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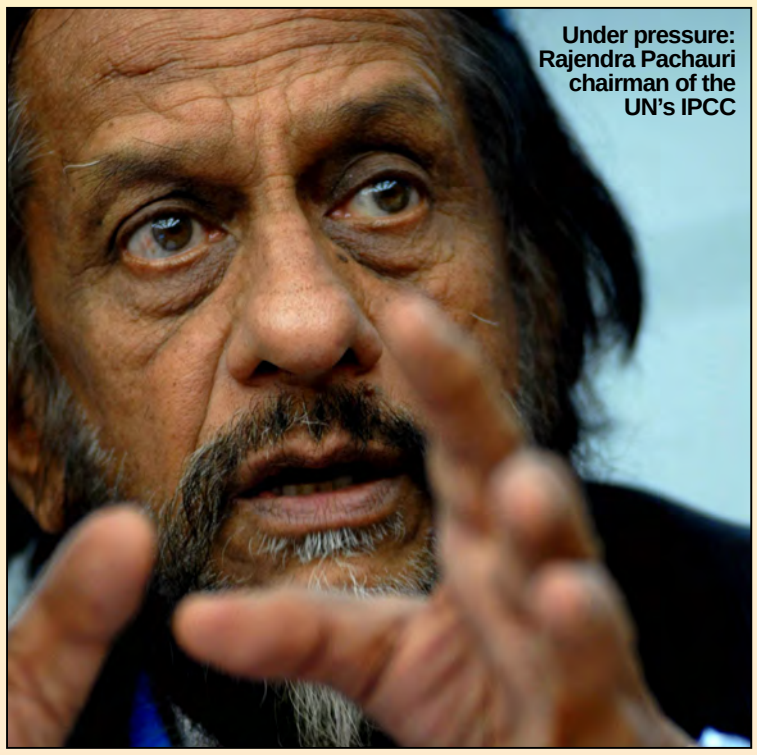
Doubters cast shadow on climate change legislation



Under pressure: Rajendra Pachauri chairman of the UN's IPCC

Recent scandals surrounding the validity of climate change research have not helped the chances of passing a clean energy bill in the US or the signing of a global climate agreement, **says Junior Isles**

The recent allegations undermining the credibility of climate change experts may have a negative impact on the US' attempt to pass a climate change bill and subsequent talks to reach a global agreement later this year.

Professor Phil Jones of the University of East Anglia's climatic research unit, which is at the centre of a storm over hacked emails, broke his silence last month to call for more transparency in his field of research.

Professor Jones first came under fire last autumn when a series of emails hacked from the University's servers appeared to show scientists attempting to prevent data that did not fit their theories from being disseminated.

Last month also saw calls for the resignation of Rajendra Pachauri, chairman of the UN's Intergovernmental Panel on Climate Change (IPCC). The credibility of the IPCC was attacked after Mr Pachauri was forced to admit that the IPCC's prediction that the Himalayan glaciers could completely disappear by 2035 if global warming went unchecked, was unsubstantiated and an error.

Many scientist, however, maintain that the recent controversies do not detract from the conclusions of the many thousands of findings by researchers over several decades which show that climate change is happening and is partly caused by human actions.

Yet some politicians in the US have seized on the scandals as an opportunity to cast further doubt on climate science and question a climate change bill that has stalled in the Senate.

Continued on page 2

Putin calls for "real work"

- Oligarchs could face large fines
- State to invest in new nuclear plants

Vladimir Putin is calling for investment in the power sector as electricity consumption in Russia returns to the level recorded before the country was hit by the global economic crisis in 2008.

The Russian prime minister has lashed out at some of Russia's tycoons, who own several of Russia's generating companies, for failing to make investments needed to upgrade capacity despite promising to do so when the plants were privatised two years ago.

"We have helped you with credits, and guarantees and moral support. You can't have not noticed this. We were counting on a responsible position from the owners. But unfortunately, far from all have shown responsibility and have preferred to search for excuses to avoid doing any real work," said Putin at a meeting on the power sector in Siberia.

Putin warned that the oligarchs would face large fines or be barred from liberalised markets unless they boosted investment.

The urgent need for investment eased last year after the financial crisis reduced gross domestic product and slowed electricity demand. The government was persuaded by the cash-strapped oligarchs to delay investment that had been pledged under the privatisation scheme launched in 2007.

However, economic recovery and the severe weather of the last two months have now driven demand to record levels. This, combined with recovering commodity prices, has swelled the coffers of the oligarchs, many of whom were helped by government hand-outs during the recession. The premier criticised the Russian power companies for ineffectively spending Rubles 66 billion ($2.2 billion) out of Rubles 450 billion allocated from state funds for investment projects in the power sector.

Putin warned that investment must be boosted or infrastructure constraints would slow economic growth. "During the crisis we did everything we could to support you. The crisis is fading away so I ask you to fulfil your obligations," he said.

In contrast, Putin noted that state companies such as Gazprom and foreign companies including Enel, E.On and Fortum had managed to stick to their investment obligations in spite of the financial crisis.

Putin also said that the government would spend 53 billion rubles ($1.76 billion) on construction of new nuclear power plants.

"I have signed a resolution to allocate 53 billion rubles for the construction of nuclear power plants," Putin told Russian news agencies.

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(Continued from page 1)

The House of Representatives recently adopted a sternly worded resolution declaring the body's deep scepticism over current climate science and called for the federal government to halt carbon dioxide reduction programmes.

The House resolution is non-binding and has no legal impact beyond expressing the sentiment of the Legislature. It passed the body by a 56-17 vote and now goes to the Senate.

Former Alaska governor Sarah Palin called studies supporting global climate change a "bunch of snake oil science" during an appearance at a logging conference in Redding, California, a state that has been at the forefront of US environmental regulations.

She criticised what she said were heavy-handed environmental laws.

Palin joined a number of US sceptics that have recently openly questioned the science behind climate change. US coal producer Peabody Energy Corp. and the Ohio Coal Association last month asked a federal appeals court to review the Environmental Protection Agency's findings that greenhouse gas emissions pose a threat to humans.

Palin also spoke out against the Obama administration's efforts to secure a climate change treaty during the international conference held in Copenhagen in December.

"Yeah, I don't think much of it," Palin said. She said it was "providential" that Obama did not return from Denmark with a clear victory after questions arose about figures used in the scientific studies.

The failure to reach an agreement in Copenhagen saw mounting pressure on the UN, which culminated in the resignation of Yvo de Boer from his post as executive secretary of the UNFCCC (United Nations Framework Convention on Climate Change).

Following Copenhagen, some countries had questioned whether the UN talks were the right forum in which to reach an agreement. Mr de Boer's resignation will be a blow to the organisation's hopes of signing a treaty on global warming at the end of the year.

Mr de Boer said he would step down in July to pursue a career in the private sector, five months before more than 190 nations are due to reconvene in Mexico for climate talks.

UN Secretary-General Ban Ki-moon learned in advance of the decision of climate chief Yvo de Boer to resign "with regret," and "will now embark on identifying and recruiting" the new climate chief, a UN statement said.

Meanwhile, the leaders of the United Kingdom and Ethiopia will head up a new high-level group launched by Ban Ki-moon last month, intended to mobilise financing swiftly to help developing countries combat climate change.

The Copenhagen accord commits rich nations to contribute $30 billion to a fund to help developing nations curb their emissions over the next three years (2010-2012). They also set a goal of increasing funding up to $100 billion by 2020.

Industrial players at odds with proposed US climate bill

Edward Markey: predicts Congress will pass a clean energy bill this year

Despite lobbying from industrial groups, the US is still confident it will pass a climate bill this year, **writes Junior Isles**

The withdrawal of ConocoPhillips, Caterpillar Inc. and BP America from the US Climate Action Partnership underlines the difficulties the US is facing in passing a climate bill.

The Climate Action Partnership is a coalition of more than two-dozen companies and environmental groups lobbying Congress to pass greenhouse gas emissions cap-and-trade legislation.

Officials from both companies said legislation pending in Congress, including a bill passed by the House last summer, does not do enough to promote expanded natural gas consumption as a hedge against climate change. Moreover, the legislation puts the transportation sector – including oil and gas producers – at a disadvantage compared with coal.

Under the bill's cap-and-trade proposal, power plants, oil refiners and other regulated entities must pollute less or buy and sell emissions allowances to meet the federal targets.

The bill would allocate the electricity sector 35 per cent of allowances, nearly commensurate with its share of emissions. The oil and gas sector, which accounts for roughly a third of US greenhouse gas emissions, would receive just 2 per cent of the allowances.

ConocoPhillips has maintained that oil refiners will not be able to pass along 100 per cent of the cost of buying allowances to consumers. Thus, refiners should be provided an allowance allocation for such "uncovered costs".

A BP spokesman voiced similar concerns. "We believe that legislation should create a price for carbon that is across the entire spectrum of the economy," spokesman Ronnie Chappell explained.

"We don't think the allowance structure in the bills will create a deep and liquid carbon market," Chappell added. "The markets will be volatile, and so will the price of carbon."

He argued that by providing hefty allowances for coal-burning electric utilities, the House-passed bill would soften demand for natural gas.

"The lowest-cost option for reducing emissions is the increased use of natural gas. Under the pending bills, demand for natural gas will actually go down... because of the concessions made to coal."

Caterpillar, meanwhile, said that it would direct its resources toward the commercialisation of technologies that will "promote and provide sustainable development and reduce carbon emissions". It noted that the company had recently joined the FutureGen Alliance, a public-private partnership established to build a coal-fired, near-zero-emissions power plant in eastern Illinois that will use carbon capture and storage (CCS).

US President Barack Obama announced the establishment of a CCS task force in early February as part of the Administration's focus on creating jobs and environmental benefits by supporting the development of clean technologies.

Obama says the country must develop cleaner energy technologies while at the same time relying upon traditional power sources like nuclear and coal.

At the end of January Obama called on Congress to pass the energy and climate bill that is currently held up in the Senate.

In his first State of the Union address, Obama said no area of the economy is more ripe for innovation than the energy sector. Obama applauded the House for passing an energy bill last year, and he urged lawmakers in the Senate to do the same.

At the World Economic Forum in Davos, Switzerland US Rep. Edward Markey predicted that Congress would pass a clean energy bill this year. Markey, who wrote a 946-page bill with Rep. Henry Waxman, said that President Obama has the power to regulate greenhouse gases by executive order if Congress fails to act. But he said he expects a bill to pass because paying for imported oil has been a major contributor to the US deficit.

"The reason that I believe that will happen is that it is in our national security and long-term economic interests," Markey said.

Barack Obama: This is only the beginning

Nuclear a big winner in proposed US budget

- Budget proposal adds $36 billion in federal nuclear loan guarantees
- Georgia reactors to receive $8.3 billion

The US nuclear power industry would be a big winner under the fiscal year 2011 budget proposed by US president Barack Obama to Congress. The proposed budget assumes enactment of a climate change bill and proposes to eliminate subsidies for fossil fuels.

Obama's budget proposal would add $36 billion in new federal loan guarantees to $18.5 billion already budgeted but not spent, offering a total of $54.5 billion for nuclear.

The DOE loan guarantee programme is designed to support the commercialisation of innovative technologies to reduce air pollutants including greenhouse gases. It was initially authorised under Title XVII of the Energy Policy Act of 2005 and was subsequently funded and extended.

The federal guarantees are seen as essential for construction of any new reactor because of the huge expense involved.

With the nuclear industry poised to begin construction of at least a half dozen plants over the next decade, Obama announced the first loan guarantees of $8.3 billion in new federal loan guarantees to build two nuclear reactors in Georgia.

The loan guarantee to build the first nuclear power plant in the US in almost three decades is part of a broad shift in energy strategy to lessen dependence on foreign oil and reduce the use of other fossil fuels blamed for global warming.

This could be the first step toward a nuclear renaissance in the US. "This is only the beginning," Obama said in designating the new federal financial backing for building Units 3 and 4 of the Alvin W. Vogtle nuclear plant near Waynesboro in Burke County. The plant is being built by Atlanta-based Southern Co. and two partners.

Oglethorpe Power Corporation said it was notified by the DOE of the conditional commitment for federal loan guarantees to help fund its participation in building the two new units. Oglethorpe Power is a 30 per cent owner of Vogtle's existing Units 1 and 2 and will also own 30 per cent of the two new units.

Germany keeps nuclear option on the table

The recent decision to keep two older nuclear reactors running at least until the autumn, when the government coalition will discuss its energy policy, is being seen as an indication that Germany is looking to reverse its nuclear exit policy.

Local magazine *Der Spiegel*, reported that Germany will for the time keep all its 17 nuclear power stations operating, including two which were planned to close down by 2010, after negotiation between government and utility companies.

The two older reactors planned to be closed, Biblis A in the state of Hesse and Neckarwestheim I in the state of Baden-Wuerttemberg, will remain operating until the government sets out its general energy policy, expected in October.

The German government and executives responsible for nuclear power at Germany's top four energy utility companies began their negotiations on a possible extension of the lifespan of the country's nuclear power stations in late January, reported *Der Spiegel*.

At present, nuclear power provides a quarter of Germany's electricity supply. Despite major renewable capacity additions, if the planned phase-out of nuclear power generation goes ahead, Germany faces a total potential shortfall of 12 000 MW of power generating capacity by 2020.

Industry analyst Datamonitor says one concern is that, if energy prices rise in response to the lack of supply, German de-industrialisation could accelerate as energy-intensive industries relocate abroad. In practice, the German government has few options at its disposal to offset the loss of baseload nuclear power generation while meeting its 2020 emission targets, it said.

Datamonitor therefore believes "it is becoming increasingly likely that Chancellor Merkel's government will be successful in phasing out the phase out".

US wind industry has record year

- 2009 success driven by ARRA
- Wind resource estimate increased

Siân Crampsie

Wind energy capacity is growing apace across the American continent in spite of earlier concerns over the impact that the recession would have on the industry.

The latest figures from the American Wind Energy Association (AWEA) show that 2009 was a record year for wind capacity growth in the USA, while the Global Wind Energy Council (GWEC) says that rapid growth was seen in several Latin American countries.

The USA's National Renewable Energy Laboratory (NREL) has also indicated that the country's onshore wind energy potential is higher than previously thought.

According to AWEA, the US wind industry broke all previous records by installing nearly 10 000 MW of new wind generating capacity in 2009. The last quarter of the year was also the strongest, with 4041 MW of new capacity installed.

"The 9922 MW installed last year expand the nation's wind plant fleet by 39 per cent and bring total wind power generating capacity in the US to over 35 000 MW. The five-year average annual growth rate for the industry is now 39 per cent, up from 32 per cent between 2003 and 2008," says an AWEA statement.

AWEA puts the success of 2009 in part down to funds received by the industry from the USA's economic stimulus package, which has spurred the growth of construction, operations and maintenance, and management jobs. However, it has warned that the industry's lack of manufacturing capacity could hurt it in the future.

It has called once again for more long-term policies and market signals, such as a national Renewable Electricity Standard, to stimulate the market.

The AWEA figures put wind energy neck-and-neck with natural gas as the leading source of new electricity generation in the USA. These two sources accounted for around 80 per cent of new capacity added in 2009.

The emerging role of natural gas in the US electricity industry has been highlighted by a recent analysis carried out by Black & Veatch, which said in its annual survey of US power industry leaders that there is growing confidence in natural gas as "an economically and environmentally attractive bridge to a lower carbon future".

Its survey of 329 electricity industry professionals put nuclear energy high on the list of technologies required to meet environmental goals. It said that wind power projects are underway or planned within the next 3-5 years by nearly 79 per cent of survey respondents.

Solar technology is also achieving significant penetration, with 73 per cent of respondents reporting projects underway or planned within the 3-5 year horizon, said Black & Veatch.

The increasing level of renewable capacity in the US has forced the Federal Energy Regulatory Commission to examine whether it needs to reform any of its regulatory policies relating to the integration of variable energy resources into the grid.

FERC in January issued a notice of inquiry seeking comments on issues concerning the integration of renewables. It says that it wants to ensure that its policies can accommodate renewable energy expansion in a non-discriminatory manner while maintaining system reliability.

AWEA said in February that a national Renewable Electricity Standard would enable the US to take full advantage of its wind resources, which NREL now estimates to be 37 000 000 GWh per year.

The advent of larger and more efficient wind turbine technology, as well as more refined wind measurements, has enabled NREL to increase its estimate of the country's wind potential, which was previously estimated to be 10 777 000 GWh per year.

In South America, Brazil's wind energy generating capacity rose by 77 per cent in 2009, while Mexico increased its installed capacity by 137 per cent, Chile 740 per cent and Costa Rica 67 per cent. Overall, Latin America's wind energy capacity grew to 1270 MW from 653 MW in 2008, according to GWEC.

Chavez turns to Cuba

Venezuela has inaugurated 130 MW of new thermal generating capacity but this has had little effect on the country's power crisis.

The country has had offers of help from Colombia as well as Brazil, but President Hugo Chavez has turned instead to Cuba for help in tackling the problem, according to local media reports.

Chavez has also decreed an electrical emergency and announced the creation of a National Electricity Fund with an initial capital of $1 billion to address the energy shortages.

The new fund is aimed at financing a 4 GW increase in the country's electricity generating capacity by the end of 2010. A total of 59 projects will be implemented in the generation and distribution sectors, while 50 maintenance projects will be identified.

In all, $4 billion will be required to achieve the 4 GW target, according to Electricity Minister Ali Rodriguez.

Water levels are continuing to fall at the reservoir of the El Guri dam, which accounts for around 70 per cent of Venezuela's electricity generation. The country is experiencing its worst drought in 50 years.

The government has already introduced electricity rationing measures and is also reported to have carried out cloud seeding in order to stimulate rainfall.

OPG outlines nuclear investments

- Pickering refurb ruled out
- AECL bid expires

Darlington nuclear plant: mid-life refurbishment

Ontario Power Generation (OPG) has announced plans to move forward with major investments in two of its nuclear power plants.

However, the Canadian province's plans to build two new nuclear reactors have suffered a setback with the expiry of a bid from Atomic Energy of Canada Ltd (AECL).

OPG says that it is to proceed with the detailed planning phase for the mid-life refurbishment of the Darlington nuclear plant, located to the east of Toronto, with construction work expected to start in 2016. It is also to invest C$300 million in the Pickering B nuclear plant to ensure "continued safe and reliable performance" for the next ten years.

Refurbishment of Pickering B will not be pursued, says OPG. The plant will be decommissioned, starting in 2020.

Ontario wants to build two new nuclear reactors in order to meet growing energy demand and replace existing capacity. It held a bidding process but rejected bids from Westinghouse of the US and Areva of France in favour of a bid from AECL.

The AECL bid was deemed too expensive, however, and the province has been negotiating with AECL ever since. The expiry of the bid leaves the new nuclear build strategy with an uncertain future.

OPG estimates the cost of refurbishing Darlington to be C$-6-10 billion and says that the work will extend its life by 30-40 years. The firm said in a statement that: "The business decision to move forward with an investment in Darlington comes after very positive outcomes of initial studies on the plant's condition and continued strong operating performance. The next phase of the process will include an Environmental Assessment, an Integrated Safety Review and an Integrated Improvement Plan that will define the scope, cost and schedule of the refurbishment project."

"As Ontario's generating company, OPG's nuclear and hydro fleets are the backbone of the provincial electricity system," said Brad Duguid, Minister of Energy and Infrastructure. "I support this business investment strategy as it aligns with the government's vision for a clean energy future."

Ecuador plans $8 billion investment

Ecuador is planning to boost its generating capacity with an investment of $8 billion in 15 hydroelectric and thermal power plant projects.

The 15 projects will add around 5000 MW to the country's grid and will take between two and six years to construct, according to the country's Electricity and Renewable Energy Minister Miguel Calahorrano.

Ecuador wants to boost generating capacity in order to overcome a 2009 energy crisis resulting from a prolonged drought.

Petroproduction, a unit of state-owned oil company Petroecuador, recently announced plans to use the gas by-product of crude oil drilling to generate electricity.

Its plans will reduce the company's diesel consumption, saving $35 million/year, according to the government's press office.

Petroproduction will implement the project at wells located in the Amazonian oil fields of Lago, Agrio, Secoya, Shushufindi and Culebra and the goal is to generate 30 MW of electricity, which will be fed into its own electrical grid. The gas that is captured will also be used to produce derivatives such as liquefied petroleum gas and gasoline.

Ecuador is one of Latin America's largest oil exporters. It has an installed generating capacity of around 4 GW, according to the US Energy Information Administration.

China to improve energy policy coordination

China's newly created National Energy Commission will hopefully bring greater coordination in planning energy policy as the country struggles to meet increasing demand, **writes Syed Ali.**

China is hoping to meet its growing energy demand and tackle shortages through a newly established government agency.

The creation of the National Energy Commission (NEC), headed by Premier Wen Jiabao, reflects the country's concern over its growing reliance on imported energy as a potential strategic weakness. China is also trying to curb environmental damage from its heavy use of fossil fuels.

According to state media, policymakers have faced difficulty in getting intra-agency cooperation on various initiatives, including reduction of carbon emissions and raising energy efficiency to help combat global warming.

The new high-level commission will draft energy development strategy, review energy security and coordinate international cooperation, according to a notice issued by the general office of the State Council.

Vice Premier Li Keqiang will be the commission's deputy head. Its 21 other members include the head of the National Development and Reform Commission, China's main planning agency, and the ministers of finance, environmental protection, land and resources, and foreign affairs.

It is hoped that the NEC will better coordinate energy policy. "Many of the problems with energy now are beyond the ability of one department to solve and requires coordination from all departments," said Lin Boqiang, director of the China Centre for Energy Economics Research at Xiamen University.

"Today you can't talk about energy without mentioning food, environment, energy-saving and other issues. It's vital to set up an agency above all these departments in order to coordinate and make final decisions," Lin said.

China is now the world's second-largest power consumer. A recent report from the China Electricity Council (CEC) stated that the country will add 85 GW of new capacity in 2010 to bring the total to around 950 GW.

Of the newly added capacity, coal fired plants will account for 55 GW, 15 GW will come from hydropower, 13 GW from wind power and 1.08 GW from nuclear. Notably, wind power capacity has doubled in the last year according to a separate report from the Global Wind Energy Council, which represents companies that make and manage wind power stations

Meanwhile power consumption is expected to accelerate to 9 per cent in 2010 from 6 per cent in 2009, driven by continuous economic recovery, the CEC report said.

However, China faces widespread difficulties in ensuring smooth supplies of fuel, coal and natural gas, partly due to conflicts over pricing policies that have caused widespread losses for refiners and utility companies. In January and February, authorities ordered rotating shutdowns of hundreds of factories

Wen Jiabao: heading new NEC

in central China to ensure sufficient power to heat homes during the cold snap.

At the end of January, Wang Zhixuan, secretary-general of the CEC appealed for the start-up of a link between coal and power prices to ease the pressure on power producers being squeezed by increasing coal prices.

India collaborates with UK on solar and nuclear

- Two multi-million pound research programmes to develop solar
- Civil Nuclear Cooperation Declaration signed

Closer collaboration between India and the UK will see both countries benefit in the fields of solar and nuclear power.

Last month Indian and UK ministers announced two multi-million pound research programmes to develop cost-effective and efficient solar energy solutions.

Indian Minister for Science and Technology Prithviraj Chavan and UK Minister for Business, Innovation and Skills Pat McFadden announced the new collaboration while chairing the bilateral India-UK Science and Innovation Council in New Delhi,

Research Councils UK (RCUK) and the Indian Department of Science and Technology (DST) have each committed up to £5 million ($8 million) over a three-year period for two research projects.

One project is aimed at advancing the efficiency and production of solar cells. It will focus on the development of materials, structures, processing and photovoltaic panel engineering of excitonic solar cells – a class of non-conventional solar cell based on new types of materials. It will build on existing research in both the UK and India to develop cheaper and higher volume solar cell manufacture. RCUK and DST have awarded £2.5 million each for this project.

The other project will target the stability and performance of photovoltaics. This will focus on improving materials supply and developing better designs to ultimately create cheaper and more efficient devices than current solar cells. RCUK and DST have awarded £2.4 million each for this project.

Mr McFadden said: "As well as helping the UK to meet its 2020 goals, it will complement India's ambitious plans to deploy 20 million solar lighting systems to 10 000 villages and hamlets currently without access to grid electricity."

The UK and India also signed a Civil Nuclear Cooperation Declaration, a step that will help both countries to achieve low carbon growth.

McFadden commented: "The declaration is an important boost for both countries and will help to mature our civil nuclear relationship. In March we will welcome two high level delegations to the UK, enabled by this new agreement, which will truly kick-start our partnership."

In early March the UK was scheduled to host a major Nuclear New Build Conference, focusing on new opportunities in India and the UAE. Senior representatives from the Nuclear Power Corporation of India Ltd (NPCIL) were scheduled to be invited to set out India's plans for developing nuclear power projects and technologies in the coming years.

In late March the UK will host a senior academic delegation from India who will meet with their UK counterparts funded by a £1 million grant of the Engineering and Physical Sciences Research Council to encourage and nurture post-doctoral research in this field. This will be the initial meeting of a two-year project.

Many British companies involved in the UK nuclear supply chain will travel as part of a UKTI-led high-level British delegation to India later this year.

Thailand lifts power demand forecast as business recovers

The Electricity Generating Authority of Thailand (Egat) has increased its projection for power demand growth this year to 4.72 per cent from 3 per cent.

Egat said power consumption is set to rise to 150 TWh this year from 145 233 TWh last year. Egat's annual projection was revised up after January's power consumption jumped by 21 per cent compared to a year earlier, according to Egat governor Sutat Patmasiriwat. However, last year January's figures are considered a low base as the country was in the midst of a severe recession and consumption had plummeted.

Speaking to the *Bangkok Post* Mr Sutat said: "This [January's] percentage [increase] was the highest recorded in Egat's history. But January 2009 was also the first time we had recorded a contraction."

The increase was mainly driven by recovery in the business sector, particularly in export production. The global recession caused power demand to contract until the trend reversed last August. Power consumption has seen double-digit growth since last November, Sutat said.

Projected peak power demand has also been revised for the year to 23 000 MW, a 5.2 per cent yearly increase, up from 3.5 per cent. Reserve power capacity currently stands at 28 000 MW.

Additional electricity capacity this year will total 1620 MW – 700 MW from Egat's gas-fired plant in North Bangkok and 920 MW imported from the Nam Theun 2 hydropower plant in Laos.

The country is looking to move away from its over-reliance on natural gas, which accounts for more than 70 per cent of total fuel used in power production and is seen as an insecure source.

"In the future, we need to work toward 50 per cent from gas, 25 per cent from coal and 25 per cent either imported or from nuclear, or we risk power outages," Sutat said.

Egat will also launch a new campaign to promote efficient electricity consumption and wants to reduce power consumption by 1500 MW by 2014 when the new save energy campaign finishes.

Philippines slates new geothermal bidding round

The Department of Energy (DoE) is looking to award 10 more geothermal contracts under the Philippine Energy Contracting Round (PECR), including those under the so-called "frontier" or undeveloped areas.

"We will have to complete our geothermal bid round. There are about 10 more contracts to be awarded," Energy assistant secretary Mario Marasigan said.

He noted the department is scheduling the auction within the first quarter, but the award of contracts will depend on the pace of the review of the submitted work programmes.

He indicated that some of the geothermal contracts due for award are for conversion to re-align incentives with the Renewable Energy Act and the rest are for fresh pre-development work.

Apart from geothermal, the energy official indicated that "there are still plenty of investors interested in RE but some of them are waiting for the final pronouncements on (some policies) – feed-in-tariffs, the RPS (renewable portfolio standard) and net metering."

Australia moves to boost renewables

The Australian government has made changes to its renewable energy scheme, saying doing so will enable it to exceed the 20 per cent target by 2020.

From January 2011 the government intends splitting the scheme into two parts: one for large-scale projects and a second for small-scale technologies such as solar panels and solar hot water systems.

Market demand for the scheme from new large scale projects, such as wind farms and solar energy plants, has stalled partly because the government used it to reward households installing rooftop solar panels with an A$8000 ($7100) rebate.

Commenting on the changes Climate Change Minister Penny Wong told

Penny Wong: expecting to exceed 2020 targets

reporters: "We anticipate that under these changes we will exceed our 20 per cent target by 2020." However, she was reluctant to nominate by how much the target would be exceeded, saying that it depended on the take-up by households.

Large scale projects will now deliver the "vast majority" of the 2020 target of generating from renewables. Wong said that the move will deliver certainty to the large-scale market and drive investment.

Small-scale projects will be covered by an uncapped fixed price – $40 per megawatt hour of electricity produced – scheme.

The changes mean the average household will pay $3-4 more a year in electricity charges, Senator Wong said.

The changes will need to be approved by Parliament.

S. Korea mulls new carbon tax

The South Korean government is considering introducing a carbon tax in an effort to meet its target for cutting carbon dioxide emissions.

In November last year the country pledged to cut greenhouse gases by 4 per cent by 2020 from the emission levels in 2005, which equals a 30 per cent cut from the expected emission levels in 2020.

"South Korea laid the groundwork for carbon emissions reductions last year, and it now needs to concretize its emissions cut target. The government is considering the introduction of a carbon tax and environment tax," an unnamed government official told Seoul's *Yonhap News Agency*.

Seoul is currently preparing to launch a three-year pilot cap-and-trade scheme as early as late this year, with the Korea Exchange (KRX), the country's bourse, serving as a platform for carbon emissions trading.

Indonesia expansion plans focus on geothermal

Geothermal power plants are to form the bulk of the list of Indonesia's 93 projects announced by the government under its second 10 000 MW programme.

The 93 power plants are expected to generate up to 10 153 MW in total. Of the total capacity, up to 3977 MW (39 per cent) will be generated by geothermal plants; 3312 MW (33 per cent) from coal-fired plants; 1660 MW (16 per cent) from gas fired combined cycle plants and 1204 MW (12 per cent) from hydropower plants.

Construction of all the power plants will require an investment of $15.96 billion.

"With the issuance of the decree, the bidding for the power plant procurement can now be opened," said J. Purwono, the director general for electricity and energy.

Of the total 10 153 MW, state electricity company PT PLN is expected to build 5118 MW. The remainder will be built by independent power producers (IPPs), which are expected to build 3097 MW of the planned geothermal capacity.

A few days before the announcement of the 93 projects, the government said it hoped that private companies backed by private investors may be able to start to build up to 150 new power plants to provide up to 1000 MW of electricity nationwide, to help cope with the frequent blackouts in the country. State SOE (State-Owned Enterprises) minister Mustafa Abubakar said some of these IPP projects would be under the second 10 000 MW programme.

State oil and gas company Pertamina, which will also be part of the geothermal build under the 10 000 MW programme, said it will need an investment of about Rp2.5 trillion ($250 million) to develop geothermal sources. Pertamina has already developed 272 MW of geothermal electricity.

The Sarulla 1 plant in north Sumatra, with an expected total capacity of 3x110 MW, will be the biggest of the geothermal power plants under the programme. Of the other technologies, the 1000 MW Indramayu power plant in west Java will be the biggest of the coal fired plants. The biggest hydroelectric plant will be the 4x250 MW Upper Cisokan plant in west Java. The Muara Tawar plant, also in west Java, will be the largest gas fired combined cycle plant with a total capacity of 1200 MW.

Some 57 per cent (5770 MW) of the new capacity to be built under the second 10 000 MW programme will go into the Java-Bali grid, while the rest will go to the other islands across the archipelago.

n PT PLN plans to build two gas power plants with a total capacity of 600 MW in south Sumatra this year. The two power plants will use gas from south Sumatra, PLN president director Dahlan Iskan said. One power plant in Prabumulih will have a capacity of 200 MW and the other in Musi Rawas, 400 MW.

EU on track for 2020 targets

National forecast documents show that the majority of EU member states will meet their 2020 renewable energy targets, according to the European Wind Energy Association (EWEA).

EWEA's analysis shows that 21 member states will meet or exceed their national targets, while six expect to be within one percentage point of their target by the 2020 deadline. The national forecasts illustrate a change in attitude, says EWEA.

"Europe has witnessed a sea-change since the 2009 Renewable Energy Directive was agreed. In 2008 many countries were stating that their target would be difficult to meet – now the majority are forecasting that they will meet or exceed their national target," said Justin Wilkes, Policy Director of EWEA. "The forecast documents give a clear signal to the European Commission of where they could facilitate implementation of the Renewable Energy Directive."

Top achievers include Spain, which believes it will reach 22.7 per cent renewables by 2020 – nearly three percentage points above its target – and Germany, which expects to be 0.7 percentage points above its 18 per cent target.

EWEA recently announced that Spain led the EU and ranked third worldwide in terms of new wind power capacity installed in 2009. The country accounted for around 24 per cent of the 10 163 MW of wind power capacity that was installed in the EU in 2009, followed by Germany with 19 per cent and Italy and France with 11 per cent each.

Italy, however, is one of the countries that believes it will not reach its 2020 renewable energy target through domestic action alone. The country says that it will have to import renewable energy from neighbouring non-EU countries – including Albania, Croatia and Serbia – to meet its target.

EWEA also says that more wind power capacity was installed in the EU in 2009 than any other electricity generating technology.

"It is a remarkable result in a difficult year," said Christian Kjaer, CEO of EWEA. "The figures, once again, confirm that wind power, together with other renewable energy technologies and a shift from coal to gas, are delivering massive European carbon reductions, while creating much needed economic activity and new jobs for Europe's citizens."

Regulator suspends merger policy

- Move creates uncertainty, say UK utilities
- Radical reforms proposed

Siân Crampsie

UK energy regulator Ofgem says that major changes in the ownership structure of the country's energy networks over the last few years have forced it to review its merger policy for that sector.

The organisation has suspended its energy network merger policy with immediate effect and says that it will carry out the review "as quickly as practicable". Utilities are concerned that the move will cause uncertainty in the market at a time when investment is needed.

"The existing policy has been in place since 2002 and a review is now needed given the major changes in ownership structure that have occurred since then – in particular the smaller number of independent groupings in the electricity distribution sector and the sale by National Grid of four of its local gas grids," said a statement from Ofgem.

Ofgem says that proposed mergers will be examined on a case-by-case basis until the review is completed.

In February Ofgem also published the results of a year-long, wide-ranging analysis of the UK energy market, recommending far-reaching reforms to ensure that energy supplies remain secure.

In its Project Discovery report, Ofgem says that the "unprecedented combination of the global financial crisis, tough environmental targets, increasing gas import dependency and the closure of ageing power stations has combined to cast reasonable doubt over whether the current energy arrangements will deliver secure and sustainable energy supplies."

It warns that the country faces power cuts in the next five years unless the government takes greater control of the energy market to ensure future supply. Its most radical suggestion is the creation of a central energy buyer to determine the amount and type of new generation needed and enter into long-term energy contracts for power.

Ofgem's Chief Executive, Alistair Buchanan, said: "Our evidence shows that Britain has a window of opportunity to put in place far reaching reforms to meet the potential security of supply challenges we may face beyond the middle of this decade. We do not advocate change lightly, but all the facts point to the need for reforms now to provide resilient supply security.

"Acting earlier will also help keep costs as low as possible for consumers and business."

EDF reactors require "massive investment"

- Steam generator replacements required
- Deal reached with unions

EDF's plans to extend the life of its nuclear reactors in France beyond 40 years will require "massive" investments, according to the country's nuclear safety authority.

In an interview with the *Financial Times*, André-Claude Lacoste, president of l'Autorité de Sûreté Nucléaire (ASN) said that his organisation was starting to look at the conditions that it would impose on EDF to extend reactor lifetimes.

His comments came as pressure mounted on EDF to improve the performance of its reactors. Lacoste says that he is satisfied with EDF's management of its nuclear power plants, but revealed that the utility has been forced to commit hundreds of millions of Euros to replacing the ageing steam generators on 34 of its 58 reactors.

EDF wants to extend the life of its reactors in order to maintain cashflow and defer investments in new plants. It says that it would cost around €391 to modernise each reactor.

EDF in February announced annual results showing that the utility ran its reactors at an availability rate of 78 per cent over 2009, compared with 79.2 per cent in 2008 and 80.2 per cent in 2007. Industrial action as well as maintenance issues with its ageing nuclear fleet were the main cause of the drop in availability.

The state-owned utility says that it has reached an agreement with four French labour unions over salaries for 2010.

Around half of EDF's French workforce is due to retire over the next ten years. Of these workers, some 40 per cent will depart from the nuclear sector within five years, says EDF.

EU nations agree on CCS funds

Plans to develop up to 12 carbon capture and storage (CCS) projects across Europe are set to move forward after the EU's national governments came to an agreement over dividing up billions of euros of funding.

The agreement came after months of negotiations and has been hailed as "a positive step forward" by Chris Davies, the British MEP who was a co-author of the original initiative. He estimates that the fund – derived from the sale of 300 million carbon permits from the EU's Emissions Trading Scheme (ETS) – could yield as much as €10 billion of funding for CCS projects.

The European Commission wants the commercial-scale demonstration projects to be up and running by 2015 in order to push the region to the forefront of CCS technology development.

The value of the fund depends on carbon prices, but is currently estimated to be worth around €4 billion.

Under the agreement made in early February, the European Commission and the European Investment Bank (EIB) will have the final say on which projects will receive funding. This will ensure that the full range of technologies is tested and that all member states have the opportunity to participate.

Member states will also be expected to provide funding for the projects.

Chris Davies: "positive step"

The plans have been criticised by some environmentalists who say that the funding would be better spent on renewable energy as CCS is unproven and expensive. There is also concern about the ability of the ETS to continue to support CCS deployment given the current low carbon price levels.

Earlier this year an analysis by Redpoint Energy on behalf of the UK government indicated that "short-term financial support to accelerate deployment [of CCS] … could give CCS the potential to make a positive impact on decarbonisation targets".

"A key environmental concern has been that bringing on new clean coal capacity which is only partially fitted with CCS could have a negative short term impact on carbon emissions," said Oliver Rix, a Redpoint Director. "However, our modelling suggests that – perhaps surprisingly – emissions would not necessarily increase. This is because it tends to displace some less efficient – and higher emitting – existing coal plant, along with some gas-fired generation. But this would then pave the way for deeper reductions in the future if CCS technology can demonstrate its effectiveness as it evolves and plant could be fully fitted."

Power pools take shape

- EU offers finance
- Kenya boosts geothermal capacity

Countries across eastern and southern Africa are expecting the cost of electricity to fall as planned power pools in the region take shape.

Transmission lines are being set up between countries and power pools created in the east and south of Africa to help ease power shortages and make better use of natural resources. The European Union has offered around $800 million of financing for the projects.

East African countries such as Kenya, Ethiopia, Tanzania and Uganda have joined a regional master plan to create the East African Power Pool (EAPP). In the south of the continent, South Africa, Namibia, Botswana, Zimbabwe, Zambia and Angola are among nations developing the South Africa Power Pool (SAPP).

The EU will provide the two projects with funds through a consortium of financiers, including $100 million from the European Investment Bank (EIB).

Kenya alone is investing $700 million over the next few years in transmission lines, including an interconnection with Uganda that should be completed by 2012. Other lines from Kenya to Tanzania and Ethiopia are expected to be completed by 2015.

"Sharing out resources with our neighbours is necessary, as each country has its own potential," said Joseph Njoroge of Kenya's KPLC at a recent meeting of EAPP participants. "For example, Uganda has the advantage of hydropower because of the Nile, while Kenya has a lot of geothermal potential."

Kenya is continuing to develop its geothermal potential, with the Geothermal Development Company (GDC) announcing recently that it is planning to start drilling steam wells in the Menengai field, Nakuru, in October.

Menengai has the potential to generate 800 MW. Kenya's current peak power demand stands at around 1070 MW against an installed capacity of 1160 MW.

Demand is projected to rise at a rate of ten per cent per year over the next 20 years.

Armenia approves new line

Armenia is to further integrate its electricity system with that of its neighbours by constructing a fourth interconnector with Georgia.

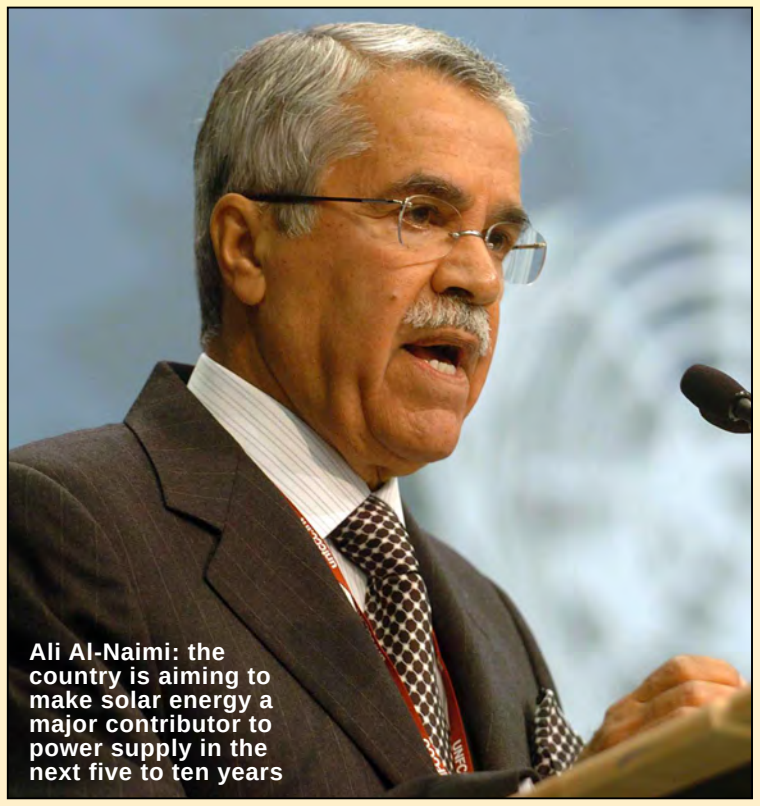
The Armenian government has approved a project to construct a 400 kV electricity transmission line from Armenia to Georgia. The line will ensure the parallel operation of the power grids of Armenia, Georgia and Iran, according to Minister of Energy and Natural Resources Armen Movsisyan.

The new line would be 105 km in length and will run from Hrazdan town in Armenia to the Georgian town of Gardabani.

Studies on the construction of a third electricity transmission line between Iran and Armenia are currently underway.

Saudi turns to solar

Advanced solar power technologies will help Saudi Arabia to diversify energy sources and reduce desalination costs, **writes Siân Crampsie.**



Ali Al-Naimi: the country is aiming to make solar energy a major contributor to power supply in the next five to ten years

Saudi Arabia is looking to solar energy to help it reduce the cost of water desalination as well as reduce dependence on fossil fuels.

The country's government has launched a three-phase initiative to introduce solar energy to the Kingdom, starting with the development of a desalination plant by the King Abdulaziz City for Science and Technology (KACST).

Saudi Arabia produces 18 per cent of the world's desalinated water, consuming 1.5 million barrels of oil equivalent per day at its desalination plants on the Red Sea and Arabian Gulf. Harnessing its solar resources – estimated to be 2000 kWh/m^2/year – would reduce production costs, emissions and dependence on fossil fuels.

The first plant will consist of a 10 MW solar photovoltaic (PV) power plant and a 30 000 m^3/day reverse osmosis plant near Al-Khafji City. Later phases of the programme will involve the construction of larger facilities around the Kingdom and will help the country to address energy and water problems.

The initiative will result in the introduction of advanced nanotechnology techniques used for the production of solar energy systems developed under a joint initiative by KACST and IBM.

According to KACST, the initiative will reduce the production costs of water desalination to less than 1.5 Saudi Riyals per m^3 ($0.4/m^3) from current cost levels of 2.5-5.5 Saudi Riyals per m^3. The cost of electricity generated by the solar power plants will be less than 30 Halalah per kWh.

Saudi Petroleum and Mineral Resources Minister Ali Al-Naimi recently said that the country is aiming to make solar energy a major contributor to power supply in the next five to ten years. Electricity demand in the Kingdom is growing at around seven per cent per year and the government is keen to preserve oil reserves.

The second phase of the solar desalination initiative will see the construction of a 300 000 m^3/day desalination plant at a location yet to be determined. The final phase will involve the construction of several solar water desalination plants in various locations around the Kingdom.

According to the Saline Water Conservation Corporation (SWCC), one of the participants in the solar initiative, a total of nine desalination projects are either being constructed or studied in Saudi Arabia. One of them – the Shuqaiq-II Independent Water and Power Plant (IWPP) in Jazan – is ahead of schedule and should be completed before May, according to Mitsubishi Heavy Industries (MHI), the project's main contractor.

The Japanese firm is responsible for the engineering, procurement and construction (EPC) of the 850 MW, 212 000 m^3/day plant that will run on Arabian heavy crude oil, and said in mid-February that the project is over 93 per cent complete.

Nigeria pledges power sector investment

- $1 billion budget proposed
- Gas shortages worsen

Nigeria's government has announced plans to invest over N153 billion ($1 billion) in the power sector in an effort to deliver the country from its lingering electricity crisis.

The investment is part of preliminary budget proposals put forward by the Nigerian Ministry of Power, and would cover all sectors of the industry from generation down to transmission and distribution.

The Ministry has also pledged to intensify efforts to ensure proper implementation of the National Integrated Power Projects, which aim to add over 1 GW of new capacity to the grid in 2010.

Local press reports from Nigeria in February suggested that natural gas shortages had worsened the ongoing electricity crisis, with available generating capacity falling to around 2500 MW from a level of 3700 MW in December 2009.

The fall translated into increased outages for consumers. The government has now directed the Power Holding Company of Nigeria (PHCN) to sign a commercial gas purchase deal with the Nigerian National Petroleum Corporation (NNPC), say local reports.

The government had set a target of reaching 6000 MW of installed capacity by the end of 2009 and in February 2009 approved a total of N43.3 billion to help PHCN achieve this. The money was not released until October 2009, however.

The proposed new budget includes N62.7 billion for the Ministry, N13.9 billion for generation companies, N72.2 billion for transmission and N4.3 billion for distribution.

Key target areas for the investment include the repair and rehabilitation of generation plant and the expansion of the transmission and distribution network. The Ministry wants to diversify fuel sources away from natural gas and has identified a number of wind and hydropower projects for implementation.

It also wants to undertake feasibility studies on the development of coal-fired generation capacity.

Geopolitics scupper Iran-India energy projects

Ambitious energy projects proposed by India and Iran are set to flounder amid increasing tensions between the two countries and between India and Pakistan.

Plans to construct a major new power plant in Iran and transmit the power to India have ground to a halt because Iran sees India as an ally of the USA, which has accused Tehran of harbouring a nuclear weapons programme. The fact that the power would have to be transmitted through Pakistani territory is also an issue.

A long-standing proposal for the construction of a gas pipeline linking India and Iran has also been affected.

The proposed $10 billion power project would see Indian state-owned firm NTPC build a 6000 MW power plant in Iran and transmit some of the electricity back to India via a transmission link built by Power Grid Corp of India. Some 1000 MW of capacity had also been allocated to Pakistan.

Iran has accused India of delaying the project due to pressure from the US, according to local press reports. Iran is facing more economic sanctions from the US and other countries.

Areva targets solar start-up

- Targets €1 billion in renewable sales
- Mining agreement in Jordan signed

Areva has entered the solar power market with the acquisition of a US solar energy company.

The French engineering firm has announced the acquisition of Ausra, a California-based start-up company specialising in concentrated solar power (CSP) technology for electricity generation and industrial steam production.

The acquisition is part of plans by Areva to diversify its technology portfolio away from nuclear. It says that its strategic objective is to be the world leader in CSP and that with Ausra it is well poised to take advantage of the substantial growth predicted in the CSP market over the next decade.

Ausra was founded in 2006 and has yet to return any revenues or profits. Areva recently reported strong growth in the fourth quarter of 2009, led by a strong performance in its reactors and services business.

"By acquiring Ausra, Areva has taken a major step forward to achieve its strategic ambition in renewables," said Anil Srivastava, Business Group Renewable Energies Senior Executive Vice President for Areva. "The group intends to become the world leader in the CSP market thanks to a reliable, cost-effective product."

Areva has targeted €1 billion in sales from renewable energy by 2012. In 2008 its renewable energy business posted sales of €147 million.

Ausra's Chairman and CEO Dr. Robert E. Fishman declared: "With Areva, Ausra is joining forces with one of the world's global energy leaders. Combining Areva's financial and commercial strengths, and its energy expertise, with Ausra's proven technology and experienced management team will help position Areva for even greater success in the renewable and carbon-free energy industry."

Ausra specialises in Linear Fresnel CSP plants, which use flat mirrors that concentrate the sun's energy to heat water and raise steam. The firm's chairman, Bob Fishman, says that Ausra is expected to announce its first commercial sales in the US and Australia in the next few months.

Areva reported that its fourth-quarter revenues for 2009, excluding the transmission and distribution (T&D) business, grew to €2.75 billion, a rise of 12.5 per cent over the same quarter in 2008. For the full year its revenues grew 5.4 per cent to €8.53 billion.

Areva, which is selling its T&D business to a French consortium, says that it expects "significant growth in backlog and revenue" for the nuclear and renewable business in 2010.

Revenues from its reactor business in France, where Areva recently reached an agreement with EDF over a nuclear fuel services contract, remained stable.

Areva and EDF announced at the beginning of February that they have come to an agreement over the transport, treatment and recycling of used nuclear fuel from EDF's nuclear plants in France. The deal brought to an end a dispute between the two firms, which escalated after a joint bid for the construction of nuclear power plants in the United Arab Emirates failed.

Areva collects and reprocesses fuel waste from EDF's plants, while EDF buys uranium from Areva. However, a dispute over the price of enriched uranium and the cost of recycling fuel led to Areva temporarily withdrawing its services.

According to the agreement, "starting from 2010 on, EDF will increase the amounts of used fuel sent for treatment to the Hague from 850 tons to 1050 tons per year and the amounts of MOX fuel fabricated at the Melox site from 100 to 120 tons per year."

Areva has recently seen some success in the Middle East, however, with the signing of an agreement with Jordan for the mining of uranium resources in central Jordan.

Under an agreement with the Jordan Atomic Energy Commission (JAEC), Areva has been granted the right to mine deposits in the region for 25 years. The deal follows an initial agreement signed in October 2008, and will see Areva continuing the exploration activities that it launched a year ago.

Mitsubishi aims to expand bio-pellet business

Japan's Mitsubishi Corporation could soon make a move into the growing US biofuel market after signing a strategic memorandum of understanding (MOU) with Weyerhaeuser Company.

The two companies have agreed to assess the feasibility of jointly investing in and operating a commercial scale bio-pellet production facility in the USA by 2011.

The bio-pellets would be produced using wood-based biomass and sold to utilities and industrial users for energy production.

Bio-pellets are made from biomass – including forestry byproducts – that is compressed and moulded into small pellets. Co-firing them with coal in conventional thermal power plants is a cost-effective means for utilities to reduce greenhouse gas emissions.

Both companies believe that there are emerging opportunities in the expanding bioenergy market and that a joint venture would allow them to take advantage of each other's strengths: Weyerhaeuser's ability to produce renewable biomass at scale from its sustainably managed forests, and Mitsubishi's experience in the energy sector and bio-pellet manufacturing business.

"Given the potential for bio-pellets to reduce the greenhouse gas emissions from coal-fired power plants, we see good prospects for future bio-pellet market growth," said Yorihiko Kojima, Mitsubishi Corporation President and CEO. "This opportunity with Weyerhaeuser will enable us to establish a bio-pellet production facility in the US, adding to our existing investments in Japan and Europe and thereby creating a stable worldwide supply."

Depending on the success of their feasibility study, the two companies could build several bio-pellet production plants in the USA.

Mitsubishi currently operates two bio-pellet facilities in Japan and is also actively involved in the management of Vis Nova Trading GmbH, a major producer of bio-pellets in Germany.

Saudi Arabia attracts desalination firms

Rising demand for desalination technology in the Middle East has prompted two Japanese firms to establish membrane element manufacturing facilities in Saudi Arabia.

Toyobo Co. Ltd. and Itochu Corporation of Japan have joined forces with Saudi firm ACWA Holding to establish a new company to manufacture reverse osmosis manufacturing facilities in western Saudi Arabia. The facility will be the first of its kind in the whole of the Middle East and North Africa region.

The companies have selected Rabigh technical park, 150 km north of Jeddah on the Red Sea, for the site. Production is scheduled to start in March 2011.

The three partners estimate the total investment required in the next decade to be around $350 million, including the establishment of a sales office in Riyadh. The new company – Arabian Japanese Membrane Company – will manufacture reverse osmosis membrane elements for seawater desalination using hollow fibre technology and will serve the market in Saudi Arabia, which produces 18 per cent of the world's desalinated water.

According to a statement from the three companies, Toyobo's membrane technology is already in use in most of the largest desalination plants in the Middle East and the firm boasts 80 per cent of the seawater desalination membrane market in Saudi Arabia.

Toyobo's desalination elements utilise hollow fibre membranes made from cellulose triacetate, which is highly resistant to the chlorine that is used to prevent the growth of micro-organisms.

Vestas breaks 14-month US dry spell

Wind turbine manufacturer Vestas has taken its first order for the US market in 14 months, but has gone ahead with layoffs in its North American business.

The Danish firm has secured an order for 33 wind turbines for the Granite Reliable Power Windpark in New Hampshire from Noble Environmental Power. Its last US order for turbines was in November 2008.

However softening demand for its products in the US has forced the firm to cut six per cent of its North American workforce, including 15 positions from its Portland, Oregon office that serves as its North American headquarters.

In February Vestas cut its 2010 revenue and operating profit forecasts, saying customers were having trouble securing financing for renewable projects. It now expects to achieve revenues of €7 billion in 2010, with the majority of orders being taken in the second half of the year.

Americas

GE chosen for Brazilian wind project

GE's wind energy technology is to make its debut in Brazil after the US firm was selected by two developers for projects in Rio Grande do Norte and Bahia states.

Dobreve Energia SA (DESA) and Renova Energia SA have both chosen to install GE's 1.5 MW wind turbine technology for the projects, which will add a total of 400 MW to Brazil's grid. The projects were given the go-ahead after participating in a wind-specific energy auction held by the Brazilian government in December.

DESA is to build a 144 MW project in Rio Grande do Norte, while Renova is planning to install 270 MW in Bahia state. All of the projects are scheduled to be on-line by July 2012.

Sacramento firm expands solar plant

Solar Power Inc has awarded Advanced Energy Industries (AEI) the second phase contract for the expansion of a solar plant installed at Aerojet's corporate headquarters in Sacramento, California.

After the successful commissioning of the original 3.6 MW plant in November 2009, Solar Power has announced a 2.4 MW expansion and has selected AEI's Solaron PV inverters for the project. The expansion is due to be completed by April 2010 and will make the Aerojet site the single largest industrial installation in the State of California, and one of the largest in the USA.

Manzanillo set for repowering

Mexico's Comision Federal de Electricidad (CFE) has awarded the contract to upgrade the Manzanillo power plant to a consortium comprising Spain's Grupo Cobra and Grupo ACS.

The winning consortium placed a bid of $981.3 million for the project, beating bids from Iberdrola and Isolux, according to reports.

The Manzanillo repowering project is part of a plan to develop western Mexico's energy infrastructure. Other projects included in the plan are the construction of a liquefied natural gas terminal at Manzanillo and a natural gas pipeline from Manzanillo to Guadalajara, Mexico's second-largest city.

Cogeneration conversion will use 7FAs

A consortium made up of Abener and Abengoa Mexico has selected GE's 7FA gas turbine technology to convert a conventional power plant into Mexico's first large-scale cogeneration plant.

GE will supply two Frame 7FA gas turbines for Nuevo Pemex, a 300 MW cogeneration plant located in the state of Tabasco, Mexico. GE's 7FA gas turbine has the capability to burn natural gas with high nitrogen content, which fits the profile of the available fuel at the Nuevo Pemex site.

The converted plant will supply process steam to one of Mexico's most important natural gas complexes, and supports the Mexican government's initiative to promote cogeneration. GE will provide a full range of services to the plant through a 20-year contractual service agreement (CSA).

The converted plant will generate 550-800 t/h of process steam as well as electricity for Pemex's natural gas processing facility at the site.

Asia Pacific

Sumitomo to build geothermal plant

Indonesia's PLN has appointed Japan's Sumitomo Corporation to construct a $156.7 million geothermal power plant in Lampung.

The 110 MW Ulubelu plant will be located in Tenggamus regency and is expected to start operating in 2012, according to state-owned PLN. The project will be supported by a low interest rate loan from the Japan International Cooperation Agency (JICA).

The power plant will receive steam from the geothermal field in Ulubelu district, which is operated by PT Pertamina Geothermal Energy (PGE), a subsidiary of state oil and gas company PT Pertamina. It will supply power to the PLN grid in Lampung and South Sumatra.

HHI to build Pakistan wind farm

Hyundai Heavy Industries (HHI) has struck a deal to build a 50 MW wind farm in Pakistan, according to local reports. The firm will supply a total of 30 wind turbines for the project, which is thought to be the first of its kind in Pakistan.

HHI and its partner, state-run Korean Southern Power, will sign a deal with the Pakistan government's Alternative Energy Development Board to develop the project.

Areva T&D wins orders in India

Areva Transmission and Distribution (T&D) has won several new orders to supply and install equipment in India.

India's Delhi Transco Limited (DTL) has placed two orders with Areva T&D for GIS substations, while Power Grid Corporation of India Ltd (PGCIL) has awarded the French firm two contracts for air insulated substations.

The two turnkey orders from DTL include design, engineering, manufacturing and commissioning of 220/33 kV GIS substation packages in Delhi. The combined approximate value of the orders is around 1100 MINR (€17 million) and both are scheduled for completion by the end of 2010.

The two orders from PGCIL have a combined value of 2800 MINR and cover the supply and installation of air-insulated substation for the Northern Grid II and Northern Grid III. These projects are scheduled for commissioning by the end of Q1, 2012.

PLN to repeat tender

Indonesian state power utility PT Perusahaan Listrik Negara (PLN) is to call a repeat tender for the development of a 1200 MW power plant in West Java.

Only one bidder took part in the previous tender for the construction of the Muara Tawar add-on thermal power plant in Bekasi and the lack of interest means that it must be repeated.

The $1.02 billion project is part of the Indonesian government's plan to develop a total of 10 000 MW of capacity. However PLN says that it will not receive financing from the Japan Bank for International Cooperation (JBIC) as originally thought.

Europe

REpower lands offshore contract

Suzlon-owned REpower System AG has received a contract from RWE Innogy to deliver the turbines for a major offshore wind farm in Germany. The Germany-based wind turbine manufacturer will supply 48 of its 6M wind turbines for the Nordsee Ost offshore project. It will also be responsible for the start-up of the wind farm and for servicing.

The deal is the first contract to be concluded under a framework agreement signed by the two firms in early 2009. Nordsee Ost will be situated 35 km north of the island of Helgoland and will be built between 2011 and 2013.

REpower's 6M turbines have a rated capacity of 6.15 MW and are based on the firm's 5M range.

Wärtsilä wins Rhodes order

Finland's Wärtsilä has been contracted to supply the equipment and engineering for a new power plant being built on the Greek island of Rhodes.

The order is for a 119 MWe power plant and was placed by Terna S A, which is building the plant on behalf of Greece's Public Power Corporation. The plant will help to ensure a reliable supply of electricity to the tourist island of Rhodes, where demand surges dramatically during the tourist season.

The South Rhodes power station will generate electricity for the island's grid from seven Wärtsilä 18V46 engines running on heavy fuel oil. Wärtsilä will also supply the auxiliary equipment and emissions cleaning system.

When installed, this power plant will bring the total output of electricity produced by Wärtsilä engines in the Greek islands to 690 MWe, which represents a majority share of the archipelago's baseload supply.

GDF Suez plans PV facility

French utility GDF Suez has signed an agreement to build a solar photovoltaic (PV) power plant in Curbans, southeast France.

At 33 MWp, the Curbans plant will be the largest PV facility in France and will consist of 145 000 PV panels producing approximately 43.5 GWh/year of energy. It will cover 61 hectares on a large plateau at 1000 m altitude.

The project is part of GDF Suez's strategy to diversify its generating base and to reach an installed capacity of 10 000 MW by 2013. Commissioning of the Curbans plant is scheduled for August 2011.

RWE announces biomass contractors

RWE npower renewables has announced that Metso of Finland and Aker Solutions of Norway are to be the main contractors for the construction of a £200 million biomass combined heat and power plant in Scotland.

The UK-based utility is building the new plant in Markinch, Fife and says that the facility will supply steam and electricity to paper maker Tullis Russell.

As main contractors for the project, Metso will provide the biomass boiler while Aker Solutions will project manage construction, provide support services and procure some of the plant equipment. The value of Metso's order is around €75 million.

The new plant will have a capacity of 50 MW and will replace an existing coal-fired plant at the site. It will reduce Tullis Russell's carbon footprint at that site by 72 per cent when it starts operating in late 2012.

International

China Gezhouba inks Kazakhstan contract

China Gezhouba Group Ltd (CGGC) has signed a $728 million contract to build a new hydropower plant in Alma-Ata, Kazakhstan.

CGGC says that under the deal with Kazakhstan Natural Gas Technology Co. Ltd., it will build a 254 MW plant on the Chilik River. Construction of the plant will take around 57 months.

The project has yet to receive the approval of the Kazakhstan government.

GE picked for Maritza East 3 project

Enel SpA has awarded GE a contract to complete phase six of an eight-phase project at the Maritza East 3 (EME3) thermal power plant in Bulgaria.

Under the contract, GE will convert two electrostatic precipitators from tumbling hammer to GE's top-rap technology design to increase reliability, reduce maintenance costs and reduce emissions.

GE was awarded the top-rap conversion of fields 3 and 4 of all ESPs for the four boilers in 2005. Execution of the project was staged to one boiler per year with final completion in 2008. The performance of the partially rebuilt precipitators was demonstrated to be successful, and in order to achieve an additional margin on the emission limits, EME3 decided to also rebuild fields 1 and 2 of the precipitators.

This latest contract will convert fields 1 and 2 of the Unit 2 precipitator to help achieve emissions below 50 mg/Nm^3 (dry at 6% O_2).

Currently, fields 1 and 2 are configured as a rigid emitter frame, tumbling hammer design. GE previously reconfigured fields 3 and 4 of the Unit 2 precipitator to a top-rap design. As part of the new contract, the two inlet fields will be converted to the same top-rap design with components supplied by GE.

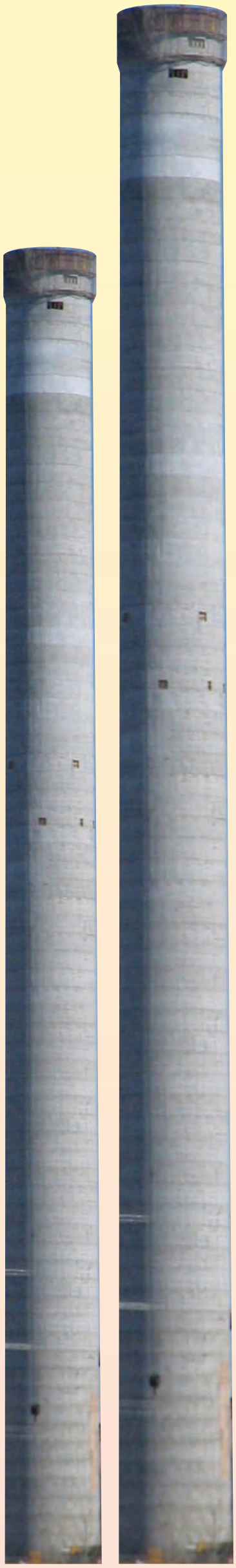
Emerson wins Jordan contract

Emerson Process Management has won a contract from China Shandong Third Electric Power Construction Corporation (SEPCOIII) to install its PlantWeb digital plant architecture with the Ovation expert control system at the new Samra combined cycle power plant in Zarka, Jordan.

The plant is owned by the Samra Electric Power Generating Company (SEPGCO) of Hashemite Kingdom, Jordan, which currently generates an estimated 25 per cent of the total electricity consumed in Hashemite Kingdom. Once the new facility is operational, it will greatly increase Jordan's generation capacity and help to support the region's economic development.

SEPGCO is currently converting two GE 9E combustion turbines that have been operating as separate simple cycle units since 2008 into a single 300 MW combined cycle plant equipped with two heat recovery steam generators and one 100 MW steam turbine. The contract calls for the Ovation system to monitor and control the heat recovery steam generators, Dongfang steam turbine and balance of plant processes, as well as interface to the existing gas turbine controls.

Emerson will supply a total of six Ovation controllers and eight workstations, and the Ovation system will manage more than 3300 I/O points.



Putting the 'smart' into smart grid

While the shape of the final model for smart metering remains unclear in many countries, it will certainly need to be underpinned by a solid communications network.

Eugen Mayer

With climate change right at the top of the political agenda, governments across Europe are introducing radical compulsory emission reduction targets. In the UK alone, carbon emissions must be slashed from 1990 levels by 34 per cent by 2020, and by at least 80 per cent by 2050.

A recent study by UK electricity regulator Ofgem suggested that an investment of up to £200 billion ($320 billion) is required to hit these environmental targets and to secure supply. With the UK's energy industry struggling with rising prices, fuel poverty, growing exposure to a volatile global gas market and a raft of rapidly expiring power stations, never have governments been under more pressure to back new clean technologies, improve energy efficiency and reduce consumption.

As part of the drive to meet its legally binding targets, the UK is moving towards a smart grid model for its energy market. The smart grid is a simple idea: an intelligent power generation and distribution system that automatically balances and controls supply and demand to make maximum use of energy at minimal cost.

But while the idea of the smart grid is simple, there are significant challenges when it comes to implementation and impact. It will drive a fundamental change in the way we all consume energy and this starts with smart meters. Combined with a two-way communication network, smart meters act as the main interface between suppliers and consumers for the collection and transmission of detailed data on energy use. This two-way exchange of information means that consumers can play a far more active role in the supply chain, taking greater control over their energy consumption, carbon emissions and energy costs.

While the shape of the final model for smart metering remains unclear, it will certainly need to be underpinned by a solid communications network – something that is sorely lacking at the moment. Smart meters can only provide their intelligent functionality if they are supported by a seamless communications structure that provides bi-directional transmission of consumption and control data in real-time.

Broadband powerline (BPL) technology is one technology that is being increasingly employed for this purpose.

BPL, already widely deployed in Germany, turns existing electricity grids into an internet protocol-based communication platform. Every power line becomes a broadband data interface and power grids turn into intelligent systems, connecting to meters in homes and businesses.

BPL is the next generation successor to a raft of older technologies that have struggled to bridge this gap in the communication network. GSM, for instance, has proved hard to integrate into state-of-the-art network management systems as it uses a very slow dial-up connection and, unlike BPL, is not IP-based. A further sticking point with GSM is that meters are usually installed in locations that have poor connections for GSM modems, leading to installation and maintenance issues that would make for an awkward and costly roll-out process.

DSL lines, on the other hand, initially appear to have more in their favour: they are IP-based and enable bi-directional communication, with a very high bandwidth. But in common with GSM and GPRS, the location of the meter is often a problem, and lack of convenient DSL access can present significant obstacles. Not least of these is a dependence on the client's internet access. In addition, the prices for DSL lines are regulated in Europe, meaning that installing extra lines can become an expensive affair. Above all, without a proper communications network to support the utility companies, telecoms companies have to rely on a third party as they have no way of running their DSL lines to the utilities' substations.

Narrowband powerline communication, meanwhile, is hampered by a slow transmission speed and, as a proprietary technology, each vendor's solution is incompatible with that of its peers. Furthermore, the narrow frequency range means that disturbances on the power line can disrupt communications. Although it is perfectly suitable for basic meter reading for billing purposes, it is far from scalable to new applications that rely on real-time communication.

Eugen Mayer: Broadband powerline is already widely deployed in Germany

As carbon reduction deadlines draw closer for countries across Europe, BPL technology makes sense from all sides of the energy equation

Relative to these other technologies, BPL presents a far more cohesive package of qualities. Because it uses the existing power networks, gearing up the grid for BPL technology is comparatively straightforward. It eliminates the need for additional networks and third-party approvals, and significantly reduces investment costs. Furthermore, BPL can work instantly with any meter from any vendor.

As well as relatively low set-up costs, a BPL-enabled smart grid has some clear advantages for the consumer in terms of savings. Remote metering will give them a very detailed, real-time view of their actual power consumption. BPL will provide the technology to enable suppliers to introduce more flexible, lower-cost tariffs at non-peak times. Access to this broader range of tariffs should also encourage consumers to reduce their peak-time consumption, reducing the need for extra plants to cope with this peak demand.

Crucially, BPL is not a static technology: its use of internet protocol means that a wide variety of additional smart grid applications can be implemented step-by-step, as they become available. In the future, intelligent power networks could also be used for load management through automatic, time-of-day and load-dependent adjustment of user appliances such as freezers or dishwashers.

Besides the consumer, there is one other group that could be a key beneficiary of BPL. The advent of smart metering will also support the creation of new revenue streams by the owners of the electricity networks themselves, the distribution network operators (DNOs).

The German market has been seeing particularly strong activity, underpinned by a new legislative framework that sets out compulsory installation of meters in all new and renovated buildings. From the end of 2010, every household will be entitled to a monthly utility bill reflecting actual consumption, and from the beginning of 2011 these same utilities will also have to offer flexible tariffs that cater for fluctuations in the load and the network.

In contrast to Germany, the UK network is owned by a small number of DNOs – such as Scottish Power and EDF – who are licensed to distribute electricity in their own particular region. As the UK moves towards wide-scale adoption of smart meters, DNOs are in a prime position to capitalise on the benefits of BPL.

With just eight DNOs, the structure of the UK market is currently very flat compared to markets like Germany, which has as many as 800. And as the network owners, they have a direct connection to every meter in the UK.

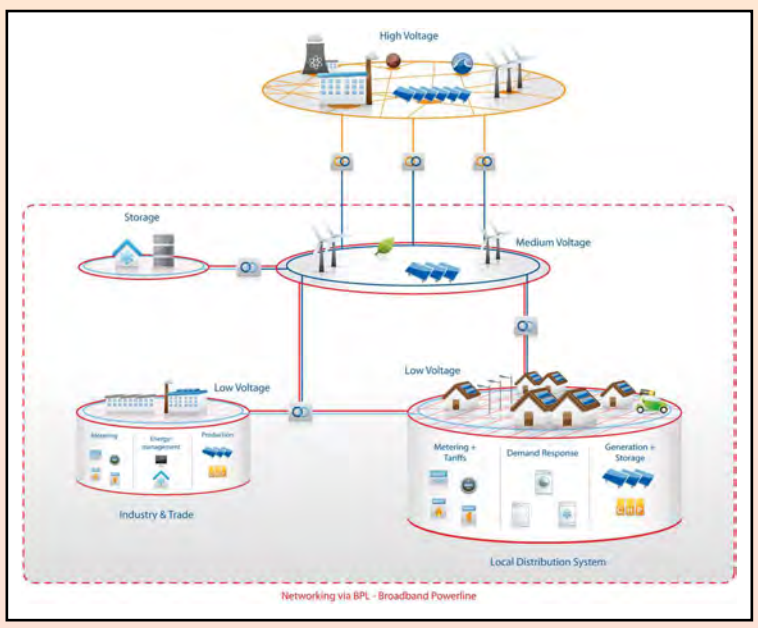
A partnership between the DNOs and BPL communications providers would be an important step towards reducing the UK's carbon footprint by supporting the integration of renewable energies. Altruism apart, it could also generate significant benefits for the DNOs themselves, enabling them to generate new revenue streams if they have the strategic vision to grasp the opportunity to make the most of this and take the money before other people catch on. In addition to these new revenue streams, DNOs can also benefit from other applications opened up by this, such as power quality measurements and other network monitoring.

Current studies indicate that 60 per cent of companies in the energy market plan to invest in smart metering over the next three years, with a quarter of these firms already having committed money. This level of investment by governments and energy companies alike gives a clear insight into the potential of smart metering technology in terms of improving energy efficiency, securing supply and exploring new products and markets.

As carbon reduction deadlines draw closer for countries across Europe, BPL technology makes sense from all sides of the energy equation. With the smart grid poised to transform the way energy is produced, bought, sold and consumed, BPL could provide the vital communications platform to support large-scale low-carbon generation through renewable sources and by helping consumers to monitor and improve their patterns of energy usage. As an economic, straightforward and undisruptive solution, BPL looks poised to give energy suppliers the power to turn the electricity grid of today into the smart grid of tomorrow.

Eugen Mayer is chief operating officer at Power Plus Communications

With BPL technology, every power line becomes a broadband data interface and power grids turn into intelligent systems, connecting to meters in homes and businesses



Oil

Oil demand to increase in 2010

Growth to come entirely from non-OECD countries
Demand for oil in OECD has peaked

David Gregory

The Paris-based International Energy Agency (IEA) and US Department of Energy's Energy Information Administration (EIA) have forecast increases in crude oil demand growth during 2010 in their latest monthly assessments of the oil market.

In the February issue of its *Oil Market Report*, the IEA revised its global demand forecast up by 50 000 b/d for 2009 and by 170 000 b/d for 2010. The IEA said global oil demand for 2010 is expected to rise to 86.5 million b/d, an increase of 1.6 million b/d over 2009's forecast demand of 84.9 million b/d. "Growth comes entirely from non-OECD countries, where oil's elasticity is more pronounced," the IEA said in the report. "However," it added, "should global economic growth in 2010 fail to live up to expectations, oil demand could be around 400 000 b/d lower."

The agency's forecast for OECD demand was largely unchanged for both 2009 and 2010 at 45.5 million b/d, and stated that this forecast supports contentions of an "oil-less" economic recovery and also reinforces the argument that demand for oil in the OECD has peaked.

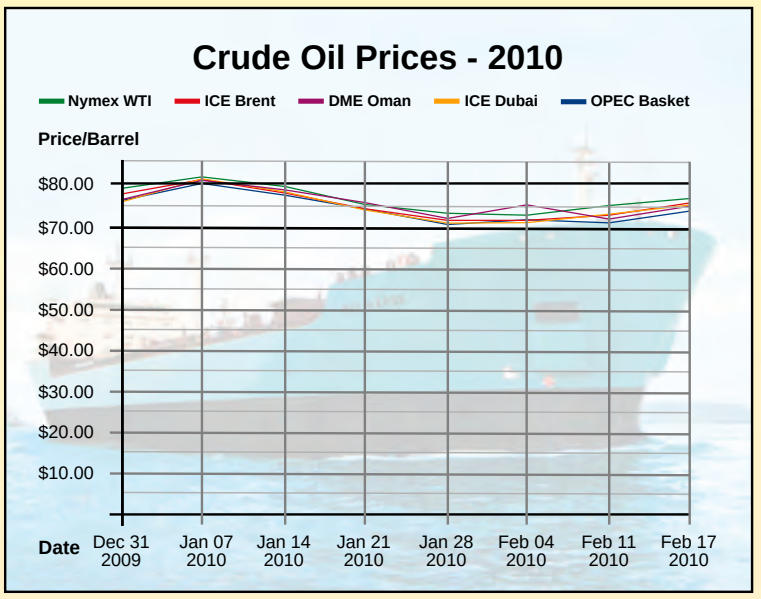
However, demand in non-OECD countries, particularly China, is set to grow, according to the IEA. It adjusted its forecast up for both 2009 and 2010 "on the back of higher economic forecasts and yet again higher than expected demand readings from China and other Asian countries." Demand in the non-OECD during 2009 is expected to average 39.4 million b/d, up by 0.8 million b/d year-on-year, the IEA said, adding that demand for 2010 would likely reach 41.0 million b/d, an increase of 1.6 million b/d over 2009.

It added that this forecast was made assuming that stimuli programmes will only be gradually withdrawn, "notably in China, where the imperative to sustain economic expansion may arguably take precedence over inflationary concerns."

Washington's EIA agreed that non-OECD countries would account for the majority of oil demand growth in 2010 and 2011. In its *Short-Term Energy Outlook* for February the EIA forecast that global liquid fuels consumption would grow by 1.2 million b/d in 2010 and 1.6 million b/d in 2011, after declines in 2008 and 2009. The EIA put total world oil demand at 85.3 million b/d in 2010 and 86.86 in 2011.

The world oil market "should gradually tighten in 2010 and 2011, as the global economic recovery continues and world oil demand begins to grow again," the EIA report said.

For its part, Opec forecast global crude oil demand to reach 85.12 million b/d in 2010, compared with 84.32 million b/d in 2009, in its *Monthly Oil Market Report*. Opec predicted that demand for its crude would decline during 2010 to 28.75 million b/d, compared with 28.78 million b/d in 2009.



Despite the fact that during 2009 Opec attempted to cut its overall output by 4.2 million b/d from the September 2008 production figure to a target of 24.845 million b/d, compliance by member countries has slipped.

The cuts that Opec made to oil output during the early months of 2009 helped to stabilize the oil market to some degree, but as prices increased over the past nine months, some Opec members have exceeded their quotas in order to take advantage of higher prices. Meanwhile, and despite the price rise, crude stocks remain high, with the IEA and EIA both estimating OECD crude inventories just below 2.7 billion barrels.

Opec compliance with its own target production is put at 55 per cent. Output by the Opec-11, which excludes Iraq, averaged 26.74 million b/d in January 2010, 1.895 million b/d above the 24.845 million b/d target. Total production by all 12 Opec members amounted to 29.22 million b/d in January.

Opec's next ministerial meeting is scheduled to take place in Vienna on March 17. Until now, ministers have made little comment on what might take place during the next Opec gathering. However, Opec members have stated that they plan no steps that would put global economic recovery in jeopardy.

While it is likely that Opec will remind its members that they have agreed to adhere to their quotas, there is little chance that a strong push for greater compliance will be undertaken provided prices remain in their current range.

Gas

Gazprom and partners delay Shtokman project

The global economic downturn, which has reduced demand for natural gas, has been cited as one reason for a three-year delay in the development of the giant offshore Shtokman gas project. It remains to be seen if the delay will complicate the capacity of the Nord Stream project.

Mark Goetz

Russia's state-owned gas monopoly Gazprom and its partners Total of France and Norway's Statoil have announced a three-year delay in the development of the giant offshore Shtokman gas project situated in the Artic Circle.

In a brief statement last month, the Shtokman Development AG Board of Directors announced that due to changes in the [gas] market situation and particularly in the LNG market, it was decided to "single out" the start-up facilities including the offshore production facilities, pipeline to the shore and onshore gas treatment unit into a separate stage within Phase 1 development.

The statement said a final investment decision (FID) on pipeline gas is planned for March 2011 and on the LNG facilities before the end of 2011. "According to the shareholders' opinion, this will allow for pipeline gas production start-up in 2016 and LNG in 2017," the statement said.

Previously, the partners – Gazprom (51 per cent), Total (25 per cent) and Statoil (24 per cent) – had been expected to make the final investment decision before the end of this year, meaning the pipeline project would come into operation in 2013 and the LNG project in 2014.

Gas from the Shtokman gasfield, located in the Barents Sea, 600 km northeast of Murmansk, is to either be shipped to Europe by pipeline via Vyborg and the new Nord Stream underwater pipeline through the Baltic Sea to Germany, or processed into LNG with the US as the target market.

However, developments in the gas market are seen as having forced Shtokman Development AG to push back its development schedule. The global economic downturn has reduced demand for natural gas and an increase in the US of production of unconventional shale gas has reduced demand there for LNG. With the US market meeting most of its needs with domestic production, established LNG producers have been offering more spot sales to Europe, where some countries that purchase Russia gas have this winter imported the minimum that their contracts would allow in order to take advantage of cheaper LNG cargoes.

It remains to be seen if the delay in producing Shtokman pipeline gas will complicate the 55 billion m^3 per year capacity Nord Stream project, which will have dual pipelines, the first of which is to come into operation in 2011 and the second in 2012. Theoretically, Shtokman gas would have entered the second pipeline in 2013.

With the delay of Phase 1 on the Shtokman project, Phases 2 and 3 face delays as well.

The Shtokman field is estimated to hold gas reserves of 3.8 trillion m^3 of natural gas and 53 million tons of condensates. Phase 1 requires an investment of $15 billion. It will produce 23.7 billion m^3 (bcm) per year, half of which is to be shipped to Europe via pipeline, while the remainder would be used to produce 7.5 million tons per year of LNG.

Shtokman is a three-phase project to be developed over 50 years. First phase production would require the drilling of 16 production wells and four platforms. A total of 68 production wells would be drilled to complete Phase 3, which would bring output to 71 bcm/y and 30 million tons/year of LNG. Gazprom has not yet chosen partners for Phases 2 and 3, but it has begun the feasibility study for the second phase.

The decision to delay the project is seen as entirely economic, although Russia is keen to establish itself as a gas producing power, especially with Europe. But with so much at risk, the partners are anxious to have a reliable market.

Gazprom remains confident that European demand for natural gas will result in it securing a growing market share in the future that will reach 30 per cent by 2015 and around 32 per cent by 2020.

The statement issued by the partners suggests a decision could be made to proceed with the pipeline project for Phase 1, but that a further delay to the development of the LNG facilities is possible.

With the US LNG market now uncertain, Russia has turned its attention to the Far East. But with established LNG suppliers on the hunt for markets and new production due to come on-stream soon in Qatar, Australia and Indonesia, Gazprom could be forced to postpone Shtokman LNG until demand begins to show definite signs of improvement.

Assessing the ASEAN

The ASEAN Vision 2020 emphasises greater regional power and energy cooperation. A major study of the region analyses the status of key developments. **Vishvjeet Kanwarpal**

Vishvjeet Kanwarpal: energy security, availability, accessibility, affordability and acceptability are key shared concerns

As of June 2009, the ASEAN (Association of Southeast Asian Nations) region had a population of 584 million, a total area of 4.5 million km^2, a gross domestic product (at current price) of $1506 billion and a total trade of about $1698 billion.

Eight of the 10 ASEAN member-countries (Indonesia, Thailand, Malaysia, Philippines, Vietnam, Singapore, Myanmar, Brunei Darussalam, Lao PDR and Cambodia) have proven oil and gas reserves, and five have substantial coal reserves. The total energy reserves of ASEAN by the end of 2008 were: oil, 2330 million t; natural gas, 7375 billon m^3 (4 per cent of the total world's natural gas reserves); coal, 12 404 million t.

The ASEAN region is a significant player in oil production. Indonesia ranks among the top 20 oil-producing countries in the world, and Brunei, Malaysia, Thailand and Vietnam also produce significant amounts of oil. Thailand, which began producing oil in 1980, has since then tripled its production to about 190 000 bbl/d in 2007 as a result of offshore exploitation. Recent discoveries have also been made in Myanmar and Cambodia.

Meanwhile, the installed generating capacity of the region in 2007 was 130 GW. Indonesia had the highest installed capacity of 35 GW followed by Thailand (29 GW) and Malaysia (24 GW). Of the total installed capacity of ASEAN, gas-based generation capacity accounts for 40 per cent (including CCGT), coal 22 per cent, furnace oil 19 per cent, hydro 15 per cent, geothermal and renewable 2 per cent each.

The ASEAN Vision 2020 emphasises greater regional power and energy cooperation via the Trans-ASEAN energy network comprising the ASEAN Power Grid (APG) and the Trans-ASEAN Gas Pipeline (TAGP). These have been deemed imperative for an efficient, reliable and resilient energy infrastructure.

The average rate of growth of regional electricity production was 8 per cent per annum from 1990 to 2005 and is projected to grow at 6.1 per cent annually from 2005 to 2030. The development of an integrated ASEAN power grid is considered essential in meeting this objective. A flagship programme known as the ASEAN Power Grid (APG) was mandated in 1997 by the ASEAN heads of states and governments under the ASEAN Vision 2020 in order to ensure energy security, efficient utilisation and sharing of resources of the region as a whole.

The following strategies have been adopted to ensure the success of the APG:

- Accelerated development of the APG interconnection projects: The APG is in progress, with four ongoing interconnection projects and an additional 11 projects planned for interconnection through 2015
- Optimisation of the generation sector *vis-a-vis* the available indigenous energy resources in the region
- Leveraging ASEAN based resources, such as, funding, expertise and products to develop the generation, transmission, and distribution sectors.

Gas is a key resource that will be shared. The natural gas demand of the region has increased tremendously over the years and new gas discoveries are not sufficient to meet demand growing annually at an estimated 7-8 per cent. The ASEAN region consumes approximately 283 million m^3/day (10 billion ft^3/day) of natural gas. ASCOPE (ASEAN Council on Petroleum) findings indicate that the supply gap will widen to more than 340 million m^3/day (12 billion ft^3/day) by 2025.

Many options are being considered to address this future shortfall such as increasing imports of LNG or by exploring new discoveries in the region. Coal bed methane has also been identified as an additional gas supply source.

The Trans-ASEAN Gas Pipeline (TAGP) aims to develop a regional gas grid by 2020, which would facilitate the interconnection of the gas pipeline infrastructure and enable gas to be transported across the borders of the ASEAN member countries.

The main sources of gas in the ASEAN region are the Natuna gas fields and their commercialisation is essential to address the future supply gap. ASEAN member countries are also building LNG regasification (R-LNG) terminals to supplement their energy needs.

The updated ASCOPE-TAGP Master Plan 2000 involves the construction of 4500 km of pipelines mainly undersea, with an estimated investment of $7 billion.

As of December 2009, eight bilateral gas pipeline interconnection projects, with a total length of approximately 2300 km were in operation. The growth of the various energy-consuming sectors of the ASEAN economies is linked to these interconnections and hence they play a pivotal role in enabling energy security, sustainability of supply objectives of ASEAN and efficient utilisation of available resources.

After gas, coal is the next major source for electricity generation. Some 22 per cent of the total installed capacity of the ASEAN region is based on coal (as of 2007). Due to the increasing demand for coal as a fuel in electricity generation and the industrial sector, coal supply is estimated to increase from 56 million t oil equivalent (MTOE) to 297 MTOE in 2030 at an annual growth rate of 6.9 per cent.

The energy plans of the ASEAN member countries indicate growth in coal utilisation for power generation which will provide an opportunity to promote and increase cleaner coal use and coal trade for mutual economic benefits towards enhancement of regional energy security.

In order to promote the development and use of clean coal technologies, to facilitate intra-ASEAN coal trade and address environmental issues, a range of strategies have been developed:

- Strengthening institutional and policy framework and building an ASEAN coal image
- Promotion of coal and clean coal technologies
- Promoting intra-ASEAN coal trade and investment
- Enhancing environmental planning and assessment of coal projects.

Although gas and coal are the major sources for electricity generation, ambitious targets have been set for renewables.

During the APAEC period 2004-2009, only 10 per cent of the target to increase the installed renewable energy (RE) based capacities for power generation was met. As of 2007, the installed capacity of the ASEAN region was 16 383 MW whereas RE potential is estimated at 474 416 MW.

During the 2010-2015 APAEC (ASEAN Plan of Action for Energy Cooperation) period, RE is key to increasing the diversity of energy supply, replacing fossil fuel-based generation and reducing the environmental impact of energy use in the ASEAN region. The total share of renewable energy is expected to grow annually at a rate of 9.1 per cent to reach 185 MTOE in 2030.

It is also envisaged that by the end of the Plan period, clear policies and programmes will be in place to enhance commercialisation, investment, markets and trade potential of RE technologies.

In order to institute and maintain sustainable development on the use of RE and its technologies, the following strategies have been adopted:

- Developing a policy and institutional framework for the development of RE
- Enhancing awareness and information sharing and strengthening networks
- Promoting intra-ASEAN cooperation on ASEAN-made products and services
- Promotion of RE financing scheme
- Promoting the commercial development and utilisation of biofuels
- Develop ASEAN as a hub for RE.

Nuclear is also being seen as an important weapon in combating climate change and securing energy independence.

Five of the 10 ASEAN countries – Indonesia, Malaysia, Philippines, Thailand and Vietnam are exploring nuclear power. The timeframe for the start of operation of the nuclear power plants is from 2015 to 2021. Out of these five countries, Indonesia, Thailand and Vietnam have planned to add 2 GW each of nuclear capacity by 2020 and 2021 whereas the Philippines is planning to revive its 600 MW Bataan nuclear power plant (BNPP) which was shutdown about two decades ago. Malaysia is in the initial stages of conducting a feasibility study to be approved by its Commission.

To cooperate on a voluntary and non-binding basis and to enable the sharing and exchange of information and knowledge, technical assistance, networking and training on nuclear energy for power generation, the following strategies have been incorporated:

- Conduct capacity building among the ASEAN member countries
- Strengthen public information and public education on nuclear power generation
- Strengthening of institutional, legal and regulatory capacities on nuclear power generation.

While the development of renewables and nuclear are crucial in addressing climate change, energy efficiency and conservation also has an important role to play. Efficiency and conservation is now being recognised as a key factor in achieving energy security and sustainability, addressing climate change issues and promoting optimal use of available resources in the region.

Various measures to promote energy efficiency form part of the objectives of the EE&C-SSN (Energy Efficiency and Conservation Sub-Sector-ASEAN) programme launched by ASEAN Centre for Energy.

Various strategies have been adopted in order to achieve the objective of implementing energy efficiency and conservation measures. These include:

- Development of energy efficiency policy and build capacity
- Raising awareness and dissemination of information using all appropriate media
- Promoting good energy management practices, especially for industrial and commercial sectors
- Facilitation of energy efficiency financing.

Regional energy policy and planning is an important element to attain the objectives of energy security, environmental sustainability and promotion of open market competition.

Energy is viewed as the most critical area of government policy intervention. To enhance cooperation on regional energy policy analysis and planning towards sustainable development and to effectively manage the implementation of APAEC, the following strategies have been formulated:

- Enhancing energy policy and supply security information sharing network
- Effectively manage the implementation of APAEC 2010-2015
- Conduct capacity building in energy and environmental policy planning and energy supply security assessment
- Preparing regional energy outlooks and conducting ASEAN energy policy reviews and analyses
- Strengthening collaboration and dialogues with ASEAN partners and national, regional and global institutions.

Energy security, availability, accessibility, affordability and acceptability are key shared concerns in the ASEAN region.

To address these concerns, the ASEAN region has developed a clear vision that incorporates regional cooperation via energy interconnection projects, diversification of energy sources to include a larger portion of renewables, efficient utilisation of existing resources, the fostering of energy efficiency practices and technologies.

The ASEAN region has developed a clear vision that incorporates regional cooperation via energy interconnection projects and diversification of energy sources

Vishvjeet Kanwarpal is CEO of Global InfraSys (P) Ltd. and Asia Consulting Group (P) Ltd. This article is an excerpt from "The ASEAN Power and Energy Study". For further information email: ceo.gis.acg@gmail.com

A direct approach

A new direct-drive wind turbine that could reduce the complexity of wind turbines and thus increase reliability and maintainability is now under test in Denmark.
Junior Isles reports.

Brande may be just a small Danish town with a population of around 7000 people but notably it is the site of a prototype of a new wind turbine that could be of significance to the growing global wind turbine market.

In December last year, Siemens Wind Power announced that it had installed the first prototype of a newly designed direct-drive wind turbine near its headquarters in Brande, on the Jutland peninsula in west Denmark. The new SWT-3.0-101 DD is a 3 MW machine with a rotor diameter of 101 m. The machine has no gearbox, which, according to Siemens, offers greater reliability and competitiveness than conventional geared wind turbines.

"Even though we have very reliable gearboxes, gearboxes will always be the most complex part of a wind turbine. Anything you can do to reduce complexity of a turbine will increase reliability. Since this turbine has just half the number of parts and much less than half the number of moving parts, there will be a positive impact on reliability and maintenance. Also, for the same rotor, we expect a couple more per cent in terms of power output. This is because, unlike an electrically excited machine with a gearbox, a permanent magnet excited machine does not expend any energy on the excitation itself," explains Henrik Stiesdal, chief technology officer at Siemens Wind Power.

Traditionally, a geared design has been the starting point of most wind turbines because of the easy availability of large generators and gearboxes. Stiesdal says: "Typically, direct-drive machines have been more expensive because you cannot buy big direct drive generators off the shelf. There are very few other industrial applications where such machines are used. But now we are looking to combine the skills of our wind division in mass-producing large pieces of industrial equipment with the ability of other parts of Siemens that are competent in making large electrical machines. This will allow us to make a turbine that is more competitive than conventional wind turbines."

While it was originally thought that direct drives would be particularly suited to large offshore wind turbines, Siemens now believes that they can also be attractive for onshore wind farms. Stiesdal says: "The 3 MW size is in the hotspot for the onshore market for the coming years. This machine will offer 25 per cent more power than our present 2.3 MW machine but with a much lower weight."

Although not new, direct drive machines are not widespread. German company Enercon has a direct drive turbine series that has been successfully operated in the market. Before Siemens acquired it, Bonus began working on a direct machine as long ago as 1999, making a "topology analysis" that studied the overall electrical design and arrangement of a potential machine. However, little progress was made on industrialising the machine and work stopped around 2004 during the period when Siemens acquired Bonus. But work re-started in 2005 once the acquisition was completed.

In addition to this merging of competencies following the acquisition, another key driver behind the restart of work on direct drive machines has been the reduction in the price of permanent magnets, which has fallen by around 50 per cent in the last 10 years. The permanent magnets used for excitation are a key component of direct drive machines.

These developments saw two proof-of-concept machines being installed in 2008 and 2009 to test understanding of the technology. The proof-of-concept machines have formed the basis of the 3 MW prototype now installed at Brande.

The new machine will offer 25 per cent more power than Siemens' existing 2.3 MW machine but with a much lower weight

The two main targets for the engineers developing the new unit were to reduce the weight and the number of parts in the machine. Stiesdal notes: "The target for the number of parts was fairly ambitious. We wanted a machine with 50 per cent fewer parts than our 2.3 MW geared turbine and we succeeded in doing this."

The topology Siemens has selected is what it calls a 'radial flux' design. "This is the simplest and best known arrangement and is how most standard electric motors are made," comments Stiesdal. The machine also has an "outer rotor design" where a rotor spins on the outside of the stator unlike in a typical electrical machine where the rotor is inside the stator. "This is not new technology. On such a large electrical machine, the stator is fairly flexible. Being able to mount it on a stiff inner structure gives the advantage of being able to operate it on narrower tolerances. This means we can have good tolerances on even a large machine," adds Stiesdal.

This is important in terms of meeting size constraints since it will allow the machine to be transported through the Elbe tunnel, en-route from Denmark to Germany, without having to turn it upside down or lay it down on the truck. There is a diameter restriction of 4.26 m.

The generator sits at the front of the nacelle, between the nacelle itself and the rotor hub. The reduction of equipment inside the nacelle means that the nacelle is only about 4 m long.

In terms of new parts, Siemens has made a great effort to use as much of its existing technology as possible. This helps to reduce technology risks. "The machine has effectively the same rotor as our 2.3 MW 101 machine. Everything that is in front of the generator is known equipment taken from the 2.3 MW machine," says Stiesdal.

> "The target for the number of parts was fairly ambitious. We wanted a machine with 50 per cent fewer parts than our 2.3 MW geared turbine and we succeeded in doing this."

He adds: "There are five main parts that make up a wind turbine – the blade, rotor hub, nacelle, tower and the controller. Out of these five elements, four are used from our existing portfolio. Only the nacelle is new. So when it comes to risks related to new technology, this is as careful as you can make it."

Such a large direct drive generator that runs at only 15 r/min cannot generate electricity directly at 50 Hz and therefore needs to use a power converter. Here, all of the power is first fed to a rectifier to convert it to DC and then through an inverter to re-convert it to AC at 50 Hz. The power converter is made up of a number of identical modules and just one more module is needed to increase the power output from 2.3 MW to 3 MW.

The power converters allow precise control of the power output regardless of rotor speed. The power converter is regulated to give the optimum combination of rotor speed and power output. This optimises the efficiency of the rotor from wind speeds of about 3-4 m/s up to 11-12 m/s, where the machine reaches its maximum rated output. At higher wind speeds, i.e. up to 25 m/s, the machine continues to run at maximum capacity but the rotor blades are pitched away from their optimum aerodynamic position to reduce loads on the equipment.

The proof-of-concept machine answered key questions related to efficiency, operating temperatures and behaviour under changing ambient conditions. "We found that the 3.6 MW proof-of-concept machine could do much more than 3.6 MW without overheating. We have had no issues whatsoever with the two prototype generators," according to Stiesdal.

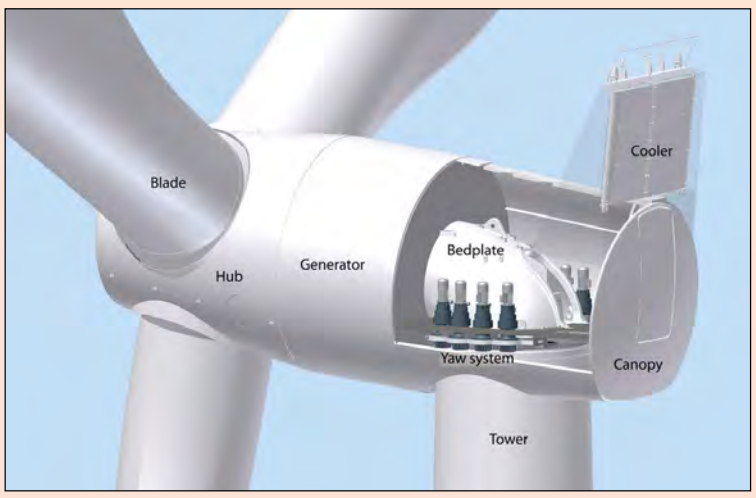
While there are no obvious downsides to the technology, the proof-of-concept machine and newly installed prototype will help to eliminate any risks that may be associated with a new technology. "Running a controlled ramp-up programme to analyse and eliminate as many risks as possible is important before producing thousands of machines," says Stiesdal.

The prototype machines will undergo even more extensive testing than that carried out on the concept machines but will include key parameters related to the generator e.g. temperature, vibrations, efficiency etc. "Everything tested on the concept machines will be done with the prototypes, and more. The prototype machines will also need to be proven to a much higher level, so there will need to be much more load and structural measurements. Also, because it will be going into serial production, we will also look at how easy components are to replace and the ergonomics of the design for people that will have to service the machine," notes Stiesdal.

The units installed in Denmark will not experience the full range of operating conditions that the machines could be exposed to; therefore an additional 5-10 machines will be installed in other parts of the world. Stiesdal says: "Pre-serious machines will also be installed in locations that are perhaps very hot or very windy i.e. in as diverse operating conditions as we can find."

Siemens remains tight-lipped on the exact date of when the turbine will be launched but says it will be some time this year.

The generator sits at the front of the nacelle, between the nacelle itself and the rotor hub. The reduction of equipment inside the nacelle means that the nacelle is only about 4 m long



Junior Isles

Is it the man or the tool?

A bad workman always blames his tools. This could be the initial reaction to Tim Yeo's comment that carbon markets are failing to encourage investment in cutting CO_2 emissions.

Mr Yeo, the UK Member of Parliament who chairs the UK's Environmental Audit Committee (EAC) recently said: "Emissions trading should be helping us to combat climate change, but at the moment the price of carbon simply isn't high enough to make it work.

"If the government wants to kick-start serious green investment, it must step in to stop the price of carbon flat-lining."

Indeed carbon prices have flat-lined, unfortunately at not a very high price. Currently trading at around €13 per tonne, the price of carbon is a long way off the €100 per tonne of CO_2, which Yeo says is needed to encourage investment in cutting CO_2 emissions.

Certainly the European Union's emissions trading scheme (EU ETS) has its problems. Under the scheme, heavy industries are issued with a quota of carbon permits and companies that want to pollute more than their quota have to buy permits from companies that have an excess of permits. Theoretically, this should encourage companies to invest in technologies that cut CO_2 emissions.

The market, however, was perhaps kicked off too gently. Carbon allowances were clearly over-allocated in Phase I (2005-2007) resulting in low carbon prices and an overall increase in emissions between 2005 and 2007.

Now with the recession, companies have cut output and thus need fewer carbon permits. This is being blamed for the current low prices.

> "If the government wants to kick-start serious green investment, it must step in to stop the price of carbon flat-lining."

"The recession has left many big firms with more carbon allowances than they need and carbon prices have collapsed," said Yeo. "Ministers should seriously explore the possibility of a carbon tax and must press the EU to tighten up the overall caps in the Emissions Trading System," he added.

The EAC stated that there is much to welcome in the current design of the EU ETS – especially the declining cap in Phase III (from 2013) that could drive genuine emissions cuts. But it also said that there is a real risk that Phase II (2008-2012) will turn out to be significantly over-allocated, especially if economic recession leads to a prolonged reduction in emissions.

It said that given that surplus allowances may now be banked and carried over into the subsequent phase, this could significantly weaken the effectiveness of Phase III. Even without the recession, the committee is concerned that in Phase II, industrial sectors have again been allocated allowances in line with business-as-usual projections, and that in Phase III they may again have free allowances. This could significantly reduce the potential for the EU ETS to motivate businesses to make carbon efficiencies and invest in low-carbon research and development.

The committee added that there is much uncertainty about the likely effectiveness of the EU ETS up to 2020.

As a market-based mechanism it is questionable whether any type of trading scheme will ever be able to deliver the cuts that scientists say are needed. But whether the government needs to step in is a point of debate that has split the industry.

David Porter, Chief Executive of the UK's Association of Electricity Producers believes that the industry still looks to the ETS as the main driver for new greener investment. However, he did note: "There is some frustration that we can't be very confident about allowances in the longer term but there is not agreement on how to address the present problem with regards to carbon prices. On the other hand, some would argue that there is no problem and that the market is doing what it is meant to do."

The EAC is calling on the government to consider measures such as a floor price for carbon or a new carbon tax that would guarantee a minimum price for carbon.

It said that experience elsewhere has shown carbon taxes are not incompatible with carbon trading schemes, and their use to address an insufficiently high carbon price should be explored urgently. It also recommended that the government explores with the European Commission and other member states the creation of a floor price for the EU ETS, which could increase progressively as the market carbon price rises.

Addressing the issue of a floor price, Professor Dieter Helm (chairman of the Academic Panel of economists at the Department for Environment, Food and Rural Affairs) told the Committee: "It is hard to think why one would not have a floor: what could the downside risk possibly be? For, if policymakers genuinely thought that the carbon price might fall below the floor, there would be a credibility question about the scheme as a whole. Either the Commission believes that the EU ETS price will always be above the floor (in which case, there is no problem putting a floor in place), or it believes that the price could fall below (in which case, there is a good case for having a floor)."

In his contribution to the Committee's study Paul Ekins, Professor of Energy and Environment Policy at King's College in London, said that one way a floor price might be implemented is that governments could guarantee to buy any permits offered for sale at a specific price. Another is that they would set a carbon tax at the level of the desired floor price.

Professor Ekins supported the use of a carbon tax to set a minimum carbon price within the EU ETS, but stressed that this would have to be done across the EU in order to be effective, and that given a previous unsuccessful attempt in the 1990s to set an EU carbon tax this might be politically difficult.

Yet the industry is not convinced that setting a floor price is the right response. "We all agree that we need something firm and credible to steer investment but there is not agreement that it should be supplemented by the setting of a floor price. Some would go along with it but many would not," said Porter.

Certainly there is broad agreement among power companies and business groups that offshore wind and carbon capture and storage (CCS) require additional, dedicated subsidies. Sara Vaughan of E.On, for example, told the Committee that relying on the EU ETS alone to encourage investment in CCS would take too long. EDF has also argued that subsidies should be provided for new nuclear plants.

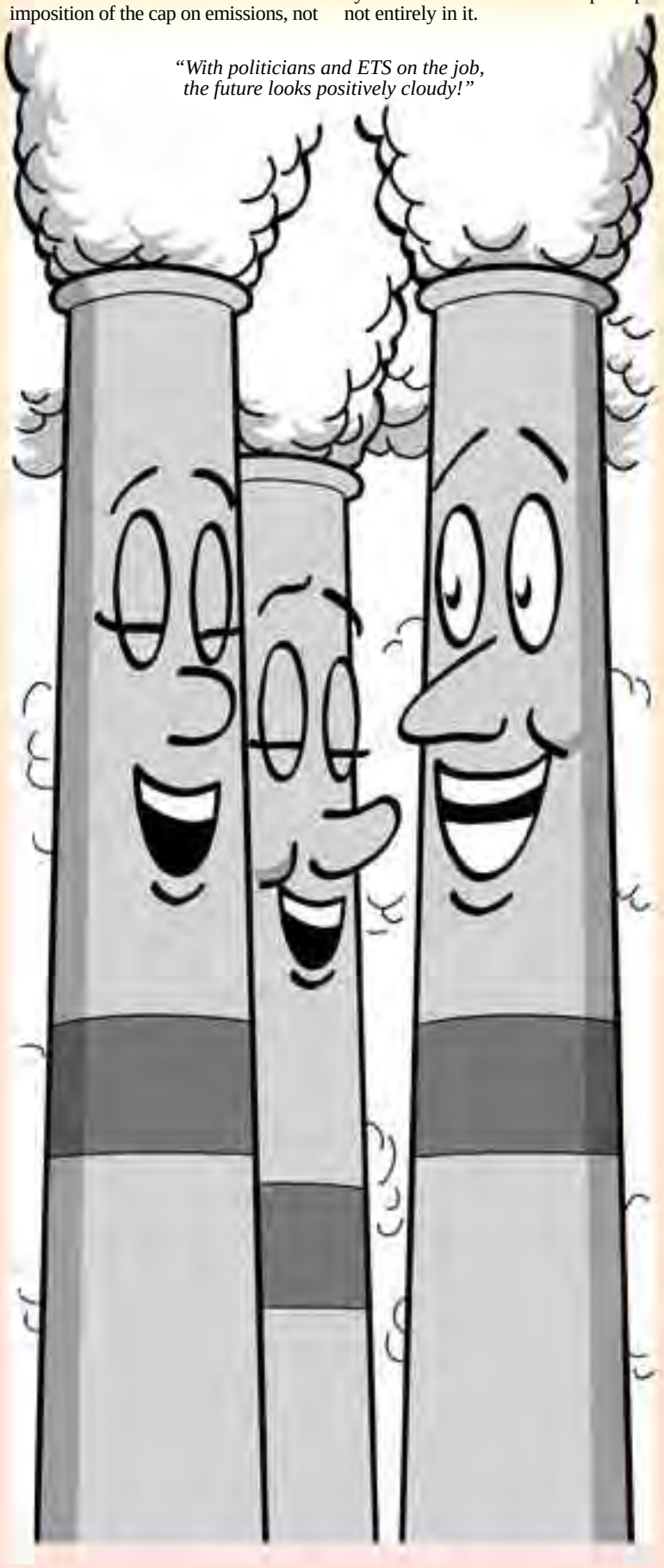
Carbon taxes do have an advantage over emissions trading schemes in that they are able to set a stable and predictable carbon price. But carbon taxes are vulnerable to political lobbying, aimed at weakening the carbon price. Further we have seen that money that governments raise from taxes is often not spent on the purpose for which the tax was introduced.

In a perfect world, the politicians would make the ETS work better. However, people have to sense how strongly the politicians believe in the scheme and sometimes there are signs that perhaps they do not believe in it as strongly as they would have the public believe. The stance of Italy and Poland on the setting of allowances was one example, as was the outcome of Copenhagen.

Porter commented: "It is the imposition of the cap on emissions, not the market or the trading, that reduces greenhouse gases. The cap is set by politicians, whereas the trading of allowances in the carbon market enables the industry to deliver solutions efficiently. The market works. It is the politics that is failing."

The jury may still be out on whether fixing the price of carbon is necessary. Perhaps the industry does need a bigger beating stick, or at least greater certainty, in order to make the investments that are needed to promote greater investment in green technology.

So far, history shows us that as a tool on its own, the EU-ETS is perhaps not man enough for the job. But then it is a big job – one that is being undertaken by workmen whose hearts are perhaps not entirely in it.



"With politicians and ETS on the job, the future looks positively cloudy!"