustained high oil prices and slowing economic growth had "dramatically curbed" global oil demand growth in recent months.

"In addition to the pressure of high oil prices, an overhang of sovereign debt and an uncertain fiscal picture in the developed world have, so far, sapped consumer confidence and prompted rigorous economic tightening," the IEA said in the report. "Moreover," it added, "emerging markets have begun decelerating as the lagged effects of monetary tightening in the hope of cooling inflation take hold."

The IEA said in this respect, it had revised down its forecast for 2011 global oil demand by 60 000 b/d, and said that "weaker readings" in the US and China were "driving the adjustment." The agency forecast world crude oil demand for 2011 at 89.5 million b/d during 2011 and at 91.1 million b/d in 2012.

The London-based Centre for Global Energy Studies (CGES) agreed with the IEA in its assessment of high crude prices and said they were "damaging economic recovery in a number of ways." The consultancy also stated in its *Monthly Oil Report*, released on August 22, that "the prices needed by oil producers are rising dangerously close to levels with which the global economy cannot cope."

The CGES said that oil prices have "once again become a liability, but it is not clear how much room there is for them to fall, given the rising demands of oil-producing nations." It added that this "inexorable rise in the break-even oil price needed by Opec member countries is becoming a concern."

The London consultancy said it had estimated that Saudi Arabia needed an Opec Basket price of around $90/b during 2011 to cover its expenditures. Other Opec members need the Opec Basket to average even higher, it added, and warned the "revenue needs of Opec producers are now pushing oil cost to levels that the global economy cannot tolerate."

Gas

Noble Energy set to drill for gas offshore Cyprus

Hydrocarbon drilling, set to begin off the coast of Cyprus, will mark the advent of a new industry for the island if a discovery is made.

Mark Goetz

US independent Noble Energy will begin drilling offshore Cyprus on October 1 or earlier, officials in Nicosia recently announced. Exploration will get under way in accordance with a production sharing agreement awarded to Noble by the Cypriot government in 2008 for Block 12, one of 13 blocks in the Cyprus exclusive economic zone (EEZ), which covers some 70 000 km^2 in the eastern Mediterranean off the island's southern coast.

This will be the first hydrocarbon well ever drilled in Cyprus, marking the advent of a new industry for the island if a discovery is made.

Houston-based Noble has made several significant gas discoveries offshore Israel during the last two years and officials at the Energy Department in Cyprus say the company will be drilling in a structure now identified as the Aphrodite field. Natural gas reserves in the structure are estimated by the Energy Department at around 10 trillion cubic feet (tcf), or 280 billion cubic meters (bcm).

Prospects for a discovery look good. The Aphrodite field is located some 50 km west of the Leviathan field in Israel's offshore EEZ. Leviathan was discovered by Noble in December 2010 and reserves there are estimated at 16 tcf. In 2009, Noble discovered the Tamar gas field where reserves were recently increased to more than 9 tcf. Noble and its Israeli partners are now developing the Tamar field and gas from it will be used to meet Israel's domestic needs. The Leviathan field will be developed for export, perhaps in conjunction with any discovery that Noble makes in Cyprus's territorial waters.

Earlier this year, Noble and its main Israeli partner, the Delek Group, approached the Cypriot government with a proposal to build a 15 million tons/year LNG facility on the island's southern coast near Vassilikos. Talks on that issue have yet to begin, but an initial start-up date of 2020 has been set for such a project.

Noble estimates that drilling its first well in Cyprus Block 12 will take about two months to complete, meaning that results will be known by late this year or early in 2012.

In mid-August, the Delek Group announced that it had reached agreement with Noble regarding its participation in Block 12, for which Delek subsidiaries hold a 30 per cent option. That option has now been extended to August 1, 2013. The farm-in requires the approval of the Cypriot government. In the meantime, Delek subsidiaries Delek Drilling and Avner Oil and Gas will each contribute 15 per cent of the cost in exploratory work in Block 12.

Should a discovery in the Cyprus offshore be made, it would come at a time when the government of Cyprus is addressing a number of problems, the most immediate of which is recovering the loss of 793 MW of generating capacity when munitions improperly stored at a naval base at Mari exploded and destroyed the island's main power generation facility at nearby Vassilikos.

Cyprus is also facing the introduction of financial austerity measures in an effort to reduce its fiscal deficit and avoid risk of needing assistance from the European Union. Together, the island's financial woes and the loss of generation capacity, plus the electricity rate hikes that will come in combination with austerity measures, have made for a tense political summer on the island.

However, Turkey is attempting to halt the exploration for hydrocarbons in the Cyprus EEZ.

Turkey argues that drilling in the Cyprus EEZ should not proceed because the government in the south does not represent both Greek-Cypriot and Turkish-Cypriot communities and that exploration work should not begin until there is a political settlement between the two communities on the island. When the Cypriot government announced in early August that Noble would start drilling in October, Turkish Foreign Minister Ahmet Davutoglu issued a statement saying that Ankara would "show the appropriate reaction if any further step is taken."

Cyprus, which has signed the International Law of the Sea, has stated that all the offshore hydrocarbon exploration activity being carried out in its EEZ is done so in accordance with international law. The European Union, the US and Russia have all expressed support for Nicosia in this matter.

Producing water from smoke

An industry-EU funded project could see power plants become important water producers instead of consumers.

Junior Isles

Flue gas from power plant stacks contains a substantial amount of fairly clean water vapour, which, if captured, can be a valuable source of high quality water for use in the power station itself or in locations where water is scarce.

Under a project commissioned by the European Union and led by international energy consultants, KEMA, 13 industrial partners are approaching the stage of field testing a technology that can change power stations and other industrial installations from being water consumers to water producers.

Known as the CapWa (Capture of evaporated Water with novel membranes) project, initial calculations show that hundreds of millions of euros can be saved annually with this new technology.

The CapWa Project is the culmination of almost 12 years of research to demonstrate the principles of technology for capturing evaporated water from flue gas stream using membranes. With the principles having been proven in the laboratory, the project is now entering the important stage of proving the concept at a much larger scale.

Ludwin Daal, KEMA's project manager for the CapWa project explained: "Some of the membranes we are using are based on ultra-filtration. However, the selective material that is needed for these membranes has not been made at production scale yet. One of the main aims of CapWa is to produce membranes for this application on a commercial scale."

The industrial consortium in charge of the project therefore includes a leading membrane supplier from Germany known as Membrana GmbH, and a membrane module specialist called Cut GmbH & Co. KG. Israeli engineering company, Yodfat Engineers Ltd. will design the end system, which will be based on the innovative membrane module containing the new membranes and available technologies for condensation of evaporated water etc.

While figures for funding the project are undisclosed, a considerable portion will come from the EU, which has specified that the membranes and modules must be manufactured in Europe. Since the new technology will be deployed in areas where water is scarce, the consortium also includes three African partners and two from the Middle East. "The inclusion of consortium partners from across the entire value chain means the project has good potential to be successful," commented Daal.

The technology is being tested at Israel Electric Corporation's Ruthenberg 4 x 575 MW coal fired power plant in Ashkelon

The consortium is hoping to commercially develop a technology that essentially overcomes the problems faced by existing technologies for water condensation. When water is condensed from flue gases in particular, ducts have to be protected from corrosive compounds such as sulphur dioxide and hydrogen chloride that are condensed in the evaporated water.

The water capture technology basically separates water molecules in the gas phase from the other molecules present in the gas stream.

Capturing of the water can be realised by selective membranes placed directly in the flue gas stream. These membranes only let through water molecules, while the other gas molecules continue to flow. The water captured is of high quality and ready for use in industrial processes or to be distributed for other purposes.

The membranes are hollow fibres with a water-selective coating. Inside the hollow fibre, a vacuum is created, which causes a pressure difference and starts the process. A sorption-diffusion mechanism then starts in order to re-establish the equal distribution of the gas molecules inside and outside the tubes. However, only the water molecules can pass through the membranes. So, on the inside of the tubes, only water molecules will be present. The water has been captured and the air that is emitted to the atmosphere is dewatered.

An important characteristic of the CapWa technology, which makes it different from other water-producing technologies, is that it is based on gas/gas separation. This means that fewer steps are needed to ensure high water quality.

Comparing the technology with existing technologies, Daal said: "A disadvantage of condensing the entire flue gas stream, as in other technologies, is that it requires a high cooling demand since all of the air and the water vapour has to be condensed. In hot regions, cooling is not readily available and can therefore be a challenge. This is what makes our technology interesting. We just take out the water vapour we want and condense what we need. It separates water out of the flue gas stream in a single step. The water quality is much better than drinking water quality; it is clean enough to use in some processes immediately or you might need a simple mixed bed to polish it to make it suitable for boiler feed."

The ability to produce water from what would be waste water offers the potential for significant savings. KEMA has performed calculations for a coal fired power plant. It says energy savings will be realised in the case where a coal fired power plant reheats the flue gas, as is required by law in Europe.

Flue gas reheat ensures the flue gas exits the stack and also protects the stack from corrosion. However, it results in an energy penalty in the range of 1 per cent – a considerable amount in the power industry. Calculations are now under way for gas fired plants. These are not required to have reheat, so the energy penalty will be compared with the scenario of when they would produce water.

Site conditions and type of industrial application will have a big impact on the amount of water that is captured. In the Middle East for example, the technology may be interesting but a challenge would be how to cool the evaporated water that is captured.

The technology is being tested at several sites in different industries. Tests are planned at power plants owned by Gas Natural Fenosa and the Israel Electric Corp. (IEC), which are both consortium partners. The IEC project will take place at the Ruthenberg 4 x 575 MW coal fired power plant in Ashkelon, Israel.

Dr Jinjikhashvily Gabriel, Expert Engineer at IEC commented: "Acquisition of skills and knowledge during the project implementation, will be useful for the IEC Engineering Division in its consulting activities with power companies overseas."

IEC says the membranes developed within the CapWa framework will permit it to accomplish several goals. Extraction of high quality water will allow it to reduce its use of potable water, which is in short supply, from the national water supply system. It will also enable it to cut expenses in both water purchase and in water treatment.

Here the new technology will be tested on a slipstream of the flue gas from one of the plant's units. Daal noted: "The slipstream will be about 1000 m^3/h but the membrane modules should be able to treat more. IEC may want to treat a larger stream just to get a better idea of what the upscale will be. But we are aiming for the unit to be able to capture 1 m^3 of water, this would require considerably more flue gas (in the region of 22 000 m^3/h) but for safety reasons, we plan to keep it at 1000 m^3/h for now. If the results are satisfactory we can build a larger unit and it will be IEC's decision to build a larger bypass."

Putting this into perspective, a 400 MW coal fired power plant typically has a flue gas stream of 1.5 million m^3/h, of which 150 m^3 would be liquid water. Such a plant requires around 30 m^3 of process water, which could be met by capturing just 20 per cent of the water in the flue gas. Daal believes this is easily achievable. "Tests in the laboratory have shown we can actually capture more than 40 per cent. This would mean coal fired plants could actually be water producers," he noted.

The scale of testing at Ruthenberg will be decided in just over a year from now. There will then be 3-6 months for manufacturing and preparing the end system. The equipment will be installed on site during the last half year of the programme. The final results of the project will be presented in late 2013 in Ghana. "We expect the recovery levels to be equal or even better than what we have achieved so far because the quality of the membranes will improve in a manufacturing environment compared to a lab environment," explained Daal.

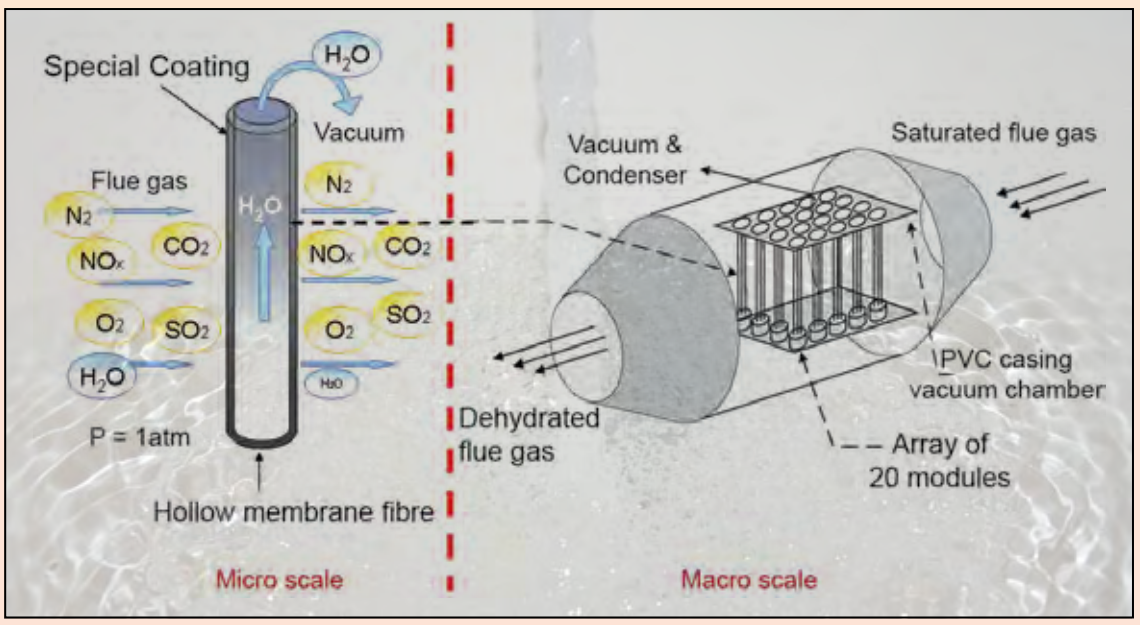
With such positive prospects, KEMA says there have been many requests for a commercial product. Daal said that the consortium partners have indicated that if the tests are successful, they are capable of getting everything ready within a year. "We could see a commercial product in 2-3 years, and most likely in 4-5 years," he noted.

According to KEMA, the cost of the technology, based on a 400 MW coal fired plant in the Netherlands, will be competitive with existing demineralised water systems. "This is even without savings from reheating, water distribution costs, taxes or maybe any costs related to the discharge of chemicals. We would be looking at a water price of between €0.5-1.10/m^3, that is even below the price of drinking water in the Netherlands," said Daal.

Certainly the new technology presents a good economic case. Membranes are expected to have a life span of about five years and payback time, if energy savings are included, is calculated to be in the order of a couple months.

Apart from economics, there is also the aspect of sustainability. Daal concluded: "Companies are willing to invest in something that can enable them to supply a product from their industrial process that has value to the local community. In arid regions it would allow power plants to supply water to people. This social aspect is also very important."

Capturing of the water can be realised by selective membranes placed directly in the flue gas stream



Junior Isles

When the cap doesn't fit

Whether we are talking about headgear or carbon dioxide emissions, a cap that is too loose is of little use. Yet having a cap that fits just right might be both tricky and unaffordable.

While Europe has found that perfecting a cap-and-trade system for CO_2 emissions is no easy task, concerns in the US related to the costs to business and consumers are jeopardizing the country's only operating CO_2 cap-and-trade scheme.

In mid-August the Regional Greenhouse Gas Initiative (RGGI), a programme covering 10 states from Maine to Maryland, set out a timetable for a review that could lead to tighter limits on emissions being agreed next year.

The review has led New Jersey to drop out of the scheme and now opponents are looking to seize the opportunity to kill the scheme altogether.

Opponents say that the US economy cannot deal with the impact of stricter environmental regulations at this tough economic time, while supporters say it is a crucial step in the US' transition to a clean energy economy.

The US has long struggled with introducing legislation to curb carbon emissions. A proposed cap-and-trade system for carbon emissions linked to climate change failed in Congress last year after protests from states and businesses.

It is arguable that this failure has in large part led to the lack of progress in reaching a global agreement on greenhouse gas emissions to replace the Kyoto Protocol.

Countries around the world have been struggling with how best to lower CO_2 emissions. Some have opted for a direct carbon tax, while others prefer a market-based mechanism such as cap-and-trade.

Certainly each has its pros and cons. A tax is simple and easy to enforce, with clear incentives. But although a tax fixes the price of carbon, it allows the amount of carbon emissions to vary. Further, taxes are always unpopular – especially when money raised is used by governments for purposes other than the original intention.

> "It is likely that those opposed to the cap-and-trade system would also be against a carbon tax or any legislation that might increase energy costs

In Australia for example, a plan to introduce a tax of A$23 on every tonne of carbon emitted is being fiercely opposed. The country plans to move to an emissions trading scheme in 2015.

A cap-and-trade system puts a limit on emissions and lets the market price of tradable allowances vary. Generators can buy or sell CO_2 permits depending on whether they are above or below the cap. A well-designed system arguably offers long-term investors certainty in the cost of cutting carbon, whereas a tax is open to political dabbling. There are those, however, who also argue that the volatility of a trading scheme makes the decision to invest in a particular technology more difficult than under a straightforward taxation.

The experts may be split on which system will best deliver the desired results but governments seem to be increasingly in favour of a market-based emissions trading scheme. Notably, the large Asian emitters seem to be leaning in this direction.

China, the world's biggest emitter of greenhouse gases, plans to set up a unified national carbon trading platform by 2015. It plans to start carbon trading pilot programmes in the cities of Beijing, Chongqing, Shanghai, Tianjin and the provinces of Hubei and Guangdong during the five years through 2015.

In April this year India said it would launch a pilot emissions trading scheme in Tamil Nadu, Gujarat and Maharashtra – but for air pollutants – and said that the scheme could go nationwide in the future.

In its pilot phase, the scheme will target only suspended particulate matter emitted by industrial units in regional 'clusters' but the government hopes to later include other air pollutants, such as sulphur dioxide and nitrogen oxides. While there is as yet no mention of CO_2 trading, the move will give India the experience and confidence to begin CO_2 trading if it decides to do so.

The two other major Asian economies – Japan and Korea – are also looking at developing CO_2 trading schemes.

One clear benefit of developing national trading schemes compared to a straight carbon tax is the ability to link national schemes, ultimately providing a global system for what is a global problem.

The EU's Emissions Trading System (ETS) has been operating since 2005 and covers half a billion people in 27 EU countries. Norway, Iceland and Lichtenstein are also linked to the EU ETS and Switzerland has plans to link its ETS to the EU's.

But the EU ETS has had its share of criticism. The theft of credits, which forced a closure of the system at the start of the year, presented another opportunity for the system's opponents to argue that it should not be the EU's flagship tool in cutting CO_2. Certainly, in itself the ETS has done little to cut emissions in the EU since its inception. This has largely been due to an over allocation of free permits in the first two phases of its operation.

Proponents of the EU ETS argue that the scheme will be far more effective when it enters its third phase from 2013 as tighter caps and a move from free allowances to auctioning of permits take hold.

The US also launched the RGGI in 2005. However, like the EU ETS, it has also had little impact because the cap agreed by the 10 states – to reduce emissions by 10 per cent by 2018 – has turned out to be far above actual emission levels. Reduced electricity demand caused by the recession, combined with greater use of cheap natural gas for power generation has seen emissions fall to about 30 per cent below the cap.

These systems demonstrate the difficulty of developing an effective trading system. The ineffectiveness of the scheme has led environmentalists and some businesses to lower the cap and bring it down to reflect where emissions are now.

While the RGGI may not have reduced emissions, at the same time it has caused negligible increase in electricity prices.

Certainly there is potential that if limits are tightened within the RGGI, energy costs may rise but so far that has not proven to be the case. It is therefore difficult to justify the concerns of cap-and-trade opponents in the US. Their concerns are even less justifiable when you consider that the US was the pioneer of successful trading systems for acid gas pollutants.

It is likely that those opposed to the cap-and-trade system would also be against a carbon tax, a renewables quota or indeed any other legislation that could potentially increase energy costs.

But tough economic times or not, the US, as the world's second largest emitter of CO_2, should not be going backwards. Before throwing away the cap entirely, the potential consequences should be considered. Whether we are talking about headgear or carbon emissions, the end result may be a healthier bank account but with a case of extreme sunstroke.