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Diluted Energy Efficiency Directive will still drive investment

Marie Donnelly: the directive “opens the platform for action”



The recently signed Energy Efficiency Directive may have fallen short of original proposals but still offers opportunities for players in the sector. **Junior Isles**

Despite a diluted version of the original proposal, the recently passed EU Energy Efficiency Directive (EED) will still offer opportunities for investment in technologies to reduce energy consumption.

According to the Danish Energy Association (DEA) the new EED will not achieve the EU’s 20 per cent energy efficiency target, as was the original target under the 20-20-20 framework of Energy and Climate. Instead it will deliver about 15 per cent of the 2020 target, said the Association.

At the heart of the deal – signed off by member state representatives and

due to be approved by the European Parliament in July – is a compromise over annual energy saving obligations for energy suppliers.

In its proposal last summer, the Commission called on member states to require energy suppliers to deliver an annual 1.5 per cent energy saving among end-users, calculated from the previous year’s sales. Member states, however, subsequently introduced a large number of loopholes. The Directive now contains a binding energy saving commitment of all EU energy companies at 1.5 per cent.

This 1.5 per cent target, seen as the

backbone of the directive, will deliver most of the savings – 70 per cent according to an assessment by the DEA. It will most likely force the European energy sector to be innovative and focus on selling energy efficiency services – as seen in Denmark, for example – instead of more energy.

The DEA study considered the final text in light of the European Commission’s April report on the costs and benefits of the EED, together with research on energy efficiency investment by the Fraunhofer Institute. It also took into account Denmark’s experience of implementing energy efficiency laws,

explained Ulrich Bang, director of European affairs at the DEA.

Implementing the EED will require an investment of €640 billion (\$808 billion), according to the DEA study, although investors are waiting for national-level implementation.

“Our analysis shows that about half of the total market for energy efficiency in Europe of €640 billion is in high-skilled energy efficiency technology development and advice. European companies currently hold a market share of 70 per cent of this market

Continued on Page 2

Little to show from Rio

As expected there were few positive outcomes from the Rio 20+ United Nations Conference on Sustainable Development last month.

Faced with the prospect of complete failure, negotiators ended up agreeing on a proposal that makes virtually no progress beyond what was signed at the original 1992 Earth Summit.

“We’ve sunk so low in our expectations that reaffirming what we did 20 years ago is now considered a success,” said Martin Khor, executive director of the Geneva-based South Centre and a member of the UN Committee on Development Policy.

One of the few positive developments that came out of the Summit was news that some \$513 billion dollars in funding has been committed to achieve a sustainable future.

In a press release posted on the UN’s

website, UN Secretary-General Ban Ki-moon said he was encouraged by the nearly 700 concrete commitments – totalling \$513 billion – registered at the conference from governments, business, industry, financial institutions and civil society groups, amongst others.

Of the funds committed, \$323 billion will be devoted to the secretary-general’s Sustainable Energy for All initiative, which seeks to achieve universal access to sustainable energy by 2030.

The World Bank also announced that it would boost efforts to expand energy access, while also increasing support for renewable energy and energy efficiency in developing countries.

The Bank Group – which already supports energy access initiatives in 60 countries around the globe – plans to scale-up initiatives to provide

electricity, clean household fuels and improved cooking stoves in selected countries, while also seeking increased financing to implement them.

Through the initiatives, and as part of its effort to support the Sustainable Energy for All initiative, the World Bank seeks to double leveraging of its low-carbon energy lending to \$16 billion a year.

Specifically, the Bank pledged to: provide technical assistance, policy guidance and financing to help up to five selected countries establish energy access plans; expand access programmes such as Lighting Africa; advance the clean cooking agenda by supporting clean cook stoves and household fuels programmes in Africa, South and East Asia, and Central America; provide risk mitigation for clean energy investments;

support development of geothermal power in developing countries; support cities in improving energy efficiency; help countries undertake mapping of renewable energy resources; support small island developing states’ investments in clean energy; and expand the Global Gas Flaring Reduction partnership.

Rio also saw the launch of the Clean Revolution campaign, a major initiative by The Climate Group and a range of partners from the public and private sectors. The campaign calls for a ‘green growth’ push out of the global recession.

Just ahead of Rio 20+ the International Energy Agency warned of government complacency over climate change, and called for policies to transform the energy system via a \$36 trillion investment plan.

Continued from Page 1

within Europe. The other half is blue-collar installation and renovation work, for which the market is almost completely covered by European SMEs. Therefore the directive is not just hot air – it will actually boost the European economy,” said Bang.

According to Marie Donnelly, director of new and renewable energy, energy efficiency and innovation at the Commission’s energy directorate, the EED should kick-start private sector financing of efficiency improvements in buildings.

She told a press briefing at the EU Sustainable Energy Week conference in Brussels last month: “The directive marks a substantive shift in the world of energy efficiency. It opens the platform for action to a wide range of actors.”

An earlier study by Friends of the Earth Europe and Climate Action Network Europe said €200 billion net could be saved in the EU each year through energy efficiency measures.

With member states drastically diluting the European Commission’s original proposal while the European Parliament tried to strengthen it, many doubted a deal could be struck.

The breakthrough came when they agreed to bundle a set of ‘flexibility measures’ together and cap their total use at 25 per cent. Essentially this meant that energy suppliers would have to deliver a 1.125 per cent saving per year.

The flexibility measures are: a phasing in of the 1.5 per cent target, credits for action in previous years, an exemption for energy used by sectors in the EU Emissions Trading System (ETS) and counting of supply-side savings, such as from combined heat and power (CHP).

Notably, there is no reference to shoring-up the EU ETS, although the Commission has promised to look into it.

Ed Davey, the UK’s Secretary of State for Energy and Climate Change commented that the EED was an opportunity to strengthen the EU ETS that “didn’t come off”. He said: “Some of what we wanted to get done didn’t get done.”



Ed Davey: “Some of what we wanted to get done, didn’t get done”

WWF-UK criticised the UK government for “cynically undermining” the EED, saying that the UK’s position had “effectively scuppered” the potential for energy savings across Europe. Contrary to its leadership on the need for 30 per cent carbon reductions across Europe by 2020, the UK is said to have insisted on changes to the EED that effectively provided it with get-out clauses.

Zoe Leader, energy efficiency policy officer at WWF-UK, said: “This unambitious deal shines a light on the UK’s real attitude to energy efficiency... It seems they are happy to talk the talk but not to walk the walk.”

Rules needed to unlock gas potential

The IEA has set out some “golden rules” to unlock the potential of unconventional gas but warns that a global dash for gas will result in global warming above the 2°C limit. **Junior Isles**

Exploiting the world’s vast resources of unconventional natural gas holds the key to a golden age of gas, but for that to happen governments, industry and other stakeholders must address legitimate public concerns about the associated environmental and social impacts, says a recent report from the International Energy Agency (IEA).

“The technology and the know-how already exist for unconventional gas to be produced in an environmentally acceptable way,” said IEA Executive Director Maria van der Hoeven. “But if the social and environmental impacts are not addressed properly, there is a very real possibility that public opposition to drilling for shale gas and other types of unconventional gas will halt

the unconventional gas revolution in its tracks.”

A special World Energy Outlook report on unconventional gas, *Golden Rules for a Golden Age of Gas*, sets out seven golden rules or principles that allow the environmental and social impacts to be addressed.

They are: measure and disclose; watch where you drill; isolate well and prevent leaks; treat water responsibly; eliminate venting, minimise flaring and other emissions; be ready to think big; and ensure consistently high level of environmental performance.

Peter Kiernan, energy analyst at the Economist Intelligence Unit: “The release of the IEA’s *Golden Rules for a Golden Age of Gas* reflects that the

debate on unconventional gas development is shifting from “if” to “how”.

The IEA forecasts that China, the US and Australia will drive the growth in unconventional gas supply between now and 2035, with the combined growth in these countries being greater than the forecast growth in conventional gas supplies from Russia, the Middle East and elsewhere.

It also said that the share of natural gas for power generation globally would increase from 22 per cent today to 24 per cent by 2035.

The report explicitly points out that “natural gas cannot on its own provide the answer to the challenge of climate change”. The IEA’s Chief Economist Fatih Birol said “a golden age for gas

does not mean golden news”, noting that a high dependence on gas would still result in global temperature rise of more than 3.5°C – well above the 2°C limit needed to avoid irreversible climate change.

A growing dependence on natural gas will see the US introduce 27 new storage sites by the end of 2016, states a new report by international energy analysts GlobalData.

The report claims that as the US plans to generate up to 80 per cent of its electricity through gas-fired plants by 2035, the working capacity of its underground storage network will increase from 4 650 122 MMcf (130.2 billion m³) in 2011 to 4 970 022 MMcf (139.16 billion m³) by 2016.

New technology for cleaner gas fired generation

- Produces pipeline-ready CO₂ without increasing costs
- Test plant commissioning in 2014

NETPower LLC, Toshiba Corporation, the Shaw Group and Exelon Corporation, are teaming up to develop NET Power’s new, clean, gas-fired power generation technology.

The new technology, called NET Power, uses a new a high-pressure, supercritical carbon dioxide oxyfuel power cycle to produce pipeline-ready CO₂ without reducing plant efficiency or increasing costs.

“NET Power’s technology is driven first and foremost by its low-cost electricity production, which does not require regulations or additional revenue streams to be highly competitive in the marketplace,” said Bill Brown, chief executive officer of NET Power. “By affordably capturing CO₂, though, NET Power can access the large enhanced oil recovery (EOR) market, creating substantial added value for NET Power plant owners, providing strong

market incentives for CO₂ capture and storage (CCS), and enabling large reserves of stranded, domestic oil to be accessed.”

A four-phase programme will see Shaw, Toshiba, Exelon and NET Power develop a pilot plant followed by a commercial scale plant. Phases 1 and 2 involving front-end engineering and combustor rig testing are expected to be completed in 2012. Phase 3, expected to be completed in mid-2014, involves the construction and commissioning of a 25 MW small-scale natural gas plant that will capture all emissions and will generate revenue from the sale of electricity and carbon dioxide for EOR.

Development of the first full-scale commercial natural gas plant is expected to begin in late 2014 or early 2015.

NET Power will be responsible for

overall project development and systems engineering; Toshiba will design, test and manufacture a combustor and turbine; Shaw will provide engineering, procurement, and construction services; and Exelon will support the development and operations of the 25 MW test plant.

As milestones are completed for the four phases, Shaw will invest up to \$50.4 million in cash and in-kind services and will acquire up to 50 per cent of NET Power LLC, to obtain exclusive worldwide rights to engineer, procure and construct NET Power plants.

Exelon, the largest competitive power generator in the United States, will provide and obtain permitting for the test site, test and commission the facility, market its output, supply fuel and provide other operations and maintenance support.

Exelon will also have options for the

first full-scale commercial plants when development is complete.

The team is working to design, develop and manufacture an innovative turbine for this new technology.

“Toshiba’s expertise in high-pressure and high-temperature turbines is a tremendous asset to NET Power,” said Brown.

The initial application of NET Power will be based on a natural gas fueled turbine. Future variants of NET Power are expected to be capable of using coal as the fuel source with existing, commercially available gasifiers.

“This next-generation technology, which was invented and is being developed here in the United States, will be of great interest to both electricity generating utilities, as well as oil recovery and exploration companies,” said J.M. Bernhard Jr., Shaw’s chairman, president and chief executive officer.

Boost for North-European power market integration

The decision to move forward with an interconnector between Norway and the UK will contribute to further integration of the North-European power markets and strengthen the North-European power grid.

The interconnector is a cornerstone in the development of the North Sea Network project and provides a boost to ambitions for increased renewable energy production in the whole region.

The signing of the agreement by Statnett and National Grid last month follows three years of joint feasibility

and development work.

The two parties are currently performing a joint seabed survey along the planned route and will now focus on obtaining the necessary regulatory and environmental agreements and concessions as well as preparing for the procurement of some 700 km of cable and two converter stations.

With a planned capacity of up to 1400 MW, the interconnector is expected to be complete by 2020.

Steve Holliday, Chief Executive of National Grid said: “This is a huge and

innovative project – it will use state-of-the-art technology to create the longest interconnector in the world and would link Norway’s flexible, clean hydro power into the UK market to strengthen energy supplies for both countries.”

Auke Lont, CEO of Statnett commented: “... the agreement provides a strong signal that our companies remain committed to deliver on common ambitions for a North-European power network.”

Statnett also gained approval to build an HVDC interconnector to Germany.

Norway’s Minister of Petroleum and Energy Ola Borten Moe and Germany’s Federal Minister of Economics and Technology Philipp Roesler said they expect that Statnett’s plans for a power cable between Norway and Germany can be realised in 2018.

It would be the first network connection between the two countries and would be particularly attractive for Germany, which is in the process of massively expanding renewable power generation capacity following its decision to close its nuclear plants.

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EMEC supports US marine energy

US ocean energy developers are calling on the expertise of a UK-based marine energy centre to help them establish a marine energy centre off the Pacific northwest coast of the USA.

The Oregon Wave Energy Trust and the Northwest National Marine Renewable Energy Centre (NNMREC) have announced a major collaboration with Scotland-based European Marine Energy Centre for advice and support on the design, set up and operation of the Pacific Marine Energy Centre (PMEC).

PMEC will be a grid-connected test centre that could help the USA to develop its marine energy resources. It will be the region's first standardised test facility and will demonstrate the viability of wave energy with a fully functional ocean test facility for prototype and commercial-scale devices. When complete, the centre will offer up to four test berths connected to the regional grid, each with capacity for testing devices up to 1MW in size.

"There is significant wave resource available to the United States in the Pacific Northwest and the creation of the Pacific Marine Energy Centre will deliver a vital resource in terms of capability for testing grid-connected devices," said Richard Morris, commercial director of EMEC.

"EMEC is uniquely placed in terms of providing consultancy support to countries wishing to set up marine energy test sites, through our groundbreaking and world-leading operations in the Orkney Islands, and this is an excellent opportunity for Scotland to assist and work alongside our colleagues in North America," added Morris.

EMEC is already working with the FORCE wave and tidal test centre in Nova Scotia, Canada.

Brazil hits the spot for investors

■ Investment environment lures international firms ■ EDF signs hydropower agreement

Global energy companies are turning to Brazil to make investments thanks to the country's energy demand growth, attractive incentives and commitment to infrastructure development.

State Grid in May became the latest Chinese firm to buy a Latin American asset being disposed of by a European firm, while Iberdrola and EDF have both made progress in the development of key energy projects.

State Grid's acquisition of the electricity transmission assets of Spain's Actividades de Construcción y Servicios (ACS) is the company's second purchase in Brazil.

It will pay \$530 million for a total of seven electricity transmission assets spanning five voltage levels with a total length of 2792 km.

In 2010 State Grid bought seven electricity transmission companies in

Brazil.

Brazil's national development bank BNDES in June approved \$187 million in loans for wind power projects being developed by Spain's Iberdrola, marking an important step forward in the firm's Latin American strategy.

The wind power projects will have a combined capacity of 150 MW and will be developed by Forca Eolica do Brasil, a joint venture between Iberdrola and Neoenergia, which is in turn owned by Iberdrola and Brazil's largest pension fund.

BNDES in 2011 carried out financing for wind projects with a total capacity of 1160 MW. The inexpensive financing that BNDES offers, as well as other fiscal incentives, have helped Brazil to attract investment.

However, a recent auction in Brazil for the rights to build six electricity

transmission lines attracted few competitive bids, with one project failing to sell.

The projects included the construction of 678 km of transmission lines and four electricity substations. Four of the winning bids offered no discount on the ceiling price set by the government, while the fifth bid offered a 40 per cent discount.

The transmission projects form a key part of Brazil's plan to expand its transmission infrastructure in the face of rising electricity demand.

Brazilian President Dilma Rousseff says that the country is determined to develop its electricity sector in a sustainable manner. Renewables accounted for 88 per cent of electricity generation in Brazil in 2011, 2.5 percentage points higher than in 2010, according to the Brazilian Energy

Research Corporation (EPE). Hydro-power output rose by 6.3 per cent year on year, while wind energy showed a 24.2 per cent increase.

Last month also saw an agreement signed between France's EDF and Centrais Eletricas Brasileiras (Eletrobras) to study potential hydropower projects on a tributary of the Amazon River.

The two state-controlled companies will work together to study projects on the Tapajos River basin, which could house at least six hydroelectric dams with close to 4000 MW of total capacity, Eletrobras said in a statement.

The companies will also share information on nuclear power and the so-called North Arch project, which would integrate the electricity networks of Brazil, Suriname and French Guyana.

Emissions drop amid falling coal use

■ Coal use falls to 20-year low

A reduction in the use of coal in the USA is the main cause of a drop in carbon dioxide (CO₂) emissions in the country.

Figures from the International Energy Agency (IEA) show that US CO₂ emissions have fallen by 7.7 per cent, or 430 million metric tonnes, since 2006. It is the largest reduction in CO₂ emissions of any country and is primarily due to a decrease in coal use.

In 2002 coal accounted for around 50

per cent of electricity generation in the USA, but is now close to 40 per cent. Statistics from the US Department of Energy (DOE) show that in March 2012 coal's share in electricity generation was just 34 per cent – the lowest level since January 1973, the earliest date for which monthly statistics are available.

The drop in March was due largely to a mild spell. However, the fall in the price of natural gas – caused by a boom

in shale gas production in the US – is also causing that fuel to encroach on coal's share in the generation mix.

DOE data also shows that natural gas fired generation jumped 40 per cent in March 2012 compared with March 2011. The fall in demand for coal is depressing coal prices and leading to producers to cut output.

While natural gas prices in the US are set to recover in 2013, according to analysts, coal-fired power plants face increasingly strict environmental regulations.

Even clean, advanced coal-fired power plants that are being planned for development around the USA are under threat from low natural gas prices. Three coal-to-gas projects are planned for Illinois and one in Indiana but critics have questioned their financial viability amid a market awash with abundant, cheap natural gas.

However the coal sector received some positive news in June when the US House of Representatives restored funding for clean coal technology research that the Obama administration had tried to eliminate.

The bill provides funding for the DOE and other related agencies for the 2013 fiscal year.

Keen competition for SMR funds

US vendors and energy companies are lining up to try and win funding from the Department of Energy (DOE) for the development and commercialisation of small modular reactor (SMR) technology.

Washington state-based Energy Northwest is considering the development of an SMR-based power plant at the site of its WNP-1 nuclear power plant, the construction of which was never finished.

Meanwhile, Westinghouse has announced that it has teamed up with Burns & McDonnell and General Dynamics Electric Boat to submit a bid for the DOE funding opportunity.

The DOE announced in March 2012 plans to award funds to SMR projects that have the potential to be licensed by the US Nuclear Regulatory Commission and achieve commercial operation by 2022.

According to a development council in Energy Northwest's service area, an SMR reactor could provide energy for a hazardous waste vitrification plant being developed at Hanford, Washington state, as well as the Pacific Northwest laboratory in Richland.

The WNP-1 site would be ideal because some of the plant's required infrastructure would already be in place, it added.

Westinghouse says that it submitted its application to the DOE in May. It

is planning to deploy its SMR technology at Ameren Missouri's Callaway Energy Center.

The DOE will award one or two winning bids up to \$450 million, which will be fund-matched by private industry and will support engineering, design certification and licensing activities. The agreements will run for five years.

Electric Boat will provide Westinghouse with modular design support, drawing on its expertise in the nuclear submarine design sector.

Energy Northwest is likely to favour NuScale Power, which is based in Oregon, USA, as its vendor.

The DOE is likely to announce winning bids in September 2012.



The US Department of Energy will announce winning bids in September



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Japan moves to boost renewables investment

Attractive feed-in tariffs for renewables could help boost renewables investment and help Japan reduce its dependence on nuclear and fossil fuels. **Syed Ali**

As part of a plan to boost investment in renewables, as of July 1 power companies are required to buy all renewable electricity generated by qualifying suppliers at a higher rate than initially expected.

Currently, power companies are only required to buy excess electricity generated by renewable sources up to a maximum of 500 kWh. The government is now removing this ceiling. Under the new programme, utilities will buy solar, biomass, wind, geothermal and hydropower at a special tariff.

All costs will be passed on to consumers in surcharges, which the government estimates will average about Yen100 (\$1.26) a month.

The move to create a guaranteed market for renewables is expected to make Japan a key market for companies in the solar power business.

Under a feed-in-tariff plan approved on June 18, 2012, power companies will be required to buy solar power at Yen42 per kWh (\$0.53) for 20 years. The Yen42 rate, aimed at 10 kW or bigger plants, is above the Yen38 price the

industry expected.

The plan is designed to reduce Japan's dependence on fossil fuels and nuclear, and came just days after the re-start of the first two reactors following the nationwide shutdown of the country's nuclear power plants after the Fukushima Daiichi crisis in March last year.

All of Japan's 50 nuclear reactors are now offline for maintenance or safety checks. Although public opposition to the resumption of nuclear operations remains high, the government has been pushing hard to bring some reactors online as soon as possible to avert power shortages as demand increases during the summer months. It says the two reactors in the town of Ohi are particularly important because they are in an area that relied heavily on nuclear

before the crisis, and have passed safety checks.

About 20,000 people gathered in front of Japanese Prime Minister Yoshihiko Noda's residence in Tokyo to protest his decision to restart the reactors.

The government hopes to restore public confidence in the country's nuclear sector with the establishment of a new regulatory body. The body was to be launched on April 1 but the start of Diet deliberations on related bills was delayed because of objections from the opposition.

Last month a bill crafted by the ruling and opposition parties passed in both the House of Representatives and the House of Councillors. The bill will see the launch of a "nuclear regulatory commission" with legally guaranteed independence, possibly by September,

and the enforcement of tougher rules to operate nuclear reactors.

The loss of its nuclear capacity caused Japan to use 40 per cent more coal, oil and gas in the first four months of 2012 than in the same period in 2011. The government now says it will have to scale back its planned cuts in carbon dioxide emissions and is currently rethinking its energy policy, which had been based on a high share of nuclear prior to Fukushima.

The new feed-in tariff for solar, which is about triple what industrial users now pay for conventional power, will see Japan become the world's second largest solar market behind Germany.

According to a Bloomberg New Energy Finance forecast, the tariff could drive at least \$9.6 billion in new installations with 3.2 GW of capacity.

China eyes private capital

- Fair treatment for all enterprises
- Supervision over electricity sector pricing system



Guangdong: a planned IPO will help raise money to pay for work on nuclear plants in the province and elsewhere

In the latest move to increase the efficiency of its economy and bolster growth, China's State Electricity Regulatory Commission, has issued a 15-article guideline to attract private capital into the country's state-dominated power sector.

The guideline gives specific policies regarding the sector's market access, supervision of fair power coordination, renewable energy network access and price reforms. It says enterprises under all types of ownership are supported to enter the power market, and the access standard for renewable energies such as wind and solar power will be improved.

The guidelines state that fair treatment will be given to all enterprises, and that power infrastructure companies owned by private investors will

be granted operation certificates.

The government will urge state grid enterprises to strike grid connection contracts and power transactions with private power firms and step up supervision to ensure transparency and fairness.

The guideline also stressed supervision over the sector's pricing system, vowing to unify the price of electricity for all enterprises, both private and state-owned.

In addition, the government will work to gradually open the power survey and design, construction, consultation and the material and equipment purchasing markets, it said.

In a separate development, China's main developer of nuclear power plants says it plans to raise money with an initial public offering. The IPO

will help to pay for a Yuan173.5 billion (\$27 billion) programme to build or expand five nuclear power plants, China National Nuclear Power Corp. said in a statement.

The statement said the share sale will take place in China but gave no timetable or a fundraising target.

China has ambitious plans to have more than 100 reactors operating by 2020 to help curb surging demand for coal and imported oil and gas but development was suspended after the nuclear crisis at the Fukushima Daiichi plant in Japan in March last year. The IPO suggests the building boom is resuming.

A separate Environment Ministry statement said China National Nuclear Power Corp. (CGNPC) had passed an environmental inspection that is required before an IPO can be approved by securities regulators.

IPO proceeds will help pay for work on nuclear power plants in Fujian, Guangdong and Zhejiang provinces in the southeast, Jiangsu province north of Shanghai and on the southern island of Hainan, the company said.

■ Last month the construction of the EPR reactor at Taishan, coordinated by EDF, CGNPC and Areva, passed a key stage in its development with the lowering of the vessel into the Unit 1 reactor building, after which it was installed in its final location in the reactor pit.

Nepal to attract \$6 billion in hydro investment

A new Project Development Agreement (PDA) template for hydropower projects above 500 MW looks set to attract \$6 billion in investment.

The template, approved at a meeting of the Nepali Investment Board, will now provide the necessary impetus to enable negotiations on the current four priority projects, which will produce 3000 MW of electricity.

The caretaker Prime Minister Baburam Bhattarai, who chaired the meeting, commented: "Harnessing Nepal's hydro resources for Nepal's socio-economic transformation has always been my number one economic priority."

He also noted that the new PDA template would give Nepal the ability to negotiate good hydropower deals and ensure maximum benefits in terms of revenue, spending, industrial and employment benefits, and electricity.

The new PDA template comes as a response to the previous PDA model that was rejected by developers and financiers in 2010 for not being bankable, according to chief executive of the board Radhesh Pant.

"With the approval of the PDA template, we are now on a fast-track to move on project agreements that will unlock the country's vast hydro potential and solve the load shedding problem," said Pant, adding that the board will present the PDA to key developers to enable both sides to lay the groundwork for intensive negotiations.

He told *The Himalayan Times*: "We have the opportunity to bring in \$6 billion in foreign direct investment, and create new opportunities for Nepali businesses and the labour force," adding that it not only solves the load shedding problem but also addresses the country's biggest obstacle to investment, business development and economic growth.

The Investment Board, as a leading agency representing the government, was set up in November 2011 as a one-window solution for foreign investors and developers investing in hydro projects above 500 MW and other infrastructure projects above 10 billion Nepali rupees (\$113 million) to fast-track projects and cut through bureaucratic obstacles and delays.



Baburam Bhattarai: harnessing hydro is a number one priority



Australia's carbon tax is already having an impact on energy prices as it puts pressure on coal fired generators.

Electricity and gas prices were set to rise in New South Wales (NSW) from July 1, due to higher network costs and the introduction of the carbon price, the state's pricing regulator said.

The Independent Pricing and Regulatory Tribunal (IPART) said NSW electricity bills would rise by an average of 18.1 per cent, increasing annual household electricity bills by up to A\$427 (\$424) and gas bills by up to A\$142.

The average price increases will vary for customers of the three regulated electricity retailers, it said.

"Around half of the increase in NSW electricity prices from 1 July is because of the continuing rise in costs faced by the retailers from the

electricity network or the poles and wires," IPART Chairman Peter Boxall said in a statement.

"The other half is due to increasing wholesale electricity costs faced by the retailers resulting from the introduction of a carbon price on emissions from electricity generators."

The price increases have led to calls for the carbon tax to be scrapped. NSW Premier Barry O'Farrell said: "... it's about time this federal government put the national interest first and scrap the carbon tax because it's going to hurt NSW, it's going to hurt families, hurt jobs and hurt our industry."

The carbon tax is already taking its toll on operators of coal fired plant around the country. In late June, Hazelwood power station in Victoria received a bailout from its parent owner worth A\$650 million after banks reportedly refused to refinance

the brown coal generator on terms acceptable to Hazelwood's owners.

Hazelwood supplies 25 per cent of Victoria's power, and as one of Australia's dirtiest generators will be hit hardest by the carbon tax.

The call for a Hazelwood bailout comes shortly after power firm Inter-gen had to bailout its Queensland black coal generators Callide and Millmerran after banks refused to recognise a government loan to the distressed stations.

"There will be a rationalisation of generation capacity because we have too much, and what the carbon price will do is influence which of the existing generators remains competitive and which does not," said Ross Garnault, adviser to the Multi-Party Climate Change Committee. "The market will decide that some of it should cease production."

India in nuclear talks

India is in talks with Russia, France, the US and South Korea to buy nuclear reactors as it seeks to set up 63 GW of nuclear generating capacity by 2032, V. Narayanasamy, minister of state in the Prime Minister's office, said at a conference in June.

Areva SA said on the sidelines of the industry conference it expects to sign a contract by December to build two reactors in Jaitapur for Nuclear Power Company of India Ltd (NPCIL).

"If we sign the contract by the year-end, we will target to commission the first reactor by the year 2020 and the second by 2021," said Arthur Montalembert, Areva India's chairman. He also said Areva is supporting NPCIL to secure export credit financing for the reactors.

The Indian utility is also setting up a project at Kudankulam in southern India with two 1000 MW Russian reactors. Narayanasamy said the first unit at Kudankulam may start generating power shortly, after receiving the necessary approval.

Meanwhile, Westinghouse Electric Company and NPCIL signed a Memorandum of Understanding (MOU) agreeing to negotiate an Early Works Agreement (EWA) supporting future construction of AP1000 nuclear power plants at the Mithivirdi site in Gujarat.

The agreement represents significant progress toward the realisation of the India-US Civil Nuclear Agreement signed in 2008. The Early Works Agreement will include preliminary licensing and site development work.

The signing of the MOU was welcomed by the US Secretary of State

Hillary Rodham Clinton during the annual strategic dialogue between the two governments in Washington.

Clinton said she looked forward to additional deals with other American companies, including General Electric. But she said there was still a lot of work to be done to address the implications of Indian nuclear liability legislation that effectively has blocked US suppliers from capitalising on the agreement.

India is keen to progress its nuclear programme especially in light of the problems it is facing in its coal sector. Narayanasamy said that "nuclear energy can be the second-best option" after coal. "It's cheap, it's clean," he noted.

More than half of India's 200 GW generating capacity is coal-based, and many upcoming projects will also depend on coal, but generation is being curbed by coal shortages.

In early June India's federal power ministry said it wants Coal India Ltd to increase the penalty it is willing to pay for failing to meet supply commitments to utilities.

"We want to change (increase) the minimum penalty clause. We are in talks with the coal ministry and Coal India," said Power Secretary Mr. P. Uma Shankar.

NTPC earlier said it wanted Coal India to alter the clause to increase the penalty up to 40 per cent of the value of the shortfall, as was the case in the previous supply pacts.

Coal India, which meets more than 80 per cent of the country's coal needs, has been facing stagnation in coal output growth for the past two years.



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Commission takes up 2030 gauntlet

The European Commission has urged the EU to work towards its 2020 renewable energy goal and has pledged to prepare a framework for 2030.

Siân Crampsie

The European Commission has acknowledged the need for a policy framework for renewable energy beyond 2020.

The EU's executive body said in a June communication on renewables that growth in the sector will slump without a clear policy framework in place. It came as market participants in the EU's Emissions Trading Scheme (ETS) called for strong intervention to boost carbon prices.

The Commission has proposed to start preparing future policy options and milestones for 2030. The EU's current energy strategy is focused on targets for renewable energy and greenhouse gas emissions for 2020.

It has also called for greater cooperation between member states in order to make renewable energy development more cost-effective.

"We should continue to develop renewable energy and promote innovative solutions," said Energy Commissioner Günther Oettinger. "We have to

do it in a cost-efficient way. This means: producing wind and solar power where it makes economic sense and trading it within Europe, as we do for other products and services."

Currently EU member states are allowed to 'trade' renewable energy and use other cooperation mechanisms such as aligned incentive schemes in order to reduce the cost of renewables. Few member states have implemented such schemes, however.

Earlier the International Emissions Trading Association (IETA) released a survey that indicates that ETS participants want the EU to intervene in the market to support the price of allowances.

The ETS is supposed to be the EU's main tool for encouraging investment in green energy technologies but the current low price of allowances – around €6.5 – provides little incentive for investment. ETS participants believe that the price will lie at €11-20 in Phase III of the ETS (2013-2020), according to the IETA survey.

Fulvio Conti, CEO of Enel, called at

the annual Eurelectric Conference in Malta for the ETS to become the "umbrella policy" for driving low carbon investment. He said the electricity sector stood by its commitment to achieve carbon neutrality by 2050, but was struggling with investors' lack of confidence and the low carbon price.

"We urgently need investment in Europe's transmission and distribution grids, in new power plants, and in innovative technologies like smart grids. But policy as well as regulatory uncertainty is blocking access to capital," said Conti.

The Commission has put forward the continued use of the ETS as the main instrument for stimulating renewable energy investment post-2020, a move that would require it to set new greenhouse gas goals for 2030. Other options that it has suggested include setting national or EU-wide targets for renewable energy, energy efficiency and greenhouse gases for 2030.

The European Renewable Energy Council (EREC) said that the Commission's 2030 agenda lacked ambition.

EREC and its members are calling for a binding target of 45 per cent for renewables by 2031.

"European Ministers must turn this message into action and back a renewable energy target for 2030, as supported by the Strategy's Impact Assessment," said Stephane Bourgeois, Head of Regulatory Affairs of the European Wind Energy Association (EWEA). "A legally binding renewable energy target for 2030 is crucial if we want to foster Europe's leadership in wind energy, and in particular offshore wind."

EWEA also backed the European Commission's criticism of recent abrupt changes in support mechanisms for renewable energy in several member states. "Retroactive changes in support mechanisms undermine investor confidence in the sector and could put the 2020 renewable energy targets at risk."

"We share the Commission's concerns, but the Commission must now take all legal means to prevent this," said Bourgeois.

IEA praises UK policy

The UK's efforts to promote investment in green technologies has been praised by the International Energy Agency (IEA).

The Paris-based organisation says that the UK is "leading by example" with its vision for a low-carbon future, but has warned that the country's policy design and implementation need to ensure that consumers are getting the best value for money.

The UK is currently reforming its electricity market and industry players and investors are concerned about proposed upcoming changes. The IEA says that the reforms should lead, in the long term, to a more liberalised power market where low carbon technologies compete.

Industry groups in the UK recently called for the government to publish more details on the proposed electricity market reforms in order to provide investors with greater certainty. One-fifth of the country's ageing power generating capacity needs to be replaced this decade.

Energy firm Centrica, which is part of a consortium planning to build new nuclear capacity in the UK, has voiced concerns over the government's plans for a guaranteed price for low-carbon electricity – including nuclear energy – under the reform plans. It believes that the proposal may clash with EU state aid rules.



The UK is "leading by example"

German TSOs propose grid superhighway

Germany's four transmission system operators have put forward proposals for an electricity 'superhighway' connecting wind farms in the North Sea to cities in the south, marking an important step forward in the country's energy transformation.

Tennet, Amprion, 50 Hertz and Transnet BW's plan involves the construction of 3800 km of high voltage power lines and will be a major building block of Germany's move from nuclear power to renewables.

The ambitious plan faces challenges, however, particularly in financing and in permitting, with strong objections to new power lines from nearby residents likely. The plans envisage development of 2100 km of direct current power lines as well as 1700 km of traditional alternating current lines.

The power lines will connect wind farms in the North and Baltic Seas to manufacturing centres in southern Germany and will cost around

€20 billion. The country has targeted the construction of 10 GW of offshore wind capacity by 2022.

Germany is already experiencing problems getting offshore wind farms connected to the onshore grid, mainly because of the technical challenge of building infrastructure offshore and financing the projects.

Tennet is currently investing €5.5 billion in the construction of nine offshore grid connection projects, two of which are behind schedule. It has sold stakes in two projects to Mitsubishi and is seeking investors for its other projects in order to avoid increasing its debt levels.

Germany is relying on renewable energy and natural gas fired plants to replace its nuclear power plants, the last of which will be closed by 2022. The four TSOs say that the four main DC lines need to be brought into operation between 2017 and 2020 and have called on the government to streamline planning procedures.

Poland mulls energy future

Poland's plans to become a major European gas producer have been thrown into doubt after the withdrawal of ExxonMobil from shale gas exploration projects in the country.

The oil firm announced in mid-June that it would not go forward with exploration. It is thought to be concerned over the commercial viability of Poland's shale gas reserves. In March, a report from the Polish government revealed that the country's shale gas reserves were just one-tenth of previous estimates.

Poland has granted four shale gas exploration licenses to ExxonMobil, and two to an Exxon-Chevron joint venture. A total of 112 shale gas exploration licenses have been granted to oil firms.

Exxon's decision is a major blow to Poland's plans to diversify away from coal to natural gas.

According to data from international equipment manufacturer Alstom, around 1.45 GW of new steam plant out of a total 2.5 GW, will come on line between 2014 and 2015. However between 2016 and 2020, the majority on new capacity will be in the form of combined cycle gas turbines (CCGTs). Out of about 1.75 GW for the period,

around 750 MW will come from CCGT plants compared to about 500 MW of steam plant.

Speaking at a press conference to coincide with the commissioning of a new turbine shaft welding facility in Elblag Poland, Jakub Radulski, Alstom's Country President, Poland said: "The Industrial Emissions Directive presents a challenging situation for Poland. It will cause the closure of 6-8 GW of plant by 2016."

Poland is a key market for Alstom,

which is investing in its steam turbine facility at Elblag to meet both domestic and global demand for turbines. Alstom said it has supplied the turbines and balance-of-plant equipment for 95 per cent of the country's installed fleet.

Andreas Lusch, Senior Vice President of Alstom Thermal Power's steam business noted that all of these turbines have been produced in Elblag. He added: "Some 320 turbines installed all over the world have been produced by Alstom in Poland."

Radulski: the Industrial Emissions Directive presents a challenging situation



Hitachi approved for Visaginas

Lithuania took a major step forward in its plans to construct a new nuclear power plant when its parliament gave its approval to a contract between the government and Japanese equipment manufacturer Hitachi.

Hitachi is to be the strategic investor in the Visaginas nuclear power plant, which is also supported by neighbouring states Latvia and Estonia.

Construction of the 1350 MW nuclear plant, based on advanced boiling

water reactor technology, will be carried out by GE Hitachi.

Operation of the new power plant is scheduled for 2021. A construction and operating license should be issued by 2015.

South Africa commits to nuclear and renewables

- Medupi achieves milestone
- AREA positive on renewable investment

The South African government has reiterated its commitment to diversifying its energy resources into nuclear and renewables.

Speaking at the National Nuclear Energy Conference in Johannesburg at the end of May, South Africa's Deputy President Kgalema Motlanthe said that the country would seek to work with foreign partners to "forge ahead in the development and construction of nuclear power plants".

He said that the government was primarily focused on large-scale nuclear power plants but indicated that nuclear developers could also consider small modular reactor (SMR) technology in the future.

South Africa's integrated resource plan calls for the construction of 9.6 GW of nuclear power capacity by 2029. It also calls for widescale development of renewable energy projects alongside a number of key fossil fuel-fired projects.

In June national power utility Eskom

announced that it had started the final phase of the pressure test on the boiler of the first unit of the Medupi power station, a flagship coal-fired power project in the company's efforts to boost generating capacity.

President Jacob Zuma initiated the test on June 8. Medupi is the first new power station to be built in South Africa in more than two decades and is the largest infrastructure project ever undertaken in the country.

It will also be the world's fourth-largest coal fired power station, at 4800 MW, and the world's largest dry-cooled power plant. It will boost Eskom's generating capacity by 12 per cent.

Eskom says that its budget for expanding electricity infrastructure could reach more than Rand1 trillion by 2026 as it seeks to develop transmission line projects and double generating capacity to 80 000 MW.

Major expansion of renewable energy infrastructure is also planned in South Africa, which in May announced the

preferred bidders in the second round of its renewable energy procurement programme. Round 2 attracted 79 bids, of which 19 were selected – totalling 1043 MW of renewable energy capacity – by the South African Department of Energy.

South Africa's goal is to produce up to 17 800 MW of renewable energy by 2030. According to the African Renewable Energy Alliance (AREA), Africa as a whole will be central to the global energy sector as a destination for renewable energy investment.

At AREA's annual meeting, participants said that political stability and strong political will, coupled with the need for off-grid energy development, would make the African continent a global leader in renewable energy.

"Renewable energy, especially solar and wind, has a leading role to play when it comes to energy access in rural areas," said Wisdom Ahiataku-Togobo, Director Renewable Energy, Ministry of Energy, Ghana.

Arava seals PV financing

Israeli solar firm Arava Power is to invest a total of NIS500 million (\$127 million) in five solar power projects after reaching financial close with four financial institutions.

The five projects will add 35 MW of capacity to the Israeli grid.

The company also announced that with partner EDF Israel, it has reached financial close on a further three solar projects totalling 23 MW of capacity.

Together the two deals represent the largest transaction of its kind in the country. The projects will be located in the Negev Desert, with construction starting this year.

Companies financing the projects include Noy Fund, Migdal Insurance Company, Bank Hapoalim and Amitim.

Energy from the plants will be sold to Israel Electric Company.

JBIC finances Morocco project

The Japan Bank for International Co-operation (JBIC) has approved its first project finance loan to Morocco.

JBIC announced in June that it has signed a buyer's credit agreement for up to \$216 million with Jorf Lasfar Energy Company for the construction of a 700 MW coal fired power plant near Casablanca, Morocco.

The 2 x 350 MW power plant is

being built by the Abu Dhabi National Energy Company (TAQA).

The loan will help to finance the purchase of equipment and services from contractors Mitsui & Co and IHI Corporation.

The loan is part of a \$360 million syndicated loan that JBIC has formed alongside France's BNP Paribas and Societe Generale.



Reactor closures boost decommissioning market

The global nuclear reactor decommissioning industry is set for a surge as half of the world's nuclear reactors are scheduled to close by 2030.

According to a new report from Global Data, more than 200 nuclear reactors are scheduled to reach the end of their design life, providing significant amounts of work for the decommissioning sector.

Europe will account for the bulk of the closures, followed by Asia-Pacific. Reactors could also be selected for life extensions, providing a boost for that part of the market.

In Europe,

more than 150 reactors are scheduled to close by 2030, some because the reactors are reaching the end of their lifespans while others are being shut down in line with government policy.

France, the UK and Russia have the highest decommissioning values, at \$21 494 million, \$18 717 million and \$13 446 million, respectively.

North America is expected to shut-down fewer nuclear reactors than other continents, with the US closing five and Canada set to decommission 17.

Contrary to the global trend, the US has granted life extensions to 71 of its nuclear reactors and more extensions are expected in the future.

More than 150 reactors are scheduled to close in Europe by 2030



Climate efforts disappoint

Progress in climate change negotiations is slow, while investment in clean energy technologies needs to be stepped up, according to key international organisations.

Siân Crampsie

Investment in clean energy technologies is at risk because of slow progress in the international climate change talks and barriers to investment by fund managers.

Senior international figures from the UN, IMF and IEA have separately said in the last few weeks that efforts to change the world's energy systems need to change.

UN climate chief Christiana Figueres said at the end of May that climate negotiations were proceeding at an "unacceptable pace" but said that governments were persevering and making some progress.

Speaking after a meeting in Bonn Figueres said that participating nations were tackling the issue of how to treat credits carried over from the 2008-2012 period of the Kyoto Protocol, while delegates from developing nations approved a registry for greenhouse gas mitigation measures.

Meanwhile the International Trade Union Confederation (ITUC) has

criticised the post-G20 reform agenda for not taking on board climate change financing priorities. It has called for increased investment from pension funds in the clean tech sector to help drive growth.

"Not enough money is being invested in emission reduction and adaptation policies," said Sharan Burrow, ITUC General Secretary. "While governments and other financial institutions should take the lead – the pension fund industry can play a key role."

Barriers to climate change investment come from the limited availability of climate change investment products and the post-G20 financial reform agenda.

The flow of green debt and equity financing could be affected if changes are not made, according to the ITUC, which is calling for an investment of five per cent of pension fund portfolios in green investments by 2015.

Pension funds currently contribute around 0.3-0.5 per cent of portfolios to clean energy infrastructure.

Last month the International Energy

Agency (IEA) said global efforts to bring about a clean energy transformation are falling behind and that the right policies need to be put in place to enable investment in clean technologies.

Launching its *Energy Technology Perspectives 2012* publication, the IEA said that the "technological revolution would not be cheap, but the long-term benefits far outweigh the costs". An additional \$36 trillion of investment is required to overhaul the world's energy system by 2050, but this would be offset by reduced fuel costs.

Also in June Christine Lagarde, the head of the International Monetary Fund, called on governments to tax carbon dioxide emissions to help in the fight against climate change while raising revenues.

Lagarde said that a tax would help ensure that the price paid for goods reflected the environmental damage caused by their production.

She called climate change "one of the greatest challenges of our time".

Hanergy buys into thin-film technology

Deal gives Chinese firm access to advanced thin-film technology, writes Siân Crampsie.

Financial problems among European and North American solar panel manufacturing firms could lead to increased consolidation in the global solar sector, with Chinese firms poised to make acquisitions.

Chinese group recently Hanergy announced plans to buy part of Q-Cells, the insolvent German solar panel maker. The deal follows a similar one by China's LDK to take over Sunways, another German solar panel firm.

Hanergy is to acquire Q-Cells' thin-film subsidiary Solibro, which specialises in copper-indium-gallium-diselenide (CIGS) thin-film technology. Details of the transaction have not been disclosed, but Q-Cells says that it "evaluated several potential partners" before agreeing a deal with Hanergy.

Q-Cells filed for insolvency in April

after failing to reach an agreement with creditors over financial restructuring. Other major solar firms to have instigated bankruptcy proceedings include Solar Trust of America, SolarHybrid, Solar Millennium and Solon.

The financial difficulties reflect intense competition in the global solar sector caused largely by overcapacity in production – particularly in China – that has resulted in steep price drops for solar panels.

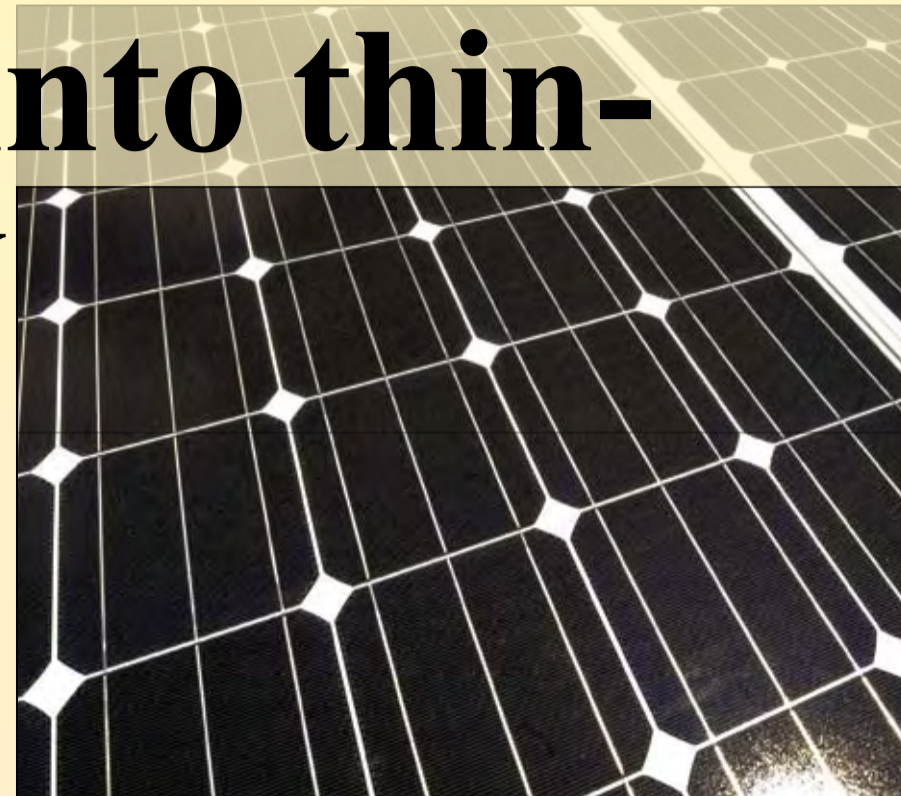
In January 2012 LDK Solar, China's second-largest solar panel maker, agreed to buy a 33 per cent stake in Sunways and later increased its holding to just over 70 per cent.

Hanergy's acquisition gives it access to Solibro's thin-film technology. It has also agreed to maintain Solibro's workforce and leadership. "Solibro's tech-

nology and manufacturing capacity, combined with Hanergy's photovoltaic (PV) strategy, resulted in a fast and successful conclusion of the transaction," said Q-Cells in a written statement.

"This acquisition is not solely about consolidating our position on a global and competitive market. It is also about creating synergies between our two organisations in order to provide our respective customers with added value," said Li Hejun, Chairman of Hanergy.

Jason Chow, Senior Vice President of Hanergy Industrial PV Group added: "Solibro has a proven track record in thin-film CIGS technologies. Hanergy will provide the extensive network, the strong production capacity and the long term R&D investment. We are confident that the acquisition will



enhance Solibro's performance and capacity despite the industry's current downturn."

Thin film solar panel manufacturing is a sector that Chinese firms have largely avoided because of the advanced technology involved.

Thin-film photovoltaic (PV) panels

are cheaper to manufacture than traditional PV panels and require more space.

Solibro's thin-film solar panels hold the world record for module efficiency, according to Q-Cells, which bought the firm in stages between 2006 and 2009.



Russian gas giant Gazprom is branching further into Europe's energy markets through a new cooperation agreement with French firm EDF.

The two companies have held talks over the construction of new gas-fired power plants in Europe, as well as the acquisition of existing ones.

According to a statement from EDF, the agreement is the culmination of several years of "intensive work" and would also help to strengthen the energy dialogue between Russia and Europe.

For Gazprom, the deal will give it access to Europe's power generation markets, an important destination for its own natural gas and a natural extension of its Russian power generation assets, which it now regards as core to

its business.

The deal will help EDF to secure natural gas supplies as Gazprom would be the exclusive supplier of natural gas to power plants developed or acquired under the partnership. "EDF aims at building strong partnerships with worldwide major energy players," said EDF CEO Henri Proglio.

He added that EDF and Gazprom had been cooperating since 2009 and EDF's involvement in the South Stream gas pipeline project.

EDF holds a 15 per cent stake in the South Stream gas pipeline project, which will bring Russian gas to Europe along the Black Sea floor.

In June, UK newspapers reported that Gazprom was one of the front-runners to buy Sutton Bridge, an 819 MW gas

fired power plant in the UK that is being sold by EDF to comply with the terms of its purchase of British Energy in 2009.

The European Court of Justice has upheld a ruling by a lower European Court that EDF had not received state aid in the form of a tax concession. The French firm will now be able to keep the sum of money plus interest – a total of €1.2 billion – that the French government transferred to EDF in 2009. The European Commission ruled in 2003 that EDF had received a tax concession corresponding to the corporation tax that it did not pay in 1997 and that this amounted to state aid. The courts, however, said that the commission failed to consider whether the French state has acted as a private investor.

Metso buys out Wärtsilä stake

Engine manufacturer Wärtsilä says the sale of its stake in MW Power, its venture with Metso, will enable it to focus on engine-based power plants.

The two Finnish firms have reached an agreement for Metso to buy Wärtsilä's 40 per cent share in the joint venture that they initiated in 2008. MW Power supplies small and medium sized combined heat and power plants

for the European market, with a focus on renewable fuel solutions.

"In the future, Metso will develop MW Power's business as part of its comprehensive power generation solutions offering for the international market," says Jyrki Holmala, President of Metso's Power business line.

The MW Power joint venture combined Metso's heat and power business

with Wärtsilä's biopower business.

MW Power's customers are mainly municipalities, process industries and utilities. The company has a total of 250 employees in Finland, Scandinavia, the Baltic area and Russia.

The sale requires the approval of the EU's competition authorities. The two companies estimate the deal will be completed by the end of this month.

Vattenfall hires wind power expertise

- Iberdrola invests in Wikinger
- RWE reinforces renewables strategy

European utilities have pledged to continue investments in renewable energy in spite of the continued financial environment in the Eurozone.

Vattenfall announced plans to hire another 200 people as it presses ahead with \$5.4 billion of wind power investments to 2016, while both RWE and Austria's Verbund are planning to expand their renewable energy portfolio.

Iberdrola, meanwhile, announced the start of the engineering phase of the €1.6 billion Wikinger offshore wind farm in Germany.

Vattenfall has so far received permission to go ahead with four new wind farms this year. It currently owns around 40 different wind farms around Europe and has a further 60 in various stages of planning.

"Wind power is a prioritised investment area for Vattenfall. Wind is one of our six energy sources and during the coming five years we will invest another €4.2 billion in wind power

projects in Sweden and in the rest of Europe," says Anders Dahl, head of Vattenfall Renewables.

According to Peter Terium, RWE's new CEO, the German company will triple its onshore wind power capacity to 5000 MW and increase its offshore capacity to 6500 MW by 2025. It is also planning investment in solar capacity to take advantage of price falls in photovoltaic (PV) equipment.

Iberdrola's 400 MW Wikinger offshore wind farm is the firm's first in Germany and is scheduled for start-up in 2016. The firm is one of the world's leading developers of offshore projects, with a project pipeline of 11 GW.

Verbund CEO Wolfgang Anzenbauer told Austrian daily *Wirtschaftsblatt* that the company is interested in building its renewables portfolio in Austria, Turkey and Greece, targeting hydropower acquisitions as well as wind and solar power projects.

E.On seeks damages

E.On is to seek damages of around €8 billion from the German government following the enforced shutdown of its nuclear power plants.

The German energy company has filed a complaint with the German constitutional court, which will ask the federal government, parliament and 63 other institutions for a response, according to reports in local newspapers.

Daily paper *Frankfurter Allgemeine Zeitung* reported that German utilities

would be demanding a total of €15 billion in compensation for the early nuclear exit, which resulted in the immediate closure of eight of Germany's 17 nuclear reactors.

The remaining reactors will have to close by 2022.

Nuclear power plant operators in Germany are also at odds with the government's nuclear fuel rod tax, which it has continued to impose on generators in spite of the planned plant closures.

Tenders, Bids & Contracts

Americas

Canadian Solar wins with Potentia

Canadian Solar has signed a master supply agreement with independent power producer Potentia Solar Inc. for the supply of 17 MW of photovoltaic panels.

Ontario, Canada-based Potentia will use the solar modules for a number of commercial rooftop solar systems planned for major urban areas of Ontario. Canadian Solar will deliver the solar modules to Potentia on a per project basis, with all projects scheduled for completion through 2014.

Abengoa selected for US solar plant

Abengoa has announced that it is to build a photovoltaic (PV) plant in the USA that will be one of the largest of its kind in the world.

The engineering firm says that the 200 MW plant will be built in Imperial Valley, California and will come online in the second half of 2013. It has declined to name the project or its customer.

The contract is worth \$360 million, according to Abengoa.

Hyundai orders boiler for Colombia project

Babcock & Wilcox Power Generation Group Inc., a subsidiary of Babcock & Wilcox Co., has been awarded an engineering contract by South Korean firm Hyundai Engineering Co., Ltd. to begin design work on a coal fired boiler for the Termotasajero power plant near Cúcuta, Colombia.

B&W will engineer the 180 MW boiler, coal pulverisers, air heater, fans and structural steel for Termotasajero Unit 2. Engineering work for Termotasajero is underway, and B&W anticipates a full notice to proceed on the project in the fourth quarter of 2012.

DTE boosts Michigan wind capacity

DTE Energy has placed orders with GE Energy for the supply of wind turbines for projects in Michigan, USA.

GE is supplying DTE Energy with 69 advanced 1.6-100 wind turbines for its Sigel, Minden and McKinley projects and sixty eight 1.6-100 units for its wind project in Chandler Township, adjacent to the McKinley site. DTE Energy's total investment in these projects is \$500 million.

The projects total 220 MW in capacity and will support Michigan's Renewable Portfolio Standard (RPS), which calls for 10 per cent of electricity in the state to be generated from renewable resources by 2015.

Gamesa boosts presence in Latin America

Gamesa has won a contract to build, deliver and install a 44 MW wind farm project for Eolo de Nicaragua, S.A., owned by Globeleq Mesoamerica Energy (Wind) Limited.

Gamesa will install 22 of its G90 wind turbines, each with a capacity of 2 MW, which it will manufacture in Spain and the United States during 2012. The wind farm, in the town of Rivas, is on the shore of Lake Nicaragua in southwestern Nicaragua.

Gamesa will carry out operation and maintenance (O&M) services at the wind farm for a period of ten years. It says that the project is its first in Nicaragua, and that it will enhance its position in Latin America.

ABB wins Brazil orders

ABB has won orders worth over \$50 million to build transmission substations in Brazil.

The engineering firm will design, supply, install and commission two new 230/69 kV substations at Miramar and Tucurui and a 230/138 kV substation at Nobres for Eletrobras Eletronorte in the North of the country.

ABB will also construct a new 230/138 kV substation at Umuarama and extend the existing substation Cascavel Oeste for Costa Oeste Transmissora De Energia S.A., a special purpose company of Copel Transmissao and Eletrobras Eletrosul, utilities serving Southern Brazil.

In another two projects awarded by Eletrobras CHESF, ABB will install a new 230/69 kV substation (Teresina III) and extend other existing 230 kV and 500 kV substations in North East Brazil.

"These new substations and extensions will increase capacity and strengthen the country's transmission and distribution infrastructure to help meet growing electricity demand from residential, industrial and commercial consumers," said Oleg Aleinikov, head of ABB's substations business.

Siemens wins first Chile wind order

Siemens has received a contract to supply the wind turbines for a major new wind power project in Chile, the company says.

The German power engineering firm will develop the 115 MW El Arrayán wind plant with Pattern Energy and AEI. The project marks Siemens' entry to the Chilean wind power market.

The scope of supply includes delivery, installation and commissioning of 50 SWT-2.3-101 wind turbines with a power rating of 2.3 MW and a rotor diameter of 101 m, and a five-year service and maintenance contract. Installation of the project is scheduled to begin in spring 2013, with commissioning of the wind power plant planned for early 2014.

The El Arrayán wind farm is located about 400 km north of Santiago on the coast of the Coquimbo IV Region. Once completed, it will be the largest wind project in Chile and provide clean and renewable energy to power the equivalent of up to 200 000 average households.

Asia-Pacific

JFE Steel opts for multi-fuel solution

Japan's JFE Steel Co. has awarded GE Energy a contract to supply a Frame 9E gas turbine for an innovative gas-to-energy recovery project at its East Japan Iron Works in Chiba City, Tokyo, Japan.

Engineering, procurement and construction contractor Toshiba Plant Systems & Services Corp. will install GE's 9E gas turbine at JFE's new 150 MW, multiple fuel, combined cycle power plant. The plant will use the steel mill's own blast furnace and coke oven gases to generate on-site power for the mill's operations.

The project will reduce carbon dioxide emissions as well as energy costs at the steel mill.

GE has also signed a 15-year parts supply and repair service agreement for the equipment.

Siemens commissions offshore project

Siemens has commissioned its first offshore wind power project outside Europe.

The 50 MW Jiangsu Rudong wind farm consists of 21 of Siemens' SWT-2.3-101 wind turbines located off the coast of the Rudong District in the East China Sea and is owned by Jiangsu Longyuan Offshore Wind Power Co. Ltd.

Siemens won the contract to build the wind farm together with Shanghai Electric in mid-2011. Its scope of delivery includes a five-year service and maintenance agreement.

TNB signs Indonesia pact

Malaysia's Tenaga Nasional Bhd (TNB) has signed an agreement with Indonesian state-owned utility company PT PLN and coal mining firm PT Bukit Asam to build a power plant in Indonesia.

The initial agreement will cover the construction of a transmission line and coal fired power plant in Indonesia. TNB said that the project will facilitate cross-border electricity exchange and be of great benefit to both countries.

AGL plans NSW solar

AGL Energy has revealed plans to develop two large solar power projects in the Australian state of New South Wales (NSW).

First Solar Australia is to build a 106 MW photovoltaic (PV) project at Nyngan and a 53 MW project at Broken Hill on behalf of AGL Energy. They will cost a total of A\$450 million to develop, A\$195 million of which will come from federal and state government grants.

The two projects will be completed by 2015.

China places 48 MW Vestas order

Vestas has won a 48 MW wind turbine order from China Longyuan Power Group Corporation Ltd., the largest wind power developer in China.

The order includes the delivery and installation guidance of 24 of its V90-2.0 MW wind turbines at the Putian Hanjiang Baihe wind farm in Fujian Province.

The project will bring the installed capacity of Vestas wind turbines in Fujian Province to 498 MW.

Toshiba, Sojitz, Daelim win Vietnamese order

A consortium of Toshiba Corp., Sojitz Corp. and South Korea's Daelim Industrial Co has landed an \$830 million order to build a new coal fired power plant in Vietnam's Thai Binh province.

The consortium has signed an engineering, procurement and construction contract with PetroVietnam and will provide two steam turbines, procure boiler and auxiliary equipment and handle overall plant engineering.

The plant will start operating in 2015.

ABB boosts India grid

Indian power firm NTPC has placed an order worth around \$33 million with ABB to build two substations in the western Indian state of Maharashtra that will facilitate transmission of electricity from new power generation plants being constructed in the region.

The substations will include seventeen 400 kV bays and fourteen 132 kV bays in Solapur, and twelve 400 kV bays and eight 132 kV bays in Mauda. ABB's turnkey project scope comprises the design, engineering, supply, installation, commissioning and associated civil works for the substations.

"These substations will provide the transmission and distribution infrastructure to increase capacity and meet

growing demand for electricity in the region," said Brice Koch, Head of ABB's Power Systems division. "They will also help to strengthen the grid and improve power reliability."

Europe

Swedish dam gets SEK300 million makeover

Fortum Generation AB has awarded Swedish contractor NCC AB a SEK300 million (\$43.3 million) contract to remodel the Holjes power station in the Municipality of Torsby, Varmland, Sweden.

The Holjes power station on the upper Klaralven river was inaugurated in 1962 but requires parts to be rebuilt because of new requirements for dam safety. Work will commence this year and be completed in September 2015.

International

Thika awards contract

Independent Power Producer Thika Power Ltd., part of Matelec Group of Lebanon, has awarded MAN Diesel & Turbo a contract to build an 88 MW power plant in Kenya.

The plant will be built in Thika, an industrial town to the east of Nairobi, and will supply power to Kenya Power Company Ltd. Construction is underway and the plant will come on line in early 2013.

Around 60 per cent of Kenya's electricity supplies are based on hydro-power but recent droughts have caused water levels in reservoirs to fall. The country is attempting to expand its thermal and renewable generating capacity.

Saudi Arabia enhances grid capacity

Saudi Electricity Company (SEC) has awarded ABB orders worth over \$30 million to install new substations that will improve grid capacity and reliability.

ABB will design, install and commission two new 132/13.8 kV substations in the Al-Kharj area and in the Second Industrial City in southeast Riyadh, where industrial development is driving electricity demand growth.

ABB's turnkey project scope includes delivery of key products such as high- and medium-voltage gas and air insulated switchgear, transformers, auxiliary systems and cables. ABB will also supply the SCADA system as well as the automation, control, protection and communication systems.

The substations will be equipped with capacitor banks to reduce electricity losses and enhance the stability and quality of power supply by improving the network's power factor. The projects are scheduled for completion by 2014.

Tunisian tissue firm orders Centrax GTs

Centrax Gas Turbines is to supply the power package at the heart of a new, €32 million plant that will meet burgeoning demand for tissue products in northern and central Africa.

Tunisian tissue producer Azur will utilise a Centrax 501-KB5 gas turbine to provide the reliable, consistent and cost-effective supplies of electricity on which the purpose-built plant depends.

The gas-fuelled indoor 501-KB5 package produces up to 3.9 MW of power and its exhaust heat is recovered to benefit manufacturing processes at the plant. The plant will be the most advanced of its kind in northern Africa and could also in the future be easily upgraded with the larger KB7 turbine.



Oil

Growing crude supply brings price decline

- Opec maintains production levels
- Prices in the hands of Saudi Arabia

David Gregory

A growing supply of crude oil has eased oil prices and brought relief to those who have worried that \$100+ per barrel crude would do continuing harm to the world's struggling economy. But economic data in mid-June has also apparently played a role in crude demand. The data shows China's economy slowing, Europe on the brink and the US making little progress.

In mid-June West Texas Intermediate (WTI) was trading near \$80/b and ICE Brent under \$95/b. The US Energy Information Administration (EIA) reported mid-month that US commercial crude inventories had risen to 387 million barrels. Traders forecast sufficient supply and dwindling demand.

A decision by Opec at its June meeting in Vienna to maintain crude production at 30 million b/d reinforced opinions that crude markets would be replenished. Saudi Arabia and other Gulf producers have in recent months

boosted production beyond their target volumes in order to compensate for less Iranian crude oil on the market as a result of European Union sanctions. Also, Saudi Arabia and its allies within Opec have calculated that crude prices in a range of \$120/b and higher could lead to a slump in demand and a fall in prices that would impact their economies.

Some analysts have forecast that if the price of crude oil could be kept at an \$80/b range, the global economy could improve. But others say that falling crude prices has as much to do with the negative economic outlook as the increase in supply.

Whether lower prices will actually boost demand and economic activity remains to be seen.

"What happens to oil prices over the next six months is largely in the hands of Opec, or, more accurately, of Saudi Arabia, which has effectively been given a free hand to produce as it sees fit in the absence of a meaningful

output agreement," the London-based Centre for Global Energy Studies (GCES) said in the June issue of its *Monthly Oil Report*, commenting on the Vienna meeting. "How much oil the Kingdom needs to produce in the second half of the year will depend on its own price ambitions and on the level of production from Iran," it said.

Opec price hawks argued in Vienna that production be reduced so that prices would remain at \$120/b or better.

The International Energy Agency (IEA) said Opec's decision to stick with its current production target of 30 million b/d was a plus for consumers. Executive Director Maria van der Hoeven said during a panel discussion at the St. Petersburg International Economic Forum in mid-June that she was happy with the outcome of the Opec meeting because it showed "there is still some wish to meet the demand of customers."

In the IEA's June *Oil Market Report*,

the agency said: "Some may be tempted to see the market as over-supplied, and there have been calls by a number of producers for 'over-production' to be reined-in." But it added: "Memories are indeed short: crude prices remain very high in historical terms, and are acting as a drag on household and government budgets in OECD and emerging markets alike. High prices eventually stunt demand growth, directly if consumers pay full price for their oil, or indirectly via weaker activity levels and GDP growth if consumers are shielded from full price pass-through."

According to the latest Opec *Monthly Oil Market Report*, Opec members produced 31.52 million b/d during May, with Saudi Arabia going 859 000 b/d over its target of 9.058 million b/d. Gulf producers Kuwait and the UAE produced an extra 371 000 b/d and 204 000 b/d, respectively.

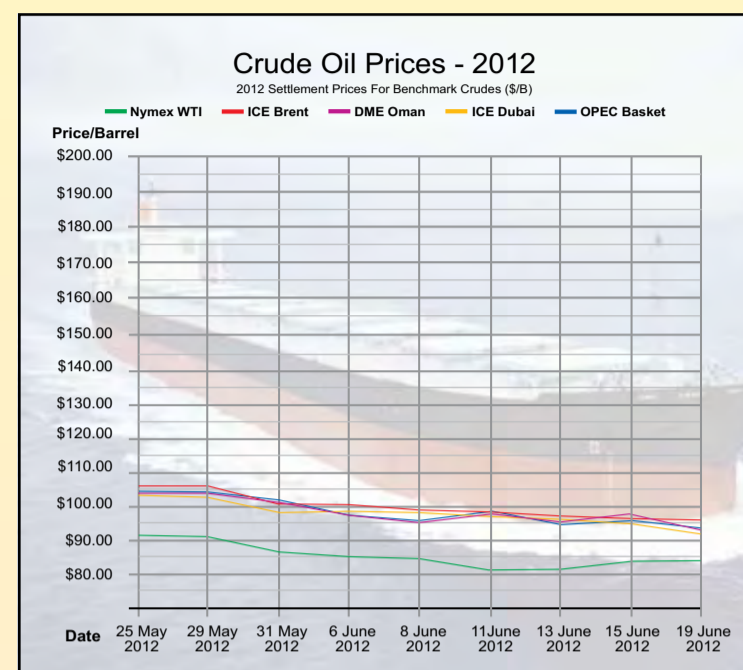
Iran's crude oil production is down by more than 200 000 b/d from its

3.553 million b/d target to 3.138 million b/d according to the Opec report, while CGES estimated Iranian output at 3.07 million b/d.

Iran has not taken kindly to its Opec partners boosting their production while it copes with sanctions designed to damage its economy. But as far as Iran is concerned, so far the sanctions have yet to have any effect on production or imports.

Industry reports say that Iran's on-shore storage facilities are full and that it is storing crude in a growing number of tankers offshore.

Talks between Iran and the P5+1 group over Tehran's nuclear energy programme have yet to make progress, therefore the EU ban on Iranian crude imports will move into full effect in July. Meanwhile, the US is labouring in the diplomatic realm to get Iran's Asian customers to find alternative supplies and it looks increasingly likely that Iran may see many Asian buyers succumb to US pressure.



Gas

Natural gas is rising star of energy markets

Increasing trade in LNG and the development of unconventional gas in the US are shaping the future energy landscape, according to BP's latest Statistical Review of World Energy.

Mark Goetz

In the latest edition of its *Statistical Review of World Energy 2012*, BP said two developments in the natural gas industry shaped 2011: the rapid increase in trade in natural gas, especially in the form of LNG, which "has connected hitherto segmented regions in an increasingly flexible manner"; and, the development of unconventional resources in the US – shale gas – which "has left everyone wondering where gas might next turn into a relatively abundant source."

Gas prices during 2011 increased broadly in line with oil prices except in North America, said BP. In North America, prices hit record discounts to crude and to international gas markets. Natural gas trades grew by 4 per cent.

This was driven by a 10.1 per cent expansion of LNG into the market, with Qatar accounting for 87.7 per cent of that increase. Qatar's LNG trade in 2011 grew by 34.8 per cent, according to BP.

Global gas consumption grew by 2.2 per cent during 2011, according to BP, below average for all regions except North America, "where low prices due to the shale gas 'revolution' drove robust growth."

The *Statistical Review* shows a record decline of 9.9 per cent gas consumption in the European Union (EU), "driven by the weak economy, high prices, warm weather and continued growth in renewable power generation."

Global gas production rose by 3.1 per cent, while output in the US rose by 7.7 per cent in 2011, making it the world's main producer. Gas production declined in the EU by some 11.4 per cent.

Meanwhile, output in Qatar grew by 25.8 per cent during 2011, by 40.6 per cent in Turkmenistan and 3.1 per cent in Russia. This offset reduced output in Libya, which was down by 75.6 per cent and in the UK, where production fell by 20.8 per cent.

Shale gas and LNG have indeed

revolutionised the US natural gas industry. Once seen as a potentially huge market for LNG, the explosion of shale gas output in the US has turned the tables and led to a debate in Washington over whether the country should become an LNG exporter.

US company Chenier Energy Partners has obtained a license to export gas – in the form of LNG – to countries that lack free-trade agreements with the US. It is reported to have lined up deals with companies in the UK, Spain, India and South Korea.

Chenier LNG exports are to begin in 2015 in a plant it will construct in Sabine Pass, Louisiana. The company has recently begun to seek financing for the plant and infrastructure and is expected to receive numerous financial backers.

Opponents in the US say that launching an LNG industry would lead to a rise in natural gas prices in the US and put US consumers at the mercy of the international market.

In a recent article written by US

Congressmen – Senator Ron Wyden (D-Ore) and Representative Ed Markey (D-Mass), the two Congressmen said a study by the Energy Information Administration (EIA) show that exports of 12 billion m³ per day could raise US prices by 54 per cent.

They noted that there are 18 existing applications for licenses to export natural gas.

The White House, for its part, has so far taken a neutral stance on the debate except to make known that President Barack Obama plans to continue to advance policies that support the development and use of natural gas, whether it be for LNG export, domestic transportation or power generation.

During a recent debate in Brussels on Europe's future relationship with natural gas, speakers questioned how important the resource will prove to be as the EU plods along with its Energy Roadmap.

Claude Turmes, coordinator for the Greens on energy issues in the

European Parliament said gas would play a limited role in Europe's energy mix if the group reaches its renewable and energy efficiency target, *Interfax* reported.

Citing better insulation in homes that would further cut Europe's gas demand, Turmes said, adding that full-scale solar and wind power would reduce the average demand for gas-generated electricity.

A WWF official, Jason Anderson agreed, adding that gas is incompatible with EU climate targets and that carbon capture and storage is still too expensive.

But the director-general for energy at the European Commission, Philip Lowe, said natural gas is not a transitional fuel, *Interfax* reported.

He said gas is an important part of Europe's energy mix and that it would play a crucial role in the implementation of the Roadmap 2050.

He added that it would take an overall increase of energy efficient of 30-40 per cent to implement the roadmap.



Financing renewables

Infrastructure projects such as large offshore wind farms face a number of risks but that is not putting investors off, says **Andy Cox**, Energy Partner at KPMG.

Last year, 42 GW of onshore wind capacity and 25GW of solar capacity was installed – more than in any other year, and KPMG’s recent survey of renewables mergers and acquisitions (M&A): *Green Power 2012*, found that financial investors in particular, will not be letting this opportunity pass them by.

In fact, the renewables sector has come a long way in a short space of time. Investing is no longer about buying the land, getting planning permission and hoping to get a return from building a wind farm. The cash flows of a renewable energy business have traditionally played to the strengths of the utility companies, requiring high initial cash outflow to fund the acquisition of power generation equipment, site investment, including infrastructure to link the power generated to the national grid, and construction work.

However, KPMG’s global research, with a range of investors, debt providers, service providers and government bodies, found that 92 per cent of those surveyed expected infrastructure funds and private equity investors to be the most active in buying and investing in renewables (up from 64 per cent a year ago), followed by independent power producers themselves 87 per cent, (up from 61 per cent last year)

What these findings show, is that there is a shift away from the utility companies that have traditionally been the most active in this space.

Reports on many deals that were announced last year such as private equity fund, Bridgepoint’s, acquisition of 442.5 MW of Spanish onshore wind assets from ACS for €636 million in August 2011, and Japanese trading house Marubeni Corporation’s, acquisition of a 49.9 per cent stake in DONG Energy’s Gunfleet Sands operational offshore wind farm in November 2011, support our research. But why are we seeing this shift now?

On a simple level, renewables are

looking increasingly attractive as a place for long-term investment. As certain technologies mature and risks become more fully understood financial investors are attracted to the long term nature and attractive returns of the projects, and more than 50 per cent of those surveyed agreed that for each asset class, renewable energy investments represented a sound alternative as a place for investors’ capital. Indeed, when it came to hydro, onshore wind and solar technologies, more than 70 per cent agreed.

That said, in general they pay little value these days for early stage development pipelines and what we are seeing is a lot of interest around operating projects or, the “secondary assets”. Many utilities are recycling capital away from these projects to focus on primary development where their

“What we do know is that where governments do communicate their plans transparently and ahead of time, investors are happy to carry on buying”

technical and engineering skills are put to best use.

But this trend is all predicated on a number of factors being favourable, not least the financing markets and the stability of the regulatory regimes concerned.

In fact, nearly three quarters of the people we spoke to said that it was now harder to secure debt financing to fund acquisitions of renewable projects and companies, yet despite this, 85 per cent expect renewable energy deal flow to remain robust in the next five years. So, although debt is harder to find, investors can, and are, finding money available if they have a good track record and if they are trying to invest in what is deemed to be a good quality project.

What can be deemed as “good quality”, however, will vary between technologies. For example, solar, biomass and onshore wind took the top three places in our survey of where investors would be spending their time and money in the near future.

In solar, rapid cost reductions are rendering solar photovoltaic generation assets more competitive and therefore more attractive from an M&A perspective. Almost half of corporate and investor survey respondents are currently seeking to acquire into the solar PV power generation sector, up 10 per cent from last year.

Biomass continues to be a highly attractive sector for acquisitions. Deal activity in the sub-sector is gaining momentum – over 60 M&A deals totalling \$4.3 billion were announced in 2011, a significant increase on the 48 deals totalling \$1.6 billion announced during the previous year. However, biomass M&A deals only accounted for a relatively modest 8 per cent of the total value of all renewable energy activity in 2011.

Biomass assets offer significant advantages over wind and solar because they offer a predictable baseload power supply. However, historically many investors bypassed the sector due to concerns over feedstock price volatility and the operational performance of plants. These concerns are still very much at the forefront of investors’ minds but dealmakers are now finding ways to structure transactions to minimise the exposure to these risks albeit on a small scale

The onshore wind sector is currently undergoing a heavy period of consolidation. Some 227 M&A deals totalling \$25.2 billion were announced in 2011, more than double the value of the \$12 billion deals that were done two years ago. And, despite the current global economic challenges, the activity seen so far this year shows no signs

retroactivity across all renewable technologies this year. So despite the fact that Spain has large asset portfolios and strong sponsor counter-parties, and therefore should be particularly attractive to investment, this is on hold until investors have full visibility over future revenues.

In the UK, cuts by the government to subsidies for homeowners and businesses who installed solar panels earlier this year should be balanced by the creation of the Green Investment Bank (GIB), which could play an important role in encouraging capital into the sector.

At the moment, offshore wind has previously been dominated by utilities, but there is potential that the GIB could find a key role in encouraging significant capital into the sector. The unanswered question is “what role will the GIB play in reducing construction risk associated with major off shore wind projects?”

What we do know is that where governments do communicate their plans transparently and ahead of time, investors are happy to carry on buying, as has been demonstrated by events in Germany.

For the second year running, Germany topped our survey as the most frequently targeted European country for renewable energy acquisitions and investment – 21 per cent of corporate and investor respondents worldwide plan to target Germany over the next 18 months, significantly more than the proportion targeting the UK (12 per cent), Italy (9 per cent), France (6 per cent) and Spain (3 per cent).

While Germany has implemented a series of subsidy cuts in recent months, they have been communicated to the market in a highly transparent manner and are in line with the falling equipment costs. As a result, M&A activity has remained buoyant – some 64 M&A deals totalling \$3.7 billion were announced in 2011, compared with 79 deals totalling \$3.6 billion in 2010.

As with most other areas of business, the emerging economies are also starting to make their presence felt, using lucrative incentive mechanisms to attract investment, and it is these markets that are expected to grow very fast in terms of renewables in the next few years.

For example, Brazil’s wind energy sector has experienced rapid growth in recent years as a result of multiple project tenders. The country’s state plan calls for 12 GW of wind energy capacity to be brought online by 2020, significantly more than the 1.5 GW that was operational at the end of 2011. Chile and Uruguay have also launched sizeable wind energy tenders.

So while other sectors continue to feel the force of the economic downturn, the outlook is pretty positive for the renewables sector and, for forward thinking investors, the right project in the right geography could provide years of solid returns to come.

Cox: the onshore wind sector is currently undergoing a heavy period of consolidation



Meeting European demand for biomass wood pellets

Driven by European Union renewables targets, demand for biomass wood pellets is set to soar over the next decade as utilities displace coal in thermal power plants. **Tim Probert** explores how the industry will manage to procure sufficient sustainable biomass.

While utilities can and do burn hundreds of different types of biomass, literally almost any old rubbish such as chicken litter, peanut husks and olive stones, the most cost-effective biomass to displace coal in co-firing and conversion plants in large volumes are usually wood pellets.

At present, the global trade of wood pellets is a manageable 10-12 million tonnes per year. However, the use of pellets is rising rapidly, driven by European Union (EU) targets. Around half of the EU's target for providing 20 per cent of energy from renewable sources by 2020 will be made up by biomass, according to member states' national action plans.

According to the European Pellet Council, pellet imports to the EU increased 50 per cent in a single year 2009-2010 to 2.5 million tonnes, while trade within the EU rose 60 per cent to 3.45 million tonnes. Overall, global trade could hit 60 million tonnes by 2020, it says. Meeting this demand will require large investment in both feedstock for wood pellets and processing, while at the same time it needs to ensure supplies are sustainable.

Utilities are used to purchasing commodities towards the end of the supply chain, i.e. at the port of loading or discharge, on a long-term basis. At present this is simply not possible on a viable scale with wood pellets. Some utilities have recognised the upstream risks by building and operating their own pelletization plants to increase security of supply.

However, this still leaves them fully exposed to fibre risks and therefore the price and volume of biomass is difficult to secure in the long term, as Diekumo Anthony, biomass fuel developer at E.On Climate & Renewables, explains. "The primary feedstock of pelletization plants is sawmill residue and forestry residues like bark," he says. "They are by-products of another market altogether. The entire biomass fuel supply chain on the power side is reliant on subsidies, while upstream the feedstock is led by the demand for timber from the US construction industry.

"So the entire supply chain is floating in the middle of two uncertainties. Therefore, the price and volume of the feedstock for wood pellets is completely dependent on other markets. That presents huge risks in developing a secure biomass supply chain."

The bulk of feedstock for wood pellets in North America, which accounts

for two-thirds of EU imports, comes from small landowners, with the rest coming from a handful of large forestry product companies traditionally supplying pulp, paper or other wood-based products. Anthony suggests the only way to manage fibre risks is to take control of the supply chain as far upstream as possible, and partnering with forestry product suppliers owning vast tracts of forest.

One such company is Weyerhaeuser. The Washington state-based company is the world's largest private sector owner of softwood timberland, managing more than 20 million acres of forest in the US and Canada, and one of the largest pulp and paper companies in the world. James Leitheiser, Director of Global Business Services for Weyerhaeuser Solutions, believes the power industry is needlessly reinventing the wheel by manufacturing a product it does not truly understand.

"The paper supply chain does not exist in a vacuum; it is integrated with traditional forestry products. The economics of the supply chain mean that biomass has to be integrated into these products as well. The paper industry has learned these lessons 50 years ago."

In other words, says Leitheiser, utilities should leave wood pellet manufacture to forestry product companies who can harness their natural economies of scale in terms of feedstock and expertise to offer long-term security of supply. Weyerhaeuser is pushing what it calls its 'Resource Forward' model, which it says would reduce project risk and commercial risk for investors.

In this model, a large timberland owner with strategically located resources would bring the supply chain forward via an institutional investor to provide stable, relatively low-cost capital to build a pelletization plant in conjunction with an offtake partner. The offtake partner could be a utility, or it may be a biomass supply intermediary, such as a commodity trader or an agribusiness, delivering wood pellets to European ports.

Leitheiser says the model also incorporates an element of floating prices so that trading companies can partake in price risk. "It's almost always cost-effective to source some supplies on a short-term, spot basis from third parties, but having a long-term anchor supplier offers a great deal of security to end-use customers and investors," he says.

This 'Biomass, Inc.' model is proving



Global trade in biomass pellets could hit 60 million tonnes by 2020. Source Deutsches Pelletinstitut

very attractive to investors. Dr. Chris Rowland, senior research analyst at Ecofin, an investment management company specialising in energy, says biomass is on the cusp of a huge change. "Many companies are eyeing investment in the biomass feedstock supply chain. We see potential in investing in assets along the entire chain, owning forestry, pelletization plants, as well as storage facilities at UK ports."

As utilities tend to produce pellets themselves, pricing biomass can be a challenge. In November 2011, the Amsterdam-based energy exchange APX-ENDEX launched the world's first biomass exchange. In phase one, the exchange started with non-cleared wood pellets, meaning the physical settlement is arranged bilaterally between the counterparties after trade has been concluded.

Phase two, scheduled to take place later this year, will include the implementation of clearing services for wood pellet contracts with contribution of Port of Rotterdam's 'BioPort' with regards to shipping, storage and distribution. By utilising these contracts, says APX-ENDEX's futures manager Paul Groes, end-users and institutional investors can hedge themselves against price movements, while producers will be able to sell biomass on a longer-term basis in order to access working capital.

An important challenge that the industry has to overcome, is the lack of international standardisation of wood pellets. Peter Rechberger, general manager of the European Pellet Council, says wood pellets need to become a clearly defined commodity in order to compete against fossil fuels. "There is no EN (European Standard) for industrial pellets yet, although the power sector has virtually defined its own industrial pellet qualities: I1, I2, I3," he says.

"We are working with IWPB (Initiative for Wood Pellet Buyers) to include industrial grade certification as part of PelCert, which aims to develop an ENplus-compatible certification scheme for industrial wood pellets that also incorporates sustainability."

Sustainability is absolutely critical to the biomass industry and utilities are acutely aware of this. Hitherto, many European utilities have effectively self-certified their biomass as sustainable. The 'Sustainability Policy

of British generator Drax, for example, dictates that it will not burn any biomass that does not reduce carbon dioxide versus the coal alternative.

As demand grows, however, an increasing volume of fresh wood will be needed from forests, the use of which for sourcing biomass is coming under stricter control from the EU. RWE npower, which operates the ill-fated Tilbury coal-to-biomass conversion plant, which caught fire on February 27, says demand in the UK alone could reach 11-12 million tonnes of pellets by 2015, equivalent to 22-23 million tonnes of fresh wood.

Sawmill residues can only be expected to provide 50 per cent of the fibre for this volume of wood pellet production, according to Karine Culierier, Senior Market Analyst, RWE Supply & Trading. "More and more volume from sustainability-certified forests will be needed," she says.

The increasing volume of fresh wood required has boosted sustainability schemes such as the RWE npower-supported Green Gold Label, which requires forest sustainability certification. But there are dozens of such schemes – 67, in fact, according to a University of Utrecht study – and it is slowing down the development of the supply chain.

Jorrit Hachmer, vice president of biofuel trading at RWE, is pressing for a single, European-wide sustainability scheme. "The lack of one is harming the industry," he says. "We need to convince the public that biomass is sustainable. Without public support, there will be no industry."

Not all European utilities support the use of biomass in large combustion plants. Dr. Bernhard Graeber, Director of Renewable Energies & International Climate Projects at another German utility, EnBW, would prefer biomass to be burned at its country of origin. "It's wrong for Europe to subsidise power generation which makes it feasible to transport wood from the USA and Canada. It would actually make more environmental sense for these countries to use this biomass to displace their own coal generation and export more coal to Europe."

It has yet to be proven whether utilities will be able to source enough biomass on a sustainable basis. Europe, particularly the UK, is essentially conducting a very large experiment to see if it can.

Drax will not burn any biomass that does not reduce carbon dioxide versus the coal alternative



Technology

Watch this space

The use of white space technology for smart metering communications looks set to have a significant impact on the rollout of smart meters in the UK and potentially around the world. **Junior Isles**

As part of the EU Energy Package, the gas and electricity market directive requires that EU member states implement intelligent metering systems. By 2020, the directive targets that 80 per cent of households in Europe should be equipped with smart electricity meters and that a complete rollout should be achieved by 2022.

Although several countries are making notable progress towards the EU targets, there is no single technology or standard for smart meter communications across Europe. In the UK, the most prevalent technology is GPRS (General Packet Radio Service), while other parts of Europe such as France and Italy have adopted powerline carrier. Across the Atlantic in the US and Canada, there is a wider deployment of mesh radio networks.

Recent developments in the UK have now thrown another communications technology into the mix. In April, UK-based Bglobal carried out for the first time a smart meter reading over a distance of 1 km using previously unused 'white space' – the spare frequency of television channels that is no longer utilised following the country's switchover from analogue to digital TV.

The groundbreaking trial, which was facilitated by UK white space technology experts, Neul, could result in smart meters being fitted in every home across the UK, however remote their location.

According to Bglobal, the significance of the 1 km trial is that it is a "real world test as opposed to something that has been done on a laboratory bench". The plan is to increase this 1 km distance to several kilometres this summer.

Bglobal believes the use of white space to collect meter readings could potentially revolutionise the nationwide rollout of smart metering, as it overcomes one of the key challenges to smart meter rollout to every location.

GPRS, which is currently the leading

communications technology for smart metering trials in the UK, is a packet oriented mobile data service based on the 2G and 3G cellular communication system's global system for mobile communications (GSM). Although it provides extensive coverage, there is still the problem of communicating with meters in rural areas or other areas poorly served by cellular or wired-broadband connections.

Aaron Forshaw, Solution Architect for Bglobal, commented: "Almost all of our existing work uses GPRS and it's something that plenty of other people use. It works very well on the whole. Of course there are some small areas across the UK where you can't get a good signal. Although there are some coverage problems, it's not a huge deal for us. Our interest in white space is to understand what this technology can potentially offer us."

The potential Forshaw speaks of could come in the form of wider geographic coverage and lower cost.

Compared to GPRS, there are three areas that might deliver lower costs. Firstly, the radio spectrum used is free of charge in contrast with mobile cellular technologies where billions of pounds have to be paid to obtain a license to use the spectrum. The cost of the chip-set will also be much lower. A chip-set for white space communications would cost \$1-2 compared to in the region of \$15 for a GPRS dongle.

White space radios take advantage of these vacant parts of the TV spectrum to communicate information

The third area is in operational expenditure. Machine-to-machine (M2M) communications have fairly specific requirements. Although a smart metering network may consist of millions or even billions of terminal devices, only a small amount of data is sent infrequently.

Forshaw explained: "The requirements are not like for personal communications where we might expect to download video. With M2M you are talking about sending a few hundred bytes as opposed to streaming a video. This means you end up with a very different network, which is likely to have lower operational costs than a network in the cellular world."

White space is best visualised by considering a number of TV transmitters across the UK. To avoid interference, each transmitter has to be configured so that it does not broadcast on the same frequency as an adjacent one in a geographical area where there is overlap. These frequencies that are unused by the licensed user (the TV broadcaster) in that frequency spectrum are known as white space.

White space radios take advantage of these vacant parts of the TV spectrum to communicate information. Signals in these frequencies (470 – 790 MHz in the UK) offer wide coverage as they have excellent propagation characteristics, i.e. they can travel long distances and easily penetrate walls and obstacles.

According to UK telecoms regulator Ofcom, the amount of available white



Smart grid development is essential for smart meter rollout

space is significant – the equivalent of what is currently available on the UK 3G mobile network.

Work on using white space for smart meter communications has been triggered by a change in the regulatory

with other users is a huge technical challenge.

A technique known as 'spreading' that is used to extend the duration of the messages that are sent helps to address the interference issues. The radios also use Time Division Duplex (TDD) to allow simultaneous communication in both directions between the base station and channel device.

"Because you can't guarantee the availability of two white space channels you have to use TDD, which essentially segments a channel in time," added Forshaw.

In addition to developing the radios, Neul and Bglobal in cooperation with several other companies are aiming to unify the fragmented world of M2M communications with a new open M2M communications standard. The protocol known as Weightless, is specifically aimed at M2M communications in the white space spectrum.

"Beyond smart metering and smart grid, there is a whole world of potential applications for this white space spectrum. Work [on Weightless] will continue for quite a period of time and there is a special interest group that manages the development of the specification.

"We anticipate that by around the first quarter of next year, there will be a version 1.0 of the Weightless specification that will be sufficient to allow design and manufacture of chips. This is when the M2M communications market will start to get really exciting," said Forshaw.

According to Forshaw, the Weightless specification is developing rapidly and is roughly 85 per cent complete. "The technology is in pretty good shape," he said.

Because white space operates in the TV spectrum there is the potential for global deployment. "This is a real positive," concluded Forshaw. "It is anticipated that regulations in other parts of the world are likely to follow the US and UK."

Aaron Forshaw, Solution Architect at Bglobal





Junior Isles

Market for rotten fruit?

It's rare to see top executives speak their mind at high-level conferences. Fortunately, there are a few that break the mould.

The European Emissions Trading Scheme (ETS) and its usefulness as the main tool for cutting Europe's carbon dioxide emissions provided the touch-paper for fierce debate at this year's Annual Eurelectric Conference in Malta.

At a press conference held just before the main conference debate, Connie Hedegaard, European Commissioner for Climate Action expressed concern over the price of carbon under the ETS. Currently delivering just over €6 per tonne of CO₂, the scheme is doing little to provide the incentive needed for investment in low carbon technology.

But despite this failure, Hedegaard still defends the scheme itself as the key tool for reducing emissions. "It's not that the ETS doesn't work; it works. It works so much so, that a lot of countries such as China, Korea, Australia and others are now trying to build their own ETS systems. They have seen that our system did its primary job, namely, to secure that emissions are being reduced."

However, Johannes Teyszen, CEO of E.On and speaking as vice president

of Eurelectric disagreed. "We share the target. We share what should be achieved, but I respectfully disagree that the system does not work. It is bust and [the low carbon price is] not just due to the recession. It is also due to several birth defects that were created, and doesn't reflect the effect of other factors. It was supposed to ensure that we all grabbed the low-hanging fruit. But what happened was that we grabbed the most high-hanging fruits – the most expensive fruit – through other systems."

"Last year we had 20 per cent renewables in the system for very, very, high prices and in the same year had an output of 6 million tonnes more [CO₂]"

Teyszen explained that companies have opted for solar panels, an expensive way to reduce CO₂ while letting the "low hanging fruit rot away".

He used Germany as an example. "Last year we had 20 per cent renewables in the system for very, very, high prices and the system in the same year had an output of 6 million tonnes more [CO₂] because the 80 per cent of non-renewables got dirtier and dirtier. The system does not deliver any meaning-

ful signals. Because we had hundreds of millions of tonnes being grabbed for high prices outside the [ETS] system, the system never took note of that."

He said the system needs a structural fix and there needs to be a long term target for 2030. "I fully share that the [ETS] system is fundamentally the right system because it is European and not local; it is technology neutral; and it invites innovation because it is market based. It has all the right elements. But all of us maybe underestimated what we did when we allowed

Commission cannot set a floor price or even a target price for carbon. It is, however, able to see deterioration in volumes being handled.

"This is something we do see," said Teyszen. "We have seen that roughly the amount of one year of Europe's emissions have been abated already just by German renewables in the last five years. This could result in a break of eight years from innovation where nobody does anything. Then suddenly we wake up and realise that because we have lost eight years, we have to be even more ambitious for the next 10 years."

He said the result is a "stop and go" process that does not work. "The most important thing we need now is a 2030 target and we should strive for that almost in linear fashion as of tomorrow. It means we will need more ambition in the early years but starting with grabbing some of the low hanging fruit, starting innovation earlier and not always doing the most expensive things. All the schemes for renewables and energy efficiency need to be brought along and aligned. These are the main structural things we would need to bring the house in order."

Industry and EU politicians may disagree on the structure of the ETS but seem to be singing from the same hymn sheet that a market-based mechanism is the best way forward.

However, on a wider perspective there has been a growing chorus questioning the conventional wisdom that market-based instruments are indeed the best way to deliver the sometimes conflicting goals of today's electricity sector.

Balancing affordability against security of supply and carbon targets is a difficult task. As result, many governments around the world are taking a more interventionist strategy, which many believe will be a growing trend.

In the UK, the Electricity Market Reform is very much in the spotlight as the country debates a host of measures aimed at stimulating investment in affordable, low carbon, technology while keeping the lights on.

The question of whether the liberalised market is the best way of delivering all the goals is very much in the dock and there are questions as to whether the time for a liberalised energy market is reaching the end of the road.

With the energy sector going through unprecedented change, commentators are increasingly beginning to ask whether liberalised markets that have delivered in the past will continue to do so into the future.

Liberalisation has been an interesting experiment. Whether it has provided secure electricity at cheaper prices – which was initially put forward as the main reason for its introduction – has always been highly questionable. No doubt there is too much vested interest in the business to go full circle. Markets have their place but with carbon reduction targets, by prescribed timelines, now part of the picture, perhaps their place is no longer in this sector.

At a recent industry roundtable organised by Pöyry Management Consulting, the topic of discussion was markets versus regulation. I put the question to the table: is there any evidence in any sector where markets have successfully delivered a specific target by a specific target date? In the ensuing silence you could have heard a pin drop, or perhaps I should say a rotten apple.

national systems to incentivise outside the [ETS] system. The ETS is like a blind judge not taking note of other factors. Structural adaptation is therefore a must."

Hedegaard at least acknowledges that the ETS has not achieved what it was designed to do and agrees that structural reform is in order.

She responded to Teyszen: "We share the view that there must be long term price signals. You do not have to convince the Commission about that. The European Parliament realises that. It is the Member States that will also now have to accept that this is needed and also endorse the policy initiatives that will come from the Commission."

The ETS was also designed to drive innovation in low carbon technology; something that Hedegaard admits it is failing to do. In April she said that before this summer the Commission would come up with a review of the first years of the ETS.

"The review will analyse different options for the long term. How do you get a price in the system to do this other part of the job? We will propose how we can change the auctioning profile... so that we will have relatively fewer allowances sent to the market earlier in the period. Relatively more will then be there for later in the period," she stated.

According to a recent report produced by NGO Sandbag, more than 3 billion EU emission allowances (EUAs) must be withheld to fix the EU ETS. Europe's GDP growth forecast up to 2020 is down a third since 2008, when the 2013-20 EU ETS cap was set. This translates to 2.2 billion fewer tonnes of emissions within the system, said the group.

In addition, Sandbag estimates there are a further 900 million excess allowances in the system against original forecasts, as a result of over-allocation in the industrial sector.

"A full correction to the cap would require withdrawing 3.1 billion tonnes of allowances from the scheme," with a view to permanently cancelling them, says the report.

Teyszen commented that with the ETS being based on volume and flexibility on price, the

