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Obama climate drive is timely

Call for action: Obama wants to address the problem "before it's too late"

The US government's decision to move climate change back up the agenda comes at an important time for both the country and the international community. **Junior Isles**

With the US energy sector facing disruption due to increasing global temperatures and international climate change talks in need of a boost, US President Barack Obama's proposals to tackle climate change are well-timed.

The president's renewed focus on global warming comes as the government issued a report warning that US energy supplies will likely face more severe disruptions because of climate change and extreme weather, which it says have already caused blackouts and lowered production at power plants.

Citing prior disruptions, the report noted that coastal power plants are at risk from sea level rise and power lines operate less efficiently in higher temperatures. Last year in Connecticut, the Millstone Nuclear Power Station shut down one reactor because the temperature of water from the estuary needed to cool the facility was too high. A similar problem caused power reductions in 2010 at Hope Creek Nuclear Generating Station in New Jersey and Limerick Generating Station in Pennsylvania.

Jennifer Morgan, deputy director of climate and energy at the World Resources Institute, commented: "The report accurately outlines the risks to the energy sector and should serve as a wake-up call."

While climate change is not the sole cause of drought, scientists say rising temperatures can cause more moisture to evaporate from the soil, causing a lack of water in some areas. The DOE report also cites research indicating that nearly 60 per cent of current thermal power plants, which need water for cooling, are located in water-stressed areas.

Falling water levels could also impact the country's shale gas industry. In Texas, which is suffering a three-year drought that now affects 87 per cent of its land, conflicts are arising over the water-intensive fracking process used to extract oil or natural gas from shale deposits. In 2011, Grand Prairie banned city water for fracking. Other municipalities have restricted water use for that purpose.

Meanwhile, an Argonne National Laboratory study found that higher peak electricity demand as a result of climate change related temperature increases will require an additional 34 GW of new power generation capacity – roughly equivalent to more than 100 new power plants – in the western United States by 2050, costing consumers $45 billion.

The DOE report was issued one week after President Obama, describing climate change as a threat to future generations, called for action to address the problem "before it's too late".

At the end of June, the President laid out plans to address global warming. He said he aims to cut greenhouse gas

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Renewable budget may face cuts

US President Barack Obama had a taste of the difficulty he will face in pushing through proposals to tackle climate change when the House of Representatives voted last month to slash money for renewable energy research.

A Republican-crafted annual spending bill for energy and water programmes has little support in the Democratic-led Senate and faces a White House veto. However, it highlights the stark divisions over policy as Congress and the White House look toward an autumn showdown over spending, taxes and the debt ceiling.

The bill, which passed 227-198, approves $30.4 billion for Energy Department programmes, Army Corps of Engineers projects and Energy Department nuclear weapons maintenance for the budget year beginning in October. This is $2.9 billion below what was enacted for 2013, before the automatic cuts or sequestration kicked in, and $4.1 billion below what President Barack Obama asked for in his budget proposal.

It is one of the 12 spending bills Congress is supposed to pass every year to pay for the operations of 15 Cabinet departments and other federal agencies.

The Senate Appropriations Committee has approved a $34.8 billion energy and water bill.

Budget restrictions the Republican-led House is adhering to, including prospects for a second year of automatic cuts, "made for some very difficult decisions," said Rep. Rodney Frelinghuysen, R-N.J., chairman of the appropriations panel that determines Energy Department spending levels. He said he expected the private sector to take up some of the slack in applied energy research and development.

Money for renewable energy and energy efficiency programmes would be cut to less than $1 billion, about half of last year's total, while the budget for research into futuristic energy technologies would plummet some $195 million from the pre-sequester 2013 level to $70 million.

The bill provides $430 million for fossil fuel research and $656 million for nuclear energy, down about 19 per cent and 14 per cent, respectively from 2013.

The bill, said Rep. Marcy Kaptur of Ohio, top Democrat on the energy and water subcommittee, "abandons America's quest for energy independence, which has the potential to create millions of new jobs".

Democrats failed in several attempts to shift money from the nuclear weapons budget to renewable energy and energy efficiency programmes.

The White House has already issued a blanket veto threat against all House spending bills, saying the House and Senate must work out a budgetary framework that better supports the nation's needs.

Specifically, it said in its veto threat that the energy and water bill "drastically underfunds critical investments that develop American energy sources to build a clean and secure energy future".

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emissions by limiting CO_2 emissions from both new and existing power plants and boosting renewable energy production on federal property. It is the first time federal regulations have been proposed for carbon dioxide emitted by existing power plants. Another component of Obama's proposal will involve ramping up hydropower production from existing dams.

The Obama administration also launched a process to award $8 billion in loan guarantees for cleaning up the extraction and burning of coal, oil and natural gas.

In issuing a draft solicitation for the fossil fuel loan guarantees, the Energy Department essentially revived a programme that has not been tapped since it was authorised eight years ago.

Having outlined his proposal, Obama now has the difficult task of executing it. The proposals will likely result in the closure of most coal fired plants across the country. With each state required to draft its own compliance proposal, a major component of Obama's plan will be placed largely in the hands of governors and state policymakers – many of whom are deeply skeptical about the plan and what it could mean for local economies.

Obama has instructed the Environmental Protection Agency to craft the regulations under the Clean Air Act, the 43-year-old federal law that states largely enforce. The agency says it will finalise the rules by June 2015. At that point, states would submit implementation plans.

This is the same year in which international climate change negotiators plant to secure a new legally binding agreement on carbon dioxide emissions that will replace

Under a cloud: existing coal fired plants are likely to close under new rules

the Kyoto Protocol.

Obama is calling for an end to US support for public financing for new coal-fired plants overseas, officials said, but will exempt plants in the poorest nations as long as the cleanest technology available in those countries is being used. He is also pledging to work with major polluting countries like China and India to curb emissions.

It is hoped that the US's renewed focus on climate change will give a much-needed boost to international climate talks.

Last month, the US and China, the world's biggest emitters of greenhouse gases, agreed to five initiatives to cut carbon emissions from the largest sources, including heavy duty vehicles, manufacturing and coal-fired plants.

Officials from a working group formed by both countries in April agreed to the measures during a two-day meeting held at the US State Department.

UK welcomes EU plans on nuclear aid

- New plans could make it easier to subsidise nuclear
- Shale gas gives UK leverage with EDF

Junior isles

The EU's plan to make it easier for countries to subsidise nuclear power provides a welcome to boost the UK's new nuclear programme.

According to the *Financial Times*, a leaked copy of draft guidelines on energy aid shows that member states would be allowed to offer state aid for nuclear power as a matter of course.

Companies can already apply for exemptions from state aid rules on a case-by-case basis. Under the new proposals countries would be allowed to use state aid for projects to address "market failure" as long as it is through a time-limited mechanism not offering more than a "reasonable rate of return".

The news will be welcomed by the UK government, which is offering various financial support mechanisms such as a guaranteed price for electricity generated from nuclear plants as well as a financing guarantee to help kick-start its nuclear programme.

The UK government is currently locked in talks with EDF over the guaranteed price for power from the proposed Hinkley Point C project in Somerset, England. According to reports, EDF has been holding out for a price of just under £100/MWh, while the government has been insisting that the strike price should be nearer £80/MWh. The current wholesale electricity price is about £48/MWh.

The EU plans would mean that any deal the UK government struck with EDF would be less likely to be vetoed by Brussels.

The UK is desperate to get its nuclear new build programme under way and last month Minister of State for Energy Michael Fallon announced that the benefits for local communities hosting new nuclear power stations would be funded by the Department of Energy and Climate change (DECC).

The government's determination to support nuclear has been heavily criticised by environmental groups. In response to Fallon's announcement Dr Doug Parr, Chief Scientist at Greenpeace UK, said: "Whilst wind farms and even shale gas developers have to pay community benefits, only nuclear stations will get a fat taxpayer subsidy to fund them.

"Our entire energy policy is now absurdly distorted by the desperation to prop up EDF's faltering Hinkley C project, with the government piling the costs onto the taxpayer to avoid the embarrassment of admitting they backed the wrong technology. We can't go on like this."

Recent surveys suggesting the UK may have vast reserves of shale gas may, however, see the government take a tougher stance with EDF over the £14 billion project.

Sources close to the project told the *Daily Mail* that the government now felt able to take a tougher negotiating line with EDF after recent geological surveys showed that there might be 1.3 trillion cubic feet of shale gas in the north of England – double the previous estimates.

Fallon told *The Mail on Sunday* that talks with EDF were continuing, but that there were a number of significant hurdles to cross. "There are three or four main hurdles still to get over. The negotiations are ongoing and will continue to be," he said.

Talks are expected to last until the end of the year, well past the initial deadline of the end of 2012 set by EDF.

Whether EDF and the UK can reach an agreement is seen as a litmus test for the economic viability of nuclear energy in Europe.

Britain's nuclear plans have been dogged by a number of setbacks. Several European companies have moved to reduce their exposure to the UK nuclear programme. In February Centrica pulled out of the joint venture to build Hinkley Point C, while E.On and RWE last year sold their site in Anglesey to Japan's Hitachi.

Most recently Spain's Iberdrola and France's GDF Suez said they plan to cut their stakes in the NuGen consortium, which hopes to build a project near Sellafield, Cumbria.

Last month, China's state owned nuclear group SNPTC said it was interested in investing in NuGen. Several other companies are also keen to invest in the project, including Westinghouse, owned by Japan's Toshiba, Areva of France and Canadian nuclear technology company, Candu.

EU ETS backloading not enough

The vote to 'backload' carbon allowances in the EU Emissions Trading Scheme (ETS) is a step in the right direction but will not be enough to rescue Europe's flagship tool for cutting carbon emissions.

In a 344-311 vote last month, European lawmakers in Strasbourg, France, approved a proposal to delay an auction of 900 million allowances in the EU ETS.

The delay is designed to boost the carbon price, which has dropped below €5 ($6.5) per tonne due to an oversupply of allowances and Europe's economic slowdown.

The plan is an amended version of a proposal rejected by the European Parliament in April. It must also be approved by EU governments.

Commenting on the vote, Sam Van den plas of WWF European Policy Office said that the "European Parliament has done the minimum to rescue the ETS from redundancy". He added: "Member states should back further measures to eliminate these toxic tonnes permanently from the EU's carbon market."

Parliament rejected provisions that would immediately reintroduce all backloaded allowances, and provide exemptions and subsidies to heavy industry that assume far higher carbon prices than are seen in reality.

Eurelectric, the association representing European utilities welcomed the vote but also recognised there is still a long way to go.

"Today's positive vote is a much needed step in the right direction but it is nevertheless only a first step. We urge the Commission to continue down this path of strengthening the ETS in the long run by proposing more significant structural reforms. Such reforms should include revising the ETS annual linear reduction factor in the range of 2.3 per cent and extending the scope of the ETS to other sectors of the economy," commented Eurelectric's Secretary General Hans ten Berge.

Reacting to the vote, Bloomberg New Energy Finance (BNEF) carbon analyst Konrad Hanschmidt said: "The backloading plan has passed its largest hurdle so far, but auction curbs are still far from certain and unlikely to start before mid-2014. The focus will now shift from Strasbourg to Berlin, as Germany's decision on the plan will determine whether it can go ahead."

IEA says current decade is critical for CCS

In a new Roadmap, the International Energy Agency has outlined what it sees as critical near term steps needed to help commercialise carbon capture and storage.

The International Energy Agency says the current decade is critical for moving carbon capture and storage (CCS) beyond the demonstration phase.

Speaking at the launch of its *Technology Roadmap: Carbon capture and storage 2013 Edition* Didier Houssin, the IEA's Director of Sustainable Energy Policy and Technology (SPT) said: "We need to revive the CCS debate. It is not enough to envisage it in a long-term scenario. The new Roadmap focuses on the next seven years."

With coal likely to continue to play a major role in energy production for decades to come Houssin said that CCS "is not an option" but is "absolutely vital". According to the IEA, 14 per cent of all emissions reductions in 2050 will have to come from CCS.

The Roadmap highlights seven key actions needed in the next seven years to create a solid foundation for deployment.

The slow uptake of CCS has largely been one of economics and one of the key actions the Roadmap notes is that incentives are needed to deliver upwards of 30 projects by 2020.

It also says that carbon capture also had to be undertaken in other sectors. "It's not just about electricity," said Houssin, "Forty five per cent of CO_2 captured should come from industrial applications between 2015 and 2050".

Lack of policy is also blamed for the lack of progress. Ellina Levina the IEA energy analyst largely responsible for the Roadmap said: "Policy is key for this decade. Electricity market reform is being looked at as a way of driving the carbon price needed to support CCS."

US must maintain high drilling rates

Shale oil production continues to rise in the USA, with local and global impacts. But output is also rising elsewhere, and could trigger a fall in prices.

Siân Crampsie

Companies drilling for shale resources in the USA will have to sustain high rates of drilling in order to boost production levels and make the country the world's largest oil producer.

A new study from Harvard University has found that while oil production capacity in the USA is surging and putting the country on track to energy independence, growth levels may be hard to maintain.

Production of shale oil in the USA now stands at around 1.5 million barrels per day (b/d), a rise of 23 per cent over 2009 levels, and could reach almost 5 million b/d in 2017, according to the report from Leonardo Maugeri from Harvard's Kennedy School.

The impact of the shale boom – which also includes a rapid rise in the output of natural gas from unconventional sources – has been substantial, helping to keep energy prices low, improving the competitiveness of the US economy and spurring investment in infrastructure and industries such as chemicals.

It has also had a global impact, with large-scale North American crude oil imports tapering off and excess US refining output looking for markets, according to the International Energy Agency (IEA).

"The boom is having a transformational effect on communities and industry, it will improve the competitiveness of the US economy versus those of Asia and Europe, and may well alter the balance of global power," said Poppy Allonby, Managing Director and co-portfolio manager of BGF World Energy fund and BGF New Energy fund. "The US economy is being rebooted and recharged."

However, shale oil wells have very fast drop-off rates once they have been brought into production and so oil firms need to maintain high drilling rates. In addition, shale oil production is relatively expensive when compared with drilling in other parts of the world, and so oil firms are unlikely to maintain drilling rates if the price of crude falls.

Oil production rates are also surging in other parts of the world – including Canada, Venezuela, Iraq and Brazil – and global oil output capacity is likely to grow by 20 per cent by 2020, says Maugeri.

This could prompt a fall in oil prices, causing companies to cut back on investment in production and exploration.

Any fall in prices could be partially offset by a fall in costs, argues Maugeri, who expects reductions of 8-10 per cent per year in US drilling costs.

According to the report, investment in US shale oil production will continue as long as oil prices remain above $70/barrel.

But according to Allonby, not all sectors of the US economy will benefit from a continued strong oil production output. "North America as a whole will benefit from cheaper energy costs and the related job creation," says Allonby. "Yet some industries will enjoy structural advantages while others will suffer.

"Those who appear well positioned include low cost producers of oil and gas, service and technology providers, select refining assets, and the infrastructure, petrochemicals, fertiliser and steel sectors. Meanwhile coal producers and high cost oil and gas producers appear structurally disadvantaged, whether domestically or in Asia and Europe."

Merino: Solar electrification programme "aimed at the poorest people"

PV panels electrify Peru

Peru is planning to provide electricity to more than two million people through a solar energy electrification programme.

Energy and Mining Minister Jorge Merino has announced the new initiative, known as the National Photovoltaic Household Electrification Program, which will use solar panels to provide electricity to poor households.

The programme will bring electrification rates in Peru to 95 per cent by the end of 2016, up from the current rate of 66 per cent. It was initiated in early July in Contumaza province, where 1601 solar panels have been installed.

The first phase of the programme will focus on providing solar panels to 500 000 extremely poor households in areas that lack access to the power grid. Bidding will be opened later for contractors to install the rest of the panels, Merino said.

"This programme is aimed at the poorest people, those who lack access to electric lighting and still use oil lamps, spending their own resources to pay for fuels that harm their health," said Merino.

The entire programme will cost around $200 million.

Peru is the third-largest country in South America, with a population over 24 million. Its average solar radiation levels can reach 5 kWh/m² a day in the foothills of the Andes.

■ Solar photovoltaic (PV) installations in the US have now broken through the 10 GW barrier, following strong market deployment since the start of 2010. During the first half of 2013, more than 1.8 GW of new solar PV capacity was installed in the US, according to the NPD Solarbuzz North America PV Market Quarterly report.

Mexico announces 2013 tenders

Mexican utility CFE is to invite tenders for the construction of new power plants in order to boost the country's generating capacity.

The government-owned utility says it will open bidding for eight power plants with a combined capacity of over 3 GW.

The tenders for four of the power projects have already been announced, while the remaining four include three combined cycle power plants and one large-scale hydro power project.

Bids will be sought before the end of 2013 and the construction of the new plants will require investments of around $4.6 billion.

The four projects for which tenders have already been announced are the 7 MW Guerrero Negro IV fuel oil project, the 25 MW Los Humeros III Phase A geothermal plant, the 41 MW Baja California Sur V fuel oil fired plant and the 790 MW Norte III combined cycle project.

The remaining four are the 660 MW Centro II combined cycle plant, the 601 MW Valle de México II plant, the 1034 MW Noreste plant and the 225 MW Chicoasén II hydropower plant.

Mexico has an installed capacity of 52 515 MW.

ATMEA1 gets initial OK

- CNSC gives initial OK to design
- SMR funding bids submitted

Areva says that its ATMEA1 nuclear reactor design has "good commercial prospects worldwide" after it passed the first stage in the pre-certification process carried out by the Canadian Nuclear Safety Commission (CNSC).

ATMEA1 is a mid-sized generation 3+ reactor that has been designed by a joint venture of Mitsubishi and Areva. It is designed for long operating cycles and greater load-following capabilities compared with other reactor designs, factors that the two companies hope will appeal to utilities.

The CNSC has validated the objectives and global safety options of the reactor by comparing them with the regulatory requirements for the construction of new nuclear plants, and the French nuclear safety authority reached a similar stage of approval in early 2012.

In Canada the second and third stages will consist of performing an in-depth analysis of the reactor design in order to ensure that the certification process begins under the best possible conditions.

The ATMEA1 design is also under consideration for build in Argentina, Jordan, Brazil and Turkey.

In the USA, the potential demand for smaller nuclear reactors with greater operating flexibility has prompted research and development into small modular reactors (SMRs).

Last month both NuScale Power and Westinghouse Electric submitted applications to the US Department of Energy (DOE) for its second funding opportunity for SMR development.

Westinghouse also announced that it has completed the manufacturing and assembly of two nuclear fuel test assemblies for the Westinghouse SMR at its Columbia Fuel Fabrication Facility in Columbia, South Carolina.

Final preparations are now being performed on the two fuel assemblies before hydraulic testing begins, where SMR reactor operation will be simulated to confirm acceptable performance of the fuel design. Hydraulic testing of the fuel designs will continue through August 2013.

US DOE has received SMR funding applications

Vietnam calls for new power plan

Vietnam is looking to draw up a new electricity Master Plan following ongoing delays with implementing the current plan. **Syed Ali**

Vietnam is about to adjust its national electricity development master plan, as delayed implementation of the existing plan over the past two years threatens security of supply.

In a document released by the Government Office last month, Deputy Prime Minister Hoang Trung Hai ordered the Ministry of Industry and Trade (MoIT) to "urgently complete the adjusted electricity master plan VII" to be submitted for prime ministerial approval next year.

The electricity master plan VII, or the national electricity development master plan for the 2011-2020 period, was released two years ago and comprised of construction timelines for 86 power generation projects and the national power transmission grid.

The plan was designed to ensure long term power security but its implementation has been slow, raising concerns over potential power shortages in the near future.

"The construction of many power projects, particularly those in the south, have been delayed, requiring additional supply from the north and central regions to be sent to the south. This threatens the supply security of the national power system," Hai said in the Government Office's document.

The situation is also being compounded by the decision to abandon plans for a number of hydropower projects, which according to the Ministry of Industry and Trade offered low economic benefits and potentially had negative impacts on the environment and local society.

At the end of June The Ministry of Industry and Trade and provincial authorities agreed not to go ahead with 338 hydropower plant projects with a total capacity of more than 1000 MW. Another 169 potential projects will also be dropped from consideration.

Last month the US Export-Import Bank also rejected a proposal to provide financing for a new coal fired power plant. The bank said in a statement that the vote against the project came after "careful environmental review" of the project's expected greenhouse gas production.

In June US President Barack Obama said that the US would no longer support building coal fired power plants abroad as part of an effort to curtail global greenhouse gas emissions.

Vietnam says it will not hike power prices in August but warned a long-term plan to increase the tariffs is needed to attract investment.

Chinese solar manufacturers get domestic boost

- Solar capacity to reach 35 GW
- Increased financial support for sector

Syed Ali

China's decision to increase its solar targets provides a welcome boost to its domestic solar panel manufacturers.

The country plans to raise its 2015 target for solar generating capacity in a bid to boost domestic solar companies as they suffer from shrinking global demand and frequent trade disputes.

Under its latest plans, China aims to approximately quadruple its installed generating capacity of solar power to 35 GW by 2015, and add 10 GW annually from 2013 to 2015, the State Council said in a guideline issued for the sector. The previous target was 21 GW.

"The country's solar companies are facing widespread operating difficulties as global demand for solar products has slowed, product exports are facing heavy resistance and the sector's development is uncoordinated," it said.

China also vowed to increase financial support for the sector and urged banks to lend to large and promising solar panel producers.

Analysts said the government is encouraging mergers and restructuring, as well as decreasing overcapacity, in order to aid the struggling industry.

In June, the EU imposed an interim anti-dumping duty of 11.8 per cent on imports of all Chinese solar panel products, including panels, cells and wafers. The duty may be raised to an average of 47.6 per cent two months after going into effect if both sides fail to come to an agreement.

Following a session of the China-EU Trade and Economic Joint Committee, Commerce Minister Gao Hucheng said China and the EU hope to solve the dispute through price undertaking talks.

Last year the US also slapped anti-dumping duties on solar cells imported from China.

Korea to build underground power plant

The state-run power supplier Korea Midland Power Corporation (KOMIPO) is to build what will be the world's first urban underground combined cycle power plant facility in northern Seoul.

Last month Doosan Heavy Industries & Construction (HIC) signed a contract with KOMIPO for Doosan HIC to provide key equipment for the Won360 billion ($324 million) project.

Slated for completion in September 2016, Seoul Combined Cycle Thermal Power Plants No. 1 and 2 will be constructed at the site of the Seoul Thermal Power Plant, Korea's first thermal power plant located in Dangin-dong of Seoul's Mapo-gu district.

The underground power plant will have a power output of 800 MW.

Doosan HIC is to supply the main power plant equipment and facilities, including two gas turbines, two steam turbines and two heat recovery steam generators.

The superstructure of the underground facility will be used as an urban park area for residents, officials said.

"Underground plant construction, though 1.5 times more expensive than conventional above ground construction, is an effective use of the limited urban space," said a KOMIPO official.

The blueprint was modelled after Tate Modern, the famous art gallery in London located in the former Bankside power station, he added.

China guides nuclear investment

A new benchmark on-grid nuclear power price of 0.43 yuan (7 US cents) per kWh for newly built reactors across the country, will facilitate the healthy development of nuclear power and help guide investment flows into the sector.

The National Development and Reform Commission (NDRC) said the price will be kept relatively stable, adding that it will make periodic assessments and price adjustments according to technology advances and changes in costs and market demand and supply situation.

The rate, which is charged by power plants to grid operators, had previously varied from project to project.

The Chinese government's commitment to steady growth in the sector under the current Five-Year Plan, was underlined with last month's signing of a cooperation agreement between Alstom and China's Dongfang Electric Corporation (DEC) for the supply of turbine and generator packages for future Chinese projects based on the Westinghouse designed AP1000 Generation III reactor.

According to the agreement, DEC's turbine and generator packages related to future AP1000 projects will be based on Alstom's Arabelle steam turbine technology.

The first contract under this agreement is expected to be signed shortly.

Pakistan tries to get to grips with power shortfalls

Pakistan's government has asked the National Electric Power Regulatory Authority (NEPRA) to increase power tariffs by Rs3-5 per unit, as the country struggles to come to grips with the rising power shortfall and growing circular debt.

The higher tariff would provide the government with an additional revenue of Rs600 billion ($6 billion).

To cut the cost of generation, the government is also trying to reduce the use of oil in the power sector. Four independent power producers (IPPs) including Hubco, Mian Mansha's Nishat Power and Nishat Chunian and Saba Power have already agreed to invest in retrofitting their plants with coal fired boilers.

In July Hub Power Company (Hubco) said it aims to start switching its 1200 MW power plant to coal from oil as soon as the government revises policy guidelines and renegotiates the power purchase agreement to make the shift feasible, the company's CEO Khalid Mansoor said in Karachi.

"We are looking at an investment of $800 million-plus in this conversion," said Mansoor. "Now government agencies have to move quickly. A lot of negotiations need to be done."

In a separate move, the Executive Committee of the National Economic Council (Ecnec) approved the development of five projects costing Rs1303 billion (12.9 billion).

The projects have a total generating capacity of more than 3500 MW. They include the K-I and K-II nuclear projects in Karachi (2200 MW), the Neelum-Jhelum hydropower project in AJK (generation capacity 969 MW) and the Nandipur project in Punjab (425 MW).

The new government is trying to immediately resume work at Nandipur and is hoping to lure back the disgruntled Chinese contractor, which abandoned the project during the tenure of the previous government.

"We are renegotiating the deal with the Chinese contractor – Dongfang Electric Corporation – and Punjab province is part of the negotiations," a water and power ministry official said.

"About 90 per cent of the issues have been settled," he added.

The Chinese firm had sought compensation for losses caused by delay in clearance of $85 million worth of machinery that remained stuck at the Karachi Port for over two years.

Impasse in solar trade war

Nitzschke says China has "no real interest" in negotiations

The solar industry is suffering as the anti-dumping dispute rumbles on.

Siân Crampsie

Officials from the EU and China are running out of time to reach an agreement on the trade dispute over solar panels.

The two sides in the clash want to settle a deal by August 6 in order to prevent an escalation of the anti-dumping duties placed on imports of solar goods from China.

Brussels wants Chinese exporters to agree to a minimum price for solar panels being sold into Europe but an offer made by the Chinese in mid-July fell short of the European Commission's expectations.

If a deal cannot be thrashed out, punitive tariffs on Chinese imports will rise from 11 per cent to an average of 47 per cent.

The trade dispute has already started to take its toll on European manufacturing companies, with Gehrlicher Solar filing for bankruptcy last month.

The trade war is the EU's largest ever trade case and came after a year-long investigation by EU officials. It was triggered by a complaint by a group of European solar manufacturing companies but there is now concern in the industry that the case will result in rising solar panel prices and job losses, whatever the outcome.

Brussels is thought to be asking for a minimum price of around 58 eurocents per watt, with the volume of eligible Chinese exports capped at 60 per cent of the EU market, according to press reports.

Beijing is thought to have offered around 5 eurocents less than that in July.

The average price of German solar panels on the international spot market was 77 eurocents per watt in June, according to solar price index pvXchange.

EU ProSun, the group that triggered the trade case, labelled Beijing's offer as a "joke", while the European Photovoltaic Industry Association (EPIA) called for all governments to ensure fair and open competition based on WTO rules.

EU ProSun said in a statement that China's offer was a price that is below the current dumped price, with no import volume cap. "China has obviously no real interest in negotiations with the EU," said Milan Nitzschke, President of EU ProSun.

EU ProSun believes that China's dumping of solar goods on Europe's market allowed Chinese firms to capture 80 per cent of the EU market and cost the industry over 15 000 jobs. It has also resulted in 60 insolvencies and plant closures in Europe, it says.

Last month Germany's Gehrlicher Solar filed for preliminary reorganisation proceedings at the District Court of Munich after its lenders called in loans worth €85 million. "With the EU-wide introduction of anti-dumping tariffs on Chinese modules and the resulting deterioration of market conditions in Europe, the company is no longer able to fulfil its business plan upon which the two-year loan agreement extension had been signed just three months ago," said the company in a statement.

Gehrlicher grew from a one-man company in 1994 to become one of the world's largest project developers and system integrators in the photovoltaic industry. At its peak in 2010, the group had over 400 employees and achieved global sales of nearly €350 million.

"Anti-dumping tariffs on modules do not help anyone, not even those who request them, because they destroy jobs throughout the whole PV value chain," said Management Board Member and COO, Richard von Hehn.

Analysts have voiced concerns over the effectiveness of a resolution based on price, because it would require dozens of Chinese firms to agree.

Beijing has responded to the EU's case by launching its own trade investigation into European wine and threatening another in the automobile sector.

In 2011 Chinese firms exported around €20 billion of solar panel goods to the EU and the country remains the EU's largest trading partner.

UK proposes shale gas tax regime

The UK government says that a proposed scheme of tax breaks for oil firms will help kick-start investment in the country's shale gas industry.

The proposed scheme has been dubbed the most generous in the world for the shale gas sector and is part of government plans to put the UK at the forefront of shale gas exploration in Europe and boost energy security.

The proposals have been welcomed by industry but vilified by environmental campaigners, who say that the government has not considered the environmental implications of hydraulic fracturing – or fracking – the method used to extract shale gas.

Jenny Banks, Energy and Climate Change Specialist, WWF-UK said: "Ministers seem to have swallowed hook, line and sinker the industry claim that the worries people have about fracking are simply scaremongering, despite strong evidence to the contrary.

"The government must take local environmental concerns and their impact on communities more seriously and taking steps to rush shale gas through the planning and consenting process is misguided in the extreme.

"If shale gas is as cheap as some claim, there's no justification for giving tax breaks to the industry."

The government's plans are part of a wider £100 billion infrastructure investment plan unveiled in June. However, uncertainty about the economics and scale of the country's resources mean that the likelihood of large-scale shale gas development in the UK is unclear.

A recent report by the British geological Survey revealed that there is more than twice as much shale gas in the north of England than previously thought. "It is important to remember that this refers to technically recoverable volumes and not to commercially recoverable gas from shale," commented Emma Wild, Head of KPMG's Upstream Advisory practice.

The government's proposed regime would implement a tax rate of 30 per cent for income generated by shale gas. This compares with 62 per cent for North Sea operators.

The government also says it will make sure that local communities benefit from hosting shale gas exploration, with operators providing at least £100 000 of benefits per 'fracked' well site during the exploration phase – and no less than one per cent of overall revenues.

"The government's consultation demonstrates a commitment to industry, ensuring that if companies determine that the geological and geographical conditions in the UK are right, they are not impeded by unnecessary barriers," said Dan Byles MP, Chair of the All-Party Parliamentary Group on Unconventional Oil & Gas. "We now need to know how much of this valuable resource we have, and capitalise on its potential to increase our energy security and secure economic benefits through tax revenue and job creation."

Spain overhauls energy sector

- Utilities bear brunt of costs
- Italy regulator highlights cost of renewables

The Spanish government has announced another round of subsidy cuts and electricity price increases in an attempt to tackle its growing tariff deficit.

The €26 billion deficit has built up over several years as the result of the difference between the cost of generating electricity and the price at which it is sold and is seen as a major drag on Spain's already stressed public finances.

The latest reforms proposed by the government will force the electricity sector as well as consumers and the government's own finances to take a hit.

Spain's electricity utilities – including Endesa, Iberdrola and Gas Natural – will be asked to swallow losses of €2.7 billion per year in subsidies and guaranteed revenues, while electricity bills will rise by 3.2 per cent in order to raise €900 million this year.

The government will contribute a further €900 million from the state budget so that this year's €4.5 billion deficit will be eliminated, said Energy Minister Jose Manuel Soria.

Hardest hit will be Spain's renewable energy generators, which will bear half of the total cuts imposed on the private sector.

Spain's generous renewable energy subsidy scheme and the large volumes of renewables development that it encouraged have been blamed for causing the tariff deficit.

Meanwhile, the Italian regulator expressed concern about the rising costs of the country's growing renewable energy sector for consumers.

In July Guido Bortoni, the country's regulator, told lawmakers that incentives promoting the renewable energy sector now account for 33 per cent of a typical bill.

Renewables generated 32.2 per cent of Italy's electricity output in 2012, an increase of ten per cent on the year. The regulator estimates incentives to renewables will rise to €12.5 billion in 2015 from around €11 billion last year. Incentives are paid by energy users via extra costs to their bills.

USA launches African partnership initiative

- Private sector commits $9 billion
- Partnerships will replace assistance programmes

Siân Crampsie

The USA has pledged more than $7 billion in financial support over the next decade to help Africa tackle its crippling power problem. The funds form the basis of a new initiative called Power Africa that was launched by US President Barack Obama during a three-nation tour of Africa.

Power Africa aims to double access to electricity in sub-Saharan Africa and will also help US companies engage in the continent's growing economies.

The funds will come from a variety of US agencies and development banks and will be bolstered by private sector commitments of more than $9 billion. Power Africa will add more than 10 GW of generating capacity, enhance energy resource management capabilities and improve energy security.

Only about a quarter of sub-Saharan Africa's population has access to electricity, compared with about half in South Asia and more than 80 per cent in Latin America, the Middle East and Northern Africa, according to the World Bank.

"Access to electricity is fundamental to opportunity in this age, it's the light that children study by, the energy that allows an idea to be transformed into a real business," said Obama. "It's the lifeline for families to meet their most basic needs and it's the connection that's needed to plug Africa into the grid of the global economy."

According to the International Energy Agency, sub-Saharan Africa will need more than $300 billion to achieve universal electricity access by 2030. Power Africa will initially focus on six countries, helping them to realise the potential of their natural resources, including oil and gas reserves, geothermal and hydropower potential, and wind and solar energy resources.

Obama promised a new model of support, developing partnerships between the US and Africa rather than providing straightforward assistance. "More and more African economies are poised to take off and increased trade and investment from the United States has the potential to accelerate these trends," he said.

Companies that have already pledged funds and assistance to Power Africa include Standard Chartered Bank, GE, Symbion Power, Aldwych International and Husk Power Systems. They will initially work on initiatives and projects in Ethiopia, Ghana, Kenya, Liberia, Nigeria and Tanzania.

These six countries have set ambitious goals in power generation and are making the utility and energy sector reforms required to pave the way for investment and growth, said a White House statement.

US agencies involved in the initiative include USAID, OPIC, the US ExIm Bank and the Millennium Challenge Corporation. The Africa Finance Corporation (AFC) said it would be a key partner in the Power Africa Initiative.

AFC has disclosed plans to invest over $250 million in the power sectors of Nigeria, Ghana and Chad.

Developing nations drive renewables growth

Renewable energy is set to continue its growth worldwide in spite of the difficult economic environment, according to new forecasts from the International Energy Agency (IEA).

The Paris-based IEA says that power generation from hydropower, wind, solar and other renewable resources will exceed that from gas and will be twice that from nuclear by 2016.

Renewables are now the fastest growing power generation sector and will make up almost one-quarter of the global power mix, said the IEA in its Medium-Term Renewable Energy Market Report.

The growth in renewables is being led by non-OECD countries, in particular, China. Such countries will account for two-thirds of the global increase in renewable power generation between now and 2018 and will compensate for volatility in regions such as the USA and Europe.

Falling costs are driving the uptake of renewables, said IEA Executive Director, Maria van der Hoeven. "As their costs continue to fall, renewable power sources are increasingly standing on their own merits versus new fossil fuel generation.

"This is good news for a global energy system that needs to become cleaner and more diversified, but it should not be an excuse for government complacency, especially among OECD countries."

Van der Hoeven cautioned that renewable development is becoming more complex and faces challenges – especially in the policy arena. In several European countries with stagnating economies and energy demand, for example, debate about the costs of renewable support policies is mounting.

Van der Hoeven said that "policy uncertainty is public enemy number one" for investors. "Many renewables no longer require high economic incentives. But they do still need long-term policies that provide a predictable and reliable market and regulatory framework compatible with societal goals," she stated. "And worldwide subsidies for fossil fuels remain six times higher than economic incentives for renewables."

Saudi Arabia sets ambitious targets

Saudi Arabia has announced plans to invest $109 billion to become the world's largest renewable energy market.

The Kingdom has revised its national energy plan, outlining initiatives that will see it generating one-third of its energy needs from renewables by 2032.

It is aiming to develop 16 GW of photovoltaic (PV) solar power, 25 GW of concentrating solar power (CSP), 3 GW of waste-to-energy capacity, 1 GW of geothermal energy and 9 GW of wind power.

The plan will be a major step-change for Saudi Arabia, which is highly dependent on its own oil resources, and will require the creation of clear, long-term policies.

The country recently scored highly in an assessment of the renewable energy readiness of GCC countries compiled by the GCC Consortium on Clean Energy and the EU-GCC Clean Energy Network.

The UAE came out on top as the GCC country with the most proactive approach to deploying renewable energy, and Saudi Arabia came second.

Saudi Arabia's plans also include the construction of 18 GW of nuclear energy.

Last month the National Institute of Technology (NIT) in Bahrah signed a cooperation agreement with Areva and EDF of France aiming to develop nuclear energy skills in Saudi Arabia.

World Bank charts new course

- Alignment with SE4ALL initiative
- Natural gas, hydropower targeted

The World Bank has set out its course for future energy sector funding and has pledged to limit funding for new coal fired power plants.

The Bank's latest Energy Sector Directions Paper states that it will focus on expanding access to energy and sustainable energy, and will put other international financial institutions under pressure to follow suit.

The World Bank says that nearly one-fifth of today's global population – 1.2 billion people – lives without access to electricity, while two-fifths of the population rely on traditional energy supplies such as wood, charcoal and dung for cooking and heating.

The Bank's paper, which is updated every ten years, states that it will make every effort to "minimise the financial and environmental costs of expanding reliable energy supply" while also recognising that "each country determines its own path for achieving its energy aspirations."

It emphasises the importance of selecting areas in which the Bank can best help countries mobilise energy solutions that reduce poverty sustainably.

"We need affordable energy to help end poverty and to build shared prosperity," said World Bank Group President Jim Yong Kim. "We will also scale up efforts to improve energy efficiency and increase renewable energy – according to countries' needs and opportunities."

Environmental group WWF said the move was a "welcome step towards a sustainable energy future".

"Coal is the dirtiest of fossil fuel power sources – polluting local environments, and contributing heavily to global warming.

The move by the World Bank to limit new coal financing is welcome, and this should immediately become the norm for all international finance institutions," said Samantha Smith, leader of the WWF's Global Climate & Energy Initiative.

The World Bank says that its future direction is aligned closely with the UN Sustainable Energy for All initiative, which sets goals for 2030 of universal access to modern energy, a doubling of the global rate of energy efficiency improvement and a doubling of the share of renewable energy in the global energy mix.

Other guiding principles identified in the paper include an emphasis on improving the financial, operational, and institutional environment for the energy sector in countries to help stimulate private sector investment, and consulting with affected communities and civil society organisations, as well as industry.

The paper addresses the use of fossil fuels. It affirms that the World Bank Group will "only in rare circumstances" provide financial support for new greenfield coal power generation projects, such as "meeting basic energy needs in countries with no feasible alternatives".

It says the Bank Group will scale up its work helping countries develop national and regional markets for natural gas, the fossil fuel with the lowest carbon intensity.

The paper also confirms the Bank Group's intention to increase support for hydropower projects.

Schneider eyes Invensys

The long-rumoured takeover bid for the UK automation and controls firm could finally emerge.

Siân Crampsie

Schneider Electric says that the acquisition of UK-based Invensys would enable it to expand in key industry sectors and realise both cost and revenue synergies.

The French energy management firm has confirmed that it is "in the early stages of discussions" with Invensys over a bid for the company, which last year sold its rail division to Siemens for £1.7 billion.

The two firms' negotiations are focused on an indicative offer from Schneider that values Invensys at £3.3 billion. Invensys has been the subject of rumours in the markets about a takeover for several months, with ABB, GE, Emerson and Siemens seen as potential suitors.

GE last month played down suggestions that it could enter a rival bid for Invensys, which provides software, automation and control solutions for a wide variety of industrial and process industries as well as the appliance sector.

Schneider says that the financial and strategic rationale for the proposed deal is "compelling" as it would expand its access to key electro-intensive markets such as oil and gas and chemicals and also allow it to gain a leading position in the fast-growing software business for industrial operational efficiency.

Other areas of the Schneider Electric business would also gain from the acquisition, according to industry analysts Frost & Sullivan.

"The immediate impact would certainly result in Schneider Electric's capitalisation on home and building energy management, a market estimated to be over $20 billion globally, and a significant aspect of Schneider Electric's increasingly diversified corporate strategy," said Frost & Sullivan Industry Manager Konkana Khaund.

"However, without doubt, the combined portfolio will eventually be optimised by Schneider Electric to potentially strengthen its offering in the datacentre business, particularly software solutions geared towards infrastructure and building operation level supervision, control and monitoring."

At present, over 50 per cent of Schneider Electric's current global revenue is accounted for by its buildings, residential and datacentre businesses.

Invensys said in July that it had made a solid start to the year with profits on track to be ahead of profits in 2012. The group's reorganisation that followed the disposal of its rail sector was on track to deliver £20 million of cost savings this year and £5 million next year.

Nordex consolidates production

- Production shifts to Germany
- Siemens sustains Kansas operations

Nordex is to reorganise its production of wind turbines in response to overcapacity and uncertainty in the global wind energy sector.

The German firm is to cease nacelle production at its Jonesboro, Arkansas facility and shift production to a single plant in Germany.

It said that production capacity at Jonesboro had been underutilised due to weak demand from the US market and that it would have greater flexibility to react to US demand from one single site in Rostock, Germany.

"We are reacting to the weakened demand from the US market, brought on by the unpredictable extensions of the Production Tax Credit (PTC), and the resulting low utilisation rate of our US assembly plant," said Dr. Jürgen Zeschky, CEO of Nordex SE. "We see great potential in the US and Latin American markets and are committed to serving those markets and increasing our installed base."

Nordex's move is in contrast to Siemens, which last month said that it had sufficient turbine orders to sustain operations at its Hutchinson, Kansas plant, for 18-20 months.

The wind nacelle manufacturing plant, which will complete its third year of operation in October, will also begin producing direct-drive nacelles early next year, helping ensure its longer-term future, Plant Manager Gus Shaar advised a local Chamber of Commerce audience.

"We have an order for 1 GW of power, which is 540 nacelles or enough product for a year, and we're looking solid for the next 18 to 20 months," Shaar said. "Wind energy is here for the long term," he added. "We've just got to deal with business cycles."

Siemens has altered the 300 000 ft² facility to enable it to manufacture other wind turbine components, a move that helps to ensure that its capacity is always utilised.

Nordex will react to US demand from Rostock, Germany

China "disregard" for trade law

AMSC (American Superconductor) has called for a re-evaluation of the USA's trade relationship with China after prosecutors in the USA charged Sinovel with stealing trade secrets.

The indictment alleges that Sinovel, formerly AMSC's largest customer, stole proprietary software and technical details belonging to AMSC, which manufactures electronic controls and systems for wind turbines. It also says that Sinovel then exported turbines using AMSC software to the USA and installed them in Massachusetts.

"The fact that Sinovel has exported stolen American intellectual property from China back into the United States – less than 40 miles from our global headquarters – shows not only a blatant disrespect for intellectual property but a disregard for international trade law," said Daniel P. McGahn, AMSC's President and CEO.

AMSC warned wind farm developers that wind turbines purchased from Sinovel might contain stolen intellectual property. "We will continue to seek justice on a global basis," said John Powell, Vice President and General Counsel, AMSC.

The US Justice Department said that the alleged loss to AMSC is more than $800 million. If proved, the charges carry a maximum penalty running into billions of dollars and also possibly prison sentences for Sinovel executives.

A former employee of Sinovel was also indicted. Dejan Karabasevic pleaded guilty in Austria last year to stealing AMSC source code for turbine controllers on behalf of Sinovel.

AMSC, which lost more than $1 billion in market value after the theft became public, is seeking $1.2 billion in damages in Chinese courts. Sinovel accounted for 70 per cent of AMSC's sales in 2009.

GE, Alstom localize Chinese business

Both GE and Alstom are enhancing their local capabilities in China in order to compete more effectively in the country's power sector.

GE has established a new dedicated power generation products and services business unit in China, while Alstom has signed a long term cooperation agreement with Harbin Turbine Corporation (HTC) to license its GT13Es gas turbine in China.

GE's new business segment will be located in Beijing and includes its heavy duty gas turbine, steam turbine, generator and gasification products and services. It will reportedly have enhanced local capabilities, expertise and decision-making authority to more effectively compete in China, where the demand for cleaner gas, coal and alternative energy technologies continues to increase.

Under its deal with HTC, Alstom will license the GT13E2 turbine for manufacture, assembly and sales in China and establish a service joint venture to address the aftermarket needs of Chinese GT13E2 customers. The deal will give Alstom improved access to the Chinese market, said the firm in a statement.

GE said it was making the move "to address China's unique local dynamics". The new unit's main priority will be to increase GE's local capabilities by optimising the company's power generation partners in China, including Harbin Electric for heavy duty gas turbine projects, as well as Nanjing Turbine and Electric Machinery Company (NTC) in both gas and steam turbines.

In June GE Power Conversion signed a memorandum of understanding with two Chinese firms to develop the solar energy business in China, where aggressive targets for carbon intensity are driving continued growth in the renewables sector.

GE Power Conversion is seeking to cooperate with Yingda International Leasing Co. and Sinoma International Engineering Co. to develop solar technology, source financing and manage government relations.

Bo Liu, president of GE Power Conversion China said: "China is already one of the largest solar energy users as well as a leading producer of PV hardware globally. The opportunity for growth in clean and efficient solar energy is immense as China aggressively pursues a reduction in carbon emissions."

Clean energy drives supergrids

China's growing energy demand and clean energy targets are also expected to drive demand for supergrid technology and smart grid solutions, with firms such as ABB, Siemens and Alstom vying for business.

Through the use of HVDC technology, supergrids will facilitate the integration of renewable energy and the balancing and transport of electricity.

According to Alstom the HVDC market has a global market potential of €50 billion up to 2020. Last month Patrick Plas, Senior Vice President of Alstom Grid outlined the importance of China during a press visit to Stafford, UK, where the company develops the power electronics that are essential to the development of DC projects.

"China needs HVDC to move bulk electricity from where it is produced to the major consumption areas on the coast. China represents a significant market. Through to 2018, China has a market potential of €11 billion," he told reporters.

Meanwhile, Alstom last month boosted its smart grid capabilities with the opening of a new smart grid centre of excellence in France.

The facility will focus on command control and protection systems for digital control rooms, a key element in the transition from conventional electrical grids to smart grids.

Plas: China represents a significant market

Americas

GDF Suez finalises Alstom service package

GDF Suez Energy North America has awarded Alstom a long-term service contract to give its power plant fleet new flexibility.

Under the terms of this €360 million ($480 million) contract, Alstom will provide comprehensive maintenance services and gas turbine upgrade packages for four natural gas-fired power stations.

The plants together use 14 Alstom GT24 gas turbines and generate enough electricity to power more than three million homes in Texas and Massachusetts.

Alstom's responsibilities for the Midlothian and Hays plants in Texas, and Bellingham and Blackstone power plants in Massachusetts include management and provision of replacement parts, technical field advisors and gas turbine services for their fourteen power generating units over the life of the contract.

It will also carry out turbine upgrades to enhance the operating flexibility of the plants.

Exelon orders Nordex turbines

Nordex says that it will be supplying 19 wind turbines to Exelon Wind for the next phase of the Beebe Community Wind Project in Gratiot County, Michigan.

The N117/2400 turbines will be located near Ithaca, Michigan, about 45 miles north of the state capital of Lansing. Turbine deliveries are expected to begin in May 2014.

The first phase of the project was completed in December 2012 and features 34 of Nordex's N117/2400 turbines. It was the first major project worldwide to use the machines, which have a rated capacity of 2.4 MW, feature 91 m-high towers and are specifically designed for light wind conditions.

Nordex will be responsible for delivery, commissioning and testing of the turbines and will provide ongoing maintenance under a 20-year Premium Service contract. Project completion and commercial operation are planned for late 2014.

First Mexico wind contract for Alstom

Alstom has been awarded a contract with Enel Green Power Mexico for the supply and commissioning of 34 wind turbines at the new Sureste I-Stage II power generation plant in the Tehuantepec Isthmus, Oaxaca, Mexico.

The project, awarded to Enel by the Federal Electricity Commission under the "external energy producer" scheme, is the first wind power project in Mexico for Alstom.

The Sureste I-Stage II wind farm, which will be fully operational at the end of 2014, will generate more than 350 GWh a year. It will be equipped with 3 MW wind turbines from Alstom's ECO 100 wind turbine platform.

The installed capacity of wind power in Mexico is currently 1.4 GW and the country has established a target of 12 GW by the year 2021.

GE, ComEd sign smart meter deal

GE has been selected by ComEd, the electric utility serving Northern Illinois, to deliver approximately 4 million smart meters from 2013 to 2021 in a deal worth more than $200 million.

By deploying advanced meters across its service territory, along with other components of its grid modernisation initiative, ComEd expects to transform the delivery of electricity to homes and businesses and give consumers greater control over their energy consumption and costs.

The utility has committed to invest more than $2.6 billion over ten years to modernise its electric grid in Northern Illinois – more than $1.3 billion of which is earmarked to build a smart grid network and install smart meters.

Phoenix Solar signs Simon contract

Phoenix Solar Inc. has signed a contract with Silicon Ranch Corporation to build a 38.6 MW solar plant called Simon Solar Farm in Georgia, USA.

The installation will be the largest utility-scale solar power facility in the state and the largest solar installation in the 14-year history of Phoenix Solar. Construction has already started and is scheduled for completion by the end of 2013.

Phoenix Solar Inc. will provide all engineering, procurement and construction (EPC) services to Silicon Ranch to realise the ground-mount solar park on 161 acres at the Simon Solar Farm, about 30 miles east of Atlanta. Phoenix Solar will also provide long-term operations and maintenance support for the solar park.

Georgia Power, the state's largest electrical utility, has agreed to buy the electricity generated from the solar park under a 20-year Power Purchase Agreement (PPA) with Silicon Ranch.

Asia-Pacific

Siemens wins Philippines order

Siemens is to deliver and install the wind turbines for the Caparispisan project in Illocos Norte, Philippines.

The German firm has received an order for 27 direct drive SWT-3.0-101 wind turbines from a consortium of Northern Luzon UPC Asia Corporation, AC Energy Holdings Inc. and the Philippine Investment Alliance for Infrastructure.

The deal also includes a five-year service agreement.

Installation and commissioning of the wind turbines is scheduled for 2014.

ERC approves new link

The Phhilippines' Energy Regulatory Commission (ERC) has given the go-ahead for construction of a new transmission corridor connecting the provinces of Cebu, Negros and Panay.

According to the ERC, the Peso12.9 billion ($298 million), 230 kV project would increase the transmission capability of the submarine cable interconnection between the three provinces. This in turn makes the so-called transmission corridor more reliable as new plants are developed in response to increasing power requirements in the Visayas grid.

The proposed project will relieve the existing 138 kV transmission corridor in Negros and Cebu islands from power flow congestion during single line outage conditions and will optimise the Leyte-Luzon 350 kV line.

In early 2012, NGCP had said the proposed project would help absorb more than 400 MW in new capacity that would be installed in Panay by 2016.

Based on NGCP's 2011 Transmission Development Plan, ten generating plants would be constructed in Panay by 2016. Such a capacity increase will result in excess power and thus the need for new transmission lines to export the excess power to other islands in the Visayas.

The project will also extend the existing 230 kV transmission corridor from Compostela Substation in Cebu toward Panay through a combination of submarine cables and overhead transmission lines which will pass through Negros Island. Once completed, the project will add 238 circuit kilometres of transmission lines to NGCP's facilities.

Bangladesh plans oil fired plant

The government of Bangladesh has outlined plans for the construction of a 100 MW oil fired power plant at Chapai Nawabganj in the northwest of the country.

The Bangladesh Power Development Board estimates that the project will cost Tk11.14 billion ($143 million), and has already selected China's Hubei Electric Power Survey & Design Institution, to install the plant.

SMC breaks ground on Davao

SMC Global Power Holdings Corp., the subsidiary of diversified conglomerate San Miguel Corp., has broken ground on the 600 MW coal fired power plant in Davao, Philippines.

In a disclosure to the Philippines Stock Exchange (PSE), SMC president and chief operating officer Ramon Ang said the company is on track to completing the plant in 2015.

The power plant, to be built in Malita, Davao, will help balance the power supply differential between North and South Mindanao and provide a reliable and continuous supply of electricity at a low cost, Ang also said.

He said the plant aims to help address the growing power crisis in the island, which is currently facing shortages of up to 10 hours, depending on the area.

SMC is also building a 600 MW power plant in Bataan.

Europe

Westinghouse supports Spain's waste plans

Westinghouse Electric Company has been awarded a contract by ENRESA to provide architect engineering services in support of the El Cabril low- and intermediate-level nuclear waste repository in southern Spain.

The four-year operation and engineering support contract with the Spanish agency responsible for radioactive waste management and nuclear plant decommissioning covers design modifications and the preparation of technical and licensing documentation for the repository.

The El Cabril disposal facility, near Córdoba, was designed in the 1980s by Westinghouse Electric Spain. The facility began receiving low- and intermediate-level waste from Spain's operating nuclear plants in 1992.

Muckle advises on Normandie 3

Commercial law firm Muckle LLP says it has been working with Jersey Electricity to advise on a series of contracts to provide Jersey with a third submarine cable from France.

The Normandie 3 project will enable Jersey to access reliable sources of electricity and will eventually form part of the Channel Islands Electricity Grid.

Muckle has advised on a contract for a submarine power and integral optical cable contract worth €40.6 million with Prysmian Group and on a separate £5 million contract between Jersey Electricity and the English subsidiary called Prysmian Cables and Systems Limited, in relation to the installation of the land cable.

Terna, Amprion choose Nexans

Nexans has been awarded contracts worth over €20 million to design, manufacture and install EHV (Extra High Voltage) cable systems for two of Europe's leading TSOs (Transmission System Operators) – Terna of Italy and Amprion of Germany.

For Terna, Nexans will design, supply, install and test two major EHV underground cable circuits in south-east Sicily. For Amprion, it will design, supply, install and test the entire cable system for the construction of the first pilot section of partial undergrounding of overhead lines in residential areas in Emsland.

B&W Vølund wins WTE contract

I/S Nordforbrænding has awarded B&W Vølund, a subsidiary of Babcock & Wilcox, a $40 million contract to engineer and supply steam generating equipment, ash handling systems and combustion control systems for a solid waste-to-energy plant located north of Copenhagen, Denmark.

B&W Vølund will supply waste-firing equipment, including an advanced DynaGrate combustion grate for the plant's steam generator. The new line will burn 80 000 tons of waste per year.

Start-up of the plant is anticipated in the spring of 2016

International

Tenaga and Kharafi ink O&M deal

Tenaga Nasional Bhd of Malaysia, and its partner Kharafi National, of Kuwait, have won a RM1 billion ($313.5 million) contract from the Kuwaiti government to operate and maintain a power and desalination plant in Kuwait.

The seven-year contract covers the operation and maintenance of the Shuaiba north cogeneration plant within the Shuaiba Industrial Authority Area, about 40 km from Kuwait City.

The plant is able to produce around 780 MW of power and 45 million imperial gallons per day (MIGPD) of water and was commissioned in 2010.

ABB strengthens Iraq grid

ABB has won an order worth around $30 million from Zagros Energy to build four new transmission and distribution substations in the Kurdistan region of Iraq.

The project is part of a wider initiative to expand and strengthen the regional power grid in response to growing energy demand.

ABB's project scope includes the design and supply of the substations and will enable the supply of an additional 600 MW of power to the region. The substations are based on GIS technology, which offers a compact footprint for projects located in urban areas.

Industrial growth in Kurdistan is driving an electricity demand growth rate of 10-25 per cent per annum and outages and blackouts are frequent. The region's power grid currently has a capacity of 2750 MW.

The project is scheduled for completion in 2014.

Alfa Laval wins Middle East order

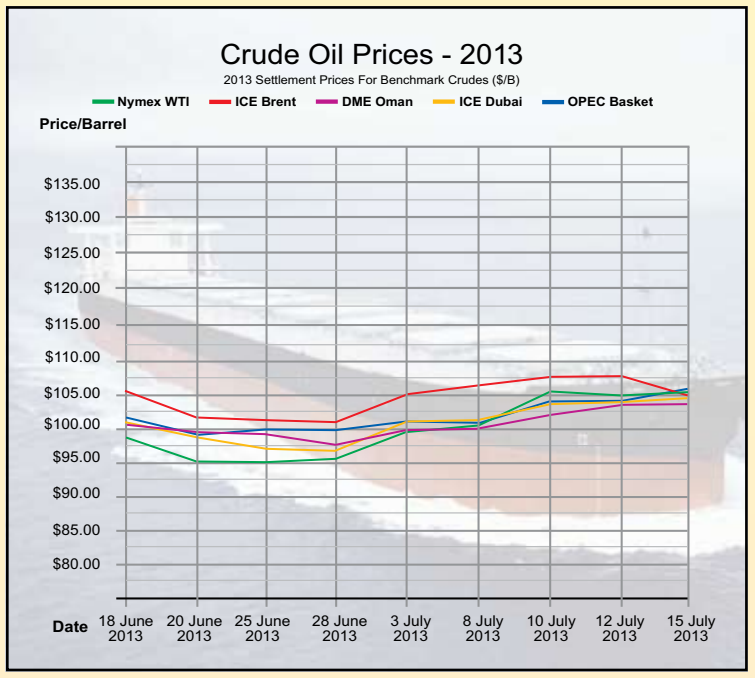
Alfa Laval has won an order to supply waste heat recovery systems for two diesel power plants in the Middle East.

The orders have a combined value of around SEK80 million ($12.3 million) and will enhance the efficiency of two gas turbine-based power plants being built by Burmeister & Wain Scandinavian Contractor A/S (BWSC) in the Lebanon.

Oil

Middle East politics pushes crude well above $100/b

- Traders worry about the security of the Suez Canal
- Opec to cut production in face of growing US shale oil



David Gregory

The price of West Texas Intermediate (WTI) settled at more than $106/b in mid-July, more than $8/b over the price a month earlier. Brent did not score such a large increase, trading at $109/b in mid-July compared to around $105/b four weeks earlier, but it is clear that prices are on the rise, spurred by the continuing and spreading social and political upheavals in the Middle East.

Since early May, WTI had settled into a mid-$90/b range and it appeared that it would remain there, but the latest phase of the Egyptian revolution kicked in, causing traders to worry about the security of the Suez Canal and the Sumed pipeline, through which millions of barrels of crude flow each day.

The situation in Egypt will lend itself to acts of lawlessness and sabotage – the gas pipeline infrastructure in the Sinai was attacked again shortly after former president Mohamed Morsi's removal, causing the meager gas shipments that still go to Jordan to stop.

As is often the case, politics in the Middle East is having more impact on the price of energy than the fundamentals of supply and demand.

Despite the burgeoning rise within North America of shale oil and the statistics that show a decline in crude oil imports, US consumers find themselves confronted with rising prices. Western economies continue to struggle to return to a sound economic footing in the wake of the 2008 global financial collapse. Although lower energy costs could spur their efforts, for many crude producers, lower oil prices would spell disaster for their own economies.

A report in the *Wall Street Journal* last month said it looked likely that Opec would cut production by 500 000 b/d as a result of growing shale oil production in North America. Opec's official production target is 30 million b/d, but it regularly exceeds that amount.

Saudi Arabia and other Persian Gulf states have stepped in when necessary to keep prices within a range that the global market could tolerate without biting into demand.

They made up the shortfall in supply when the civil war in Libya removed that country's usual 1.5 million b/d from the market and have only this year begun to readjust their production.

Libya is another Arab country where the revolution keeps on coming. Social unrest, in the form of protests by Libyans staged outside oil facilities, has impacted Libyan crude output. People are demanding jobs at the facilities and those with jobs frequently strike for better conditions and for pay equal to foreign workers. Militias and tribes frequently battle each other over the role of providing security for the facilities.

Industrial action and political unrest in Libya is reported to have reduced crude production by as much as 200 000 b/d in June and at times it resulted in the country's output falling to less than 1 million b/d.

The fact that its oil facilities escaped serious damage during the civil war allowed Libyan crude production to return to around 1.5 million b/d just a few months after the end of hostilities.

Tripoli's National Oil Corporation (NOC) has set a production target of 1.7 million b/d by the end of the year.

Meanwhile, fighting continues to rage in Syria and sometimes spreads to its periphery. The most recent comment by Damascus on oil production was that output is down to 20 000 b/d from a pre-war average of 380 000 b/d. Of that, about 160 000 b/d was exported.

In its latest monthly report, Opec estimated that demand for its crude will be down by about 800 000 b/d during the first half of the year and by around 400 000 b/d for the entire year – hence the likelihood of a cut in the production ceiling. But the Middle East still has the rest of 2013 to get through and where the region will be when Opec meets in December is hard to tell.

Gas

Egypt energy struggle comes down to subsidies

Egypt may have removed its president from office but its energy problems are far from over. Difficulties are likely to remain until the issue of government subsidies is addressed.

Mark Goetz

One of the surprising results from the ouster of Mohamed Morsi as president of Egypt was a near immediate end to the domestic energy crisis that the country had been facing. But Egypt's energy problem is anything but over – and it won't be over until the issue of government subsidies for fuel is addressed and subsidies removed. While Egyptians may see an improvement in their energy situation now, it is likely to be short-term.

Egypt produces oil and gas, but has ceased to be an energy exporter. Crude reserves are estimated at 4.3 billion barrels and gas reserves are put at 2 trillion cubic metres (72 trillion cubic feet). In 2012 it produced an average of 728 000 b/d of oil and consumed 744 000 b/d. Gas production reached 60 billion cubic metres in 2012, of which it consumed 52.6 bcm.

Egypt's energy problem is essentially one of subsidies. The government spends $15 billion per year to provide Egyptian's with fuel and power far below international prices, and it is feared that any attempt to remove the subsidies will bring more social upheaval – serious upheaval because the vast majority cannot afford to pay anywhere near international prices – yet until the government comes to grips with this calamity, it will forever face mounting debt.

Many international energy companies operate in Egypt, but if things continue in the same vein as they have in recent years, the country will never attract the foreign investment it needs to turn the situation around.

For the last two years – since the overthrow of Husni Mubarak – the government has fallen behind in its ability to pay for the oil and gas that foreign companies put into the domestic system. The lack of natural gas for export has resulted in the closure of the 5 million tons/year LNG plant in Damietta, meanwhile the Egypt LNG facility at Idku cannot meet its obligations to customers.

In a recent statement on its performance in Egypt, UAE-based Dana Gas reported that it had achieved record production in Egypt of 39 000 barrels of oil equivalent per day, including 190 million cubic feet per day and 8500 b/d of liquids.

Dana Gas also reported that it "continues to engage with relevant government authorities regarding its overdue receivables and its future capital expenditure plans." Dana "welcomes and actively supports the government's desire to increase local hydrocarbon production in order to meet growing domestic demand. Discussions of fiscal support by the international community will also play a significant role in addressing investment decision by key international investors. During Q1 2013, Dana gas collected $41 million with a 100 per cent revenue collection."

During the latter days of Morsi's presidency, Cairo started negotiations with Qatar about purchasing LNG in order to meet rising demand. Egypt does not have the infrastructure to import LNG, but installing an offshore regasification system would be part of the deal. Talks continue about future deliveries, but in May Qatar agreed to 'gift' to Egypt five cargoes of LNG that are expected to be signed over to BG Group and GDF Suez, which are partners in Egypt LNG. The Qatari shipments will be swapped with the gas that would usually be available for Idku, which is now needed to meet domestic demand.

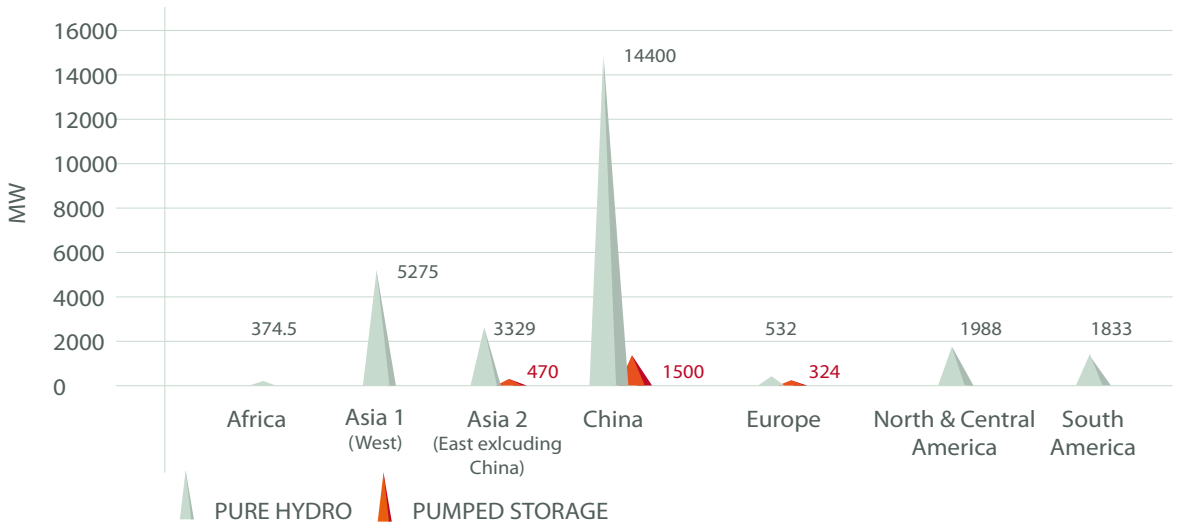
The latest round of political upheaval in Egypt has prompted LNG traders to express concern for the safety of tanker shipments through the Suez Canal, through which some 14 per cent of world trade passes. During 2011, some 40 million tons of LNG passed through the canal, most of it northbound from Qatar and Oman.

A disruption in traffic through the canal would add costs for shippers as they diverted their tankers around the Cape of Good Hope.

Mursi's government last year decided to officially end the Egyptian gas sales contract to Israel for political reasons despite the fact that the pipeline used to ship gas to Israel had been damaged by repeated attacks and shipments had stopped anyway.

Despite the damage to pipeline infrastructure, Egypt had managed to maintain its gas shipments to Jordan at a rate of around 40 million ft^3/day. But those shipments stopped earlier this month when the pipeline infrastructure was again attacked shortly after Morsi's removal.

IHA estimates of added hydropower capacity in 2012



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Countries in North and Central America by hydropower capacity

Country	Capacity (GW)	Increase 2012 (GW)
United States	99.9*	0.2
Canada	77*	0.7
Mexico	12	0.8
Costa Rica	1.6	0
Panama	1.4	0.3
Others	5.1	0.1
Total	197	2

* includes pumped storage

Countries in South America by hydropower capacity

Country	Capacity (GW)	Increase 2012 (GW)
Brazil	84.2	1.8
Venezuela	15.7	0
Colombia	11.6	0.1
Paraguay	8.8	0
Argentina	7.7*	0
Others	16	0
Total	144	1.9

* includes pumped storage

Countries in Europe by hydropower capacity

Country	Capacity (GW)	Increase 2012 (GW)
Norway	30.3*	
France	25.4*	
Italy	19.5*	
Spain	16.1*	
Sweden	16*	0.2
Others	119.7*	0.3
Total	227	0.5

* includes pumped storage

Countries in Africa by hydropower capacity

Country	Capacity (GW)	Increase 2012 (GW)
Egypt	3	
Democratic Republic of the Congo	2	
South Africa	2*	
Mozambique	2	
Ethiopia	2	
Others	15*	0.4
Total	27	0.4

* includes pumped storage

Countries in West and Central Asia by hydropower capacity

Country	Capacity (GW)	Increase 2012 (GW)
Russian Federation	47.6*	2.9
India	43.2*	0.6
Turkey	19.6	0.7
Iran, Islamic Republic of	9.5*	0.8
Pakistan	6.6	0.1
Others	28.5	0.2
Total	155	5.3

* includes pumped storage

Countries in East Asia and Oceania by hydropower capacity

Country	Capacity (GW)	Increase 2012 (GW)
China	248.9*	15.5
Japan	46*	0.5
Vietnam	13	2.3
Australia	8.5*	
New Zealand	5.5	
Others	33.1*	0.8
Total	355	19.1

* includes pumped storage

This section is supported by ABB

Source: International Hydropower Association, 2013 IHA Hydropower Report

Keeping the "B" in BRIC

Despite recent challenges, Latin America's largest economy still presents major opportunities for energy sector investment.

Brad Hartnett

Over the past decade, political and economic stability in Brazil has led to growing interest from international investors looking for new opportunities in this market of almost 200 million consumers. Together with Russia, India and China, Brazil became part of the so-called BRIC quartet of emerging markets, characterised by large populations, geographies and rapid economic growth.

The power and utilities sector has responded to opportunities in Brazil with transnational stakeholders such as GDF Suez, AES Corp., Duke Energy, Enel, Iberdrola and E.On expanding asset portfolios and operations to take advantage of local incentives and higher growth prospects than can be found in their own domestic markets.

But growth in Latin America's largest economy has been relatively weak over the last two years and falling demand from China has put the brakes on Brazil's long-term commodities boom. In June, the central bank cut its growth forecast for 2013 from 3.1 per cent to 2.7 per cent, citing volatility as a risk factor. Furthermore, a recent wave of street protests has turned a spotlight on political corruption and inadequate public services as new considerations and challenges for investors doing business in Brazil.

Nevertheless, the country remains a leading destination for foreign capital and Brazil's government has played a significant role in developing strategic industries, including power and utilities. In 2007, it launched the Growth Acceleration Programme (PAC), which is focused on implementing policies and investment projects funded by government and the private sector to accelerate economic growth in Brazil. The energy sector has the largest PAC budget allocation by far with key focus areas including electricity, oil, natural gas, renewable fuels, and energy efficiency.

The initial four-year phase of PAC had an estimated public-private investment target for energy of R$294 billion ($130 billion) for the 2007 to 2010 period. Phase 2 or PAC-2 covers the post-2010 period. The estimated PAC-2 investment target for energy is R$466 billion for 2011 to 2014 period and R$627 billion for the post-2014 period.

Electricity consumption per capita in Brazil is low relative to North America and Western Europe but with industry expansion and a growing middle class, the gap is expected to narrow significantly in the coming years. Installed generating capacity in Brazil is expected to grow at a 5 per cent compounded average annual growth rate (CAAGR) over the next decade with consumption by energy intensive industries such as aluminium production driving much of this growth.

To provide stable and reliable sources of electricity for its growing economy, Brazil needs to diversify its generation mix beyond hydropower, which accounted for almost 70 per cent of installed generating capacity in 2012 and supplied around 80 per cent of the country's total electricity needs. This overdependence was highlighted in late 2012 and early 2013 when dam capacities fell to levels not seen since Brazil's energy crisis over a decade earlier. With limited hydropower resources available, electricity distributors were forced into costly spot purchases of backup thermal power.

While the installed base of hydropower will continue to grow, its relative share of the generating capacity mix is expected to decline to around 60 per cent by 2022. Opportunities to take advantage of Brazil's domestic natural gas resources should gain momentum in the coming years through the development of major natural gas-fired generation projects. An expansion of LNG import capacity will also increase supply options to fuel the country's growing fleet of natural gas-fired plants.

Non-hydro renewable energy capacity, especially from wind and biomass sources is also expected to play a significant role in Brazil's development. In 2012, installed wind capacity represented just over 1 per cent of Brazil's total generating capacity and is expected to account for almost 8 per cent by 2022.

New wind power projects in Brazil benefit from several key advantages. Although wind generation is characterised by low capacity factors due to intermittency and incurs high transmission costs, capacity charges and transmission costs in Brazil are distributed equally across all generators. In addition, low cost project financing from Brazil's national development bank, BNDES, is available given compliance with local content rules. This has resulted in a clustering of local and international wind component manufacturers, including Suzlon, GE, Vestas, and Enercon.

Brazil is already a world leader in biomass-sourced energy, with established expertise in the production of sugarcane ethanol for transportation fuel. Some developers are also focused on ethanol for electricity production. Eucalyptus-based crops, elephant grass, and biogas from landfill are some of the other biomass sources with generation potential in Brazil.

Hartnett: Foreign investors need a thorough knowledge of the local environment

Installed generating capacity from biomass sources is expected to account for over 8 per cent of total generating capacity by 2022.

Significant transmission and distribution (T&D) investment will also be required to support grid expansion and improve energy efficiency. The government has implemented a 10-Year Energy Expansion Plan that estimates R$61 billion of investment will be needed to build new substations and expand the interconnected system from just over 100 000 km at end-2011 to almost 150 000 km by 2021.

Federally-controlled Eletrobras controls over half of the transmission network in Brazil, with state controlled Cemig and Copel also holding significant transmission assets. The Colombian state-owned transmission enterprise ISA owns 13 per cent of Brazil's transmission capacity through its subsidiary Companhia de Transmissão de Energia Elétrica Paulista (CTEEP).

The electricity distribution segment is more open to foreign and private operators with over 60 distribution companies, of which around 70 per cent are funded with private capital. Foreign companies with stakes in Brazilian distribution companies include AES, EDP, Enel, and Iberdrola.

Expansion of T&D infrastructure is typically undertaken by consortia comprising local and foreign companies and led by Eletrobras, Cemig, Copel, Alupar Participações, or CTEEP.

As part of Brazil's electricity market reforms, the government introduced new rules in 2004 to ensure reliable electricity supply and the continuous expansion of generation, transmission and distribution activities. The new regulatory framework is based on universal system access, equitable returns, and tariff adjustments with energy auctions established for distribution companies to procure energy to serve their customers.

Under this system, auctions of generating capacity are held three to five years in advance of new projects coming online with local and international developers bidding down the price they will accept to sell power. Winning generators sign long-term energy contracts directly with distribution companies. Three such auctions are scheduled for this year for new power projects due to come online in 2016 and 2018.

Auctions for the development of new transmission and distribution infrastructure were also held in early 2013 with more scheduled in coming months, including auctions for power line contracts to connect up to 6900 MW of wind capacity due to come online in 2016.

In 2012, the Rousseff government announced plans to stimulate the broader economy by slashing electricity tariffs in Brazil, which were among the highest in the world. The stock prices of local power companies including Eletrobras and Cemig plummeted largely as a result of this decision. In January of this year, the government introduced the new tariff structure, which will see residential rates lowered by 18 per cent and industrial rates cut by up to 32 per cent, making it more challenging for investors to earn acceptable rates of return on existing and new generating capacity.

To compensate companies for the costs of prior investments, the government has indicated that it would reimburse all unamortized costs and provide subsidies where necessary. Separately, Eletrobras has stated that it still plans to invest a total of R$52.4 billion in its transmission and generation businesses between 2013 and 2017.

Despite disappointing economic growth in the last few years and recent market and societal challenges, there is good reason for optimism in Brazil. Foreign direct investment quadrupled between 2005 and 2012 from R$37 billion to R$148 billion and momentum should continue with the lead-up to the World Cup in 2014 and the Olympics in 2016.

High priority is being given to the development of energy infrastructure and domestic sources of oil and gas. The power and utilities sector is well placed to respond to Brazil's growing energy demands through partnerships with government agencies, private companies and non-governmental organisations to create a world-class power grid that integrates diverse sources of renewable energy and thermal generation.

For foreign investors, due diligence and a thorough knowledge of the local environment including the "Custo Brasil" or increased operational costs associated with doing business there need to be understood. The establishment of effective partnerships with key local stakeholders such as Eletrobras, Petrobras and BNDES is especially important for power and utilities investors looking to mitigate the political, regulatory, and financial risks of new projects and ventures.

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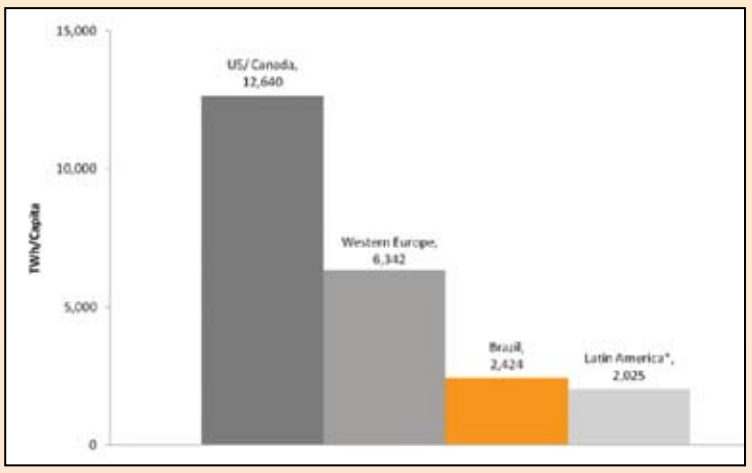
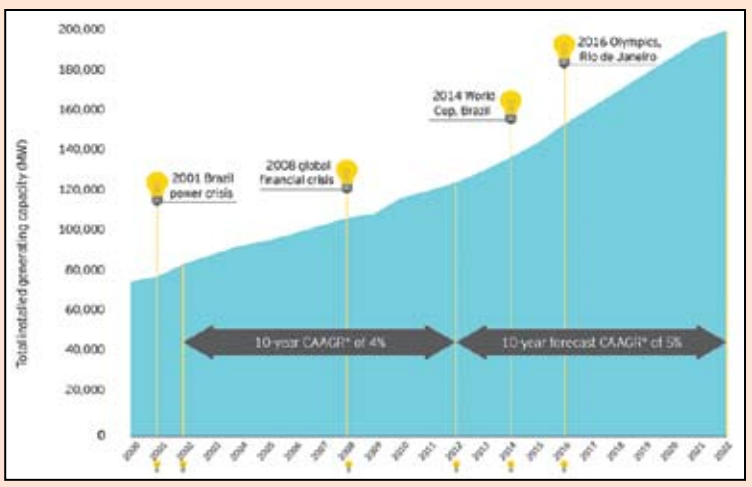
Brazil electricity consumption, regional comparison





Meeting Brazil's electricity demand

Thailand: no more wasted opportunities

Thailand's waste-to-energy market offers exciting opportunities for the right technology.
Howard White

A recent report from Frost & Sullivan has revealed that the Asia-Pacific 'e-waste' recycling market is expected to reach $4.01 billion by 2017 – over double its worth of $1.85 billion in 2012. The rapid industrialisation and advancements in technology have led to the accumulation of electrical and electronic waste in Asia-Pacific, compelling governments to pass regulation mandating e-waste recycling.

But it is not just the e-waste recycling market that is rising; with well-developed industrial sectors including chemicals, petroleum and other industries, businesses, especially those in Thailand, create a lot of industrial waste; an inevitable issue that must be managed. Developing countries are currently facing waste challenges due to booming population growth contributing to high levels of urbanisation; and the waste management problem has become so severe that municipal authorities are unable to cope with the needs and demands for the disposal of waste alone.

Thailand's largest and most popular integrated agricultural wholesale market, Talaad Thai, is home to the distribution centre for domestic and international agricultural products. However, its environmental operations in this market are neither standardised nor up-to-date and there is a lack of waste management despite its abundant potential to produce renewable energy from organic waste. Generating 120 tonnes of waste per day, over 90 per cent is dumped into landfills by contracting private landfill sites situated almost 60 km away from the market.

Another issue for Thailand is its energy supply. After Indonesia, Thailand is the second largest energy consumer in Southeast Asia. Importing over half of its energy supply, a sustainable, renewable energy development plan has been set-up to increase alternative energy consumption by 25 per cent by 2022. Thailand has also recognised the need to reduce pollution and greenhouse gas emissions, thus its main objective is to move towards a low carbon society.

With landfill on the way out, and energy targets that must be met, there are genuine opportunities for investment. Many local and regional authorities currently view waste-to-energy as the only viable large-scale alternative to landfill.

Annually, Thailand produces a total of 3.5 million tons of hazardous waste and 23.5 million tons of non-hazardous waste. What's more, each year, over 10 million Thai baht ($321 000) is allocated solely to the cleaning and disposal of waste generated in Talaad Thai alone. If similar amounts were spent on installing energy production plants, profits would soar and the burden on the environment would diminish.

Despite the relatively high cost of power in Thailand, its economy is surprisingly stable and is the 25th largest in the world. Even through the course of political upheaval, the commercial environment has remained unaffected.

Clearly Thailand has a need for waste-to-energy technology, a reason for the recent expansion and opening of Waste2Tricity offices in the Rajchathewi district of Bangkok. Over the past six months, Waste2Tricity has been in discussion with many Thai waste companies over various potential agreements and joint ventures. These companies have waste streams, land and local government relationships. There are natural opportunities that exist in its expanding economy – an economy with inherent issues concerning waste management and a shortage of power.

Recovering energy from waste can contribute to a balanced energy policy, and around 22 500 homes could be powered by just one waste-to-energy plant. Based on a simple premise, Waste2Tricity advances waste-to-energy deployment projects that use the proven plasma gasification process to generate syngas (synthesis or energy gas) to power efficient and proven internal combustion engines (ICE) or gas turbines (GT) to generate electrical power. This aims to utilise the most efficient and economic technologies in order to achieve an efficient conversion of scrap carbon – i.e. post recyclate waste-to-energy.

The first stage is to convert feedstock via high temperature gasification (more than 1100-1200°C) to ensure clean syngas. Waste enters the Alter NRG Westinghouse plasma gasifier, which not only removes the impact of tars etc. at the clean-up stage, but also maximises the conversion of carbon in the feedstock to useful energy gas.

> Annually, Thailand produces a total of 3.5 million tons of hazardous waste and 23.5 million tons of non-hazardous waste

Gasification takes place in a controlled oxygen-starved chamber and the resultant syngas is quenched to remove any carryover particles. This prevents reformation of higher chain hydrocarbons. Clean up follows with the removal of acid gases, sulphur, volatile metals, etc., and the syngas can then be used in ICEs or turbines.

The other option is for the syngas to be processed further to produce hydrogen. In this instance, a catalytic water gas shift converts the carbon monoxide proportion of the syngas to hydrogen and carbon dioxide, separated by Pressure Swing Adsorption (PSA).

The benefits are two-fold because at the same time as creating clean hydrogen for the fuel cells, plants will generate a stream of capture-ready pure CO_2. So the alkaline fuel cells are the ideal technology to efficiently produce low, or even negative, carbon electricity once storage technologies are established, thus avoiding the issues surrounding current carbon capture from the combustion conversion of waste.

This potential for production of low carbon hydrogen at dispersed sites also offers the opportunity for the diversion of gas-to-vehicle fuelling and other hydrogen economy destinations. This type of plant is future-proofed. It is not simply tied to one output [i.e. electricity] but is producing a chemical building block that is adaptable to changing economic circumstances.

As Thailand consents more waste facilities, there is the potential for a surplus of capacity compared to the tonnage in the waste stream. It is important to note that determining the right technological solution and gaining strong competitive advantage will revolve around three key critical elements:

- Generating maximum energetic conversion efficiency from the waste
- Selling that energy at a higher price than anyone else, and
- Ensuring the lowest carbon footprint in the process (thus obviating future threats from Carbon tax exposure).

To address its waste problems, Thai authorities have increased their efforts to reduce waste pollution and turn the waste into usable energy. According to the US Energy Information Administration, Thailand is providing incentives for renewable energy projects to reduce its reliance on fossil fuels, which account for more than 80 per cent of the nation's energy consumption. Additionally, renewable energy is promoted by the Energy Policy and the Thai government has launched several support schemes including feed-in premiums, Board of Investment tax incentives, direct subsidies, soft loans and government joint investment schemes.

Waste2Tricity will be seeking opportunities to deploy the Alter NRG Westinghouse plasma technology in multiple locations and is in advanced discussions with several potential partners.

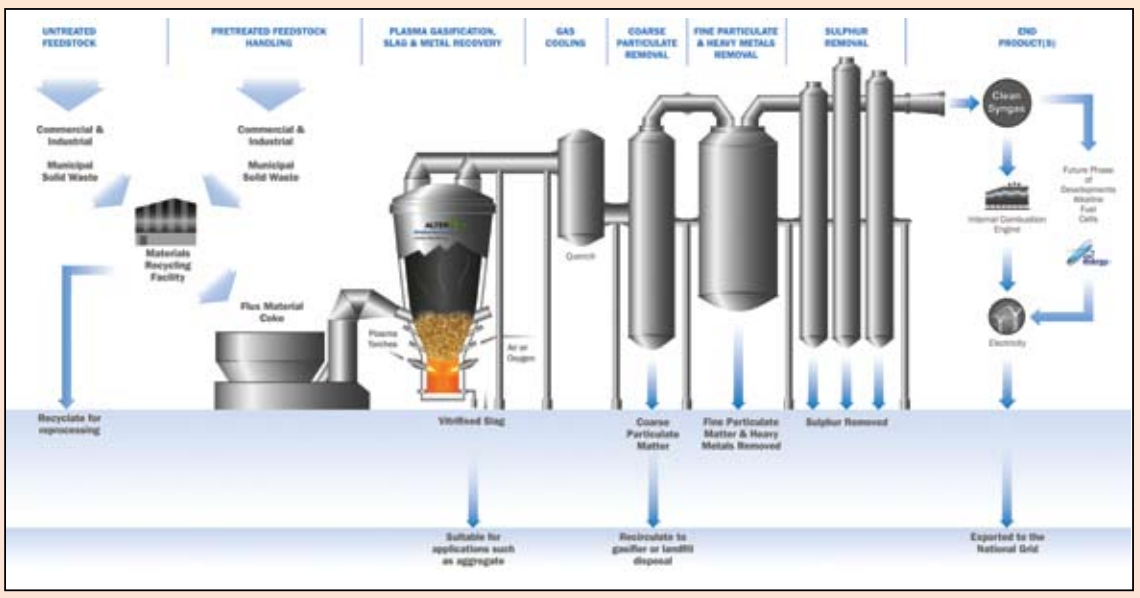
The Thai government has created the most coherent and simple support model to attract high efficiency conversion models for waste-to-energy plants into the market. We firmly believe the plasma technology will outperform any other competing technology by generating the most low carbon electricity and providing exceptional returns to investors.

There has also been substantial interest in the future deployment of the AFC Energy fuel cell, which will significantly enhance return on capital employed. The use of fuel cells will result in a substantial increase in the gross generated electricity from the same feedstock input, in the region of 50+ per cent additional power output.

The opportunities for development of this technology in the Thai market are at least on a par with the UK market. With the future prospect of the AFC Energy fuel cell technology achieving commercial roll out by 2016, the prospects for investors in Waste2Tricity are very exciting.

In this highly competitive market, it is as common to see companies exit the market as it is to see new entrants. The ones that stay afloat are those that understand the need to increase their technological capabilities and maximise conversion of waste into usable energy. After all, converting waste-to-energy is key to the creation of a sustainable environment for all.

Howard White is Senior Consultant at Waste2Tricity.



The plasma gasification process is used to generate syngas to power internal combustion engines or gas turbines to generate electrical power

High powered, clean and the size of a washing machine

UK-based Ceramic Fuel Cells Limited believes recent changes to support schemes will help its fuel cell-based micro-CHP units penetrate not just the UK market but further across Europe.
Junior Isles

It may be little bigger than a washing machine but can produce more than 13 MWh of electricity on site per year as well as generate heat for domestic hot water. Introduced to the market a few years ago, the BlueGen micro-combined heat and power (CHP) unit could be the shape of things to come as Europe and certain parts of the world take a more distributed approach to generation.

Ceramic Fuel Cells Limited (CFCL) the manufacturer of BlueGen believes the drive toward low carbon generation and incentives that support such technology are now providing the impetus the market needs.

Fuel cell technology has long showed significant promise but has failed to gain widespread penetration, largely due to cost. Outside of Japan, the uptake of fuel cells – which are well suited to micro-combined heat and power installations – has been slow.

Paddy Thompson, General Manager Business Development at Ceramic Fuel Cells Limited said: "Recent changes to the [UK] new feed-in-tariffs (FITs) and advances we have made ourselves have made a fundamental change to the economics of our fuel cells in the UK."

Noting the success of Japan, Thompson says the technology is applicable all over the world but the transfer from one market to another is all about market practices and where the value is created in that market.

Taking the UK as an example, Thompson explained: "Where you generate electricity has a fundamental impact on the value. If I'm generating in the wholesale market, I get around £45-55/MWh. If I can use it behind the meter, I might get up to $140/MWh. We live almost exclusively behind the meter. So, in addition to being as efficient as CCGTs without the losses in the wires, we are living in a much more higher value market."

The business case for the UK has been made even stronger since the FITs for this type of installation have been raised to 12.5 p/kWh – a level that Thompson says is "just about" acceptable.

"It's still at the low end. The industry has always argued for 15p/kWh and we've never been given it. But in the last round, the government reduced the FIT for other technologies but increased ours. So we came out with a good result."

Thompson adds, however, that they do not want to be "subsidy junkies" and insists that the technology is economically viable under the right circumstances. "I did a study in 2006 that showed that so long as the market structure is right and the volumes are up, this works in a non-subsidy environment," he said.

With an output of 1.5 kW, the power output of the units is too large for the average European home and so CFCL's target market is small businesses, schools, apartment blocks, etc – particularly, social housing.

Thompson commented: "The potential UK market is huge – there are 18 million gas connections. In terms of early stage markets, there are roughly four million social housing properties. At one unit between four, that's one million BlueGens. The SME market is another several hundred thousand."

At a retail price of £19 000 for a 1.5 kW unit, BlueGen is not exactly cheap in terms of cost per installed kW. For financiers providing funding for a BlueGen unit, the return on investment, based purely on the FIT and capital cost, is 6-9 per cent. However, Thompson argues that when considering the FITs and the energy benefits, the payback time of a typical installation could be around seven years, even when taking into account maintenance costs.

He added that many installations are now also eligible for funding under the ESCo (Energy Savings Company) model, which makes them even more attractive and in some instances result in zero cost. CFCL says it received 350 enquiries within three weeks of launching this scheme in late June this year.

BlueGen is based around Solid Oxide Fuel Cell (SOFC) technology. It runs on natural gas and can be controlled remotely via the internet. Like all SOFCs, it is a high temperature device, operating at about 750°C. Although this high temperature allows heat recovery the unit is optimised for electricity production. According to CFCL, the unit delivers an electrical efficiency of about 60 per cent "at the plug".

"At the stack," adds Thompson, "we are around 68 per cent." This performance has been demonstrated during around 2 million commercial operating hours from units in the field since the launch three years ago.

During operation, cell degradation will see unit electrical efficiency fall from 60 per cent to about 50 per cent after 3-5 years. Cell stacks will therefore be replaced once or twice during a typical 10-year maintenance contract. The units have a predicted lifetime of 15 years.

One area that CFCL is currently focusing on, is improving fuel cell durability. "If we can take it from two replacements in 10 years down to none, it means we can reduce the maintenance costs and thus compete in wider markets," said Thompson.

Around 200 units have been installed globally, with about 50 of those being in the UK and 100 in Germany. Indeed the German market continues to look increasingly lucrative.

In the German state of North Rhine Westfalia, where units are manufactured, a special incentive for high efficiency and innovative technologies for micro-generation has been introduced. SMEs can now receive a 65 per cent funding grant to install BlueGen units, which translates into about €13 000. They also receive a grant from federal government as well as the FIT.

Notably, out of back-orders of 400 units, some 100 of these are for a project with German utility, E.On. With European utilities under pressure to alter their traditional business model, installing micro-CHP units could be part of how they make that change.

As the utility industry transforms itself and favourable regulatory structures take hold, talk of 100s of units could become thousands. In Japan, favourable market conditions saw 28 000 micro-CHP units sold last year, according to decentralised energy experts Delta Energy & Environment.

Europe is a long way off the 50 000 micro-CHP units that Delta forecasts will be sold in Japan this year but Thompson remains optimistic. "Selling 50 000 units would certainly be nice… when you start producing that many units, prices will be much lower.

"The concept of buying less from the grid and saving carbon appeals to people. We have had installations in nine countries and will expand to 10 shortly. But it's about focusing on where the value is now and that's the UK, Germany and Benelux. In the longer term we will expand to other countries and continents."

Thompson says where you generate electricity has a fundamental impact on the value

BlueGen installation at Madeley Centre in Staffordshire, UK

How an SOFC works

A fuel cell is like a battery that always runs. It consists of three parts: an electrolyte, an anode, and a cathode. An electrochemical reaction converts fuel and air into electricity without combustion.

Solid oxide fuel cells are a class of fuel cells characterised by the use of a solid oxide material as the electrolyte. SOFCs use a solid oxide electrolyte to conduct negative oxygen ions from the cathode to the anode. The electrochemical oxidation of the oxygen ions with hydrogen or carbon monoxide thus occurs on the anode side.

A solid oxide fuel cell is made up of four layers, three of which are ceramics. A single cell consisting of these four layers stacked together is typically only a few millimeters thick. Hundreds of these cells are then connected in series to form a SOFC stack. The ceramics used in SOFCs do not become electrically and ionically active until they reach very high temperature and as a consequence the stacks have to run at temperatures ranging from 500 to 1000 °C.

At high temperature, warm air enters the cathode side of the fuel cell and steam mixes with fuel to produce reformed fuel, which enters on the anode side.

Next, the chemical reaction begins in the fuel cell. As the reformed fuel crosses the anode, it attracts oxygen ions from the cathode. The oxygen ions combine with the reformed fuel to produce electricity, water, and small amounts of carbon dioxide.

The water is recycled to produce the steam needed to reform the fuel. The process also generates the heat required by the fuel cell.

As long as there is fuel, air, and heat, the process continues producing clean, reliable energy.

Junior Isles

Help in unexpected places

Scientists are now saying that climate change has not only slowed in recent years but has in fact paused. So where is this previously unpredicted help in the fight against global warming coming from? Well, they are not entirely sure.

Some argue it is likely to be the result of slow warming of the deep oceans. Other theories have been put forward as contributing factors. These include a less active sun and volcanic eruptions in Iceland, where ash released has had a cooling effect. Sometimes we find help in unexpected places

It seems the subject of global warming and climate change is full of surprises. Not only are fate and nature combining to turn the tide against rising temperatures, so are two of the world's largest emitters.

In a similarly unforeseen turn of events, China and the United States last month signed a deal to cut carbon emissions from heavy-duty vehicles, manufacturing and coal fired power plants. The deal follows an earlier agreement by the countries to phase out hydroflourocarbons – greenhouse gases that are even more harmful to the earth's atmosphere than carbon dioxide.

Although responsible for about 43 per cent of global greenhouse gas output, the two countries have been at the centre of a standoff between developed and developing countries that for several years has scuppered attempts to frame a global agreement that would legally bind them to reduce carbon emissions.

> "On the one hand it's not suddenly going to transform the negotiations, I'm absolutely not saying that, but... it will project something positive that I think will be helpful,"

The Kyoto Protocol exempted China and India, the biggest polluters in the developing countries. The US, meanwhile, refused to ratify the treaty, arguing that it imposed an unfair burden on its businesses and economy.

As a result, the eagerly anticipated Conference of the Parties (COP15) in Copenhagen in 2009 failed to live up to expectations and ended up with climate negotiators only agreeing a weak accord. Progress at subsequent COP meetings has also been painfully slow.

With China and the US now pulling in the same direction, their recent bilateral agreements make success at the crucial COP meeting in Paris in 2015 seem much more likely.

The US-China climate change working group, which officials from both countries formed in April, will work with companies and non-governmental groups to develop plans by October to carry out initiatives aimed at fighting climate change and cutting pollution.

The climate agreements will concentrate on improving technologies. According to the US State Department, the initiatives are also aimed at improving energy efficiency, collection and management of greenhouse gas data, and promoting electric grids to carry more power from renewable energy.

Notably, increasing the ability of the two countries to capture carbon emissions from coal-fired plants and to bury them underground was also the focus of one of the agreements.

According to US climate envoy Todd Stern, the goal is to move from the research and development phase to large-scale demonstration projects. Stern said: "It's certainly not the case that we are going to be financing large-scale CCS (carbon capture and storage) plants in China, per se, but rather to try to spur the development of them there and also here."

A recent report by the International Energy Agency (IEA) highlighted the importance of CCS in meeting the climate challenge.

In its latest *Technology Roadmap: Carbon Capture and Storage*, the IEA calls for strong action by governments and business to construct a new industry capable of capturing and storing about 7 Gt of CO_2 in 2050.

Speaking at the launch of the Roadmap, Didier Houssin, the IEA's Director of Sustainable Energy Policy and Technology (SPT) said that although CCS was not a "silver bullet", it was "absolutely vital" as coal will play a major role in the energy sector for decades to come.

Ellina Levina, an energy analyst at the IEA added: "One sixth of all emission reductions in 2050 will have to come from CCS."

Whether this is the case or not, unfortunately there will be no widespread CCS development any time soon – at least not in Europe – due to the current lack of economic drivers and the low carbon prices.

The EU Parliament's vote at the beginning of July to backload 900 million carbon allowances in the EU Emissions Trading Scheme (ETS) is a step in the right direction but will do little to provide boost carbon prices over the long term.

Unfavourable economics pretty much leaves CCS dead in the water in Europe for the foreseeable future. In the US, if the Obama administration gets its way, new rules on limiting emissions from coal fired plants combined with cheap gas is likely to spell the end of coal fired plants and CCS along with it.

China will therefore have to take the lead if there is to be any meaningful global roll-out of CCS. In May the department of Climate Change of the National Development and Reform Commission said the government will further encourage CCS demonstration projects in chemical and coal-fired power plants, as well as steel and cement industries.

The government plans to explore ways of overcoming hurdles to its commercialisation, by first establishing a well-rounded demonstration system consisting of different technical roadmaps as well as a batch of representative demonstration projects and industrial bases.

At the same time, it will adopt stimulus mechanisms and preferential tax and land policies to promote CCS technology and widen financing channels for these projects.

In many ways it makes perfect sense for China to take the lead on CCS. Coal contributes two-thirds of primary energy supply and around 80 per cent of electricity generation. Although the country is making progress in reducing its coal consumption by increasing the share of renewables in the energy mix and improving energy efficiency, coal will remain the dominant energy source for decades to come. And with smog reaching record levels in some cities as a result of pollution, the government will not want to be seen as one of the countries opposing a global agreement at the 2015 meeting.

US President Barack Obama's renewed fight against climate change at home and abroad certainly brings an air of optimism for a new agreement in Paris. Further, any dialogue with China during the run-up has to be seen as positive.

Some will argue that the recent US-China agreements are not binding and do not seek to cut emissions by specific volumes. Still, the hope is that any cooperation could lend support to wider international talks and help finalise a global treaty to replace the Kyoto Protocol.

"On the one hand it's not suddenly going to transform the negotiations, I'm absolutely not saying that, but... it will project something positive that I think will be helpful," said Stern.

Global warming may have paused and climate sceptics will understandably question climate science. In response to the finding that global warming had reached a plateau, the London Met Office issued three reports, one of which says that although average surface temperatures have been flat over the last 15 years, Arctic sea ice continues to decline. It claims that 2012 saw a 50 per cent reduction in ice cover over the Artic compared to the 1980s, noting that this is a clear indicator of how the climate is changing.

No doubt the arguments on global warming will continue. If the climate scientists are right, any help we can get from whatever source has to be a good thing – whether it be from the oceans, volcanic activity or unexpected cooperation on the political stage. If they are wrong, it will be interesting to see how long that cooperation lasts.