Kicking the hydrocarbon habit
Oman looks to coal for power generation. Page 2

We're in the money
The US is hoping that the release of $3 billion in stimulus funding will boost growth in renewables. Page 14

Final Word
Junior Isles follows the smart money
Page 20

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THE ENERGY INDUSTRY TIMES

IN BRIEF

Mixed reception to UK White Paper
The UK government's plan for a transition to a low carbon economy has received a mixed reception.
Page 2

Nuclear ambitions take shape
Thailand and Malaysia's nuclear power ambitions are steadily taking shape.
Page 7

Norway plans for offshore "adventure"
The Norwegian government has hailed as "historic" a new set of proposals designed to underpin the large-scale development of offshore renewable energy production.
Page 9

Gulf states prepare for trade
The operational start-up of the GCC's North Grid marks a milestone in the development of the region's power sector.
Page 11

UK View: Leading the low carbon economy
TEI Times gets an industry view on why the UK could set an example for other countries to follow in making the transition to a low carbon economy.
Page 14

Industry Perspective: Preparing for take off
The European Commission's Jan Panek says there are still a number of issues to be tackled to help ensure that CCS is demonstrated by 2015.
Page 16

Fuel Watch: Milestone agreement for Nabucco
Despite the recent signing of an intergovernmental agreement, the Nabucco pipeline still faces a number of hurdles before it comes into operation.
Page 17

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G-8 leaders agree on climate targets

James Connaughton: This would appear to be a good-faith attempt

The G-8 Summit in Italy last month saw leaders agree on some important goals in combating climate change, but getting developing countries to commit to binding targets remains an uphill struggle.

By Junior Isles

Leaders from the Group of Eight (G-8) industrialized nations have agreed on new targets for battling global warming but remain unable to persuade leaders of developing countries to commit to reductions of their own.

The agreement at the G-8 meeting in Italy marks a significant step in efforts to limit greenhouse gases blamed for the world's rising temperature. The US has agreed to language supporting a goal of keeping the world's average temperature from rising more than 2˚C. The G-8 previously had not been able to agree on that temperature limit as a political goal.

The G-8 leaders also agreed to a goal of having industrialized nations reduce their greenhouse gas emissions by 80 per cent by 2050. It would be part of a worldwide goal of a 50 per cent cut in such gases from all nations, rich and poor.

It remains far from certain however, that any targets will be met, especially as China, India and other rapidly industrializing nations have not agreed to any binding targets.

James Connaughton, the chair of the White House Council on Environmental Quality under President George W. Bush, said the G-8 agreement goes a step further than a deal struck at a meeting last year in Japan by assigning a specific goal to industrialized nations. Developing countries back then would not agree to a 50 per cent worldwide reduction by 2050.

"This would appear to be a good-faith attempt to assure the developing countries that the developed countries will bear a greater proportion of the task," Connaughton said in an interview with *The Associated Press*.

China was among five developing economies – along with Brazil, India, Mexico and South Africa – participating in the summit for the fifth straight year.

Chinese State Councillor Dai Bingguo offered a three-point proposal on the global fight against climate change. He called for unswerving implementation of the principle of "common but differentiated

Continued on page 2

EC sets out renewable roadmaps

The European Commission has published a template for 27 national renewable energy roadmaps. The 40-page National Renewable Energy Action Plan (NREAP) template gives governments a binding framework for drawing up the steps they will take to meet binding national targets set out in the 2009 Renewable Energy Directive.

The template explicitly states that Member States are to set national sectoral targets for electricity, transport, and heating and cooling and outline the expected contribution of each renewable energy technology to these targets.

"What the filled-out template will do is to effectively provide the wind energy sector with 27 national roadmaps for its development up to 2020, and show the expected share of the different technologies year on year," explained Christian Kjaer, Chief Executive of the European Wind Energy Association (EWEA).

"This will be of huge value to the wind power industry, which will have a clear trajectory for expected wind energy installations in the EU," he added.

The template also requires national governments to explain the actions they will take to develop the power grid so that their national renewable electricity target can be met. For example, they need to outline their development plans for transmission infrastructure and whether they are planning to reinforce the interconnection capacity with neighbouring countries.

The same goes for the planned measures to smoothen administrative procedures. Governments must list any "unnecessary obstacles or non-proportionate requirements" and outline "whether further steps are needed to ensure that procedures are proportionate and necessary" says the report.

Member States must complete and submit their NREAPs to the European Commission by 30 June 2010. Should they fail to do so, or should the Commission consider that a plan is insufficient to meet the legally binding national renewable energy target, it can start infringement proceedings against the Member State in question.

Meanwhile the UK's Crown Estate is to proceed with the third round of leasing in UK waters for offshore wind farms. The decision at the end of June follows the government's Strategic Environmental Assessment (SEA), which says that an extra 25 GW of offshore wind energy could be accommodated around the UK's shores, in addition to the 8 GW already built or planned.

The new licensing regime for the cables to connect offshore wind farms to the mainland also started in late June. The competitive tender process, run by regulator Ofgem, has the potential to save generators £1 billion and will also attract new entrants with transmission expertise. It also offers a longer term stable investment opportunity.

The government also published '*A Prevailing Wind: Advancing UK Offshore Wind Deployment*'. The document sets out work that will enable the necessary expansion of the industry.

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(Continued from page 1)

responsibility" established by the UN Framework Convention on Climate Change (UNFCCC), since it is the guideline of international cooperation to cope with the challenge.

Dai said that developed countries should take the lead in reducing emissions to honour their commitments under the Kyoto Protocol for the first commitment period.

The developed countries should also set a medium-term emission reduction target after 2012, when the first commitment period expires, he said.

Secondly, the spreading of technologies should be reinforced, said Dai. He called for the building of environmentally friendly and energy-saving societies, technology promotion, energy optimization and strengthening environmental protection.

Thirdly, a solid foundation should be strengthened. Dai said that economic development is the key to the fight against climate change and efforts to tackle the challenge would be in vain without the economic development of the developing countries.

During the run-up to the summit, Mexico's President, Felipe Calderon proposed that the world's leading nations contribute $10 billion to a Global Green Fund charged with financing programmes to combat climate change.

"We want it to become a financial mechanism that mobilizes and brings together the different investment efforts dealing with climate change," he said in the central Mexican city of Jiutepec at the beginning of a two-day G-8 preparatory session in late June.

Calderon, whose country is the chief promoter of this multilateral instrument, said administration of the Green Fund should be handled by "an already created international organization".

He said: "I think the World Bank is capable of handling it; it has what it takes to establish an administrative agency for the Green Fund."

The basis of this mechanism should be "that everyone contributes, not just rich, developed countries," he said, though he made an exception for the world's poorest nations.

Calderon added that there should be a principle of common and individual responsibilities, with industrialized countries benefiting from the fund in an amount less than they put in, while less developed countries receive more than the quota they contribute to the fund.

One requirement this mechanism should have, he said, is a technical agency "for the rapid application of resources" that wouldn't be a permanent source of political debate.

In a separate announcement Swedish Prime Minister Fredrik Reinfeldt, whose country has the European Union presidency in the second half of 2009, said that the recession has caused such havoc with the budgets of EU nations that poor countries cannot count on much money from Europe to help them meet their climate change goals.

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Oman turns to coal

Oman's decision to set up a coal fired power plant could be a significant development in the region's strategy to reduce its dependence on oil and gas for power generation.


Matrah: Gulf of Oman

By Junior Isles

Oman is once again taking steps towards setting up the first coal fired power plant in the Gulf region. At the end of June, the country began the process of selecting a team of project advisers to assist the government in the development of an integrated independent water and power project (IWPP).

The decision breaks from a policy that has traditionally seen countries in the Middle East use indigenous resources for thermal power generation where possible. Currently, Israel and Morocco are the only countries that have coal in the fuel mix.

A strain on oil and gas resources, as a result of huge domestic demand for power plants and large industrial projects combined with the need to maintain exports of LNG, has led Oman to look at importing coal for power generation. At the beginning of last year, Saudi Arabia, the United Arab Emirates and Bahrain were also rumoured to be looking at the possibility of building coal-fired power plants.

Coal could be perceived as the only tangible mid-term alternative to hydrocarbons for large baseload generation in the country and Oman has long considered the building of a coal fired power plant.

In 2004, it had awarded a $410 million contract to Doosan Heavy Industries and Construction to build a coal fired power and desalination plant in Sohar. The project never came to fruition but at the beginning of last year the Oman Power and Water Procurement (OPWP) Co again said it was considering the option of building a plant that would have a capacity of 700 MW of power and 26 million gallons a day of desalinated water.

In the latest announcement, OPWP has outlined plans for a 1000 MW coal fired IWPP at Duqm in the remote Wusta region of the sultanate. The project is designed to meet the energy needs of a future industrial and economic hub at Duqm.

Oman's Supreme Committee for Town Planning has already earmarked a 271 hectare site just north of the Duqm port for the development of the IWPP, which is slated to be operational by 2015.

While the source of coal for the plant has not been revealed, India could be a frontrunner. In 2007 Oman made an offer to India to exchange gas for coal. Indian coal has a high flyash content, a key component in cement, which would help meet the needs of the infrastructure and construction boom in Oman.

In August last year, India's National Thermal Power Corporation (NTPC) was looking to forge relationships with firms in Oman with the hope of securing fuels to feed its domestic power plants. In return, NTPC would exercise its power generation expertise to develop coal-based power projects in Oman.

Coal could provide the stop-gap in terms of new large, non-hydrocarbon baseload generation, until countries in the region set up their civil nuclear programmes.

In a separate development, last month the Jordan Atomic Energy Commission (JAEC) said it is currently examining potential sites for what would be the Kingdom's third and fourth nuclear reactors, to be constructed within the next 30 years, narrowing in on an area in the central region, east of the Jordan Valley, JAEC Chairman Khaled Toukan told *The Jordan Times*.

The two plants are expected to generate between 1000-1600 MW of electricity each and utilise water from the Red-Dead Water Conveyance Project.

Under a cooperation agreement between JAEC and the Ministry of Water and Irrigation, the nuclear reactors will supply 726 MW of electricity for the Red-Dead project's water pumping and desalination operations, while in turn the reactors will receive around 80 million m^3 of water annually for cooling.

The JAEC is currently in negotiations with a bidder from a shortlist of three international consulting companies to identify and prepare the site for the Kingdom's first nuclear power plant, an area southeast of Aqaba, some 9 km inland.

Mr Toukan said the selected firm will carry out feasibility studies over a two-year period, during which it is expected to help pinpoint a site for future power plants.

Mixed reception to UK White Paper

- The target for wind energy could result in a "dash for gas"
- CBI calls for more nuclear power and less wind

The UK government's plan for a transition to a low carbon economy has received a mixed reception from British business and players in the power industry.

In July, the British government detailed ambitious plans to cut carbon emissions substantially by 2020. The goal is to reduce carbon emissions by 34 per cent in 2020 (compared with 1990 levels) and 80 per cent by 2050.

Energy and Climate Change Secretary Ed Miliband said the proposal, which now must be debated by lawmakers, relies on expanding the use of wind energy, insulating homes better, installing sophisticated electric meters and other measures.

"This is a route map for how as a country we are going to take the carbon dioxide out of what we do, in the way we provide energy, in our homes, and in the ways we provide transport as well," he said.

The White Paper also calls for 40 per cent of the country's electricity to come from renewable sources by 2020.

The government's plans were generally well received by environmental groups, including Greenpeace and Friends of the Earth.

Andy Atkins, executive director of Friends of the Earth, said the planned measures were welcome, but more decisive steps were needed. "We need more ambitious emissions cuts, greater levels of investment and an industrial strategy that really delivers," he said.

In addition to the expansion in wind energy, the White Paper also envisions the continued use of nuclear power and clean coal but some question whether the government has the right balance in its planned energy mix.

The Confederation of British Industry (CBI) issued a report that said the UK government needs policies that will allow the development of more nuclear power and less wind energy.

Citing a report prepared for the CBI by consultants McKinsey & Co., CBI deputy director general John Cridland said the government's current policy of offering incentives for investment in wind power through the Renewables Obligation will result in less investment in other forms of low-carbon energy such as nuclear and carbon capture and storage.

"The government's over-ambitious target on wind will crowd out investment in other low-carbon sources that have a critical role to play in the mix," Cridland told a press briefing ahead of the report's publication.

The UK is also facing a looming energy gap. Around half of its generating capacity is due to close by 2020 and many industry experts say the 2020 target for wind energy is unlikely to be met. This could result in a "dash for gas" as utilities scramble to build electricity generating capacity quickly and cheaply.

This would leave the country relying mostly on gas imports by 2030. "If the government can't deliver on renewables, the only sensible default is gas which means we won't decarbonize the power sector and we'll also have an issue of security of supply," Cridland added.

Cridland said a 25 per cent target for electricity generated from renewable sources would result in a more balanced mix overall than the current 32 per cent target for 2020.

The "balanced pathway" the CBI is advocating would result in wind power comprising 20 per cent of the generation mix by 2030, versus 24 per cent in the business-as-usual scenario. Meanwhile, nuclear would provide the bulk of power generating capacity at 34 per cent instead of 20 per cent if current policies continue.

Under the alternative scenario, the UK would need 10 to 15 new nuclear reactors instead of the gas power stations that would have been built under the business as usual case.

EDF Energy welcomed the publication of the CBI's Energy Report. Vincent de Rivaz, CEO of EDF Energy, said: "We strongly endorse the conclusion that a diverse low carbon generation mix, with contributions from nuclear, renewables and fossil fuel with carbon capture and storage is essential to our future.

"A robust carbon price is important to the delivery of low carbon electricity generation, including our plans to build four new European Pressurized Reactors in the UK, with the first operational by the end of 2017," he added.

EU to tighten pollution standards

The European Union has moved to tighten curbs on pollutants that cause acid rain for 50 000 sites in most EU nations, particularly in eastern Europe where many plants will have to be upgraded to pollute less.

At the end of June, EU governments agreed to set new pollution standards for heavy industry and power plants to limit how much sulphur dioxide and nitrogen oxide they can release by 2016.

The new rules, which still need to be approved by the European Parliament, would not force tighter standards on German industry, where many sites already meet the proposed new EU minimum standards.

Germany's deputy environment minister Michael Mueller said his country, France, Austria and Ireland had hoped for stricter pollution controls, and the new law would give some factories until 2020 to comply.

EU lawmakers must try to agree the final shape of the law with governments later this year.


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US ready to release $3 billion for renewables

Wind capacity additions could halve in 2009

CSP research gets $52.5 million

Denise Bode: grants will get companies back on track

The US government is hoping that the release of up to $3 billion of stimulus funding will entice private capital off the sidelines and boost growth in the renewable energy industry.

The Obama administration has released the much anticipated guidelines for renewable energy project developers to apply for the funding and is expecting to receive large numbers of applications from the opening date of August 1. The funding could support up to $15 billion worth of renewable energy projects, according to the government.

The guidelines were released as the US Department of Energy (DOE) published its latest *Wind Technologies Market Report*, which indicates a significant slowdown in wind capacity additions in the country for 2009 compared with 2008. The DOE has also announced $13.8 million of Recovery Act funding for a number of wind energy research projects, as well as $52.5 million of funding for research into concentrating solar power (CSP) research.

The opening of the renewable energy grant application process has been widely welcomed by the USA's renewable energy lobby, including the American Wind Energy Association (AWEA), which says that project developers are "anxious to ramp up investments".

"As with all industry, the economic conditions of the past eight or nine months have held us back," said AWEA CEO Denise Bode. "We believe these grants will help get our companies back on track, create more jobs, and balance our electricity portfolio with clean, renewable energy.

"The implementation of this programme for renewable energy will be a welcome boost, just when we all need it."

> A key factor… is the decision by the US Treasury to release the funds up-front to projects, rather than in the form of tax credits

A key factor for renewable energy developers is the decision by the US Treasury to release the funds up-front to projects, rather than in the form of tax credits. This will give the industry a much needed cash injection, says the government.

Some in the industry have criticised the government for taking too long to get the application process started, but the DOE and Treasury say that the funding will support around 5000 biomass, solar, wind and other types of renewable energy facilities. AWEA believes that the cash injection will jump-start the entire renewable energy value chain.

While the US wind energy industry enjoyed a record year in 2008, expectations are for a much slower year in 2009. In its *Wind Technologies Market Report* for 2008, DOE says that the USA is the fastest growing wind market worldwide, leading the world in new capacity additions for four years in a row.

The country has also overtaken Germany to take the lead in cumulative wind capacity installations.

The year 2008 saw the addition of 8558 MW of new wind capacity in the USA, representing investments of $16 billion, but this is expected to fall to 4400-6800 MW for 2009, says the report. Most predictions show market resurgence in 2010 and continuing for the immediate future.

In July the DOE announced the selection of 28 new wind energy projects that will receive up to $13.8 million in funding, most in the form of Recovery Act funds. The projects include research into manufacturing, operation, maintenance and reliability of wind turbines carried out by companies such as QM Power, PPG Industries, Honeywell, GE and Bayer.

The DOE has also announced plans to provide up to $52.5 million to support research, development and demonstration of CSP systems, which capture the sun's energy as heat, which is then used to generate electricity. The government is keen to see the development of this technology, which is already in use in the world's sunbelt, as it has the ability to store energy – a major advantage over other renewable energy systems.

The CSP funding will not only support research into components for a CSP plant, but will also help in the evaluation of the feasibility and development of a prototype CSP plant capable for operating for at least 18 hours per day.

"Low-cost renewable energy generation that includes energy storage is one key to our efforts to diversify domestic energy sources and create new jobs," Energy Secretary Steven Chu said. "By investing in the development of low-cost solar technologies we can pave the way toward faster deployment of carbon-free, large-scale energy sources."

GDF Suez turns to Brazil's nuclear market

Jirau finance agreed

Attractive regulatory environment for new nuclear

European utility giant GDF Suez is looking to exploit opportunities in the Brazilian nuclear power market following its success in the country's hydropower market.

The company sees Brazil as a potentially lucrative market for EPR nuclear reactor technology, according to the *Financial Times* newspaper. It recently agreed the finance contract for the 3300 MW Jirau hydropower plant, which it is building on the Madeira River in the north of Brazil.

GDF Suez chairman Gérard Mestrallet told the *FT* that the economic and regulatory environment in Brazil looks promising for new reactors because the government is taking a measured and rational approach to new energy investments.

In June, local reports from Brazil indicated that the government was planning to build four new 1000 MW nuclear power plants by 2030. The move would form part of plans to boost generating capacity in the face of continued economic growth in Brazil.

The Jirau project is also part of the Brazilian government's Growth Acceleration Plan, known as PAC. The BRL7.2 billion (¤2.44 billion) finance contract agreed between GDF Suez and Brazil's development bank BNDES will finance 68.5 per cent of the ¤3.3 billion project.

The loan is the largest ever made by BNDES. GDF Suez is leading the ESBR consortium in the construction of the Jirau plant, which is due to start operating in 2013.

In 2008 GDF Suez completed the construction of the 148 MW Sao Salvador hydropower plant on Brazil's Tocantins River, and also bought two small hydropower facilities in Mato Grosso state for BRL314 million.

Brazil currently operates two nuclear power plants at Angra, while a third unit at the site is projected to open in 2014.

Tenaska, Duke move forward with IGCC projects

FutureGen gets Record of Decision

DOE collaborates on gas cleanup system

Advanced clean coal projects in the USA are taking tentative steps forward with the support of federal government funds and the prospect of climate change legislation.

Energy firm Tenaska said last month that it has been selected to negotiate for up to $2.5 billion in federal loan guarantees for its Taylorville Energy Center in Illinois, while Duke Energy has filed testimony with the Indiana Utility Regulatory Commission over its plans to store carbon dioxide from the Edwardsport plant being built in Indiana.

The two companies' plans for clean coal received a boost in June when the US House of Representatives passed legislation aimed at reducing carbon dioxide (CO_2) emissions. The US Senate is expected to take up the issue later this year.

In addition, the federal economic stimulus package has allowed an increase in funds for the US Department of Energy's Clean Coal Power Initiative. The DOE also took a step forward with the FutureGen clean coal project by issuing a National Environmental Policy Act (NEPA) Record of Decision.

Tenaska says that it expects to receive the federal loan guarantees when it finalises an agreement with the DOE. The funds would support construction of the Taylorville project, which would consist of an integrated coal gasification combined cycle (IGCC) power plant equipped with carbon capture and storage (CCS) technology. The proposed plant will cost an estimated $3.5 billion to build.

Duke is also planning to equip the Edwardsport IGCC facility with CCS technology, and is proposing a study of potential permanent underground storage sites for CO_2 in southwest Indiana. It wants to invest $121 million in a three-year study to determine the characteristics of storage sites and drill wells.

The company reached a milestone in late June with the arrival of the first major pieces of equipment for the Edwardsport plant at the site.

July also saw an announcement by the DOE that it is to team up with Research Triangle Institute (RTI) International to design, build, and test a warm gas cleanup system to remove multiple contaminants from coal-derived syngas. The 50 MWe system will include technologies to remove trace elements such as mercury and arsenic, capture CO_2, and extract more than 99.9 per cent of the sulphur from the syngas.

A novel process to convert the extracted sulphur to a pure elemental sulphur product will also be tested.

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- O&M Services

Recent Projects Overseas

Teshrin Combined Cycle Power Plant

- Location: 50 Km Southeast Damascus - Syria
- Client: PEEGT
- Capacity: 484 MW
- Configuration: 2×162 MW V94.2 Gas Turbine + 1×160 MW E-Type Steam Turbine
- Main Equipment Supplier: MAPNA GROUP
- Contract (EPC) Awarded on March 6, 2008
- Duration: 39 Months

Al-Sadr Simple Cycle Power Plant

- Location: Al-Sadr District Baghdad - Iraq
- Client: SUNIR-Amran Ofogh Joint Venture
- Capacity: 324 MW
- Configuration: 2×162 MW V94.2 Gas Turbine
- Main Equipment Supplier: MAPNA GROUP
- Contract (EP) Awarded on June 18, 2008
- Duration: 36 Months up to FAC of the Last unit

Najaf Simple Cycle Power Plant

- Location: Najaf Province - Iraq
- Client: IPDC
- Capacity: 324 MW
- Configuration: 2×162 MW V94.2 Gas Turbine
- Contract (EPC) Awarded on May 5, 2009
- Duration: 40 Months up to FAC of last unit

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Southeast Asia lifts clean energy investments

- World Bank launches support programme
- Japan to provide loans to developing countries


Wannarat Channukul: Thailand's Energy Minister

The drive to make the transition to a low carbon economy in Southeast Asia countries is making significant progress, with both multi-national and national lending agencies announcing funding for clean energy projects and sector reform.

In July the World Bank and its subsidiary, the International Finance Corporation, said they would offer Thailand $700 million in financial support to help develop renewable energy. The two organisations will finance development projects through the World Bank's Clean Technology Fund and the IFC, said Jitendra Shah, country sector coordinator at the World Bank.

While the terms and conditions for accessing the funds were scheduled to be released to loan applicants at the end of July, it is expected that the average interest rate will be from 0.25 per cent to nearly 2 per cent with a 20 to 40-year repayment period. The World Bank and the IFC will provide technology and support for loan applicants. They will also coordinate the market's clean development mechanism or carbon credit trading.

Thailand along with Indonesia, the Philippines and Vietnam is one of the first ten countries where the World Bank has launched the support programme.

Thailand's Energy Minister Wannarat Channukul commented: "Thailand was selected to be one of World Bank's preferred countries since the kingdom has a clear policy on renewable and alternative energy and has the potential to become a demonstration country in this field."

The news follows an announcement in June by the Japanese government, which said that it would provide up to Yen500 billion ($4.8 billion) worth of loans for developing countries, including Vietnam, to combat climate change over the next five years.

According to the Japanese government, the credit programme aims at winning the developing countries' support for an initiative to build a new global agreement on reducing greenhouse gas emissions. Under the lending programme, the beneficiary countries will set specific objectives to cut down the volume of greenhouse gases in areas such as energy and industry.

In June, the Asian Development Bank (ADB) announced an energy policy to help Asia and Pacific countries secure adequate energy supplies while cutting levels of greenhouse gas emissions.

The 2009 Energy Policy is designed to help developing member countries provide reliable, adequate and affordable energy supplies to all citizens, as an integral part of the ADB's Strategy 2020 of promoting inclusive and environmentally sustainable growth.

ADB vice president Ursula Schaefer-Preuss said that the bank's investments in the sector will focus on energy efficiency and renewable energy projects, along with expanding access to energy, particularly in remote rural regions where coverage remains limited.

It will also support sector reforms, improved governance and capacity building. Starting from 2013, the ADB will double its target for clean energy investments to $2 billion a year in a bid to accelerate low-carbon growth and reduce greenhouse gas emissions in the region.

Despite these efforts, however, the continuing use of coal, which is the major energy source for power generation in the region, remains a challenge to reducing emissions.

Greenpeace and other environmental groups recently called on Thai energy policymakers to rethink building coal-fired power plants.

Environmentalists also do not believe advanced clean coal technology is a solution. Wanun Permpibul, a representative from the Thai Working Group for Climate Justice, said it was impossible for a carbon capture and storage system (CCS) to be commercially viable. He added that the technology would never materialize, as its cost is too high for the business sector.

Nuclear ambitions take shape

- Malaysia to draft energy and nuclear policy in three months
- Thailand to complete feasibility studies by year-end

Nuclear ambitions are steadily taking shape in Thailand and Malaysia.

Malaysian Science, Technology and Innovation Minister Maximus Ongkili said in local newspaper reports that Malaysia would draft an energy policy and guidelines to include nuclear energy within the next three months. Ongkili said the government has already agreed on the policy and that his ministry was cooperating with the Malaysian Energy, Green Technology and Water Ministry in drafting the policy.

Malaysia will need 10 to 15 years to tap energy from nuclear because of the huge human resource involved, Ongkili said after witnessing the signing of technical cooperation agreements between Malaysian companies and the South Korean Research Institute of Bioscience & Biotechnology.

He also said that Malaysian Energy, Green Technology and Water Minister Peter Chin Fah Kui would visit South Korea this month on the issue of nuclear technology.

The Electricity Generating Authority of Thailand (Egat), meanwhile, says its nuclear power programme will move forward as planned.

Feasibility studies on the technology should be completed by the end of next year as scheduled.

In the current 15-year power development plan (PDP), the country's first nuclear plant will start operating in 2020, said Dr Kamol Takabut, assistant governor for Egat, who oversees power plant engineering for the authority.

Under the PDP, the relevant state agencies have until the last quarter of 2010 to complete their feasibility studies for a 2000 MW nuclear plant. The cabinet will base its decision on whether to give the plant the go-ahead on the results of the studies, which will investigate issues such as environmental impact, health and safety, technology selection, human resource development and public opinion. The Nuclear Power Programme Development Office (NPPDO) has a Baht 1.345 billion ($39.5 million) budget to carry out the studies from 2008 to 2010.

The plant's proposed locations will be narrowed down to three from 14 by year-end. "Which technology to select, such as a pressurised water reactor or a boiling water reactor, will also be clearer by that time," said Dr Kamol.

Egat is currently considering sites in Surat Thani, Nakhon Si Thammarat, Chumphon, Prachuap Khiri Khan, Chonburi and Chai Nat provinces.

Nuclear is seen by energy policy makers as the cleanest, most viable way to boost Thailand's energy security, despite arguments from the environmental lobby that the technology comes with high risks.

Slowing demand and delayed reform impact Philippines IPPs

A slowdown in demand combined with delays in establishing an independent market operator is having a negative impact on planned independent power producers in the country.

By Syed Rashid Ali

The poor response to bids for recent independent power producer (IPP) contracts in the Philippines may be a reflection of the government pushing back the projected electricity shortfall combined with ongoing delays in full market liberalization.

In July DMCI Holdings Inc. was declared the highest bidder for the 600 MW Calaca coal fired thermal power plant in Batangas with an offer of $361.7 million.

Notably, however, the state-owned Power Sector Assets and Liabilities Management (PSALM) Corp. said there were at least four groups pre-qualified to bid for the power facility but only two showed up during the bidding.

Meanwhile, at the end of June the government rejected bids for contracts to manage the 1000 MW Sual and 700 MW Pagbilao coal fired power plants.

"[The bids] did not meet the reserve price," Jose Ibazeta, president of PSALM, told reporters after the bidding. Despite the setback, PSALM said it remained confident that IPP administrators would be appointed before the year ended, as it would start preparations for a new round of bidding.

This was the first batch of independent power producer administrator contracts that were bid out to the private sector for management. IPPs are currently contracted to supply electricity to National Power Corp (Napocor). When these are turned over to the private sector, the winning bidders will then manage the contracted capacities of the government in IPP plants.

The privatization of 70 per cent of the government's IPP contracts is one of the five requirements under the Electric Power Industry Reform Act (EPIRA) of 2001 before open access and retail competition can be implemented.

At the end of June, members of the Philippine Independent Power Producers Association (PIPPA) were still pushing for the establishment of an independent market operator (IMO) that will manage the operations of the wholesale electricity spot market (WESM).

Ernesto Pantangco, president of PIPPA, said the EPIRA mandated the formation of the IMO, which had been delayed for more than two years.

He said the IMO should have been created a year after the commercial operations of the Philippine Electricity Market Corp. (PEMC), which started in 2006.

"There has to be strong political will to push through with the privatization of the IMO in order to give more confidence for not only the existing investors but foreign investors to take a look again at investing at the Philippine power industry," he said.

The ongoing delays are not good for the IPPs, especially at a time when electricity demand is slowing. At the end of June, Team Energy Philippines, a 50-50 joint venture between Marubeni and Tokyo Electric Power Company, said it was deferring its expansion plans for the 700 MW Pagbilao coal-fired power plant in Quezon, as the projected shortfall in electricity has been pushed back to 2013.

Originally, the Department of Energy had forecasted that the country would suffer from an electricity shortfall as early as 2010.

Team Energy president Federico E. Puno said that the global economic crisis had also dampened local power demand. "So, you're looking at 2012 to 2013 when the new plants will be needed," he said.

Puno added that the company would also have to determine if it could pursue its expansion plans once management of the Napocor's IPP contract for the Pagbilao facility has been turned over to the private sector.

China to invest heavily in environmental protection


Xie Zhenhua: NDRC vice-minister

China is tackling climate change on several fronts and has said that the investment demand by its environmental protection industry is likely to reach 450 billion yuan ($65.9 billion) in the coming five years.

According to Xie Zhenhua, vice-minister of the National Development and Reform Commission (NDRC), out of the four trillion yuan economic stimulus package, 210 billion yuan will be invested in energy savings and emission reduction, the development of a recycling economy and eco-environment construction.

Notably, in early July, the Asian Development Bank (ADB) said it would provide a $1.25 million technical assistance fund to push forward technology to capture and store CO_2 from the country's coal fired plants.

The technical assistance will produce a comprehensive road map for carbon capture and storage (CCS) demonstration projects, as well as policies, and legal and regulatory frameworks to promote CCS. It will also identify priority demonstration projects and their financing needs, as well as undertake capacity assessment and comprehensive capacity development in critical areas of CCS demonstration.

The technical assistance supports China's plan to develop its first IGCC demonstration power plant in Tianjin, which is lined up for possible ADB financing under the Country Programming Mission (2009-2011).

"CCS is in its early stage of development globally, and demonstration projects need to be undertaken," said Ashok Bhargava, senior energy specialist in ADB's East Asia Department. "The full benefit of such a technology cannot be achieved unless it is used in major coal-based developing economies such as India and China."

ADB will fund the bulk of the $1.55 million project in the northern Chinese city of Tianjin. ADB's technical assistance will be sourced from the Climate Change Fund and technical assistance special fund. The rest of the money will come from the Chinese government.

China also said that it would make a greater effort to improve energy efficiency goals in the next five-year national climate change plan from 2011. In the current five-year plan to 2010, China has set a goal of cutting energy consumption per unit of gross domestic product by 20 per cent from 2006.

China has also been making rapid progress in wind power. Workers were scheduled to begin construction of the country's first 10 GW-scale wind power project in mid-July in the far north-western city of Jiuquan, Gansu Province. The project is designed to have an installed capacity of 5.16 GW by the end of 2010, 12.71 GW by the end of 2015 and 20 GW by the end of 2020.

Last month, the ADB also announced that it would partly finance a $73 million wind farm in Chifeng City in the Inner Mongolia Autonomous Region to support China's efforts to cut greenhouse gas emissions and promote private investment in renewable energy.

Sri Lanka develops renewable energy

The Sri Lankan government has designed a national energy plan for the development of wind and biomass energy, with the goal of meeting ten per cent of its energy needs from renewable energy by 2016.

According to a statement issued by the Department of Government Information, the government has decided to join the International Renewable Energy Agency (IRENA) as a move to promote the development of renewable energy in the island.

"The development of indigenous renewable energy is the key solution to the current challenge on reducing the dependence on imported petroleum," said the statement.

With its economy growing at 7-8 per cent for the last few years, the country has struggled to keep pace with power demand.

The country also struggles to supply power to the north and eastern regions during periods of drought. But the situation looks set to ease with the signing of an agreement at the end of June with the Chinese government to commence the second and third phases of the 600 MW Norochcholai coal power project.

The first phase of the project generating over 300 MW is expected to be completed by next year.

Power and Energy Minister John Seneviratne said the first, second and third phases of the project are expected to generate over 50 per cent of the country's power needs. They will also halve the production cost of a unit of electricity since the diesel power generation plants will be removed after the project is completed.

He said the main objective of the project is to reduce the existing electricity tariff, which is the highest in the Asian region.

Japan utilities to build smart grid

The Federation of Electric Power Companies of Japan will begin development of a smart power grid able to accommodate widespread solar power generation.

The Federation's ten utilities will collaborate on the project and is aiming for completion by 2020.

Building this grid will entail R&D on systems to predict solar panel output, power storage devices, and other technologies.

Power industry experts say the current grid is unable to handle solar power output of more than 10 GW. This spring, the government decided to double its target for solar power output in 2020 from 14 GW to 28 GW. The Federation determined that Japan's power infrastructure needs to be rebuilt to accommodate this rapid expansion of solar power generation.

The government expects solar power output to reach 53 GW by 2030. Just creating a storage system to handle this output will cost an estimated Yen6 trillion ($63 billion). The burden of such investments may be passed along to consumers in the form of higher electric bills.

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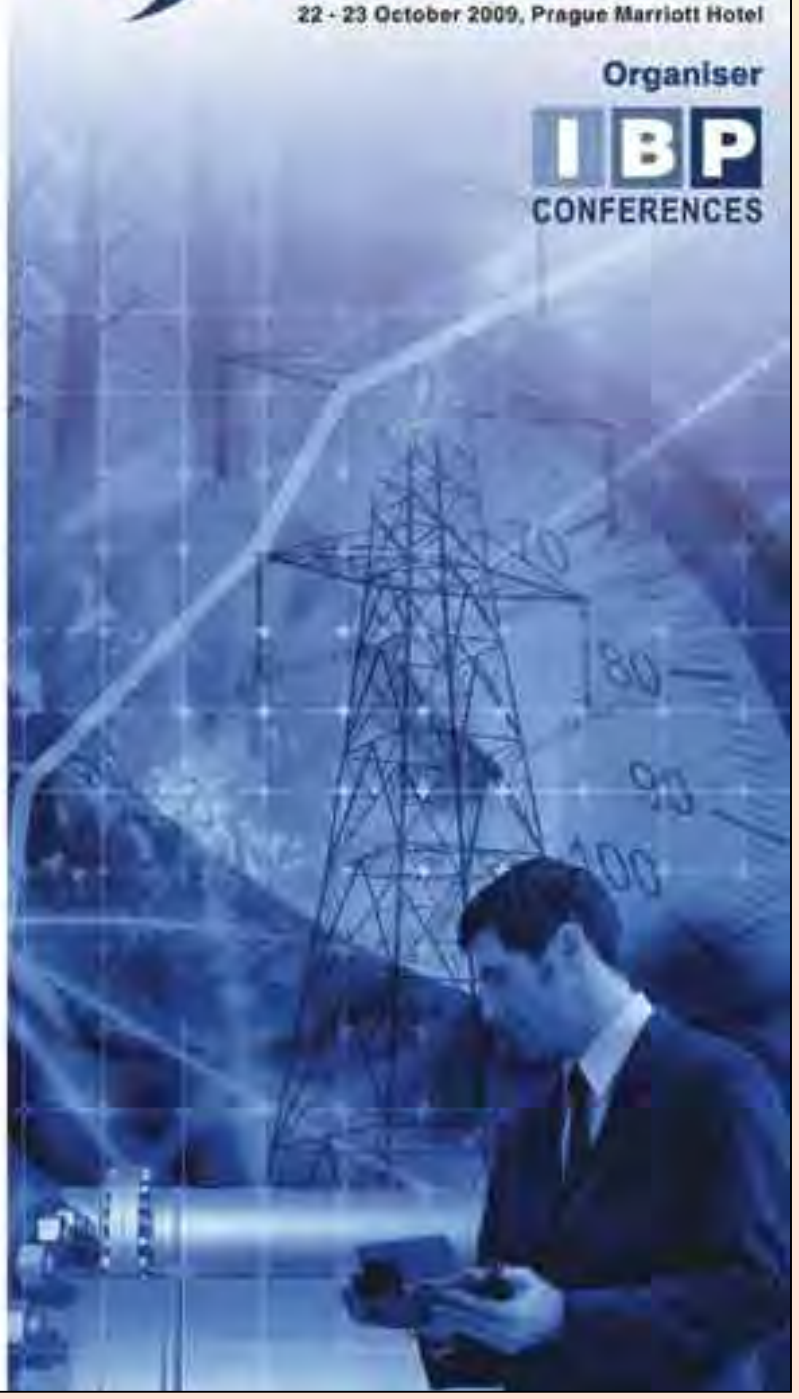

EDF calls for action on debt

As the French government prepares to sell stakes in Areva to boost the engineering group's finances, state-owned utility group EDF has highlighted its own troubles.

Siân Crampsie


Christine Lagarde: tariff increase "incomprehensible"

The French government has ruled out the prospect of large increases in the electricity tariffs as a means of helping utility giant EDF to reduce its debt.

French economy minister Christine Lagarde has told the country's parliament that while no decision has yet been made on tariff increases, any tariff rises "will be based on costs associated with electricity in France".

Her comments came after head of state-owned EDF told the French media that it would have to cut investment in 2010 if the government did not agree to raise electricity tariffs by 20 per cent over the next three years. Pierre Gadonneix's comments are reported to have angered the government and allude to the pressure that the firm is under following its recent spending spree.

Gadonneix says that EDF, which controls much of France's generation and supply market, has increased investments in the country without a rise in income. Lagarde has conceded that continued investments are required but has said that the call for a 20 per cent increase is "incomprehensible", according to reports.

Electricity tariffs is already a hot topic in France due to on-going investigations by the European Commission and the recent publication by the government-appointed Champsaur commission of proposals to overhaul the country's complicated electricity pricing system.

Paul Champsaur, former Chairman of the French regulatory telecommunications authority, said in May that all electricity suppliers in France should be given access to low-cost electricity generated by EDF's nuclear and hydropower fleet. If implemented, his proposed measures raise the prospect of a rise in tariffs, although EDF would probably lose market share.

The net impact would be positive for EDF, however, according to analysts.

Gadonneix's comments came just days after another state-owned giant, Areva, said that it would sell its transmission and distribution division in order to raise cash. The company will also receive proceeds from the government's plan to sell 15 per cent of its 90 per cent stake to industrial peers, current stakeholders and employees.

Areva CEO Anne Lauvergeon said the move would raise around ¤10 billion and would mean the end to years of uncertainty.

The government's decision to sell part of its 90 per cent holding in Areva and to sell part of its business will mean that the nuclear engineering group will be able to finance its long-term development plan. The company is benefiting from rapid growth in the global nuclear energy market, and says that it needs to invest and recruit as well as maintain a healthy balance sheet in order to reinforce its position in the market.

Areva is to open its capital to investment certificate holders and is also launching an employee shareholders programme. It is also planning to continue its cost reduction programme and improve operational performance.

Areva is to announce an open call for bids for its transmission and distribution group.

EDF, meanwhile, is feeling the pressure of its ¤24.5 billion debt, which is largely the result of its recent £12.5 billion purchase of UK nuclear energy firm British Energy. Recent months have also seen it having to deal with strike action at some of its French nuclear power plants and rising costs and delays at the Flamanville EPR project.

In June, EDF announced that it increased its shareholding in Austrian energy supplier Estag from 20 to 25 per cent by GDF Suez's 20 per cent stake in Austrian firm SIA.

The utility is also waiting for a regulatory decision on its proposed purchase of a 50 per cent stake in US utility Constellation Energy, with which it has a joint venture – UniStar Nuclear – to build new nuclear capacity in the USA. Constellation accepted EDF's bid of $4.5 billion in December 2008, a deal which also included an immediate $1 billion cash injection from the French firm.

Gadonneix told French newspaper *La Tribune* in July that he recently received positive signals from US regulatory authorities over the deal, which he expects to complete in the autumn.

Andalusia to host smart city

The Spanish city of Malaga is to follow in the footsteps of Amsterdam and Miami by launching a "smart city" initiative aimed at promoting sustainable energy use.

Endesa and the regional government of Andalusia have unveiled the project, which they say will cut energy consumption by 20 per cent and avoid the emission of 6000 tonnes of carbon dioxide (CO_2) each year.

The ¤31 million Smart City initiative will involve 11 companies under the leadership of Endesa and will be rolled out over a four-year period. It is a "pioneering" project that will "introduce a new urban energy management model" for others to follow, says Endesa.

In June, the City of Amsterdam selected consulting firm Accenture to help implement a smart city programme that is set to become the first of its kind in the European Union. The US city of Miami has also laid out plans for a $200 million smart city initiative.

Endesa's project will benefit 300 industrial customers, 900 service providers and 11 000 households. It will involve the deployment of technologies such as photovoltaic panels, micro power generation systems and energy storage devices.

All customers participating in the project will receive smart meters. Endesa will also analyse the energy usage and efficiency data generated and use the result to improve energy systems in other urban areas.

Nuclear debate fires up election politics

- Italy says "yes"
- Spain decides on Garona plant

Nuclear energy has once again become a topic for political debate in Germany in the run-up to the country's September general election.

The emergency shutdown of a nuclear plant in northern Germany – just a few weeks after it had reopened following a two-year closure – has given Chancellor Angela Merkel's rivals a chance to criticize her policies on nuclear power.

Germany's centre-left Social Democrats say that the September 27 elections are a chance for Germany to decide on whether the country's nuclear reactors should continue to operate.

The Kruemmel reactor near Hamburg shut down automatically in early July when a transformer short-circuited. It had reopened in June after a two-year closure prompted by a fire in another transformer.

Under plans implemented by Germany's previous, Social Democrat government, all of the country's 17 nuclear plants are to be closed by 2021. Merkel's Conservatives, which lead the country's present coalition government, have kept that plan.

Merkel, however, is keen to extend the life of some reactors in order to help the country achieve greenhouse gas emission cut targets.

The revival of the debate in Germany follows recent decisions in Italy and Spain on nuclear power. The UK government has also proposed changes to the regulation of the nuclear industry.

Italy's parliament has given final approval to a contested bill allowing a return to nuclear energy more than two decades after the country voted in a referendum to shut down its reactors. The government is now expected to choose the sites for construction of the plants, a programme in which both Enel and France's EDF are expected to play a major role.

In Spain, meanwhile, the government has given the go-ahead for the country's oldest nuclear power plant to continue producing electricity for four years. The move follows a recommendation by the country's nuclear regulatory agency that the Garona plant be allowed to operate for another ten years provided that it undergoes a safety upgrade.

The Garona plant came on line in 1971 and was initially designed to operate for 40 years. The latest decision to extend its operating license has angered environmental campaigners.

In June the UK government put forward a proposal for the creation of a single regulatory body to oversee the country's nuclear energy sector. The restructuring would help the industry meet the challenges of dealing with the new build programme, the operation of ageing nuclear reactors and the decommissioning of legacy plants.

Norway plans for offshore "adventure"

The Norwegian government has hailed as "historic" a new set of proposals designed to underpin the large-scale development of offshore renewable energy production.

Presenting a new act on offshore renewable energy to parliament, minister of petroleum and energy Terje Riis-Jonahsen said that the proposals would establish a framework for the development of renewable energy resources as well as ensure that other challenges are properly overcome.

The government wants to undertake a process of identifying sea areas that are suitable for offshore wind power development and carrying out full impact assessments. The proposed act also includes regulations on the process of applying for concessions, and the construction, operation and close-down of offshore renewable energy production assets, including offshore grids.

"A future large-scale development of offshore renewable energy production presents us with a number of challenges," said Riis-Johansen. "The proposed act is an important part of the long-term efforts of the Norwegian government in the field of offshore wind power.

"The proposal creates a framework for ensuring that energy infrastructure is planned, constructed and operated with due concern for energy supply, environment, security, fisheries, sea transport and other interests."

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GE imagination at work

Gulf states prepare for trade

The operational start-up of the GCC's North Grid marks a milestone in the development of the region's power sector, **writes Siân Crampsie.**

The six nations of the Gulf Cooperation Council (GCC) say that the start-up of the region's North Grid marks a new era in power sector economic integration and cooperation.

The North Grid links the electricity grids of Saudi Arabia, Bahrain, Qatar and Kuwait and will allow the four nations to trade electricity, boost security and reduce required reserve margins. It was due to be completed at the end of July with the synchronisation of a subsea link between Bahrain and Saudi Arabia.

The link between Qatar and Kuwait was completed in mid-July. "Qatar and Kuwait can now commercially exchange energy," Yousef Janahi, Chairman of the GCC Interconnection Authority (GCCIA), was quoted as saying in local the press. Bahrain was scheduled to synchronise with Qatar and Kuwait on July 22.

Five of the six GCC nations prepared for the operation of the new grid by signing a power exchange and trading (PETA) agreement governing its operation. The ability to trade is expected to reduce the cost of power generation in the Gulf as well as help the Gulf states to meet rapidly rising demand for power.

The start-up of the $1.4 billion North Grid marks the end of the first phase of the GCC's interconnection project. The second phase – the interconnection of Oman and the UAE to form the South Grid – has already been completed and the two 'mega grids' are due to be joined in 2011.

Oman has yet to sign the power trading agreement and has not yet confirmed its participation in the regional grid.

The power trading agreement sets out the regulations and procedures of electricity exchange and trading during usual periods as well as in the event of emergencies. It also defines the commitments of the GCCIA and the GCC electricity bodies in power trading and transmission, and lays down the operation standards of the interconnected grid.

The North Grid project involved construction of an 800 km, 400 kV double circuit interconnection line from Al Zour, Kuwait with Doha, Qatar, and a 400 kV submarine line linking Saudi Arabia with Bahrain. The whole system is overseen by a control centre in Ghunan, Saudi Arabia.

Separately, the Gulf states have been urged to establish a regional energy centre in order to speed the introduction of renewable energy sources to the energy supply system.

A recent report from the Gulf Organization for Industrial Consulting (GOIC) says that there is a need for "an energy programme or centre that…brings about sustainable development", particularly in light of international discussions on greenhouse gas emissions.

"As GCC countries are moving to accession of the Kyoto Protocol on GHG emissions, energy flexibility is to be pursued and further management efforts must be directed towards improving energy efficiency and introducing alternative energy sources," said the report of the Doha-based GOIC.

"These challenges also produce some opportunities with them, the carbon trading business that is now developing is one of the opportunities that the GCC companies can capitalize on and benefit from," said the report.

Gulf countries – in particular the UAE – have made a concerted effort in recent years to develop their renewable energy industries as a means of meeting their own energy demand as well as boosting exports. In Saudi Arabia, oil firm Saudi Aramco recently announced plans with Japan-based Showa Shell to study the feasibility of generating solar energy using Showa Shell's technology.

The two companies have signed a letter of intent to develop a number of pilot solar power projects in Saudi Arabia based on Showa Shell's thin film CIS (copper, indium and selenium) photovoltaic technology.

Kenya unveils renewable energy drive

- 2000 MW identified for development
- Masinga Dam closed

Kenya's government is hoping that a raft of new measures aimed at addressing the country's shortage of electricity will help it to avoid the need for rationing.

Kenyan Prime Minister Raila Odinga has unveiled extensive plans for investment in renewable energy as well as energy efficiency measures to help bridge the growing gap between demand and supply. The move came as the country's main power generating company, KenGen, announced the closure of the Masinga Dam due to low water levels.

As well as the free distribution of energy-saving lightbulbs, Odinga says that the sale of solar water heaters will now be subsidized. The announcement was made at the inaugural meeting of the National Task Force on Accelerated Development of Green Energy, which will also oversee the development of 2000 MW of power generating capacity over the next three years.

The projects identified for development include six geothermal projects with a capacity of 490 MW, wind power projects with a capacity of 810 MW and a number of cogeneration projects. Odinga is also hoping to see the development of solar and biomass projects.

KenGen produces around 77 per cent of Kenya's 1296 MW of power, mostly through hydropower plants. In July the utility stopped operations at the 40 MW Masinga Dam after water levels dropped following a prolonged drought.

The plant was only contributing some 14 MW to the national grid at the time of its closure, according to KenGen. The company has also announced plans to build a 120 MW thermal power plant on a fast track basis in the city of Mombasa.

Electricity demand in Kenya is growing at an estimated 8 per cent per annum. The distribution of energy-saving lightbulbs is expected to save 49 MW.

Europeans back Desertec concept

- Blue chip firms sign MOU
- DII to develop implementation plan

José Manuel Barroso: Desertec could meet 15 per cent of Europe's power needs

An ambitious plan to supply some 15 per cent of Europe's electricity needs by harvesting the solar potential of North Africa has received the backing of 12 companies.

ABB, Abengoa Solar, Deutsche Bank, E.On, RWE, Schott Solar and Siemens – among others – in July signed a Memorandum of Understanding (MOU) establishing the Desertec Industrial Initiative (DII), which aims to develop the framework for the proposed Desertec project.

With an estimated cost of up to ¤400 billion, Desertec envisions the construction of hundreds of solar thermal and wind power plants across North Africa and the Middle East and transmitting the electricity to Europe through a 3000 km high voltage network. The transmission portion of the project alone could cost up to ¤45 billion.

The project – developed by the TREC Initiative of the Club of Rome – is not without its critics, who are sceptical about Desertec's costs and viability.

But Desertec's supporters – which include José Manuel Barroso, president of the European Commission – believe that the project could meet 15 per cent of Europe's electricity needs as well as a portion of the producer countries' power needs by 2050.

"Desertec is a visionary project that can make a substantial contribution to sustainable power supply in the future energy mix," stated René Umlauft, CEO of the Renewable Energy Division at Siemens Energy. "The Desertec project unites sustainability, technological competence and visionary entrepreneurship."

Over the next three years, the DII will focus activities on the development of a viable investment plan.

Lebanon under strain

The electricity supply system in the Lebanon is experiencing increased levels of strain due to continued economic growth and a lack of investment, according to local reports.

Severe electricity shortages are set to continue in the country over the summer months, partly due to the annual influx of tourists, and the government has been pushed to ration electricity.

According to Lebanon's Energy Minister Alan Tabourian, the country's available electricity generating capacity stands at around 1500 MW, while actual demand is "at least" 2300 MW. Recent deals to import electricity from Egypt have proven insufficient for bridging the demand-supply gap.

Large parts of the country are already receiving less than 14 hours per day of electricity, according to local press.

The government has been criticised for failing to enact plans that would encourage investment in the Lebanese power system, including the privatization of power generation and distribution, the construction of new capacity and switching to natural gas.

Prime Minister Fouad Siniora has said that Lebanon requires investments of at least $1 billion to meet growing electricity demand.

Exelon withdraws NRG offer

- Increased offer rejected
- NRG shareholders reject Exelon proposal

US utility Exelon Corporation says that it will focus on stand-alone growth opportunities following its decision to terminate its offer to buy NRG Energy.

The July 21 announcement came after a protracted battle with the board of New Jersey-based NRG and the rejection by NRG shareholders of an Exelon proposal to expand NRG's board of directors.

Exelon had been pursuing NRG since late 2008, seeing an opportunity to create the largest power generation company in the USA with a diverse fleet of nuclear, coal and gas based power plants. Its approaches were repeatedly rejected by NRG.

"The NRG shareholders have spoken, and Exelon will move on. We wish NRG and its owners well," said John Rowe, chairman and chief executive officer of Exelon after the decision by NRG shareholders to re-elect all of the company's director nominees to the NRG board of directors.

"Now we can redouble our focus on Exelon's stand-alone growth opportunities," added Rowe. "We have the nation's largest low-carbon nuclear fleet, and our plan to expand our nuclear output through uprates provides even greater upside from carbon legislation. We believe our long-term growth proposition remains the best in the industry."

In July Exelon increased its offer for NRG to 0.545 of an Exelon share for each NRG share, up from 0.485 of a share. The move was rejected by NRG, which said in a letter to shareholders on July 16 that the offer "continues to undervalue NRG".

John Rowe: now focusing on Exelon's stand-alone business

The acquisition of NRG by Exelon would have given the latter access to NRG's gas and coal-fired plants and allow it to expand its presence in Texas, California and northeast USA. Chicago-based Exelon has almost $19 billion in annual revenue and operates 17 nuclear reactors – equivalent to about 20 per cent of the country's nuclear capacity.

Exelon had asked NRG shareholders to vote in favour of a proposal to expand NRG's board of directors in an effort to change the dynamics of the boardroom and raise the possibility of its offer being accepted. The company maintains that its offer adequately valued NRG.

"NRG stockholders understood that this vote was all about value and they voted overwhelmingly to send a message that Exelon's current offer was unfair to NRG stockholders," said David Crane, NRG President and Chief Executive Officer. "Our stockholders share the same commitment as the company's management and its board of directors to maximizing value either through continued effective implementation of the company's stand-alone business plan or through combination with Exelon or another interested party at a price that reflects the value NRG has created and our future growth prospects."

Exelon said in a June letter to NRG shareholders that "an Exelon-NRG combination provides a strategic platform for continued growth and offers extraordinary value creation benefits to the shareholders of both companies".

CCS ventures cut costs

Energy companies and engineering firms around the world are racing to develop commercially viable carbon capture technology, and are finding that joint ventures can help to reduce both costs and risks. **Siân Crampsie**

Utilities and technology firms around the world are continuing to join forces in the field of carbon capture and storage (CCS) to help reduce costs and achieve faster times to market.

Among the latest agreements to be signed are a cooperation agreement between Italy's Enel and French research body IFP and an exclusive cooperation agreement between Siemens and TNO, the Netherlands Organisation for Applied Scientific Research.

Across the Atlantic, Mitsubishi Heavy Industries (MHI) has announced plans to work with Atlanta-based Southern Company to demonstrate MHI's Carbon dioxide (CO_2) capture process on a coal fired power plant.

Siemens says that its agreement with TNO will allow the companies to leverage synergies and better utilise common resources. Both organisations have been carrying out research into second-generation amino acid processes for CO_2 capture.

By combining forces, Siemens and TNO hope to achieve a faster time to market for the technology and the implementation of a full-scale demonstration plant by 2014.

"CO_2 capture and storage technologies will in the future play a decisive role in the utilization of fossil fuels. They need to be tested for deployment in large plants and brought to market readiness," said Michael Suess, CEO of the Fossil Power Generation Division of Siemens Energy. "We are currently building a pilot facility at the Staudinger power plant operated by E.On, where we will be testing our process under real operating conditions. Cooperation with TNO will take us a great step forward."

Enel's agreement with IFP will focus on the testing of a first-generation post-combustion CO_2 capture process on a pilot unit to be built by Enel at its Brindisi coal-fired power plant in Italy. IFP's chemical solvent-based scrubbing technology has already been tested under the European Castor project, and further tests under this latest agreement will allow it to verify recent improvements made to the process.

Like Siemens and TNO, a major area of focus for Enel and IFP will be the reduction of operating costs and the energy consumption of the processes.

MHI, meanwhile is to demonstrate its KM-CDR CO_2 capture process at an existing unit of Alabama Power's Plant Barry. The project, which is being funded by MHI, Southern Company and the Electric Power Research Institute (EPRI), will capture the emissions from the equivalent of 25 MW of generation capacity.

The project is scheduled to be in operation by early 2011 and will capture 500 tonnes per day of CO_2 and supply it for storage in nearby saline rock formations. "We are very excited to be party to this important project that is the critical next step in our development plans for full commercial deployment of the KM-CDR process for coal-based applications," said Mitch Morimoto, MHIA President and CEO.

"The main challenge facing deployment of carbon capture and sequestration technology is demonstrating its effectiveness at a large scale," said David Ratcliffe, Southern Company Chairman, President and CEO. "Our involvement in this and other related projects is part of our commitment to be a leader in finding solutions that make technological, economic and environmental sense."

Exxon bets on blue-green future

Oil firm ExxonMobil is making a rare foray into the alternative energy market with a $600 million partnership to research the potential for making biofuels from algae.

The company is joining forces with Synthetic Genomics Inc. (SGI), a firm founded by Craig Venter, the pioneer of human genome research, and believes that the technology would help to meet "the world's energy challenges". However, it has warned that commercial deployment could be several years away.

The research and development alliance will focus on the development of advanced biofuels from photosynthetic algae that are compatible with today's gasoline and diesel fuels. The move is in line with legislation in Europe and North America mandating the use of biofuels in the transport sector as a means of reducing greenhouse gas emissions.

Exxon says that if research and development milestones are successfully met, it expects to spend more than $600 million on the programme, which includes $300 million in internal costs and potentially more than $300 million to SGI.

"The real challenge to creating a viable next generation biofuel is the ability to produce it in large volumes which will require significant advances in both science and engineering," said Venter, CEO of SGI. "The alliance between SGI and ExxonMobil will bring together the complementary capabilities and expertise of both companies to develop innovative solutions that could lead to the large scale production of biofuel from algae."

RWE expands venture capital portfolio

- Scandinavian biomass firms targeted
- RWE pools energy efficiency resources

RWE Innogy says that its on-going venture capital programme is helping to bring promising low-carbon technologies closer to commercial deployment.

The Germany-based renewable energy firm has acquired a minority share in Stirling DK ApS, a Danish manufacturer of distributed cogeneration systems that can be fuelled by solid biomass. It is also making an investment in the Swedish technology firm Mantex, which has developed an automated, continuous method to determine biomass moisture concentration.

The deals bring RWE Innogy's venture capital portfolio to a total of six companies and an investment volume of some ¤35 million.

Crispin Leick, head of RWE Innogy's venture division, said: "With our commitment, we intend to take promising technologies enabling carbon-neutral energy generation to the production stage so as to make them fit for commercial deployment."

"We set great store by a diversified portfolio covering the whole range of renewable energies," continued Leick. "As corporate venture capital investor, we are a reliable partner in the current market environment for young innovative companies seeking equity capital to develop and launch their technologies in the market."

Last year RWE Innogy acquired shares in Quiet Revolution, a British developer of micro wind turbines, and Dutch company Topell, which is developing a process to produce bio-coal pellets. These were followed in 2009 by an investment in Revolt Technology and the creation of Voith Hydro Ocean Current Technologies.

RWE Innogy's parent company, RWE also said in July that it has pooled its activities and expertise in the field of energy efficiency to create a new company, RWE Effizienz.

The purpose of the new company is to ensure the rapid development of energy efficiency solutions for key residential and mobility sectors, including electricity and natural gas-powered vehicles.

Americas

Machu Picchu orders ABB solutions

ABB is to supply electrical and automation equipment for the expansion of the Machu Picchu hydropower plant in Peru's Cusco region.

The Swiss technology firm will provide an integrated instrumentation control and electrical solution as part of plans by Peruvian state-owned power firm Empresa de Generacion Electrica Machu Picchu to increase the plant's output by 100 MW. ABB will execute the project as part of a strategic alliance with Harbin Electric Machinery.

ABB will supply protection and control equipment, instrumentation and control products, medium- and high-voltage switchgear, generator circuit breakers, excitation systems, transformers and cables. The project is to be completed by the end of 2011.

The expansion project involves the construction of a second underground powerhouse at an elevation of 1800 m above sea level. The work will also help to regulate the level and flow of the Vilcanota River.

The present output of the Machu Picchu plant is 90 MW.

ABB will also supply its System 800xA power plant control system for the hydro governor and balance-of-plant, enabling all automation functions from a single platform.

WinWind eyes US project

Finnish wind turbine firm WinWind Oy has signed a letter of intent with USA-based renewable energy developer Wild Brush Energy to supply up to $200 million in turbines for an upcoming project.

Wind Brush Energy is aiming to develop wind power projects in North America, including a $270 million project that will have a capacity of up to 120 MW.

Gamesa to power Mexico project

Gamesa Corporacion Tecnologica has signed an agreement with Turbo Power Baja Energy to supply five wind turbines to the Rumorosa wind farm in Mexico's Baja California state.

The five G87-2MW turbines will give a total power output of 10 MW. The scope of the agreement includes the supply of the wind turbines, their installation and start-up, as well as their operation and maintenance.

Assembly work is expected to commence in the second half of 2009.

Gamesa says that the annual production of the wind power facility will avoid the emission into the atmosphere of 15 000 tons of CO_2 a year.

Asia Pacific

Areva T&D to improve Indonesia grid

Areva Transmission and Distribution (T&D) is to help improve power supplies in Indonesia through the provision of high voltage substations.

Under a turnkey contract worth ¤120 million with Indonesian public power utility PLN Persero, Areva T&D will deliver several high voltage substations as well as underground electrical cables. The equipment will be used to improve electricity supplies on the island of Java and its main cities of Jakarta, Bandung and Surabaya.

Maharashtra orders substation

Swiss technology group ABB has won orders worth $28 million from the Maharashtra State Electricity Transmission Company for substations to help improve the efficiency and reliability of the network in the Indian state of Maharashtra.

ABB will provide 220 kV and 132 kV substations in the Nashik, Amravati and Nagpur zones of the state. The project is an integral part of Maharashtra State Electricity Transmission Company's efforts to reduce transmission and distribution losses, and is scheduled for completion in 2010.

ABB is responsible for the system design and engineering, civil works, supply, installation, commissioning and overall project management. The turnkey solution includes the supply of a range of circuit breakers, instrument transformers, power transformers, power line carrier communication equipment, and the supervisory control and data acquisition system.

Malaysian firm plans Cambodia project

Leader Universal Holdings Bhd of Malaysia is to invest $160 million in a new coal fired plant in Cambodia, according to the *Vietnam News Agency*.

The 100 MW plant will be built in Sihanoukville and will help the southeast Asian nation overcome electricity shortages. It will take two years to build and is scheduled to start operation in 2012.

According to Cambodian electricity firm Electricite du Cambodge, the country has an installed capacity of around 410 MW, while demand is estimated to be over 800 MW. Cambodia currently imports electricity from Vietnam and Thailand.

Alstom wins Indian hydro project

Joint venture firm Alstom Hydro has been awarded a contract by Lanco Infratech to build a new hydropower plant on the river Teesta in the Indian state of Sikkim.

Under the terms of the ¤40 million contract, Alstom Hydro will supply four 125 MW Francis turbines and generators, as well as other equipment. The plant will be connected to India's electricity grid and will help to meet rapidly rising demand for electricity.

Alstom will also supply the main inlet valves and control and protection systems, and will be responsible for design, engineering, erection, testing and commissioning. The project is due for completion by 2013.

Vestas wind turbines for Pingtan Island

Vestas Wind Systems subsidiary Vestas China has received an order from China Fujian Wind Energy Company to supply wind turbines for a project located on Pingtan Island in the eastern part of China's Fujian province.

Vestas will supply 17 of its V80-2MW units, with delivery scheduled for the fourth quarter of 2009. The contract includes supply and commissioning of the wind turbines, a supervisory control and data acquisition system and a two-year service and maintenance agreement.

BHEL to equip Jharkhand project

Bharat Heavy Electricals Limited (BHEL) is to supply the main plant package for a greenfield thermal power plant in Jharkhand, India.

The company has been awarded a contract worth INR6.4 billion by Adhunik Power and Natural Resources (APNRL). Its scope of work includes design, engineering, manufacture, supply, erection and commissioning of the steam turbine, generator and boiler, along with associated auxiliaries and electricals, control and instrumentation and electrostatic precipitators.

Areva submits India bid

Areva has submitted a bid to the Nuclear Power Corporation of India (NPCIL) for the design and construction of two EPR reactors in Maharashtra state.

The proposed reactors would have a combined output of 3200 MW and would be built on a site in Jaitapur that could accommodate up to six nuclear units, according to NPCIL. They could be commissioned by the end of 2018, says Areva.

Europe

OPT commits to UK project

Wave energy technology firm Ocean Power Technologies (OPT) has signed a commitment agreement to advance the development of a 5 MW power project off the coast of southwest England.

The New Jersey, USA-based firm is planning to build, install and operate a wave power station comprising its PowerBuoy wave energy converter at the Wave Hub site in Cornwall. It says that it will deploy the devices in a phased approach once the project infrastructure has been completed.

The South West Regional Development Agency (RDA) has been awarded £42 million by the UK government to construct offshore berths and sub-sea cables for Wave Hub, which will eventually feature wave energy converters from a variety of manufacturers and which could eventually generate up to 50 MW.

Angus Norman, Chief Executive of OPT, said: "OPT has provided strong support to Wave Hub and the South West region's vision to create a world-class centre for the marine energy industry over the past five years. As a result, we are proud to be the first to sign a Commitment Agreement to make this project a commercial reality.

Consent granted for 295 MW biomass plant

British company MGT Power Limited has received consent from the UK government to construct a 295 MW biomass power plant in northeast England.

The Tees Renewable Energy Plant will burn woodchips and will be one of the largest-ever biomass plants to be built in the world. It is scheduled to start operating in late 2012.

Chris Moore, Director of MGT Power, said: "The government's consent is welcome news as we are at an advanced stage with the forestry establishment for fuel sourcing and power plant procurement. We can now appoint our banks, conclude the financing and reach agreement with our preferred technology bidders."

He added: "Other similarly sized biomass plants are proposed in other parts of the country, but our Teesport project is currently two years ahead of the pack and likely to be one of the first to be operational."

The Tees plant will save the emission of 1.2 million tonnes of CO_2 per year and will account for 5.5 per cent of the UK's renewable electricity target. Its biomass feedstock will be sources from certified sustainable forestry projects in North and South America and the Baltic States.

Emerson to retrofit Fellside

Emerson Process Management has been awarded a contract to retrofit the plant and turbine control system at Sellafield Ltd.'s Fellside power station in the UK.

Emerson will replace the obsolete systems at the combined heat and power (CHP) plant with its Ovation technology. The retrofit will take place during a scheduled eight-week outage in September and October 2009.

Under the contract, Emerson will replace the controls on one gas turbine and one heat recovery steam generator. It will also perform various instrument upgrades on the GE gas turbine, such as installing hydraulic servo valves, linear variable displacement transducers and flame detectors.

For the turbine controls upgrade, Emerson will replace existing GE Speedtronic Mark IV turbine controls with Ovation technology. For the HRSG controls retrofit portion of the project, Emerson will replace an outdated Alstom Microrec control system, installing its proven PlantWeb digital plant architecture with the Ovation expert control system.

Fellside consists of three 40 MW GE Frame 6B gas turbines and one 68 MW steam turbine. It supplies electricity to the national grid as well as steam to the nearby Sellafield nuclear facility.

International

Poland plans Baltic wind farms

Polish energy companies are planning to build five wind farms on artificial islands in the Baltic Sea, according to local reports.

Four companies, including the Polish Energy Group, are said to be close to signing an agreement to build the $5.6 billion project in the Baltic off the country's northern coast by 2020. The output of the wind farms will be over 1000 MW.

Environmental groups have expressed concerns about the impact of the project on the local ecology.

Nordex to supply Bandirama III turbines

German wind turbine producer Nordex has won a contract to supply ten wind turbine units for installation at the Bandirama III project in Turkey.

Under a contract with Turkey-based industrial group As Makinsan, Nordex will supply its N90/2500 turbines for the 25 MW project, which is based in flat grasslands close to the port city of Bandirma in west Turkey. As Makinsan has also signed a premium service agreement with Nordex.

With wind speeds averaging 7.4 m/s, the wind farm is expected to achieve an annual yield of around 72 GWh, equivalent to the annual energy consumption of around 36 000 Turkish households. It will avoid the emission of over 70 000 tons of greenhouse gases.

ABB to strengthen Saudi network

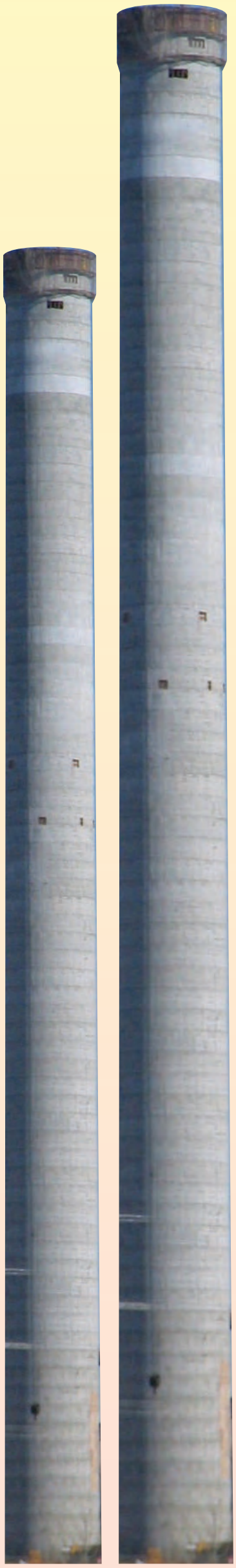
The Saudi Electricity Company (SEC) has awarded Swiss technology firm ABB a $34 million contract to refurbish and expand 20 substations in the western provinces of Saudi Arabia.

Under its contract, ABB will be responsible for the design, engineering, supply, installation and commissioning work. The project is expected to strengthen the distribution network in western Saudi Arabia.

ABB will supply capacitor banks, medium-voltage switchgear, protection and control equipment, and a supervisory control and data acquisition system that will enable SEC to manage the flow of power in the network.

The expansion project is designed to enable the SEC to meet growing demand for electricity and improve power quality.

The project is expected to be completed by the end of 2010.



Leading the low carbon economy

Last month UK ministers set out their strategy for tackling the threat of climate change and increasing renewables. Just prior to the announcement, *TEI Times* took the opportunity to exchange views with **Stephen Burgin**, country president of Alstom UK on why the UK could set an example for other countries to follow.

Stephen Burgin: Companies need to ask 'what role can we play to make the plan a reality'?

"The UK is very important as a leader. History has shown and continues to show there is a high degree of respect for what we do in the UK and how we handle matters. We have a substantial international influence."

Stephen Burgin, country president of Alstom in the UK is a firm believer that the UK has plenty to offer the world's power market. With a long and solid background in the power industry, his view of the UK market is worth noting. Burgin is an electrical engineer who began his career as a student apprentice in 1975 with GEC and has spent most of his career working in the transmission and distribution business.

Certainly over the last two decades, the UK has been among the global leaders in setting the trends that have been responsible for the energy markets we see today. It was among the world's first to have an operating liberalised energy market and is now attempting to play an instrumental role in the global fight against climate change through the adoption of various market mechanisms and technologies to reduce CO_2.

Earlier this year, as part of its budget announcements, the government set carbon budgets. "The fact that we have put our targets down in law is another example of leadership," notes Burgin.

Most recently, the UK government launched its White Paper called '*Transition Plan for a Low Carbon Economy*.' The plan explains how the UK will meet the carbon reduction goals set in earlier carbon budgets, setting out its plans to deliver around 40 per cent of electricity from low carbon sources i.e. renewables, nuclear and clean coal by 2020.

The government also confirmed that there would be four projects set up to demonstrate carbon capture and storage at coal fired plants. This is a move that Burgin sees as significant for both the industry and Alstom. Carbon capture technology is a major focus area of Alstom Power's strategy in the coming years. The company is heavily involved in post-combustion and oxy-fuel capture technology, participating in a number of pilot projects in Europe and the US.

Burgin explains: "We are putting a lot of money into CCS. On the power side, it's a major focus area for R&D investment. We see the main problem being with cleaning up today's power plants so we are concentrating on post-combustion. We are looking at the chilled ammonia and advanced amines processes and have a well elaborated pilot project programme which starts at 5 MW, then to 30 MW, and on up to 100 MW. By 2015 we will be able to offer full-scale commercial carbon capture technology."

While he sees the UK's decision on setting up the four demos as good news for Alstom and CCS, he acknowledges the challenges that remain. "The government now needs to make this happen by setting the environment to spearhead growth in the area. Other challenges to clean coal include the public consultations and planning processes. Also, we are still waiting to see the benefits of the Infrastructure Planning Commission. The process still has to be established and tested. In parallel, the government needs to create the appropriate environment which encourages the utilities make necessary investments," said Burgin.

The UK White Paper on energy and climate sets out how the government plans to reach its renewable energy targets. The government plans to produce 32 per cent of its electricity from renewables by 2020.

But not all are convinced of the wisdom of putting such a great emphasis on renewables. The CBI (Confederation of British Industry), the UK's voice of business, argues that the intermittent nature of wind, will lead to gas having a larger than necessary share of the energy mix. It would also like to see the renewables target reduced to 25 per cent. Too high a target could lead to increased marginal costs. The volatility of wind could also blunt the price signals on which the market relies.

Some industry observers believe nuclear should play a bigger role in the energy mix than is planned, and could do so if the government creates the right climate for investment.

> With some coal plants closing down by 2016… and the decommissioning of existing nuclear plants, there is an opportunity to install more gas plants

While Burgin had no comment on the subject of whether or not nuclear should be subsidised or incentivised in some way, he did note that nuclear is in some respects more advanced than clean coal. While the planning issues, permits and public consultation still have to be addressed, the market conditions, although important, are less of a consideration. "It [nuclear] is not dependent on an effective carbon market. So in this respect, nuclear's path is probably clearer today."

With CCS projects coming in the mid-long term and new nuclear in the longer term – there could be as much as four new reactors with a capacity of 6 GW in 2022 – there is an intervening period where the UK will need new capacity. Between now and the point where we see new baseload nuclear capacity, according to Burgin, the UK energy mix will have three elements: accelerated investment in renewables, new clean coal and gas. But with some coal plants closing down by 2016 as a result of opting out of the Large Combustion Plant Directive, and the decommissioning of existing nuclear plants, Burgin foresees "the opportunity to install more gas plants".

Alstom is building new gas combined cycle power plants at Langage, Grain and Staythorpe. In April it also broke ground at the Pembroke power station, which at 2.2 GW will be the UK's largest combined cycle plant when it is completed.

It is likely that such gas plants will meet demand while the industry waits for the necessary legislative clarity and the carbon markets to be put in place to allow new coal plants.

It is fundamental that the UK has a diverse energy mix. Burgin argues that it is also fundamental that new clean coal forms part of that mix.

Although the western world has led the development of the technology, Burgin believes there is an increasing global awareness around the need for clean coal and therefore a global intent.

"The key is to get the technologies developed, deployed quickly, overcoming the initial costs to get up to industrial level so that we can then gain the economies of scale," he says.

Burgin also welcomes the UK's plans to accelerate the introduction of wind power. With its purchase of Ecotecnia in Spain nearly three years ago, Alstom is currently building its first UK onshore wind farm in Scotland. "We are well positioned to win other wind farm contracts."

It also has an agreement with Canadian company, Clean Current and is now "engaged in dialogue with various parties about involvement in potential new tidal projects in Pentland Firth and the Severn Estuary".

The UK is a good market for Alstom. We have the most diverse technology platform in the supply market and have a strong presence in a country that has a demand for a diverse energy mix. We are growing our UK organisation – recruiting engineers and project managers as well as graduates and apprentices, and establishing new business streams."

TEITimes met with Burgin again at the opening of Alstom's new welding factory in Burgin's hometown of Stafford. It was just two days after the release of the UK White Paper and Burgin was excited by the prospects of what it offers. "Companies like ours need to read and study the paper and ask: 'what role can we play to make the plan a reality'? Companies need to take the government document and use it proactively. If we get this message out to people, then the UK can really take a commanding role and be a reference for the world."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Preparing for take off

While there have been a number of major achievements in key areas of development in carbon capture and storage (CCS) at the European level, there are still a number of issues to be tackled to help ensure that CCS is demonstrated by 2015. **Jan Panek**

The European Commission has acted to reduce EU greenhouse gas emissions by 20 per cent compared to 1990 levels by 2020, and has committed to take the necessary actions for the decarbonisation of Europe's energy system by 2050. In all realistic future scenarios the deployment of carbon capture and storage (CCS) is deemed to be a necessity for achieving these targets, with the potential to deliver around 30 per cent of all CO_2 emissions reductions.

These ambitious emission reduction targets have introduced a sense of urgency to the commercialisation of CCS. Consequently, the European Commission has identified the need for a Europe-wide programme of CCS demonstration projects.

CCS has become an integral part of EU energy policy in recent years. Globally recognised bodies, most notably the Intergovernmental Panel on Climate Change (IPCC) in their 4th Assessment Report (2007), have stressed the need to transform the energy sector towards a low-carbon economy based on clean technologies.

The European Commission has promoted CCS with several policy instruments. The first communication from the Commission regarding CCS was published in January of 2007 aiming for *near-zero emissions from coal power plants after 2020*. In March of 2007 the European Council endorsed the Commission's intention to stimulate the construction and operation of up to 12 CCS demonstration projects by 2015. Early demonstration of the technologies is considered crucial if CCS is to be an emissions reduction method of choice for the commercial power sector by 2020.

In January 2008 the proposal of the enabling Directive on the *geological storage of carbon dioxide* establishing the legislative framework signalled, along with the second communication on *supporting early demonstration of sustainable power generation from fossil fuels*, the commencement of a set of actions on behalf of the Commission towards financing these CCS demonstration projects across Europe.

The communication outlined an ambition for each industrial-scale demonstration project to integrate all parts of the CCS value chain, from capture to storage, and for the portfolio of projects to include all main technology routes: pre-combustion capture, post-combustion capture, oxyfuel combustion, pipeline transport of CO_2, shipping transport, depleted gas field storage, saline aquifer storage etc.

Since then, developments have gathered pace and a number of exciting initiatives look set to advance CCS demonstration. Amongst them, the CCS Project Network which was proposed by the Commission in late 2008 to coordinate the demonstration of CCS and provide participating projects with a European identity. Communication actions, facilitation of knowledge sharing, public engagement to raise awareness of the potential of CCS and international cooperation, are the main tasks of the CCS Project Network. Furthermore, the European Energy Programme for Recovery (EEPR) and the ETS-New Entrants Reserve (NER) are initiatives introduced to stimulate funding for CCS technologies.

The long-term economic viability of CCS will rely on markets that value CO_2 emissions avoidance higher than the additional costs of capture, transport and long-term storage. Europe's climate policies operate within the framework of the Emission Trading Scheme (ETS), which caps emissions and provides a future carbon price signal to the market.

The Commission's energy and climate change package adopted in December of 2008 included the most ambitious and comprehensive framework for promoting renewable and low carbon energy in the world. The package included a number of CCS-related documents, including the aforementioned CCS Directive and a revision of the EU ETS Directive. From 2013 the third phase of the ETS will create a CO_2 market with full auctioning of CO_2 certificates. Furthermore, a New Entrants Reserve (NER) will be established in the ETS, from which 300 million allowances (corresponding to 300 million tonnes of CO_2 emissions or their cash equivalent) have been earmarked for the benefit of early projects in CCS and similarly innovative and currently non-commercial low-carbon technologies.

In addition to the agreement on the use of ETS-NER allowances, the EEPR was adopted in the spring of 2009. Its total budget is approximately ¤4 billion with ¤1.05 billion reserved for CCS demonstration projects. Up to seven projects can be funded in seven EU countries. Up to ¤180 million per project can be available for the incremental costs of CCS. It is expected that proposals will be evaluated and successful projects selected by the end of 2009. Investment in CCS through EEPR will contribute directly to the recovery of the EU economy and the stimulation of low-carbon technologies and capacity building.

Furthermore, funds from FP7, the EU's Seventh Framework Programme for Research, can be allocated in the areas of CCS and clean coal technologies to facilitate early demonstration and prepare for commercial employment. In particular, R&D projects related to capture technologies, storage site development, public awareness, or efficiency increase in power plants equipped with CCS can be funded under FP7.

Jan Panek: CCS will take the combined efforts of all stakeholders

Selection of the projects that will be funded is expected to take place by the end of 2011

Certainly there have been a number of major achievements in key areas of CCS development at the European level. These measures complement industry and Member States' support to help ensure that CCS is demonstrated by 2015. Still, there remain a number of issues to be tackled.

Firstly, the details of the mechanism under which allowances from ETS-NER will be allocated to CCS demonstration projects and innovative renewable projects need to be worked out. The Commission has already started taking steps to ensure that the mechanism is defined by 2010. Selection of the projects that will be funded is expected to take place by the end of 2011.

Secondly, the CCS Directive needs to be transferred into national laws. Through the CCS Directive the Commission has provided EU Member States and industry with a regulatory framework. It is of vital importance that each Member State determines how they will integrate CCS and establishes the legal basis for storing CO_2 on its territory. This will provide much needed certainty for developers to invest in CCS projects on a long-term basis. In addition to the regulatory aspects of transport and storage, some technical aspects also need to be resolved. Evaluation of cross-border CO_2 transport networks and national storage potentials are just two areas that could be prioritised to assist CCS deployment.

Thirdly, successful demonstration of CCS in large-scale projects depends upon the extent that knowledge sharing and 'learning-by-doing' will drive down costs. The CCS Project Network will be in a position to gather information on how EU countries and CCS projects are addressing the common obstacles they face. Each of the tasks of the CCS Project Network aims to accelerate deployment of CCS in the EU and assist technology transfer globally. The indirect benefits of 'learning-by-doing' and maximising knowledge sharing through the CCS Project Network can contribute towards the reduction of technology and operational costs, faster diffusion, deployment and commercialisation. Additionally, the issue of public acceptance needs to addressed. The precise environment in each country will be different, but through the CCS Project Network the common challenges can be understood and addressed.

Fourthly, we need to start thinking about deployment of CCS after the technology is demonstrated on large scale and becomes commercially viable. Successful deployment of CCS in Europe will mean that sources of CO_2 emissions from power generation and other industrial processes will dispose of storage options almost irrespectively of their geographic location. For many sources, this will mean the possibility of linking to storage sites in other, perhaps relatively remote, locations. This underlines the importance of future CO_2 infrastructure for long-distance CO_2 transportation.

The Commission has already started taking steps to identify key parameters of such future infrastructure. A study, to be completed in 2010, aims to identify the possible scenarios of long-distance CO_2 transportation in Europe and to outline alternative blueprints for requisite EU-wide infrastructure. This task includes the identification of possible needs of public co-financing.

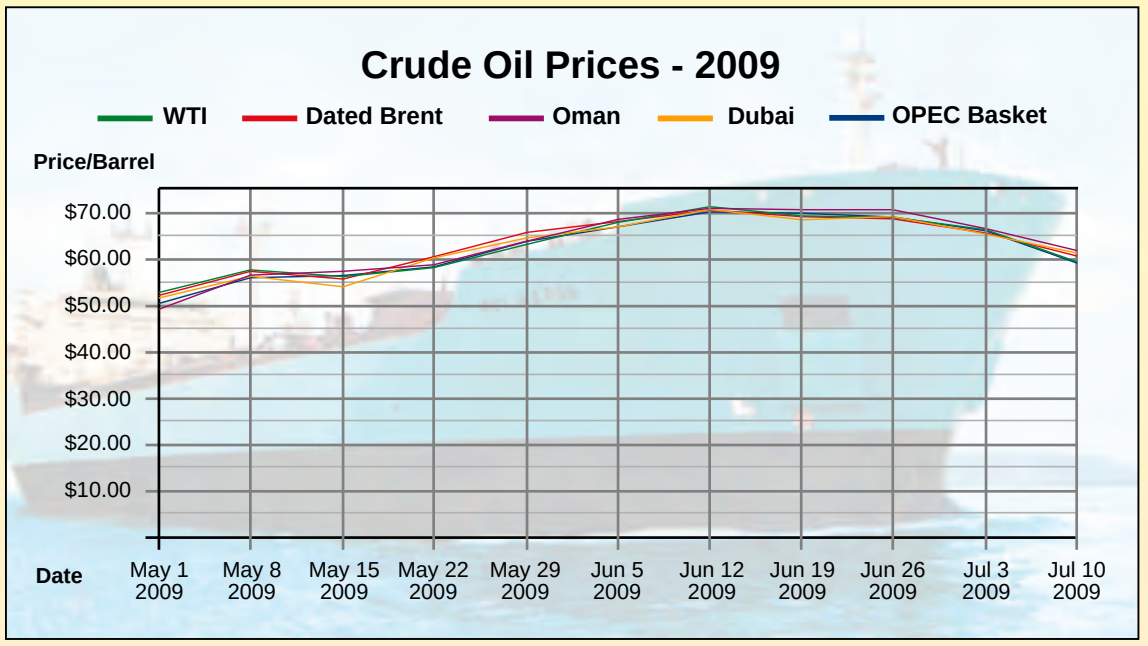
Finally and most importantly, the financing instruments the Commission has proposed via the EEPR and ETS-NER will not cover the full additional investment and operation costs required for the first CCS demonstration installations. There is a need for effective funding solutions from Member States in addition to the funds Member States will be able to use on the basis of the ETS-NER. Additional funding from national governments and industrial sponsors will be crucial for providing investors with further confidence in the first CCS projects and accelerating the wide scale deployment of CCS in a timely manner.

Only with the combined efforts of all stakeholders will the early CCS demonstration projects, and consequently the commercialisation of CCS, be achieved within the ambitious timeframe for decarbonising Europe's energy system and stabilising the global climate.

Jan Panek is Head of Unit Coal and Oil, Directorate-General Energy and Transport, European Commission, Brussels.

Oil

Crude prices in correction but demand to improve in 2010



- Global demand for crude will not return to 2008 level until 2011
- Opec may make further cuts if price falls to lower $50/b range

David Gregory

Prices for West Texas Intermediate crude oil on the New York Mercantile Exchange have experienced a correction recently, falling from a high of $72.68/b in mid-June to less than $60/b by mid-July. Analysts have for some time argued that the fundamental laws of supply and demand could not support prices in the $70/b range.

Despite efforts by Opec to cut back on production, supplies of crude oil for the global market remain abundant. It would not be a surprise to see crude prices continue to trend downward through the third quarter and not resume an upward course until the last three months of this year.

In the latest issue of its *Monthly Oil Market Report*, Opec commented on the rise in crude prices in June with the onset of the summer driving season in the US, but noted that weak demand and continuing increases in refined product stocks "capped the bullish sentiment."

Opec forecast in the report that crude oil demand in 2009 would average 83.84 million b/d compared with 85.49 million b/d in 2008, saying that "world oil demand is settling down in line with the current world economic situation." Oil demand was showing slight recovery in the US it said, but added that there is still no sign of recovery in the other OECD regions – Europe and Japan.

However, the situation is forecast to turn around in 2010. Opec projects that world oil demand will turn positive next year after two consecutive years of negative growth and show a moderate increase of 0.5 million b/d putting demand for 2010 at 84.3 million b/d. Most of the demand growth will take place in non-OECD countries, particularly China, building by 0.8 million b/d while demand in the OECD will continue to contract, by 0.3 million b/d after declining by 1.8 million b/d in 2009. "The pace of the global economic recovery continues to be the main risk for the outlook for next year," Opec said in the report.

Demand for Opec crude is forecast to average 28.5 million b/d the report said, down by 2.3 million b/d from 2008. In 2010, demand for Opec oil is estimated to reach 28.1 million b/d, down by 0.4 million b/d from the current year.

Opec has also recently released its annual *World Oil Outlook (WOO)*, which forecast oil demand up to 2030. According to the *WOO*, the destruction of demand brought on by the global economic downturn means that demand for Opec oil will not return to its 2008 level of 31.2 million b/d until 2013. The report forecasts that Opec supply will reach 32.0 million b/d in 2015, 37.4 million b/d in 2025 and 41.1 million b/d in 2030.

Opec said in the *World Oil Outlook* that global demand for crude would not return to its 2008 level of 85.6 million b/d until 2011. Global demand is forecast to reach 87.9 million b/d by 2013, 90.2 million b/d in 2015, 95.4 million in 2020 and 105.6 million b/d in 2030.

Most future growth will occur in developing countries, the *WOO* forecasts, compared to the OECD countries where governments will be implementing measures to reduce the use of crude oil. Demand in developing countries is projected as averaging 33.0 million b/d in 2008, 44.8 million b/d in 2020 and 56.1 million b/d in 2030. By comparison, OECD demand is expected to go from 47.5 million b/d in 2008, to 45.5 million b/d in 2010, 45.0 million b/d in 2020 and 43.4 million b/d in 2030.

Meanwhile, Opec continues to face present day reality. Earlier this summer, with crude oil prices on the rise and economic analysts talking of 'green shoots' and improving economic indicators, Opec ministers were expecting crude prices to reach the "fair" price of $75/b months before they had anticipated. However, analysts predict the end of the global downturn will be more of a U-shape than the hoped for V-shape.

Opec will hold its next scheduled meeting on September 9 and what course it decides to take depends on the trend in prices between now and then. Fundamentals are still weak and some Opec members have suggested that if the price falls to the lower $50/b range the group may decide to make further production cuts.

Gas

Milestone agreement for Nabucco

Despite the recent signing of an intergovernmental agreement, the Nabucco pipeline still faces a number of hurdles before it comes into operation, the most serious of which is securing a source of gas supply.

Mark Goetz

New impetus was given to the Nabucco Gas Pipeline on July 13 when the heads of state of five governments participating in the ¤8 billion project signed in Ankara an intergovernmental agreement laying the groundwork for the construction and operation of the 3300 km natural gas pipeline.

The leaders of Turkey, Austria, Hungary, Romania and Bulgaria signed documents forming the Nabucco International Joint Venture Company and creating a common tax regime and unified tariff.

Discussed for years, but delayed by political technicalities and questions over the source of supply, the Nabucco pipeline is designed to deliver natural gas from the Caspian Sea region and the Middle East through a route independent of Russia.

The signing of the governmental agreement was made possible when Turkey was persuaded to drop its demand to keep 15 per cent of the natural gas shipped through Nabucco, which has an initial design capacity of 31 billion m^3 per year (bcm/y). The agreement stipulates that the pipeline will be capable of a reverse flow that would allow shipments of gas from the EU partners to Turkey should a shortage in Turkey arise. It also states that the pipeline's six partners will have the right to reserve 50 per cent of the pipeline's capacity. The remaining 50 per cent is to be contracted to third-party customers.

The project still has any number of hoops that it must jump through before it comes into operation with initial gas shipments in 2014-15. The most serious of which is securing a source of supply. Atop the list of potential suppliers is Azerbaijan, which currently exports gas to Georgia, Turkey and Greece through the South Caucasus Pipeline (SCP) from its offshore Shah Deniz gasfield. Stage 2 of Shah Deniz is due to come on-stream with a production rate matching present output of some 8 bcm/y.

Azerbaijan has on a number of occasions expressed its interest in shipping gas through Nabucco, but until now has been unable to commit. Meanwhile, Russia's Gazprom has been lobbying Baku to purchase the entire Shah Deniz Stage 2 output, which it would likely ship to Europe through its proposed South Stream project across the Black Sea. South Stream is Russia's alternative to Nabucco, which Russia downplays because it has yet to secure sources of supply.

Apart from Azerbaijan, Iran, Iraq, Egypt and Turkmenistan could supply gas to Nabucco under favorable circumstances.

Iran has the second largest gas reserves in the world and although Turkey favors Iranian participation at some point, Washington, which has been a strong supporter of Nabucco, has made it clear that Iran would not be welcome.

Iraq could be a major supplier in the years ahead. Iraqi Prime Minister Nuri al-Maliki said Iraq would be willing to supply Nabucco with 15 bcm/y. Mr. Maliki was probably referring to gas coming from the Akkaz field in western Iraq, but in May this year, Austria's OMV, leader of the Nabucco consortium, and Hungary's MOL reached agreement with the Kurdistan Regional Government (KRG) on the development of two gasfields with the intention of exporting the gas to Europe through Nabucco.

Egyptian gas could enter Nabucco through the Turkish domestic pipeline system once the Arab Gas Pipeline is connected between Syria and Turkey.

But the clincher for Nabucco would be getting Turkmenistan to provide gas through a pipeline across the Caspian Sea. Turkmen President Gurbanguli Berdymukhammedov has stated on several occasions that his country is interested in developing multiple export routes and on July 13, the Russian newspaper *Vedomosti* reported that the Turkmen leader stated openly for the first time that his country was ready to participate in the Nabucco project.

But securing supplies from Turkmenistan poses a multi-faceted problem. The first is Russia's desire to have for itself the bulk of Turkmen gas exports. Gazprom has a contract with Ashgabat to purchase as much as 80 bcm/y of the country's gas as of 2010. Another problem is resolving the differences between Turkmenistan and Azerbaijan over disputed offshore hydrocarbon deposits. A trans-Caspian gas pipeline would link up with the SCP, which begins at Azerbaijan's Sangachal terminal on the Caspian coast.

Another problem would involve coming to terms with the unresolved status of the Caspian Sea. Furthermore, both Russia and Iran have expressed their opposition to hydrocarbon pipelines running across the Caspian Sea.

Nabucco has passed a milestone, but clearly still has a long way to go.

Floating in the wind

What is being claimed as the world's first large scale floating wind turbine is about to be connected off the coast of Norway. The technology could open up many new possibilities in the offshore wind power market. **Junior Isles**

Located approximately 10 km south east of Karmøy in Norway is a wind turbine that could mark the start of a new generation of offshore wind power plants. Construction of the Hywind project developed by StatoilHydro, was completed in June this year and will see the operation of a Siemens SWT-2.3 MW wind turbine with a rotor diameter of 82 m – sited out at sea where the water depth is about 220 m.

Typically, most offshore wind turbines are installed in water depths of 5 m-30 m. These turbines are fixed in foundations on the sea bed. However, costs of such installations begin to escalate as water depth increases. Henrik Stiesdal, Chief Technical Officer of the Siemens Wind Power Business Unit notes: "The first projects we did were in water depths of 5-8 m. These used relatively simple concrete gravity dam foundations. This water depth is really too shallow for big turbines because you cannot manoeuvre the ships needed to install the turbines. But above 20 m, the cost of the foundation really starts to escalate and above 30 m, installation is very difficult. So there is a window for installing offshore turbines."

There are several factors that influence this escalation in costs. One factor is that wave height changes with depth. Deeper sea depths produce bigger waves. These waves cause resonance in the structure and set the structure in motion. This movement can be avoided by replacing the typical foundation that is made from monopiles, with a three-leg structure but these become very expensive.

Stiesdal also points out that ultimately, suitable sites for offshore wind projects will become limited. "When considering other issues such as ship navigation and wildlife etc, at some point in time there will be limited available sea floor with the correct depth profile. Therefore, it would be good to have the ability to go to depths of more than 30 m."

There are other reasons why floating wind turbines could be desirable. There are areas in the North Sea where moving sand waves can cause the sea bed to shift considerably over the lifetime of a turbine installation. This could result in a scenario where the wind turbine is essentially left hanging freely if the sea bed disappears.

"Sea currents dig away material from any structure inserted in the sea bed. To avoid this you have to conduct scour protection which involves building a rock structure around it to prevent the sand being moved by the sea," commented Stiesdal.

The need for siting wind projects in deeper water will become more acute in countries such as Denmark where water depths are shallow. Further, there could be greater exploitation of offshore wind in countries such as Norway, Italy and Spain that have deeper water.

StatoilHydro took the decision to build the project in the first half of 2008 and is allocating in excess of NOK400 million ($64.25million) to building and developing the pilot. It entered into a technology agreement with Siemens under which StatoilHydro is responsible for the underwater part of the system and Siemens provides the mast and turbine.

StatoilHydro, with experience in the oil and gas industry, has experience of floating structures and provided Siemens with the confidence to go ahead with the Hywind project.

The world's first large-scale floating wind turbine is located approximately 10 km south east of Karmøy in Norway at a water depth of about 220 m

Stiesdal said: "We have looked at floating turbines for many years and there have been many people with floating concepts that have wanted to get into bed with us. But there are some challenges to doing floating wind turbines. StatoilHydro gave us the confidence that they could address those challenges. Their concept came closest to being cost competitive with fixed foundations and required the least amount of optimisation."

According to Siemens, Hywind is designed to be suitable for installation in water depths between 120-700 m but it is not strictly the water depth that limits the installation; the limiting factor is the anchorage. Stiesdal explained: "The structure floats when the water depth reaches about 100 m. The floating structure is anchored to blocks lying on the sea bed via several cables. When the water becomes very deep, the cable and anchor costs become very high. The cost of the electrical cable from the structure to the sea floor also increases significantly. There is nothing magical about the 700 m figure, it may change according to costs."

In the Hywind prototype StatoilHydro relies on the "spar buoy" concept, an underwater floating structure of steel and concrete with ballast tanks – a method which has been used for years for floating offshore rigs. The floating structure is essentially a 107 m (350 ft) long steel pipe, with a bottom at one end and a flange for the turbine tower at the other. A temporary lid is placed on the open end so that it can be shipped as a floating pipe. At the site, the pipe is filled with ballast tanks so that it up-ends to sit vertically in the water.

The float pulls the entire structure so deep into the water that the centre of gravity is far below the surface. This prevents the wind turbine from rocking backwards and forwards in rough seas. The centre of gravity can be set exactly by the ballast tanks. The wind turbine is tied to anchors on the sea bed with three flexible steel cables to prevent it from drifting. The turbine is then lifted onto the flanged end and fixed. "As long as you are not experiencing big waves, the installation is as easy as if you were on land," commented Stiesdal.

The Hywind project uses a turbine that was designed for offshore use. There are no special modifications. "As with all offshore machines, the tower is specially designed to match the foundation," added Stiesdal.

> The biggest challenge is the movement of the structure with the waves. Engineers therefore have to find a way of eliminating or reducing any swinging motion of the turbine

The biggest challenge is the movement of the structure with the waves. Engineers therefore have to find a way of eliminating or reducing any swinging motion of the turbine, which consequently causes fatigue problems.

This requires development of special turbine regulation technology. The turbine blades have to be set in a way to dampen out the movement of the platform. Stiesdal explained: "It is similar to if you were on a swing. You can set the swing in motion or stop it by your body movement. We make the blades act in the same way as a child on a swing."

There is also the possibility that the engineers could get it wrong and accelerate the movement, and this, according to Stiesdal is the big challenge. "We have to ensure that we never get to the situation where we create a stability problem with the structure. This has been the main area in developing the project – to ensure that the regulation stabilises the structure."

The turbine has been pre-commissioned and (as of July 15th) was scheduled to be connected to the grid at the end of July/beginning of August 2009. Following start-up, the turbine will be tested for two years, with a number of instruments attached to record loads. This field testing will be crucial.

A 3 m-high model has already been tested successfully in Sintef Marintek's wave simulator in Trondheim. Stiesdal said: "We have done many computer simulations that produce data but in the end it can only be proven when you have the data from a real [operating] machine. So there is an extensive testing programme aimed at comparing predictions with reality. With the unsteady airflow of offshore winds and the wave movement, our prediction models may not be as accurate as with fixed foundation machines."

In the beginning, the turbine will run at moderate power output but this will be gradually increased along with the operating weather window. The initial operating wind speed is expected to be about 12 m/s. This will eventually be increased to up to 25 m/s, which is the normal shutdown wind speed.

Siemens says it is too early to assess the potential market for floating wind farms. "When we built our first offshore wind project in 1991, we said it would be 10 years before we have a market. In reality, it was nine years; the next project came in 2000. I think it will be the same in this case. There will be a significant period of pilot projects first. The real challenge is not the technology but more the new infrastructure needed to ship out large volumes of floating structures. But we can say that this is a technology that could expand the amount of offshore wind energy that we can exploit," said Stiesdal.

In the Hywind prototype StatoilHydro relies on the "spar buoy" concept, an underwater floating structure of steel and concrete with ballast tanks – a method which has been used for years for floating offshore rigs

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Follow the smart money

We hear the term 'smart grid' almost as much as we hear swine flu (although perhaps slightly less so in the UK). Countries around the world are catching the smart grid bug.

Perhaps the most immediate drivers have been the need to accommodate intermittent sources of generation i.e. wind and solar into the grid as well as reducing peak demand by actively managing consumer demand. But how many utilities have done the maths to determine whether smart grids are where the smart money is?

Certainly, it would seem that many of the major economies around the world are convinced that it represents a smart investment.

At the beginning of June, China said it was developing a stimulus package for developing an intelligent power grid to help reduce costs for both utilities and consumers as well as protect the environment. The plan is for State Grid Corporation of China, the leading grid operator, to build a major smart grid by 2020.

Also in June, Korea said that it would have a nationwide smart grid in operation by 2030.

Meanwhile in July, the 10 utilities that make up Japan's Federation of Electric Power Companies said they would begin full-on development of a smart power grid able to accommodate widespread solar power generation, aiming for completion by 2020.

Across the Atlantic on June 25, the US Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability finally released details of funding for its Smart Grid Investment Grant Programme (SGIG).

The DOE announcement is perfectly timed. Although we are seeing numerous plans for smart grid development there have been few studies on what they represent in terms of a return on investment.

With pressure to meet their targets for renewables and energy efficiency, smart grids are an essential part of any government plans. Yet this does not automatically mean they are essential to the plans of a utility or grid owner. If the bulk of money for smart grid development and deployment has to come from the utility then no doubt they will want to see an analysis of the return on investment before parting with hard-earned profit.

So are smart grids a smart investment? Just before the DOE's Funding Opportunity Announcement, Jackson Associates (JA) released results from what is claimed to be the first utility-detailed nationwide study of smart grid savings. JA is a Texas-based US company that provides utility customer databases, energy-efficiency analysis and programme development and energy industry consulting.

This study is said to be the first to apply individual utility customer end-use hourly electric loads to evaluate smart grid costs and benefits. Data for more than 800 000 residential and commercial utility customers in the 200 largest US utilities were applied in the study.

> JA said that total savings potential, after cost, was $48 billion for the 200 largest US utilities

JA also claims that it breaks new ground in providing the first "bottom-up" analysis of utility smart grid systems by applying the MAISY Utility Customer Hourly Loads Databases. These databases have a long history in evaluating energy technology impacts including studies of fuel cells, combined heat and power (CHP), storage, wind, flywheel and other technologies.

The study, according to JA, applies load control and pricing programme impacts directly to individual customer end-use loads such as air conditioning, water heating, etc to determine utility-level impacts.

The economic indicators produced from the study seem encouraging. JA said that total savings potential, after cost, was $48 billion for the 200 largest US utilities and claimed that individual utility savings range from negative savings to $3.2 billion. It found that just one out of 10 utilities might lose money with comprehensive smart grid deployments.

These are fairly comforting odds but utilities should note, however, that the benefit-to-cost ratio of comprehensive smart grid systems depends on what JA calls "a complicated mix of factors (such as dwelling unit age and size) and vary widely across utilities". JA added that targeted, strategic technology deployments significantly increase the benefit-to-cost ratios. It also said that customer end-use hourly load information should be used to ensure that economic benefits exceed costs.

The message appears to be that in most cases there will be considerable savings but there should be careful study before deploying smart grid technology.

With approximately $3.3 billion in funding from the American Recovery and Reinvestment Act of 2009, the SGIG's stated purpose is to accelerate the modernization of the US electric transmission and distribution systems, and to promote investments in smart grid technologies, tools, and techniques "which increase flexibility, functionality, interoperability, cyber-security, and operational efficiency".

The DOE's Funding Opportunity Announcement (FOA) has cleared the way for applications to be submitted. According to the DOE, the first awards will be announced in October.

Grants will be split up according to the size of the proposed projects, with those under $20 million to get 40 per cent of the total funds, and larger projects between $20 million and $200 million to get the remaining 60 per cent.

With this level of funding, investing in smart grid technology makes economic sense for energy companies. At the same time it will help utilities meet government targets for combating climate change through energy conservation, speeding up the integration of renewables and preparing for the widespread introduction of electric and plug-in hybrid vehicles – should it ever happen.

Utilities argue that the integration of renewables and moving to a low carbon economy will increase the cost of electricity to the consumer. Following the UK's publication of its strategy for a transition to a low carbon economy last month, energy companies, unsurprisingly, welcomed the government's warning that energy bills would need to rise to pay for cuts in CO_2 emissions.

The UK government predicted that energy bills would need to rise by 8 per cent or £92 a year on the average bill. The effect of the planned boost to renewable energy alone would be much higher, adding about £249 to the average yearly bill to pay for the £100 billion investment needed, mostly in wind farms, to hit government targets.

In May, the UK said that it planned to complete the roll-out of smart meters to 26 million homes by 2020. Fortunately, if the case of a certain Ms Karen Gibson is anything to go by, the additional cost to the consumer as a result of more renewables may be compensated for by the use of smart meters.

A *Presswire* report said Karen Gibson, a 33-year old Nursery Manager from Northumberland, is an npower customer who had a 'smart pre-payment meter' fitted in October 2007. "I reckon I have saved around £250 since I had it fitted a couple of years ago because I am not wasting as much energy as before. I know at any given moment how much energy I am using in pounds and pence and I pay for exactly what I use," she said.

On the strength of this and the study by Jackson Associates, smart technology should prove to be as good an investment as Tamiflu.

"Mr Madoff, if you're smart, you'll tell this commission where exactly you DID invest ...!"