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Busy month ahead as EU agrees CCS funding

Nick Otter: EU should work out a mechanism for financing demos.

The European Parliament has agreed funding for a programme of CCS demonstration projects but there is little time to fully approve the mechanism of funding. **Junior Isles**

The run up to the end of 2008 will be a busy phase as EU member states discuss their approach following the decision of the European parliament to fund the building of demonstration carbon capture and storage projects.

In October, the European parliament agreed to provide €10 billion in funding for 10-12 carbon capture snd storage (CCS) demonstration projects.

It is hoped that CCS will form part of the EU energy and climate change package. The EU wants the package agreed under the French presidency, which comes to an end this year. If the EU does not agree these numbers within the coming few months, with the coming parliamentary election, the plans could be derailed for a couple of years.

Much of the work with regards to CCS has come through the Zero Emissions Platform (ZEP), which was set up to allow industry to speak to Brussels with a unified voice on a strategy for rolling out the technology.

The ZEP's goal is to ensure the technology is in a position to be commercially deployed by 2020. While the component parts are proven, there is not yet sufficient confidence in the technology as an integrated system. Nick Otter, coordinator of the ZEP said: "The ZEP made the recommendation – which was picked up in the EU policy packages in January 2007 and in 2008 and reinforced this summer – that the EU should work out a mechanism for financing these demos."

The EU parliament has decided to allocate 500 million CO_2 allowances from the new entrants fund of the Emissions Trading Scheme (ETS). At a CO_2 price of €20/tonne, this would deliver €10 billion – the approximate

Continued on page 2

Italy plans nuclear in response to climate change

- **Italy plans 10 nuclear plants**
- **Threats to EU climate package**

The Italian government announced plans for new nuclear plants as the EU war of words on climate change heated up last month.

Energy Minister Claudio Scajola said that the country would build between eight and 10 new-generation nuclear reactors, with the construction of the first one starting in 2013.

"We will need between eight and 10 nuclear reactors of the European Pressurized Reactor (EPR) type," Scajola said at a nuclear conference in Paris.

Italy, which rejected nuclear power in a 1987 referendum after the Chernobyl disaster in Ukraine, depends on oil and gas imports to cover about 80 per cent of its energy needs.

The current Italian government plans to present its national energy policy, including a re-launch of nuclear energy next spring, as it tries to diversify energy supplies. Analysts are sceptical about a nuclear revival because of strong popular opposition and regular changes in the government.

The announcement came following Italian Prime Minister Silvio Berlusconi's surprise announcement that 10 other EU nations backed his efforts to block an EU climate plan.

"It cannot be us, who have the biggest manufacturing economy in Europe along with Germany, to take on the costs that would depress our economy, our automotive sector, compared with other economies, in a moment of [economic] crisis," Berlusconi said.

He compared the EU – which sees itself as being at the vanguard of moves to tackle climate change – to the naive fictional character Don Quixote for acting without similar commitments from other big emitters like Russia and India, China and the US.

"I've always admired Don Quixote," he said. "Absolutely! Let's go on the attack! But let's go on the attack with rationality. And above all... in a balanced and just way."

Analysts and environmentalists said Italy's unexpected change of stance has caught the EU off-guard. "Nobody really envisaged a west European state playing hardball," said analyst Simon Tilford at London's Centre for European Reform. "And this is all before the economic crisis has really started to make itself felt," he added.

Meanwhile, Greenpeace spokesman Mark Breddy said that new green technologies for energy efficiency and renewable energy could create around 120 000 jobs in Italy.

Breddy hit back: "Mr Berlusconi is prepared to ignore the interests of his people for the sake of another fortnight in Europe's political limelight," he said. "But the EU is not the Roman Empire and he's certainly not the emperor."

Europe must weather tricky climate;
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cost of the CCS portion of 10 demonstration projects of about 400 MW each.

With the need for financing now initially accepted, the goal is to drive down the cost of the technology to a level where it can compete with other low carbon technologies in the ETS. "The assumption is that as the trading scheme gets tighter, the price of CO_2 will go up and cost of the capture-related issues would come down to meet it. But to kick-start it needs funding for the companies to be rewarded as early movers," said Otter.

The fund has the benefit that it can be set up quickly and could be available within the next year. "The industry sees this as very positive and is ready to act. ZEP is currently working on what it regards as its 'optimal set of criteria' for selection, which it will present at its general assembly on November 10th.

It remains to be seen whether this mechanism of funding will be supported in the tri-party discussions between the member states, EU energy council and European Commission.

Parliament has brought forward the date of the plenary vote on the EU's climate and energy proposals in what is widely seen as a strategic move to avoid being handed a fragile compromise between national governments that leaves MEPs little room for manoeuvre.

On December 3rd and 4th, the full parliament will vote on a package of four proposals, tabled by the Commission on 23 January this year.

Otter believes that this backing is "absolutely vital" if Europe is serious about meeting the targets for reducing GHG emissions. "If we are to meet our CO_2 reduction targets, we don't have a couple of years. It is all going in the right direction but it has to come to fruition on a very urgent basis. If we are to get the demonstrators up by 2015, we cannot afford a two year deferral."

To meet deployment by 2020, ZEP believes that it is essential that these demonstration plants go forward. "The industry is ready. Through the ZEP, industry sent Andris Piebalgs a letter in February 2008 saying that if there was a structure under which the EU would support these demonstrations, then the industry would play its part."

The EU projects are probably a subset of 20 projects being recommended by the G8 worldwide. It is understood that one of the 12 projects could potentially be in China. Otter explained: "Politicians are realising they cannot duck the CO_2 issue, in particular coal. This means they have to develop CCS and engage big coal using countries like China and India. The Commission sees one way of engaging China and India, is through joint R & D activities and capacity building. It remains to be seen whether one of the demonstration projects will in fact be in China. The Chinese like to take their time about these things and would probably want to see a project built in the EU first but the timing of these projects may not fit in with China's plans."

China warns on GHG reduction difficulties

- Industrialization makes GHG control difficult
- Rich countries urged to fund and supply technology

A policy document warning of difficulties that China will face in cutting CO_2 is likely to fuel the debate on how developing countries should be handled in any new global climate change agreement.

The document released by the government said China recognized that climate change would have a major impact on the country, including more extreme weather conditions, floods, droughts and rising sea-levels. However, it warned of the difficulties it faces in tackling the problem and called on developed countries to help it.

The document said that coal is likely to remain China's main source of energy for some time to come and urged richer countries to fund and supply developing countries with technology to help provide cleaner forms of energy.

The report said that China's ongoing industrialization and coal-dominated energy mix makes its task of controlling greenhouse gas emissions (GHG) difficult. This is in spite of the steps the country is taking to reduce energy consumption and increase the use of CO_2-free forms of energy such as wind, nuclear power and hydroelectric plants.

The release of the document comes ahead of a UN conference in Poland in December that will discuss a future international pact to tackle climate change to succeed the Kyoto Protocol.

China has previously said that it will not accept any cap on its emissions as it continues its process of economic development. "Developed countries should be responsible for their accumulative emissions and current high per-capita emissions and take the lead in reducing emissions, in addition to providing financial support and transferring technology to developing countries," said the report.

A government official responsible for climate change policy, Gao Guangsheng, said that China is suggesting that developed countries should give one per cent of their gross domestic product to fund poorer countries' efforts to tackle climate change.

Under the current climate change pact, only developed countries are obliged to cap emissions. China has repeatedly said it is unfair to expect poorer, developing countries to do so in the near future.

"It (China) has onerous tasks to develop the economy and improve people's livelihoods and faces a more severe challenge of climate change than developed countries do," the policy document said.

More than 70 per cent of China's energy is supplied by coal. The environmental group Greenpeace suggested that a carbon tax should gradually be introduced per ton of coal produced to try to discourage consumption.

There has been limited engagement of China by EU and US organizations to introduce technologies such as IGCC and coal plants fitted with CCS. Speaking at the recent *CEPSI* conference in Macau, Stuart Dalton, director of generation at US-based Electric Power Research Institute (EPRI) noted: "Many [chemical] plants in China recover CO_2. IGCC and CO_2 removal is offered commercially, they just have not operated in an integrated manner."

China is developing its own versions of entrained flow gasification. Under a programme funded by the five major power companies, it is planning a longer-term project called GreenGen, which is similar to the US FutureGen project.

China ranks second behind the United States in terms of greenhouse gas emissions, according to UN figures, although a Dutch environmental monitoring agency says it has already climbed above the United States.

The Chinese government said it plans to provide about 15 per cent of its energy from cleaner forms of power by 2020, mainly through the massive expansion of hydropower projects. It is also attempting to reduce its energy consumption by 20 per cent by 2010.

New power plant emission limit sparks security concerns

There is concern that new plant emission limits will increase EU dependency on gas, **writes Junior Isles**

The European parliament's decision to impose a 500g/kWh limit on CO_2 from all new power plants has sparked concerns over security of supply.

While the EU pulled back from a limit of 350g/kWh, it still means that all new coal fired plant will have to be equipped with carbon capture and storage. Nick Otter, coordinator of the Zero Emissions Platform (ZEP) commented: "State-of-the-art coal plant are currently around the 750 [g/kWh] mark. If the 500 mark is adopted, it will mean that any new coal plant will not be able to meet the limit without CCS."

Gas plants, however, are able to meet these limits without the need for carbon capture. This has prompted speculation that it will cause generators to opt for cheaper gas fired generation, leading to an increase in Europe's dependency on gas. "This goes against the targets you want for security of supply, where coal is wanted in the energy mix."

It is expected that the issue will be debated in the coming weeks among member states. Otter commented: "I am not sure the member states will agree with the new limit. Parliament will try to give encouragement. I believe the UK would like to see the same conditions applied to coal and gas. You need to achieve the targets while maintaining security of supply."

EU investment boost for fuel cells and hydrogen research

The European Commission and industry stakeholders' decision to invest nearly €1 billion over six years in fuel cells and hydrogen research, technological development and demonstration, will provide a major boost in the effort to commercialize these technologies.

In October, the European Union (EU) and industry announced plans to make fuel cells and hydrogen one of its leading new strategic energy technologies of the future.

The goal is to achieve mass market roll-out of these promising technologies before 2020, said the Commission, the executive body of the EU.

"By investing in such a results-oriented scientific project, we are putting our money where our mouth is: the development of new technologies is crucial if we are to meet EU objectives to address climate change and energy challenges," said EU commissioner for science and research, Janez Potocnik.

The Fuel Cells and Hydrogen Joint Technology Initiative (JTI) is a recently established public private partnership, with joint funding from the Community and from industry, with industry in the lead.

Fuel cells, as an efficient conversion technology, and hydrogen, as a clean energy carrier, have great potential to contribute to addressing the energy challenges facing Europe. EU Framework Programmes (FPs) have given increasing levels of funding to this area, going from €8 million in FP2 to €315 million in FP6. The Commission will fund €470 million from the FP7 programme and at least the same amount will come from private industry under the JTI.

However, the cost of fuel cells remains high. Installed costs currently exceed €10 000/kW. Wärtsilä launched a fuel cell project this summer in Vaasa Finland (*The Energy Industry Times*, April 2008). Erkko Fontell, director of the fuel cell programme at Wärtsilä said: "Analyses show there is the potential to reach commercial feasibility levels of about €1500/kW by 2010."

RGGI leads by example

The success of the USA's first government-mandated carbon credit auction indicates a strong commitment to reduce carbon emissions ahead of the likely introduction of a national carbon trading system in the next few years.

Gov. Schwarzenegger: signed new legislation designed to make new developments more sustainable

The Regional Greenhouse Gas Initiative (RGGI) – a ten-state consortium in northeast USA – said that its first auction saw strong demand for carbon allowances and raised over $38.5 million. The cap-and-trade system is the first of its kind in the country and has been implemented alongside a number of other greenhouse gas initiatives in various other US states.

RGGI reported that power companies were most active in the auction, where all of the 12.5 million allowances offered for sale were sold. The clearing price was $3.07 per allowance, a 65 per cent premium over the minimum set price of $1.86.

The trading initiative is seen by many as a model for a national greenhouse gas trading system, debate over which is likely to start after this month's presidential elections.

In California, Governor, Arnold Schwarzenegger signed new legislation designed to make new developments more sustainable, while Florida's energy and climate change 'action team' has made a number of recommendations to help reduce emissions and meet targets set by Gov. Crist last year.

The RGGI initiative includes Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont. The funds raised will be used by these states to implement renewable and energy efficiency projects.

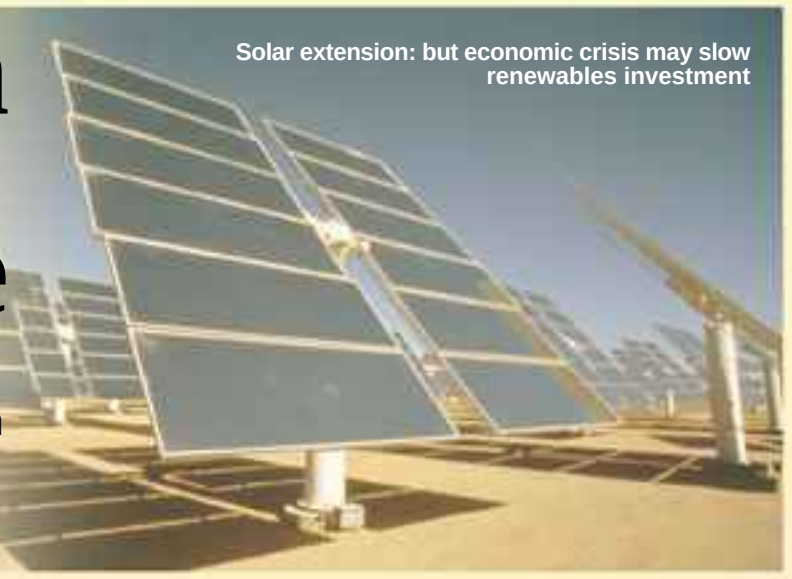
"The start of the RGGI auction … demonstrates both how far we've come and how far we need to go to effectively address climate change," said Eileen Claussen, President of the Pew Center on Global Climate Change. "RGGI and other US state and regional efforts demonstrates that effective cap-and-trade programs can be implemented.

These states are paving the path to a comprehensive national program that offers the most cost-effective solution to significantly reduce US greenhouse gas emissions."

Both US presidential candidates have advocated carbon trading as a means of reducing greenhouse gas emissions.

"As we await the new Administration and Congress, RGGI leads by example to show government and business leaders that cap and trade is a manageable, economically-efficient approach to reduce GHG emissions," said Claussen.

Credit crunch rains on a sunny parade



Solar extension: but economic crisis may slow renewables investment

The financial turmoil and lower oil prices threaten to slow growth and investment in renewable energy in the US, but it seems that large utilities may be well placed to take up the slack, **writes Siân Crampsie.**

The immediate prospects for investment in the USA's clean energy sector remain uncertain in spite of Congress' recent approval of a bill to extend renewable energy tax credits.

The legislation means an eight-year extension of tax credits for solar systems and a one-year extension for wind projects, but the current global economic crisis is likely to temper investors' appetite for renewable energy projects.

The renewable energy industry had hoped that the passing of the bill would unleash billions in investment and allow for continued strong growth in the sector, worth some $17 billion per year to the US economy. But amid the continuing financial turmoil, banks are struggling to maintain flows of finance to renewable energy projects.

Recent falls in oil prices – the result of a looming global recession – could also hamper growth in the renewable energy sector. Share prices of clean energy firms have fallen faster than those in the wider market.

The tax credit legislation – passed as part of the $700 billion rescue package for banks – removed a $2000 cap on credits for solar photovoltaic (PV) installations and also allows utilities to earn credits when they build and operate their own installations. In addition it includes a tax credit for the installation of so-called smart-grid technologies.

The Solar Electric Power Association (SEPA) expects the bill to create more than 440 000 jobs and generate at least $325 billion in private investment. And in spite of the economic turmoil, several solar and clean energy tech firms say they are continuing with investment plans.

After Congress passed the tax credits, SunPower Corp., a Silicon Valley-based manufacturer of PV panels, said it would add hundreds of jobs and build a manufacturing facility in North America by the end of the year.

Similarly GE Energy Financial Services has announced an investment of $2.5 million in solar panel maker Soliant Energy Inc. And TUV Rheinland Group is partnering with Arizona State University and Arizona Public Service to create a new solar testing company in the USA.

In addition, the Center for Revolutionary Solar Photoconversion (CRSP) has launched its inaugural round of research and development funding with $1.1 million earmarked for 12 projects.

But in spite of some signs of optimism in the industry, there have also been indications that problems in the credit markets are having an impact on investment decisions.

BP Solar is reported to have scrapped a $97 million expansion of its Maryland manufacturing plant. Schott Solar has called off a planned $578-887 million IPO due to the dramatic deterioration in market conditions.

There are also concerns that without access to capital, solar companies may look to Asia to produce solar panels, while more advanced – and high-risk – renewable energy technologies may lose out altogether.

The Wilderhill New Energy Global Innovation Index (NEX) – a global index of 91 clean energy companies – stood at 154 in mid-October, down from around 430 in May 2008 and a high of 460 in November 2007.

Analysts believe that it will take some time for the supply of debt finance to return to levels seen in the last two years, and that for the near future at least, the finance that is available will not be as cheap as it once was. It is therefore inevitable that some planned projects will not go ahead, and the development of pipeline projects will slow.

But there does appear to be a silver lining in the fact that utilities will from next year be able to claim the credit extensions for solar projects, and are probably also best-placed to buy up planned renewable energy projects from developers that are adjusting their pipeline portfolios.

Utilities were previously prohibited from claiming the tax credits and had to solicit solar power projects through independent power producers.

The new policy, coupled with the fact that most states are mandating increased use of renewable energy, puts utilities in a good position as solar power developers. In fact SEPA says that it expects utilities to quickly become the largest and one of the most important customers for the solar industry, while analysts believe that the strong balance sheets of the large utilities will enable them to take control of the large-scale solar power project market.

"US electric utilities' engagement with grid-connected solar electricity has increased significantly in 2008, with major photovoltaic and concentrating solar thermal project announcements totalling more than 5000 MW," said Julia Hamm, SEPA executive director. "The change to the tax credit facilitates utility ownership as another option, which will result in additional projects and innovations."

"This is a very positive development for the utility industry as it will go a long way to putting solar power within reach of many more Americans," said Jim Rogers, chairman, president and CEO of Duke Energy, a SEPA member. "It is exactly what we need as we explore investing $100 million to install, operate, maintain and dispatch solar panels on our customers' rooftops in North Carolina as a viable option to build a bridge to a low-carbon future."

Venezuela seeks nuclear support

France exploits ties with Iran
Solar, gas targeted

Hugo Chavez: looking to nuclear and renewables to combat energy shortages

Venezuela is seeking to secure its future energy supplies by investing in nuclear power and renewable energy.

The oil-producing nation has held talks with France over the development of a civilian nuclear power programme, and has also accepted an offer from Russia for assistance in building a nuclear reactor.

Venezuela, a member of OPEC and one of the world's largest exporters of crude oil, is facing energy shortages and has suffered from blackouts in recent weeks. The government has made plans to invest in the country's electricity infrastructure, and wants to reduce dependence on hydropower.

France hopes that an accord with Venezuela will not only help to strengthen its commercial ties with the country, but also help it to start discussions with Iran about its disputed nuclear programme.

Venezuela – a staunch critic of the USA – has close ties with Iran and has defended it against allegations that it is secretly seeking to develop nuclear weapons. It has also forged close ties with Russia, partly on the basis of their shared opposition to what they claim is US global domination.

Russia is promoting itself as a constructor of nuclear power plants in developing countries and offered Venezuela help during a meeting between Venezuelan president Hugo Chavez and Russian prime minister Vladimir Putin in Russia in September.

Venezuela's government estimates the national energy shortage to be 1000-2000 MW. In addition to investing in electricity generation and transmission infrastructure, it is importing energy in the short term and also promoting energy conservation.

In September Chavez announced plans to install 21 small generating units around the country to overcome energy shortages. It has also signed an agreement to import around 80 MW from neighbouring Colombia, which currently has a large power surplus.

One of Venezuela's energy programmes aims to install rooftop solar panels in remote communities around the country. The 'Sowing Light' programme has so far set up solar panels in 550 communities so far, according to its programme director.

The programme is still in its pilot phase, but the government has earmarked $4.7 million for its expansion. The solar panels are manufactured in Spain, assembled in Cuba, and supplied to Venezuela in exchange for oil.

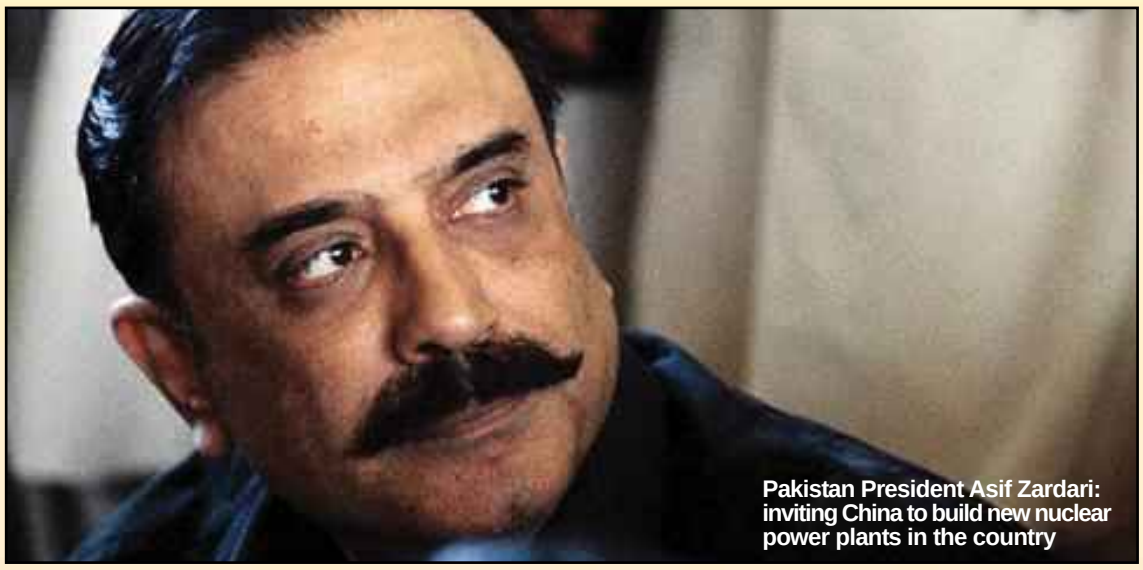
Chavez also announced plans for Venezuela to exploit its natural gas reserves, with state oil company signing accords with companies from around the world to produce natural gas. Much of the country's large gas reserves are associated, and a large proportion of the gas produced is currently used for re-injection to aid oil production.

In August the nationalised National Electricity Corporation (Corpoelec) said that the government of Venezuela had assigned over $930 million of improvements in the electricity sector. Ultimately, the government plans to invest some $13 billion in the sector in the next few years.

Venezuela relies on the 8900 MW Guri Dam for around 70 per cent of its electricity needs.

Pakistan battles power deficit

In the grip of a worsening power crisis, Pakistan is turning to China for assistance with its nuclear power programme and hopes that new IPP projects and growth in the renewable sector will bridge the immediate supply gap.



Pakistan President Asif Zardari: inviting China to build new nuclear power plants in the country

Syed Rashid Ali

Pakistan's worsening power crisis has led the country's government to seek assistance from overseas partners to establish new power generation projects.

Pakistan President Asif Zardari has invited China to build new nuclear power plants in the country, while the government has encouraged Malaysian power development firms to invest in the power sector. A number of independent power producer contracts have also been awarded in a bid to add new capacity to the country's power system as quickly as possible.

Pakistan has been suffering from regular power outages for some time but recent falls in reservoir levels at hydropower dams have caused the power deficit to fall to around 4000 MW. The Pakistan Electric Power Company (Pepco) has increased load-shedding across the country to 6-8 hours, according to local reports.

The country's government has approached China to ask for assistance in the construction of two new nuclear power reactors as part of plans for a massive expansion of its nuclear power sector. The move is thought to be partly a response to the recent nuclear agreement between the USA and India.

While Pakistan is a key ally of the USA's in the war on terror, its relations with India remain hostile.

Nevertheless it is promoting its power sector to regional partners such as Malaysia as one of the best investment regimes in the region. The Private Power and Infrastructure Board's most recent request for proposals for the construction of IPP and power rental projects attracted a total of 12 bids.

Pakistan is also aiming to build new generating capacity using indigenous coal reserves at Thar, and is about to commission its first wind power project.

In the nuclear sector Pakistan wants to increase installed generating capacity from 425 MW to 8800 MW by 2030. However, its ambitions are hampered by its nuclear weapons programme, which prevent it from joining the nuclear Non-Proliferation Treaty (NPT).

China has already constructed one nuclear reactor at Chashma and is currently developing a second at the same site, making it Pakistan's most obvious partner. Pakistan has proposed the creation of a Pakistan-China Power Company to move proposed new projects forward.

Pakistan wants Chinese firms to help it build two new units at Chashma, each with a capacity of 320-340 MWe and costing PKR129 billion ($1.585 billion). However, China's involvement in the projects is questionable due to its participation in the Nuclear Suppliers Group, which in theory prevents it from selling nuclear equipment to Pakistan.

Malaysian firm KUB Malaysia Berhad, together with its partner Progas Pakistan, is one of three consortia awarded rights to construct new IPPs in Pakistan by the Private Power and Infrastructure Board (PPIB). KUB and Progas will build a 305 MW power plant at port Qasim, Karachi.

The two other IPP projects to be approved are a 470 MW plant at port Qasim, to be developed by Cavalier Energy, and a 154 MW project in Lahore by Ruba Energy Pakistan.

The PPIB also awarded two power rental projects in Karachi – one of 232 MW to Karadeniz Elektrik Uretim and one of 205 MW to Walters Power International.

Power shortages in the country have been made worse in recent weeks by the closure of several thermal power plants for annual maintenance. Gas supply interruptions have also increased due to essential repair work at the Qadirpur gas field, according to local reports.

Seven thermal power plants were closed for maintenance in mid-October and are due back on-stream in November, according to Pepco. Hydropower generation has been reduced by 2600 MW due to reduced outflows from reservoirs.

Turkish firm Zorlu Enerji says that it is close to completing installation of the first wind turbine in Pakistan, a move the government hopes will encourage the development of more renewable energy projects.

Zorlu has almost completed the foundation work for five wind turbines in Jhimpir, 70 km from Karachi. Each unit will be capable of producing 1.2 MW, and the company is aiming to expand the project to 50 MW over the next few years.

Pakistan's Alternative Energy Development Board has been tasked with promoting renewable energy development and has formulated policies offering good rates of return for investors, according to Zorlu.

Pakistan's generating capacity currently stands at around 21 GW and the government plans to expand this to 160 GW by 2030 under a 2005 Energy Security Plan.

Japan hopes CO_2 market will accelerate GHG reductions

- Corporations to set their own targets
- Trial scheme expected to start next year

Japan is hoping that a new voluntary carbon trading market will help the country to accelerate reductions in greenhouse gas emissions ahead of plans for a nationwide mandatory cap-and-trade regime.

Large industrial groups from the power, steel and motor sectors have all indicated that they will sign up to the trial market, the framework for which was outlined last month by the government.

The new system will urge corporations to make efforts to reduce greenhouse gas emissions by setting their own reduction targets. Those that fall short of their goals are to buy surplus carbon credits from those that exceed their goals.

The system is seen as the frontrunner to a mandatory system that the government is widely expected to implement as it comes under pressure to set targets beyond its Kyoto obligations. Tokyo Electric Power Co is expected to join the scheme, as are Sumitomo Chemical Co., Nissan Motor Co., and Toshiba Corp.

Other utilities will join the scheme if they are allowed to set a cap for their sector as a whole.

Japan is one of the most energy-efficient nations in the world but also the world's fifth-largest greenhouse gas emitter. It has been reluctant to impose mandatory targets on its industries because of their past efforts to reduce emissions and the potential economic impact of emission caps.

The government is expecting applications from thousands of companies to join the scheme, which is designed to help the country achieve its Kyoto target.

Japanese firms are already active in the purchase of UN certified emission reduction (CER) units, but the powerful Keidanren business lobby has resisted mandatory emission targets. Under the Kyoto Protocol, Japan is obliged to cut greenhouse gas emissions by six per cent over 1990 levels by 2012.

The trial scheme is expected to start operating next year. Japan's emission levels currently stand six per cent above 1990 levels

Negotiations are underway aimed at agreeing a replacement for Kyoto that would hopefully bind all nations to emissions curbs from 2013. The UN-led talks reach a climax in Copenhagen, Denmark, at the end of next year and several countries are implementing new climate change policies in anticipation of more ambitious targets.

Meanwhile, China established an emission trading exchange in Tianjin Binhai New Area, the first of its kind in the country. The exchange will initially trade sulphur dioxide and is part of Tianjin Binhai's energy conservation and environmental management policy.

Tianjin Binhai New Area: home of China's first emission trading exchange

Indonesia fears for power projects

- Interest rates could affect smaller projects
- Kepco plans CCGT

Indonesia fears that its plans to expand electricity generating capacity will be damaged by an upward trend in inflation and interest rates.

The country has plans to add some 10 000 MW of new coal fired capacity and the government says that projects outside of Java will be worst-hit. The global financial crisis may also affect funding for some of the projects.

State power firm PT PLN says that so far it has signed contracts for some 8700 MW of projects, most of which is located in the Java-Bali system. Projects outside this system are funded by domestic financial institutions, which could be affected if interest rates increase in response to inflation.

The larger projects will be less affected as they are backed by larger, international banks, according to Indonesia's Energy and Mineral Resources Minister Purnomo Yusgiantoro.

South Korea's Kepco has announced plans to build a $1 billion, 1000 MW gas-fired combined cycle project at Bojonegero, Banten. Construction will start in 2010 and the project will be completed in 2014.

Indonesia's coal-fired power plant programme was launched in 2006 and the projects are set to be completed by 2011. It was devised to meet increasing electricity needs across the country, especially in the Java-Bali system, where demand is growing at around 6-7 per cent per year.

Areva deepens Chinese ties

French nuclear engineering firm has sought to strengthen its foothold in the Chinese nuclear power market by reinforcing its strategic partnership with China Guangdong Nuclear Power Company (CGNPC).

The two companies have signed new agreements covering the uranium mining and power plant construction fields, a move that will give Areva a guaranteed market for its uranium output as well as enable it to engineer and procure technology for power plant projects in China.

CGNPC has agreed to take a 49 per cent stake in UraMin, an Areva-owned uranium mining company with operations in Africa. It had already committed to taking a 35 per cent stake in UraMin late last year, but this new agreement guarantees it access to more than half of UraMin's future production.

The deal will also help Areva to finance its mining expansion activities.

CGNPC has also agreed to establish a new joint venture company with Areva charged with the engineering and procurement of second and third generation nuclear power plants.

The joint venture – 55 per cent owned by CGNPC and 45 per cent by Areva – will initially be dedicated to CGNPC's projects in China, but will subsequently be in a position to contribute to joint projects abroad.

Qian Zhimin, the Chairman of CGNPC said: "These agreements are key for our company. One secures the supply of uranium for our nuclear power plants until 2022. The other affirms our long term technological cooperation with Areva in the joint development of nuclear power station projects."

Areva and CGNPC are building two third-generation EPR power plants in Taishan, China, under an agreement signed in late 2007.

Thai wind firm expands

Incentive mechanisms for renewable energy will help Thailand to fulfil its wind power potential, according to local wind turbine manufacturer Gunkul Engineering (GKE).

GKE has announced plans to invest Baht1 billion ($28.73 million) to develop its own wind power plant and to establish production of wind turbine generators, and says the investment is needed to meet the country's growing appetite for renewable energy.

The firm – one of only a few Thai firms that manufacture wind power equipment – says that the government's adder scheme will encourage further investment in renewables. GKE has also received an incentive from the Board of Investment.

The adder is a state scheme that gives renewable power plant operators Baht3.50 on top of the average price of Bht2.50/kWh paid by the Electricity Generating Authority of Thailand (Egat).

Egat recently bought two wind turbine generators from GKE, and the company is waiting on the outcome of a bid for a 250 kW turbine for the Provincial Electricity Authority.

GKE said it will raise funds through an initial public offering on Thailand's stock exchange in late 2009.

Firms line up for $30 billion nuclear market

123 Agreement opens India to trade
US, Russian and French firms seek opportunities


New opportunities:
US and India sign landmark deal

The lifting of a nuclear trade ban on India will allow the country to strengthen its energy security, meet climate change objectives and preserve indigenous coal reserves for export, according to Chairman of the Indian Atomic Energy Commission, Dr. Anil Kakodkar.

Referring to an agreement reached by the 45-nation Nuclear Suppliers Group (NSG) in September, Kakodkar said that such deals would allow India to "make an even bigger contribution to the growth of international civil nuclear cooperation" and offer its nuclear technology to other countries. He described 2008 as a "remarkable" year for India in the nuclear energy field.

Last month the NSG's decision to lift a ban on atomic trade with India was enhanced when US President George W. Bush signed a landmark US-India nuclear cooperation accord.

Together the agreements open up India's nuclear energy market – thought to be worth in excess of $30 billion – to foreign investors. In addition to the USA, India has been seeking nuclear agreements with other countries, including France, Japan and Kazakhstan.

India is planning a rapid expansion of its nuclear power sector in order to overcome rapidly rising electricity demand. The signing of the US-India pact – the so-called 123 Agreement – means that by 2050, 35 per cent of India's electricity needs will be met by nuclear power plants, said Kakodkar.

"By undertaking new cooperation on civil nuclear energy, India will be able to count on a reliable fuel supply for its civilian reactors, meet the energy demands of its people, and reduce its independence on fossil fuels," said Bush on signing the pact.

"For our part, the United States will gain access to a growing market for civilian nuclear technologies and materials, that will help American businesses create more jobs for our people here at home."

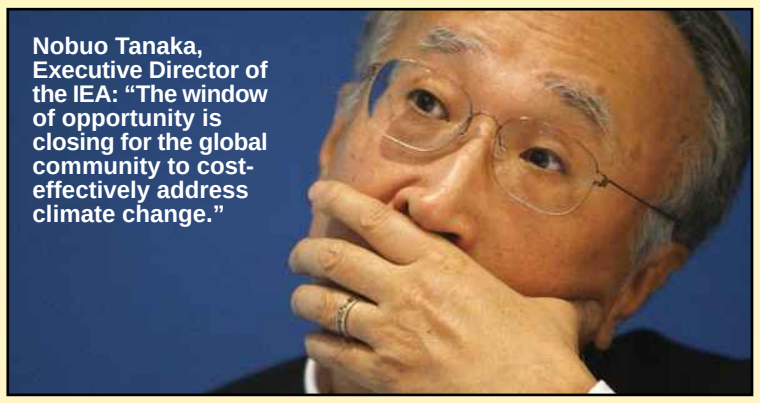
India is reported to be planning construction of 21 nuclear power plants based on a variety of technologies. French firm Areva could supply up to six reactors following an agreement on nuclear energy between India and France earlier this year. Russia's Rosatom could supply four reactors, while US firms such as GE and Westinghouse could supply up to four reactors.

India's refusal to sign the nuclear Non-Proliferation Treaty (NPT) has made these international deals controversial, both within US political circles and the wider international community.

While Kazakhstan is keen to ink a deal on uranium supply with India, Japan has refused to engage in civil nuclear cooperation with India until it signs the NPT.

Europe must weather the tricky climate

Some EU states believe that climate change commitments must be put on the back burner in the face of current financial woes. Others disagree. Finalising a deal on emission targets in Europe before the UN's climate meeting in Copenhagen next year will prove difficult, **writes Siân Crampsie.**



Nobuo Tanaka, Executive Director of the IEA: "The window of opportunity is closing for the global community to cost-effectively address climate change."

The global financial crisis is threatening to derail the European Commission's environmental objectives, with some EU member states saying that they will have to choose between climate change and economic competitiveness.

Poland, Italy and a number of other nations have called for the finalization of the Commission's energy and climate legislative package to be delayed, claiming that adoption of the proposed measures will be too costly in the current economic climate.

At a recent summit of European leaders, the EU's 27 member states agreed to commit to a timeline that should see the legislation finalized by the end of December. However, the objections raised by Italy, Poland and several other East European states indicate that ongoing negotiations over the package will be tough and that its adoption is likely to be delayed.

Their objections also show a deep divide in Europe over climate change strategy. While Italy is concerned over the impact of legally-binding emission reduction targets on its industry, some European lawmakers are adamant that they should not use the global financial situation as an excuse to go back on their commitments.

The UK, which has established itself as an international carbon trading hub, recently announced a commitment to cutting its greenhouse gas emissions by 80 per cent over 1990 levels by 2050.

The Climate and energy package, first proposed in early 2007, commits the EU to reducing greenhouse gas emissions by 20 per cent over 1990 levels by 2020 and increasing the share of renewable energy.

Italy says that the plan will cost its economy around €25 billion per year, and has called for significant changes to be made. Poland and other East European states – including Bulgaria, Romania, Hungary and Slovakia – are heavily dependent on coal and say that they made major sacrifices in the 1990s by closing heavily polluted factories.

The potential for the climate and energy package to be weakened is causing concern not only because it could result in the EU bloc missing its targets for reducing CO_2 emissions, but also because it may result in lowered ambitions elsewhere. The United Nations is aiming to conclude negotiations on targets for the post-Kyoto period at its conference in Copenhagen at the end of next year.

Those in favour of the Commission's package include France – which relies heavily on nuclear power – the UK, the Netherlands and most Nordic countries. A key element of the proposed legislation is an overhaul of the emission trading system that would see most industrial sectors having to pay for some or all of their permits.

In addition to drastic cuts in greenhouse gas emissions, the UK is also planning to introduce a feed-in tariff to support small-scale renewables. It believes that economic and environmental objectives can go hand-in-hand and has endorsed a recent report that says that for global warming to be held to 2°C above pre-industrial levels, global emissions must fall by 50-60 per cent by 2050.

The UK has one of the toughest renewable energy targets proposed under the European Commission's energy and climate package.

While the European Commission's latest progress report on emissions shows that the EU and most member states are on track to deliver their Kyoto Protocol commitments, a new report from the WWF indicates that global warming is accelerating at a faster rate than climate change experts had previously predicted.

The WWF's report says that the Arctic Ocean is losing sea ice up to 30 years ahead of IPCC predictions, the number and intensity of extreme cyclones over the British Isles and the North Sea are projected to increase, and that marine ecosystems in the North and Baltic Seas are being exposed to the warmest temperatures measured since records began.

WWF has called on the EU to adopt an emission reduction target of at least 30 per cent below 1990 levels by 2020, delivered within the boundaries of the EU rather than by offsetting overseas.

"If the European Union wants to be seen as leader at UN talks in Copenhagen next year, and to help secure a strong global deal to tackle climate change after 2012, then it must stop shirking its responsibilities and commit to real emissions cuts within Europe," said Dr. Tina Tin, climate scientist and author of the WWF report.

European electricity association Eurelectric has also called on EU legislators to finalise the energy and climate package by the end of the year. It argues that electricity companies need regulatory certainty in order to be able to plan expenditure and has broadly endorsed the Commission's planned changes to the Emission Trading Scheme (ETS).

Eurelectric said that it has advised Europe's Environment Ministers that revenues from the proposed auctioning of carbon allowances should be used to support the demonstration of carbon capture and storage (CCS) – a technology that it sees as vital for tackling climate change. It has also warned that the legislation should not ban or mandate any particular technology, nor should it set CO_2 emission limits for coal-fired power plants.

Such a move would distort the carbon market and increase the region's reliance on energy imports, said Eurelectric.

Eurelectric's support of CCS has been endorsed by the International Energy Agency (IEA), which says that its latest study demonstrates that CCS can deliver cost-effective emissions reductions. It has called on governments to finance large-scale CCS demonstration, a move that will help reduce the overall costs of climate change mitigation.

"The window of opportunity is closing for the global community to cost-effectively address climate change. CCS technologies must play a key role, but first they must be proven in the next decade," said Nobuo Tanaka, Executive Director of the IEA.

The IEA said that in the power and industrial sectors alone, CCS could contribute nearly one-fifth of the reductions needed to halve greenhouse gas emissions by 2050 at reasonable cost. However, technology demonstration has been challenged by a global increase in costs and a lack of suitable financial support mechanisms.

Scotland aims to turn the tide

Scottish Power and the Scottish government hope the construction of the world's largest tidal energy installation will help the country to become a leading centre of expertise in the technology.

The utility has announced plans to develop three sites using the Lànstrøm tidal device and is currently evaluating two sites in Scotland and one in Northern Ireland for the projects. It plans to submit planning applications in mid-2009 and believes that the projects could be operational by 2011.

Scottish Power is to establish a new tidal energy company in Scotland and the company believes that the region's marine energy resource presents a unique opportunity.

"Following significant research and development in Scotland during the 70s and 80s, the opportunity associated with the manufacturing of on-shore wind turbines was not realised," said Keith Anderson, director of Scottish Power Renewables. "Tidal power now provides Scotland with another chance to become the global leader in a new renewable energy industry."

Each site could have up to 20 turbines and the combined capacity of the three projects could therefore reach 60 MW. The rapid technological advancement of tidal power has enabled Scottish Power to progress plans for the projects, said the company.

"Scotland has a marine energy resource which is unrivalled in Europe – we have an estimated 25 per cent of Europe's tidal resource and 10 per cent of its wave potential," said Scottish First Minister Alex Salmond.

EC gives ground on Gazprom clause

- **Weaker package approved**
- **Unbundling will promote competition**

Energy Commissioner Andris Piebalgs: "I am pleased that member states are supporting the Commission's drive to create a real internal energy market."

Germany and other EU nations will be free to allow foreign investors to buy stakes in their electricity networks after European energy ministers reached agreement on the European Commission's liberalization package.

Ministers approved a weakened version of the so-called "Gazprom clause", allowing non-EU companies to purchase network assets in EU states provided that a bilateral agreement between the two nations concerned exists. They also approved legislation on the unbundling of vertically integrated utilities.

The European Commission hailed the agreement as a "crucial step" in the creation of a single market in spite of the fact that several elements of the legislation have been diluted from the original version.

The agreement is a victory for Germany, which gets 40 per cent of its gas from Russia and is keen to promote strong ties with Gazprom, the Russian state-owned gas company. The European Commission sought to curb the influence of Gazprom within Europe by specifying that foreign companies could only acquire transmission assets in the EU if their own home market was a competitive market.

However, the deal forbids energy producers from buying the transmission assets of energy companies in European countries where full unbundling has been introduced.

Energy ministers also agreed on plans to separate energy production from supply – an issue over which they had been deadlocked for several months. Companies will now have to separate transmission from production and supply by ensuring that their transmission businesses are operated independently by a subsidiary.

Energy Commissioner Andris Piebalgs said: "I am pleased that member states are supporting the Commission's drive to create a real internal energy market. The internal market is essential to deliver all three of Europe's energy objectives: a competitive European economy, security of energy supply and sustainability."

The legislative package, originally proposed in September 2007, aims to implement a complete internal energy market with open competition and effective regulation.

The European Commission had originally wanted to implement full unbundling of large, vertically integrated energy companies, forcing them to sell their transmission assets. But its proposal was strongly opposed by France, Germany and several other states, which successfully negotiated softer terms.

GCC faces power crunch

n Fuel supply is a major risk
n GCC grid prepares for operation

Grand designs: potential power shortages threaten Dubai's massive construction projects

The ability of Gulf Cooperation Council (GCC) countries to keep up with rapidly rising electricity demand has been called into question by a leading international ratings agency.

London-based Moody's latest analysis of the region shows that the massive levels of investment required in the power sector coupled with fuel supply risk are likely to result in power shortages and have a significant impact on growth.

But electricity sector development in the region took a step forward last month when the GCC Interconnection Authority (GCCIA) said that it was planning to start trial operations of its interconnected electricity grid project.

In a new report, Moody's said that power sector requirements "pose significant operational and financial risks", and that the ability of the region's power producers to deliver new capacity is a "significant worry". The Dubai Electricity and Water Authority (DEWA) is particularly prone to fuel supply risk, said Moody's.

According to business intelligence firm MEED, the six GCC countries – Kuwait, Qatar, Oman, Saudi Arabia, Bahrain and the UAE – require around $50 billion of investment in power generation capacity by 2015, plus additional investment in transmission, to meet rapidly rising demand. Nearly 40 per cent of regional capacity additions are needed in the UAE.

Moody's believes that in Dubai, the current gas supply arrangements will not be sufficient to satisfy all of DEWA's future capacity. Last year, the utility was forced to run most of its power stations on oil purchased on spot markets.

The ratings agency says that procuring fuel for power plants would pose a problem for most GCC countries, and that the risk of blackouts is likely to rise.

High levels of industrial and commercial development, plus rapidly expanding populations, are driving exceptional levels of energy demand growth in the GCC region. In Dubai, the construction of 'mega real estate' projects mean that the state is expected to invest around $9.4 billion to add 11 GW of generating capacity.

The GCCIA has announced that the first phase of the GCC electricity grid will be fully operational in the first quarter of 2009 following completion of trial operations. The $1.2 billion project will link all the networks of the Gulf states, helping them to overcome demand growth and reduce the cost of power

Trial operations are due to start by the end of 2008 and continue until January 2009, according to the GCCIA. The first phase of the project will link Kuwait, Bahrain, Qatar and Saudi Arabia, creating the North Grid.

The Energy Industry Times reported in August 2008 that the rapid development in the northern Emirate states was posing problems for the UAE's Federal Electricity and Water Authority (FEWA). The utility had also indicated the existence of natural gas supply problems, and analysts indicated that the possibility of power shortages could deter investment in the region.

Kenya affirms geothermal programme

n 350 MW of development earmarked
n IPP environment remains difficult

Kenya is to turn increasingly to renewable energy as a means of overcoming high energy costs and rising demand in its power sector.

The country's Energy Secretary, Patrick Nyoike, has said that the exploitation of the country's considerable geothermal energy resources is the key to a rapid increase in generation capacity. It is planning to develop at least 350 MW of geothermal capacity by 2030.

Like other African countries, Kenya is heavily reliant on the use of solid biomass such as wood fuel in its primary energy mix, but needs to increase electricity generating capacity due to strong demand growth. Independent power producers are active in the country, but lack of project finance remains a barrier to the implementation of many projects.

The government is also concerned not only about high oil prices but also about the vulnerability of the hydropower sector to weather and climate changes.

Kenya has 130 MW of geothermal capacity, with another 70 MW under construction. It has identified four new areas to exploit, and plans to spend Sh 12 billion ($151.3 million) per year on drilling work to 2012.

Much of Kenya's estimated 7000 MW of geothermal potential is located in the Rift Valley region. The areas planned for development are Longonot (140 MW), Menengai (140 MW), Suswa (70 MW) and North Rift (140 MW).

Another driver for the rising demand for electricity in Kenya is the government's rural electrification programme, which seeks to increase rural coverage from the current 15 per cent to 50 per cent by 2030.

One of the latest IPP projects in the country is the 90 MW Rabai power plant, which is being built by Aldwych International and Burmeister & Wain Holdings at a cost of Sh12 billion. The plant will run on diesel fuel and will be brought on-line by the end of 2009.

Kenya's current installed capacity stands at around 1096 MW, 62 per cent of which is hydropower.

Russia expands nuclear plans

n Bolsters uranium exploration activities
n Capacity will more than double

Sergey Kiriyenko: confident of continued cooperation with the US

Russia is moving ahead with its aggressive nuclear power development programme in spite of the USA's withdrawal from a new agreement aimed at advancing collaboration on nuclear energy.

Russia affirmed its commitment to the construction of some 19 new nuclear power plants over the next eight years, and said it is drawing up plans for the construction of additional units. It also signed a new agreement with South Korea to cooperate in the fields of energy research and uranium development.

A deterioration in the relationship between the USA and Russia led the former to step back from the so-called '123 Agreement', which would have paved the way for extensive nuclear trade between the two countries. The US took action following August's conflict between Russia and Georgia over South Ossieta.

US Energy Secretary Samuel Bodman is reported to have met with Sergey Kiriyenko, head of the Russian Federal Atomic Energy Agency at the IAEA General Conference in Vienna. The two sides are continuing to cooperate as before and have determined a programme for further action, according to Kiriyenko.

Under current plans, Russia is aiming to commission around 16 800 MW of nuclear capacity by 2016 and a further 16 000 MW to 2020. Around 4800 MW of capacity is currently being constructed, including the 1200 MW Seversk 1 plant for which Alstom Atomenergomash was recently contracted to supply the turbine generator package.

Under its latest bilateral agreement, Russia is planning to work with South Korea to expand uranium supplies. South Korea is heavily dependent on imports of uranium and the agreement will help to ensure a steady supply of fuel for its 20 reactors.

Russia is the world's fourth-largest uranium producer, while South Korea is the world's sixth-largest importer.

The two countries have also agreed to expand activities in the oil and gas sector.

Russia is also looking to continue supplying nuclear fuel to Ukraine when their current contract expires at the end of 2010.

Russia's pact with the USA would have allowed it to import, store and possibly reprocess spent nuclear fuel from US-supplied reactors. It was not only commercially important for Russia, but also a key element of the USA's policy of promoting peaceful use of civilian nuclear energy technology around the world.

Russia plans to invest around $282 billion by 2015 in its nuclear programme, and a further $204 billion to 2020. The investment will result in its current nuclear power generating capacity being more than doubled to nearly 50 GW.

GE, Siemens sign Iraq deal

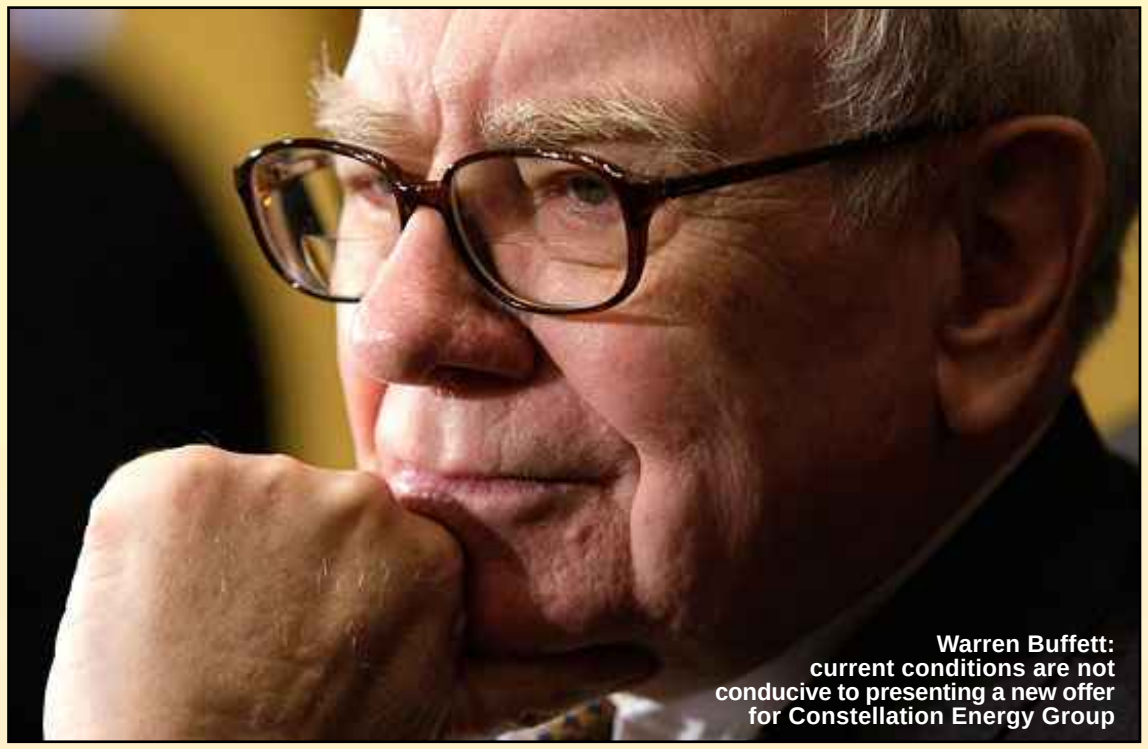
Iraq's plans to improve electricity supplies have moved forward with the signing of preliminary deals with Siemens and GE for the supply of equipment and services.

The deals are worth billions of dollars and could result in a near-doubling of electricity generation, according to *Reuters*.

Iraq has signed a memorandum of understanding with GE for the supply of turbines that will help the country add 6800 MW of capacity to the grid. A separate deal with Siemens is for equipment with a capacity of around 2000 MW, according to Iraqi officials.

Iraq's maximum power capacity stands at around 4500 MW while total demand is estimated to be 8500 MW, according to USAID. The agency also said that much of the country's existing power infrastructure is in a poor state of repair, while looting of cables, destruction of high tension towers and the sabotage of fuel lines are continuing problems.

EDF abandons Constellation bid



Warren Buffett: current conditions are not conducive to presenting a new offer for Constellation Energy Group

The French firm was caught napping when MidAmerican snapped up Constellation last month, but is determined to remain on track with its global nuclear ambitions, **writes Siân Crampsie.**

EDF may be forced to reassess plans to build new nuclear power reactors in the USA through a joint venture with Constellation Energy following its decision to abandon a bid for the US utility.

The company's proposed takeover of British Energy has also continued to come under fire from consumer groups because of its potential impact on competition.

EDF has released a statement confirming that it will not pursue a takeover of Constellation, a US utility with which it owns a joint venture – UniStar Nuclear Energy – to design and construct nuclear power plants in the USA. It said the decision was the result of the "current state of financial markets and in particular the difficult credit markets for corporates".

An initial bid for Constellation Energy by EDF was triggered when the US firm agreed to a $4.7 billion takeover by MidAmerican Energy – a utility controlled by US entrepreneur Warren Buffett – in September. EDF considered making an increased bid in conjunction with US buyout firm KKR but believes that "current conditions are not conducive to presenting a new offer for Constellation Energy Group".

The move is a possible setback for the company's plans to build nuclear plants in the US, although it remains committed to its objective of developing at least four EPRs in the country. EDF and Constellation each own 50 per cent of UniStar Nuclear, which has four EPR-based nuclear projects under development around the US.

The 2007 deal with Constellation was EDF's pathway into the US nuclear market and the French utility was hoping that MidAmerican's bid would be rejected in view of EDF's more generous offer. EDF owns 9.5 per cent of Constellation.

MidAmerican Energy swooped in with a $26.50/share offer for Constellation in September after concerns grew about the stability of the latter's commodities trading operations and credit ratings. Constellation quickly agreed to the bid from MidAmerican in spite of its low value and an offer from EDF that was 33 per cent higher.

The French group said it will hang on to its stake in Constellation but may now have to reconsider its options to guarantee access to the US nuclear market. Its main fear is that Buffett will not want to invest in nuclear energy or will turn to an alternative reactor maker such as GE for a new build programme.

GE recently announced plans to sell $3 billion of preferred stock to Buffett's Berkshire Hathaway. Buffett has also voiced concerns in the past over the rising costs of nuclear power plant construction and last year pulled MidAmerican back from plans to build nuclear capacity.

One of EDF's options is a buyout of Constellation's stake in UniStar, but it may again face difficulties raising capital.

Back home on European turf, EDF may yet have its plans to build new nuclear capacity in the UK thwarted over concerns about competition in the market.

Consumer groups such as Consumer Focus and energy suppliers such as Welsh Power have said that the proposed £12.4 billion takeover of British Energy by EDF will result in the creation of a company controlling around 25 per cent of the UK's electricity supply market. EDF wants to use British Energy as a springboard for the construction of four EPR plants in the UK.

The deal is backed by the British government, which is keen to kick-start construction of new nuclear capacity. However, it will be reviewed by regulator Ofgem, which will advise the Office of Fair Trading on whether to approve the merger or refer it to the Competition Commission.

EDF said it is confident that the deal will be approved by Brussels.

Consumer Focus has voiced concerns that the purchase of British Energy by EDF – which already controls around 16 per cent of the supply market through its subsidiary EDF Energy – will further concentrate market power among the "big six" energy suppliers and therefore be detrimental to a market where small suppliers already struggle to compete.

Welsh Power said that the market is already "fundamentally broken" and that the deal will result in increased energy costs for consumers.

However, according to market intelligence firm Datamonitor, the EDF-British Energy deal is likely to be approved by the UK authorities due to the government's backing and recent mergers in the financial sector that have resulted in concentration of market power. In Europe, too, approval should be straightforward, according to Datamonitor, as market shares above 30 per cent are quite normal in Europe.

CEZ continues spending spree

CEZ's ambitions to become a leading player in the southeast European electricity market received a boost with news that it is to purchase a majority stake in Albanian distribution company Operatori i Sistemit te Shperndarjes (OSSH sh.a.).

The Czech utility's bid beat that of Italian utility Enel and has been recommended to the Albanian government by a nine-member privatization commission. The €102 million deal – which has yet to be confirmed by the Albanian government – will give CEZ access to nearly one million customers consuming around 5.3 TWh per year.

CEZ's success in Albania adds to the company's recent investment spree in the region, where it has bought energy firms in Bulgaria, Romania and Poland as well as a seven per cent stake in Hungary's MOL.

As owner of a 76 per cent share in OSSH, CEZ will be expected to make substantial investments to modernize the power system. Albania imports much of its power from Greece and per capita electricity consumption is around one-quarter of that in Austria.

Electricity consumption in Albania is forecast to grow at five per cent per year, according to CEZ.

Masdar, E.On ink global partnership

- Masdar gains UK foothold
- E.On aims for industrial-scale renewables

Masdar, the UAE-based renewable energy developer, has extended its international portfolio with the acquisition of a stake in the world's largest offshore wind farm.

Government-backed Masdar has reached an agreement with E.On to buy 40 per cent of the German utility's share in London Array, a major offshore wind farm project in the UK. The two companies have also pledged to work together across a range of other renewable energy projects.

The move gives Masdar a 20 per cent stake in a project that forms a key part of the UK's plans to expand renewable energy capacity, and will give the project a financial boost following the decision earlier this year by Shell to withdraw its involvement. It will also allow Masdar to "build a partnership with the UK government to drive the future growth of the renewable energy sector", according to Dr. Sultan Al Jaber, Masdar's CEO.

British Prime Minister Gordon Brown said: "I very much welcome Masdar's decision to invest in renewable energy in the UK. This is an excellent example of the partnership we need between oil producing and oil consuming countries to develop new energy sources and technologies, diversifying their economies and reducing our dependence on carbon."

The 1000 MW London Array project, situated in the Outer Thames Estuary off the coast of southeast England, is being developed by E.On and Dong Energy and will consist of up to 271 wind turbines. The first phase – consisting of up to 175 turbines – is scheduled for completion in 2012.

Masdar's investment in the project and its partnership with E.On is part of the company's global alternative energy strategy. Last month the company made an investment into Finnish wind turbine manufacturer WinWinD Oy.

Initially the two companies will focus on wind power projects, but over time they expect to be able to announce a series of "exciting projects across the broad spectrum of renewable energy", according to E.On. Potential projects will focus on carbon emission reduction, and both companies are looking to jointly develop joint implementation (JI) and clean development mechanism (CDM) projects.

E.On says that the scale of London Array will present new challenges and lessons learned in its development will be important for future projects. It is planning to invest €6 billion by 2010 to help move renewable energy projects from "boutique to industrial scale", according to E.On's CEO Dr. Wulf Bernotat.

E.On and Danish utility Dong Energy joined forces in July to buy Shell's stake in the project after the oil firm pulled out in May. Analysts attributed Shell's decision to soaring costs, which rose from initial estimates of £1.5 billion to £2.5 billion.

Americas

Lockheed to demonstrate OTEC technology

The US Department of Energy (DOE) has awarded Lockheed Martin a contract valued at up to $1.2 million to demonstrate technologies that could be used in Ocean Thermal Energy Conversion (OTEC) systems.

Lockheed Martin will develop and demonstrate cold water piping fabrication methods in a bid to help overcome a key technical barrier to the commercialization of OTEC technologies.

OTEC systems use the thermal gradients in the oceans to generate energy and involve the installation of large-diameter cold water piping at depths of hundreds of metres. They also consume a significant portion of the energy they produce as they need to pump large volumes of water around.

Rhode Island selects Deepwater Wind

The US state of Rhode Island has selected Deepwater Wind to develop a $1 billion offshore wind farm.

Deepwater Wind, which is co-owned by FirstWind, capital investment firm DE Shaw & Co., and asset management company Ospraie Management – was chosen from seven bids to develop the project, which will generate around 1.3 million MWh/year. The company has also pledged to build manufacturing facilities in the state.

Rhode Island has set a target of generating 20 per cent of its electricity needs from renewable energy sources, and also wants to become a leading centre for alternative energy technologies.

Asia Pacific

Wärtsilä wins Pakistan IPP project

Finnish engine manufacturer Wärtsilä has received an order from Nishat Chunian Power Ltd., an independent power producer in Pakistan, to construct a 200 MWe combined cycle power plant near Lahore.

The new plant will consist of 11 Wärtsilä 18V46 generating sets equipped with exhaust recovery boilers supplying steam to a single steam turbine. It will be located on the same site as the Nishat power plant in Jambar Kalan, Kasur District.

The €131 million order is Wärtsilä's second power plant order from Pakistan this year. Wärtsilä will not only supply the plant equipment but will also erect, test and commission the plant and provide local construction supervision.

An O&M contract to operate and maintain the power plant is also under negotiation, according to Wärtsilä.

The Nishat Chunian power plant will operate on heavy fuel oil and will have an overall efficiency of 45 per cent. It will supply power to the national grid under a power purchase agreement with the National Transmission & Despatch Company.

Essar Oil opts for Siemens steam turbines

Vadinar Power Company Ltd., a subsidiary of Essar Oil, has placed an order with Siemens Energy for four steam turbine generators for a new cogeneration plant in Gujurat Province, India.

Under the €40 million contract, Siemens will supply two steam turbines rated at 105 MW, two rated at 93 MW and four generators. The new plant will be commissioned in 2011, supplying power and steam to Essar Oil's oil refinery in Vadinar.

Siemens will also supply the entire instrumentation and control system, the electrical systems and auxiliaries. Delivery of the steam turbines is scheduled for late 2010. The order is the fourth placed by Vadinar Power Company for Siemens steam turbine generators.

Europe

New engine is pride of Holland

Royal Pride Holland, one of the largest tomato greenhouse operators in the Netherlands, has started operating the world's first commercial 24-cylinder gas engine.

The company is using the engines – supplied by GE Jenbacher – to power a new cogeneration plant at its greenhouse. The new plant is equipped with two of the 4 MW J624 GS engines, which began operating in September.

Royal Pride's greenhouse facility is located in Middenmeer, 50 km north of Amsterdam. The gas engines were installed as part of a pilot project to demonstrate their commercial viability for the horticultural industry.

The plant is equipped with Jenbacher's cogeneration-CO_2 fertilization process that treats the engines' CO_2-rich exhaust, allowing the gas to be recycled in the greenhouse as a special fertilizer to help boost crop production instead of venting the gas into the atmosphere. In addition to supporting the greenhouse's operations, surplus electricity from the cogeneration plant is being delivered to the local grid.

The cogeneration plant project allowed Royal Pride Holland to expand the greenhouse to 102 ha, up from the site's original 45 ha, making it one of the largest facilities in the Netherlands and a major international horticultural production centre.

Siemens to connect Thanet offshore wind farm

Thanet Offshore Wind has awarded Siemens Energy and consortium partner Prysmian Cables & Systems a €87 million contract to connect the Thanet offshore wind farm to the British power grid.

The 300 MW wind farm is being built in the North Sea, 11 km off the coast of Kent, and will have its connection to the grid ready for operation in the summer of 2009.

To connect the wind farm to the grid, Siemens will build an offshore platform equipped with a 33/132 kV substation, while Prysmian will supply two three-phase 132 kV high voltage subsea cables. Siemens will also build a new high voltage switching station in Richborough, Kent.

E.On places Rødsand II order

German utility E.On has placed an order with Siemens Energy for the supply of 90 wind turbines for Rødsand II, one of the largest offshore wind farms in the world.

Siemens will install its 2.3 MW wind turbines at the 207 MW project, located 3 km to the west of the existing Rødsand I offshore wind farm near the Danish Island of Lolland in the Baltic Sea. The turbines have a rotor diameter of 93 m and will be installed in 2010.

The order includes a two-year service contract and is valued at around €275 million. Rødsand II will have an estimated annual output of 800 000 MWh/annum.

The 166 MW Rødsand I wind farm is also equipped with Siemens' 2.3 MW machines and this latest order confirms Siemens' position as the world's leading supplier of offshore machines, said the company.

Vestas wins Spanish contract

Danish wind turbine manufacturer Vestas has secured an order for a total of 43 wind turbines from EDP Renovaveis for two projects in Catalonia, Spain.

The order covers the supply and installation of 18 of Vestas' V90-3.0MW units and 25 of its V90-1.8MW units as well as a Scada system and a five-year service agreement. The value of the order has not been disclosed.

The wind turbine units will be installed in Terra Alta, Tarragona province.

Siemens to supply Solar Tres steam turbine

Siemens Energy has won an order to supply the steam turbine for one of the world's first commercial solar tower power plants, being built by Sener near Seville, Spain.

The Solar Tres plant will have a capacity of 19 MW and will use a Siemens industrial steam turbine specially adapted for solar technology requirements. The pioneering plant, and the steam turbine, will serve as references for future solar thermal plants.

Solar Tres will use sun-tracking mirrors – known as heliostats – to capture the sun's energy and reflect it on to a receiver located on top of a 120 m-high tower. Molten salt inside the receiver is heated to temperatures of 565°C and flows through a heat exchanger in which steam is raised. The steam passes to the steam turbine-generator to produce electricity.

Siemens will supply a two-cylinder reheat SST-600 industrial steam turbine for the project, which will cover an area of approximately 320 000 m^2.

GE to expand Serre wind farm

GE Energy's wind turbine technology has been selected to expand the Serre wind farm in southern Italy.

Located near the town of Girifalco in the Calabria region, the Serre wind farm expansion will support the development of the Italian wind sector, and marks the debut of GE Energy's 2.5xl wind turbine in the country. Italy has set a goal of 12 000 MW of installed wind capacity by 2020.

GE will supply 12 of its 2.5xl wind turbines to the project, which will be complete by mid-2009. The 2.5xl is GE's largest and latest unit in the company's wind turbine fleet.

The 30 MW Serre wind farm will have an estimated annual output of 74 GWh.

According to the European Wind Energy Association, Italy had more than 2700 MW of installed wind capacity at the end of 2007, a 30 per cent increase over the previous year.

Drax awards biomass contract

The UK's Drax Power has awarded Doosan Babcock Energy an $18 million engineering, procurement and construction (EPC) contract for a direct injection biomass co-firing system for the 4 GW Drax power plant.

The direct injection system will be installed on all six of the coal-fired power plant's units and forms part of plans by the generator to reduce carbon dioxide emissions by 15 per cent.

Doosan Babcock will start work immediately with the detailed engineering design and procurement of key equipment. The work is scheduled to be complete by the end of 2009.

In May Drax awarded Alstom a €63 million contract to build the main processing works for the new biomass facility. The project is believed to be the largest biomass co-firing project in the world.

International

Turkey chooses Vestas

Wind turbine manufacturer Vestas has received an order for five of its V90-3MW units from Akenerji for installation at a project in Turkey's Balikesir province.

The contract for the Ayyildiz project includes the supply and installation of the turbines, a supervisory control and data acquisition solution and a five-year service agreement. The project is the first wind farm investment made by Akenerji, which generates heat and power from conventional power plants across Turkey.

The wind farm – located in northwestern Turkey at the southern part of the Marmara Sea – will have an annual production capacity of approximately 57 GWh. Delivery of the turbines is scheduled to start in early 2009, while the project will be completed by the third quarter of 2009.

Romania modernises Bucharest heating facilities

Romanian firm S.C. Vest-Energo S.A. is to install a 14 MW cogeneration plant based on GE Jenbacher Type 6 gas engines as part of plans to modernise its district heating facilities in Bucharest.

The new cogeneration plant will feature four gas engines, two of which will be GE's new J624 GS units – the world's first commercial 24-cylinder gas engines. The plant will be fuelled by natural gas and will serve residential and commercial customers in the city's western district.

Alstom to design Seversk turbine generator

Alstom Atomenergomash LLC is to design the turbine generator package for the Seversk nuclear power plant in Tomsk, Siberia.

The joint venture company will engineer the turbine generator package and the turbine hall equipment based on Alstom's Arabelle technology. The contract is the first to be signed by Alstom Atomenergomash since the joint venture was established in 2007.

The Seversk nuclear power plant is being built by Atomenergoproekt, the engineering subsidiary of Russia's state-owned nuclear firm Rosatom. It will be a two-unit power plant with a total capacity of 2400 MW.

Alstom and OAO Atomenergomash, a subsidiary of Atomenergoprom, established their joint venture in order to equip the turbine islands of nuclear power plants being constructed as part of Russia's Federal Target Programme. They will also target nuclear plants being built outside Russia that are using Russian nuclear technology.

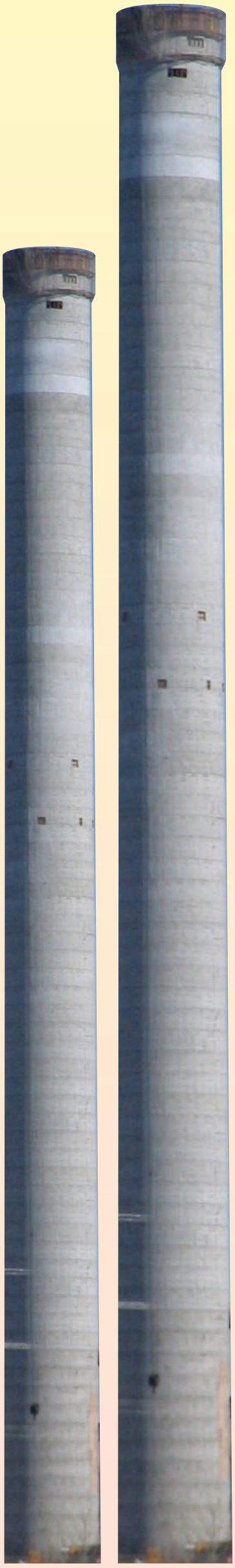
Trent 60 for central Europe

Two leading power generators in central Europe have become the first in the region to choose Rolls-Royce Trent 60 generating sets for power projects.

PPC Energy a.s. of Slovakia and Moravia Energy of the Czech Republic are to use the Wet Low Emissions (WLE) version of the industrial Trent 60 gas turbine for installation in peak-shaving power plants. Delivery of the units is scheduled for mid-2009 and both projects are expected to start operating in early 2010.

The Moravia Energo installation will be located at a greenfield site southeast of Prague and will operate at times of peak demand as well as providing grid support.

The Trent 60 for PPC will be installed at an existing power station, providing 58 MWe of energy at times of peak demand.



Unsung hero

Vattenfall's CEO and current president of Eurelectric, **Lars G. Josefsson**, is seen by many as a true believer in the need for clean technology. In 2005, *TIME magazine* dubbed him 'Mr Clean'. He took the time to speak to *TEITimes* about the role he can play in securing a cleaner future.

Speaking to Lars G. Josefsson, one gets the distinct impression he is a committed individual with a genuine interest in making a difference to the world. Like many idealists, he appears humble. Not once did he mention that in 2005 he was named in *TIME magazine* as one of their "European Heroes". As such he shares company, so to speak, with celebrities such as former pop star and now human rights campaigner, Sir Bob Geldof, and the man with "va-va voom", French football star Thierry Henry.

His industry peers also see Mr Josefsson as someone who seems to have a more genuine interest than many of his industry counterparts in striving to create a better world. Mr Josefsson himself sees it as part of his character. "The possibility of achieving something of higher importance, so to speak, and contribute to the positive development of the world, has always been a driver for me," he explains.

This drive perhaps stems from Josefsson's background. He started out as an engineer with a Masters of Science in physics. "Maybe this, combined with my personality, gives me the desire to want to do the analysis and have an understanding of the complete system."

Josefsson's career path has also given him the ability to do the analysis, rational decision-making and multi-dimensional planning that he believes is necessary to run an organisation like Vattenfall. Josefsson became president and CEO of Vattenfall in August 2000. Since his appointment, the Swedish utility has established itself as a dynamic northern European energy group, with a strong presence in Germany and Poland as well as in Sweden, Denmark, and Finland.

Indeed, Josefsson's life now has many dimensions. In addition to his duties as CEO of Vattenfall, he is a member of the supervisory board of South African utility, Eskom Holdings and of the World Childhood Foundation.

In June this year he was also appointed as the president of, Eurelectric, the organisation that represents the power utilities of Europe. It is a position that is important to Josefsson. "It is an honour to be appointed president by my peers and it is therefore a great responsibility in that sense. But it is also an opportunity to try and influence the rules of the game i.e. policymaking in order to achieve both stable market conditions and taking on responsibility for sustainability and the climate."

Ensuring security of supply, making electricity clean and promoting different ways in which electricity can be used are all close to Josefsson's heart. "Two examples with great potential are the automotive industry and providing heating through heat pumps," he explains.

Yet they are not as dear to his heart as his family. Although, a man with many business responsibilities, Josefsson still finds time for his family. His children have all grown up but there are still babysitting duties. "I have two grandchildren. The youngest being just nine months; so I am still called on to baby-sit,

Lars G. Josefsson: the climate issue is now the centrepiece of our strategy

which I absolutely enjoy," laughs Josefsson. As a Swede, he is also a big fan of tennis legend Bjorn Borg and enjoys the game when time allows. But that is where the comparison ends. "Unfortunately, I can in no way be compared with him. But I do like tennis; there is speed in that sport, which I like."

Josefsson may like speed but is sensible enough not to like too much speed. "Playing tennis is, let's say, healthier than driving racing cars," he jokes.

> We would absolutely welcome a nuclear turnaround in Germany.

Measured pace combined with strategic thinking on and off court perhaps describes Josefsson's track-record at Vattenfall. He is now eight years into his current position. At the time of taking the job, there were two main goals. One was to turn Vattenfall into an international company and the other was to make the company more customer-oriented. Many things have changed since then. "The business is now changing at a faster pace than ever. So it is exciting from that point of view. The big thing that has been added in these years is the climate issue, which is now the centrepiece of our strategy."

Europe is now entering a new build phase, which was not the case eight years ago. And this has also played a part in Vattenfall's strategy. "Today the company is now a progressive market-oriented European company. We are looking forward to the combination of growth and contributing to the fight against climate change."

Vattenfall recently made a declaration that it will be carbon-neutral by 2050. It aims to do this by turning its investment streams into renewables, nuclear and CCS.

Germany is and will continue to be an important market in Vattenfall's strategy. In 2007 it had total external net sales of €15.168 billion, €8.18 billion of which was generated in Germany. Nuclear has been hotly debated in Germany since the country's decision to close its nuclear plants by 2020. It is a decision, which Josefsson says is up to the government. "As a responsible operator of nuclear plant, we believe nuclear is a very good form of energy and has a good future. If you look at the lifecycle analysis, the carbon footprint of nuclear is the lowest of any form of electricity generation. It uses land effectively and the waste cycle is a closed loop. However, its use is a decision for the people. It has to be decided by the voters in that country. We would absolutely welcome a nuclear turnaround in Germany."

Anything is possible. The opinion of Josefsson's native country, Sweden, has certainly changed to become pro-nuclear in recent times. "The German population is also on the move but is less positive than the Swedish population. But it's a dynamic situation and things like the climate problem are a key reason why nuclear can have a good future," he notes.

Vattenfall also still has its eyes on the new build nuclear programme in the UK. "The programme has its own rhythm and tempo and we will see where it ends up, but we have an interest."

Josefsson is sure where he wants to see the company end up. Vattenfall has ambitious investment plans in the direction of carbon neutrality he reiterates. In the next 12 to 36 months, the company also has the ambition to enter into new markets.

Carbon capture and storage is one of the most important areas in the drive to achieving carbon neutrality. Josefsson is confident in Europe's chances of success. Commenting on the EU's recent decision to support and follow through with CCS, he says: "It will proceed. I believe the EU will be up to this litmus test and will be able to partially fund this demonstration phase, which will be a pre-requisite to commercialization. "I don't see how the world can handle climate change without CCS technology."

Vattenfall is already well underway with a number of projects of its own. In Schwarze Pumpe, Germany, it has built a pilot plant connected to one of its lignite-fired power plants. The purpose of the pilot plant is to validate and improve the technology relating to the oxyfuel method of capturing CO_2.

In Germany, it will turn the Jänschwalde power plant into a demonstration plant. Parts of the existing plant will be equipped with units for CO_2 capture and it is currently investigating the possibilities of implementing both oxyfuel and post-combustion technology at Jänschwalde.

Meanwhile, in northern Denmark, it is investigating the possibility of storing CO_2 at the Vedsted geological structure between 1-2 km below the Earth's surface. If the site proves suitable for CO_2 storage, the Nordjylland power station will be equipped with a full-scale unit for CO_2 capture using post-combustion.

But it is not just about Vattenfall building big projects to cut CO_2. Josefsson does not miss an opportunity to remind us that we all have a part to play. Like a true physicist, he is tackling climate change from all angles. He pointed towards a new climate manifesto on the Vattenfall website.

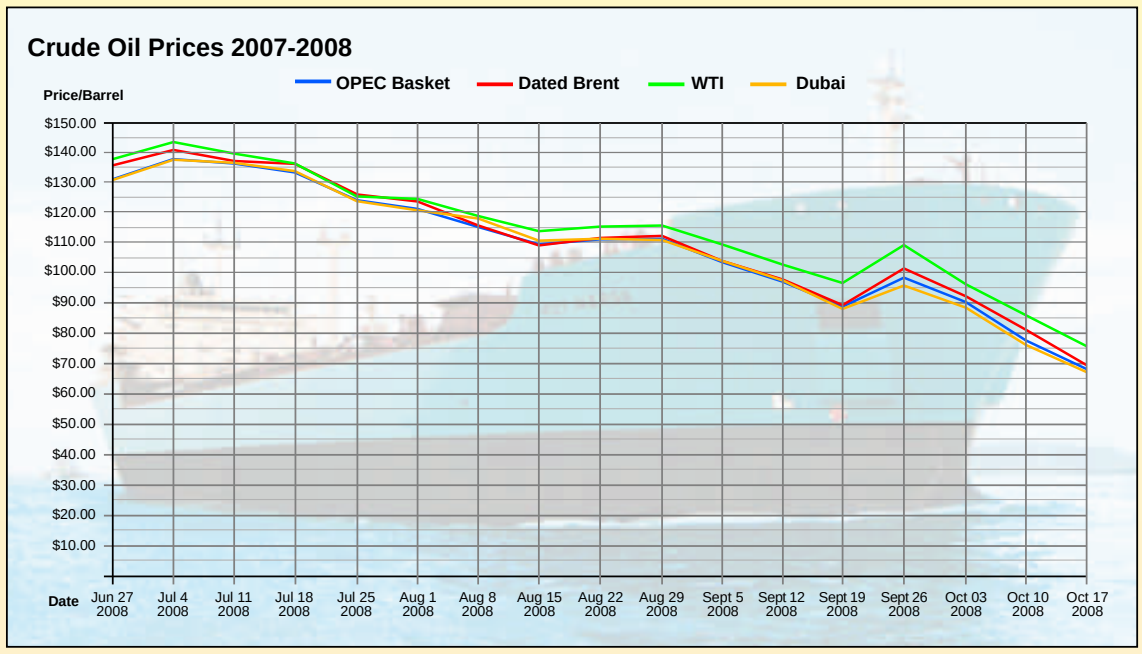
"Here, people can sign-up to have their voice heard by the decision-makers. This may be something you may like to do as an individual. Some 70 000 plus individuals have done it before you."

In return for the interview it was the least we could. There are now 70-odd thousand names, plus one.

Oil

Oil prices forecasted to slide despite production cuts

The decline in demand for crude in OECD countries has led OPEC to cut oil production in an effort to boost falling oil prices. Yet prices continue to slide as a global recession looms.



by David Gregory

The Organization of Petroleum Exporting Countries (OPEC) met in Vienna on October 24th at an Extraordinary Meeting to address falling crude oil prices and the global economic crisis. Within two hours, the cartel announced a production cut of 1.5 million b/d, a move designed to boost crude oil prices. Immediately following the announcement the price of oil began to fall, indicating that the market is amply supplied and that demand under the current financial circumstances is expected to decline further.

West Texas Intermediate (WTI) crude closed on the New York Mercantile Exchange (Nymex) at $64.15/B on October 24th, which on its own proved to be another bad day for Wall Street. WTI crude has fallen by 56 per cent from its record high of $147.27/B on July 11th. The price slide prompted OPEC to first call an Extraordinary Meeting for mid-November, but as downward momentum in the market grew, the group moved the gathering forward by three weeks.

The fact that OPEC has cut 1.5 million b/d from its production target, coupled with the fact that prices fell as a result and are expected to trend downward, does not bode well for some OPEC members. OPEC price hawks Iran, Venezuela and others could face serious challenges with their economies if crude prices stay below the $80-100/B range.

Some analysts have openly said that the global economy is in recession and are questioning its depth and duration, suggesting that demand growth will remain subdued for some time. Crude oil traders are speculating that prices could touch $50/B before the end of the year. That price would hit all oil producers, although Saudi Arabia and other Gulf OPEC member states are viewed as being able to tolerate lower prices more easily. However, lower earnings for oil members are expected to have a negative impact on financing for development projects designed to boost production capacity for the years ahead, a situation that could lead to supply shortages when the inevitable return of demand for crude oil returns.

OPEC's announcement of a production cut did not sit well with OECD countries that see a declining oil price as a respite from all the other economic trouble.

A spokeswoman for the US Department of Energy said: "In these economic times, producers should be looking to reassure the global market place that energy supplies are affordable and dependable, lest they prolong or deepen the challenges we now face."

A statement issued by OPEC said it would reduce output for the OPEC-11 (Indonesia is leaving the organization at the end of the year, and Iraq is excluded from the target system) by 1.5 million b/d as of November 1, 2008 to an aggregate target of 28.808 million b/d. The largest cut is to be made by Saudi Arabia, 466 000 b/d from its target output of 8.943 million b/d.

In its statement OPEC said it "observed that the financial crisis is already having a noticeable impact on the world economy, dampening the demand for energy, in general, and oil in particular. This slowdown in oil demand is serving to exacerbate the situation in a market which has been over-supplied with crude for some time, an observation which the organization has been making since earlier this year. Moreover, forecasts indicate that the fall in demand will deepen, despite the approach of winter in the northern hemisphere."

The statement added: "Similarly worrying, the Conference noted that oil prices have witnessed a dramatic collapse – unprecedented in speed and magnitude – these falling to levels which may put at jeopardy many existing oil projects and lead to the cancellation or delay of others, possibly resulting in a medium-term supply shortage."

The effectiveness of OPEC's decision will depend on its key producer, Saudi Arabia and whether it adheres to the new targets. Analysts suggest that the production cut will do little to halt the decline in prices or demand. The market for crude oil is seen as remaining bearish as the output reduction is viewed by traders as inadequate.

The organization is due to meet again in December, when or if the recession does deepen, talk of further production cuts will again top the agenda.

Gas

'Gas OPEC' would prompt EU energy policy review

Russia, Iran and Qatar have announced their intention to cooperate on gas issues. EU leaders say the creation of any OPEC-style gas cartel would lead to a rethink of its energy policy.

Alexei Miller: We are united by the world's largest gas reserves

by Mark Goetz

The European Union on October 22 said it would review its energy policy if Russia, Iran and Qatar proceed with the creation of a 'Gas OPEC' that would attempt to dictate prices. While EU energy policy has yet to be sufficiently defined, the spokesman for the EU Energy Commission, Ferran Tarradellas Espuny said that if a price-fixing cartel was created it would prompt the 27-member organization to rethink its policies.

"In principle, the Commission is against cartels for the sale and marketing of products, and hydrocarbons are no exception to that," Mr. Tarradellas said. "We believe the best condition for the sale of a product such as gas is a free and transparent market." He added that the EU would expect to be informed if the three natural gas-rich countries did create the gas equivalent of the Organization of Petroleum Exporting Countries (OPEC).

The EU's concern stems from the fact that it already imports about a quarter of its natural gas requirements from Russia and fears that further dependence could allow for Moscow to eventually use natural gas as a political weapon.

Russia, Iran and Qatar, which among them hold nearly 60 per cent of the world's natural gas reserves, met in Tehran on October 21 and announced their intention to cooperate on gas issues. Calling themselves the Gas G3, the three states plan to meet up to four times per year to discuss gas market developments and establish a Supreme Technical Committee.

The chief executive of Russian gas monopoly Gazprom, Alexei Miller described the Gas G3 as a "big gas troika," during a joint news conference in the Iranian capital, which was hosted by Iranian Oil Minister Gholamhossein Nozari, and attended by Qatar's Deputy Prime Minister and Minister of Energy Abdullah al-Attiyah.

Mr Miller said in a statement: "We are united by the world's largest gas reserves, common strategic interests and, which is of great importance, high cooperation potential in tripartite projects… We share the opinion that oil price fluctuations don't put in question the fundamental thesis stating that the era of cheap hydrocarbons has come to an end, and the parties will proceed from this standpoint in their work."

Iranian Oil Minister Nozari was more direct in describing the outcome of the meeting: "We have made major decisions. There is a demand to form this gas OPEC and there is a consensus to set up a gas OPEC."

While Russia has built an extensive pipeline network for exporting gas, Iran's gas industry is undeveloped due to a lack of investment, with exports limited to Turkey and Caucasus countries. Furthermore, Iran is forced to import natural gas from neighboring Turkmenistan to meet its own domestic demand. Neither Russia nor Iran produce liquefied natural gas (LNG), but Qatar is the world's largest supplier and projects under development will eventually put its LNG production capacity at 77 million tons annually.

Iran is looking to eventually export natural gas by pipeline to Europe across Turkey, but recently said it would forego participation in the Nabucco project and attempt to construct a pipeline of its own. Considering the current state of Iran's economy and the lack of foreign investment, this project is unlikely to take shape anytime soon. The Gas G3 grouping conjures up the prospect that Iranian gas could find its way to Europe through the Russian pipeline system.

The thought of another cartel operating along the lines of OPEC may alarm developed countries that are low on energy resources. However, experts say a gas OPEC would not have the same impact due to the fact that the natural gas market is itself under-developed.

Shipments of LNG are a fraction of the volume of crude oil that is traded on a daily basis – a condition that allows OPEC to function as it does. Furthermore LNG contracts are generally of a long-term nature. Gas is generally exported by pipeline and contracts run for years. Both LNG terminals and pipelines are expensive and lengthy undertakings and gas prices are usually linked to crude oil prices. Clearly it remains to be seen exactly what the Gas G3 has in mind.

Can nuclear resolve the energy crisis?

Stan Gordelier: nuclear is hard to ignore under current circumstances

On October 16th, the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development celebrated its 50th anniversary. At the same time as its special celebration meeting, it launched its first ever *Nuclear Energy Outlook*. **Stan Gordelier**

Outlooks have become a recognisable brand for the Organisation for Economic Co-operation and Development (OECD) but this is the first time that the Nuclear Energy Agency (NEA), within the OECD, has issued a *Nuclear Outlook*. Why now? The interest in nuclear power seems to be growing on a daily basis across the world, driven by the concerns of national energy security, the dramatic rise and volatility of fossil energy prices and last but not least, by the concerns about carbon dioxide releases from fossil fuel combustion and their effect on climate change. Now seems to be an excellent time to respond to that reawakened interest.

The *Outlook* is a book covering all aspects of nuclear energy. A key part is an analysis of projections of future world energy and electricity demands. The figures are alarming; by 2030 the world is likely to be using 50 per cent more energy and by 2050 the demand will probably have more than doubled. If the world is to avoid a potentially disastrous increase in temperature of more than 2ºC, average CO_2 emissions from each unit of energy used must be reduced by at least a factor of four.

The Intergovernmental Panel on Climate Change (IPCC) has shown that power plants are by far the biggest and fastest growing source of anthropogenic CO_2 emissions. Data on the full life cycle of CO_2 emissions for a wide variety of electricity generating sources demonstrate that, even accounting for uranium mining and power plant construction, nuclear energy ranks alongside the best of the renewables. Here then is a natural role for nuclear energy.

The *Outlook* makes projections of the contribution that nuclear energy could make, looking out to 2030 and then further still to 2050; the projections are based on assumptions behind low and high scenarios.

The low scenario considers the case where nuclear is not popular and the alternative low carbon technologies live up to the hopes that are currently resting on them. Even in this low scenario, the NEA projects an increase in nuclear capacity from 372 GWe today to around 580 GWe in 2050, more than 50 per cent growth.

The high scenario looks at the case where climate change concerns and carbon trading have significantly improved nuclear energy's acceptability, and where the alternative low carbon sources are not so successful. In this high scenario, nuclear energy could grow by almost a factor of four to 2050, with an increase in the number of reactors from 439 today to around 1400.

Assumptions for the NEA low and high scenarios

The Low Scenario

New plants are built only to replace retirements in the two decades to 2030. Capacity is maintained or slightly increased via life extension, up-rating and higher power replacements.

Between 2030 and 2050:
- Carbon capture and storage are successful
- Energy from renewable sources is successful
- Experience of new nuclear technologies is poor
- Public and political acceptance of nuclear power is low

The High Scenario

Life extensions and plant upratings continue. Current national plans and authoritative statements of intent for additional capacity are largely implemented.

Between 2030 and 2050:
- Carbon capture and storage are not very successful
- Energy from renewable sources is disappointing
- Experience of new nuclear technologies is good
- Public and political acceptance of nuclear power is high
- Carbon trading schemes are widespread and successful

The assumption here is that the average reactor size will continue to increase to around 1000 MWe; the current world average is about 850 MWe. Modern designs in the developed economies are generally larger (up to 1600MWe) but such large outputs will not fit well into countries with smaller grids and a number of small and medium sized reactors are under development.

The outcomes of the NEA projections are compared with those of others, from the International Atomic Energy Agency (IAEA), the International Energy Agency (IEA, *World Energy Outlook 2006* and *Energy Technology Perspectives 2006*), the Energy Information Administration of the US Department of Energy (EIA) and the World Nuclear Association (WNA) – the pattern is reasonably consistent.

A number of questions arise from the high growth scenario, starting with the practicality of constructing reactors in these numbers. The high scenario implies a yearly construction rate of about 10 reactors a year up to 2020. In June 2008 there were 37 units under construction so this level of growth is easily manageable. In the late 2020s the rate of construction would have to increase to 20 units per year. The bigger challenge is during the period from 2030 onwards, when numbers of currently operating reactors will start retiring. To grow the capacity will require replacements and additions. To match the high scenario, the rate of build must increase to 40 to 50 units per year in the 2030s and increase further still to 50 to 60 per year in the 2040s.

By exploring the historical construction rate and mapping this on to the present day position it is possible to show that, if the demand was there, reactors could be built to a rate that would exceed that required by the high scenario. Indeed, looking at the French nuclear construction programme of the late 1970s to the early 1990s, with similar dedication much more could be achieved. The high scenario leads to some 22 per cent of the world's electricity coming from nuclear power in 2050, compared to the current 16 per cent (23 per cent in the developed economies of the OECD). In the low scenario, the nuclear share would increase in absolute terms but be reduced to a 9 per cent share by the rising demand.

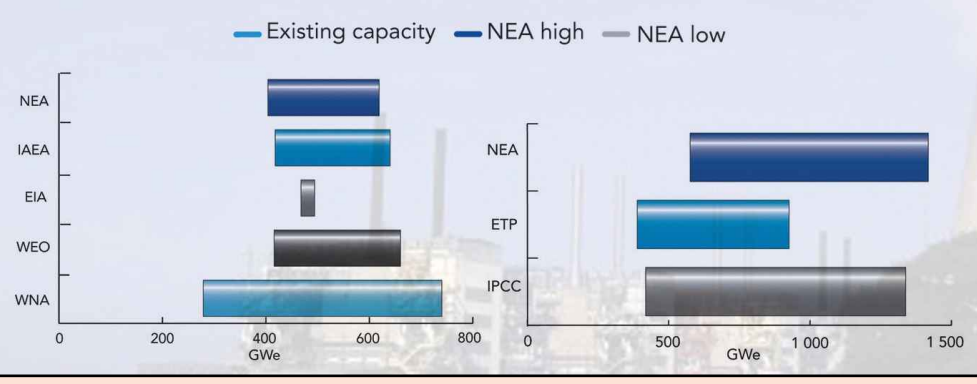
A further key issue is the availability of uranium to fuel such an expansion. Currently identified uranium resources are already sufficient to fuel the NEA high scenario expansion employing a once through fuel cycle (i.e. no reprocessing) until 2050, allowing plenty of time for further discoveries. This will require that new production capacity is brought into operation in a timely way. The introduction of fast reactor technology would improve the energy extraction by a factor of up to 60, leading to thousands of year's worth of virtually CO_2-free energy.

But all of this cannot happen if governments do not play their part. There are responsibilities to fulfill and actions that need to be taken if governments want to use nuclear energy as part of the solution to the world's energy problems. The decline in nuclear construction since the growth period of the 1980s has resulted in a depleted skills base that needs to be remedied. Continued effectiveness of the regulatory regimes is essential. Governments have a key role to play in progressing facilities for waste disposal. While there are technological ways to improve proliferation resistance, the answer will always be political in part and the maintenance and reinforcement of the international non-proliferation arrangements is another essential requirement.

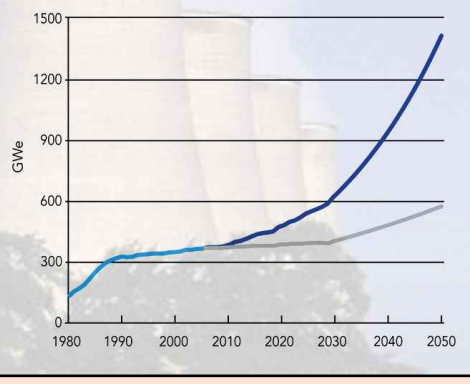
Nuclear is a base load technology that may not provide a complete answer to the world's energy issues but it could provide a significant part of the answer. It is not waiting for any technological breakthrough. The uranium and the technology are available to provide very large quantities of energy, largely CO_2-free and for very long periods of time. It is a technology that should be hard to ignore in present circumstances.

Stan Gordelier is Head of the Nuclear Development Division, OECD Nuclear Energy Agency

Ranges of projected installed nuclear capacity in 2030 and in 2050



Global nuclear capacity in the NEA high and low scenarios



Power on-the-fly

The potential of flywheels for energy storage in power systems has been discussed for many years. A 5 MW flywheel matrix is about to be energised in New England, USA for frequency regulation service. It is the first-of-a-kind application in a commercial setting and utilities will be watching closely, **says Junior Isles**

Artist's impression of the 20 MW flywheel matrix. It will occupy an area of approximately 14 164 m^2

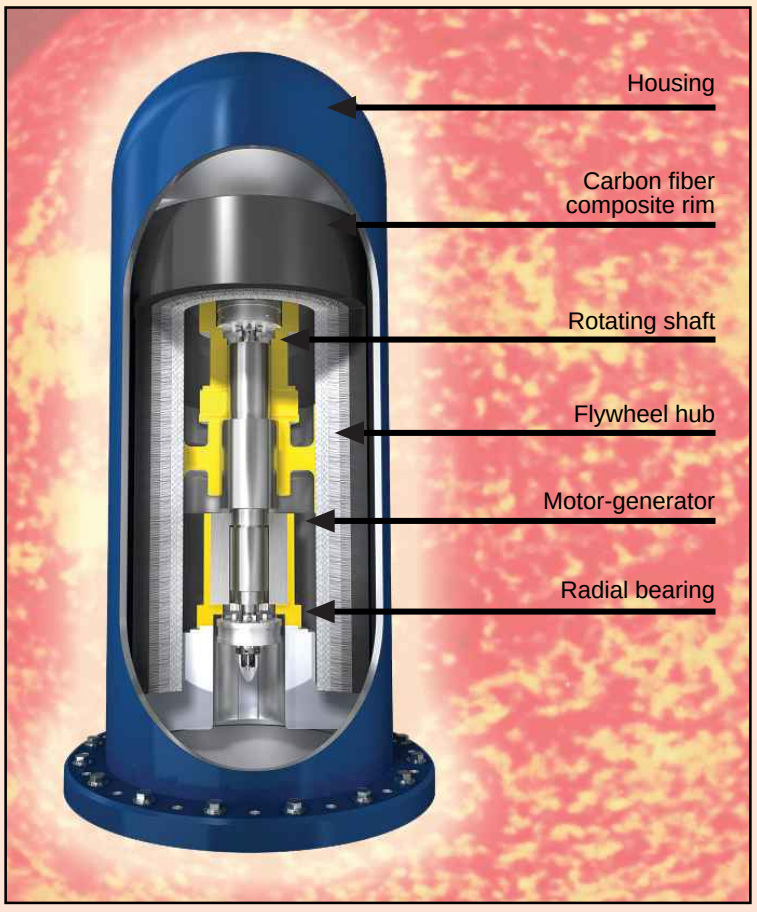
Energy storage is gaining greater attention with the increasing role of intermittent generating sources such as wind and solar. Certainly, it is a technology that can play many roles on the world's power grids. There are various forms of energy storage, ranging from compressed air (CAES) and pumped hydro systems for bulk energy storage, to small UPS systems for residential and commercial use.

Now another long-known technology, which to date has not made any significant progress in terms of commercial deployment on the grid, may finally find a role in the market. Flywheels effectively recycle electricity, burning no fuel and creating no direct CO_2 or other emissions. With a 20-year design life and clean, carbon-free operation, flywheel energy storage is being hailed as a sustainable solution for grid stability and reliability.

In mid-September, Beacon Power Corporation, a US company that designs and develops advanced products and services to support more stable, reliable and efficient electricity grid operation, announced that it had built an integrated matrix of ten high-power flywheels that can be operated together to absorb and supply a full megawatt of electricity. The system, currently located in Beacon's Tyngsboro Massachusetts, headquarters, will be the first of up to 5 MW of flywheel-based regulation capability that will be produced this year and commercially deployed to provide regulation services in New England.

Beacon's flywheel technology in its current fourth generation 25kWh/100 kW configuration has been optimized for frequency regulation; also known as providing "megawatts for minutes."

Flywheels are capable of absorbing energy and feeding it back into the grid when needed



... the flywheel matrix is responding to actual ISO test signals to absorb and supply power

Grid frequency regulation addresses the balance between a network's load and power generated. Traditionally, frequency regulation is managed by varying the amount of generation connected to the grid. Flywheels essentially 'recycle' energy, where electrical energy is first absorbed when there is an excess and then fed back into the system when needed for frequency regulation.

In the US market, frequency regulation has traditionally been a function required by utilities but with deregulation in many regions it has become a separate service with its own established market price. This is one of several 'ancillary services' that are now an additional source of revenue for generators.

Beacon has been testing its flywheel system for several months. Based on internal testing of an integrated matrix of ten flywheels, the company said that it has now shown that its 1MW Smart Energy Matrix can ramp up and down to absorb and supply a full megawatt of power.

Beacon is now preparing for commercial operation of the system. Since mid-September, Beacon has been testing the system in conjunction with ISO (Independent System Operator) New England, during which time the flywheel matrix is responding to actual ISO test signals to absorb and supply power. This plan will allow the company to meet its schedule to interconnect live to the grid and to begin performing frequency regulation services under an ISO New England Alternative Technologies Pilot Program scheduled to start on November 18th. The program, which was unanimously approved by ISO New England and its members, received formal approval from the Federal Energy Regulatory Commission on September 15, 2008.

Describing the results so far, Gene Hunt, director of corporate communications said: "We began by running the flywheels at different speeds, storing and returning different amounts of energy based on internally-driven commands. All results were positive. The next step is to finalize the signalling protocols with ISO New England and let them 'drive' the system. All this is in preparation for the expected 'go-live' date of November 18, which will be the start of the pilot program."

According to Beacon, the standard 1 MW Smart Energy Matrix comprising ten 25 kWh flywheels can store and return 250 kWh, or 1 MW at constant output for 15 minutes. The system uses 100 kW motor/generators. "This configuration and performance specification was optimized to provide highly responsive and continuous regulation service on the grid. It can achieve full power output in less than 4 seconds, which happens to be the time interval between ISO regulation signals," explained Hunt.

A 20 MW plant provides 20 MW of up and down regulation, equal to a 40 MW swing. It will occupy an area of approximately 14 164 m^2 (152 000 ft^2)

While the systems are not cheap, in the US market the payback period is relatively short. According to Beacon, the target cost for a 20 MW plant is $25 million, although the first 20 MW plant, planned for Stephentown New York in 2009, will likely cost around twice that amount. "Based on 2007 ISO New York pricing, a 20 MW regulation plant can generate approximately $10 million in revenue per year at an expected gross margin of 80 per cent. The payback, therefore, would be on the order of three to four years for plants built after the first few, and somewhat longer for the earliest ones," said Hunt.

The customers, at least in the US, are not utilities but the grid operators (Independent System Operators and Regional Transmission Organizations) in the open-bid markets. Four of the five open-market ISOs have approved or certified Beacon's technology for use on their grids. "At the state and federal levels there is general support and enthusiasm for what they can offer. This is because using flywheel energy storage for regulation not only provides the highest level of responsive performance, it also frees up conventional generation assets that are used for regulation today, enabling them to be used more efficiently for baseload generation," said Hunt.

Commercial deployment of flywheels is not without challenges. Hunt commented: "The two main challenges we face are firstly the need in certain ISO regions for modification of market rules that have not yet been adapted to apply to non-generation resources like energy storage, and secondly capital formation required to build the 20 MW plants. With respect to the first point, under orders from the Federal Energy Regulatory Commission (FERC), the market rules are in fact now being changed to accommodate energy storage. By mid-2009 most or all of the ISOs are expected to have appropriate rules in place (the US's largest RTO, the PJM Interconnection, already has suitable rules in place).

"As to financing, we recently raised an additional $7.9 million in new funding. In addition, Beacon has been selected as a finalist for the US DOE's loan guarantee programme, which would provide a debt guarantee for 75 per cent of the cost of the first plant. That decision should be reached in the next few months. After the first 20 MW plant is built we expect to be able to attract project financing for subsequent plants."

Although Beacon's main focus today is on producing fourth generation systems in volumes for regulation service, it has also begun preliminary research activities on a fifth generation flywheel system. Beacon envisions a next-generation system that would cost less and spin faster, thus storing more energy.

The company's initial market focus is to supply turnkey flywheel-based energy storage plants for grid scale frequency regulation in the US but already it is looking beyond its own shores. "Our next move will be to enter the European market on a selective basis. As production volumes increase and costs decrease, we plan to expand into other applications, including 'ramping support' for large-scale wind power and unitary equipment and small system applications, including wind/diesel/flywheel energy storage hybrid systems for use in remote areas, and uninterruptible power supply applications," concluded Hunt.

Junior Isles

Hitting the nail on the head

"If your only tool is a hammer – then your solution is very likely to be a nail". It was an interesting comment and perhaps a bit of a reality check for the CCS (carbon capture and storage) proponents.

Thomas Brown, emission control project manager at CLP Power Hong Kong Ltd, made his comment as a panelist in a session on clean coal at this year's *CEPSI* (Conference of Electric Supply Industry) conference in Macau. Brown came straight to the point in acknowledging that coal is one of the dirtiest fuels. Yet when compared to all other fuels, for power generation he said it had the fewest drawbacks in every other respect. Hydro, wind and solar all depend on location; gas has the drawback of price and nuclear still has the waste issue. With that he claimed: "It is an inconvenient truth that coal will remain a part of the energy mix whether clean coal or not."

What at first seemed a potentially uninspiring presentation on CLP's approach to "clean coal", in many ways highlighted the reality of the current euphoria that has been surrounding CCS.

The first observation is that the terminologies have changed over the last few years. Now that CO_2 has taken over the agenda, clean coal now has an entirely different meaning compared to just a few years ago.

Brown questioned whether clean coal was "fact or fantasy". "If we are talking about pollution control. Then it's fact. Our clean coal strategy is to install pollution control technology at our coal fired plants. But if we are talking about CCS for carbon capture it is fantasy," he said.

CLP is one of the two power utilities in Hong Kong and is also active in China and other parts of Asia. With that kind of footprint (low carbon or not) when it speaks, the industry should listen. "We are not going to spend money on IGCC and CCS. The technologies are not saleable. Our approach to reducing CO_2 is to improve the efficiency of our plants." Notably, his thoughts were mirrored by Jilu Chen, division chief of China Datang Corporation.

With two large Chinese power companies adopting this attitude, some may argue that we should pack up and go home when it comes to CCS and think of something else. Brown and Chen, both trying to perhaps put on a brave face for the audience said that when the economics are right, they would consider it. They agreed that the industry has tried for 20 years and still not managed to reduce the cost of IGCC to where it needs to be. Further, it is difficult to see where the reductions will come from in trying to reduce the costs of CCS.

> This lack of global dialogue at all levels will not help reduce CO_2 globally

Another pressing question is: can Brown and Chens's approach of using best available technology now and seeing what happens later really work in terms of rolling out CCS within the short timeframe that experts say is needed? CCS proponents often talk of building plants that are "capture ready" or equipping existing plants with CCS.

But can this be done? Depending on the space constraints or configuration of a plant, it may not even be possible to equip an existing plant with CCS. And if building a plant to be "capture ready" (a term which is still yet to gain a universal understanding), how much will a generator be prepared to compromise his plant design at the outset in preparation for something that may be way down the line?

Yet we come back to Brown's original statement: coal will be around for a long time. The industry and governments are certainly working on that assumption and so are slowly cranking up the CCS train.

Last month, EU leaders decided to allocate €10 billion in funding for 12 CCS projects, all across Europe, except one which may be in China. It is a decision that has been welcomed by the industry and one that is needed if the technology is to stand a chance.

At the same time, the EU agreed a CO_2 limit of 500 g/kWh on all new power plants. This means that all new coal plant will have to be equipped with CCS. Gas plants, however, will be able to meet the new limits.

The decision has now sparked another debate. On the sidelines of the *European Turbine Network* (*ETN*) conference, held in Brussels just after the announcement, one delegate said: "Now I hear the coal industry is pushing for different limits for gas plant. But why should that happen when they already meet the new standards specified by Brussels?" The argument is that the new limits will see generators turn to gas and thus increase dependency on gas; a scenario that the EU is keen to avoid.

While this is a hugely important topic for European generators, it has to be kept in the overall global context. One delegate at *CEPSI* asked what Eurelectric, the association representing Europe's electric utilities, was doing in terms of working with Asia to reduce emissions. Eurelectric's Secretary General, Hans ten Berge admitted that til now they had been more focused on their own market. This lack of global dialogue at all levels will not help reduce CO_2 globally.

Back at *ETN* in Brussels, Derek Taylor, senior advisor, DG Transport and Energy, EC said: "Unless we get China and India on board for CCS, our efforts will have little impact on climate change. We have a Working Group focused on India, aimed at modernizing Indian plant equipment and getting them to move towards CCS. But understandably they don't see why they should reduce CO_2 when their emissions per capita is about one tenth of ours. Also the cost of the technology is high and they don't see why they should end up paying 50 per cent more for electricity [because of expensive technology] when they are struggling with blackouts and brownouts."

And it is not just a lack of dialogue between developed and developing countries that is a challenge. Taylor feels there is a contrast in approach between the US and Europe. "Policy is better formulated in Europe. Our approach is about sustainability while the US focus is more on competitiveness. At the moment I don't think we are necessarily pulling in the same direction. This gives a confusing picture to developing countries," he said.

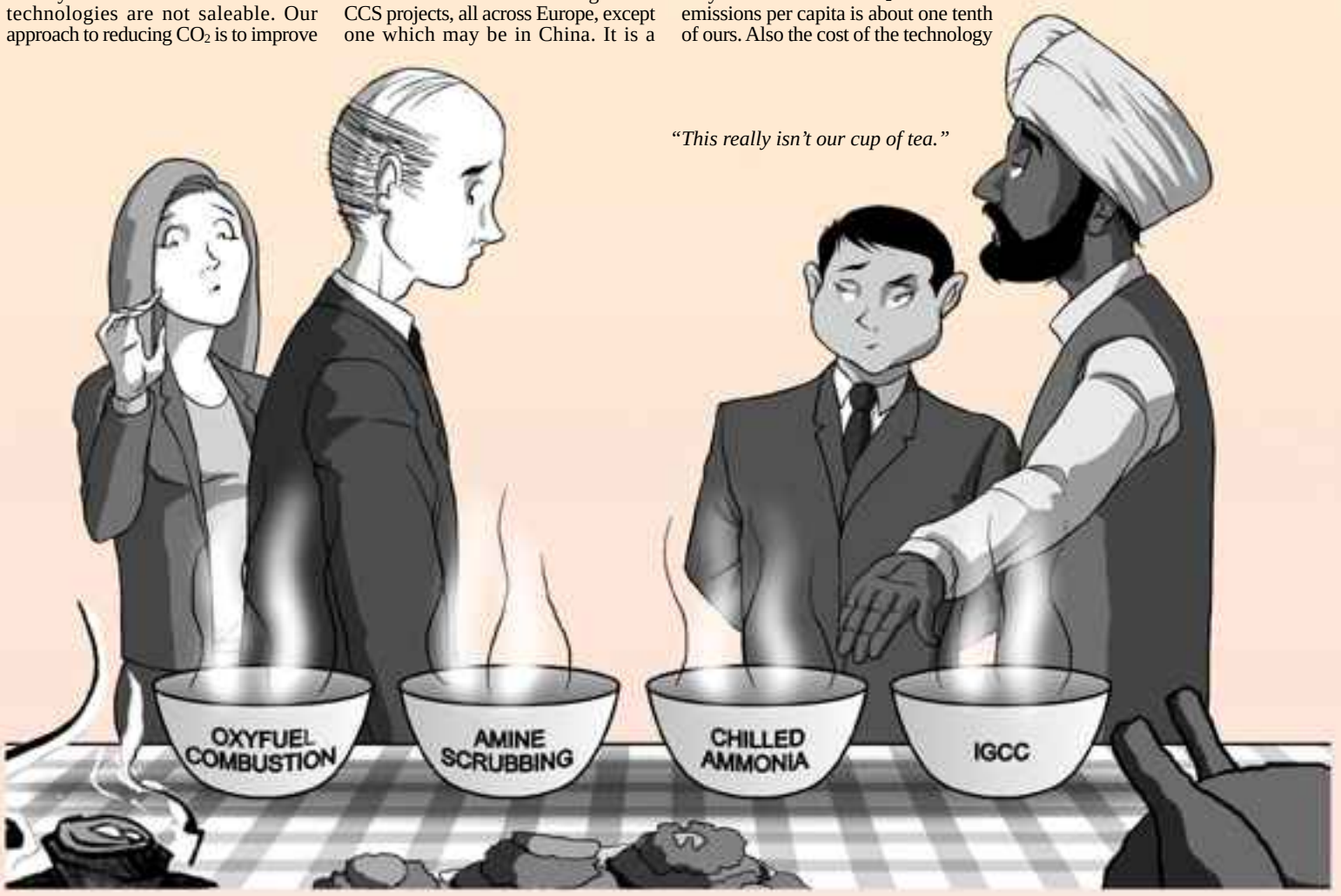
Sustainability, competitiveness and security of supply are, according to Taylor, a kind of "three-legged stool". If too much emphasis is put on one instead of the other, the result is a stool that is not useful to anyone.

Getting the balance right is the big challenge for energy policy. "We may have perhaps gone too far one way. The events in Georgia demonstrate that we have perhaps not put enough emphasis on security of supply," said Taylor.

Victor Der, principal deputy assistant secretary for Fossil Energy in the US Department of Energy believes that the way out of the climate problem is technology. "Legislation alone cannot drive everything to where we need to be. The big question right now is: how do we make CCS affordable for existing capacity?"

If, as most believe, that in the long run coal is here to stay, then we have to remain hopeful and at least first attempt to demonstrate that these technologies work – even if the economics don't stack up.

In the end, global agreements, the market price of carbon, and the price and availability of fossil fuels will have to take care of the economics. But don't expect the likes of China, India and other developing countries to drink from the "clean coal" bowl in the meantime.



"This really isn't our cup of tea."