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January 2009 • Volume 1 • No 11 • Published monthly • ISSN 1757-7365

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THE ENERGY INDUSTRY TIMES

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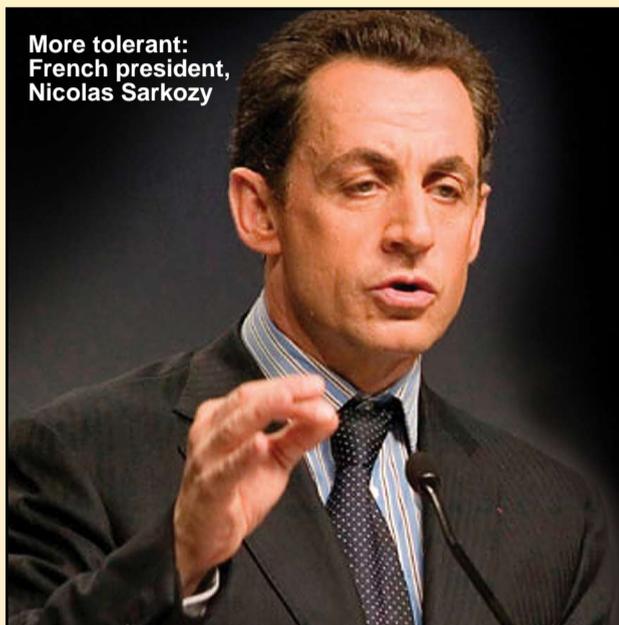
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More tolerant:
French president,
Nicolas Sarkozy



EU makes concessions to clinch climate deal

The European Parliament has approved the EU's climate change package. But some argue the concessions made to seal the deal may result in an uneven playing field and threaten security of supply.

Junior Isles

The European Parliament's approval of the European Union's deal on cutting greenhouse gas emissions by 20 per cent by 2020 marks the final step in a year of talks to secure the world's broadest agreement yet to combat climate change. The deal, however, has drawn criticism from parts of the industry and environmentalists.

The climate change deal agreed between European leaders in mid-December was only reached after watering down the costs for industry in terms of fines and pollution permits. The economic crisis had at times threatened to derail the EU's plans but a range of concessions to industry helped clinch the deal amid criticism from environmental groups. The biggest threat to the package was the opposition of nine eastern

European nations, which argued that it would increase costs for their coal-fired power sectors. To secure their support, the EU agreed to provide them with funding from about 12 per cent of the revenues generated from the EU emissions trading scheme (ETS).

The European Parliament endorsed the EU deal despite misgivings about the ETS. Money generated from the auctioning of permits is supposed to

finance green technologies or carbon capture and storage (CCS).

Graham Watson, leader of the assembly's Liberals, regretted the "blizzard of concessions" to industry in the climate change deal.

German energy major RWE also expressed concerns over the climate package saying that it fails to create a level playing field and has greatly

Continued on page 2

EU Renewables Directive will see wind gather speed

- More than one third of EU generation to come from renewables
- Wind to account for 14 per cent of electricity demand

The Renewable Energy Directive will see wind energy become the biggest contributor to the target of achieving more than one third of the EU's electricity from renewables in 2020 said the European Wind Energy Association (EWEA).

The directive means that more than one-third of the EU's electricity will come from renewable energy in 2020, up from 15 per cent in 2005. By 2020, wind energy is expected to have overtaken hydropower as the EU's largest source of renewable electricity.

Welcoming the new directive, Christian Kjaer, EWEA Chief Executive said: "Today, tomorrow changed. The European Parliament and the Council have agreed the world's most important energy law.

Europe has turned away from transferring ever larger amounts of European citizens' wealth to a handful of fuel-exporting nations, opting instead to put the money to work at home and exploit our abundant domestic renewable energy resources."

For the first time, each member state has a legally binding renewables target for 2020 along with a clear trajectory to follow. By June 2010 the member states will draw up National Action Plans detailing how they will meet their 2020 targets. These will then be submitted to the Commission for assessment. They will report on their progress every two years. These measures should lead to concrete progress in the 27 countries.

"The grid and administrative barriers

whose shadows loom long over wind energy project developers will finally be tackled throughout Europe thanks to the directive. Furthermore, member states will be able to work together to meet their targets under stable market conditions, which will give investments in the wind energy sector a boost," said Kjaer.

Wind power is expected to generate up to 14 per cent of EU electricity demand by 2020, compared to 3.7 per cent in 2007.

In a statement the EWEA said: "There will be many new investment, business and manufacturing opportunities. Research and development, with additional funding, will thrive. Tens of thousands of well-paying jobs will be created.

"For Europe, the legislation will translate into phenomenally massive fuel cost savings while the uncertainty associated with the ever increasing importation of oil and gas from unstable regions will begin to lessen."

The directive will help mitigate global warming, caused primarily by greenhouse gases from burning fossil fuels.

According to the EWEA, with 56 GW of cumulative installed capacity in 2007, EU wind power avoided the emission of 91 million tonnes (Mt) of CO₂ – equal to taking 46 million cars off the road. By 2020, with an expected 180 GW of installed capacity, wind power could avoid 328 Mt of CO₂, equivalent to neutralising 165 million cars.

(Continued from page 1)

weakened Germany's position as an energy producer.

Johannes Lambertz, CEO of RWE Power, said that security of supply calls for a diverse energy portfolio and that coal would be indispensable to such a portfolio. He noted, however, that the EU has seriously curtailed prospects for coal-fired plants.

Despite the urgent need for power plant renewal, RWE expects that several such projects will now have to be set aside and the modernization of existing plants delayed. The German energy major has said that the climate package will raise the risk of a power shortfall as well as increase dependence on gas imports, since the incentive to build gas-fired plants will now be greater.

RWE said that, if faced with a lack of sufficient incentives to build modern coal-fired power plants, energy companies will have no choice but to keep older plants with much higher carbon emissions on the grid, benefitting neither the economy nor the environment.

Negotiations were fast tracked to get the deal finalised well ahead of the Copenhagen meeting in December 2009 to find an international deal, causing anger in the parliament that it had not been properly consulted.

French president, Nicolas Sarkozy, who chaired the EU meeting said he "acknowledged concessions were made to smokestack industries, especially in eastern EU nations, to get unanimous approval".

"When you must solve things with 27 nations, you become more tolerant," Sarkozy told the EU assembly.

Czech conservative member Miroslav Ouzky said after the vote: "Exceptional circumstances sometimes demand an exceptional response."

The deal takes on a greater importance coming just before Barack Obama assumes the US presidency, amid hopes in Europe of transatlantic cooperation to tackle climate change.

Sarkozy called on the US and others to match the commitment of the 27-nation EU to slash greenhouse gas emissions. Incoming US president Barack Obama and other leaders "must take account of what we have done," Sarkozy told the European Parliament in a speech ending France's presidency of the bloc.

He said the deal will also make wind, solar and other renewable energies satisfy 20 per cent of the EU's energy consumption by 2020.

The EU is offering to cut greenhouse gas emissions by 30 per cent if a global deal, now under debate in the United Nations, is reached. This will call for a more active US role in environmental issues than the outgoing administration of President George W. Bush was ready to play, according to EU officials.

European Environment Commissioner Stavros Dimas said in the debate preceding the vote: "Everybody knows what Mr Obama has set as priorities – energy security and climate change."

US agreement will boost Middle East nuclear ambitions

The US is about to sign a nuclear cooperation agreement with the United Arab Emirates as Iran is proposing to develop nuclear power plants in co-operation with its Arab neighbours. **Junior Isles**

The Bush administration plans to sign a nuclear cooperation agreement with the United Arab Emirates (UAE) shortly in what might be seen as a move that runs counter to a proposal by Iran to build nuclear plants with its Arab neighbours.

It is expected to be the first nuclear cooperation agreement between the US and a Middle East country. According to a report in *The Wall Street Journal*, the administration also seeks to sign similar pacts with Saudi Arabia, Jordan and Bahrain.

The pacts require the US to share nuclear fuels, technologies and know-how on the condition that the countries commit to abiding by the Nuclear Non-proliferation Treaty and IAEA (International Atomic Energy Agency) safeguards, the report said.

The US also signed a science and technology cooperation agreement with

Saudi Arabia that includes nuclear power technology.

The UAE, which pledged to protect against nuclear materials being diverted and accept international inspections, has already signed agreements with two US engineering companies, Thorium Power Ltd and CH2M Hill, to help develop nuclear power plants, according to the report.

"This is a real counter-example to what Iran is doing... We're seeking commitments from nations within the Middle East that they're going to rely on the markets for nuclear fuel," the report quoted a senior US official as saying.

The US has accused Iran of trying to develop nuclear weapons under the cover of a civilian nuclear programme. Iran has denied the charges and insists that its nuclear programme is for peaceful purposes only.

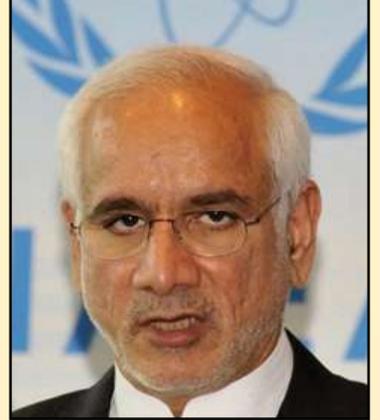
Earlier in December, in spite of increasing international pressure to halt its nuclear programme, Iran proposed to develop nuclear power plants in cooperation with neighbouring Arab countries in the Persian Gulf region.

Several Arab countries have expressed interest over the past few years to develop their own nuclear power programme, partly as a response to Iran's controversial nuclear programme. Iran is proposing to build light-water reactors along with its Arab neighbours.

Reza Aghazadeh, head of the Iran Atomic Energy Organization, told *Xinhua* news agency: "Iran is ready to provide very soon a comprehensive plan for the proposal if it were approved in generalities by the Persian Gulf littoral states."

Iran is building its first nuclear reactor

Reza Aghazadeh, head of the Iran Atomic Energy Organization: ready to provide a comprehensive plan



in the city of Bushehr with Russian support and is also building a 40 MW developmental research reactor in Arak, according to media reports.

At the end of November, head of the Rosatom state corporation for nuclear energy, Sergey Kiriyenko, said that difficulties with ensuring the timely financing of the construction of the Bushehr nuclear power plant have been removed. "We are to complete the work in full next year," Kiriyenko stated.

■ Korea Electric Power Corp. (Kepeco), South Korea's state-run electric power company, has signed a preliminary deal to build a nuclear power station in Jordan. Under the deal signed with the Jordan Atomic Energy Commission, both sides will form a working committee to conduct a feasibility study on the project and to layout a scheme on project financing, Kepeco said in a statement.

Generator says EU CO₂ permits scheme unfair

The finalization of the EU's climate change package and in particular a decision to make all EU power stations pay for carbon permits from 2013, has been met with dismay by German energy giant RWE.

Making power companies pay for the carbon dioxide they emit would mark the end of fair competition in Europe's energy sector, RWE chief executive Juergen Grossmann told the *Financial Times* newspaper.

"Companies such as ours that... rely on coal-fired power generation will find themselves at a distinct disadvantage vis-a-vis companies like EDF, which are based mainly on nuclear and have virtually no CO₂

costs," he said.

He said the decision for full auctioning carbon permits for utilities would essentially hand €40 billion to French state-controlled EDF.

RWE, however, welcomed the decision to invest some of the revenues from sales of emissions allowances in promoting new methods of carbon capture and storage (CCS). The company is planning to invest more than €30 billion in its power stations, open-cast mines and supply networks in the coming years. At least €1 billion of this total has been earmarked for the first utility-scale power plant with CCS technology. Located near Cologne, Germany, this

plant is expected to come on stream in 2014.

Prior to the finalisation of the package, a group of 20 energy and engineering companies and clean technology investors wrote a letter to European Union heads of government urging stronger backing for CCS projects.

The letter stated that urgent implementation of CCS is crucial for the EU to be able to deliver its 2020 and 2050 emission reduction targets.

"Crucial investment decisions are required in 2009-10 to deliver operational CCS projects in 2015", it said. It also said that EU leadership on CCS is a necessary prerequisite

for securing a global climate deal involving developing countries.

"The private sector is willing to continue investing significantly in the development of CCS technologies, and stands ready to share the development risks associated with the 12 CCS demonstration projects on a 'no performance, no pay' basis," it said.

The letter was signed by Vattenfall, Alstom, E.ON, Siemens, Fortum, GE, OMV, RWE, BP, Eni, DONG Energy, Royal Dutch Shell, Endesa, Climate Change Capital, the Carbon Markets and Investors Association, Bellona, E3G, the European Climate Foundation, ClientEarth and Sintef.

Canada could undermine global carbon marketplace

The proposed Canadian federal emissions trading framework could undermine global efforts to achieve climate change by failing to open to the wider carbon marketplace, according to market analyst, Datamonitor. Achieving climate change ambitions is more likely if regulatory consistency can be established across major polluting nations on a global scale it said.

In a recent report entitled: 'The development of pan-regional and national allowance-based carbon marketplaces', Datamonitor concludes that while federal emissions trading is

still under consideration in Canada, the likelihood of such a scheme opening to the wider carbon marketplace remains very low.

Firstly, the integration with initiatives at the province level will be challenging given the large variety of approaches followed by the various provinces. Moreover, the use of relative intensity targets in Canada would make linking with US and other markets worldwide more difficult as these rely largely on absolute emissions targets.

Finally, given that the use of Clean Development Mechanism (CDM) credits – known as Certified Emission

Reductions (CERs) – for compliance purposes is capped at 10 per cent of each Canadian installation's total target, it is quite unlikely that a substantial demand for such offsets will materialize in the next 10 years or so in Canada. Where demand does occur, domestic offsets will be prioritized over international offsets, particularly if CER prices remain higher than the Canadian carbon fund price ceiling.

Although Canada is party to the Kyoto Protocol, the country is pursuing an alternative greenhouse gas (GHG) emissions reduction schedule, having



postponed reaching its Kyoto target to beyond 2020. Among the Kyoto ratifying parties, Canada is not on track to meet its GHG emissions target of six per cent below 1990 levels, given that its GHG emissions have been steadily increasing since 1990 and were recorded at 24.7 per cent above 1990 base levels (equivalent to 747 MtCO₂e) in 2005.

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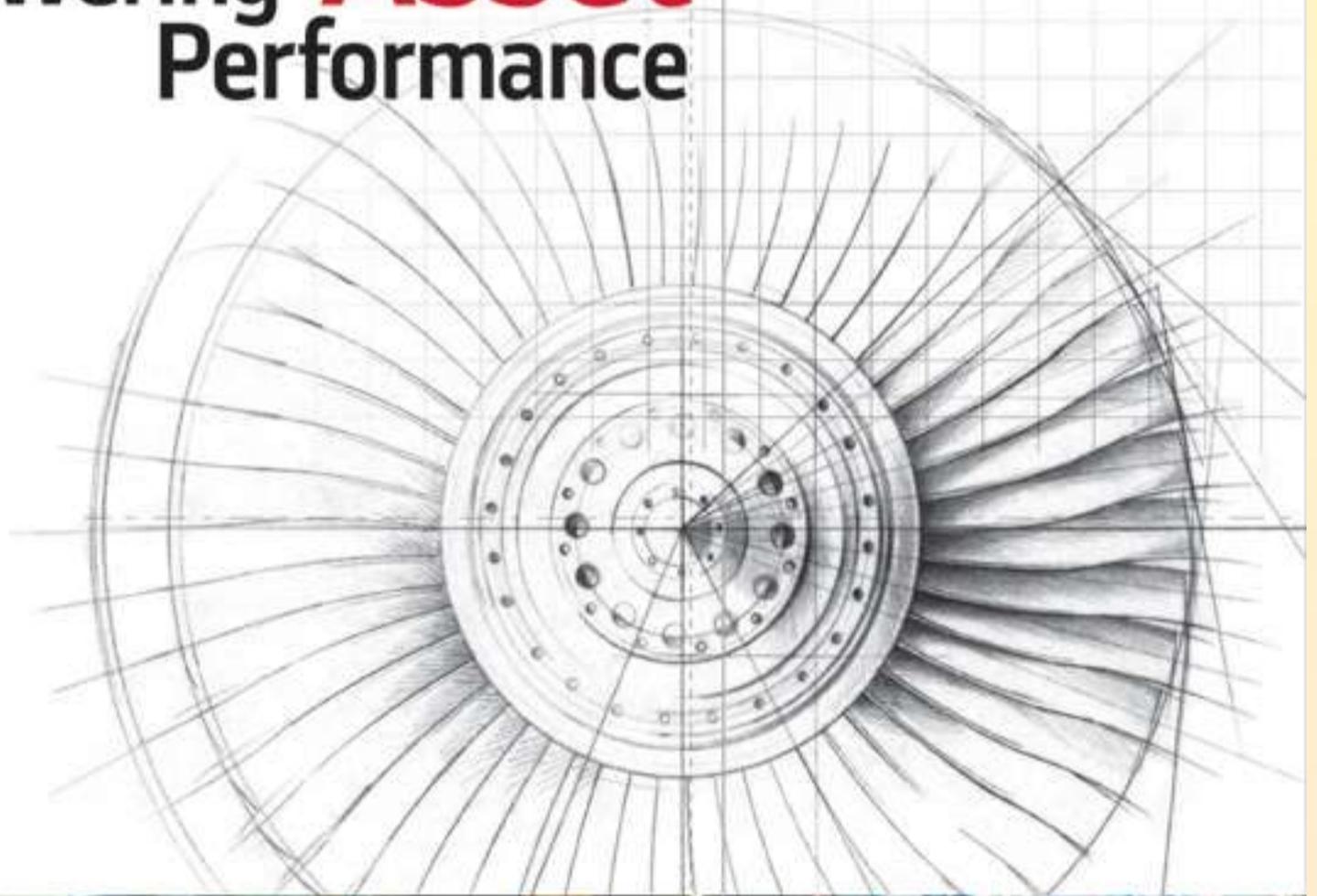
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Obama names climate and energy team

Dr Steven Chu: his appointment demonstrates the importance of science to the Obama administration



Barack Obama has hailed his vision of a new energy economy as part of the solution to the economic crisis, but with investor confidence so low, his new White House team has its work cut out.

Siân Crampsie

US President-elect Barack Obama has renewed his pledge to pursue a new energy economy and has charged a new Whitehouse energy and climate team with fulfilling his promise to chart a new course for the country.

Obama's selection of Dr. Steven Chu as Secretary of Energy signals his intent to tackle climate change through policies and technology based on science. He is also keen to make the energy and climate effort a major part of an economic recovery plan.

Obama has developed a plan to invest in renewable and alternative sources of energy in order to reduce the USA's energy imports, create new jobs and address climate change. Key elements of the plan include a national cap-and-trade carbon market and the introduction of targets for renewable energy.

Heading the energy and climate team and in charge of implementing these policies will be Chu, a Nobel prize-winning physicist who currently heads the Lawrence Berkeley National Laboratory. Obama has also appointed a so-called "energy and climate czar" – officially the Assistant to the President for Energy and Climate Change – to help drive his ambitious

plans through the legislature.

Chu is a leading advocate of reducing greenhouse gases by developing new energy sources and his appointment is another sign that Obama intends to focus efforts on the development of renewable and alternative sources of energy. His plans entail investments of \$150 billion over the next ten years to build a clean energy future.

"Chu blazed new trails as a scientist, teacher, and administrator, and has recently led the Berkeley National Laboratory in pursuit of new alternative and renewable energies," said Obama. "His appointment should send a signal to all that my Administration will value science, we will make decisions based on the facts, and we understand that the facts demand bold action."

The energy and climate czar position is to be filled by Carol Browner, a protégé of Al Gore who is currently Principal of The Albright Group LLC, where she provides strategic counsel on environmental protection and climate change.

Obama's ambitions to revitalise the economy through investment in the energy industry will please the sector's leaders, including Duke Energy CEO Jim Rogers, who recently called on Congress not to use the economic crisis

as an excuse to delay new environmental legislation.

"We can solve our economic and environmental crises simultaneously," said Rogers in November. "Our climate and economic challenges are twin ills; we should not treat either in isolation. The cure for one will help us fuel the other and help our nation emerge stronger and healthier than ever."

Rogers and the US Climate Action Partnership (USCAP) – of which Duke is a member – say that legislation is needed to spur innovation in green technologies that will create jobs and increase economic activity. Their cause was underlined in December when the Department of Energy reported that greenhouse gas emissions in the US increased in 2007 after a decline in 2006.

Obama's plan envisions the creation of five million new jobs and ensuring that ten per cent of electricity comes from renewable sources by 2012. In addition to renewable energy development, his team will also promote energy efficiency and the development of clean coal technology.

The President-elect's apparent commitment to change has brought relief to developers of coal-fired power plant, with a number of key projects making progress after many months

of cancellations and postponements.

In Virginia, Old Dominion Electric Cooperative said it is proposing to build a \$6 billion coal and biomass-fired power plant, while in Illinois Tenaska was finally given the good news that state lawmakers had passed legislation that will support development of a 630 MW integrated gasification combined cycle (IGCC).

The developers of the Mattoon FutureGen power plant are also still hopeful, announcing in December that they have closed on the purchase of the land in Illinois required for the project.

But in spite of progress on some projects, others are falling foul of the economic crisis and fuelling concerns that the difficult financial conditions are putting pressure on utilities' investment plans.

Power producer Dynegy said it is re-evaluating its role in developing new power plants – including two coal-fired plants currently under construction in Texas – because of the high cost of capital and difficulty in permitting new coal plants. In Montana an electric cooperative has been forced by a regulatory deadline to start construction of a 250 MW coal-fired plant with only enough cash to lay the concrete foundation.

Florida Power and Light has trimmed its 2009 capital expenditure plan by nearly 25 per cent to \$5.3 billion. Instead of 1500 MW of new wind generation, the company is now looking at building just 1100 MW.

Similarly, San Francisco-based Public Service Enterprise Group (PSEG) has cut its 2009 capital expenditure plans by \$275 million to \$325 million in response to the "challenging credit markets".

In addition, the renewable energy markets are being hit by a significant slowdown in the USA's tax equity markets, where companies invest in renewable energy projects in return for tax credits. The tax credit system is a fundamental part of project financing in America's renewable energy market and the lack of activity signals a real slowdown in construction activity for 2009, according to the American Wind Energy Association.

Obama's Whitehouse team will also include Nancy Sutley – currently Deputy Mayor for Energy and Environment for the City of Los Angeles – as Chair of the Whitehouse Council on Environmental Quality, and Heather Zichal – currently serving on Obama's transition team – as Deputy Assistant to the President for Energy and Climate Change.

Mexico sets climate target

- Urges global action on climate
- World Bank warns on Latin America

Mexico is hoping to spur collective global action on fighting climate change by setting a specific reduction target for greenhouse gas emissions.

The country's Environment Secretary Juan Rafael Elvira has announced a plan to halve greenhouse gas emissions from 2002 levels by 2050, making it one of the few developing countries to set a specific reduction target.

The plans were announced at the UN climate talks in December. Elvira said the target would be met through

the use of clean and efficient technologies such as wind and solar power.

The country is also planning to implement a domestic cap-and-trade system for greenhouse gases by 2012. Its proactive attitude to climate change has been praised by environmental groups such as WWF, as well as by the World Bank, which has called on governments in Latin America not to sacrifice climate change efforts in the midst of the financial crisis.



Juan Rafael Elvira Quesada: plans to halve Mexico's GHG emissions by 2050

Mexico produced more than 430 million tonnes of carbon dioxide in 2006, making it the world's 13th largest emitter. Mexican President Felipe Calderon is due to provide more details of the plan in February this year.

The World Bank recently reported that while Latin America is not a major polluter compared with other regions, its carbon emissions are increasing and its citizens are vulnerable to the effects of climate change.

Manitoba accepts St Joseph proposal

A decision by Canada's Manitoba government to accept a proposal to develop the country's largest wind farm illustrates the economic and environmental opportunity that wind energy can offer the country, according to the Canadian Wind Energy Association (CanWEA).

Manitoba Hydro and the Manitoba government said that the proposal for the 300 MW development was the best that they received in response to a 2007 request for proposals and brings the province one step closer to achieving its goal of developing 1000 MW of wind power by 2016. The project is owned by St Joseph Wind Farm Inc., a subsidiary of Babcock & Brown.

"This announcement confirms what we have been advocating for some time – that wind energy is competitively priced and able to make a major contribution to both

the economic and environmental portfolios," said Robert Hornung, CanWEA President.

Wind currently supplies around one per cent of Canada's electricity demand and there are 85 projects representing approximately 2500 MW of generating capacity due on-line by the end of 2008. The country's wind industry has set a goal of meeting 20 per cent of electricity needs through wind energy by 2025.

Canadian Hydro Developers recently opened the Melancthon EcoPower centre, a 200 MW facility that is currently the largest operational wind farm in Canada.

The St. Joseph project is worth over C\$800 million and will consist of 130 turbines located near Letellier in southern Manitoba. Construction is expected to start in 2009 and power deliveries in 2011.



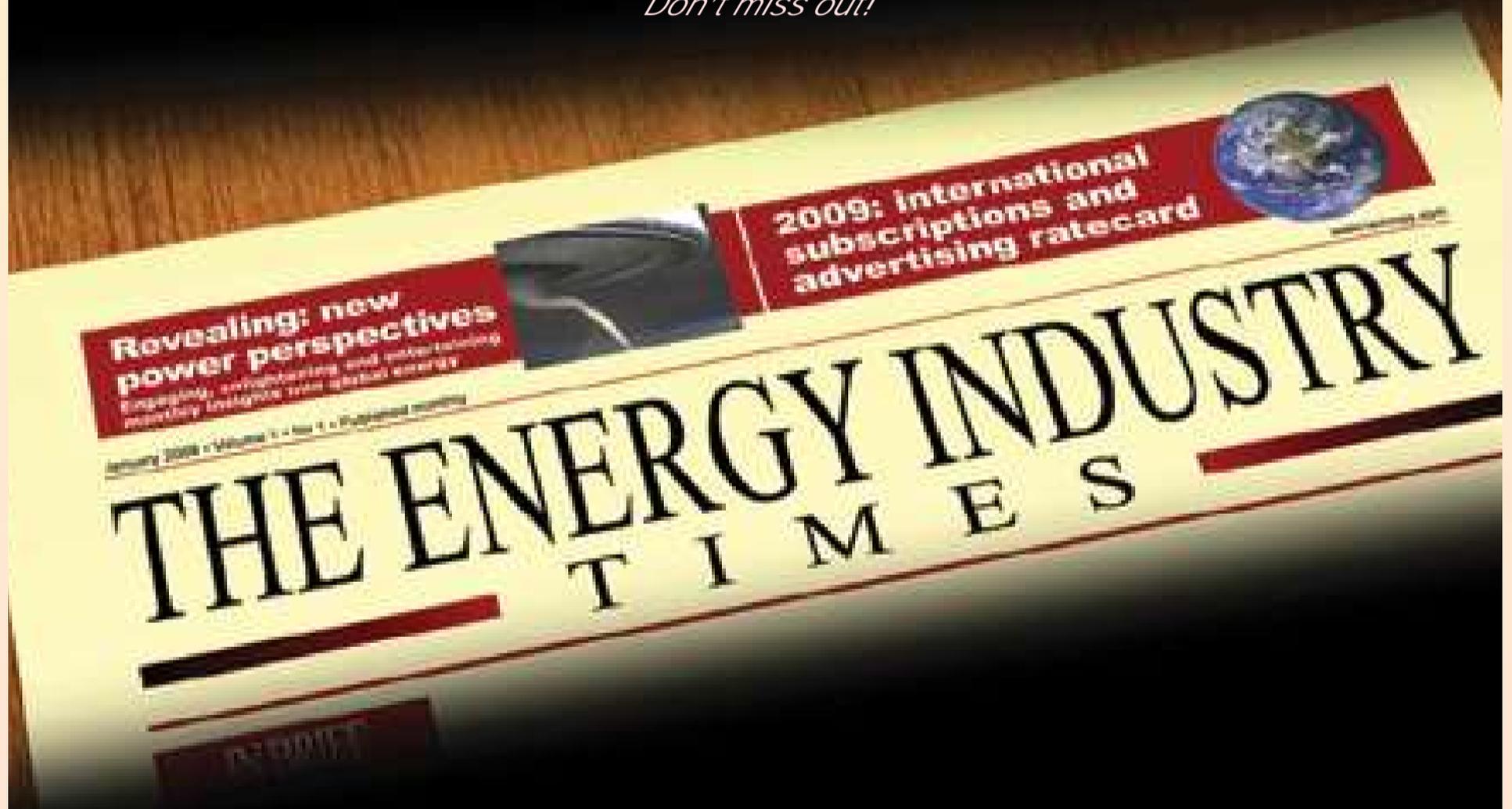
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Financial crisis and volatile fuel prices spark slowdown

Parts of Asia are beginning to feel the effects of the global turmoil, writes Junior Isles

Global turmoil in the financial sector and fuel prices has started to have an impact on countries in southeast Asia.

In December, the Electricity Generating Authority of Thailand (Egat) said it is considering delaying several power purchases from private producers in Thailand and abroad in line with expected lower growth in electricity demand.

Pornchai Rujiprapha, the Energy Ministry's permanent secretary, said a panel of executives from state utilities including Egat was revising the country's power development plan (PDP) to reflect a poorer economic outlook next year and impact from the global slowdown. The power purchases affected would be from neighbouring countries. Egat will also decide whether to open a new round of bidding for independent power producers (IPPs).

According to the 2007 five-year PDP, Egat will build its own power plants with a combined capacity of 9000 MW between 2011 and 2022. The third round of bidding for IPPs calls for deliveries totalling 3000 MW from 2015 to 2018. Power purchases from Laos, for which agreements are not yet signed, are expected to add nearly 6000 MW starting from 2013 to 2015, Mr Pornchai said. Purchases of another 14 800 MW have not been finalised with Burma, Cambodia and China.

The PDP drawn up in 2007 was based on average economic growth of 4-5 per cent annually and power consumption growth of 5-6 per cent. Now, the panel will revise the PDP forecast with three scenarios based on gross domestic product (GDP) growth of one per cent, two per cent and three per cent.

At the same time, the Philippines' Energy Development Corporation (EDC) said it is looking at the possibility of suspending its projects until the first quarter of 2009 in order to review its options, including capital expenditures and geothermal projects. EDC is the largest producer of geothermal energy in the Philippines.

EDC president and CEO Paul Aquino said the EDC, formerly a subsidiary of the Philippines National Oil Company until it was privatized last year, was not planning to cancel any of its projects yet. Cancellations or postponements were not on the cards as the company needed to ensure only that it was moving in the right direction.

Projects that were up for review included the 200 MW Nasulo project

"Thank God coal prices have come down, otherwise we would be in serious trouble in fiscal 2009."

in Negros, the 50 MW Tanawon geothermal project in Sorsogon and the Burgos, Ilocos Norte wind power project.

Aquino said EDC needed to borrow \$500 million for 2009 to fund its geothermal projects, pay its yen loans and to join in the bidding for government power assets. Among the power assets that EDC intended to acquire were the Palinpinon, Tongonan and Bacman projects.

Meanwhile, the high fuel prices experienced for much of last year has resulted in losses for state-run Korea Electric Power Corp (Kepeco). In December, Kepeco said it expected to post a 1.8 trillion won (\$1.32 billion) loss in 2008 due to high raw material prices in the first half of the year and

a weak won in the latter half.

The power monopoly has been suffering from hefty fuel costs as import prices of major feedstocks such as coal, liquefied natural gas and fuel oil jumped to record highs in mid-year, while the local currency lost nearly 40 per cent against the US dollar on the year.

The company said it needed to increase electricity tariffs by at least 20 per cent in 2009 to avoid its net loss suffering further. At the same time, it announced that it would be cutting its workforce by 10 per cent.

Utilities will, however, gain some respite from falling fuel prices. In December, power station coal prices at Australia's Newcastle port, a benchmark for Asia, dropped for a fourth week, declining to the lowest

in almost 14 months as demand from utilities weakened.

The weekly index for power station coal prices at the New South Wales port fell \$2.10, or 2.7 per cent, to \$76.09 a metric ton in the week ended December 5, 2008, the lowest price since October 19, 2007, and a 61 per cent decline from a July record.

Merrill Lynch cut its forecast for 2009 contract prices, for the year starting April 1, by 38 per cent to \$80 a ton.

Malaysian state-controlled power utility Tenaga Nasional Berhad (TNB) said in its annual report that cost pressures have eased somewhat following the recent sharp fall in coal prices. Chief executive officer, Che Khalib Mohamad Noh told reporters



Che Khalib Mohamad Noh: TNB is lowering forecast demand in 2009

at the company's annual meeting: "Thank God coal prices have come down, otherwise we would be in serious trouble in fiscal 2009."

TNB expects to pay almost two-thirds more for electricity supplies in fiscal 2009 due to the 'take or pay' contracts it has with IPPs.

In late December, the company also lowered its power demand forecast for 2009 to 2-3 per cent from 4 per cent

Meanwhile, the financial crisis has seen Indonesia struggle to raise financing for its 10 000 MW 'Crash Programme'. The state power company, PT Perusahaan Listrik Negara (PLN), therefore plans to issue Rp1.5 trillion (\$123.26 million) worth of bonds this month (January) to help finance the programme, which is scheduled for completion in 2010.

President director Fahmi Mochtar recently said the company remained upbeat that the bonds would be attractive to investors, even in the present adverse conditions where the global financial crisis has restricted liquidity.

PLN continues to seek loans to finance the programme, which needs Rp17.33 trillion to build power stations and Rp8.58 trillion for transmission systems.

At the beginning of December, it managed to secure a loan of \$260 million from a syndicate of Chinese

financiers. With the new loan, PLN is still seeking additional funds of \$1.24 billion to complete the programme.

However, the global economic situation is also presenting opportunities. At the end of November, Egat said it was planning to acquire stakes in private coal-fired power plants in the Philippines and Indonesia.

The power plant in the Philippines has a capacity of up to 600 MW. Egat governor Sombat Samtjaree said: "We see an investment opportunity in the privately run power plants, as they are experiencing a cash crunch."

Egat will invest more than Baht300 million (\$8.7 million) in the development of an Indonesian coal mine, with a view to exporting to Thailand, China and other regional countries.

Last month, Malaysian power company, YTL Power International agreed to buy Singapore power generator, PowerSeraya for \$2.4 billion. The transaction is due to be completed shortly. In late November, Temasek scrapped the sale of PowerSeraya as the global credit crisis drove down the asset prices and made funding difficult for potential buyers. The sale completes the long-awaited sell-off of Singapore's three major generating companies. Tuas Power and Senoko Power were sold earlier in 2008.

International investors show interest in Pakistan

Syed Ali

British companies interested in alternative energy projects

UAE firm eyes coal-based power plant

International investors are showing genuine interest in Pakistan's power sector.

Several British companies have expressed particular interest in investing in alternative energy projects.

British High Commissioner Robert Brinkley recently told minister for water and power, Raja Pervez Ashraf that more than 100 British companies are operating in different fields in Pakistan. He said these companies are keen to

enhance their business by investing more particularly in the power sector.

He commented on the UK's expertise in alternative energy projects and said that the officials of the Alternative Energy Development Board of Pakistan are being invited to visit the UK this year to brief British companies on the potential of alternative energy.

Ashraf said there is great potential in the power sector and that investors are getting high returns for their investment through liberal and incentive-based policies. The minister outlined the

current energy situation in Pakistan, future energy requirements and the short and long term measures to end the power deficit. He said that the project proposals are being processed through a "single window operation" on a fast-track basis.

Separately, the Abu Dhabi National Energy Company has expressed interest in setting up a coal-based power plant in Pakistan.

The company's vice-president, Mr Abdullah Khunji, told Pakistan President Asif Ali Zardari during his

visit to Abu Dhabi that his company was willing to invest in the power sector.

Mr Khunji later told reporters that Pakistan was the best place for investment and his company would soon launch its energy projects in the country.

The president assured him of the government's full support and cooperation.

The president said his government encouraged foreign investments in energy, agriculture, construction, infrastructure development and banking and financial sectors.

Mixed commitment on carbon reduction

- Australia establishes cap-and-trade system
- New Zealand dismantles climate-friendly policies

Junior Isles

Australia unveiled the world's broadest carbon trading scheme and pledged to cut its greenhouse emissions by 5 to 15 per cent by 2020, despite business calls for a delay due to the global slowdown.

Prime Minister Kevin Rudd said the carbon scheme was vital for Australia, which has the fourth-highest per-capita greenhouse gas emissions in the world.

Under the new proposal, permits to produce carbon will be auctioned by the government in the first half of 2010, raising an estimated A\$11.5 billion in 2010/11 that will help compensate businesses and consumers for higher power and fuel costs.

The system will cover 75 per cent of Australia's carbon emissions and involve 1000 of the nation's biggest firms, the government said, and participating firms will need to surrender a permit for every tonne of carbon emitted.

But there will be exemptions of up to 90 per cent for major polluters who could be penalised by the added

carbon cost when facing untaxed competitors on the international market, like iron ore and aluminium producers including BHP Billiton, Alcoa and Rio Tinto.

Australia is second only to the European Union in its drive to cut emissions by establishing a cap-and-trade system that puts a price on carbon output. However, critics said the target was too weak and blasted the trading plan that will give free credits to some of the economy's most carbon-intensive industries.

Commenting on the scheme, Martijn Wilder, partner at Baker & McKenzie in Sydney said: "By adopting a A\$40 price cap, it will provide companies with certainty as to their compliance cost but it also enables companies to buy their way out of compliance, in circumstances where the carbon price breaks the \$40 ceiling."

"The proposed scheme is disappointing in terms of the levels of reductions required as set down by the UN's IPCC (Intergovernmental Panel on Climate Change)," he added.

The government said Australia would only target the full 15 per cent cutback if a global deal emerges from

UN talks in Copenhagen in late 2009, angering environmentalists.

Scientists and green groups wanted cuts of at least 25 per cent but the carbon reduction scheme comes at a politically sensitive time for the government, with the mid-2010 start date set only months before it is due to hold elections to seek a second term.

Rudd defended the targets saying they were more aggressive on a per-capita basis than those in the EU. The government also said the scheme would only trim about 0.1 per cent off annual growth in gross national product from 2010 to 2050, with a one-off increase in inflation of around 1.1 per cent.

Australia's target is far shy of the 20 per cent reduction that Europe has promised and the IPCC recommendation of up to 40 per cent by then, and underscores the challenge world governments face in finding a successor to the Kyoto Protocol in the next 12 months.

Last month, the New Zealand government moved to dismantle several environment-friendly energy policies adopted by the ousted



Australian Prime Minister Kevin Rudd: pledged to cut greenhouse emissions by 5 to 15 per cent by 2020

government. A former Cabinet minister said the move could cost jobs and kill a fledgling industry.

Energy minister Gerry Brownlee said Parliament will repeal the obligation for oil companies to sell 0.5 per cent biofuels in gasoline now and 2.5 per cent by 2012. "Oil companies estimated it would add to the cost of fuel between 2 and 8 (New Zealand) cents a litre (4 and 16 US cents a gallon)" Brownlee said.

Brownlee earlier ended the former government's 10-year ban on building new carbon fuel power generation stations and suspended its emissions trading scheme, vowing to make it more "friendly" to business and agriculture.

Meanwhile in Japan, a panel of

environment, energy and economic experts held its first meeting at the end of November to help the government set a national mid-term greenhouse gas emissions reduction target next year ahead of UN climate change talks in Copenhagen.

The eight-member panel, led by former Bank of Japan Governor Toshihiko Fukui, agreed that they will steer discussions based on science, theory and objectivity, so that they can draw conclusions that will address climate change and energy security while ensuring economic growth.

The panel is scheduled to hold five or six more rounds of talks before compiling an interim report around spring or later, a government official said.



India opens up nuclear to private sector

Jairam Ramesh, Minister of state for power: energy shortages in the country will reduce in 2008-09

India's government is planning to open up its nuclear sector to private players after it completes bilateral civil nuclear cooperation pacts.

The statement came after Indian prime minister Manmohan Singh signed a landmark nuclear deal with Russian president Dmitry Medvedev covering the building of four new nuclear energy reactors in India.

"Once negotiations with Russia and possibly Canada in nuclear commerce are done, the government will soon open up the sector for private players to participate," Science and Technology Minister Kapil Sibal said.

The four new nuclear energy reactors will be built in Kudankulam in southern Tamil Nadu state, where two Russian 1000 MW light water reactors are already being built.

The nuclear deal with Russia follows similar agreements with the US and France after a decision in September by the Nuclear Suppliers Group to waive its ban on trading nuclear technology with India.

A host of private companies such as Westinghouse and GE of the US have been jockeying for a slice of India's lucrative civilian nuclear technology market, having sent trade delegations to the country recently.

According to local newspaper reports, France's Areva is in talks with state-owned Nuclear Power Corp of India Ltd (NPCIL) to supply 1600 MW reactors. "We are talking to possible partners, particularly NPCIL, for possible tie-ups," Jean-Jacques Gautrot, special adviser to Areva CEO Anne Lauvergeon, told the *Mint*.

Nuclear is an important part of India's strategy to reduce the power shortages being experienced in the country. In mid-December, the government estimated that the power shortage would fall by one per cent by the end of 2008-09.

Minister of state for power, Jairam Ramesh said: "It is estimated that the energy shortage in the country would be reduced from 9.9 per cent during 2007-08 to 8.8 per cent by the end of 2008-09." The Ministry of Power has set a target of 11 061 MW power generation in the current fiscal with 3570 MW from the central sector, 4054 MW from the state sector and 3437 MW from the private sector.

India is expected to add another 1500 MW of nuclear power to the national grid in 2009. Nuclear plants have been running at low capacity factors due to a lack of fuel.

Vietnam opens coal plant bidding in move to boost generation

The Ho Chi Minh City-based Tan Tao (ITA) Group unveiled plans for a \$2.5 billion power and seaport complex and solicited bids by international contractors. The facility, to be located in Kien Luong District, Kien Giang Province, some 300 km from HCM City, is an important part of the country's efforts to meet a power demand that is expected to increase by 17-20 per cent per year.

The facility will be located on a 556-hectare area that will be the site of a 5200 MW coal fired power complex, a large coal port and a smaller cargo port.

Work on phase 1, to include the 1200 MW Kien Luong Plant No 1, will begin in late 2009 and be completed in four years.

The first stage of the Kien Luong Power and Port Complex is estimated to cost \$2.5 billion, according to Tan Tao chairwoman, Dang Thi Hoang Yen.

ITA Group president Dang Thanh Tam said it would be the first major power project to be entrusted to a private company by the government.

In the meantime, Electricity of Vietnam (EVN) plans to purchase 2.7 billion kWh of electricity from China in 2009 to meet domestic demand.

China renewables funding

London-based alternative energy investment management firm, Climate Change Capital (CCC), believes the financial crisis offers a great opportunity for it to boost its presence in mainland China. Ka Keung Chan, managing director and head of China investments said that assets are now cheaper and companies are having a harder time securing capital.

CCC plans to invest Yuan 5 billion (\$732 million) in environmental projects in China including industrial

waste management and clean technology over the next two to three years.

The firm, which has not yet put its capital to work in China, is also looking to expand its investment in the world's fourth-largest economy by setting up a yuan-denominated fund in the next two to three years.

"There are a lot of cheap assets lying out there. If you see the right company, this is the best time to negotiate," said Chan, who joined the firm in February

after serving as managing director for renewable energy at Hong Kong electric utility CLP Holdings.

Meanwhile, according to a notice issued by the National Development and Reform Commission and the State Electricity Regulatory Commission China provided Yuan 2.023 billion (\$296 million) in subsidies to 148 renewable energy power generation projects from October 2007 to June 2008.

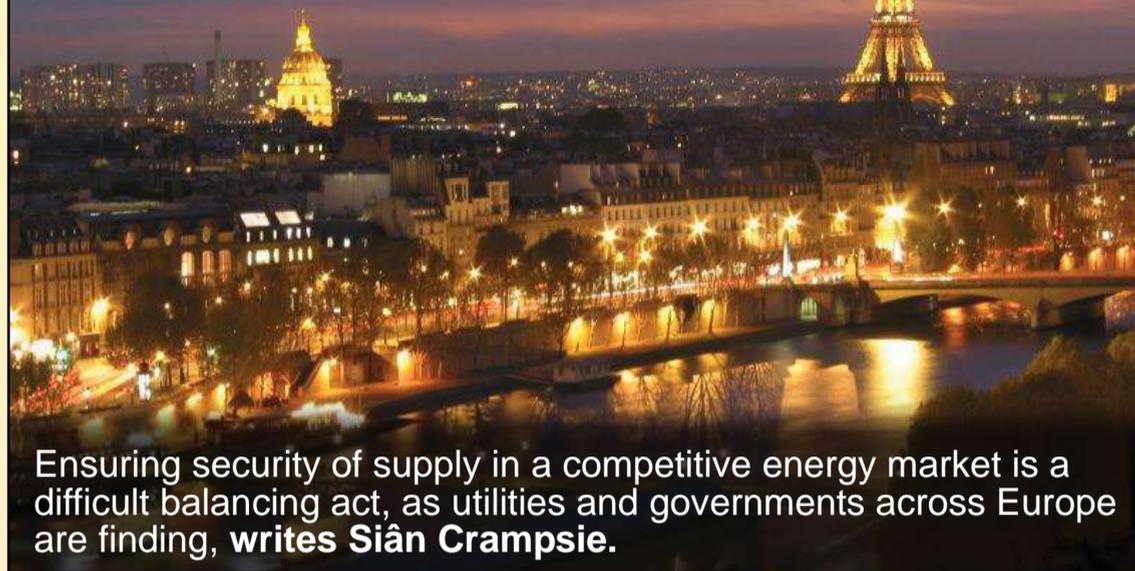
The influx of renewables is being

supported by the development of investment in the national grid.

The State Grid Corporation of China (SGCC), the country's biggest power supplier, plans to more than double its investment for the next two years to a total of Yuan 1.16 trillion (\$169.9 billion) for grid construction nationwide.

The company will add about Yuan 500 billion investment to the original Yuan 550 billion scheduled for 2009 and 2010.

Utilities pressured by balancing act



Ensuring security of supply in a competitive energy market is a difficult balancing act, as utilities and governments across Europe are finding, writes Siân Crampsie.

European utilities need to ensure the lights stay on

Energy companies across Europe are facing the competing demands of cutting prices for consumers while continuing to make investments to make sure the lights stay on.

The European Commission's desire to see a strongly competitive energy market and vigilance among consumer groups is putting pressure on utilities to pass low fuel prices on to their consumers. However, there are fears in some countries that low electricity prices and the difficult financial markets will cause a slowdown in investment.

A drop in investment could result in imbalances in supply and demand in the future when economies pick up once again, particularly in countries such as Germany and the UK where large portions of generating capacity require replacement over the next few years. It would hit the renewable energy sector particularly hard, and make it difficult for EU countries to meet targets set out in the recently agreed energy and climate package.

Utilities are fighting their corner, arguing that the way in which they

purchase energy – mostly on the forward markets – means that it will take time for them to pass on savings to customers. British Gas, the UK's largest energy supplier, said that it will be unable to cut retail prices until March 2009.

The pressures that utilities are facing highlight the difficulties of balancing competition with security of supply, especially in such unusual economic conditions. In the UK a recent report by a committee of lawmakers said that the government might need to step in to ensure that

energy industry investment levels are maintained, just as it stepped in to save the financial sector from collapse.

In France a recent economic stimulus package unveiled by the government includes plans to increase investments in the high voltage electricity network. RTE, which is owned by state-controlled EDF, is aiming to invest €15 billion up to 2020 in its 100 000 km grid to reinforce power pylons and upgrade the network in line with stricter environmental regulations.

RTE will increase its debt levels to help pay for the bullish investment plan, which will also be funded by EDF.

The French government has been famously slow to introduce competition to its energy markets and has so far resisted pressure from the European Commission to spin off and privatize RTE.

In the UK, where around one-third of generating capacity requires replacement by 2020, a parliamentary committee has voiced concerns that energy companies will not be able to raise finance to build new power stations. There is particular concern about nuclear and other forms of baseload capacity, which have high capital costs.

Ofgem, the country's energy regulator, said that it is also concerned about the impacts of the financial crisis and that it plans to review whether the industry can deliver the required levels of investment.

Energy companies in the UK estimate that over £100 billion of investment is required in the next few decades to meet electricity demand.

Another concern is the possibility of a major network company getting into financial difficulties, according to Ofgem.

The renewable energy sector in Europe is already suffering the effects

of the financial crisis, with demand for wind turbines and photovoltaic (PV) equipment falling and some market players reducing their aggressive production and development targets.

"The current economic situation is slowly affecting the wind energy industry," said Frost & Sullivan research analyst Gouri Nambudripad. "We are going to see a slowing down of the double-digit growth rates that were witnessed in the past few years."

The problems in the renewable sector are a particular concern for Germany, where the manufacture of wind turbines, PV panels and other equipment has become a key growth sector in recent years.

RWE npower renewables, the German utility's UK renewable energy arm, is reported to be reviewing plans for its wind power portfolio due to rising costs and the financial environment. Q-Cells, the world's largest producer of solar cells, based in Germany, has cut its sales forecasts amid a raft of project postponements.

Turnover in the German renewables sector grew ten per cent to €24.6 billion last year as rising oil prices helped spur interest in the technology, supporting some 250 000 jobs.

Germany's major renewable energy regulator and its financial sector are said to be discussing the problems. State bank KfW recently announced plans to raise the upper limit on credit that it makes available for small and medium-sized renewable energy projects, and to extend lending periods.

In the wind energy sector, Frost & Sullivan believes that the financial turmoil may be good in the long run as it will foster fiercer competition between suppliers and force them to reduce costs and prices. This will be underpinned by falling raw material costs and continued government support for renewable energy.

EDF given BE go-ahead

■ Areva lines up supply chain

■ Commission addresses competition concerns

The European Commission has given its blessing to EDF's takeover of British Energy, paving the way for the utility to fulfil its ambitions of expanding in the UK and for the construction of a new generation of nuclear reactors in the country.

The UK government's plans for development of new nuclear capacity have also been boosted by news that engineering groups Rolls-Royce and Balfour Beatty are forging alliances with Areva of France to build new nuclear plants in the country.

The European Commission's approval of the £12.5 billion takeover of British Energy by the state-owned French group is conditional upon a

commitment by EDF to divest two power plants in the UK in order to address competition concerns. It should also allow the deal to move forward unhindered and enable UK energy company Centrica to come on board and purchase a minority stake in British Energy.

Brussels said that if EDF agrees to its conditions, the transaction will not significantly impede effective competition in the EU.

To meet Brussels' conditions, EDF will have to sell its Sutton Bridge power plant as well as the Eggborough plant, which is currently owned by British Energy. It will also have to sell a minimum volume of electricity in the UK's wholesale power market, divest a site potentially suitable for building a new nuclear power station in the UK, and to end one of the merged entity's three grid connection agreements with the National Grid at the Hinkley Point nuclear plant.

Areva is also working on its plans to participate in the new wave of nuclear plant construction in the UK, lining up deals with Rolls-Royce and construction firm Balfour Beatty to develop its supply chain for the projects. It is anticipating the construction of four EPR-based reactors in the UK: two with E.On and four with EDF.

E.On is in the process of creating a joint UK-based team with staff from

Areva and Siemens to take its projects forward. Areva said it is working with all of its partners to identify the skills that will be required for the projects, and to develop an 'upskilling' programme.

Potential supply chain bottlenecks in the civil nuclear market could be eased if UK-based company Forgemasters goes ahead with construction of an open-die press capable of manufacturing some of the large components needed for nuclear power plants. The Sheffield-based company is hoping for financial assistance of up to £30 million from the government for the £140 million project.

The UK's new nuclear build programme could be as much as 25 GW and will help to overcome the twin challenges of energy security and climate change, according to the government. The UK's Nuclear Decommissioning Authority (NDA) has already started the process of land sales to potential developers of new nuclear power stations.

Engineering firm Rolls-Royce earlier this year set up a dedicated business unit to address the global civil nuclear power market, which it believes could be worth £50 billion in 50 years time. It currently has the largest nuclear skills-set of any UK company, with around 2000 specialist nuclear-focused employees and a supply chain of 260 suppliers.



Belgian enterprise minister, Vincent Van Quickenborne

The competitive landscape in Europe's energy industry is once again in the spotlight after it emerged that Belgian utility Electrabel could be fined because it is too dominant.

Local media reports quoting Belgian enterprise minister Vincent Van Quickenborne said that the utility – which controls some 75 per cent of electricity production in Belgium – could be taxed up to €750 million by the government. According to the reports, the tax would recur annually if the group refuses to allow more competition on the market.

However Electrabel, which is owned by GDF Suez, reached a deal in December with E.On of Germany to swap a substantial amount of capacity in a move that the utilities say will "enrich the competitive landscape in Germany and Belgium". The deal will give E.On a 12 per cent share in the Belgian

market and will also boost GDF Suez's European expansion strategy.

Currently Electrabel's only competitor in Belgium is SPÉ.

E.On's agreement to dispose of generating capacity is part of a deal with the European Commission designed to reduce its market power in Germany. It has pledged to sell a total of 5000 MW of capacity in the next few months, as well as dispose of its high voltage transmission network in Germany.

Under the memorandum of understanding with Electrabel, E.On will sell 1700 MW of generating capacity and power procurement rights in Germany to Electrabel in return for the same amount of capacity and power procurement rights in Belgium. E.On has also reached a MoU with Germany's EnBW to sell its stakes in two German power plants: Lippendorf (446 MW) and Bexbach (79 MW).



Under the hammer: Sutton Bridge power plant owned by EDF

Chill wind stalls Russian reform

Electricity industry investors are urging Russia's government to stay the course of reform in order to finance the rebuilding of the power sector, but industrialists are fearful of price increases. **Siân Crampsie**

The global financial crisis is threatening to stall Russia's electricity reform process, halting investments and putting the country's power system under increased strain.

Utilities and investors in Russia's recently privatized electricity industry are calling on the government to press ahead with the liberalization process, while the country's industrial sector is lobbying for a delay in order to ease the impact of the global financial crisis.

Continued liberalization of the electricity sector will result in higher prices for consumers and help utilities to fund investments aimed at improving infrastructure. Most of the electricity sold in the country is subsidised, and there are fears that the

power system will not be able to cope with the severe Russian winter.

Russia's federal tariff service recently said that plans to implement regulated asset based pricing (RAB) in electricity grid companies would continue as planned, countering rumours that they were being delayed as a result of the global financial crisis. The new tariffs are designed to encourage investment but will increase distribution costs and prices for end-consumers.

Grid firms in three regions have already transferred to the RAB system, which is based on the UK's electricity sector reform model, while more are due to switch over in 2009. The RAB system changeover is due to be completed by 2011, and should help

to make the grid companies profitable entities.

The apparent commitment to price liberalization will be welcomed by the many Russian and international companies that have invested heavily to obtain a slice of Russia's massive power market. Most are obliged to make investments to upgrade the creaking power system, although local reports indicate that some have asked the government if these commitments can be postponed.

The financial crisis has hit Russian share price indexes hard, while falling power consumption indicates a decline in economic activity. Electricity prices on the liberalized market have also fallen accordingly, said the Trading



Putin: Focused on reform

System Administrator.

Falling power prices coupled with difficulties faced in raising funds on international markets will make it difficult for utilities to meet their investment targets. Gazprom, the state-owned gas giant that owns controlling interests in a number of utilities, is thought to have already approached the government for assistance with funding.

Other companies active in Russia include Germany's E.On, Italy's Enel and Fortum of Finland. Such investors believe that failure to make adequate investments now will result in a supply deficit in the future when the economy recovers.

Oil companies are putting large

amounts of pressure on the government to delay price liberalization due to the cheap oil environment. Russian Prime Minister Vladimir Putin has pledged, however, that the pace of reform will not be delayed.

Electricity demand levels have fallen back to 2006 levels, according to analysts. In central Russia, where industry and population is most concentrated, power consumption fell by 8.9 per cent in November year-on-year.

Data released in December showed that electricity prices on the liberalized market fell by around 25 per cent in November compared with the previous month, and over 18 per cent year on year.

South Africa mandates energy conservation

- Nuclear still on the agenda
- Mmamabula on track



Mmamabula project site in Botswana

The South African energy regulator is hoping that a proposed mandatory energy conservation scheme will give national utility Eskom breathing space while working on its programme to expand generating capacity.

The National Energy Regulator of South Africa (Nersa) has published a consultation document that proposes the allocation of an annual electricity consumption limit for large energy users and a strategy for managing new electricity connections as well as growth in consumption.

The proposed Energy Conservation Scheme (ECS) rules were published in December just weeks after Eskom announced that it could not afford to go ahead with the construction of new nuclear power capacity in the current financial climate. The utility is facing a tight schedule for the construction of new capacity and is also having difficulty raising funds for the R343 billion (\$36.66 billion), five-year expansion programme.

Under the proposed ECS programme, users will pay additional charges if they exceed their allocated annual consumption limit. Essential

services such as health, public transport, police and water services will be excluded from the programme, as will national priority projects such as major infrastructure schemes.

Companies will be allowed to trade their consumption rights through auctions and bilateral agreements. Different sectors of the economy will be given different targets for reducing energy consumption.

The ECS is central to government plans to reduce electricity consumption in the country by ten per cent. It will be phased in, starting with the largest consumers, while energy efficiency and demand side management activities will be rolled out concurrently to the rest of the customer base.

Nersa will also oversee an Energy Growth Management (EGM) strategy designed to prioritise new connections based on the availability of supply and the economic value of the projects.

South Africa is the world's largest platinum producer and second largest gold producer. Its energy-intensive mining sector was hit hard in early 2008 when chronic power shortages

led to widespread load shedding.

Eskom is now focused on raising funds as well as implementing its capacity expansion programme but was forced in December to admit that high costs had put its plans for the Nuclear One project out of its reach. It has already started the process of appraising two bids for the project, which would have resulted in the construction of up to 3000 MW of new nuclear capacity.

In spite of the setback, the government maintains that its nuclear power plans still stand. It says that it will seek a technology partner to implement new nuclear projects, rather than pursue a commercial procurement process.

The country's power sector will also receive a boost in 2012 or 2013 when the Mmamabula project in Botswana comes on line, delivering a portion of its 1320 MW directly to Eskom. CIC Energy, a Canadian company developing the massive coal mine and power project, said it is on-track to reach financial close in mid-2009, and will start examining the project's second phase in 2010.

CIC recently selected China's Shanghai Electric Group (SIC) as

the preferred engineering, procurement and construction contractor for the power station, and has also appointed UK-based consultants Parsons Brinckerhoff as its owner's engineer.

The Mmamabula energy project is thought to be the largest private sector project being developed in Africa, and will consist of a power station and integrated coal mine as well as a coal-to-hydrocarbons (CTH) project and export coal operation. The power plant and mine project alone will require an investment of around \$3 billion, said CIC.

South Africa's severe power shortages have forced Eskom to accelerate plans to add new capacity to the grid. The government also implemented a Power Conservation Programme (PCP), targeting a ten per cent reduction in electricity consumption.

Eskom recently secured a \$500 million loan from the African Development Bank for its capacity expansion programme, and is also thought to have reached an agreement in principle with the World Bank for a major loan sum.

Get to grips with planning, says report on Middle East

Countries in the Middle East must increase the level of transmission grid integration as well as improve their electricity demand forecasting and capacity planning capabilities if they are to avoid supply-demand imbalances in the future, according to a new report.

Management consulting firm A. T. Kearney said that the region's power sector will require investments totalling more than \$500 billion by 2030 and that the potential for poor infrastructure planning is high in some countries, leading to power outages and soaring electricity prices.

The report also indicates that countries in the Middle East will not be able to diversify their generation portfolios and meet renewable energy targets without proper regulatory frameworks.

"A sound demand forecast, capacity planning and regulatory management will be key to avoiding power outages in the future," said Dr. Goetz Wehberg of A. T. Kearney's Global Utilities Practice. "To better balance supply and demand within the region and prospectively with Europe, the transmission grids in the Middle East need to become more integrated."

Growing demographics and wealth in the Middle East are leading to rapid growth in electricity demand, particularly in the tourist hubs, economic cities and industrial zones of countries such as the UAE and Saudi Arabia. Countries such as Bahrain are running out of oil, while Jordan wants to decrease its dependency on energy imports.

According to A. T. Kearney, some countries are underestimating the amount of additional generating capacity that is required, and a further challenge is how to calculate the necessary energy efficiency increase. Utility companies in the Middle East face energy sector losses of more than ten per cent through theft, for example, and a lack of metering and governance leads to situations where utility facilities are not aware of where they lose energy.

RWE wins place in UK CCS race

RWE npower has once again raised its hopes of winning funding for the UK's first commercial-scale carbon capture and storage (CCS) demonstration project by creating a joint venture with two other firms.

The UK-based utility, which is owned by Germany's RWE, has taken a 75 per cent stake in Peel Energy CCS Ltd., a joint venture between Peel Energy and Danish utility DONG. Peel Energy CCS is one of three groups that have pre-qualified to participate in the British government's CCS demonstration competition.

Participation in the competition is a key element of RWE's strategy to develop and commercialize CCS technology. In 2008 the firm submitted a bid to pre-qualify for the contest, but was rejected, sparking a dispute with the government.

The other companies taking part in the competition are E.ON UK and Scottish Power Generation. BP recently withdrew from the contest.

RWE npower said that if their bid succeeds, the project most likely to host the CCS demonstration would be npower's proposed Tilbury plant, a 1600 MW supercritical coal-fired power station in Essex. Peel and DONG have also drawn up plans for a 1600 MW coal-fired plant at Hunterston in Scotland.

"We have been collaborating with Peel for some time, exploring the possibility of constructing a new power plant in the UK and it is important that we take into consideration the issue of CO₂," said Bent Christensen, Senior Vice President of DONG Energy.

RWE npower has already commissioned a CCS test facility at Didcot power station in Oxfordshire, UK, and is due to begin construction of a CCS pilot plant at Aberthaw power station in Wales in 2009. It has agreements with BASF and The Linde Group to develop CO₂ capture processes, and also has partnership agreements with another five companies – including BOC and Tullow Oil – to deliver its CCS strategy.

Gas Natural ups Fenosa stake

Spain's Gas Natural is edging closer to realising its development strategy in Spain and the purchase of Unión Fenosa.

The utility has signed an agreement with Spanish bank Caixanova to buy a 4.72 per cent shareholding in Unión Fenosa, bringing its direct stake in the company to 14.62 per cent.

Gas Natural announced in July 2008 that it had reached a deal with construction firm ACS to buy its Unión Fenosa stake. The takeover will give the company a greater retail presence in Spain's electricity sector and an outlet for its generating capacity.

Once it holds 30 per cent of Unión Fenosa's shares, Gas Natural will launch a public offer for the rest of the company's capital. Completion of the takeover will make Gas Natural one of the largest European utility operators and one of the top three in the Iberian Peninsula.

Authorities crack down on collusion

Some of the world's largest engineering firms are facing the possibility of massive fines as antitrust regulators in the European Union crack down on price-fixing cartels.

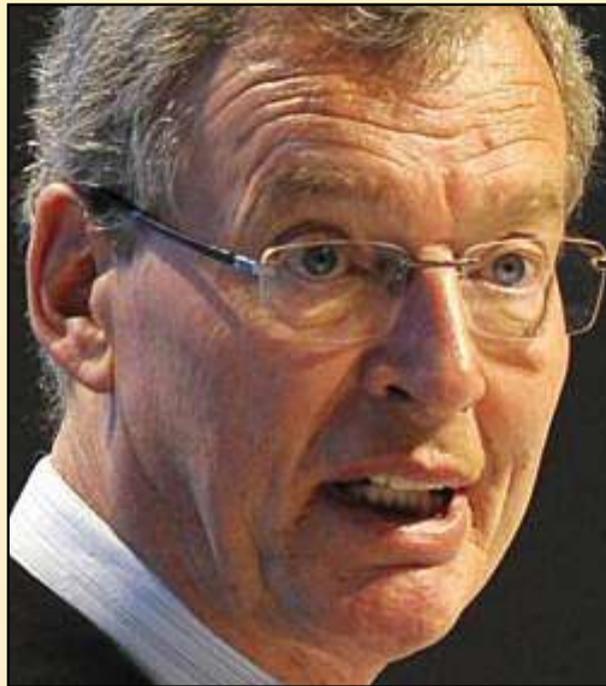
The European Commission has charged a number of companies – including Siemens, Areva, Toshiba and ABB – with running a cartel in Europe's multi-billion euro power transformer market. UK transmission system operator National Grid has also launched legal action against a number of companies over the formation of a cartel in the gas insulated switchgear (GIS) market.

Companies found guilty of price-fixing can be fined up to ten per cent of global yearly revenues for each year that antitrust rules were broken. The companies will be able to respond to the Commission's allegations in writing and at a hearing before any fines are imposed.

The charges – set out in a 'statement of objections' sent to each firm – follow raids by antitrust authorities on the offices of several power transformer companies in early 2007. The Commission is keen to come down hard on antitrust offenders, partly because of the impact that price-fixing has on prices and end-consumers.

The charges come less than two years after Siemens, ABB, Alstom and a number of other companies were fined a total of €751 million for colluding in the European market for GIS equipment. That action has led National Grid to launch a claim for more than £200 million against the companies in question.

Siemens alone was fined a record €396 million in 2007 over the GIS



■ National Grid launches claim
■ Siemens draws line under bribery scandal

Gerhard Cromme: Siemens has established a sustainable culture of compliance

cartel affair. The company has recently reached a settlement with US and European authorities after it was accused of bribing officials around the world in order to win contracts.

The German company said that the conclusion of legal proceedings against it in Germany and the USA will allow it to close a "painful chapter in its history". It has agreed to pay €1 billion in fines to the authorities in those countries and has appointed an independent watchdog to monitor compliance.

The bribery scandal surfaced in 2006 and investigations have found some

€1.3 billion of suspected payments to officials around the world.

"Today marks the end of an unprecedented two-year effort to resolve extremely serious matters for the company," said Gerhard Cromme, Chairman of Siemens' Supervisory Board. "Based on robust leadership processes, Siemens has established a sustainable culture of compliance."

The latest allegations by the European Commission centre around price arrangements for transformers made between 1999 and 2003 in various European markets.

Siemens said that it has launched

its own internal investigation and suspended three managers, while Areva has stressed that the events occurred prior to its acquisition of Alstom's transmission and distribution business. ABB stated that it has a zero tolerance policy towards unethical behaviour.

National Grid is seeking £108 million plus interest from around 21 companies linked to Siemens, ABB, VA Tech Transmission and Distribution, Areva and Alstom. The 2007 regulatory fine on the companies should make it easy for the firm to prove wrongdoing in the courts.

Constellation warms to EDF approach

EDF has managed to sweeten its deal and bring Constellation Energy back on board, writes Sian Crampsie.

EDF has strengthened its position in the US electricity market and underpinned its plans to construct new nuclear generating capacity there through an agreement to invest in Constellation Energy's generation fleet.

Constellation reached agreement with the French utility in December, finally rebuffing a previous merger agreement with MidAmerican Energy Holdings. The \$4.5 billion deal secures Constellation's financial future and also the future of UniStar Nuclear, its existing joint venture with EDF.

EDF has been courting the Baltimore-based utility since it became clear that it had liquidity problems as a result of the financial crisis. MidAmerican, which is owned by US entrepreneur Warren Buffett's Berkshire Hathaway group, stepped in with a \$1 billion cash injection and a \$4.7 billion merger deal.

But EDF's offer of \$4.5 billion for a 50 per cent interest in Constellation's nuclear generation and operation business is far more attractive.

Under the deal, which the companies

expect to close within nine months, EDF is making an immediate \$1 billion cash investment and also has the option of purchasing up to \$2 billion of non-nuclear generating assets. The transaction will extend EDF's nuclear base in the USA, where Constellation owns 3869 MW of nuclear capacity.

Crucially for EDF, the deal secures the future of UniStar Nuclear, the joint venture through which the two companies are planning to build new nuclear capacity in the US. The proposed merger between Constellation and MidAmerican had left EDF's ambitions in the US nuclear industry uncertain, mainly due to concerns that MidAmerican and its owner, Buffett, would not want to invest in nuclear or would want to work with an alternative reactor maker such as GE.

EDF and Constellation each own 50 per cent of UniStar Nuclear, which has four EPR-based nuclear projects under development around the US. The joint venture – started in 2007 – was the French utility's pathway into

the US nuclear renaissance.

EDF is planning to construct at least four EPR reactors in the USA. It will finance the deal through corporate funds and credit facilities.

"This agreement with EDF Development Inc. provides an opportunity for Constellation Energy shareholders to achieve greater value for the company's significant asset base," said Mayo A. Shattuck III, chairman, president and CEO of Constellation Energy. "The investment also provides the liquidity support to stabilize and grow our business as an independent public company dedicated to serving our customers across the country. As the largest owner of nuclear plants in the world, EDF Group brings experience, scale and financial strength to Constellation Energy's future."

EDF made an initial bid for Constellation in October 2008 following the US utility's merger agreement with MidAmerican. At the time it abandoned its bid and rejected the idea making an increased offer due



Constellation's CEO, Mayo A. Shattuck III: looking for liquidity support

to the "current state of financial markets and in particular the difficult credit markets for corporates".

The new offer will allow the utility to continue its plans in the US without over-stretching its finances. Ratings group Standard & Poor's said that it is keeping EDF's corporate credit and debt ratings on creditwatch with negative implications.

EDF will also have to finance the £12.5 billion purchase of UK nuclear generator British Energy, a deal that is expected to be approved in early 2009. It recently raised its stake in the UK utility to 88.67 per cent, and says that its first new reactor in the UK should be commissioned in 2017.

EDF recently confirmed its ambitions to build new nuclear capacity around the world, announcing that it expects to spend between €40 billion and €50 billion with its partners by 2020. It also said that its flagship EPR project at Flamanville, France, will cost more than 20 per cent more to build than the €3.3 billion estimate it gave in 2005.

Tenders, Bids & Contracts

Americas

ABB wins \$87 million US order

ABB is to strengthen and expand the Los Angeles power transmission network under an \$87 million order awarded by Intermountain Power Agency and the Los Angeles Department of Water and Power (LADWP).

The European engineering firm is to increase the capacity of the 22-year-old Intermountain Power Project Southern Transmission System to enable the LADWP to deliver more energy from renewable sources to its customers in the Californian city. The utility has set a goal of sourcing 20 per cent of supplies from renewables by the end of 2010.

ABB will upgrade the high voltage direct current (HVDC) system with a state-of-the-art control and protection system, efficient cooling systems for the valves and additional AC filters to strengthen the quality of the power supply. The capacity of the system will increase by 25 per cent to 2400 MW.

The project is due for completion by 2010 and 75 per cent of the system's capacity will be kept available during the refurbishment.

Siemens GTs for Carolinas

Southern Power has selected Siemens to supply four simple cycle gas turbine packages for a new peaking power plant in North Carolina, USA.

Siemens will supply four SGT6-PAC-5000F gas turbine packages for the new plant located near Grover in Cleveland County. The plant will be able to generate around 720 MW and is scheduled to come on line in early 2012.

Each package consists of a SGT6-5000F gas turbine, air-cooled generator, auxiliaries, SPPA-T3000 control system and an option for the exhaust stack. The fast-start capability of the gas turbine package will allow Southern Power, a subsidiary of Southern Company, to deliver power to the grid quickly while keeping start emissions low.

Mitsubishi and Emerson forge alliance

Mitsubishi Power Systems and Emerson Process Management have formed an alliance to work on power plant refurbishment projects in North and South America.

The companies will leverage Emerson's expertise in power plant automation and Mitsubishi's experience in gas and steam turbine design and services to retrofit power plants that are equipped with Westinghouse gas and steam turbines.

Emerson and Mitsubishi will support W251, W501D5, W501D5A and W501F gas turbines and all Westinghouse steam turbines. They have already collaborated on a number of turbine retrofit projects, including mechanical and control system upgrades at the Termocandalaria power plant in Colombia and the San Juan repowering project in Puerto Rico.

Siemens turbine for Ivanpah solar tower

BrightSource Energy Inc has placed an order with Siemens for a steam turbine to be installed at the first commercial solar tower power plant project ever to break ground in the USA.

Siemens will supply a reheat SST-900 industrial steam turbine, which has been specially adapted to meet solar technology requirements. It will be the largest ever fully solar powered steam turbine generator set and will be installed at BrightSource's Ivanpah

Solar Complex in southern California's Mojave Desert.

The 123 MW steam turbine generator set will offer very high efficiency under varying operating conditions, according to Siemens. It also has maximum steam data similar to conventional fossil fuel fired power plants.

The Ivanpah Solar Complex will consist of three concentrating solar thermal power plants that are each based on power tower and heliostat mirror technology. Siemens will deliver the steam turbine generator to the site in early 2011 and the plant is expected to be operational at the end of 2011.

Fluor wins Brazos contract

The Brazos Electric Power Cooperative has awarded Fluor the contract for the engineering, procurement, construction and commissioning of the Jack County Unit 2 generating facility in Texas.

The new 620 MW power plant will be a natural gas fired combined cycle facility and is due to start operating in 2011. The design of the power plant will be similar to that of Jack County Unit 1, which was also developed by Fluor.

Costa Rica selects MAN for major new project

MAN Diesel is to build the largest power plant in Costa Rica after it was awarded a contract by Fideicomiso Garabito, a trust created by state-owned power company ICE and Banco de Costa Rica.

The \$241 million facility will be constructed in Garabito and will account for around ten per cent of the country's installed capacity when it starts operation at the end of 2010.

The 200 MW Garabito power plant will be powered by 11 of MAN Diesel's most powerful medium-speed engines. It will be equipped with state-of-the-art exhaust gas treatment systems in order to comply with local and World Bank emission standards.

NaiKun and Siemens sign letter of intent

Canada's NaiKun Wind Energy Group Inc has signed a letter of intent to negotiate the purchase of up to 110 wind turbine generators from Siemens Wind Power for an offshore project in northern British Columbia.

NaiKun is intending to use Siemens' SWT-3.6-107 units for the project as well as negotiate for service, maintenance and warranty provisions. The NaiKun project will have a capacity of up to 396 MW in its first phase and will be located in Hecate Strait.

NaiKun will use the SWT-3.6-107 unit as the cost and design basis for its proposal to BC Hydro's Clean Power Call, a central part of the utility's plans to expand renewable energy generation in the province.

Installation of the project's transmission facilities and turbine foundations will begin in 2012, while the turbines will be installed in 2013 and 2014. The negotiations will also provide a framework for the provision of offshore wind turbine generators for future phases of NaiKun's project.

Asia Pacific

PVPS wins Ca Mau maintenance contract

The PetroVietnam Power Service Company (PVPS) has won a \$610 million contract to repair and maintain the Ca Mau 1 and Ca Mau 2 power plants.

Under the contract, which was awarded by the PetroVietnam Camau Power Company, PVPS will be

responsible for the repair and maintenance of the two units in their first 100 000 hours of operation – equivalent to 12 years.

Ca Mau 1 has a design output of 750 MW and began operating in March 2008. Ca Mau 2 is currently in a testing phase and was scheduled to be fully operational in December 2008.

KESC orders 64 Jenbacher gas engines

Pakistan utility Karachi Electric Supply Company (KESC) has placed an order with GE Energy for 64 gas engines in a bid to reduce power shortages in the southern port city of Karachi.

KESC will install the Jenbacher J620 natural gas fuelled engines, adding 180 MW of urgently needed power to the grid. Karachi has been facing an average daily shortage of 500 MW in electricity, forcing KESC to impose rolling blackouts across the city.

The 64 engines will be installed in two power plants at separate sites in Karachi. The first phase of this fast track gas engine power plant project will deliver 90 MW by June 2009.

In addition to the Jenbacher power plants, the utility has added 96 MW at its Korangi thermal plant and 50 MW in rental power. Combined, KESC will be adding 338 MW to the grid by the end of 2009.

Europe

Vestas supplies Thanet

Vattenfall Wind Power has placed an order with Vestas Wind Systems for 100 wind turbine units for the Thanet offshore wind farm in the UK.

Under the order, Vestas will supply its V90-3MW units as well as carry out construction, testing and commissioning of the units. Vattenfall will be responsible for the foundations, offshore and onshore cables with substations and offshore installation vessels.

The Vestas units will be installed approximately 11 km from Foreness Point in the Thames Estuary in southeast England. Delivery of the turbines is expected to take place in 2009 and 2010.

UK gives go-ahead to Gwynt y Mor

The British government has given npower renewables permission to build a 750 MW offshore wind farm off the coast of North Wales.

Npower, a unit of Germany's RWE, says that it expects to start constructing the Gwynt y Mor project in 2011 and to commission it in 2014. The project will supply enough electricity for about half a million homes and forms a major part of the UK's plans to expand its offshore wind power industry.

Vestas wins order in Ireland

Vestas Wind Systems has received an order for 19 wind turbine units for the Boggeragh Mountains project in County Cork, Ireland.

The order has been placed by Green Energy Compant Ltd and comprises supply, installation and commissioning of the turbines, a Scada system and a long-term service agreement. The Boggeragh Mountains project will be the largest wind power plant in Ireland and will generate around 162 GWh per year.

Vestas will deliver its V90-3.0MW units to the project in late 2009.

International

GE upgrades Azerenerji controls

GE Energy has signed a \$3.7 million contract with the China National

Electric Equipment Corporation (CNEEC) to supply control and protection systems for a heavy oil fired supercritical power plant in Azerbaijan.

GE Energy will supply its OC 4000 plant automation system, which includes digital hydraulic controls and emergency trip systems for the steam turbines, as well as a distributed control system for control, monitoring and protection of all the plant's subsystems.

The upgrade and refurbishment project will increase the output of the plant's eight LMZ K-300 steam turbines from 300 MW to 330 MW. GE Energy will deliver and commission the control system between the third quarter 2008 to mid-2010.

DEWA expands power network

The Dubai Electricity and Water Authority (DEWA) has awarded Siemens Energy a €200 million order to expand the power supply network of Dubai in the United Arab Emirates (UAE).

Siemens will supply two transformer substations that will supply electricity to new infrastructure projects in Dubai, where a growing population and rapidly developing economy are driving demand for power. The project is scheduled for completion within 26 months.

The two transformer substations will include gas insulated, high voltage switchgear systems with a total of 24 switchbays for 400 kV and 59 switchbays for 132 kV, eight 500 MVA power transformers, and protection and control equipment.

Sino-Italian consortium to upgrade Maritsa East

Bulgarian power plant Maritsa East 2 has awarded an Italian-Chinese consortium a €85.6 million contract to carry out environmental upgrades.

Italian engineering firm Idreco and China's Insigma Technology are to install flue gas desulphurization systems on two units of the 1450 MW plant. The project is due to be completed by 2011.

The new facilities will reduce air pollution, allowing the two 210 MW units to attain European Union environmental standards. The project is being funded by Maritsa East 2 as well as EU grants and a loan from the European Bank for Reconstruction and Development.

Two other generators at the plant have already been modernized, while Japan's Mitsui is upgrading two more under a €230 million contract that will also extend the units' operational life.

GE to double Iraq capacity

Iraq's Ministry of Electricity has awarded GE Energy a contract valued at nearly \$3 billion to provide power generation equipment and services that will nearly double the country's installed capacity.

GE Energy is to supply 56 heavy-duty frame 9E multi-fuel gas turbines capable of supplying 7000 MW of electricity.

The contract has been described as a significant milestone in the country's efforts to support economic growth and development through the expansion of its electricity supply infrastructure.

The Iraqi government said it will install the equipment at key sites around the country to boost power generation and improve power stability. GE Energy will also provide technical advisory services, performance testing and spare parts.

Power generation output in Iraq currently stands at around 6000 MW, although demand is typically more than 10 000 MW, said GE.



Electricity holds the key to global GHG reductions

Eurelectric has consistently called upon world leaders to forge a credible international agreement to succeed Kyoto. However, the 14th Conference of the Parties (COP) in Poznan left most of the “heavy lifting” for the crucial COP15 session in Copenhagen at the end of the year.

Hans ten Berge

European Union delegates arrived in Poznan in December for the 14th Conference of the Parties (COP14) to the UN climate change convention with their credibility on the line. After repeatedly urging other countries – both the developed and the rapidly developing economies – to commit to serious action to reduce the emissions of greenhouse gases (GHG) linked to harmful climate change, they had for several weeks shown an inability to put their own house in order by agreeing a substantial raft of EU legislation in the energy and climate sphere.

That the EU government heads meeting in Brussels on 11-12 December were able to forge agreement on the sensitive issues that had threatened to derail the energy-climate package, and thus stay on course for a final accord with the European Parliament, did much to restore that credibility. Parliament’s ratification of the package on 17 December means that the Union has succeeded in adopting a far-reaching set of legislative measures – governing GHG reductions, updating the Emissions Trading Scheme (ETS), revising the Directive on Renewable Energy (RES) and setting out a framework for deployment of carbon capture and storage (CCS) – which enable it to lay claim to leadership of the international climate action process.

Eurelectric has consistently called upon world leaders to forge a credible international agreement to succeed the one agreed in Kyoto in 1997. Global challenges require global solutions and the EU cannot go it alone on climate change. COP14 left most of the “heavy lifting” for the crucial COP15 session, so much needs to be done before the delegates assemble again next December in Copenhagen.

Electricity will have a major role to play in achieving the carbon reductions needed to keep global warming within a 2°C rise, above which serious geo-social effects have been predicted. A decarbonised power supply delivered through a properly functioning competitive energy market will be a key part of the solution to the great energy-climate challenges facing the world.

Meeting in October in Atlanta, USA, some 30 electricity CEOs from the EU, USA, Canada, Japan and Australia declared in a statement their conviction that “electricity can be the solution to climate change”; “new technology, with an adequate transition period, can accommodate the objective of stabilising carbon emissions from all sources”; and “with aggressive application of technology, carbon emissions reductions of 60-80 per cent can be achieved by 2050.” Recognising that a global approach is needed, the CEOs set up an International Electricity Partnership to work with policymakers and stakeholders worldwide on a roadmap designed to drive forward development and deployment of commercial technologies that will reduce carbon emissions.

Within the European Union, the need to replace the power generation fleet by 2030 offers a unique opportunity to get on the path to a carbon-neutral electricity system. The Eurelectric *Role of Electricity* project, completed in

2007, shows how the triple energy-climate challenge – ensuring secure energy supply, fostering sustainability and promoting economic competitiveness – can be met through a broad energy mix deploying all low-carbon technology options, combined with key synergies on the demand side. This will require an enabling legislative framework and clear market signals, especially from the carbon market.

Transmission and distribution grids will also need to be expanded, and in many cases redesigned, in order to accommodate large quantities of new types of power generation for which the system was not designed. Smart, interactive grids also have a major role to play in improving energy efficiency.

Improving overall energy efficiency is an important – and often rather neglected – objective in addressing climate concerns. Energy efficiency offers a cost-effective, short-term way to achieve lower carbon intensity at acceptable cost to society. Replacing less energy-efficient or more carbon-intensive processes by decarbonised power, on the principle “less electricity where possible, more electricity where necessary”, will foster energy efficiency on the demand side. More efficient lighting, electric heat pumps for spatial heating/cooling and electric or plug-in hybrid road vehicles are all examples of such synergies. All-electric or hybrid plug-in cars will not only improve overall efficiency but also help reduce oil-dependence and make a contribution to grid balancing. Several European electricity groups are now working on integrating electric vehicles into the grid system.

Improving energy efficiency in these major demand-side areas will, above all, require consumer education, better building and efficiency standards and supportive regulation.

The European power industry welcomes the fact that the EU



Hans ten Berge: the European electricity industry will be working on all fronts

instrument that puts a price on carbon, which should be reflected through the value chain of sectors concerned, and we accepted the logic that auctioning will be the main method of allocating emission allowances from 2013 provided it is applied to all countries

commercial plant become available shortly after 2020. We have estimated the demo programme – i.e. excluding power plant investment – would cost up to € billion and we welcome the framework as a means to share first-mover risks between industry and government. It is now imperative that the practicalities be sorted out in the coming months, so that first projects can kick off in 2009.

Negotiators arriving at COP15 next December will have the task of working out a solid framework agreement that will avoid a damaging hiatus between the end of the current commitments under the Kyoto Protocol and the start of a new period in 2013, and that will give business the confidence to start planning major investments which will put our economies on the path to decarbonisation. Many issues remain to be resolved – what level of action developing countries are prepared to take; technology transfer; reform of the Clean Development Mechanism; land use and avoided deforestation. The EU has made a start and is now likely to be joined by the United States under a new administration, but the next 12 months will be crucial in the effort to move beyond Kyoto. Meanwhile the European electricity industry will be working on all fronts – through technology, development, investment, and consultations on implementing the new legislative frameworks – to drive forward the decarbonisation of our society.

Hans ten Berge is Secretary General of European electricity sector association Eurelectric

Global challenges require global solutions and the EU cannot go it alone on climate change

legislators have now agreed a package that will remove some of the uncertainties in the energy-climate sphere, allowing companies to plan their strategies, investments and activities. However the package has a number of shortcomings that will make it difficult to drive forward at reasonable cost the technological progress needed.

The Renewables Directive sets a framework for development of RES in Europe to 2020, based on a binding 20 per cent target for the EU as a whole, translated into national binding targets, then mandating each Member State to reach its target in the way it deems best. European synergy is clearly not central to this approach. While the Directive provides some flexibility through the “co-operation mechanisms”, this is entirely government-led and no provision is made for a proper trade mechanism that would foster a cost-effective approach to investment. Estimates show trading could save up to €17 billion per year by 2020.

The ETS Directive also falls short on some important aspects. Eurelectric strongly supports the ETS as an

and sectors. We are therefore extremely concerned about the compromises agreed by legislators to insulate several industrial sectors from the impact of the carbon price signal and thus from the incentive to reduce emissions.

This will place a greater burden on the power sector, inevitably leading to substantial increases in electricity prices for all our customers, beyond those associated with the tightening emissions cap that is the foundation of the EU policy, who will essentially be paying for the decarbonisation, not just of electricity, but of several energy-intensive sectors as well. These compromises to the principle of ETS will tend to reduce cost-effectiveness and may lead to overall problems in the provision of a secure electricity supply to industry, commerce and households.

CCS will have an essential role to play in decarbonising power. We are glad that the CCS Directive sets the necessary legal framework for geological storage of CO₂ and that the legislators agreed to earmark up to 300 million ETS allowances to finance a 12-plant demonstration programme with a view to scaling up available technologies and ensuring that

Oil

Oil producers look for stable price level

■ OPEC is looking for prices to firm up over January

■ Unpredictability creates risk for investment

By David Gregory

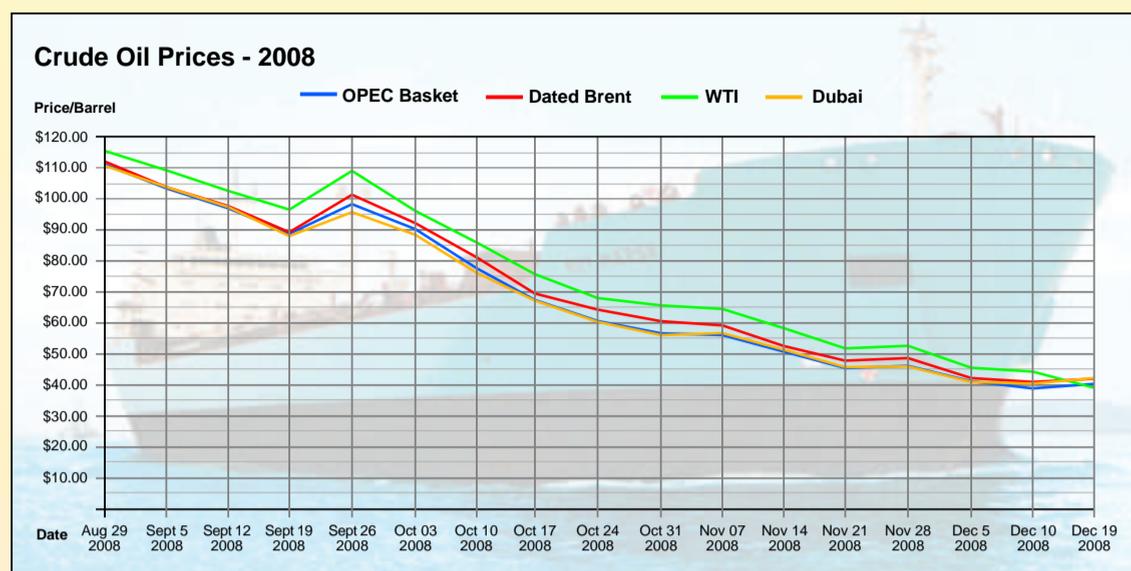
Crude oil prices have yet to find stability despite the decision by OPEC last month to reduce production by a further 2.2 million b/d. Members of the oil producers' association took the most drastic action ever taken by OPEC ministers during a meeting in Oran, Algerian, on 17 December and agreed to the group's largest collective cut in output as prices touched \$40/b. Demand for crude has fallen steeply during the course of the global economic recession and forecasts predict negative demand growth in both 2008 and 2009.

OPEC's crude oil production target for January 2009 is now 24.846 million b/d, excluding Indonesia (which

suspended its membership in the group as of January) and Iraq (which is not obliged to a quota given its special circumstances). By comparison, total production by the 13-member group in September 2008 was around 32.1 million b/d and 29 million b/d by the OPEC 11.

The crude oil market was unaffected by OPEC's attempt in Oran to support crude oil prices and continued downward. When the January contract for West Texas Intermediate (WTI) expired on 19 December, the Nymex price had settled at \$33.87/b, down by 77 per cent from the record intraday trading price of \$147.27/b on 11 July.

OPEC is now looking for prices to firm up over the course of January when the production cuts are expected



to eliminate some of the supply, much of which is being stored in tankers anchored near terminals. OPEC officials have estimated the volume of excess crude available as high as 400 million barrels.

Speaking in London on 19 December during a meeting of international energy and oil ministers, OPEC President Chakib Khelil, Algeria's Minister of Energy and Mines, said the organization expected the price of crude to stabilize once the production cuts begin to take effect over the course of January. He said a meeting of international heads of state in Kuwait planned for 19 January could allow OPEC members to make a further evaluation if the situation continues to deteriorate.

Mr. Khelil said producers would likely find it difficult to ever agree with consumers on a price for oil. "The most important thing for the producers is how to monitor and control and regulate the financial speculation that affects the oil price whether it is going up or going down," Mr. Khelil told

Reuters. "We feel very strongly that what happened in 2008 [the swift rise in oil prices] is due in great part to speculation and we need to make sure that the world community will regulate that."

Hosting the conference, UK prime minister Gordon Brown said action was needed to reduce the swings in crude prices, which had adversely impacted the world economy. "We will need a new partnership between oil-producing and consuming countries," Mr. Brown said. "As with the global financial crisis, this global crisis in our energy markets cannot be solved by one nation or one continent alone." He added that further unpredictability in oil prices created a risk for investment in the industry, adding that supply capacity could begin to tighten just as demand responds to improved economic conditions.

With demand expected to remain low throughout the global recession, OPEC appears incapable of forcing prices upward, and some analysts have said that it might prove risky

to try and do so.

But with prices in a \$30-40/b range, investment in new oil and gas production development and downstream projects is facing its own predicament. A number of projects have been delayed as they are based on oil revenues of around \$70/b or more. OPEC Secretary General Abdullah al-Badri said during the London conference that talk of cutbacks on spending for new projects is widespread and a price of \$70-90/b would be reasonable. Crude prices in that range would allow most projects to move ahead and develop the capacity expected for future oil demand.

Saudi Oil Minister Ali Al Naimi acknowledged that volatility and instability in the oil market had "hurt everyone" and had created "havoc" with investment plans in the energy industry. He said a price of \$75/b for oil "meets all the stability and predictability criteria, and creates the kind of investment climate conducive to research and development."

Gas

European energy security to remain key in 2009

The question of European energy security, particularly gas supplies from Russia that transit Ukraine, is likely to remain a prominent issue throughout 2009.

By Mark Goetz

The dispute between Russian gas monopoly Gazprom and Kiev has drawn concern yet again from the European Commission. In mid-December, Gazprom notified the EU and the governments of most European states, that supplies of Russian gas could be disrupted if Gazprom and the Ukrainian government failed to reach accord on price and if Kiev failed to pay Gazprom the \$2 billion it says Ukraine already owes.

The situation creates problems of its own for Russia, which ships 80 per cent of its gas exports to Europe through Ukraine.

The differences between Russia and Ukraine focus on Kiev's unpaid debt - it claims to owe Gazprom only \$800 million - the price of gas, and the use

of an intermediary company, Rosukrenergo (a Swiss-registered joint venture between Gazprom and a Ukrainian billionaire), in the transaction. The situation is further complicated by the Ukraine's own political and economic meltdown.

Kiev has so far refused to pay the price for gas that Gazprom is demanding. The price has gone from \$50 per 1000 m³ earlier this decade to \$179.50 per 1000 m³ for 2008. Gazprom is seeking a price closer to what it is charging its European customers, around \$400 per 1000 m³, while Ukraine's idea is to pay around \$100.

Europe again watched closely what is becoming an annual dispute between Moscow and Kiev. EU Commissioner for Energy Andris Piebalgs said on 22 December that he was worried about a possible

disruption despite having received letters from Moscow reassuring the EU that it would not have supplies interrupted.

Mr. Piebalgs is expected to travel to Moscow early in the New Year to discuss the complicated issue.

A meeting on another topic crucial to Europe's energy future is also set to take place this year, this one involving the Nabucco Gas Pipeline project. Nabucco has been marching in place for several years, faced with the predicament of being unable to secure sources of natural gas. The 3300 km pipeline is meant to carry 31 billion m³/year of natural gas to Europe through Turkey and the Balkans. Members in the group are expected to meet this month to force the €7.9 billion project forward to meet its operational target of 2013.

As an expression of its support for

Nabucco and similar projects, the EU in November announced its support for the creation of an international consortium, the Caspian Development Corporation (CDC), which is designed to develop projects in the Caspian and Caucasus regions.

Last year ended with one positive development in the logistics of energy movements that is likely to prove beneficial to Europe. After years of disagreement, the partners in the Caspian Pipeline Consortium (CPC) signed a memorandum of understanding (MoU) in early December on the expansion of the crude oil pipeline. The CPC, opened in 2001, carries crude oil from Kazakhstan's Tengiz oilfield across southern Russia to the Black Sea port of Novorossiysk. Russian crude is also shipped through the CPC.

The pipeline is to be expanded to

1.35 million b/d from its current capacity of around 660 000 b/d at a cost of some \$3.5 billion which would be funded within the consortium. Work is not expected to begin until 2010 and formalization of the agreement depends on all consortium members agreeing to allow BP to sell its shares in LukArco and Kazakhstan Pipeline Ventures, which own shares in the consortium.

The expanded CPC will provide Kazakhstan with the additional export capacity it requires as its crude output increases in the years ahead. The increased volume of the CPC will also likely supply the planned crude oil pipeline through Bulgaria and Greece that will bypass Turkey's busy Bosphorus strait. The Burgas-Alexandroupolis pipeline will have an initial capacity of 700 000 b/d, rising later to 1 million b/d.



India: the new nuclear age

The historic '123 Agreement' has ended years of nuclear isolation and will create opportunities for the international nuclear community.

Vishvjeet Kanwarpal

The Indian Planning Commission in its Integrated Energy Policy has set a target to increase nuclear power capacity to 63 000 MW in the next 25 years. This alone will require new plant investments of more than \$100 billion.

A study by the Department of Atomic Energy (DAE), projects the nuclear power share to be about 8.6 per cent by the year 2032 and 16.6 per cent by 2052. The Atomic Energy Commission (AEC) has doubled its target for 2024 from 20 000 MW to 40 000 MW.

The DAE and Nuclear Power Corporation of India Ltd (NPCIL) vision is to achieve 20 000 MW by the year 2020. The 11th Plan proposals envisage the setting up of eight indigenously designed 700 MW pressurised heavy water reactors (PHWRs), and 10 light water reactors (LWRs) of about 1000 MWe each, based on imports. In addition, pre-project activities for setting up of four fast breeder reactors (FBRs) and an Advanced Heavy Water Reactor (AHWR) were also planned for the 11th Plan (2007-2012).

Mr S.K. Jain, Chairman of NPCIL, in an interview on May 16, 2008 said that India's nuclear plans call for it to spend as much as \$40 billion over the next 16 years to buy nuclear reactors from suppliers such as French companies EDF and Areva SA, and US-based General Electric Co. and Westinghouse Electric Co. India is also reported to be negotiating with General Electric, Hitachi and Russia's atomic energy agency Rosatom.

The wave of activity is the result of a new era of nuclear cooperation between India and the rest of the world.

In 2005, during Indian prime minister Manmohan Singh's visit to the US, both countries signed a joint statement on Civil Nuclear Cooperation. In March 2006, India and the US finalized the framework of the agreement during President Bush's visit to India.

In order to enter into an agreement on nuclear co-operation with India, the US Administration sought and obtained from the US Congress a legislative waiver from a stipulation in Section 123 of the US Atomic Energy Act of 1954 requiring full scope safeguards as a condition for civil nuclear co-operation.

The Hyde Act was passed in the US Congress in December 2006, to enable the US government to cooperate with



Vishvjeet Kanwarpal: nuclear power players are flocking to India

India. An agreement was reached on September 6, 2008 with the 45-member Nuclear Suppliers Group (NSG), giving India special status although it has not signed the NPT. This paved the way for the US House of Representatives to pass the 123 Agreement for civilian nuclear cooperation between India and the US by a margin of 298-117. In October 2008, the US Senate passed the bill by 86-13.

The 123 Agreement heralded India's entry to the world stage as an equal partner in civilian nuclear cooperation.

The agreement places India in a special category as a "State possessing advanced nuclear technology", like the US, with both parties "having the same benefits and advantages". This means India is eligible to buy US dual-use nuclear technology, including materials and equipment that could be used to enrich uranium or reprocess plutonium, potentially creating the material for nuclear bombs.

Under the 123 Agreement India will allow the International Atomic Energy Association (IAEA) inspection of its

civilian nuclear facilities. In March 2006, India had already promised to place 14 of its 22 power reactors under IAEA safeguards permanently.

There is no guarantee for fuel supply in the agreement but it contains supply assurances, its linkage to safeguards in perpetuity and the provision for corrective measures in case of disruption of fuel supply. In case of disruption of fuel supplies, the US will help to restore fuel supply to India with the help of a group of friendly supplier countries such as Russia, France and the United Kingdom. The agreement will help India realize a nuclear ambition with a history that dates back several decades.

India formed its Atomic Energy Research Committee in 1946. Its nuclear programme is handled by a number of key government agencies.

Its commercial nuclear power programme commenced in 1969 with the operation of Tarapur Atomic Power Stations TAPS 1&2 (BWR). Until 1974, India had three commercial nuclear power stations, all built and maintained with Canadian assistance.

However, after the 1974 Pokharan nuclear tests, the country faced a virtual embargo in nuclear trade. This initiated decades of India's "nuclear winter" with fuel and technology denial and nuclear isolation. In 1998, India exploded a second series of nuclear devices, which precipitated another round of severe nuclear and trade embargoes.

Indian nuclear scientists indigenously developed a world-class nuclear programme, industry and infrastructure. They also led the way in research and development that has enormous export potential today. However, fuel and certain technology issues have plagued plans for increased reliance on nuclear power.

Today there are 17 reactors in operation with a total capacity of 4120 MW accounting for about three per cent of the country's power capacity. Another six reactors with a capacity of 3160 MW are under construction.

The country's nuclear programme was designed on a unique sequential three-stage programme, based on a closed fuel cycle and associated technologies essentially aimed at optimum utilization of the indigenous nuclear resource profile of modest uranium and abundant thorium resources. The basic concept of the programme is that the spent fuel of one

stage is reprocessed to produce fuel for the next stage. The long-term goal is to develop an advanced heavy-water thorium cycle.

India's nuclear reactors are operating at just 45-55 per cent capacity due to low uranium supplies. India's estimated uranium reserves are sufficient to generate only 10 000 MW. These reserves are also three times more expensive than imported supplies. The country, therefore, needs to import about 700 tons of uranium a year.

The quality of the domestic uranium ore is also low and uranium mining in India is insignificant. For reliable and long-term supplies of uranium, India is exploring the possibility of joint mining and exploration initiatives in Kazakhstan, Uzbekistan, Niger, Namibia and Mongolia.

The Indian government believes the 123 Agreement will solve its problems and create opportunities for investment.

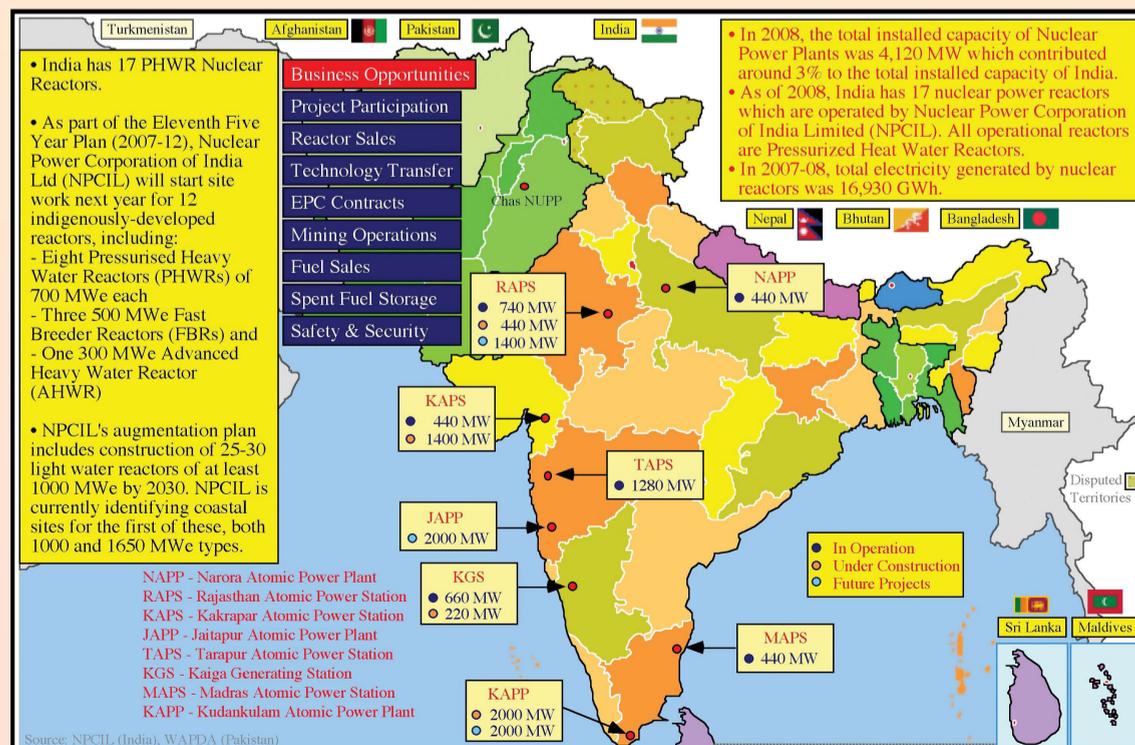
Various Apex industry and business organizations have attempted to estimate the business potential of the 123 Agreement. According to the Federation of Indian Chambers of Commerce and Industry (FICCI), India would need investments of over \$100 billion given its plans of 60 000 MW of nuclear power over the next 25 years.

The Confederation of Indian Industry (CII) estimated that the agreement could open up nearly \$27 billion in investments in 18-20 nuclear plants over the next 15 years. The US-India Business Council (USIBC) stated that the "historic vote" would open "an opportunity" worth over \$150 billion.

According to Imagindia Institute, an Indian lobby group, the overall economic benefits that could accrue to India's economy as a result of nuclear trade could touch \$500 billion by 2030.

Whatever the ultimate scale of India's nuclear power business opportunity, its positive shock waves are being experienced around the globe and nuclear power players are flocking to the country.

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Nuclear power business opportunities

Entering a new dimension

At the beginning of December, a small group of journalists were given the opportunity to see a technology that heralds a new era in high voltage power transmission. **Junior Isles.**

For the past 30 years, 500 kV DC transmission has been the most efficient means of transmitting bulk power over long distances; but as power transfer capacity needs and distances increase, the industry is beginning to see limitations in the power transfer capability of 500 kV DC lines.

This has been most evident in China. With its rapid development and need to transport huge amounts of power over long distances, the country has a need for even higher voltage levels. China's big power companies therefore asked Siemens and other large electrical equipment manufacturers to develop an 800 kV system to enable power to be transferred from its energy-rich regions to its industrial load centres on the coast.

Power transformers are one of the most critical components in such a high voltage power grid. In December, a group of journalists had a chance to visit the Siemens factory in Nuremberg to see a high voltage transformer that, according to Siemens, "ushers in a new dimension in power distribution".

The need for large bulk power transfers, upwards of 5000 MW, over very long distances has been the key driver behind ultra-high voltage DC (UHVDC) networks. Compared to AC transmission, DC transmission has a lower overall cost when the transmission distance is between 500-1000 km.

DC transmission also has a number of technical advantages. Power flow is fully controllable without the need for complex phase-shift equipment; there is no limit on transmission distance; networks can be connected even if they operate at different frequencies (asynchronous networks).

The development of an 800 kV power transformer is critical to the implementation of an 800 kV UHVDC scheme. The power transformer sits next to the valve halls as part of the rectifier stations at each end of the DC line.

In 2007, Siemens received the first two Chinese +800 kV UHVDC (ultra high voltage DC) projects: Yunnan - Guangdong at 5000 MW and part of Xiangjiaba - Shanghai at 6400 MW. Transmitting this much power in a 500 kV scheme would have called for twice as many transformers as in an 800 kV scheme.

The transformer, which has been manufactured with two local Chinese



The two valve bushings, through which the current flows from inside the transformer into the converters, are 14 m long



The 800 kV transformer in the factory in Nuremberg. It measures 26 m in length excluding the bushings

companies, has been developed using the same criteria as the 500 kV transformer.

Due to the size of the transformer, the valve leads had to be manufactured in-house. Typically, a 500 kV scheme has two rectifiers in series, each creating a voltage of 250 kV. There are a total of four rectifier bridges and three transformers per bridge.

However, the arrangement is different for an 800 kV scheme. Peter Heinzig, principal engineer for power transformer technology at Siemens

increased the size of the transformer so that it would not have been transportable on the Chinese railway. Certain components would also have become too difficult to manufacture.

Siemens therefore had to redesign all the main components of the transformer that would be exposed to the 800 kV voltage level.

"For the first time, Siemens uses three wound limbs, as opposed to two limbs, to split the power in this single-phase transformer. Splitting the capacity over three limbs allowed the

The need for large bulk power transfers, upwards of 5000 MW, over very long distances has been the key driver behind ultra-high voltage DC transmission

explained: "The 800 kV is divided into four bridges. This means there are a total of eight bridges [for the bipolar system]. There are three transformers per bridge."

The operating voltage is 60 per cent higher than the peak transmission voltage of the existing 500 kV scheme. The high operating voltage put especially high demands on insulation. One of the most important tasks was to determine the external and internal insulation needs for the active part of the transformer. The external insulation is exposed over long overhead routes or is vulnerable to dirt on the surface of insulators. 'Internal insulation' is the term used to describe the insulation in an oil insulated transformer tank.

In the ultra high voltage range, the characteristics of certain insulation parameters are not linear. For example, the clearance in air between high voltage parts and the ground on a 500 kV HVDC system can be four or five metres. A 60 per cent increase in voltage to 800 kV, however, would require a clearance distance of about 10 m, which is about twice the distance.

The easiest way to achieve this clearance would have been to increase the size of the components and the distance between them to a point where sufficient dielectric strength was assured. However, this would have

width of the transformer to be kept to a minimum. The core design has what Siemens calls a 3/2 single-phase core - three wound limbs and two unwound or return limbs," said Heinzig.

Since there is insufficient space to mount the valve lead connections between the three limbs inside the main tank, the three limbs are connected to the bushings outside the main tank. The transformer coolers are placed on the roof to save space.

The transformer measures 26 m in length (excluding the bushings), is 15 m high, 6 m wide and weighs some 512 t when filled with insulating oil. The two valve bushings, through which the current flows from inside the transformer into the converters, are 14 m long.

A special type of winding has been developed for the valve winding. The high voltage levels place high stress on the winding ends. This called for a special grading on the valve ends. A shielded wire is inserted inside a twin-transposed conductor to increase the capacitance of the winding. The design also eliminates this need for braces in the primary winding thus improving the integrity and reliability of the winding.

The challenges of developing for example new insulation technologies, bushings and disconnection system

increased the complexity of the entire manufacturing process. New production plants and processes had to be established. Manufacturer HSP installed new production equipment in order to deliver the bushings for the new transformer with the required dimensions. The difficulty of the task was compounded by the fact that there are no international design standards for the 800 kV technology.

Siemens also had to construct partially discharge-free test facilities and equipment that could generate high enough test voltages for final acceptance testing at the test laboratory.

Prototype testing of the transformer was carried out in the Nuremberg factory in Germany. Prototype testing was carried out in two stages. The first part of the electrical and thermal tests took place in December 2007. The unit was then disassembled after about three weeks and the newly designed parts were inspected. Some parts were adapted in response to inspection findings. Prototype tests were concluded in May 2008.

The next step was to perform type testing. This consisted of electrical and thermal tests, testing of all monitoring equipment and checking of mechanical equipment. Type testing lasted eight days and was successfully completed on September 27th, 2008.

The transformer went through final acceptance testing in the Nuremberg factory and was shipped in October 2008 for use in the Yunnan-Guangdong HVDC system. This system will be one of the two HVDC transmission systems with the highest capacity in the world. The transformer will be one of ten 800 kV transformers for the system which will also have ten 600 kV transformers also supplied by Siemens.

When the system begins operation in 2010, it will transmit 5000 MW over a distance of 1400 km between Yunnan province in the southwest and Guangdong province in the south, ushering in a new era in HVDC transmission.



Junior Isles

Playing the Pied Piper

Some European Union leaders will argue that 2008 ended on a high note with the agreement on the energy and climate package passing into law. It marked French president Nicolas Sarkozy's final act of EU leadership as he ended his tenure as EU president. No doubt Sarkozy and those that are happy with the agreement now see themselves as some kind of modern day Pied Piper leading the rest of the world on a merry dance towards Copenhagen.

The EU-27 has been talking the talk for most of 2008 but now it is showing it can also walk the walk. As we move into the start of a new year it is important to start as you mean to continue and Europe will be hoping that its commitment will set an example for the world to follow when global leaders meet at the end of the year in Copenhagen to agree on a successor to the Kyoto Protocol.

In line with the Commission's proposals in January 2008, the EU agreed on legally binding targets to cut greenhouse gas emissions by 20 per cent, to establish a 20 per cent share for renewable energy, and to improve energy efficiency by 20 per cent by 2020.

The EU says that the extended EU Emissions Trading System (EU ETS), the world's largest greenhouse gas emissions trading system, could now serve as the nucleus of a much larger global carbon market. The improvements mean that from 2013 an emissions cap will be set at EU level and cut each year to reach a 21 per cent cut in 2020.

The agreement will increase the level of auctioning in the system. Although there is an option for transitional free allowances that most new member states could apply for, the rule for power companies will be that they have to buy allowances. Industry installations not subject

to carbon leakage will be required to buy 20 per cent of allowances in 2013 rising to 70 per cent in 2020 and 100 per cent in 2027. Operators at risk of carbon leakage that invest in the most efficient technologies will receive allowances for free in accordance with a benchmark based on best available technology. Overall, more than 50 per cent of allowances will be auctioned from 2013, and the proportion will rise each year.

The revised EU ETS allows the use of offset credits from outside the EU, but this amount remains below half of the reduction effort in order to ensure a sufficient level of emission reductions inside the EU.

Member states should now use at least half of their auctioning revenues on measures to combat climate change. A directive on geological storage of

Energy Commissioner Piebalgs said: "I am very pleased with the outcome. There has been some tough negotiation and some long nights of debate, but the result is a truly remarkable piece of legislation which puts the EU on track towards a low-carbon energy economy in which renewable energy sources play a key role."

Sarkozy, the summit chairman, declared: "No other continent has given itself such binding rules as we have just adopted." With confidence riding high after pulling together a divided Europe, Sarkozy also threw down the gauntlet to the rest of the world. He challenged the US, Russia and China to follow the EU's lead and promised to increase the agreed 20 per cent GHG reduction to 30 per cent if a global deal is reached.

Yvo de Boer, the top UN climate official, said the EU deal showed that

package is not an example for the world to follow.

Activists said the plan was fatally weakened by a raft of concessions to eastern Europe and heavy industry at a time of worldwide economic crisis.

"Europe promised leadership on climate, but so far it has led us up the garden path. The climate package doesn't even take us half way to where we should be in the fight against climate change," said Joris den Blanken, Greenpeace EU climate and energy policy director.

Other environmentalists said the concessions made the plan ineffective. "The deal is a disaster, it's disgraceful," said Stephen Singer, a climate specialist for WWF International. "If the world follows the example of the EU, it is on a trajectory to disastrous climate change."

The plan increased the amount of emissions Europeans could offset by sponsoring green projects in developing countries. Armed with that opt-out, Singer said Europe's actual emissions reductions would be just four per cent, not the 20 per cent the EU claims.

Claude Turmes, a Luxembourg Green Party member of the European Parliament, said EU governments were "using the economic downturn as an excuse to water down climate policies".

A major bone of contention is the auctioning of industrial emission permits that are now issued free of charge. Major polluters will eventually pay \$66.1 billion a year for this permission to pollute and the plan is that governments will use that income for clean energy development.

Jos Cozijnsen, a carbon-trading expert for the New York-based Environmental Defense Fund, calculated Europe would meet half its 20 per cent goal by cutting emissions, and half by buying credits. "That's not bad," he said. "It's expensive to do everything domestically."

But critics say loopholes allow some industries, especially in Poland, Romania, Bulgaria and the Czech Republic, to largely get off the hook, with no incentive to embrace green technologies.

Turmes called the selling of pollution credits "ethically wrong", adding that "it implies a neo-colonial approach to climate policy."

So should the rest of the world follow the EU on its merry dance? With a new administration, the US is now more likely to join in but it will remain a huge challenge to get the likes of India and China on board.

Depending on which version you believe, the *Pied Piper of Hamelin* is a somewhat dark legend about the leading away of children and/or rats from the town of Hamelin in the 13th Century. Today the EU may be leading away the 'rats' that are GHG emissions from the village but if the environmentalists are right, tomorrow it could be leading our children to a place from which there is no return.

"If the world follows the example of the EU, it is on a trajectory of disastrous climate change."

CO₂ provides a legal framework to manage possible environmental risks and liability issues. The reinforced carbon market will provide a long-term incentive for investment, while up to 300 million allowances in the new entrants reserve under the EU ETS will be made available to stimulate the construction and operation of up to 12 commercial demonstration projects to capture and store CO₂, and for innovative renewable energy demonstration technologies in the EU.

No doubt Sarkozy gained considerable kudos in pulling together a deal that was under the threat of being derailed by eastern European countries who said the package would have a negative impact on their power sectors, which are largely dependent on coal fired generation.

"difficult roadblocks (to a global accord) can be overcome and resolved". He also said that developed countries were showing the courage and resolve that the world has been waiting for.

As the first region in the world to commit to such far-reaching and legally binding emission reductions, Europe can rightly say it is leading the fight against climate change.

Stavros Dimas, the European environment commissioner, said the package put the EU on a path to a low-carbon economy. "We are the only region in the world that is reducing emissions," Dimas said on the sidelines of the UN climate conference in Poznan, Poland. "Today's decisive votes send a clear signal to our international partners about our determination to address climate change and should convince them to follow our example."

But there is leading and there is leading by example; and it may be that the EU

