THE ENERGY INDUSTRY TIMES

February 2012 • Volume 4 • No 12 • Published monthly • ISSN 1757-7365 www.teitimes.com

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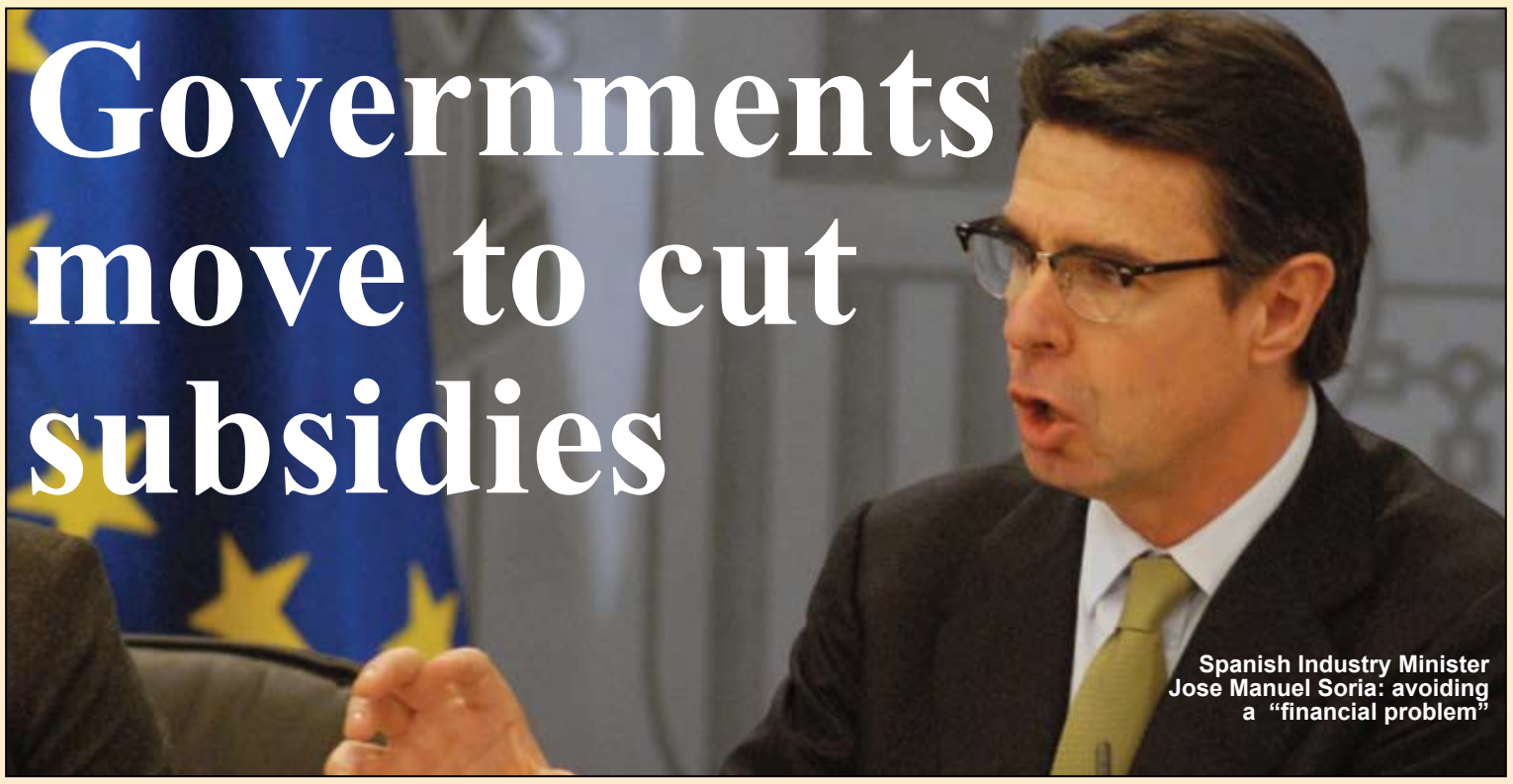
Governments move to cut subsidies



Spanish Industry Minister Jose Manuel Soria: avoiding a "financial problem"

Difficult global economic conditions are forcing governments to re-assess policies on energy subsidies, **writes Junior Isles**

Energy subsidies have come under pressure in several countries around the world as governments struggle to support them in the face of the difficult global economic conditions.

At the end of January the Spanish government passed a decree that will halt subsidies for new wind, solar, cogeneration or waste incineration plants in an effort to limit energy policy expenses, which reached €24 billion ($31.6 billion) at the end of last year.

At a recent press conference in Madrid, Spanish Industry Minister Jose Manuel Soria said that number is set to grow by €3-4 billion a year "if we don't do something." He added: "What is today an energy problem could become a financial problem."

Spain's suspension will not be retrospective and consequently will not affect existing plants or projects that have already been approved for subsidies by the government, Soria confirmed.

The decision will no doubt add further misery to developers in the solar industry in particular, who have had to contest a decision by governments to cut solar feed-in tariffs retroactively.

At the start of last year, Spain's struggling solar-photovoltaic (PV) sector announced it would sue the government over two royal decrees to reduce tariffs retroactively, claiming they would cause huge losses for the industry.

Meanwhile, a decision to cut solar subsidies in the UK was recently overturned by the Court of Appeal. Three judges ruled that parliament did not have the power to change "with such a retrospective effect" the "feed-in tariffs" paid to homes businesses and communities for generating small-scale renewable electricity.

The government must now pay the solar industry's legal costs and will also have to pay its original higher subsidy to customers who install panels between December 2011 and early March 2012. The verdict means subsidies will be halved from March 3, giving investors a three-month delay before the cuts come in.

The effect of the removal of subsidies has also been an issue elsewhere in the world.

In the US the 1603 US cash grant programme expired on 31 December after an effort to include an extension in must-pass legislation failed. Some experts say it is likely to slow but not stop the solar industry's rapid progression toward grid parity.

One more year of the 1603 programme would have put solar on course to become cost-competitive with other forms of generation during 2014-16, said Michael Gorton, CEO of Texas-based Principal Solar. However, the march toward parity will only be delayed for about a year without the cash grant programme as solar costs continue to fall dramatically, he told *Environmental Finance*.

Paul Detering, CEO of San Francisco-based solar power systems operator Tioga Energy said solar is a highly attractive asset class with good, reliable returns, which has led to an increase in the availability of investment from 'tax equity' investors for solar projects. These investors can use the tax credits renewable energy generators are able to access.

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US-China clean war dispute widens

The clean energy war between the US and China, where the US is curently investigating claims that China is practicing price dumping to sell solar panels into the US, is now escalating to the wind sector.

The dispute with China started in October when SolarWorld, a German company with a manufacturing facility in Oregon, filed a trade complaint with the the US International Trade Commission and the Department of Commerce demanding that punitive tariffs be imposed on solar panels and cells imported from China.

The dispute China has now widened to the wind sector, with the Wind Tower Trade Coalition (WTTC) filing petitions with the US Department of Commerce and the US International Trade Commission and the Department of Commerce claiming that China and Vietnam are unfairly subsidising wind turbine tower exports.

The WTTC's four members – Broadwind Energy, Trinity Structural Towers, DMI Industries and Katana Summit – allege "dumping margins" of 64 per cent by Chinese manufacturers of utility-scale wind towers, and 59 per cent by Vietnamese producers.

Alan Price, chair of the International Trade Practice at law firm Wiley Rein and counsel for the WTTC said: "The Chinese government has used, and continues to use, unprecedented levels of subsidisation to push wind towers into the US market."

The International Trade Commission has until mid-February to determine whether the domestic industry is suffering from the imports. If it finds reasonable evidence that damage is being caused to the domestic industry, the investigations will continue and the Department of Commerce will make its anti-dumping preliminary determination in June 2012.

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Detering sees the brewing trade dispute with China over solar subsidies as far more problematic than the 1603 expiry because it could drive up costs.

Although solar is rapidly moving towards grid parity, other renewable technologies such as wind and biomass still need the support of government programmes to get there, said Dan Adler, president of the California Clean Energy Fund (CalCEF), a non-profit venture capital fund in San Francisco.

"It's important as a society that we recognise the portfolio of technologies, that some technologies are not close without meaningful public support," he said.

Yet the provision of subsidies of any kind is becoming increasingly difficult for governments to maintain.

The Ugandan government announced last month it had abolished electricity subsidies, a move that will see tariffs rise by an average of 42 per cent. Energy minister Irene Muloni said the money saved would be used to expand generating capacity.

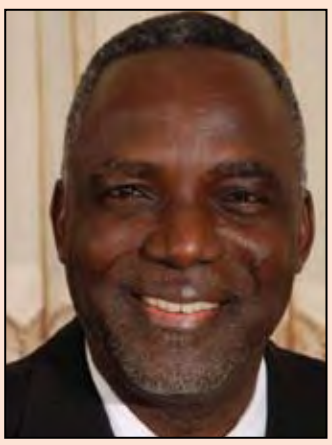
"Government has spent a total of 1.53 trillion Ugandan shillings ($623.22 million) since 2005 on subsidies to the electricity subsector. This level of subsidy is not sustainable. [The] Government has therefore decided to eliminate subsidies to the electricity subsector," said Muloni.

She did not say how much the government would save by lifting the subsidies but said the money freed-up will be used to finance the implementation of other critical government programmes such as construction of the 600 MW Karuma hydropower project.

The decision in Uganda followed a decision in Nigeria to scrap fuel subsidies that resulted in mass protests and nationwide strikes. Strikes were called off after President Goodluck Jonathan softened his stance with a new plan, which will see the government reduce fuel prices by 30 per cent.

However, the government is aware that subsidies remain an issue and supporting the power sector is too heavy a burden for it to bear. At the end of January the Minister of Power, Professor Barth Nnaji, said the Federal Government would stop constructing power plants by the end of 2014.

He said that by 2014 it is expected that all the power plants being built under the National Integrated Power Projects (NIPP) – which would bring the country's generating capacity to more than 4000 MW – would have been completed and subsequent power plants would be constructed by the private sector.



Nnaji says power plants will be built by private sector

Governments must alleviate poverty through sustainable energy

UN Secretary General, Ban Ki-moon is calling on global leaders to coordinate their efforts to alleviate poverty through an action plan that ensures universal access to modern energy services by 2030.

Junior Isles

Governments and the private sector must ramp up their investments into sustainable energy as part of a larger effort to alleviate poverty around the world and combat climate change, according to UN Secretary General, Ban Ki-moon.

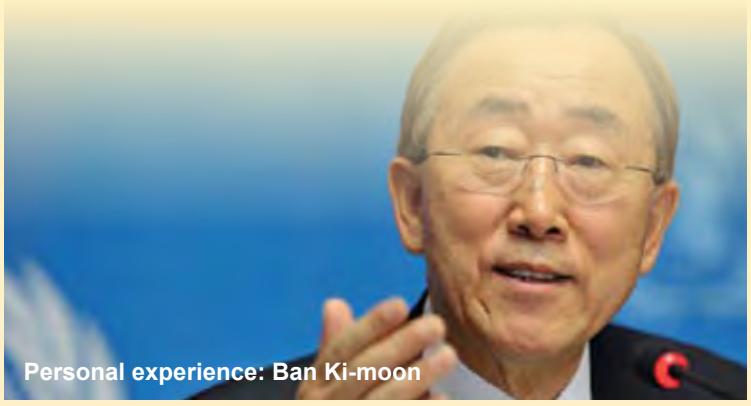
Speaking at this year's World Future Energy Summit (WFES) in Abu Dhabi, Ban called on governments, the private sector, and civil society to make significant commitments to action in support of his 'Sustainable Energy for All Initiative'.

His call to action underscores what he sees as the importance of energy to sustainable development, and contributes to the global launch of 2012 as the 'International Year of Sustainable Energy for All'.

"This is the right time for this Initiative," said Ban. "Across the world we see momentum building for concrete action that reduces energy poverty, catalyzes sustainable economic growth, and mitigates the risks of climate change. Achieving sustainable energy for all is both feasible and necessary. My initiative will help us meet these objectives simultaneously. It can be a triple win for all."

The Secretary-General has designated sustainable development as his top priority for his next five-year term.

He told delegates at WFES that globally, 1.4 billion of the world's 7 billion population has no access to modern electricity and 3 billion rely on wood, coal, charcoal or animal waste for cooking and heating. In developed countries, he said the problem is a substantial waste of energy.



Personal experience: Ban Ki-moon

The Secretary-General outlined three complimentary objectives, all to be achieved by 2030: ensure universal access to modern energy services; double the rate of improvement of energy efficiency; and double the share of renewable energy in the global energy mix from the current 16 per cent.

Ban said his commitment is based on personal experience. "Until I was a Freshman in college, refrigerators, air conditioning, etc., were a luxury. I had to study by the light of an oil lamp."

He added: "So many children do not have access to electricity. They don't have access to refrigerated medicines. We have to abolish this. I was lucky that my country developed but we now have to develop other countries. I'm appealing to leaders of the developed world to accelerate and consolidate their efforts with the developing world."

The Secretary-General has appointed a high-level group of global leaders from business, finance, government and civil society to mobilise action commitments that will help drive change on the ground, in corporate board rooms, and in policy portfolios around the world.

The group met in Abu Dhabi and produced a Framework for an Action Agenda, which proposes several high-value actions at the national and international level, including action to expand energy access, promote efficiency standards and policies, and strengthen investment in renewables.

Tepco 10-year nationalisation plan

- Government to inject Yen1000 billion
- Tepco raising power prices to improve earnings

Fukushima Daiichi nuclear plant disaster has crippled Tepco

A fundraising plan currently being considered by Japanese utility Tokyo Electric Power Co. (Tepco) and a state-backed entity for funding nuclear disaster compensation would result in the utility being nationalised.

The plan is needed to prevent Tepco from becoming insolvent due to the heavy costs resulting from the accident at the Fukushima Daiichi nuclear power plant, while ensuring that compensation payments related to the accident are paid quickly.

According to reports the special business plan, due to be submitted in March, envisages a government cash injection of Yen1000 billion ($12.9 billion) – effectively nationalising the utility.

A key issue yet to be resolved, however, is how much control the state will acquire over Tepco's management.

To exit from nationalisation as early as March 2022, Tepco would set aside a certain portion of its profits to repay the public funds. It is likely to be urged to pay back the financial assistance it has received from the Nuclear Damage Liability Facilitation Fund, using half of its pre-tax profit earned every year. The state-backed funding entity would receive funds from special government bonds and contributions from other utilities, which have nuclear power plants in Japan.

The government funding is to be matched by a roughly equal amount in loans from Tepco's private and public-sector banks. The banks are offering to provide the additional financing in exchange for not having to write-off any of Tepco's outstanding Y7800 billion debt. Effectively, they would reschedule the repayment deadline for around Yen2000 billion in emergency loans extended shortly after the nuclear accident caused by the earthquake and tsunami on March 11 last year.

Under the plan Tepco would move back into the black by 2013 and remain a listed company. But if its business condition significantly deteriorates the company may be de-listed, sources said.

Tepco has lost 90 per cent of its market value since the accident last year. Its shares closed up 5.5 per cent at the end of January in response to the news of the business plan.

The company is moving to improve its earnings by increasing electricity prices. Businesses in and around Tokyo will pay up to 18 per cent more for electricity from April. The increase will add Yen50 million ($650 000) a year to the utility bills of some factories, office buildings and department stores a Tepco simulation predicts.

Tepco had said in December that it was planning to raise prices to cover the higher cost of thermal power plants, which are more expensive to run than nuclear plants. It said that its annual fuel bills have jumped an estimated Yen830 billion as it has been forced to buy more natural gas and coal to make up for lost nuclear output.

The increase in power prices could, however, be good news for independent power producers who have struggled to break into Japan's supposedly deregulated market. Some 96 per cent of large consumers buy power from Tepco, even though they are free to buy from independent suppliers or other regional utilities.

In late January, Tepco and the Nuclear Damage Liability Facilitation Fund said they plan to invite other firms to invest in six non-nuclear thermal power plants that will be upgraded to raise efficiency and reduce fuel costs, according to the *Associated Press*.

US regains clean energy top spot

The US overtook China to regain the leading position as the world's top investor in clean energy in 2011.

A Bloomberg New Energy Finance (BNEF) report said it was the first year since 2008 that the US has been ahead of China as the world's largest market for investment in renewable energy, biofuels and energy efficiency.

It cautioned, however, that this may fall back again this year with the expiration of two key subsidy programmes introduced as part of the Obama administration's 2009 economic stimulus package – grants for renewable energy projects and government loan guarantees to encourage private sector investment in the sector.

According to BNEF, worldwide investment in clean energy rose 5 per cent to a record $260 billion. Last year investment in the US rose 33 per cent to $55.9 billion, while in China it remained largely unchanged at some $47.4 billion.

The 2011 growth in investment in renewable energy was led by solar power, which globally was up 36 per cent. At $137 billion, this represented more than half of all clean energy investment.

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Shale gas light still burns bright

US President Barack Obama: vocal support for shale oil and gas industry

International energy companies are still keen on investing in America's boom in unconventional oil and gas reserves in spite of low energy prices and continued controversy over fracking.

Chinese firm Sinopec and Total of France have both recently unveiled plans to invest in shale oil and gas reserves, the exploration of which has changed the USA's energy landscape in recent years.

Sinopec has signed a $2.5 billion deal with Devon Energy for five new development areas from Ohio to Alabama. Total is investing $2.3 billion in a venture with Chesapeake Energy and EnerVest to exploit resources in the Ohio area.

The glut of natural gas in the US has driven prices to their lowest level for ten years, and electricity prices in the country have also dropped. A number of renewable energy and coal-fired power projects have been cancelled in recent months as they are not financially viable at a time of low natural gas prices and reduced demand for electricity.

Last month, President Barack Obama lent his support to the shale oil and gas industry in his State of the Union address.

His comments were controversial because there are concerns about the impact of hydraulic fracturing – or fracking – on the environment.

In January the state of Ohio ordered a halt to well operations in an area near Youngstown for fear they were linked to a series of small earthquakes. The US Environmental Protection Agency has also been investigating the impact of fracking on groundwater.

There are also concerns about the impacts of a boom-bust cycle in the natural gas industry on the power sector. According to Bloomberg data, the cost, including construction, to produce 1 MWh of gas-fired power generation was $62.37 in the third quarter of 2011, which was less expensive than coal, wind and solar generators.

The USA needs to invest in new generating capacity to replace ageing coal fired facilities but the construction of large numbers of combined cycle plants could leave the industry vulnerable to price swings on the natural gas market.

With low natural gas prices set to remain, companies may turn to shale oil extraction instead of gas as well as cutting output from gas wells.

Chinese firms such as Sinopec are also keen to play a role in the US market in order to gain experience that could be used to exploit their own unconventional resources at home.

CSAPR put on hold

Plans to cut emissions of nitrogen oxides (NO_x) and sulphur oxides (SO_x) in the USA have been put on hold after a federal court prevented the US Environmental Protection Agency (EPA) from implementing a new rule.

The Cross State Air Pollution Rule (CSAPR) would have required power plants in 28 US states to cut NO_x emissions by 54 per cent and SO_x emissions by 73 per cent over 2005 levels by 2014.

It was to have taken effect on January 1, 2012 but on December 30, 2011, the DC Circuit Court ordered a stay of CASPR and ordered that CAIR – the Clean Air Interstate Rule, predecessor to CSAPR – be implemented until judicial review of CASPR is complete.

It is not clear whether the court ruling will result in a short or lengthy delay in the implementation of CSAPR, but it is a victory for those states and utilities that were opposed to the rule.

Around 45 companies and states raised arguments against CSAPR in the DC Circuit Court, which has fast-tracked the review of the rule.

Analysts believe that CSAPR could once again emerge later in 2012 if the judicial review is favourable for the EPA, or could be delayed until 2013 if the agency is forced to make major changes.

CSAPR will use a system of tradable air permits to reduce emissions.

Québec adopts emission trading

The Canadian province of Quebec is to implement a cap-and-trade system for reducing greenhouse gases (GHGs) in spite of the Canadian government's decision to withdraw from the Kyoto Protocol.

As of January 2013, some 75 energy-intensive companies will be required to buy permits in order to emit GHGs, according to the province's Environment Minister Pierre Arcand.

The government is setting the initial price for a ton of carbon at C$10, and is aiming to cut emissions of GHGs by 20 per cent over 1990 levels by 2020. The programme will extend to more industries in 2015.

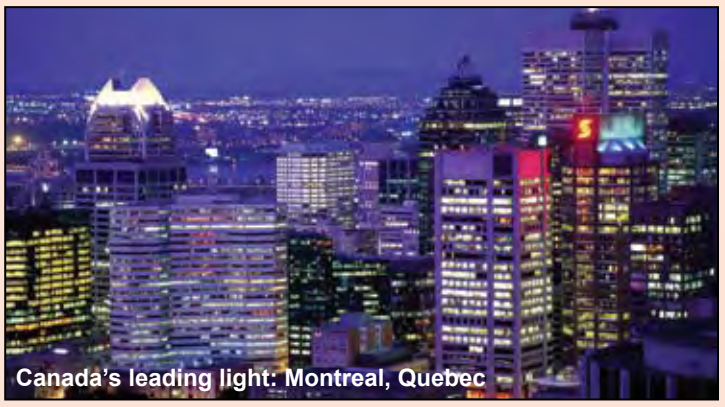
In 2012, emitters and participants will be able to register with the system, take part in pilot auctions and exchange GHG emission allowances on the market. No reduction or capping of GHG emissions will be required during this transition year.

"Cap-and-trade systems for emission allowances are recognised as one of the most effective and least costly economic tools for reducing greenhouse gas emissions. By adopting this regulation, Québec acquires the means to achieve the transition toward a green, sustainable and prosperous economy," declared Arcand.

In December Canada's federal government announced that it was formally withdrawing from the Kyoto Protocol because it leaves out some of the world's largest emitters. The country ratified the agreement in 1997 but has not met its targets under the accord.

Withdrawing from the global treaty will mean that Canada will not have to pay C$14 billion in penalties for failing to meet targets.

Canada declared four years ago that it did not intend to meet its existing Kyoto Protocol commitments and its annual emissions have risen by about a third since 1990.



Canada's leading light: Montreal, Quebec

Belo Monte decision reversed

- Construction restarts at dam site
- Electricity demand to rise 56 per cent by 2021

Construction work on a key hydro-power project in Brazil has restarted after a court judge reversed a decision to halt work on environmental grounds.

The 11 000 MW Belo Monte dam on the Xingu River is an important part of Brazil's plans to expand generating capacity in the face of rising electricity demand.

In October last year work on the controversial project was halted when Judge Carlos Castro Martins ruled in favour of a fisheries group and barred any work that would interfere with the natural flow of the Xingu.

But he now says that construction can proceed because the Norte Energia consortium that is building the dam showed that the flow of the river would not be altered in a way that would harm the habitat of fish.

The decision has prompted protests by local action groups opposed to the $11 billion project, who in January picketed one construction site and halted work there for over two hours.

The court's latest decision will be a relief to the Brazilian government, which recently published data showing that electricity consumption there will grow at an average rate of 4.5 per cent per year over the next decade.

Electricity consumption in Brazil will climb from 472 000 GWh in 2011 to 736 000 GWh in 2021, according to the state-run Energy Research Corporation, or EPE. The rise in demand is equivalent to three times the output of the massive Itaipu hydropower plant.

Environmental groups say large dams devastate wildlife

In addition to Belo Monte, Brazil is also building two other major hydropower plants – the 3150 MW San Antonio plant and the 3300 MW Jirau project.

According to EPE, the rise in electricity demand is being driven by a projected 4.7 per cent annual growth in GDP. Industrial electricity demand accounts for almost half of electricity consumption in Brazil and will rise at an average annual rate of 4.4 per cent.

Environmental groups say that the construction of large dams will devastate areas of wildlife and affect the livelihoods of thousands of people.

"The building of coffer dams, traversing one of the main channels of the Xingu, is already a major intervention in the riverine ecosystem," said Brent Millikan of International Rivers. "Besides destroying habitats and interfering in the river's hydrology, coffer dams create obstacles for local boat transportation and the movements of fish."

- E.On has signed a €350 million deal with MPX to develop power projects in Brazil and Chile. The investment is E.On's first in Brazil and is a key step in the company's strategy to build its business in fast-growing non-European markets.

China gets smart on meeting demand

The launch of a smart grid pilot and completion of a large energy storage project will help China's development of clean energy sources.

An agreement between Honeywell and the Tianjin Economic-Technological Development Area (TEDA) to implement China's first smart grid demand response project marks the official launch of the Demand Response System Pilot jointly sponsored by the US and Chinese governments through the US-China Energy Cooperation Programme (ECP). The ECP aims to develop a nationwide set of smart grid industry standards and regulations in China.

Under the agreement, Honeywell will conduct a demonstration project using its automated demand response (ADR) technology at select facilities within the TEDA development area, including government and commercial facilities, and industrial plants.

Buildings account for approximately 70 per cent of all electrical use and a majority of greenhouse gas emissions worldwide. Smart grid technology connects utilities and their customers to automatically adjust energy consumption to reduce demands on the electrical grid.

The announcement follows the completion of one of the world's largest battery energy storage stations at the end of December 2011. The utility-scale project, located in Zhangbei, Hebei Province, combines 140 MW of renewable energy generation (wind and solar), 36 MWh of energy storage and a smart power transmission system.

"The large-scale implementation of clean and green energy, such as wind and solar power, can only be realised when the technical difficulties of this new energy application in the utility system are resolved," said Xiu Binglin, Deputy Director of the National Energy Administration. "This State Grid project demonstrates a solution and will be the model of development for China's new energy resources."

The development of smart grids and energy storage projects are important for the integration of China's fast growing wind power capacity.

Overall, China plans to have some 1000 GW of installed wind capacity by 2050, making up 17 per cent of the country's electricity consumption. So far, wind power accounts for 1.5 per cent of national power generation.

According to the National Energy Bureau (NEB), China will construct 5 GW of offshore wind projects by 2015, or five per cent of its total installed wind capacity. This will create market opportunities worth Yuan80 billion ($12.7 billion).

In mid-January China announced that it will construct an offshore wind farm with an installed capacity of 300 MW in Leting County, north China's Hebei Province, making it the country's largest such project.

Industry officials say China might issue a second request for tenders for offshore concession projects, totalling 2 GW, in the first half of this year.

The development of large-scale offshore turbines will be key to meeting offshore wind targets. Guodian United Power, a leading Chinese wind turbine manufacturer, recently unveiled a 6 MW offshore wind turbine prototype in the city of Lianyungang in east China's Jiangsu province. In May 2011 Sinovel, China's largest wind turbine manufacturer, unveiled its own 6 MW offshore wind turbine prototype, installing the turbine in Jiangsu's Sheyang county.

Independent panel to discuss reforms in light of Fukushima


Osamu Fujimura: capping nuclear lifetime

Following the disaster at the Fukushima Daiichi nuclear power plant, Japan has formed an independent panel tasked with discussing reforms of the country's electric power industry.

No representatives from the power industry have been picked for the panel set up under an advisory panel to the minister of energy and natural resources. Instead, it will be an 11-member panel of university professors led by Motoshige Ito, an economist and graduate school professor at the University of Tokyo.

Other members include Junji Annen, a law scholar and professor at Chuo University's law school, Hiroko Ota, economist and professor at the state-run National Graduate School for Policy Studies, Tatsuo Hatta, economist and guest professor at Osaka University, and Toshihiro Matsumura, economist and professor at the University of Tokyo's Institute of Social Science.

Annen will act as the panel's deputy head. Hatta is known as an advocate of separating power generation and transmission businesses to promote competition in the sector.

Japan is looking to restructure its electricity sector and reduce its dependence on nuclear power following the Fukushima disaster, which resulted in the closure of the country's nuclear power plants. The plants remain closed pending the conclusion of 'stress tests'.

Last month Japan's nuclear officials moved a step closer to restarting two of more than 40 nuclear reactors that are offline – most of them for regular inspections. The Nuclear and Industrial Safety Agency said a preliminary ruling on two nuclear reactors at the Oi power plant in western Japan found the two reactors had a safety margin of 1.8 times the strength of an anticipated quake, and four times the height of an anticipated tsunami.

The stress tests are similar to those used in France and other European countries, where they conduct a simulation designed to assess if the plants could withstand extreme events such as earthquakes, tsunamis, storms and other disasters.

Some experts, however, say the tests have no clear criteria, rendering them meaningless. They also say disasters often occur in a string of events, and evaluation by computer simulation on a single event is not realistic.

Japan, which plans to announce a new energy policy this summer, is planning to cap the lifetime of nuclear plants to 40 years as part of its move to reduce its reliance on nuclear power. However, the government recently noted that the 40-year cap could be extended up to 20 years, although exemptions will be rare.

Chief Cabinet Secretary Osamu Fujimura said each reactor would only be allowed a maximum of one extension and would have to meet strict safety requirements to qualify. If the 40-year rule is applied, 36 reactors would have to close by 2030, the *Asahi* newspaper reported.

"If you limit an operational lifespan at 40 years, obviously the number of nuclear power plants would decrease," he said. "We are still aiming to reduce reliance on nuclear energy, but it's a goal that cannot be achieved overnight."

Indonesia to step up green growth

In a drive to step up green growth State power company PT Perusahaan Listrik Negara (PLN) has identified 96 locations across the country suitable for hydropower plants with a total capacity of 12 800 MW.

Around 60 per cent of the locations would be developed by PLN, while the remaining 40 per cent would be offered to independent power producers (IPP), said PLN president director Nur Pamudji.

According to the Energy and Mineral Resources Ministry's data, Indonesia has a hydro potential total of 75 670 MW but only 5705 MW is currently utilised.

Last month Export-Import Bank of Korea (Eximbank) said it was stepping up efforts to support local firms doing business in "green growth" sectors such as renewable energy, signing a deal to provide a $131 million loan to an Indonesian hydropower project.

Under the agreement, Eximbank will be the sole project financing (PF) loan provider for the $174-million project to build a 45 MW hydroelectric power plant in Wampu. Two South Korean firms, Posco Engineering Co. and Korea Midland Power Co., will take part in the construction, which is set for completion in July 2014.

Independent power projects could receive a boost if the government manages to push through a plan to raise electricity tariffs by 10 per cent in April.

Vietnam power plans gain traction in 2012

- Investments to increase by 18.7 per cent
- Nuclear cooperation agreement with the US likely to be signed this year

Syed Ali

Electricity of Vietnam (EVN) will borrow $3 billion from official development assistance (ODA) sources and foreign commercial banks in order to finance electricity projects this year.

Lenders will include the World Bank, the German Reconstruction Bank, the Asian Development Bank, the French Development Agency and the Japan International Co-operation Agency.

Funds will be used to complete the O Mon 3 and 4 thermal power projects, improve the national distribution grid and assist the electricity sector in reforming policy.

EVN's total capital expenditures this year are estimated to total about VND75.5 trillion ($3.5 billion), an increase of 18.7 per cent over last year. The investments will enable EVN to bring online eight turbine groups in four different projects with a combined capacity of 1370 MW, as well as begin construction of four other projects with a total capacity of 2390 MW.

EVN also has plans to complete 231 electrical grid projects of 110 to 500 kV and begin 60 other projects to build a 220-500 kV grid.

In the next decade, the electricity sector will build 95 power plants, with a total capacity of 50 000 MW and investment capital of $39.58 billion.

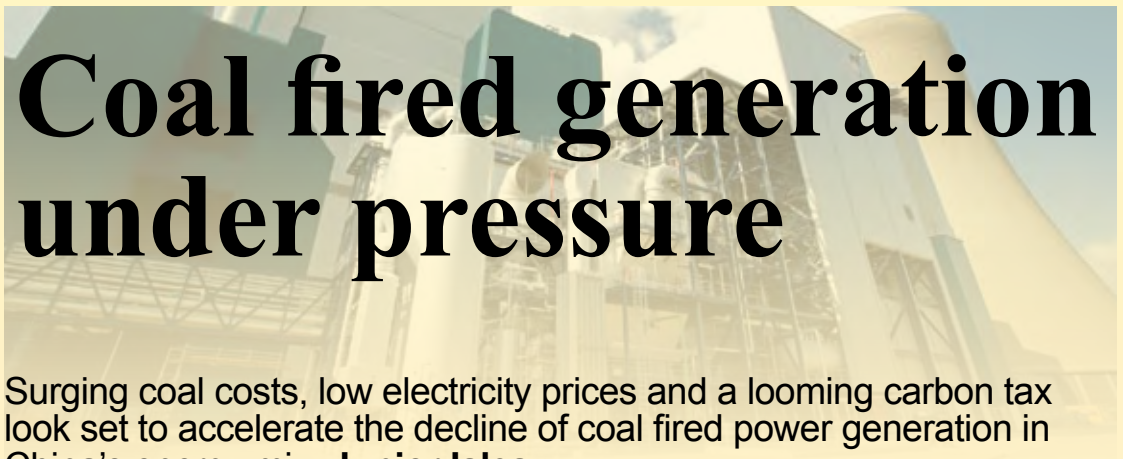
It is expected that about a fifth of the new capacity will be nuclear. Deputy Minister of Science and Technology Le Dinh Tien said last month that the country was targeting a total installed nuclear power capacity of 10 700 MW by 2030, accounting for 10.1 per cent of its total installed capacity.

Nuclear plans are expected to gain traction this year with the signing of further cooperation agreements. In January the Vietnam Atomic Energy Institute said Vietnam is likely to sign a civil nuclear cooperation agreement with the US this year, paving the way for General Electric (GE) and Westinghouse to export nuclear technology to the Southeast Asian nation.

Vietnam has so far signed the so-called 123 Agreements with Russia, China, France, South Korea, India and Argentina.

The country will use Russian technology for its first nuclear power plant and Japanese technology for the second. The plants, each with a capacity of 2000 MW, are expected to go online in 2020 and 2021, respectively.

Funds will help build thermal power projects as well as complete electrical grid projects



Coal fired generation under pressure

Surging coal costs, low electricity prices and a looming carbon tax look set to accelerate the decline of coal fired power generation in China's energy mix. **Junior Isles**

Figures from the China Electricity Council (CEC) show that investment in the Chinese power generation sector is shifting away from fossil fuel sources, particularly coal. It is a trend that is likely to continue as the country mulls the introduction of a carbon tax.

The squeeze on coal is likely to be exacerbated by weak demand and a slowing economy, which will see less investment in power projects in 2012.

In a recent report by the CEC investment totalled Yuan739.3 billion ($117.2 billion) last year, compared with Yuan705.1 billion in 2011. Investment in power generation projects fell 6.5 per cent year-on-year to Yuan371.2 billion. Spending on power grid construction increased 6.77 per cent from a year ago to Yuan368.2 billion.

Xue Jing, an analyst with the CEC, said investment in the power sector will continue to fall this year as electricity consumption growth is estimated to slow to below 10 per cent in 2012, two percentage points lower than that of last year.

The country's major power companies are planning to invest significantly less this year, especially in coal-fired power plants. Cao Peixi, general manager of China Huaneng Group, the nation's largest power company, said investment in 2012 would be scaled back, dampened by the persistent losses that coal-fired power producers suffer.

China's coal-fired power producers have long been complaining that surging coal costs and artificially low electricity prices hurt their profit margins.

Investment in the coal-fired power sector stood at Yuan105.4 billion in 2011, compared with Yuan94 billion in hydropower, Yuan74 billion in nuclear power, and Yuan82.9 billion in wind power.

The figures show a clear trend that money has been gradually shifting to the non-fossil power generation sector, said Xue Jing. During the 11th Five-Year Plan (2006-2010), investment in the coal-fired power sector shrank by half.

The trend may accelerate, with China now considering levying a carbon tax within the next three years to tighten its regulations on polluting industries. A draft of a new system of taxation has been submitted by the Fiscal Science Research Centre of the Ministry of Finance to the ministry for review. The plan would impose a tax on emissions of greenhouse gases, Su Ming, deputy director of the centre, said at the beginning of January.

Su said the tax is likely to be charged at a rate of Yuan10 ($1.59) for each tonne of carbon dioxide and is expected to increase gradually over time. The main targets of the tax will be large users of coal, crude oil and natural gas, and tax cuts will be given to companies that take steps to reduce their emissions, Su said.

Philippines invests in coal despite call for renewables

The Philippines is continuing to build coal fired plants despite a call by the president that the country should adjust its energy mix to tackle climate change.

Last month President Benigno Aquino III said the government's effort to improve the renewable energy sector is the Philippines' contribution to the global endeavour to mitigate the impact of climate change.

"With more emphasis on renewable energy resources, we can even make our own small contribution to addressing the massive problem that is climate change," he said in a speech delivered at the first Philippine BioEnergy Conference.

The President noted that almost 39 per cent of the country's energy requirements came from renewable sources such as hydropower, geothermal, solar, wind, and biomass. The government projects the contribution from the biomass sector will increase from 39 MW in 2010 to more than 300 MW by 2015.

Last June the Philippines announced its National Renewable Energy Programme (NREP), aimed at nearly tripling renewables-based generating capacity by 2030.

However, the country continues to invest in coal fired generation. At the end of December, distribution utility Manila Electric Co. (Meralco) said it was planning to install 300 MW of hydropower capacity in Luzon in the near term, but at the same time it announced it was also eyeing another 600 MW coal fired power plant.

It said that it expected to raise up to Peso40 billion ($938 million) by the first half of 2012 for a project in Subic. The power plant is estimated to cost around $1.2 billion and construction is expected to be completed by 2014.

In a separate statement, Trans-Asia Oil and Energy Development Corp. said it will start building a 135 MW coal fired power plant in Batangas this year in partnership with an Ayala Corp. unit. The plant is also expected to start operating in 2014.

At the beginning of January Sagittarius Mines Inc. (SMI) said it will build its own coal-fired power plant with a planned capacity of 250 MW within the Tampakan Copper-Gold project. The project will supply power for mining operations and export any excess to the Mindanao grid.

Meanwhile, Philippine National Oil Co-Exploration Corp (PNOC-EC) said that it is now focusing on selecting partners to build mine-mouth power plants. The company is looking to develop two 100 MW coal-fired power plants near its coal mines in northern Luzon and Mindanao.

Financial aid for Bangladesh

Syed Ali

Bangladesh's efforts to improve its economic growth and reduce poverty have received a boost as the result of a $300 million loan from the Asian Development Bank (ADB).

Only 49 per cent of Bangladesh's 150 million people have access to electricity. The nation's efforts to improve economic growth and cut the poverty rate are significantly hampered by the lack of electricity.

The ADB said aging thermal plants, inadequate natural gas supplies, and a lack of diverse power sources, have left Bangladesh with a large gap between electricity supply and demand.

The ADB loan will go towards the 'Power System Efficiency Improvement Project' which will help meet Bangladesh's urgent need for more energy-efficient generating plants and greater use of renewable power sources.

Bangladesh Power Development Board and Ashuganj Power Station Company Ltd will be the implementing agency of the project to be completed by December 2017. The total cost of the project is estimated at $581.18 million.

The ADB loan will help top-up funding from the Islamic Development Bank, which earlier pledged to provide $200 million. The rest of the money will come from the government.

The main objective of the project is to increase access to reliable and energy efficient supply of electricity.

This will see a replacement of old steam and gas turbine plants with a total capacity of 260 MW at the Ashuganj Power Station with an efficient combined cycle power plant of 450 MW capacity.

The project also calls for: the installation of a 5 MW of solar photovoltaic-based grid-connected power generation plant at the Kaptai hydropower plant site; installation of an off-grid wind solar hybrid system with a diesel generator in Hatiya Island (1 MW solar PV, 1 MW wind and 5.5 MW diesel); and the installation (and retrofitting) of 1000 km of street lighting based on solar PV and light emitting diode based technology, in six cities across the country. The cities are: Barisal, Chittagong, Dhaka, Khulna, Rajshahi and Sylhet.

Pakistan's year for wind

This year is being hailed as the year for wind power in Pakistan. The Chief Executive Officer of Alternate Energy Development Board (AEDB), Arif Alauddin says that at least 400 MW of electricity from wind power projects in Gharo and Jhimpir, Sindh province will be added to national grid by the end of this year.

He said that investment commitments of $500 million have been made for energy projects. Four wind projects were at an advanced stage, while 12 projects have completed financial closure.

Alauddin also noted that that 1200 MW would be added to the national grid every year from 2013 and pointed out that AEDB has a large number of applications from potential investors for wind projects to generate 1600 MW of electricity.

Responding to questions at a media reception in Islamabad last month, Alauddin said circular debt is not an issue with wind energy projects. AEDB has arranged a counter-guarantee worth $200 million from Asian Development Bank (ADB) for private sector wind projects. For example, ADB has provided a $32 million counter-guarantee to Fauji Foundation on its equity for $130 million project.

"ADB had offered a $500 million loan to AEDB for the development of alternative energy projects in Pakistan. But, we requested ADB to convert this loan into a counter-guarantee for alternative energy projects from the private sector. They have agreed to our proposal and allocated $200 million as the initial step," he said.

Currently, seven projects are under consideration for this counter-guarantee. Alauddin said that financing is no longer an issue for wind projects with this facility. He said that Habib Bank Ltd is financing most of the wind projects.

UK seeds public-private partnership fund

Clean energy projects in developing countries are stagnating because private investors are reluctant to give their backing without government support. A new initiative hopes to address this issue.

Siân Crampsie

The UK is joining forces with the International Finance Corporation (IFC) and the Asian Development Bank (ADB) to drive investment in clean technologies in developing countries.

The two banks and the UK's Department for International Development (DFID) have launched a new public-private fund that will provide seed finance for more than £3 billion of green energy projects.

The initiative was launched at the World Economic Forum in Davos, Switzerland, where climate and sustainability were prominent on the agenda.

The partners believe that the fund will help to encourage investment in clean energy projects, which, although deemed financially viable, are seen as too risky for private sector investment without the support of governments or other international organisations.

The Climate Public Private Partnership (CP3) initiative will consist of two funds seeded with £110 million of capital from the UK government. Every £1 is expected to attract £30 of private capital.

The fund will target solar, wind and hydroelectric power projects and is expected to result in 7000 MW of new capacity.

International Development Secretary Andrew Mitchell said that it was important to "engage and harness the power" of the private sector in the fight against climate change. He said: "Our support will reduce the risk of investing, helping the private sector to tackle this global problem by investing in some of the fastest growing economies in the world.

"Developing countries do not need to sacrifice economic growth in the interests of going green. We will support investments that deliver green growth for those who need it."

According to DFID, the fund will be run on a strict commercial basis by professional fund managers and will demonstrate that investment in climate projects in developing countries offers commercial returns for investors.

Lars Thunell, IFC Executive Vice President and CEO said that private equity could "jump-start" climate-friendly investments. He said: "Addressing climate change is a strategic priority for IFC. We hope that the fund will help make the business case for these kinds of investments and encourage additional private sector investment into innovative climate projects."

The UK will also provide a £20 million technical assistance facility to support the development of the project pipeline. The UK government says that commercial returns from the investments will be channelled into development aid.

Utilities act on prices

- ScottishPower pledges small supplier support
- UK Energy Secretary resigns

Energy utilities in the UK have taken steps to reduce bills and enhance competition in the energy market following criticism from consumer groups over the last few months.

ScottishPower in January announced plans to enhance market liquidity and support small energy suppliers, while three of the country's 'big six' energy suppliers announced price cuts.

Consumer group *Which?* welcomed the price cuts but said they were too modest and that wider reform of the energy markets was needed to protect consumers.

Energy market regulator Ofgem is currently studying proposals to simplify the energy retail markets. It wants to address tariff complexity and break the stranglehold of the big six – E.On, RWE, ScottishPower, SSE, EDF and British Gas.

ScottishPower has committed to trading at least 30 per cent of the power that it generates on the day-ahead auction of the N2EX exchange. The plans will help to enhance the liquidity of the market and allow small energy suppliers to access the market.

It also says that it will contact all of the UK's small energy suppliers to let them know about the help that it can already offer them, including simplified master trading arrangements and free trade notification services.

"We are committed to trying to establish relationships with as many small and independent suppliers as possible, and we want to help as many participants as possible to be able to have access to the market," said Neil Clitheroe, ScottishPower's CEO of Energy Retail and Generation.

Also in January, EDF Energy announced that it would cut its gas bills by five per cent from February 7, bringing the average dual fuel bill to £1129 a year, a drop of £36. It was closely followed by similar announcements from British Gas and SSE.

The price drops come after a spate of price increases late last year. The utilities have been much criticised for raising tariffs when fuel prices increase, but not putting them down in response to fuel price drops.

Richard Lloyd, executive director at *Which?*, said: "British Gas and SSE customers will welcome any help to manage their bills this winter. But with average bills now more than £1300 a year, small reductions of around £30 will not be a solution for those struggling to pay their next bill.

"This won't be enough to ensure that people get access to the affordable energy they need. That's why consumers expect the government to take action to reform the energy market."

The pace of electricity market reform and of the government's green agenda has been criticised in recent months, but the appointment of a new Energy Secretary – Ed Davey – could be a welcome shot in the arm. Davey has a strong track record in parliament in voting for tougher climate change laws and stricter pollution controls for power stations.

The previous Energy Secretary – Chris Huhne – resigned when it emerged that he is to face criminal charges relating to a speeding offence in 2003.

Danish EU Presidency targets green growth

European policymakers have stressed the need for green growth in order to boost the region's economy and overcome the fiscal crisis.

The president of the European Commission Jose Manuel Barroso as well as the Danish EU Presidency say that investment in green technologies will help to kick-start the economy and will play an important role alongside measures to sort out public finances and improving fiscal discipline.

A key challenge for the next few months will be saving the EU's emissions trading system (ETS), the region's main mechanism for reducing carbon emissions.

The recession and an oversupply of carbon credits in the ETS has led to a drastic drop in the price of carbon, making it cheaper for companies to pollute than to invest in low carbon technologies.

The Danish EU Presidency, which formally started on January 1, 2012, has put green growth and the EU single market at the heart of its agenda for the next six months. It wants Europe to invest in education, research, green growth and energy efficiency.

President of the European Commission Jose Manuel Barroso says investment in green technology will help the economy

In the next few weeks, the Danish Presidency will be focused on the Energy Efficiency Directive, which proposes a 20 per cent improvement in energy efficiency by 2020.

A newly introduced measure in the directive is proposing to reduce the number of carbon credits available on the ETS in order to 'prop up' the price of carbon.

Several major companies – including Shell and Tesco – are supporting the measure. They believe that investment in low carbon technologies is only viable at a carbon price of €25/tonne and above.

Carbon prices are currently around €6-7/tonne.

French nuclear industry needs massive investment

France will have to spend billions of euros to bring its nuclear energy fleet up to tough new standards set in the wake of last year's Fukushima disaster.

French Prime Minister François Fillon has endorsed the findings of a report by the French nuclear safety authority (Autorité de Sûreté Nucléaire, ASN), which says that "massive" investment is required.

None of the country's 58 nuclear reactors needs to be immediately shut down, says the report, but new measures such as flood-proof diesel generators and bunkered back-up control rooms must be implemented.

EDF, which owns and operates the country's nuclear plants, estimates that the work will cost €10 billion. The investment is likely to increase EDF's production costs and could lead to an increase in electricity prices.

EDF has already undertaken a programme of work to improve the availability of its reactors and maintenance practises.

International collaboration at WFES

- Leaders call for cooperation
- Valle 1 and 2 start operating

January's World Future Energy Summit (WFES) in Abu Dhabi saw the development of several key agreements and projects in the field of clean energy technology.

Masdar, the Abu Dhabi government-backed renewable energy company and organiser of WFES, signed deals with Siemens Energy, the Scottish government and the Kingdom of Tonga.

It also announced that Torresol Energy, its solar thermal joint venture with Sener, has started commercial operation at the Valle 1 and 2 concentrating solar power (CSP) plants in Cádiz, southern Spain.

Siemens and the Masdar Institute of Science and Technology (MIST) in the UAE are to jointly conduct research and development into the use of photovoltaic (PV) panels in the Middle East. In Scotland, Masdar and MIST are to support Scotland in the development of a comprehensive renewable energy programme.

Masdar's deal with Tonga will see it build a 500 kW PV plant on Vava'u Island. The plant will be financed with the help of a grant from the Abu Dhabi Fund for Development and will deliver around 13 per cent of Tonga's electricity demand.

The annual clean energy event attracts industrial leaders, investors, developers, policymakers and specialists from over the world to discuss the challenges of environment, security and sustainability in the energy sector. Chinese Premier Wen Jaibao used his keynote speech at the event to call on greater cooperation around the globe to tackle such issues.

"To reduce the problems and inequality brought by the energy and resources issues, countries in the world should take further action and exert more effort," said Wen.

Wen said that energy efficiency, renewable energy, the promotion of new technologies and the safeguarding of energy security should be prioritised on the international agenda. Favourable policies and market mechanisms should be implemented to achieve the key objectives, he said.

"China will work with the nations in the world to step up international cooperation and promote sustainable innovation to build a new world with green development and sustainable growth," the Chinese premier said.

Scottish First Minister Alex Salmond stressed the importance of international collaboration in the move to a low-carbon society. The agreement between Scotland and Masdar will lead to the development of clean energy projects as well as investment in policy development, best practise initiatives and research.

"Scotland has committed to ensuring that renewable energy sources contribute to at least 100 per cent of its own electricity requirements by 2020, while continuing to export surplus power. With abundant, untapped natural resources, Scotland has a tremendous potential for renewable energy. Our countries share a similar vision where new forms of power will compliment and help balance the global energy mix," said Dr. Sultan Al Jaber, CEO of Masdar.

In Spain, Torresol Energy has started commissioning two 50 MW parabolic trough CSP plants equipped with thermal storage. The projects are a key part of Torresol's development plan that it set out when it was created by Sener and Masdar in March 2008.

Each of the plants will produce 160 GWh of power per year, equivalent to the amount of power consumed by 40 000 households. Together, the two plants will avoid the emission of 90 000 tons/year of CO_2 emissions.

The thermal storage of the plants allows them to continue producing energy for 7.5 hours at full power capacity without sunlight.

New coal planned for Turkey

Coal fired generation is on the cards in Turkey

Siân Crampsie

Turkey's AES Entek is set to begin construction of a new coal fired power plant later this year after signing an agreement with Oyak, the country's largest pension fund.

AES Entek and Oyak will be 50-50 partners and build the 625 MW Ayas power plant on a greenfield site in southeast Turkey. The plant is likely to start operating in late 2016 and will provide Turkey with a welcome boost to its power generating capacity.

Turkey is one of the world's fastest growing economies with its annual gross domestic product forecast to grow at more than five per cent, according to Eurostat. Its installed capacity of 52 GW of coal, geothermal, hydroelectric, natural gas and wind facilities is expected to increase by as much as 30 per cent by 2016.

Turkey is also examining ways of improving its energy security by improving ties with its neighbours. Iran said in January that it would double electricity supplies to Turkey next year, while Georgia has announced plans to put into operation two high voltage power lines enabling it to increase exports of power to Turkey and Azerbaijan.

AES Entek is a 50-50 joint venture between US power firm AES and Turkish firm Koç Holding. AES has been active in Turkey since 2007 and currently operates three gas plants there with a total capacity of 302 MW, as well as 62 MW of small hydro facilities.

Lebanon cuts worsen

Beirut: power crisis Lebanon

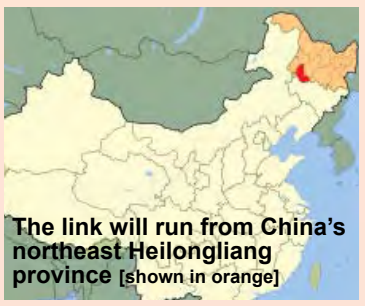
Lebanon's electricity crisis is set to worsen and is becoming a catalyst for political unrest.

Lebanon has an electricity demand of 2400 MW but can produce only 1500 MW. Power cuts are frequent across the country and local reports indicate the towns in the south receive power for only four hours per day.

Energy and Water Minister Jibran Bassil says that the situation has worsened in recent weeks, partly due to the rainy season and also because of maintenance work being carried out. Demonstrations have been reported in south Lebanon, Chouf and Bekaa regions.

Bassil says that he has formulated a number of emergency plans but that the Cabinet has taken no action. He wants to lease power barges, rehabilitate the Jiyye and Zouk power plants and complete the Mansouryeh high voltage power lines.

China, Russia complete cross-border project



The link will run from China's northeast Heilongliang province [shown in orange]

China and Russia have started trial operations of the Trans-Amur inter-connection project, the largest cross-border transmission line in China.

The 750 MW link will link China's northeast Heilongliang province with Russia's far east and is an important part of energy cooperation between the two countries, according to State Grid Corporation of China (SGCC).

Russian Deputy Energy Minister Andrei Shishkin said in June 2011 that the transmission project would increase Russia's power supply to China to five or six billion kWh. It wants to increase this to 60 billion kWh by 2020 and is planning the construction of new power plants along the border.

Clean-tech investment set for growth

- US, Asia see investments grow
- M&A remains strong

Investment in the clean-tech sector is set for continued growth in 2012 in spite of difficult economic conditions, according to the Cleantech Group, an international consulting and research organisation.

Cleantech group believes that global clean technology venture and corporate investments totalled $9 billion in 2011, a 13 per cent increase over 2010, and believes the trend will continue in 2012.

"Despite some of the well-publicised headwinds, venture capitalists continue to invest in clean-tech," said Sheeraz Haji, CEO of Cleantech Group. "Based on our historical data, we believe 2012 will be an all-time record year for global clean-tech investments."

The company's research shows that mergers and acquisitions (M&A) in the clean tech sector reached record highs in 2011 with a 153 per cent increase in dollar volume over 2010. Large corporate players remain interested in buying up emerging clean-tech players with established leadership positions in specific sub-segments, and transactions will increasingly carry "scarcity values" as top companies get acquired, says Haji.

In 2011, investments in North America rose by 31 per cent over 2010 to $6.8 billion, with California the main recipient. Investments in Europe took a step back, however, dropping 30 per cent.

Asian companies raised $879 million in 71 disclosed rounds in 2011, according to Cleantech Group, compared with 75 in 2010 valued at a total of $805 million.

Vestas sets its sights on the Middle East

Despite slashing profit forecasts for 2012, Vestas sees growth opportunities in the Middle East as a result of ongoing development in wind turbine technology, **writes Junior Isles**

Vestas believes the Middle East will be one of the regions where it will see future profits. The statement follows a tough year in 2011, which looks set to remain difficult in 2012.

Speaking at the World Future Energy Summit in Abu Dhabi, Juan Araluce, President of Vestas Mediterranean, which covers the Middle East, sees good prospects in the region.

He said: "Average use of renewables for electricity production across the world is 3 per cent. In the Middle East it is just 0.2 per cent. We see the share of renewables globally reaching 20 per cent going forward.

So with MENA having a share of 0.2 per cent, you can imagine our expectations for the future. We see growth in the region underpinning the big increase in both economic terms and population."

Rich oil and gas producing countries such as Saudi Arabia, the UAE and Oman are embracing renewables because of climate change as well as the realisation that it makes more economic sense to export oil and gas, as opposed to burning it in power stations.

Advances in wind turbine technology mean that wind turbine manufacturers are now able to exploit low wind speeds such as those found in the Middle East.

Araluce commented: "The UAE may not be known as a place for wind but with our technology we are able to generate power from wind speeds as low as 3 m/s. Ten years ago when we looked at the wind atlas for Spain, there were just two tiny areas where we could do wind projects. Today, with more than 20 GW of wind projects in Spain, the wind atlas covers the entire peninsula. The wind has not changed but the technology we have now, and the technology that is coming, means we can build projects in low wind regions. There are now plenty of places we can be very profitable."

Despite securing more than 1 GW of wind projects in Latin America alone last year, Vestas has, however, had to cope with a difficult year.

At the beginning of January it announced that it is unlikely to have made a profit in 2011, as a result of €125 million ($161 million) higher-than-expected development cost for its new turbine technology and a delay of revenues and earnings of about $400 million and $130 million, respectively from the fourth quarter of 2011 to the first quarter of this year.

Sluggish sales have already forced the company to slash its forecasts for 2012 twice. It has also abandoned its 2015 sales target of €15 billion ($19.1 billion) and the aim of reaching a profit margin of 15 per cent.

The company laid off 3000 workers after posting a 24 per cent drop in profits in the third quarter of 2011 and said it would layoff a further 2335 people worldwide. It has also warned that an additional 1600 jobs in the US could be at risk if Congress did not extend tax breaks for renewable energy.

Vestas stocks rose 2.6 per cent in late January, however, after US president Barack Obama urged Congress to vote for clean energy tax credits. The company's annual results were due to be published on February 9, 2012.

DNV boosted by Kema acquisition

DNV says that its acquisition of 74.3 per cent of Kema's shares will enable it to help energy sector companies face the challenges of a rapidly changing industry.

The Oslo-based risk management consultancy will form a new company known as DNV Kema that will offer consulting, testing and certification services focused on driving sustainability, safety and reliability in the international energy sector. The company will be led by Kema's current CEO, Thijs Aarten, and headquartered in the Netherlands.

"The combination of cleaner fossil-fuel-based power generation and the increased use of renewables will truly make a global impact. This is the strategic rationale behind DNV's biggest investment ever which… makes DNV a leading global player in third party and technical advisory roles," says Leif Arne Langøy, the Chairman of DNV's Board of Directors.

The drive for stricter environmental regulations and increased fuel costs are forcing a transition in the energy sector that will require system-wide changes that DNV Kema will be able to support. The shift is already underway in the USA, Europe and Asia, says DNV.

DNV Kema's services will cover the entire energy value chain from energy source to end user, including wind energy, carbon capture and storage, carbon trading, energy efficiency, power generation, transmission and distribution, and energy-related testing, inspection and certification. Its core markets will be Europe, North America and China.

"Over the past two decades, we have become a leading certifier and technical adviser on renewable energy. But to fulfil our ambition of really impacting our customers' transition towards a low carbon economy we need to also provide independent certification and technical advice to the power generation, transmission and distribution sector. Kema is globally recognised in this mission sector and is thus a perfect strategic fit," says Henrik O. Madsen, the CEO of DNV.

He added: "The acquisition of 74.3 per cent of Kema's shares is a huge step towards achieving our ambitions and widens our portfolio, which includes our traditional maritime and oil & gas businesses."

Renewable challenges burden Siemens

- Fossil energy boosts profits
- Project delays and charges hit profits

Siân Crampsie

Renewable energy posted a loss of €48 million attributable to increased price pressure and higher costs. Power transmission reported losses due to offshore wind connections

Siemens says that it expects to see a recovery in the economy in the second half of 2012 after reporting that the uncertainties of the eurozone debt crisis as well as project delays and charges have hit its performance.

The German industrial giant's first quarter results for 2012 show particular problems in its renewable energy and power transmission divisions, which reported losses attributable to increased price pressure and higher costs. Its fossil energy division is one of the few business areas to report a significant rise in profits, up 22 per cent compared to the period for 2011.

Overall, Siemens posted a five per cent decline in orders across its entire business compared with the same period in 2011 as well as a 23 per cent decline in profit to €1.6 billion. Revenues rose by two per cent compared with 1Q 2011, to €17.9 billion.

"The uncertainties of the ongoing debt crisis have left their mark on the real economy. Our revenue increased again, while certain project delays burdened profits," said Peter Löscher, President and CEO of Siemens AG. The company's order backlog of €102 billion should provide a buffer against wider economic problems.

Siemens' energy sector reported an overall quarterly profit of €481 million, down from the €753 million reported in 2011. Fossil power generation reported a 22 per cent rise in profits while renewable energy posted a loss of €48 million.

The company's power transmission division reported a loss of €145 million for the quarter, largely due to €203 million of charges related to grid connections in the German offshore wind sector. Siemens also took a €51 million charge related to the Olkiluoto nuclear power project in Finland.

Revenues in the renewable energy sector rose nine per cent year-on-year, with nearly all growth coming from the Americas region, while new orders climbed by 65 per cent compared to 1Q 2011. Orders from the USA for onshore wind farms showed strong growth and Siemens expects its wind business to see continued revenue growth and a return to profitability.

Siemens says that the complex regulatory environment in the German offshore wind sector caused project delays, and that the continued economic uncertainty is causing clients to put off investments. Higher expenses for R&D, marketing and selling associated with expansion in a highly competitive market contributed to the losses in the wind sector.

EV batteries get second look

Four international companies have joined forced to test the viability of using battery packs reclaimed from electric vehicles in the power sector.

ABB, 4R Energy, Nissan North America and Sumitomo Corporation of America are to investigate how used lithium-ion battery packs from the Nissan Leaf electric car could be used as energy storage or back-up power devices in the commercial and residential electricity sectors. The project is an important part of Nissan's strategy to manage the complete lifecycle of electric vehicle battery packs.

The battery packs have up to 70 per cent of their capacity remaining after around ten years of use in a car – this means that although the vehicle is likely to need a new battery, the used battery could be put to use in other applications such as energy storage or in the smart grid.

ABB and its partners intend to develop a Leaf battery storage prototype with a capacity of at least 50 kWh, enough to supply 15 average homes with electricity for two hours. "The agreement will allow us to evaluate the commercial viability of a grid storage solution and develop a prototype to effectively re-use Nissan LEAF batteries," said Bruno Melles, head of ABB's Medium Voltage power products business.

Re-usable: Nissan LEAF battery

Tenders, Bids & Contracts

Americas

Alstom wins McNeill link upgrade

ATCO Electric has selected Alstom Grid to replace and upgrade the control equipment at the McNeill converter station in Alberta, Canada.

The converter station houses a 150 MW back-to-back high voltage direct current (HVDC) link that acts as a key exchange between several North American electricity networks.

Under its contract, Alstom Grid will replace the now obsolete control equipment with the latest Alstom Grid Series V digital control system, which will improve the performance and will extend the life of the converter station.

Grand Ridge opts for GE thin film

Invenergy has announced an agreement to buy 23 MW of solar equipment from GE Energy for its Grand Ridge solar project in Illinois, USA.

GE will supply its thin film solar panels to the project as well as packaged inverter skids that include inverters, transformers and recombiners as well as SunIQ plant controls. When completed in mid-2012, Grand Ridge Solar will be the largest solar farm in the Midwest.

The Grand Ridge solar site is located adjacent to the company's Grand Ridge wind project. Invenergy, the USA's largest independent wind power generation company, owns and operates Grand Ridge Wind, where 140 of GE's 1.5 MW series wind turbines are providing 210 MW of power.

Acciona wins Montana contract

NaturEner USA has awarded Acciona Windpower a contract for the construction of the Rim Rock wind park in Montana, USA.

Acciona will supply 126 of its 1.5 MW wind turbines for the project, and will also be responsible for construction and for the operation and maintenance of the project for a period of seven years.

Acciona has previously worked with NaturEner to supply 210 MW of wind power for the Glacier Wind I and Glacier Wind II wind parks in Montana.

Toshiba ST ordered for Holcomb

Toshiba Corp has won an order to supply a steam turbine generator for a new thermal power plant planned for Kansas, USA.

Under the contract with Colorado-based utility Tri-State Generation and Transmission Association Inc. and Kansas-based utility Sunflower Electric Power Corp., Toshiba will install the equipment at the Holcomb Thermal Power Plant, which plans to start operations in 2017.

The Japanese company, which has supplied over 90 steam turbine generators for thermal power plants including those now under construction in North America, plans to supply the equipment to the Kansas plant in July 2014.

Asia-Pacific

Wärtsilä wins Bangladesh contracts

Finland's Wärtsilä has been awarded two contracts to supply power plant generating equipment to Bangladesh.

The equipment will be delivered on a fast-track basis to two new power plants that will generate a combined 200 MW. One order is for twelve 20-cylinder Wärtsilä 32 generating sets with an output of around 100 MW, while the other is for six 18-cylinder Wärtsilä 46 engines in V-configuration with an output of over 100 MW.

The engines will operate on heavy fuel oil and can be converted to run on gas when the fuel becomes available.

Rajasthan orders solar steam turbines

Siemens Energy has been awarded three orders by different customers to supply a total of four steam turbine generator units for solar thermal power plants in the Indian state of Rajasthan.

Siemens will supply its SST-700 type steam turbines for the projects, which will add a total of 300 MW to the power grid when they go on-line in 2013.

They are being built as part of the Jawaharlal Nehru National Solar Mission (JNNSM), the Indian government's ongoing programme for promoting solar power.

Six bids for Bibiyana III

The Bibiyana II gas fired power plant project in Bangladesh has attracted six international bidders.

State-owned Power Development Board (PDB) said in mid-January that five of the bids were from Chinese firms with the remaining bid from a joint venture of Japan's Marubeni and Hyundai.

The Chinese firms bidding for the 450 MW project are CNEEC, Shanghai Electric Group, SEPCO-3 Electric Corporation, China National Technical Import-Export Corporation and a joint venture of HEI, ETARN and CCCE.

Vestas enters Pakistan wind market

The second phase of Pakistan's first wind farm is to be equipped with Vestas wind turbines after Zorlu Energy Pakistan Ltd. placed an order with the Danish company for 28 wind turbine units.

Zorlu Energy is building the 56.4 MW wind farm at Nooriabad in Jimpir, Sindh, under an agreement with Pakistan's Alternative Energy Development Board (AEDB).

It completed the first 6 MW phase of the project in 2009 and Vestas is to deliver the remaining 50.4 MW.

Vestas will supply its V90-1.8 MW wind turbines to the project as well as provide site supervision and commissioning services. Wind turbine delivery is scheduled to start in the first half of 2012 and the project is expected to be completed by the end of 2012.

B&V aids Manjung project

Black & Veatch has been awarded a contract to provide engineering services and procure balance of plant equipment systems for China National Machinery Import & Export Corporation (CMC), which is building a major new power plant in Malaysia.

The 1000 MW coal-fired Manjung Unit 4 power plant will provide baseload power to the Malaysian grid. It is being built by CMC and Alstom and will use supercritical technology.

Black & Veatch will procure equipment for the major balance-of-plant facilities outside the power island. The company will also provide technical advisory services to CMC.

Europe

Lapland orders wind turbines

Vestas has received an order from Finnish firm TuuliWatti Oy for the delivery of ten wind turbine units for a project in Lapland, Finland.

Vestas will supply its V112-3.0 turbines for the 30 MW project, which is due to be commissioned in 2013. It will supply, install and commission the turbines, located in the municipality of Tervola.

Mälarenergi orders recovered fuel boiler

Metso is participating in a project to upgrade a combined heat and power (CHP) plant in Västerås, Sweden, by supplying the world's largest recovered fuel fired boiler.

The new boiler is of CFB design and will have a fuel input of 167 MW. The principal fuel for the new boiler will be recovered fuel prepared from municipal waste, and the new boiler will also be able to burn biofuel.

The modernised CHP plant will be commissioned in the middle of 2014. It will meet the district heating needs of Västerås and Hallstahammar municipalities.

Consortia submit offshore bids

EDF, GDF-Suez and Iberdrola have submitted their bids to build the first offshore wind farms in France.

Five offshore projects worth an estimated €10 billion are up for grabs and will result in the construction of up to 600 turbines in waters off the coasts of Normandy and Brittany. A second call for bids is expected to be made in April 2012.

Iberdrola is bidding for two sites in Brittany while EDF and GDF Suez are bidding for four of the five projects. EDF is teaming up with Alstom on all of its bids and Iberdrola with Areva, GDF Suez is working with Areva and Siemens.

The French regulator will announce winning bidders in April.

Fenno-Skan 2 commissioned

ABB has announced that it has successfully commissioned Fenno-Skan 2, a new high voltage direct current power link between Finland and Sweden.

The 800 MW link will reduce transmission bottlenecks in the region and will run in parallel with Fenno-Skan 1, which was delivered by ABB in 1989. It comprises two converter stations linked by an HVDC cable.

Fenno-Skan is owned and operated by Fingrid and Svenska Kraftnät.

Don Valley awards PMC contract

UK-based 2Co Power has awarded Foster Wheeler a project management consultancy contract for its Don Valley power project in Yorkshire.

The Don Valley project is part of a carbon capture and storage (CCS) scheme being developed by 2Co that comprises a 900 MW integrated coal gasification combined cycle (IGCC) power plant, carbon dioxide (CO_2) transport and storage with enhanced oil recovery (EOR) system.

Foster Wheeler's role will include development of the EPC contract package, and engineering strategy, review of the existing front-end design package, review of the licensors' scope of work and process design packages, and provision of other development support to 2Co. 2Co has said that its intention is that, after the final investment decision is taken, Foster Wheeler will manage the EPC contract.

2Co Energy has applied to the UK government and the European Union for financial support.

Svenska Kraftnät places $160 million cable order

ABB has won an order from Sweden's national grid operator, Svenska Kraftnät, to provide a new high voltage underground cable system for the South-West power transmission project in southern Sweden.

The new transmission system will enhance capacity and strengthen reliability in Sweden's national grid as well as boost transmission capacity in the south of the country and between Sweden and Norway. When completed in 2014, it will be the longest and most powerful underground cable link in the world.

ABB's underground HVDC cable system will have the capacity to transport 2 x 660 MW of electric power at a voltage level of 300 kV across a distance of about 200 km between Barkaryd and Hurva in southern Sweden.

ABB is responsible for the design, engineering, manufacture, supply and installation of the entire cable system, including terminations, joints and other accessories.

REpower supplies Bradwell

REpower Systems SE has signed a contract to supply ten wind turbines for RWE npower renewables' Bradwell wind farm in Essex, UK.

The Suzlon-owned company will supply REpower MM82 machines to the project, with installation starting in the second half of 2012.

Rick Eggleston, Managing Director of REpower UK, said: "Signing the contract for Bradwell has boosted our RWE npower renewables portfolio to over 70 MW. They were one of the first companies to buy REpower wind turbines in the UK, so we're delighted to continue our relationship with them."

International

Iberdrola wins Poland wind contract

Polish firm Tauron Ekoenergia has placed an order with Iberdrola Ingenieria for the construction of an 82 MW wind farm in Marszewo, Poland.

The wind facility will be Iberdrola's tenth in Poland. It says that it will complete the €135 million contract in 20 months.

FCVS contract for Cernavoda

SNC-Lavalin Nuclear has awarded Areva a contract to provide filtered containment venting systems (FCVS) for Units 1 and 2 at the Cernavoda nuclear power plant in Romania.

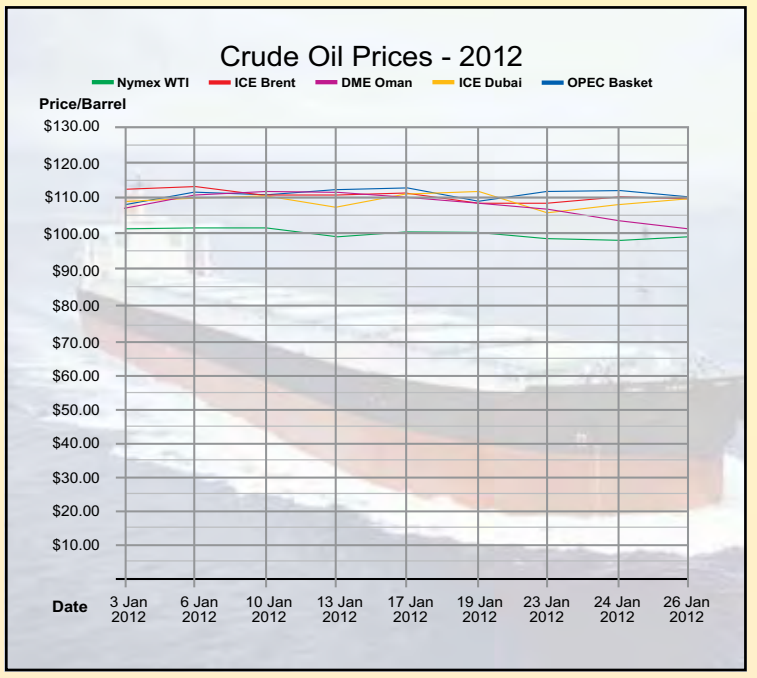
The contract is part of a global cooperation agreement between Areva and SNC-Lavalin for CANDU-specific reactor designs. FCVSs prevent the build up of excessive containment pressure and contribute to safe operations, while ensuring the protection of both the public and the environment.

They are designed for use in the event of a severe accident leading to the reactor core meltdown and the partial or total incapacitation of safety systems.

The project is planned for completion over the next 27 months.

Oil

Prices move higher amid Iran debacle



- Iran can be expected to seek alternative buyers
- Supply failed to keep pace with demand in 2011

David Gregory

Iran's refusal to halt its nuclear energy programme, in which it is suspected of working to create a nuclear weapon, has brought sanctions in the form of a ban on Iranian crude imports into the European Union starting July this year.

The EU on January 23 issued a statement announcing its decision, including in the sanctions a freeze on assets held in the EU by the Central Bank of Iran, a ban on the import of petrochemicals and the export of petrochemical technology. Investment in this sector or joint ventures has also been barred.

EU countries, which import an average of 500 000 b/d Iranian crude, are being given time to find alternative suppliers.

The EU's warning that it would impose sanctions led to Iran threatening to close the Strait of Hormuz, which handles about 20 per cent of the world's daily oil supply. The politics has affected the price of crude and is likely to keep the price of Brent in the $110-120/b range for as long as the West perceives a danger to the freedom of movement through the Strait.

Iran can be expected to seek alternative buyers and denies the EU sanctions will affect its economy or its nuclear programme.

The crude oil market is itself tight enough without the Iran drama. In its latest monthly oil market report, the London-based Centre for Global Energy Studies (CGES) said it was not surprised that 2012 began with a jump in oil prices, noting that the EU embargo on Iranian crude and Iran's possible retaliation was the spark for the new year increase. But CGES pointed out that its analysis of 2011 shows the current level of oil prices are a "reflection of market fundamentals that have tightened considerably over the past 12 months."

According to CGES, supply failed to keep pace with demand in 2011 even though world oil demand increased by only 650 000 b/d, or 0.7 per cent, during the year. And it said data shows that global oil consumption declined during the last quarter of last year, the first year-on-year drop since the middle of 2009. The consultancy noted that Opec took several months to respond to the removal of more than 1 million b/d of Libyan crude from the market last spring, adding that non-Opec production declined during the year.

"The net effect of the failure of supply to keep pace with demand last year was another big stock draw," CGES said in the monthly report. Outside the former Soviet Union, stocks cover 63 days worth of forward demand, it said. Furthermore, the CGES said that it did not expect Opec's recent decision to increase its aggregate production level to 30 million b/d to be sufficient to reduce prices.

It did, however, say that it expected Saudi Arabia, to adjust its output to sustain crude prices at around $100/b.

On prices, the US Energy Information Administration (EIA) said in its January *Short-Term Energy Outlook* that it expected the price of West Texas Intermediate (WTI) to average $93/b for 2011, $101/b in the fourth quarter of 2012 and $106/b in the fourth quarter of 2013.

Meanwhile, BP in mid-January released a global forecast for energy demand to 2030 that said world demand for energy would grow by 39 per cent, or 1.6 per cent, annually over the next 20 years. This growth would occur almost entirely in non-OECD countries.

According to BP, consumption in OECD countries will rise by only 4 per cent in total over the period. Fossil fuels will continue to dominate global energy, accounting for 81 per cent of world energy demand in 2030, although this is down by 6 per cent from current levels. It said the next 20 years will see more fuel switching, with more gas and renewables use at the expense of coal and oil.

BP's forecast said growth of unconventional supply, including shale oil and gas, Canadian oil sands, and Brazilian deepwaters, against a background of a gradual decline in oil demand, will see the West become almost totally energy self-sufficient by 2030.

"This means that growth in the rest of the world, principally Asia, will depend increasingly on the Middle East in particular for its growing oil requirements," the forecast said.

Oil will continue to lose market share although demand for hydrocarbon liquids will reach 103 million b/d in 2030, BP said, an increase of 18 per cent over 2010. "This means the world will still need to bring on enough liquids – oil, biofuels and others – to meet that forecast 16 million b/d of extra demand by 2030 and replace declining output from existing sources," it said.

Gas

Trans Anatolian gas pipeline elbows out Nabucco

An agreement to build a pipeline from Azerbaijan to Turkey's border with Bulgaria looks likely to bring down the curtains on Nabucco's decade-long run.

Mark Goetz

An agreement between Azerbaijan's state-owned oil and gas company Socar and Turkey's Petroleum Pipeline Corporation, Botas, to build a gas pipeline from Azerbaijan to Turkey's border with Bulgaria has all but sealed the fate of the Nabucco Gas Pipeline project, once the European Union's best hope to diversify gas supplies from the Caspian.

In December, Socar and Botas agreed to construct a pipeline designed to carry the exact amount of gas that Azerbaijan's Shah Deniz Stage 2 (SD2) project is slated to produce by about 2017 – some 16 billion m^3 per year (bcm/y).

Socar and its partners in Shah Deniz, including BP and Statoil, have yet to issue contracts for the gas despite the fact that the deadline for bids was October 1, 2011 and it had been expected that the contracts would be awarded by the end of last year. Contracts are now expected by mid-2012.

The Caspian offshore Shah Deniz field currently produces around 8 bcm/y, of which 6.6 bcm/y goes to Turkey, 1 bcm/y plus to Georgia and about 0.3 bcm/y to Greece through the Interconnector-Turkey-Greece (ITG) system.

Nabucco, the Trans Adriatic Pipeline (TAP) and the Interconnector-Turkey-Greece-Italy (ITGI) are the three consortia vying for the SD2 contracts and they had readied their bids for the October deadline.

However, in late September BP announced that it was considering an option to build a gas pipeline from Bulgaria to the Austrian border, the South East Europe Pipeline (SEEP).

SEEP would be designed to transport 10 bcm/y into Central Europe following basically the same route planned by Nabucco.

The Trans Anatolian Pipeline (TANAP) planned by Socar and Botas would follow the same course as Nabucco, and in total would cover 4000 km. Minus the 6 bcm/y of SD2 gas that is assigned to Turkey, TANAP would deliver 10 bcm/y to the Bulgarian border, where it could be transferred into the SEEP pipeline.

Together TANAP and SEEP bring a new dimension to the Southern Gas Corridor, which is still nothing more than a concept conceived to reduce Europe's growing dependence on natural gas imports from Russia.

The TANAP partnership gives Socar 80 per cent in the $5 billion project and Botas 20 per cent. With an initial transport capacity of 16 bcm/y this could later be increased to 30 bcm/y and perhaps 60 bcm/y eventually depending on natural gas production in Azerbaijan and possibly the availability of gas from Turkmenistan, Iraq or Iran, if the political isolation of that country should change.

While the Nabucco project has been strongly supported by the EU, the pipeline's 31 bcm/y initial capacity and its growing costs – originally $7.9 billion, now more than $12 billion – brought doubts about its feasibility.

The fact that is has not secured gas supplies – Nabucco had planned on Azerbaijan as its main source when it was launched in 2002 – has proved frustrating to its partners and led some to turn to upstream investments in Iraqi Kurdistan as a means of securing supplies for the pipeline.

Turkmenistan as a source of supply has continued to be a goal for Nabucco, but as yet, despite efforts by the EU and the US to encourage Ashgabat to take measures to move its gas westward through the long-proposed Trans-Caspian Gas Pipeline (TCGP), the gas-rich Central Asia state remains out of reach.

More bad news arrived for Nabucco in mid-January when German partner RWE said it might consider participating in the TANAP project. "RWE aims at security access to the Caspian gas resources for Europe, and this is the basis for its plans to take part in the Nabucco development project," the company said, according to *Reuters*.

"However," it added, "it is clear that RWE is only going to contribute in building a pipeline if there is enough gas to fill it and if the project is economically viable."

Furthermore, Nabucco's two rivals for SD2 gas, TAP and ITGI, have stated that they can see their projects lining up with the TANAP pipeline. Both pipelines have an initial throughput capacity of 10 bcm/y that allows for their expansion as TANAP capacity and throughput expands.

The SD2 contracts would have to be all or nothing for Nabucco, meaning that both TAP and ITGI would be cut out of the Azerbaijani gas scene.

TAP, which will run across northern Greece and Albania before crossing the Adriatic Sea into Italy, said last month that it would be happy to work with TANAP developers to coordinate "a fully integrated solution" for gas delivery into Europe.

Shah Deniz partner Statoil is a key partner in TAP, which may give it an advantage. ITGI executives have also stated that their project could easily comply with the TANAP pipeline.

With Socar now holding 80 per cent of a project designed to deliver its gas to Europe, it is highly likely that TANAP will be awarded the SD2 contracts. And should that happen, Nabucco's decade-long run would come to a close.

Staying the course on CCS

Some argue that, contrary to popular belief, CCS has not fallen off the agenda and policy makers must stay the course on accelerating its deployment.

Barry Jones

Successful and widespread deployment of carbon capture and storage (CCS) is an important part of a clean energy future for the world and one that, against popular belief, has not fallen off the agenda. A softening global economy and cash-strapped governments are not ideal for the development or deployment of any new large infrastructure project but continued progress is essential if global emission reduction targets are to be achieved.

So far the economic softening has not taken a bite out of the currently committed pie of investment in CCS deployment, although some concerns are arising around the amount of as yet unallocated funds. Total announced government funding has remained at around $25 billion over the past couple of years, but is subject to factors such as movements in European carbon prices. However, at what pace and how efficiently countries allocate and spend that funding remains to be seen and could have significant impacts on the contribution CCS can make to abating climate change.

Climate change is one of the greatest modern challenges. The world is slowly recognising this and taking action, but much more needs to happen. As more than 60 per cent of CO_2 emissions come from the energy sector, mostly from burning fossil fuels, this is where the focus of policy attention needs to be in coming decades. And this is where CCS can play the biggest role – although CCS also has a role in reducing emissions from certain industrial sources of CO_2 where there are few if any alternatives.

The Intergovernmental Panel on Climate Change (IPCC) has concluded that CCS can contribute between 15-55 per cent of the cumulative emission reduction effort by 2100, providing it with a central role within a portfolio of low carbon technologies needed to address climate change.

Similarly, the International Energy Agency (IEA) has studied a number of global greenhouse gas reduction scenarios and concluded that CCS is "the most important single new technology for CO_2 savings" in both power generation and industry. The agency has estimated that attempting to stabilise emissions without CCS will cost about 70 per cent more – equivalent to $4.7 trillion between 2010 and 2050.

The IEA estimates that CCS can bring about 19 per cent of required emission cuts in the energy sector by 2050. The IEA's 2011 *World Energy Outlook* further illustrates the need for CCS. It found that emissions from the industrial plants, buildings and transport systems in place today and still operating in 2035 will represent 80 per cent of the total CO_2 the world can afford to emit that year if it wants to keep global warming under control.

CCS is the only currently available technology that can align the increased use of fossil fuels with climate change goals, so it is important the governments are taking support for the technology seriously.

The Global CCS Institute keeps a database of global projects and releases an annual report, the *Global Status of CCS*, as well as periodic updates on project numbers and provides analysis behind CCS developments and their drivers. Our most recent data for December 2011 identifies 74 large-scale integrated CCS projects that are operating, under construction or in development and planning. This is in addition to the substantial number of smaller scale and pilot plants that are operating around the world.

Eight of these large-scale projects are operating, with two being in Europe. Norway hosts those two projects, Sleipner and Snohvit, as well as some of the most significant research and smaller scale technology demonstration projects. The United Kingdom was one of the first countries in the world to set up regulations on coal fired power plants requiring them to install CCS in the near future; it was also one of the first jurisdictions to set up a dedicated CCS unit within its government. The Netherlands too has pursued CCS aggressively, especially around the Rotterdam industrial region where a network approach could link CO_2 emitted from numerous sources into a common transport and storage system.

The European Union (EU) has pursued a common legal and regulatory framework around encouraging its Member States to deploy CCS. Members of the 27-nation bloc had until mid-last year to all pass domestic legislation making the underground storage of CO_2 legal, for instance.

Although individual governments are funding domestic projects, the centrepiece of Europe's CCS funding programme is the EU's NER300 competition, which is raising funds through the sale of carbon allowances under the EU's emission trading system.

As of January there were 13 CCS projects – and more than 40 renewable energy initiatives – vying for NER300 funding. Not surprisingly most of the candidates are from the UK and the Netherlands.

As the February announcement around the next step of the NER300 nears, concerns have arisen about just how much funding will be available, given the historically low price of carbon in Europe at the moment. As a result, questions must be asked about the most effective way of investing into projects. Focusing on providing required levels of funding to a smaller number of projects may lead to a more successful CCS deployment strategy than funding the originally planned number at significantly lower levels.

Jones: CCS is real, happening and already having an impact on reducing global emissions

Also as Europe moves forward on CCS in a unified manner, issues around infrastructure and trans-border transport and storage of CO_2 are highlighted.

The EU still faces a critical job around ensuring a safe and effective framework is in place to support CCS deployment.

While some of these challenges are unique to Europe, most are common to all countries pursuing CCS today. The economic slowdown in the US has hurt the overall number of CCS demonstration projects. Yet the most developed of the initiatives appear to be going full steam ahead. A significant recent development has been the emergence of the power sector in CCS deployment, with two projects commencing construction: Mississippi Power's Kemper County IGCC project in the United States and Saskpower's Boundary Dam project in Canada.

As a regional share, North America is home to about half of the world's advanced CCS demonstration projects. The region also has some of the highest funding levels globally.

Australia and China are also important actors in the global CCS arena.

Australia has significant funding on offer for large scale demonstration projects, functioning regulatory frameworks in place, and boasts the construction of the world's largest CCS project that will store CO_2 in a saline aquifer, Gorgon off the Western Coast of the country.

China has moved quickly on CCS in recent years, as the government has expressed recognition of the importance of CCS in addressing China's CO_2 emissions and is placing greater priority on development of this technology.

In 2011 the Institute identified approximately 20 CCS projects in China, including some of the world's most advanced post-combustion capture pilot projects. Of these projects, seven are large-scale integrated projects in the planning stages, which represent the majority of such projects in emerging economies.

> "... more abatement is happening from just eight CCS projects than the total country-level abatement achieved in either Australia or the UK through all of their climate efforts today"

To conclude, there are two important messages to deliver about CCS today. One is that CCS is real, happening and already having an impact on reducing global emissions.

The eight operating CCS projects are already sequestering – that is keeping away from the Earth's atmosphere – some 20 million tonnes of CO_2 each year. When the seven projects currently under construction go live by 2015, that figure will be some 35 million tonnes of CO_2 a year.

That means more abatement is happening from just eight CCS projects than the total country-level abatement achieved in either Australia or the UK through all of their climate efforts today. And this level of a batement is almost half of what Germany is achieving through a level of support for solar technologies that is an order of magnitude larger than that currently on offer to all CCS demonstration projects.

The second message is that as the global economy stumbles, policy makers must stay the course on CCS and realise that delaying action on climate change is a false economy.

Our own careful review of the costs of low-carbon technologies – using data from the IEA, IPCC, US Energy Department, OECD and other authoritative data sources – shows that CCS is a competitive power sector emissions abatement tool.

Technologies such as hydropower and onshore wind are among the least-cost ways of reducing emissions and should be exploited early and rapidly. But once these "low hanging fruit" options are exploited and capacity limits to their further development are reached, CCS becomes a competitive option relative to other low-carbon options including nuclear and solar technologies, or offshore wind.

Delaying action is false economy. Although it means less investment now, it also means more emissions. Delaying immediate and rapid investment in low carbon technologies, even if only by a couple of years, means large increases in costs. For every dollar saved between now and 2015, the IEA estimates we would need to spend more than $4 in order to get us back on the path to avoid dangerous climate change. A gradual move towards achieving the 2°C goal would require a $36.5 trillion investment in energy infrastructure by 2035. A 10-year delay in introducing CCS would add $1.1 trillion to the bill.

As is frequently observed for renewable technologies, the costs decline as they mature. We should have this debate on equal terms and recognise that the costs of CCS will also fall with more demonstration projects and with deployment.

Again, the real challenge is achieving global action. If the world is to prevent dangerous climate change, we need to see all countries pursue ambitious policies that include all tools in the arsenal, rather than cherry-pick one technology over another.

Barry Jones is General Manager of Policy and Membership at the Global CCS Institute.

Biomass: an unsustainable renewable resource?

Bioenergy and carbon capture and storage will be critical in helping the EU meet its targets on decarbonisation, but there are doubts over the sustainability of some bioenergy resources and the greenhouse gas savings they can achieve.

James Greenleaf

Bioenergy is expected to play a crucial long-term role in reducing the EU's greenhouse gas (GHG) emissions. As well as helping to mitigate climate change, bioenergy provides a cost-effective and more controllable energy supply relative to other renewables technologies and has the potential to reduce reliance on imported fossil fuels.

However, finding the most appropriate uses for bioenergy in combating climate change continues to prove controversial. There is considerable uncertainty around the global level of bioenergy resource that is sustainable and the proportion of it that will be accessible to the individual countries of Europe given the limits that exist on their own resources.

There are also myriad ways biomass can be employed throughout the energy system, as well as in non-energy uses, plus an array of different feedstocks and continued uncertainty surrounding the extent to which bioenergy results in overall GHG emissions reductions relative to conventional energy sources when lifecycle impacts are accounted for.

In addition, there are near-term pressures on the use of bioenergy to help meet the Renewable Energy Directive (RED), which requires that EU member states source a specified proportion of their overall final energy consumption from renewables by 2020.

Regardless of each member state's target many European countries now face a similar dilemma when it comes to considering how best to use this valuable resource. Although most have looked to address their individual RED targets, the fact that planning has taken place at domestic level only means it is subject to political sensitivities and market factors specific to each country. Moreover, some of the national renewable energy action plans that have been announced are potentially overly reliant on imports of bioenergy and the availability of biomass resource could either fall short of expectations or only be available at considerably higher cost.

GHG savings from bioenergy vary widely because they are offset by the fossil energy used for cultivation, harvesting, processing and transportation of biomass feedstocks. In addition, major direct and indirect land use change, particularly deforestation and draining of peat bogs, can completely negate any emission savings, as well as cause damage to biodiversity and other ecosystem resources.

Furthermore, the level of bioenergy accessible may be scarce, particularly with regards to imports. There is limited land available to produce biomass feedstocks both domestically and internationally, with strong competition for land in the form of food production. There are also competing uses for biomass not only for reducing emissions, but as an alternative source of material for construction, plastics and industrial chemicals. As such, doubts have been expressed as to whether many countries in Europe can source the required quantities of bioenergy sustainably, particularly if international energy demand increases beyond current projections.

Taking these concerns into account, the UK's Committee on Climate Change (CCC) recently undertook a review of bioenergy to assess how bioenergy might best be used to support the UK in building a low-carbon economy. It concluded that a 10 per cent share of bioenergy in total primary energy would be required to meet the UK's 2050 emissions target, compared to the current share of two per cent, with lower shares making it considerably more expensive to meet the target.

> "Doubts have been expressed over whether many countries in Europe can source the required quantities of bioenergy sustainably, particularly if international energy demand increases beyond current projections"

Greenleaf: some national renewable energy action plans are potentially overly reliant on imports of bioenergy

Given the complexity of assessing the most appropriate uses of bioenergy in the overall energy system the CCC, working jointly with the Department of Energy and Climate Change (DECC), engaged Redpoint Energy, a specialist energy consultancy, to lead the development of a single standardised optimisation model.

This helped to harmonise the range of disparate information on bioenergy, competing fossil and low carbon alternatives in a common framework.

Although numerous studies have been conducted to-date, they have tended to focus either on bioenergy use within an individual sector, or looked at the energy system as a whole without sufficient detail of bioenergy to understand all of the possible trade-offs. Conversely, the CCC's approach has been to identify the most appropriate use of each bioenergy technology across the energy mix – i.e. power generation, buildings, industry, surface and non-surface transport – whilst considering how to meet both the GHG and RED targets, as well as including the impact of bioenergy lifecycle emissions and competing non-energy uses.

From the modelling work the CCC constructed a hierarchy of appropriate uses of bioenergy and, in particular, how this was affected by uncertainty around different levels of sustainable bioenergy resource, particularly imports and the impact of the availability of key technologies such as carbon capture and storage (CCS). The key conclusions are that bioenergy for industrial heat and non-energy uses in construction are highly desirable, whereas liquid biofuels for surface transport and power generation – without CCS – are generally undesirable. This is because liquid biofuels offer a less cost-effective way to reduce emissions across the system as a whole, when considering both bioenergy and other low carbon alternatives.

There were also a number of uses whose desirability depends on the availability of CCS technology. In conjunction with CCS, the use of bioenergy would effectively help to generate additional GHG emission reductions, by capturing carbon from the atmosphere during growth of the feedstock and also preventing its re-release during combustion or conversion. Bioenergy with CCS could then be applied at various points throughout the energy system including in the production of power, heat and hydrogen or liquid biofuels. The CCC's Bioenergy Review reiterated the urgency of demonstrating CCS at commercial scale.

The modelling work has allowed the CCC to distil clear and robust conclusions from a complex system that are valuable both in terms of short-term policy thinking, particularly around the UK's EU targets and how best to meet these, as well as long-term planning to 2050.

In particular, it highlights that the nearer-term RED targets are potentially diverting bioenergy resources away from more appropriate longer-term uses via a combination of locking in infrastructure that becomes less appropriate in the long-term and not using the scarce bioenergy resource as cost-effectively as possible in the medium term.

This raises questions over the viability of potentially more transitional roles for bioenergy such as surface transport or new dedicated power generation, if CCS does not prove feasible or if the infrastructure cannot be cost-effectively adapted to produce aviation or maritime fuels.

Consideration will need to be given as to how the near- and mid-term policy framework incentivises real-world deployment of bioenergy relative to the idealised view from the optimisation modelling. In the UK for example, at a micro-level the CCC's review highlighted that DECC's current Renewables Obligation banding consultation is proposing higher incentives for dedicated new biomass power generation – without CCS – than for enhanced co-firing/conversion of the existing stock, which from the CCC's analysis is likely to be a more cost-effective way of contributing to the RED target.

Understanding the multiple roles of bioenergy demonstrates how it is becoming increasingly difficult to study the energy system and associated policy implications only at a sectoral level. Whilst it inevitably complicates any analysis, considering the impacts more holistically is ultimately necessary to help ensure the UK and EU's targets are met as efficiently as possible.

Despite the flexibility mechanisms that already exist under the RED, further consideration may also need to be given as to how EU member states can work together to ensure that each country can carry out its plans and that ultimately, no member state is hampered in its quest to meet its RED target because of a lack of wider EU coordination on bioenergy or other issues.

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CHP plant runs on syngas at Schwarze Pumpe

A recently commissioned plant at Schwarze Pumpe looks set to provide a commercially viable option for delivering combined heat and power from biomass gasification.
Junior Isles

Producing syngas from biomass gasification and then using this gas to generate power using a reciprocating engine is not a new concept, yet it is a technology that has not yet seen widespread commercial application at industrial scale.

However, US-based technology company, ZeroPoint Clean Tech Inc., is now introducing a combined heat and power (CHP) package that could be a viable option for users looking to install decentralised, renewable-based CHP systems. The company recently completed commissioning of an engine that runs on biomass-derived syngas at a plant in Schwarze Pumpe, Germany.

ZeroPoint has been in operation for six years, during which time it has developed various working prototypes and a beta unit but Schwarze Pumpe represents its first full scale commercial unit to be shipped and commissioned.

David Pitt, ZeroPoint's EVP of International Operations said: "This is significant in the world of gasification because the market has been looking for an industrial scale unit, something bigger than a few hundred kilowatts. A unit like ours, which generates in the 1.5-2 MWe range by producing sufficient high quality gas to run a modern gas engine genset has arguably been the holy grail of biomass gasification and as with most things the devil's in the detail. Our learning curve has been all about how to understand the nuances of the process and to optimise its control."

ZeroPoint believes that the real differentiators between its technology and other technologies lie in the high energy conversion efficiency from solid biomass to gas and its associated cleanliness and chemical stability. The company says the thermal efficiency of the process is more than 85 per cent.

Pitt explained: "Most people in the industry talk about a conversion rate of about 1 tonne of biomass to 1 MW of power. From 1 tonne of dry biomass, we produce 1.5-1.8 MW, with the remainder of the energy available as waste heat. I believe our technology is at least 25 per cent better than anything else that's out there at the moment."

The three most common process technologies used for gasifying biomass are the updraft, downdraft and fluidised bed methods.

"If you are looking for a process that produces the cleanest gas, the science leans towards downdraft gasification, however, historically it has been considered to have limited scalability with most applications being less than 500 kW. Updraft gasification has been the conventional approach for high volume gas production although it inherently produces gas, which requires significantly more cleaning than the downdraft approach hence it is generally used in boiler applications. We believed the problems related to cleaning the dirty gas from the updraft process to the quality needed for a gas engine could be commercially insurmountable and hence we decided to focus our development efforts on techniques to scale the downdraft process.

"This enables us to deliver industrial gas volumes that are capable of being cleaned to the quality required for a modern gas engine using relatively straight forward scrubbing technology." said Pitt.

ZeroPoint began developing its technology in mid-2006 with lab-scale modelling of dispersion in its proprietary downdraft gasification process. Promising results enabled the company to secure financing later that year to build a half-scale pilot plant in Potsdam, New York, USA, the following year. This facility was used to develop and validate its process designs and prove all of the basic control configurations and flow dynamics. "This gave us a decent handle on how to actually scale up to our 2 MW objective," noted Pitt.

The company secured a commercial development contract with a US waste operator in 2007 to build the first full size beta plant. The plant was designed to help the operator learn how gasification would work with engineered fuels from waste.

Pitt commented: "This occupied us for 2008 and most of 2009. It was a big learning curve, particularly in engineering a robust gas cleaning system and developing the controlling algorithms to optimise flows and achieve process stability in the reactor." As a consequence, ZeroPoint secured a contract with Kedco Power to supply gasifiers for a CHP project development in Ireland. The first unit for this plant was shipped in 2009.

The contract for the gasifier just commissioned at Schwarze Pumpe was signed with Blue Planet Bio Energy Deutschland in 2010. The gasifier unit was shipped in December 2010 and following weather delays and the completion of the formal approvals by TÜV, began commissioning in June of 2011.

> "The economics of gasification can stack up in island communities that rely on diesel."

The plant consists of a gasifier, a genset that runs on the syngas produced from biomass, and all associated balance-of-plant equipment.

The biomass or wood for the plant is supplied in chipped or pellet form with excess dust or fines already removed along with any other foreign materials such as stones and metals. "Feedstock preparation is critical to the process as it has a big impact on gasifier efficiency over time," noted Pitt.

The overall footprint for the gasifier with its cleaning system is approximately 30 m long, 4 m wide and 7 m high at its tallest point. Fuel and air are fed in to the top of the reactor where the biomass settles on a stratified grate. This creates a biomass bed, which is progressively transformed from a solid to a synthesis gas as a consequence of the gasification chemistry. Temperatures in the reactor range from about 150ºC to 900ºC.

Solid residue is separated from the syngas and collected at the bottom of the gasifier in the form of a bio-char. This bio-char can be used as a high-grade soil conditioner.

The hot syngas exiting the gasifier is initially cooled and then scrubbed before being conditioned to meet the requirements of the gas engine. Waste heat is recovered in the cooling process which can generate steam to support the gasification process along with plant specific waste heat applications such as biomass drying, chilled water production and district heating.

"We aim to produce a gas that has a calorific value well in excess of 5 MJ/m^3, which is about the minimum level a gas engine needs to operate. It is a relatively lean gas because air is used as the oxidant. The gas has a stable composition, being about 45 per cent nitrogen, 20 per cent carbon monoxide, 20 per cent hydrogen and small amounts of carbon dioxide and methane," said Pitt.

At Schwarze Pumpe, the syngas drives a GE Jenbacher 320 engine. Another project under way in Ireland will use a Jenbacher 620 engine. "Our customers have opted for Jenbacher engines as they have a reputation for being able to run on syngas. This is probably by virtue of the fact that there aren't many syngas engines running but as more of these plants are deployed, many of the major vendors will see the new market opportunity and will inevitably offer competitive options," commented Pitt.

Although just a single engine is in operation at Schwarze Pumpe, the site has the potential to run more engines. "This year will be about continuing to operate with one or two engines; we may test another engine there. It will also be about refining the process so we can invest in more lines, ultimately scaling it up to five engines or maybe well beyond," said Pitt.

Pitt believes expansion is quite possible. "German tariffs are very favourable, so the project economics stack up," he noted. And while there appear to be no real technical challenges to commercial rollout of the technology, economic incentives will be important in regions such as the EU.

Pitt said: "Gasification isn't the lowest capital cost technology; you need a sympathetic regulatory environment to enable it to get moving or an environment where the cost of power generation is inherently very high. Over time as equipment is manufactured in volume, capital costs will come down. Whether it will come down to the point where it can compete with the conventional fossil and hydrocarbon technologies is debatable."

Ultimately success will depend on fuel costs as well as biomass availability. Pitt believes that a country such as the UK will progressively move towards waste wood, as it is in good local supply and with pressure to reduce landfill, its availability is pretty much guaranteed for the foreseeable future. He therefore sees good potential for installing small 2-6 MW decentralised CHP plants in local communities that use local fuel sources.

In other parts of Europe, where biomass can come from sustainable forests, Pitt says there will be a different set of economics, which will focus more heavily on the utilisation of virgin woods.

Nevertheless the company is confident that its package will find a place in the market. In addition to the Schwarze Pumpe and Ireland projects, ZeroPoint is now looking at projects in the UK, Germany and a "host of initiatives around the equatorial belt". Pitt says the company has been working with people to look at ways of optimising the use of major agricultural waste such as palm waste.

He concluded: "We see major potential over time for using gasification in the palm industry. The economics of gasification can stack up in island communities that rely on diesel. Diesel generation can be significantly more expensive than gasification in those types of areas because the biomass is relatively cheap. We have been getting a number of enquiries from companies in Central America, Asia and the Far East assessing the potential of converting diesel engines to run on syngas produced from biomass."

Although just a single engine is in operation at Schwarze Pumpe, the site has the potential to run more engines

Junior Isles

Sub sandwiches are unhealthy

There is a growing chorus of concern regarding the energy community's diet of subsidies. The issue certainly struck a chord with several speakers at this year's World Future Energy Summit in Abu Dhabi, many arguing that subsidies slow the transition to a low carbon economy and hamper the fight against global warming.

According to the International Energy Agency (IEA) global fossil fuel subsidies amounted to $409 billion in 2010, something that it sees as the main roadblock to renewable energy.

Fatih Birol, Chief Economist at the IEA noted: "Having renewables is a very good thing but the most important thing is to prepare the market conditions for renewables. To say you want to have a higher share of renewables on one hand, while on the other hand protecting fossil fuels through substantial subsidies does not make sense. We want to have a fitter, healthier energy system but this is like going for a fitness run and having a big junk food meal afterwards."

The argument that subsidies are there to protect the poor does not hold water either. The IEA's *World Energy Outlook 2011* shows that only 8 per cent of these subsidies go to the poorest 20 per cent of the population.

"Most of the subsidies go to medium and higher income levels. Only 8 per cent goes to the poorest of the poor. Well-designed subsidy reform with perhaps direct assistance to the poor would be a well thought-out energy policy," said Birol.

However, any reduction and eventual removal of subsidies needs to be done sensibly. Nigeria's recent removal of subsidies on fuel, which resulted in mass protests, is a good example of how not to do it. Yet governments must act nevertheless.

Jose Maria Figueres, former President of Costa Rica said: "Nigeria literally doubled its fuel prices overnight, which is something that is difficult to do in any country that is trying to move forward. But there is no country or government that over a period of five years cannot phase out subsidies that are affecting the economy and bring in the correct incentives for a transition to a low carbon economy. From a policy perspective, there are two main wars we need to fight and win in the next decades: the war against poverty – there is no excuse for not winning that anymore – and the war against climate change.

"We are fortunate enough that we have a series of instruments, policies and resources that would fight and win both wars at the same time. In that context, there are two things that governments can do: they can lead; but if they can't lead, they should get out of the way."

Figueres said that 50 per cent of carbon emissions today could be eliminated by the private sector without any need for public intervention. To enable this he said governments, in addition to removing fossil fuel subsidies, must send the correct signals to markets by moving ahead with a carbon tax.

"The greatest failure of the global economy is a price on carbon. The day we get that, we will start sending the correct signals… which will drive innovation," he stressed.

Bjorn Lomborg, Director and adjunct Professor at the Copenhagen Consensus Centre said energy innovation is exactly the right argument, stressing that it is not just about removing subsidies for fossil fuels but removing all subsidies, including those from renewables, in order to develop clean affordable technologies.

Certainly subsidies face a huge problem in the economic crisis.

The recent announcement that Spain is to suspend its subsidies for renewables is evidence of this. Lomborg noted:

> "We want to have a fitter, healthier energy system but this is like going for a fitness run and having a big junk food meal afterwards"

"This is a huge elephant in the room. The fact that we have an economic crisis and at the same time a very costly energy policy, more specifically a very costly climate policy – which in the EU will run into about $250 billion a year, mostly in lost GDP growth – indicates that we have a huge problem just simply convincing people that this is a good idea."

Using Britain as an example, Lomborg said: "It is the only country with an actual law requiring carbon emissions to be cut by 80 per cent by 2050. Of course they will do no such thing but they have spent huge amounts of money actually trying to get at least some part of the way."

The problem he noted, is that telling people that energy prices will increase significantly, presenting the spectre of energy poverty, may lead them to say: "Maybe I'm not so concerned about a new green future.

Maybe I would just like to have my old fossil fuel economy back."

This could be a problem not just in the UK but globally. "We are not going to be able to get a future energy revolution if we continue to scare people and put huge financial burdens on them," said Lomborg.

He acknowledged that climate change is real and has to be tackled, but claimed it is "perhaps not as bad as the end of humanity as has been pointed out in the past". He therefore suggested that "telling people how much they need to cut emissions by within the next 10, five or even two years is not the way to go".

Lomborg added: "Instead of talking about another round of subsidies and talking about investing in inefficient technologies of today, we need to create effective technologies of the future."

The Copenhagen Consensus Group brings together some of the world's top economists to look at which climate change technologies give the most bang for the buck. It concluded that the current policy of supporting today's "inefficient technologies" means that every dollar spent only avoids a couple of cents of climate damage.

"That's a poor way of spending money," said Lomborg. "The best idea is to increase investment in R&D in green technologies. For every dollar spent on public R&D in green energy, we would avoid $11 of climate damage. The fundamental point is not that people switch in the next two or three years.

If we can come up with technologies, which in the next three to four decades will be cheaper than fossil fuels, we will solve global warming and everyone would switch. We would have the technologies that would enable everyone to have access to clean energy, energy security and get off fossil fuels."

Lomborg used the computer industry as an example. "Look at the development of computers back in the 1950s, when computers took up huge rooms and used massive amounts of power. Imagine asking back then: 'how do we make more efficient computers, to enable everyone to have a computer in the future?' Using the current day answer to green energy, the answer would have been to subsidise them. Let's buy everyone a computer by 1960. All we would have achieved is putting a lot of big, inefficient computers in everyone's home. We would have developed very cheap and efficient vacuum tubes but it wouldn't have solved the problem."

Likewise, he said it was not about taxing alternative technologies. "It was not about taxing typewriters to get computers going. Success was driven by innovations such as the transistor and integrated circuits that enabled the development of computers that people were willing to buy."

Lomborg closed with another example. "Cell phones are ubiquitous now; but that's because they are cheap. We did not develop cell phones by massively subsidising them. What we did was have a dramatic innovation process that led to them being so cheap, that everyone wants one. Once you get alternatives that are cheaper than fossil fuels, people will switch."

Lomborg is probably right. But unfortunately in the absence of innovation and time fast running out, many governments will unfortunately be saying: "In the meantime, mine will be another subsidy sandwich, please" – unless of course the economic climate makes such a diet unaffordable.