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Securing tomorrow's energy future

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European utilities continue to struggle



RWE CEO Peter Terium is exploring all options to improve economic efficiency

European utilities are closing conventional plant as difficult market conditions erode operating profits. Junior Isles

Several of Europe's major energy companies continue to struggle in the face of weak demand and a changing energy landscape that is seeing conventional plant closures as generation from renewables increases.

RWE AG, Germany's second largest utility, last month suffered the biggest decline amongst the HDAX index of 110 most valuable companies traded in Frankfurt. It announced a year-on-year fall of 62 per cent in its conventional power generation operating profit for the first 6 months of 2013, down to €690 million (\$915 million).

In an attempt to return its electricity

generating business to profit the utility says it will close 3100 MW of power plant capacity in Germany and the Netherlands – roughly 7 per cent of its current northern European assets – and look further into idling even more stations.

"The massive reduction in power station margins is a major factor" in the decision to shut plants, RWE said in a statement. "Further power stations are being assessed and all options to improve the company's economic efficiency are being explored."

Weak electricity demand and increased production of renewable

energy across Europe has led to a power price slump, hitting margins for gas and coal-fired plants hard.

Thomas Deser, portfolio manager at Union Investment GmbH, responsible for the fund's €54 million stake in RWE, said: "This is only the prelude for the industry's capacity adjustment... it's imaginable that even nuclear reactors will be closed early."

Gas fired plants have been particularly unprofitable. RWE will therefore be mothballing almost 20 per cent of its gas-fired capacity, taking a total of 954 MW offline until at least the end of next year.

Patrick Hummel, an analyst at UBS, said: "The decision to idle gas capacity does not come as a surprise in an environment of negative spark spreads. RWE will decide on plants mothballing and closures on a case-by-case basis, rather than announcing a massive capacity shutdown at once."

RWE will idle two gas turbines, each with a capacity of 272MW, at its Weisweiler power plant until the end of 2014. The company says that it will place these two units into reserve mode. RWE will also mothball its

Continued on Page 2

Mega-deals boost Q2 global deal value

While volumes remained flat, a handful of 'mega deals' during Q2 2013 in the global power and utilities (P&U) sector sparked a 30 per cent rise in mergers and acquisitions (M&A) value to \$33.0 billion, up from \$25.3 billion in Q1 2013, according to Ernst & Young's (EY) quarterly Power transactions and trends report.

Asia-Pacific M&A value rose 71 per cent in Q2 2013 on Q1 2013, with Chinese inbound M&A activity contributing 81 per cent to the region's deal value. Restrictions on ownerships of power assets in Japan and low domestic profit margins in China means this is likely to increase further in the coming months as utilities are pushed to explore foreign acquisitions, said the report.

Joseph Fontana, EY Global Transactions Power & Utilities Leader, said: "Outbound Chinese investment continued in Q2 2013, with two key

deals featuring China's state-owned grid operator moving into the Australian power sector. Lower profit margins in the domestic market are prompting the Chinese utility to explore developed markets, which offer a stable regulatory environment and relatively higher returns."

While US P&U stocks continue to trade well above 10-year historical averages, the recent market correction reflects the shifting market conditions in the sector, according to EY. During Q2 2013, US utilities continued the difficult search for growth through M&A activity, with some sizable acquisitions taking place.

Joseph Rodriguez, EY Global Power & Utilities Sector Senior Manager, commented: "A key development we saw in the US market in Q2 2013 was the creation and subsequent IPO spin-off of NRG Yield, a unit to operate and acquire contracted generation

assets, NRG Energy. Given US investors' desire for stocks providing above-average yield, supported by low-risk cash flows, we expect other utilities may follow this lead. However, recent news that the Federal Reserve will likely taper its bond buying programme may temper this."

European activity falls with the absence of large European divestments.

While volume remained flat, a lack of large European divestments meant there was a 46 per cent decline in deal value from Q1 2013. However, large transmission and distribution deals are anticipated later this year and so a bounce back is expected.

There is also continued uncertainty on renewable energy regulation in Spain, as the government's plan to cut subsidies and cap profitability is expected to push developers toward emerging markets that have more

favourable regulation.

Further afield, regulatory reform has continued to boost investor confidence in India. A revised pricing mechanism for domestically produced natural gas is expected to double natural gas wellhead prices from March 2014, incentivising domestic exploration and production.

Looking ahead, Fontana concludes: "The outlook for global M&A activity in the sector is positive, with big deals in the pipeline for Greece, Finland, New Zealand and Africa, as well as robust activity in the US and Western Europe, potentially generating a number of billion-dollar-plus deals in the pipeline for 2013."

"Financial buyers are also expected to return, with new hubs of financial investment emerging in areas such as Japan and the Middle East providing a potentially interesting second half to the year."

Continued from Page 1

410MW Gersteinwerk-F gas plant to the end of 2014, and its 410MW Gersteinwerk-G unit will be offline from April 2014.

According to German daily newspaper *Handelsblatt*, the company also intends to make further significant cost cuts to help mitigate pressure on earnings. It was reported that RWE plans to expand the savings programme by at least €1 billion (\$1.3 billion).

RWE joins many of its European peers, including its German rival E.On, which have already idled power plants or are planning to do so to minimise losses because of low electricity prices. Many are also selling off assets.

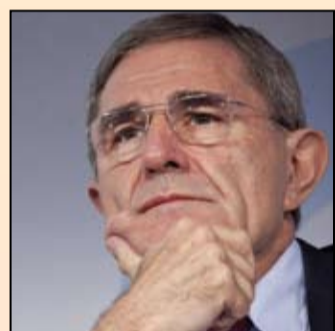
In August, E.On also announced that profit fell 42 per cent in the first half after divestments, reduced output and narrower margins on generation from fossil fuels.

Elsewhere in Europe, GDF Suez SA recently agreed to sell 50 per cent of its stake in a selection of thermal and renewable power generation assets in Portugal to Japan's Marubeni Corp.

The exact terms of the sale have not been disclosed but GDF Suez will continue to own half of the Portuguese venture. The Portuguese assets are valued at about €2.5 billion (\$3.3 billion), according to sources close to the deal.

The sale will mean a reduction of €900 million in GDF Suez's net debt once consolidated into the company's accounts. The assets represent a total installed capacity of 3300 MW, GDF said in a statement, and the transaction is expected to be completed during the third quarter of 2013.

The utility has closed or mothballed about 8600 MW of plant in the region since 2009 and looked to expansion in Asia, Latin America and the Middle East to offset falling European demand. Chief Executive Officer Gerard Mestrallet recently



Mestrallet: might pursue other shutdowns or sales

indicated he might pursue further shutdowns or sales.

In late July Sweden's Vattenfall said it had written down 29.7 billion kronor (\$4.6 billion) of assets and split its operations into two due to higher business risks and negative trends in the European energy market.

The wholly state-owned utility said that second-quarter write-downs include gas- and coal-fired plants in the Netherlands and Germany, and added that operations will be divided into Nordic and continental European units.

Vattenfall said it believes the "gloomy" energy market will not recover in the foreseeable future.

Utilities have warned of the potential effects of plant closures on electricity supply. They have called on European governments to reform the market to create financial incentives such as capacity payments for power plant operators to retain backup generating capacity.

Mexico poised for sector overhaul

Mexico is proposing a massive overhaul of its energy sector in an attempt to meet increasing electricity demand, lower prices and attract investment in oil and gas.

Junior isles

While oil dominates energy sector discussion reform in Mexico, the country is also preparing to propose an electricity market overhaul.

According to *Reuters*, a senior lawmaker close to the reform negotiations from the ruling Institutional Revolutionary Party, or PRI, says the government's proposal will likely include constitutional changes to allow an expansion of private sector investment in power generation.

Transmission and distribution, however, will remain under government control and will not be open to private competition.

"It will build a secondary electricity market where, without losing state control over transmission and distribution,

there are clear rules so it is more efficient," the lawmaker told *Reuters*.

The lawmaker added that additional laws will be changed so that electricity subsidies will be "migrated from general subsidies to targeted subsidies" to help the truly needy.

Electricity rates could fall dramatically if CFE, Mexico's state-run electricity monopoly, is dismantled and market forces spark more competition and private participation in the generation sector. Mexico has the eighth most expensive electricity costs among OECD countries.

At the beginning of August, the opposition conservative National Action Party, or PAN, unveiled its proposal, which includes constitutional changes to allow a total opening of the electricity sector.

The PAN's energy reform would get rid of the constitutional requirement of a state-run power sector, make the regulatory energy commission, the CRE, responsible for setting rates and amend secondary laws to overhaul the current subsidy regime in favour of one that helps the poorest consumers.

Mexico's electricity subsidies, among the highest in the world, currently cover about 30 per cent of overall power costs and as a result distort prices and inflate demand.

"The main problem is that we just don't have the capacity to meet our future electricity demand," said Rafael Ch, an energy researcher with Mexico's CIDAC think-tank, noting that growing demand of about 4 per cent per year will require an additional 40 GW of capacity by 2026.

Opening the country's energy sector could potentially provide the country its biggest boost since the North American Free Trade Agreement in 1994.

President Enrique Peña Nieto's plans for reform could unlock billions of dollars of investment from oil majors.

His proposal to loosen the grip of state oil monopoly Pemex is aimed at attracting the likes of ExxonMobil and Royal Dutch Shell and could boost investment by \$10 billion a year.

Peña Nieto's plans would leave Pemex in state hands while opening up exploration and development to foreign investors.

Mexico sits on reserves estimated at 115 billion barrels of oil equivalent, comparable to that of Kuwait. Just over half of these reserves are unconventional, including shale gas.

Testing times force management reshuffles

- Siemens new CEO Joe Keaser, says company "not in crisis"
- Ditlev Engel ousted after difficult years at Vestas

Recent management changes at two of Europe's major power generation equipment manufacturers reflect the difficult conditions facing the European power sector.

In what came as a surprise to the markets, German industrial giant Siemens ousted its chief executive Peter Loscher, replacing him with the company's chief financial officer, Joe Kaeser.

The decision followed a period that seen sliding profits at the company. At the end of July Siemens warned that it would meet 2014 profit guidance.

Kaeser, who assumed his new duties with immediate effect said: "Our company is certainly not in crisis, nor is it in need of major restructuring.

However, we've been too preoccupied with ourselves lately and have lost some of our profit momentum vis-a-vis our competitors."

His strategy for improving profitability will be based around Siemens' expertise in electrification.

Kaeser faces a difficult task, however, in the face of reduced power demand and difficult economic conditions in Europe. The company's profitable gas turbines division is being affected by the reduced demand. It has also faced problems with charges caused by difficulties in gaining wind farm connections in Germany.

Although global growth in the wind sector has been strong, the market has also presented challenges for Vestas,

once the world's leading manufacturer of wind turbines.

In August Ditlev Engel was ousted from his position as chief executive of the Danish company. Ditlev is replaced by Anders Runevad, who has in the past worked alongside Vestas' chairman, Bert Nordberg, at both Ericsson and its mobile phone joint venture with Sony.

The decision follows several difficult years that have seen multiple profit warnings at the loss-making company, which lost its top position to GE last year. Vestas posted a loss of €963 million (\$1.29 billion) last year.

The company has since switched its focus from revenue growth to cash flow and profitability. It is now

attempting to recover from a period during which Engel continued building new factories and hiring workers even after the financial crisis. He was then forced to cut a third of the workforce as part of a deep restructuring.

The company continues to struggle this year and has announced additional staff layoffs and plans to sell factories. Last month, however, it announced plans to gradually increase the number of employees at its blade factories in Brighton and Windsor in Colorado, USA.

Nordberg said Vestas was "entering a new phase" and now was "the appropriate time" to make the management change as the company completes a two-year cost-cutting plan.

Nigeria attracts foreign investors

Nigeria's strategy for combating power shortages by attracting foreign investment is proving to be a huge success.

The country recently shortlisted 82 companies bidding for shareholdings in ten new thermal power plants owned by Niger Delta Power Holdings Company (NDPHC). Request for Proposal (RFP) documents were sent to the 82 bidders on August 19.

As many as 110 companies had submitted Expressions of Interest to acquire the shareholdings, whose combined sales could generate several billions of US dollars and would represent one of the government's most successful private investment projects.

Anthony Muoneke, Executive Director, (Finance and Administration) at the NDPHC and Chairman of the Joint Working Group, who is overseeing the share sale transaction said: "I am delighted at the calibre of the bidders we have attracted - this is a tremendous vote of confidence by the international investment community for the Federal Government of Nigeria's declared policy to increase private sector involvement in the electricity industry."

Each of the ten power plants is currently owned by a wholly-owned subsidiary of NDPHC and 80 per cent of the outstanding shares of these subsidiaries is offered for sale. Seven of the plants are either fully or partially

operating today with the remainder due to be operational by mid-2014 at the latest. Once operational, the ten power plants will generate more than 5000 MW at ISO conditions.

Each generation company will benefit from a contract structure covering the sale of electricity, the supply and transportation of natural gas, and access to the electricity transmission network.

The sale process is being handled by the NDPHC, a special purpose company set up by the government in 2005 to implement its National Integrated Power Project (NIPP) and the Bureau of Public Enterprises. The NIPP represents the Nigerian government's flagship project that is mandated to add

new generation, transmission and distribution capacity to Nigeria's electricity supply industry and resolve its chronic shortfall in supply.

Muoneke, commented: "This will go a long way to addressing the current shortfall between supply and demand that plagues Nigeria and has prevented the Nigerian people from achieving their true potential."

Nigerian President Goodluck Jonathan recently assured Nigerians that they will soon begin to enjoy the benefits of power sector privatisation.

"We are currently in a transition phase in which the sector is being positively transformed. The sale of our generation and distribution companies is almost concluded."

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SPEAKERS



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H.E. Dr Sultan Al Jaber
 Minister of State, UAE, Chief Executive Officer, *Masdar*



The Rt Hon Gregory Barker MP
 Minister of State, Department of Energy & Climate Change



Adnan Z. Amin
 Director-General, the International Renewable Energy Agency

Shell results point to shale slowdown

■ Falling crude prices hit firms ■ Oil and gas deals fall

Siân Crampsie

Shell CEO Peter Voser played down expectations of the global impact of shale resources after taking a large write-down on the value of its shale assets in North America.

Voser said that the likelihood of the USA's shale revolution spreading around the world was "overhyped" and the firm has launched a strategic review of its North American shale portfolio to reduce its exposure.

Shell last month wrote down the value of its North American shale assets by over \$2 billion as a result of disappointing drilling results. This,

combined with trouble in its Nigeria operations, led to a 60 per cent fall in profits for the second quarter.

The US shale revolution, which has resulted in a boom in oil and gas production from 'tight' formations, is already changing the dynamics of global fuel trade and the International Energy Agency (IEA) predicts that the USA is set to become the world's largest producer of oil by 2020.

Other countries around the world are now poised to explore shale resources but Voser indicated that the bullish outlook about the global potential of shale oil and gas has been inflated.

In August the new US energy

secretary, Ernest Moniz, said the development of shale oil and gas resources in China and Europe would have major geopolitical consequences.

There are estimated to be 1200 trillion cubic feet (tcf) of shale resources in China and hundreds of tcf in Europe and their development would disrupt existing trade flows, said Moniz.

Earlier this year Opec expressed its concern over the impact that the US shale revolution would have on its powers and the economies of its members.

However investment in the US shale sector appears to be slowing amid disappointing well results and falling

crude prices.

Data from Bloomberg shows that oil firms have stopped buying shale assets and are instead focusing on developing current projects. The slump in deals could slow oil and gas production growth because companies will not be able to depend on asset sales in order to fund drilling programmes.

According to Bloomberg, North American oil and gas deals, including shale assets, plunged 52 per cent to \$26 billion in the first six months of 2013 from \$54 billion in the year-ago period. During the drilling frenzy of 2009 through 2012, energy companies spent more than \$461 billion buying North

American oil and gas properties.

Voser said that finding and developing shale oil was harder compared with shale gas, and that the firm's planned strategic review would be likely to result in the sale of half of its main nine unconventional oil and gas assets in North America.

Exxon last month posted a 57 per cent year-on-year earnings decline for the second quarter, partly as a result of a 1.9 per cent decline in production and a fall in crude oil prices.

Shell also said that it would no longer set oil and gas production targets, an indication that it could be difficult to increase output and reserves.



The lessons learned about operating the power grid during the London 2012 Olympic Games are to be passed on to Brazil, host of the 2016 Games.

UK-based Carbon Trust says that it will provide Brazilian National Electricity Operator, ONS, with best practice advice learned during the 2012 Games as Rio de Janeiro plans the next Olympics.

The Olympics are an unprecedented technical and logistical challenge for any host city, since the power grid is tapped by huge sports venues, the world's broadcasters, viewers and service providers all at the same time.

Analysis has found that the variation in power consumption during the Olympics could increase by as much as 6 GW in less than 10 minutes – twice the electricity demand of Rio de Janeiro.

The project will draw lessons from how the UK prepared its grid to provide dozens of sports venues, transport conduits, and broadcasting stations with high quality, reliable power, while responding to the hard-to-predict 'overlay' caused by non-sport activity, like busier restaurants and stronger household demand.

Operating and maintaining a complex grid during a prolonged period of

heightened security also required special solutions in London that could be applied in Rio in 2016.

Brazil is expanding its electricity generating system through initiatives such as the Growth Acceleration Programme (PAC). The federal government is planning to invest around \$440 million in energy projects over the next ten years.

■ Alstom has inaugurated its first wind tower factory in Latin America. The facility, in southern Brazil, has the capacity to produce 120 steel towers per year and will supply the southern region of Latin America.

Funds boost renewables in Central America

Six countries in Central America are to benefit from more than \$500 million in investment for renewable energy projects after the European Investment

Bank (EIB) and the Central American Bank for Economic Integration agreed a joint lending initiative.

The investment will support the

development of hydropower, wind, geothermal and photovoltaic solar resources in six countries, and will help to reduce the region's dependence on fossil fuels.

The new programme follows a similar initiative launched in 2011 between the EIB and the Central American Bank for Economic Integration to support hydropower development in Costa Rica. The programme will also support energy efficiency initiatives.

The EIB has agreed to provide \$230 million of the funding, which will support public and private projects in Honduras, Nicaragua, El Salvador, Guatemala, Costa Rica and Panama.



Report casts doubt on SMRs

A shift to the use of small modular nuclear reactors (SMRs) is unlikely to breathe new life into the US nuclear industry, and is likely to require billions of dollars of government support, according to a report from a US think-tank.

The Institute for Energy and Environment Research (IEER) says that a \$90 billion manufacturing order book would be required for the mass production of SMRs – an assembly line launch equal in proportion to the creation of a new commercial airliner – along with associated risks.

SMRs are already being developed in the USA with the help of federal financial help. Their developers argue that deploying reactors with an output of less than 300 MW will reduce construction times, increase containment efficiency and improve nuclear materials security. Supporting SMR development will also kick-start growth in the US nuclear sector, which slowed amid the economic recession.

But the IEER's report states that companies building SMRs are more likely to use established nuclear energy industry supply chains in China than develop new supply chains in the USA, resulting in limited economic benefit to the US. Additional federal subsidies to the tune of billions would

be required to set up domestic supply chain, it says.

"SMRs are a poor bet to solve nuclear power's problems and we see many troubling ways in which SMRs might actually make the nuclear power industry's current woes even worse," said Arjun Makhijani, Ph.D., nuclear engineer and president of IEER. "SMRs are being promoted vigorously in the wake of the failure of the much-vaunted nuclear renaissance. But SMRs don't actually reduce financial risk; they increase it, transferring it from the reactor purchaser to the manufacturing supply chain."

The four leading SMR designs are the mPower Reactor by Babcock & Wilcox Company; Westinghouse Electric's Westinghouse SMR; Florida-based Holtec, which is planning construction of an SMR test unit at the Savannah River Site, a nuclear-weapon materials facility in South Carolina; and NuScale Power.

■ Westinghouse's AP1000 pressurised water reactor (PWR) reactor has completed Phase 2 of the Canadian Nuclear Safety Commission (CNSC) Pre-Project Design Review. Westinghouse called the CNSC report "a significant step" forward in bringing the AP1000 design to Canada.

Canada PV set for growth

Canada is expected to add 450 MW of solar photovoltaic (PV) capacity per year over the next few years with the help of incentive programmes and falling installation costs.

A market analysis by ClearSky Advisors of policies and expected installations between 2014 and 2018 shows that Canada's installed PV capacity will reach 3.48 GW by 2018.

Ontario will remain the largest market for PV in Canada with the province's feed-in tariff (FIT) driving investment. Other provinces are also developing renewable energy incentive programmes and could become significant new markets as the Ontario market matures.

Ontario has set a target of installing 200 MW per year of PV capacity for the next four years but its FIT programme came under fire earlier this year because of its domestic content requirement (DCR).

The World Trade Organisation in May ruled in favour of Japan and the EU, which argued that the DCR, which mandates that project developers procure up to 60 per cent of the value of their installations from suppliers in Ontario, breaches WTO rules.

Ontario's government said in June that it would now take steps to bring its FIT programme in line with WTO rules.



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KEY SPEAKERS

- **Bill Richardson**, Governor of **New Mexico** (2003-2010), Former U.S. Energy Secretary, U.S. Ambassador to the **United Nations** and Member of the **U.S. House of Representatives**
- **Flora Flygt**, Strategic Planning & Policy Advisor, **American Transmission Company**
- **Sara Burns**, President and Chief Executive Officer, **Central Maine Power Company**
- **Gerry Cauley**, President and Chief Executive Officer, **North American Electric Reliability Corporation (NERC)**
- **Marie Jordan**, Senior Vice President, Network Strategy, **National Grid**
- **Tom Meissner**, Senior Vice President and Chief Operating Officer, **Unitil**

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New report outlines China green growth

Although it is the world's biggest carbon emitter, China has started to change course towards a cleaner future. According to a new report renewables could account for half of all new generating capacity by 2030. **Junior Isles**

A recent report from Bloomberg New Energy Finance (BNEF) says that renewables including large hydro could account for more than half of the new generating capacity added in China through 2030.

According to the report, China will add 88 GW annually until 2030, approximately doubling its generating capacity. The China Electricity Council recently said that the country's installed capacity would reach 1.23 GW by the end of this year.

China is currently the world's largest carbon emitter but its total power sector emissions could start declining as early as 2027 as a result of the shift in the generation mix.

The strategy will attract considerable investment to the renewables sector.

BNEF calculates that over the next two decades China could add more than 1500 GW of new generating capacity and invest more than \$3.9 trillion in power sector assets. Some \$1.4 trillion will go towards developing renewables.

Called the 'New Normal' scenario, this outlook is one of four scenarios presented in the report. Under this scenario, the share of coal-fired power generation capacity falls from 67 per cent in 2012 to 44 per cent in 2030. Gas based generation, meanwhile sees an increase.

In absolute terms, however, even in this central scenario coal will continue to grow rapidly until 2022, adding on average 38 GW per year. It will then grow at a much lower rate, installing

on average only 10 GW per year until 2030.

Jun Ying, country manager and head of research for China at Bloomberg New Energy Finance, said: "China has started to change course towards a cleaner future. But despite significant progress in renewable energy deployment, coal looks set to remain dominant to 2030. More support for renewable energy, natural gas and energy efficiency will be needed if China wants to reduce its reliance on coal more quickly."

The other three scenarios examined by BNEF were 'Traditional Territory' (which sees a heavier reliance on coal and fossil fuels), 'Barrier Busting' (in which barriers to the adoption of clean technologies are systematically

eliminated by policymakers), and 'Barrier Busting with Carbon Price'.

To complete the most aggressive scenario, combining the Barrier Busting scenario with an emissions trading scheme (ETS) starting in 2017, BNEF produced what it believes is the world's first forecast of a Chinese carbon price, based on stated national goals for emission abatement.

An average carbon price of CNY 99/tCO₂e (\$16/tCO₂e) will result in 23 per cent fewer new coal plants being built compared to the New Normal scenario. The difference would be made up by more renewables and natural gas. The sector's carbon peak would arrive four years sooner as a result, in 2023.

Milo Sjardin, head of Asia Pacific at BNEF, said: "The wide range of out-

comes in our scenarios demonstrate the extreme uncertainty facing China's energy sector. The future depends on a number of big questions, questions on which one can still only speculate: the cost at which China may be able to extract its shale gas reserves, the potential impact on fracking and thermal generation of water constraints; and potential accelerations in climate and environmental policy, including a potential price on carbon."

■ The most powerful generator-turbine unit ever built by Voith has entered service at the Chinese hydro-power plant Xiluodu on the Jinsha River. After a successful 72-hour test run, Voith handed over what is the first of three 784 MW machines to China Three Gorges Corporation.

Ratchaburi still hopeful overseas

- A\$1 billion set aside for Macquarie
- Cambodia JV cancelled

| Syed Ali

Thailand's independent power producer (IPP) Ratchaburi Electricity Generating Holding is still hopeful of succeeding in its bid to acquire assets in Australia despite a recent setback in a joint venture in Cambodia.

Ratchaburi has set aside A\$1 billion (\$903 million) to acquire the 4640 MW Macquarie power plant in Australia.

Peerawat Pumthong, the chief operating officer of Thailand's largest private power producer in terms of capacity, said Ratchaburi is fully prepared to submit an expression of interest to make an acquisition bid for the coal-fired power plant that will cost between A\$900 million and A\$1 billion. An offer is expected to be made this October, he said.

Elsewhere, Peerawat said Ratchaburi is also conducting a feasibility study of the 160 MW Nam Muan hydroelectric

power project in Laos, with a target to start construction next year.

Mr Peerawat said Ratchaburi's short-term investment plan focuses on international projects and renewable power.

Two wind farm projects with a combined capacity of 420 MW and a 20 MW solar farm in Australia have progressed. The first 180 MW wind farm is likely to be granted construction permission this quarter and is scheduled for commercial operation in early 2015. The second wind farm and the solar farm are expected to receive construction permission early next year.

Ratchaburi, however, suffered a recent setback in Cambodia. The company was recently forced to cancel its joint-venture agreement with KK Power to build a 1.8 GW coal-fired power plant in Koh Kong province of southwestern Cambodia.

Pongdith Potchana, chief executive of Ratchaburi, said that the company

had revised the plan after its analysis indicated that it would face difficulty selling the output back to Thailand and that it might have to wait for up to 14 years before it could do so.

Regarding the future power supply to eastern Thailand, the Thai government has agreed to purchase up to 5 GW from major IPPs, which will start feeding the grid in 2021.

The Electricity Generating Authority of Thailand (Egat) will set up transmission lines solely to serve the big IPPs, while small IPPs will add to the supply. This all indicates that the region will have enough supply and might not need to import from Cambodia.

Thailand has also hugely expanded its planned solar energy investments. At the end of July the government said it would secure 25 per cent of the country's total energy demand from renewable sources.

Thai officials had earlier announced plans for a new feed in tariff (FiT) with the aim of installing 3 GW of solar by 2021. That figure is part of an even greater goal to hit almost 14 GW of renewable energy, up from the previous goal of 9.2 GW. This would include investments in wind, biomass and hydropower, according to Thailand's Ministry of Energy.

Thailand currently relies on fossil fuels for more than 80 per cent of its current electricity production and is therefore looking for diversification through renewables expansion.

New power policy addresses Pakistan power crisis

Pakistan is hoping that its new National Power Policy 2013 – approved on July 31, 2013 by the Council of Common Interests (CCI), with the consensus of all the provinces – will go some way toward alleviating power shortages in the country.

In addition to raising electricity tariffs and reducing power theft, a major thrust of the policy is to build new generating capacity based on coal and renewables, particularly wind and hydro.

The new policy approves the exploration of a 'coal corridor' with an estimated capacity of 7000 MW to generate cheaper electricity as well as the exploitation of wind resources in the Sindh coastal region in order to ease the country's power crisis.

Speaking on the new energy policy, Water and Power Minister Khawaja Asif said the main thrust was to change the energy mix in the next three to five years by producing more affordable power from hydro and alternative sources and maintain tariffs at a certain level.

Looking more long term, Prime Minister Nawaz Sharif said in a separate announcement that his government has prepared a 25-year plan to generate 50 000 MW power to end the energy crisis and meet the future needs of the country.

Pakistan is making progress in closing the capacity gap. Total installed capacity reached a record 16 170 MW in late July 2013, with the shortfall declining to 3000 MW.

At the beginning of August the Prime

Minister also said that China has agreed to set up four coal-fired power plants in Gadani Power Corridor (adjoining Karachi) in Balochistan. Known as the Gadani Power Park, he said the government would establish the first plant at the park to attract local and foreign investors.

It is envisaged that eight coal fired power plants with a total capacity of 5200 MW will be set up in the park but the Prime Minister said this should be increased to 10 plants generating 6600 MW.

"We will have to plan for the next 20 to 25 years to meet demands of 50 000 MW of electricity. For this purpose, we will need four or five power parks like the one being established at Gadani," he said.

He added that a proposal is also being considered for establishment of an LNG terminal at the power park.

While unveiling the new power policy, Asif announced that the government would rationalise tariffs for domestic consumers from 1 October and for commercial and industrial consumers from 1 August.

There will be an increase in power tariffs, ranging from Rs3 to Rs7 for different categories of consumers. Asif said there would be no change in rate for the first 200 units used by domestic consumers to avoid placing further burden on the poor.

The technical committee also proposed 'Integrated Utility Courts' for dealing with electricity and gas thefts and rationalising the penalties for such crimes.



Macquarie power plant in Australia

Investment boosts biomass projects

While key biomass projects move forward, the industry has called for more details and greater clarity on policy and reform.

| Siân Crampsie

Key biomass-fired power plant projects in the UK are pressing ahead in spite of uncertainty over government support for the fuel.

The biomass sector was buoyed last month as PensionDanmark, one of Denmark's biggest pension groups and a major investor in the renewable energy sector, agreed to back the construction of a 40 MW biomass-fired plant in eastern England.

PensionDanmark formed a joint venture with Burmeister & Wain Scandinavian Contractor (BWSC) to build, own and operate the £160 million Brigg plant. The project, developed by renewable energy firm Eco2, is expected to be among the first plants to be built under the UK government's 'supplier cap' for dedicated biomass, and should also benefit from subsidies under the country's renewable obligation (RO) scheme.

But the RO scheme will be closed to new generators in 2017 and replaced by the contracts for difference (CFD) scheme proposed under the pending electricity market reform (EMR).

However the government says that it is likely that only the dedicated biomass projects that generate both heat and electricity will be eligible for support from CFDs. This means that some proposed biomass schemes are unable to move forward.

The government last month also released new rules governing the sustainability of biomass schemes to ensure that carbon savings are achieved through the use of the fuel.

Environmental groups have long raised concerns about the sustainability of biomass schemes, which can result in increased greenhouse gas emissions through fuel transport as well as environmental damage through land use for growing crops. The Brigg plant will use locally

sourced straw derived from agricultural waste, whereas a major biomass conversion project underway at the 4000 MW Drax plant in northern England is planning to ship wood pellets from the USA.

In July RWE npower suspended the development of a dedicated biomass power plant at Tilbury, blaming RWE's company-wide cost reduction programme and a lack of clarity over biomass policy.

Other major biomass projects in the UK are moving forward, however, including a conversion project at the 2000 MW Eggborough power station in northern England and Drax's £750 million investment programme to switch three of its six coal fired units to biomass.

In July renewable energy firm RES said it had received consent for the development of a 100 MW dedicated biomass power station at North Blythe.

Utilities target offshore cost reductions

- Industry collaborates on foundation design
- Study points to 39 per cent savings

An industry working group is examining the design of offshore wind turbine foundations in an effort to reduce the price of offshore wind energy.

Led by Dong Energy, the Pile Soil Analysis (PISA) project is one of the first large scale joint industry investments by the offshore sector into targeted civil engineering and geotechnical academic research. The group believes that significant savings can be made by trimming the size of steel monopiles and finding new ways of installing the foundations.

The collaboration also involves RWE, Statoil, Statkraft, SSE, Scottish Power and Vattenfall as well as a consortium of three universities and was published as a new study highlighting the cost saving potentials of the offshore wind sector.

Cost reduction has become a major area of development in the offshore wind sector for both governments and private companies alike. Dong has set a target of reducing the cost of offshore wind to €100/MWh by 2020.

"We expect to find significant savings by trimming monopile sizes and finding new ways of installing the foundations, amongst others," said Bent Christensen, Senior Vice President of Dong Energy Wind Power. "Consequently, we believe a significant contribution can come from this area towards our efforts of reducing the price of offshore wind power by 35-40 per cent by 2020."

In a study commissioned by the German Offshore Wind Energy Foundation, Prognos AG and the Fichtner Group concluded that continual development of the offshore wind sector over the next ten years offers the

industry the best chance of achieving cost reductions. The study said that costs could be reduced by between 31 and 39 per cent, with project experience and technological innovation across the entire value chain providing opportunities for savings.

It also shows that experience in project planning, construction and operation will help to reduce the risks – and consequently the financing costs – associated with offshore wind.

Dong's collaborative research project will focus on monopile foundations, which typically weigh 600 tonnes and consist primarily of steel. The thickness of the steel is about 100 mm and Dong says that if this could be reduced – even by a fraction – significant savings could be made.

The project is aiming to find technological solutions that can be implemented in time for the design and construction of the UK's Round 3 offshore wind projects.

■ Gamesa has commissioned Spain's first offshore wind turbine in Arinaga, Canary Islands. The 5 MW prototype has a rotor diameter of 128 m and a total height of 154 m and is also Gamesa's first offshore turbine. The commissioning of the unit is seen as a key step in its certification.



Coal enjoys European renaissance

The low price of coal and a flurry of construction activity in the coal-fired power sector mean that Europe's appetite for the fuel will be maintained in spite of environmental goals.

Harald Thaler, Energy Industry Director at Frost & Sullivan says that coal has become the thermal fuel of choice in the region because of its price and availability in the market.

"Rising shale gas output has made the US independent of gas imports and has led to a dramatic decline in the price of natural gas," says Thaler. "As North American utilities started to switch away from coal towards cheap natural gas, a growing amount of coal was exported rather than consumed locally."

"Rising American coal exports also came at a time of slowing Chinese demand, which in combination prompted declines in coal prices. It is not surprising, therefore, that lower coal prices make the fuel much more

attractive for European utilities."

Although some ageing coal capacity is set to be decommissioned over the next few years, new capacity under construction in Germany and the Netherlands as well as Turkey and the Balkans means that Europe will be able to maintain levels of coal consumption in the medium-term.

The longer term is less clear, though, because the future project pipeline is weak, largely because of existing overcapacities.

In addition, political support for coal is waning. The European Investment Bank in July followed the lead of the World Bank, adopting new guidelines to limit funding for coal power plants. The EBRD could follow suit after a period of consultation set to end this month.

Strong European markets for coal fired power plant development include Poland, Turkey and the Balkans, says Thaler.

Don Valley test site drilled

National grid says it has achieved a major milestone in plans to deliver a storage solution for carbon capture and storage (CCS) with the successful drilling of a test site in the North Sea.

Early indications are that the undersea site 65 km off the Yorkshire coast is viable for carbon dioxide storage and will be able to hold around 200 million tonnes permanently, says the UK utility, which has undertaken the drilling as part of the Don Valley

CCS project.

"Global energy demand is likely to double in the next 20 years and CCS is the only technology that can turn high carbon fuels into genuinely low carbon electricity and keep costs low for consumers," said Peter Boreham, National Grid's director of European Business Development. "Drilling is part of a programme which confirms our confidence that CCS will be a practical part of tomorrow's energy mix".

The Don Valley CCS project is being

developed by 2Co Energy and is one of the most advanced full-chain CCS projects in Europe. It was awarded €180 million of EU funding in 2010 and National Grid has been tasked with the development of a pipeline and offshore storage site.

The CCS project proposes taking carbon dioxide from a planned IGCC power plant in northern England as well as from other nearby industrial emitters and transporting it via pipeline to a North Sea storage site.

PV shipments rebound

■ Japan buoys shipments ■ India widens trade investigation

Siân Crampsie

The world solar photovoltaic (PV) industry is enjoying an upswing in demand in spite of deepening international trade disputes.

The solar shipment index compiled by Bloomberg New Energy Finance (BNEF) revealed a pick-up in shipments as well as firmer prices in June, underpinned by a booming Japanese market and a rush to complete shipments to the EU ahead of the increase in anti-dumping tariffs on August 6.

The trend is good news for the PV industry, which has been dogged by overcapacity and continuing trade disputes for the last two years.

Trade tensions heightened in July as China said that it would impose tariffs on polysilicon shipped from the USA and South Korea, while Indian clean energy companies told a hearing in New Delhi that companies from the USA, China, Europe and Japan had dumped cheap solar cells on the market.

BNEF's index showed that leading Chinese cell makers made shipments corresponding to 116 per cent of their average manufacturing capacity utilisation in the month of June 2013, with Chinese module makers averaging 99 per cent and Taiwanese cell makers 84 per cent.

It also shows that pricing along the

value chain has risen slightly in recent months, with the BNEF Solar Spot Price Index showing average polysilicon prices just over \$17/kg, up from a low of \$16/kg in December 2012. Module prices have also risen slightly, with Chinese modules from reputable suppliers widely commanding around \$0.75/W and international modules \$0.86/W.

Jenny Chase, head of solar analysis at Bloomberg New Energy Finance, commented: "These data show that there is strong global demand for the PV products of the largest manufacturers, despite uncertainty and the flow of bad news from the global solar market. Consolidation continues, but

2013 will still be a year of growth for the industry as a whole."

Good news for the industry also came in the form of an agreement between the EU and China to set a minimum price for imports from China rather than incur a costly anti-dumping tariff. The agreement, which brings an end to the EU-China solar trade dispute, should allow Chinese firms to maintain their market share in the EU.

"I am satisfied with the offer of a price undertaking submitted by China's solar panel exporters," EU Trade Commissioner Karel De Gucht said in a statement. "We found an amicable solution... that will lead to a new market equilibrium at sustainable prices."

However in India, IndoSolar, Jupiter Solar Power and Websol Energy System have filed a petition to expand an investigation into imports of solar panels from the USA, China, Taiwan and Malaysia to include Europe and Japan. They want the government to impose duties, both retroactive and current, as well as tariffs on thin-film solar modules.

The government was due to issue a decision by the end of August.

Meanwhile China says it will impose tariffs of as much as 57 per cent on polysilicon shipped from the US and South Korea, saying it wants to stop the product from being sold below cost.

Kengal sale boosts Turkey privatisation

Turkey's privatisation programme is moving along but its nuclear project at Akkuyu has suffered a setback.

Turkey's government says that it expects to net the same amount from the privatisation of its power generation plants as it did from the sale of electricity distribution grids.

The country has earned \$13 billion from electricity grid privatisations and last month concluded the sale of the 457 MW Kengal thermal power plant to Turkish food company Konya Şeker for \$985 million.

The Turkish privatisation authority ÖİB is planning to sell a total of 16.5 GW of electricity generation capacity currently owned by the incumbent EUAS. A total of 45 power plants, of which 27 are hydroelectric and 18 thermal, will be sold.

Alongside the sale of the Kengal coal fired plant, Turkey also recently successfully sold the 1.2 GW Hamitabat combined cycle gas turbine power station and the 600 MW Seyitomer.

In May, ÖİB said that the next plants to go up for sale would be the 300 MW Catalgazi coal-fired plant in

the northern Zonguldak province, as well as the 630 MW Kemerkoç, the 420 MW Yeniköy and the 630 MW Yatagan coal-fired plants in the south-western Muğla province.

The government is keen to promote competition and transparency in the electricity sector to encourage the investments required to meet growing energy demand. Investments of up to €200 billion are estimated to be required in the next 15 years to add 3500 MW per year to the grid.

However the country's plans for a new nuclear plant suffered a setback in July when Turkey's Environment and Urban Planning Ministry rejected the Environmental Impact Analysis Report for the plant.

The 4000 MW nuclear facility is being constructed by Akkuyu NGS in the southern province of Mersin. The Ministry rejected the report on the grounds that it had deficiencies in form and content.

Akkuyu NGS says the delay would push back the start of construction on the \$20 billion facility, which was planned to begin operations by 2019.

Kenya assists Tanzania's geothermal quest

Tanzania has enlisted the help of Kenya to develop its geothermal energy sector.

Tanzania and its northern neighbour have sealed a partnership that will see Kenya provide advice and guidance on regulatory frameworks, training and financing, as well as provide the equipment needed.

The deal will help Tanzania to diversify away from hydropower. It has a geothermal potential of 650 MW.

Tanzania and its neighbours Rwanda and Burundi last month won financing of \$340 million from the World Bank's Great Lakes Regional Initiative to help fund construction of the Rusumo hydropower project.

The 80 MW plant will boost power

supplies to each of the three countries and will have a "transformational" impact on economic development and energy costs, said the World Bank.

The financing is the first to be awarded by the World Bank under its Great Lakes Regional Initiative.

Kenya is also continuing with plans to boost electricity production capacity. Energy Principal Secretary Joseph Njoroge told journalists in Nairobi that the government had put in place plans to add 5000 MW to the national grid over the next three and a half years.

"We will soon conclude talks with financiers for the development of a 210 MW geothermal power plant," Njoroge told reporters. "These

projects are expected to boost the country's overall productivity by boosting power supply," he said.

Kenya is also planning to boost rural electrification. The investments in the electricity system would help to propel the country to middle income status, said Njoroge.

In August Chinese company Dongfang Electric International said it would construct a 50 MW solar farm in Nakuru County, northwest of Nairobi.

■ Construction of the Karuma hydropower plant in Uganda has officially started. The 600 MW project on the river Nile will cost \$1.4 billion and will be built by China's Sinohydro Corporation.



Turkey is planning to sell 16.5 GW of generating capacity

Solar, wind benefit from lower costs

Solar and wind energy are continuing to dominate investment in new renewable capacity and are quickly becoming the highest-profile renewable energy sources, says the Worldwatch Institute.

A new study from the Washington, DC-based NGO says that globally the use of solar and wind energy grew significantly in 2012 in spite of a drop in investment.

The findings echo those of a recent report by Frost & Sullivan, which states that the global renewable energy

sector "escaped relatively unscathed from the vagaries of the global economic downturn".

According to Worldwatch, solar power production increased by 58 per cent in 2012 to 93 TWh, and the use of wind power increased by 18 per cent to 521 TWh. In that year investments in solar reached \$140.4 billion, an 11 per cent decline from 2011, while wind energy investments were down 10 per cent to \$80.3 billion.

"Although policy uncertainties and changes will likely challenge the

growth of solar and wind in the future, these technologies are nonetheless well poised to grow," said Matt Lucky, report co-author and Sustainable Energy Lead Researcher at Worldwatch.

"Declining solar technology prices, while challenging for current manufacturers, are helping solar to reach near grid-parity in many markets. With the decreasing cost of operating and maintaining wind farms, wind power is already cost competitive with conventional power energy sources in many markets."

Companies News

Wind companies on the rebound

Nordex is leading the way to a healthier financial outlook among wind firms.

Siân Crampsie

Wind turbine firm Nordex says that it is "confident about the future" after posting a 57 per cent increase in sales in the first half of 2013 compared with the same period last year.

The Hamburg-based company's growth in sales figures to €661 million reflects its growing business in Europe and an increase in production output and turbine installation.

Nordex earlier this year closed production facilities in both the USA and China because of low capacity utilisation, and says that sales in the USA and Asia declined in the first half of the year.

Its move to reorganise and consolidate its business structure to improve operational performance is similar to other wind turbine firms – notably Vestas – that have had to adjust to uncertain market conditions.

Last month a report from market analysts Plimsoll suggested that the

wind energy industry's financial problems are deep-seated, with many wind firms under financial pressure. In an analysis of 216 wind energy companies registered in the UK, it found that 132 need "an urgent survival plan".

Its report explores the financial health of the companies, rating their financial health as either 'strong', 'good', 'mediocre', 'caution' or 'danger'. Plimsoll believes that its rating system can help to identify the key characteristics of a failing company.

"It is clear from this study the wind energy market is going through a period of great change and the market is highly competitive," said David Pattison, Plimsoll's Senior Analyst. "These 132 companies rated as 'danger' are clearly operating under financial pressure and many risk being forced out of the market."

Plimsoll says that typically, a failing company will show a fall in sales relative to investment, a decline in profitability relative to investment,

and increase in debt and a fall in shareholder equity. Strong companies in contrast make 12 per cent margins per year, have healthy cash piles and are operating debt-free.

However forecasts from Bloomberg indicate that wind companies' consolidation and reorganisation plans are working, with firms such as Vestas and Gamesa set to follow in Nordex's footsteps and return to profit after losses last year.

Nordex's EBIT rose to €15 million in the first half of 2013, compared with a loss of €13.1 million in 1H 2012. After tax, Nordex earned a net consolidated profit of €1.3 million in the period, compared with a net loss of €23.3 million for 1H 2012.

Nordex says that its business is growing at a considerable pace, with order intake in the first half 61 per cent higher than the same period last year. Its balance sheet is stable, debt low at €18 million and cash or cash equivalent at €174.7 million.

Marubeni buys into Mainstream business

Japan's Marubeni is to increase its activity in the renewable energy sector through an equity investment in Mainstream Renewable Power.

Marubeni is to invest €100 million in Mainstream in return for a 25 per cent holding in the Irish firm, which has built up a global project pipeline of more than 19 000 MW since its inception in 2008.

Mainstream says that the equity injection – the largest single equity investment in its history – will enable it to accelerate key projects. Marubeni already has business interests in the renewables sector globally, including the offshore wind industry in Europe.

"This investment is a game-changer for Mainstream allowing us to focus on accelerating our project portfolios

across a range of markets as well as entering into new strategic jurisdictions which present strong value opportunities for our business," said Mainstream CEO Eddie O'Connor. "Having grown our company in the midst of the global financial crises, this type of long-term strategic investment is true testament to the strength and experience of our team as well as the quality and spread of our global project portfolio."

Marubeni said that it has seized an "opportunity with the right company at the right time in the global renewable energy business".

Mainstream is focusing on accelerating projects in growth markets in Europe as well as South Africa and Chile.



Mainstream CEO Eddie O'Connor sees the investment as "a game changer"

India shelve BHEL sale

Plans by the Indian government to sell a stake in power equipment maker Bharat Heavy Electricals Ltd (BHEL) have been shelved amid concerns over the company's performance.

The government wants to sell a five per cent stake in the firm through a public offering but a depleted order book amid reduced demand for power sector equipment has hit BHEL's share price.

BHEL's shares hit a one-year low in early August, falling some 19 per cent

to Rs120.05 (\$1.74), after the company reported a halving of net profits for the latest quarter on the back of low sales. Its order backlog is at its lowest level for five years because of an industrial slump in India and competition from overseas equipment suppliers.

The government approved the divestment strategy in 2011 but market conditions led to a delay and in April 2012 BHEL withdrew the draft prospectus filed with market regulator Securities and Exchange Board of India.

Dong seals metering partnership

Dong says that its industrial and commercial energy customers will benefit from a strategic partnership the utility has formed with Smart Metering Systems (SMS), a Glasgow-based integrated metering services company.

The contract will see SMS providing meter asset management (MAM), site works and data services across Dong Energy Sales UK Limited's industrial and commercial business customer portfolio, helping them to control energy usage more accurately.

Under the deal, sites will be equipped with automated meter reading (AMR) devices to enable end users to visualise and understand energy usage patterns. "Automated Meter Reading

(AMR) and data-based solutions can play a pivotal role in energy management, data provides evidence for energy savings and used effectively, can improve a business's bottom line," said Mike Hogg, MD of Dong Energy Sales UK.

The AMR device sits alongside the gas meter and generates a pulse, recording the amount of energy used. This information is communicated back to Dong and made available to customers via a secure website, where it can be displayed numerically or graphically in a variety of units of measure. Through interpretation of this data, businesses can employ a data-based decision model to achieve effective energy management.

GE sets out new solar strategy

- Collaboration with First Solar
- In-house manufacturing plans cancelled

GE is hoping that a new alliance with solar giant First Solar will enable it to make headway in the turbulent global solar power sector.

The two companies have agreed a deal to combine their technologies in a move designed to improve the efficiency and cost-effectiveness of thin film solar panels, and overcome the difficult market conditions in the solar power business.

First Solar is to buy GE's technology for making thin film panels. In return, GE will receive 1.75 million shares of First Solar stock.

First Solar is the world's largest producer of thin film panels and among the world's largest solar farm developers. GE entered the solar power business in 2007 through the purchase of PrimeStar Solar, which specialised in thin film technology.

GE has continued to develop thin film solar technology but has not yet launched manufacturing on a large scale. Earlier in 2013 it announced that its solar panels had set a record for thin film efficiency at the National Renewable Energy Laboratory in Colorado, USA.

Thin film technology is cheap to manufacture compared with crystalline solar photovoltaic cells, but is not as efficient at turning the sun's energy to electricity. However the market for crystalline cells remains in the doldrums amid global overcapacity and both GE and First Solar believe that increasing the efficiency of thin film technology will give them an advantage over competitors from the crystalline sector.

GE in 2011 announced plans to build a large-scale manufacturing

facility for its solar panels in the USA but these plans were put on hold last year after the collapse of solar panel prices.

It has now cancelled plans for this manufacturing facility. Instead, First Solar will incorporate GE's technology into its manufacturing process, while GE will purchase and brand First Solar panels for its own installations. First Solar will also use GE's inverters, and the two companies will collaborate on research and development.

■ ABB has completed its acquisition of Power-One Inc., a provider of renewable energy and power management solutions. The transaction positions ABB as a leading provider of solar inverters and will enable the firm to expand its renewable energy business.

10 | Tenders, Bids & Contracts

Americas

Siemens secures Washington order

US utility Portland General Electric Company has placed an order with Siemens for 116 wind turbines for the 267 MW Tucannon River wind farm in Washington state.

The order includes delivery and installation of the 2.3 MW units, plus a five-year service and maintenance deal. Installation of the units is set to start in 2014 and the facility is expected to be completed in 2015.

B&V orders B&W boilers

Babcock & Wilcox Power Generation Group (B&W PGG) has been awarded a contract by engineering firm Black & Veatch (B&V) to design and supply FM water tube package boilers for a power project at a manufacturing plant in Virginia, USA.

Each FM water tube package boiler will supply steam for power generation and industrial processes at Celanese Corporation's manufacturing facility in Narrows, Virginia. The dual fuel boilers, which can operate using either natural gas or oil, will replace coal-fired units currently used at the plant.

Material delivery is scheduled for April 2014.

Trina Solar selected for Nevada PV project

Trina Solar says that it is to provide over 1 million of its multi-crystalline photovoltaic (PV) modules to the 345 MW Copper Mountain Solar 3 project in Nevada, USA.

The PV firm will supply provide 1 133 550 dual-rated, 72-cell PD14 solar modules for the project, which is owned by Sempra US Gas & Power.

The project is being built by AMEC and is due to be completed in Q1 2015.

Asia-Pacific

6F GTs will power Bangladesh

GE has signed a contract to supply two 6F gas turbine-generators for a new combined cycle power plant planned for construction at Bhola, Bangladesh.

The two units will be installed by China Chengda Engineering, which is building the facility on behalf of the Bangladesh government. They will be the first advanced F-class units of this size in the country and are expected to start up by 2015.

The order follows contracts won by GE earlier this year to supply 9F gas turbines for two power plants at Sidirganj and Bibiyana, Bangladesh.

The new plants will support the Bangladesh government's objective to increase the country's electricity supply from 8 to 20 GW in the next eight years.

Wärtsilä selected for General Santos plant

Peakpower Soccsargen Inc. has chosen diesel engines from Finland's Wärtsilä for a 20.9 MW oil-fired power plant it is building in the Philippines.

The new plant will be built in General Santos, South Cotabato Province, Philippines by Power, Manufacturing and Machine Works (PMM Works) and Ferrowelds Construction. Energy from the plant will be sold to South Cotabato II Electric Cooperative and will help to address the lack of power in the Mindanao grid.

The power plant is scheduled to start operating in 2014.

MHI to build power plant for Kegco

Mitsubishi Heavy Industries (MHI) has received a full turnkey order for the construction of a 977 MW combined cycle power plant from Khanom Electricity Generating Co, an independent power producer in Thailand.

The new plant will comprise two trains of a 488.5 MW power generation unit, with both blocks slated to go on stream in June 2016.

MHI and Kegco, a wholly-owned subsidiary of Khanom Electricity Generating, also concluded a long-term service agreement for the plant.

Once the power plant, which will be located in Nakhon Si Thammarat's Khanom district, is completed, its output will be supplied to the Electricity Generating Authority of Thailand under a long-term power purchase agreement.

The plant will have dual-fuel specifications and will be based on two Mitsubishi M701F5 gas turbines, two steam turbines and two generators.

TNB signs Manjung EPC

TNB Western Energy Bhd, a unit of Malaysia's TNB, has signed an engineering, procurement and construction (EPC) contract with a consortium of four companies for the 1000 MW coal-fired power plant at Manjung, Perak, Malaysia.

According to TNB, a consortium of Sumitomo Corporation, Daelim Industrial Co Ltd, Sumi-Power Malaysia Sdn Bhd and Daelim Malaysia Sdn Bhd will build the plant, which will use ultra-supercritical boiler technology.

"The EPC contract is for the design, supply, construction and commissioning of one new coal-fired generation facility to be operational by October 1, 2017," said TNB in a filing to Bursa Malaysia.

Wärtsilä signs landmark LTSA

Wärtsilä has signed its first major service agreement in Australia.

The engine manufacturing firm has signed a long-term service agreement with Energy Developments Ltd (EDL) of Australia to maintain the McArthur River Mine power plant. The ten-year agreement includes a guarantee for the plant's availability to generate power based on pre-planned scheduled maintenance periods.

The 53 MW power plant is located in Australia's Northern Territory. It supplies power to the McArthur River zinc mine, which is owned by the international mining resources company Xstrata plc. Electricity is generated by six Wärtsilä 34SG engines running on natural gas. The power plant will be fully operational by the end of 2013.

The agreement includes technical support as well as condition monitoring and maintenance planning to ensure maximum generating availability. Wärtsilä will have two of the company's service personnel on site at the power plant on a continuous basis.

Enel orders turbines for Chilean project

Enel Green Power has placed an order with Vestas under a global supply agreement for the supply of wind turbines for a 99 MW project in Chile.

The Taltal project will be built in Taltal in the Antofagasta region of Chile and will comprise 33 of Vestas' V112-3.0 wind turbines. The order is a call-off from the two firms' 400 MW global supply agreement of 2010.

Vestas will be responsible for supply, installation and commissioning of the turbines and a Scada system. It will also service and maintain the turbines

for two years.

Juan Araluze, Executive Vice President, CSO, Vestas Wind Systems A/S, said: "The order for the Taltal project in Chile is the second one we have signed with EGP within a few months, as part of our global supply agreement signed in 2010."

Europe

Weltec wins Belgium order

Weltec Biopower GmbH has secured an order from Belgian investor and project developer NPG Energy for a 2.4 MW biogas plant. The project, which represents the first order for the German company, will be located in the district of Limburg.

The 19 GWh generated every year will be consumed by the Spin-group BV, a company that needs the electricity for its carpet yarn production facilities.

The generated heat will be utilised directly on site for drying digestate. The dry fertiliser will then be sold to fruit and winegrowers across the border.

The plant will begin operation in 2014.

Nordex seals Finland sale

Nordex has been awarded a contract to supply the wind turbines for a new project in Finland backed by Finnish wealth management firm Taaleritehdas.

The award comes under a framework supply agreement signed by Nordex and Taaleritehdas in June 2012 for a total of 111 turbines and will equip the Nyby-li wind farm in northern Finland.

Nordex will supply eight of its N117/2400 turbines for the project. The award came as nine N117/2400 turbines for the Honkajoki wind farm – the first project under the framework agreement – went on line.

Situated close to the Gulf of Bothnia, the Nyby-li wind farm is characterised by mean wind speeds higher than 7 m/s. "The Nordex N117 is the optimal solution for our second wind farm due to its large rotor swept area and high tower," said Taamir Fareed, director of wind energy business in Taaleritehdas Private Equity Funds.

Siemens equips Polish wind farms

Siemens is to build two wind power plants in northern Poland for wind power plant developer and operator PEP S.A.

The German firm will equip the two projects with a total of 29 of its SWT-2.3-108 wind turbine units, with delivery starting in May 2014. It has also signed a five-year service agreement for the two projects.

According to Siemens, these projects are the first in Poland to use rotors measuring 108 m in diameter.

Elenia Lämpö orders Metso plant

Metso is to supply a biomass-fired plant for district heating to Elenia Lämpö in Turenki, Finland.

Metso's turnkey delivery will include process equipment, buildings and installation work. The plant will have a heat output of 10 MW and will produce hot water for the district heating network of Turenki. The plant will be fired by locally sourced wood-based biomass, such as forest residue and optional also peat.

"The new biomass-fired heating plant is in line with our strategy to increase the share of renewable fuels in our district heat production," said Elenia Lämpö's CEO Matti Tynjälä.

"The plant will significantly lower the volume of CO₂ emissions in our heat generation, which further minimises the environmental footprint of district heat. Using domestic, locally sourced fuels also boosts employment in the region.

"We additionally want to actively meet the expectations of our customers and other stakeholders to promote sustainable development."

International

Isolux Corsán signs solar deal

Isolux Corsán says that it will participate in South Africa's renewable energy programme by building a 60 MW solar power plant in Boshof for SunEdison.

Isolux Corsán will build the photovoltaic facility with South African company Basil Read Matomo. Construction work will begin this month and the plant could be on line by late August 2014, say the two companies.

The contract win is in line with Isolux Corsán's plan to expand in Africa.

Daewoo E&C wins Safi contract

Daewoo Engineering & Construction has won a 1.971 trillion won (\$1.76 billion) order to build a power plant and related facilities near the city of Safi in Morocco.

It is the most valuable order that the company has won in its history.

South Korea's third-largest construction firm said in a regulatory filing that it will build a coal-fired power plant with a capacity of 1320 MW at the site. The project is being developed by an international consortium of GDF Suez, Nareva and Mitsui, which last month signed a 30-year power purchase agreement for the plant with Moroccan utility ONE.

Construction of the power plant is expected to take 46 months.

New substation will help Zambian mine

Kansanshi Mining plc, a subsidiary of Canadian mining and metals company First Quantum Minerals Ltd. (FQM), has placed an order with ABB for the construction of a new substation and the upgrade of an existing one in Zambia.

The facilities will help to provide reliable power supplies to Africa's biggest copper mine, being built in the northwestern province of the country. The new substation will be a main node in the new 330 kV transmission ring linking the capital Lusaka and the copper belt area with two main supply transmission line systems and will help improve power quality in the Zambian network.

The \$32 million turnkey order includes design, engineering, supply and installation of high- and medium-voltage air-insulated switchgear, power transformers and automation, control and protection systems. ABB will also supply telecommunications systems and solar photovoltaic-powered repeater stations to facilitate reliable long-distance transmission of digital signals via fibre-optic cables to a remote-end substation located some 400 km away.

The new copper mine will be the biggest of its kind in Africa and will help reinforce the country's number eight global position in terms of copper production. The mining project is also expected to bring employment opportunities in the Zambezi Basin area, with a completely new town being built to support it. The project is scheduled for completion by 2014.



Oil

Opec disruptions, Middle East politics keep prices high

- Civil unrest in Libya cuts exports to lowest since 2011
- Opec supply declining by 620 000 b/d this year

David Gregory

The price of West Texas Intermediate (WTI) continued well above \$100/b during July and the first half of August, settling at more than \$107/b in the middle of last month due primarily to the ongoing political unrest in Egypt and interruptions in crude exports from Libya brought about by striking workers and the blockade of facilities by militias tasked with guarding those facilities. Brent crude closed above \$110/b in mid-August.

The US Energy Information Administration (EIA) forecast in its August issue that the average price of WTI for 2013 would average \$97/b and in 2014 average \$93/b. It noted that several pipeline projects in North America would come online in 2014, reducing the cost of transporting crude from mid-continent to Gulf Coast refiners. The EIA forecast that Brent crude

would average \$106/b in 2013 and \$100/b in 2014.

The EIA report attributed the increase in crude oil prices during the summer to crude oil and liquid fuel production disruptions that averaged 2.7 million b/d in July. During the month, non-Opec supply disruptions averaged some 800 000 b/d, while disruptions in supplies from Opec countries averaged 1.9 million b/d. "This level of crude oil production outages among Opec producers is the highest since at least 2009, and includes disruptions from Iran, Iraq, Libya and Nigeria," the administration said.

Non-Opec supply disruptions were in Sudan, South Sudan, Syria and Yemen, the EIA reported, and also Canada, where flooding in Alberta during July impacted production areas and pipelines.

Non-Opec supply is projected to grow by 1.3 million b/d in 2013 and

by 1.7 million b/d in 2014, according to the EIA. North America will account for most of this projected growth due to continued production growth in US tight oil formations and Canadian tar sands. Opec supply is seen as declining by 620 000 b/d this year, most of which will be adjustments in Saudi Arabian production in response to growing non-Opec supply.

Total world consumption, according to the EIA, will rise by 1.1 million b/d in 2013 and by 1.2 million b/d in 2014, with most of this driven by China, where consumption is projected to grow by 420 000 b/d in 2013 and 440 000 b/d in 2014. By contrast, liquid fuel consumption in the OECD countries is projected to decline by 320 000 b/d in 2013 and by a further 180 000 b/d in 2014.

The International Energy Agency (IEA), in the August issue of its monthly *Oil Market Report*, forecast

that total world oil demand would average 90.8 million b/d in 2013 and 92.0 million b/d in 2014.

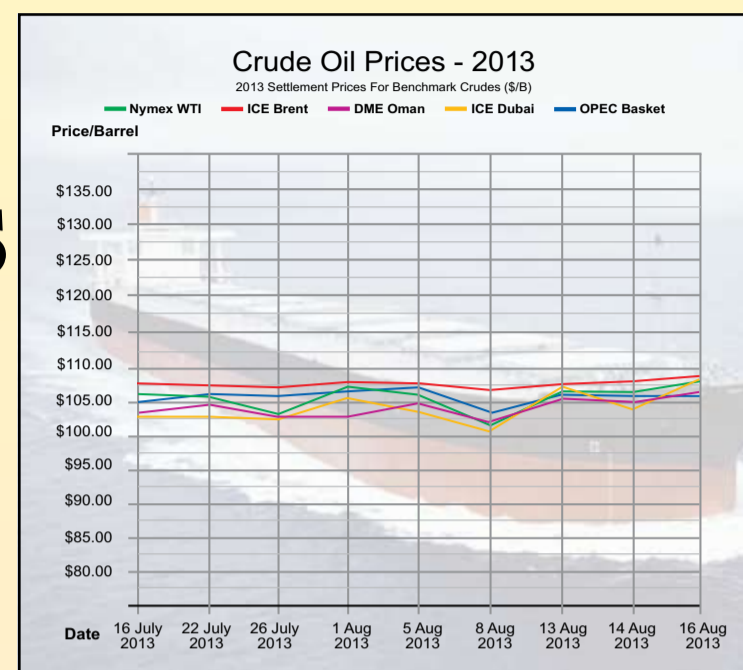
"The divergence in oil demand trends between the OECD and non-OECD regions has shown signs of abating recently, as growth in emerging-market and developing economies and contraction in mature economies have both slowed somewhat," the IEA report said. "Nevertheless, non-OECD economies continue to drive global oil demand growth throughout the forecast period, while OECD consumption trends downward."

Commenting on disruptions in Opec crude, the IEA said Opec output in July was down by 1.1 million b/d on the year "for reasons that had very little to do with lack of demand or competition from North American supply, and everything to do with domestic developments in some member countries."

The report cited civil unrest in Libya that cut exports to their lowest since the 2011 civil war. It noted that Iraqi production was less than 3 million b/d for the first time in six months, and that security issues cloud supply prospects in Algeria and Nigeria. It also mentioned the political unrest and violence in non-Opec members Egypt, Syria and Yemen, none of which are major crude exporters but yet impact overall crude supply.

Developments in those countries "likely go a long way towards explaining a run-up in prices which saw US benchmark WTI hit 16-month highs in July, despite an apparent easing of market concern relating to Iran," the IEA said.

Libyan production was reported by the IEA in early August as being down to 400 000 b/d, from around 1.4 million b/d in April.



Gas

Latest approval ratchets gas export debate

The Obama administration's decision last month to grant a license for the US's third LNG export facility in the Gulf of Mexico has guaranteed that the debate over gas exports will continue to occupy America's energy industry.

Mark Goetz

In early August the US Department of Energy (DoE) approved Lake Charles Exports LLC's application to export natural gas in the form of LNG from a facility in Lake Charles, Louisiana. The company plans to export up to two billion cubic feet per day (2 bn cfd) for a 20-year period. The license allows the firm, a joint venture between BG Group and Energy Transfer Equity of Texas, to export to countries that do not have a free-trade agreement (FTA) with the US, such as Japan and some European allies.

Lake Charles Exports must still acquire permits from the Federal Energy Regulatory Commission (FERC) before it can begin construction of the plant.

Two other licenses have been granted for LNG exports from the US Gulf: one for Cheniere Energy at Sabine Pass in Louisiana in 2011 and one

earlier this year for Freeport LNG in Texas.

Together the three projects will have the capacity to export some 5.6 bn cfd. The US has one functioning LNG plant in Kenai, Alaska, operated by ConocoPhillips.

"US exports of LNG from new liquefaction capacity are assumed to start at a level of 0.6 billion cfd in 2016 and increase to 4.5 billion cfd in 2027, as peak export volumes are shipped out of facilities in the Gulf Coast and Alaska," the DoE said in a recent statement.

There remain as many as 19 more applications with the DoE for LNG export licenses that are estimated to total some 30 billion cfd, although analysis see US export capacity reaching only about 10 billion cfd, primarily due to the cost of constructing liquefaction facilities. The Lake Charles project is expected to require an investment of \$2 billion.

The DoE has said it will review the applications in order, which means that next in line is Dominion Resources with its 1 billion cfd Cove Point project in Maryland.

Those supporting US LNG exports are keen to have the approval process speeded up. Alaskan Senator Lisa Murkowski has urged swifter issuance of licenses because of growing competition in the global LNG market.

"The window for building out our LNG capacity is not open-ended," she said. "It could close if we don't seize this opportunity to have America's natural gas play a major role in the growing global gas market."

But other US politicians are skeptical about high gas exports being in the best interest of the country. Commenting on the Lake Charles permit, Senator Ron Wyden of Oregon, who heads the Energy and Natural Resources Committee, said: "With each new permit to send natural gas overseas,

the Energy Department has a higher bar to prove these exports are in the best interest of American consumers and employers."

Major US companies Dow Chemical, Nucor and Alcoa have formed a lobbying group called America's Energy Advantage that argues that large volumes of gas exports will force the domestic price of natural gas up, reducing US industry's cheap energy supplies and "harm the manufacturing renaissance".

Environmental groups in the US are opposed to the production and export of natural gas because of the procedure of hydraulic fracturing – fracking – which is used to free the gas from shale deposits.

The DoE said when it awarded the license that it "would continue to assess authorisation of the public interest with due regard to the effect on domestic natural gas supply and demand fundamentals."

In a study completed last year, the DoE concluded that natural gas exports would be beneficial for the US economy and the net benefits increased as the level of exports increased.

Meanwhile, a recent report carried out by the Washington-based Brookings Institute Energy Security Initiative said the Obama administration should reform the process for approving applications for LNG export licenses to ship gas to countries without free trade agreements.

"There is need to reform the existing rules pertaining to exporting LNG to non-FTA countries in order to reduce the risk and uncertainty that is hurting both producers and consumers," the report said.

It said the administration should require export terminal applicants to complete a pre-filing process with FERC and have some contracts concluded before the license applications be considered for approval.

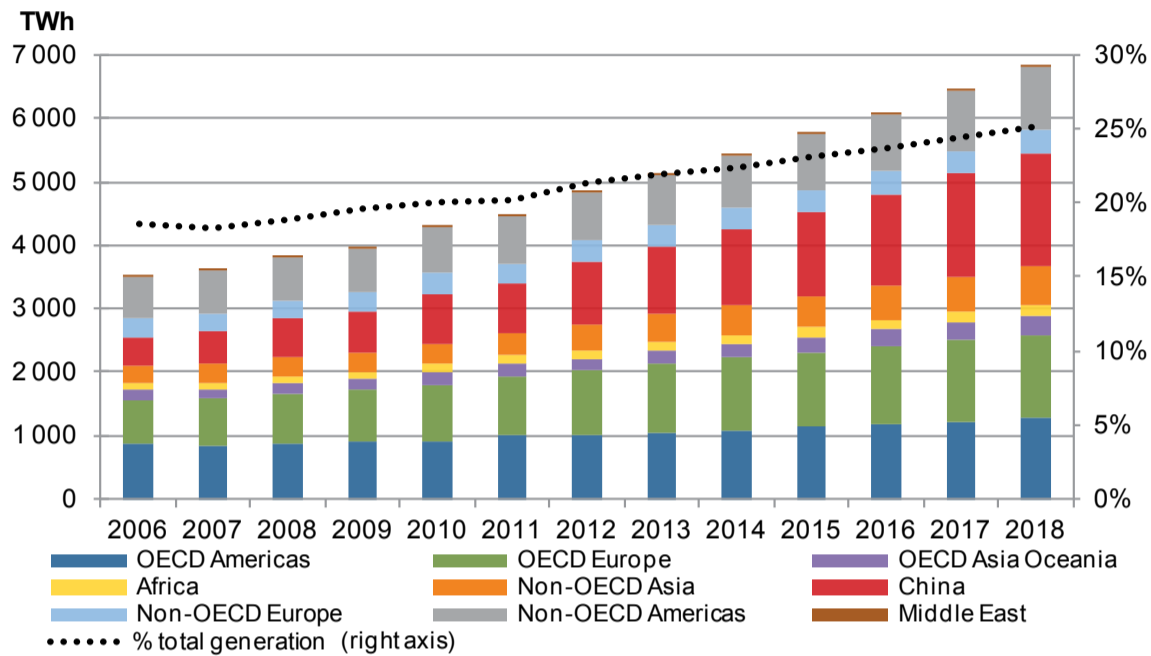
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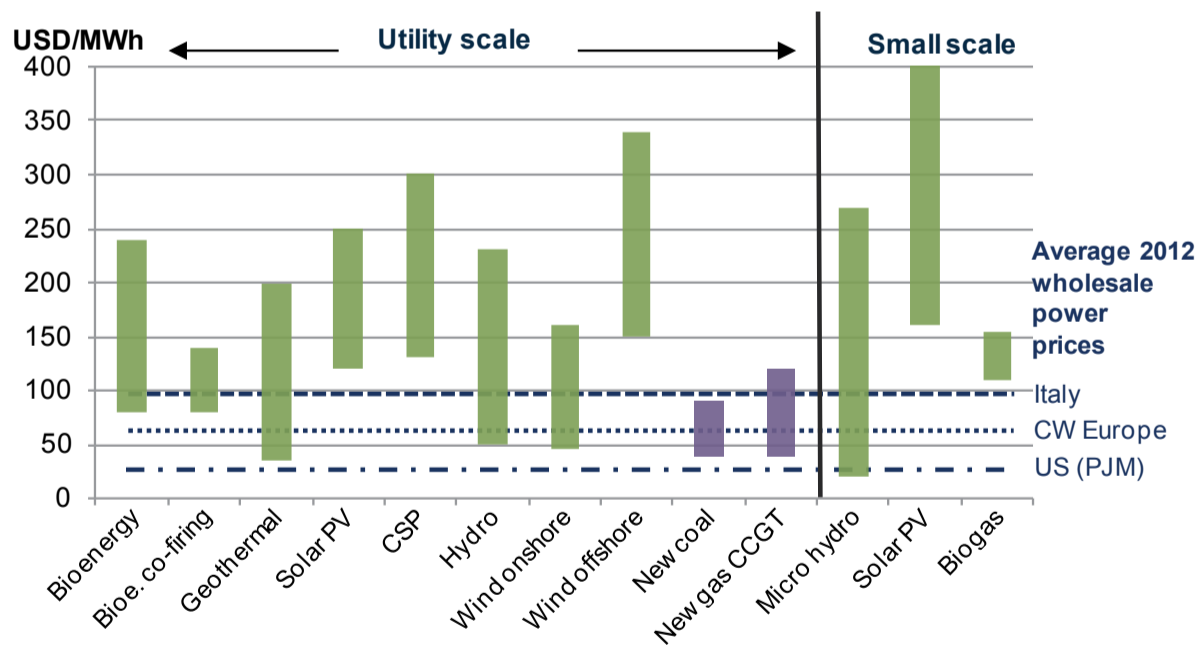
Email: bookshop@iea.org
website: www.iea.org

Global renewable electricity production by region



Notes: TWh = terawatt hours.

Global levelised costs of power generation ranges, first quarter of 2013



Notes: costs are indicative and ranges reflect differences in resources, local conditions and the choice of sub-technology. CCGT = combined cycle gas turbine. Central-Western (CW) Europe = Austria, France, Germany, Switzerland. United States (US). PJM = regional transmission organisation covering 13 states and the District of Columbia (DC).

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Securing tomorrow's energy future today

With the World Energy Congress just around the corner, *TEI Times* speaks to the World Energy Council's Secretary General **Dr Christoph Frei** on the challenges of securing a sustainable energy future.

As energy sector leaders prepared to descend on Daegu, South Korea, for the World Energy Congress next month, Dr Christoph Frei, Secretary General of the World Energy Council was eager to explain the thinking behind the theme of the 22nd in the series of this tri-annual conference.

According to Frei, this year's theme: 'Securing tomorrow's energy future today' reflects the fact we are "in the midst of a massive transformation". Certainly there is a general consensus that the old models and traditional thinking of the past will not be sufficient for the secure, sustainable and economic energy supply that is needed for the future.

"We need to rethink if we want to have sustainable energy that also delivers economic viability, energy security and is environmentally friendly. Going forward, clearly we need to have a different energy system than today because we cannot achieve these three targets with the current systems that we have in place. We need to take the decisions today to ensure we have the right infrastructure tomorrow," explained Frei.

The Congress organising committee says the globalisation of energy demand poses a number of challenges

that are summed up in the concept of the "energy trilemma". One key question is: will there be enough energy to meet growing demand among both rich and poor nations? Other issues that need to be addressed are how energy supplies can be protected against disruptions and how will efforts to mitigate climate change affect access to future energy sources.

The changing global landscape of gas supply is one area that will be a focal point of discussions in Daegu. Developments in the shale gas industry are of great interest to the likes of South Korea and other countries in East Asia.

Frei pointed out: "The shale gas revolution has put pressure on the decoupling of oil and gas [prices] in North America and led to a partial

people want to work in a particular country, or if you will have to pay massive salaries, which all comes back to social equity. Energy has a positive or negative effect on the social equity among people."

There are a number of issues currently shaping the energy landscape that the WEC measures using its 'Issues Monitor'. This is an annual survey that ranks the top 30 energy-related issues across 100 countries. "They are asked to rank the critical uncertainties; 'the issues that keep you awake at night'," said Frei.

At the moment, the top issue globally is the uncertainty surrounding CO₂ prices. This is a key factor when making investment decisions, often determining whether an asset is likely to be successful or become a stranded

asset in the future. Frei, who is part of the advisory group to UN Secretary General Ban Ki-moon, gave an update on Mr Ban's Sustainable Energy For All initiative. "The first achievement of Mr Ban is putting energy back on the political table," he said.

Sustainable Energy For All is an initiative launched by Mr Ban and guided by his High Level Group that brings all key actors to the table to make sustainable energy for all a reality by 2030.

"If you think back to 1990 and the 20 years thereafter, energy was absolutely absent from discussions on [country] development goals, even though every development goal – light for reading, cooling for medication, systems for sanitation – depends on energy. Mr Ban has managed to bring the discussion back to the table."

The second achievement of Mr Ban's team has been the delivery of a tracking process for three objectives – energy efficiency, renewable energy and universal energy access. The WEC has used data from important agencies such as the International Energy Agency (IEA) and the World Health Organisation to create a data set covering 200 countries.

The data is updated every two years to measure progress in achieving the three objectives.

The next thing that has to come is to distinguish between "those who want to change things and those who can." Frei says: "This means you need to have industry involved and the policy framework set so that industry sees value in going after opportunities in energy access, energy efficiency and renewable energy."

The subject of renewable opportunities will be of particular interest with the spectre of trade disputes on solar still looming. Outlining the WEC's position on the trade dispute between Europe and China, Frei said: "Our position is very clear. Any form of trade distortion is unwelcome. The fact that China and Europe have reached an agreement in that context is very reassuring."

It has been three years since the last World Energy Congress in Montreal, Canada. Since then, the energy landscape has become even more uncertain, which is likely to bring the industry's protagonists to Daegu.

With almost 40 energy ministers from around the world already confirmed for the congress, Frei says there has never been such huge interest. "With the unprecedented uncertainty and being in Asia, I have never seen interest so high. We are in the right pace at the right time."

...there is pressure for opportunistic decision-making prompted by factors such as recession, climate change and events like Fukushima

decoupling in Europe. The hot question is: what about Asia? Will it happen? And if so, when? Everybody has an opinion on the topic. Russia wants to reposition itself in that context, North America want to come and show what they can offer."

The second broader issue that Frei sees as a key topic is the question of the general uncertainty in the energy sector.

"I think we can say today, we have unprecedented uncertainty. In the 1990s it was just oil prices. Today, it's oil prices, different gas prices, uncertainty around CO₂ prices; there is the question of increasing nuclear costs as a result of increased safety requirements. All of these things make it a very difficult place to make the right investment and policy decisions," said Frei. "Which brings us back to the trilemma: how do we get the framework right to balance security of supply, cost and environment?"

With the need to solve the trilemma and grow economies by increasing competitiveness, some industry experts have recently been speaking of a quadrilemma as some countries set job creation as another goal of energy policy.

Frei says, however, he sees this as part of the trilemma. "It's part of the social equity dimension and energy security. Jobs are a result of competitiveness, which in turn depends on a number of issues. Competitiveness depends on whether you have good grid security of supply and low cost of energy. It also depends on if

Frei: "We need to rethink if we want to have sustainable energy that also delivers economic viability, energy security and is environmentally friendly"



Solar clouds ahead for China?

China recently announced plans to increase its solar targets – a move that will further its clean energy ambitions and help its beleaguered PV panel manufacturers. But what will be the impact of the recent solar trade agreement reached with the EU?

Alina Bakhareva

A rapid rise of the low-cost Chinese manufacturers to the top league of the global solar PV producers over the 2008-2012 period has led to many solar industry pioneers in Europe and the US going out of business. By the end of 2012, six of the top ten solar cell/module producers were Chinese.

With massive excess manufacturing capacity, protective market measures pushed forward by the largest solar markets – US and Europe – and a continued downward push on solar panel prices, stormy weather may be ahead for Chinese solar manufacturers.

The seemingly triumphal ascent of Chinese manufacturers to the top positions has been based on rather shaky foundation. Following a government goal and a directive to focus on the solar industry, about 300 out of 600 Chinese cities have invested in building solar industries. More than 100 solar industrial bases have been initiated.

A 'natural' advantage of having a massive low-cost labour pool is only

role in cell and module costs, any reduction in operational expenses strengthens a company's ability to offer lower prices without eroding its margins.

However, a favourable tax regime has backfired on Chinese solar manufacturers since for some, export tax refunds came to constitute the lion's share of their profits (up to 80 per cent). Thus, any decrease in the refund rate or in export volumes led to a severe erosion of profit margin and earnings.

By the end of 2012, the state of the Chinese solar industry looked dire. The top 10 solar manufacturers had amassed over \$17 billion debt. The six top solar companies had debt ratios of over 80 per cent.

Having focused squarely on boosting a low-cost supply, the Chinese fledgling solar industry and regulators have mostly failed to fully appreciate and act on the fact that 90 per cent of domestic solar production was going to markets abroad, with 70 per cent shipping to European markets. Thinking globally took the focus away from acting locally.

When the global solar market growth rate slowed down in 2008-2009 most small-scale Chinese solar panel producers went bust. This was a first wave of market consolidation, which left only large producers afloat – those who invested in the latest fully automated production equipment, had access to cheap capital and robust marketing activities in key end markets.

However, it took another year for the Chinese government to realise domestic demand was in need of a serious boost if domestic manufacturers were to survive and even continue their expansion eventually. By the end of 2011, the first feed-in-tariff for solar PV was introduced in China. The annual installed capacity in 2011 reached 2200 MWp, up four times from 500 MWp in 2010.

The announcement in July of an increase in the solar PV target for China to 35 GW by 2015 is a fresh attempt to boost cleantech development in the country as well as ease the massive overcapacity in the domestic solar manufacturing industry.

The published expected annual installed capacity of 10 GW for 2013-2015 may seem an ambitious target. However, if wind power is anything to go by, the target is not out of reach.

Achieving the target relies on the support available for those, who are willing and planning to invest in solar power in China. Following the announcement of the ambitious new target for domestic solar PV installations, the Chinese government has

announced a CNY0.42/kWh (\$0.07/kWh) subsidy for distributed solar projects below 6 MW.

Other measures to make the bold vision a reality have been put together as well. Around 1000 towns and villages were chosen for pilot programmes along with the establishment of 100 demonstration zones for distributed solar power.

The question, however, is: will new Chinese demand be enough to save the shaking Chinese solar PV giant?

Adding 5 GW of extra demand in China (on top of 5 GW in 2012) will absorb some of the excess manufacturing capacity – provided the demand elsewhere stays at the 2012 level, which is questionable. EU demand is forecast to soften for a few years, which could easily offset the 5 GW of additional demand coming from China. As countries in Latin America, Middle East, Africa and Asia tap into their solar power potential, the global demand for solar PV increases. In 2012 about 15-20 per cent of all new panels were shipped into these new markets. However, these markets will do little to save all the troubled second and third-tier manufacturers that sprang up across China on the back of state subsidies.

Another wave of industry consolidation is inevitable. A key question here is whether Chinese local authorities will continue to intervene to keep their local companies afloat.

Suntech, one of the biggest Chinese solar PV producers, is a prime example. Having missed a payment on \$541 million of convertible bonds, the company was sued by local banks. Shortly after, a court declared it bankrupt and ordered debt restructuring to begin. There have been clear signs that the local government of Wuxi, the province where Suntech is based, will not allow it to go under. Suntech has sought local government aid and hired an executive from a state-backed company in Wuxi. The company continues working while a Chinese court restructures its \$2 billion debt.

Globally, during 2010-2012 market volatility continued to keep solar PV manufacturers on their toes. With expected (Germany, Italy) and unexpected reductions and cuts in support mechanisms, and in some cases even retrospective changes in FIT (Feed-in-Tariff) schemes, the major driver for customers was price. By that time Chinese products had reached the quality of western products and solar panels became a commodity product.

A sharp decline in market prices for solar PV modules has sustained at least some demand in key markets, despite the uncertainties about the future of support mechanisms.

However, since price has become a major purchase criteria, high-cost manufacturers in the US and Europe have found the cut-throat competition unsustainable.

Deteriorating market conditions pushed SolarWorld, a German company that runs the largest solar manufacturing plant in the US, to file a complaint about alleged Chinese dumping in October 2011. Single-handedly, the company hoped to create a fairer playground for solar manufacturers in the US.

The US commerce department came to a decision in May, 2012 that Chinese manufacturers had been dumping their panels in the US market at below

the cost of production in a free-market economy. The proposal for import duties was ready in October, 2012. The proposed duties ranged from 24 - 255 per cent.

The result of the battle was not as straightforward as SolarWorld had hoped. On one hand, the duties have been effective. US imports of cells from China have fallen many times. An average of 11 million per quarter in 2011 has dwindled to 900 000 in the 1Q 2013. However, imports from other Asian countries (Taiwan, Malaysia) have risen significantly. The much feared increase in prices has not become a reality.

On the other hand, a much expected boost to the domestic manufacturing has not yet happened either. SolarWorld itself is being forced to continue laying off people in its plant in Oregon. The company announced it would cut 14 per cent or 100 temporary and permanent jobs by the end of August 2013.

Following the US example, a similar case in anti-dumping was launched in EU in September, 2012. Initially, import duties as high as 47 per cent were proposed to be imposed on all Chinese solar panels. A trade war was about to start with China announcing its own investigation into imported European wine and polysilicon and threatening another against European luxury cars.

The EU has divided into two camps, much in the same way as the US solar industry a year earlier. EU ProSun, a group of European manufacturers led by SolarWorld, felt their very existence was under threat, with Chinese products taking an 80 per cent share of all solar panels sold in Europe.

The other group, which included Wacker Chemie, one of the largest polysilicon producers, and many small European solar installers, hold the opinion that duties would lead to higher prices and destroy their business in an already challenging market conditions.

By the end of July 2013, the EU and China had settled a case over solar panels on terms favourable to China. Chinese companies are allowed to export up to 7 GW of solar products annually to the EU without paying duties, on the condition that the price is no less than 56 cents per watt. Panels sold above the quota or below that minimum price will be subject to anti-dumping duties, averaging 47 per cent from August 6, 2013.

Will the deal save the solar manufacturing in Europe? Probably not. The mass-market of commodity solar panels is where the Chinese have no rivals. Similar to the US, importing from other locations can become a solution in case of demand greatly exceeding 7 GW. However, once the largest solar market with 17.2 GW installed in 2012, the EU is forecast to see a softer demand in 2013-2015. Softer demand will leave a larger market share to the Chinese under the 7 GW quota, even without leveraging any of the roundabout tricks mastered in the US market.

Alina Bakhareva is Research Manager, Renewable Energy (Europe), Frost & Sullivan

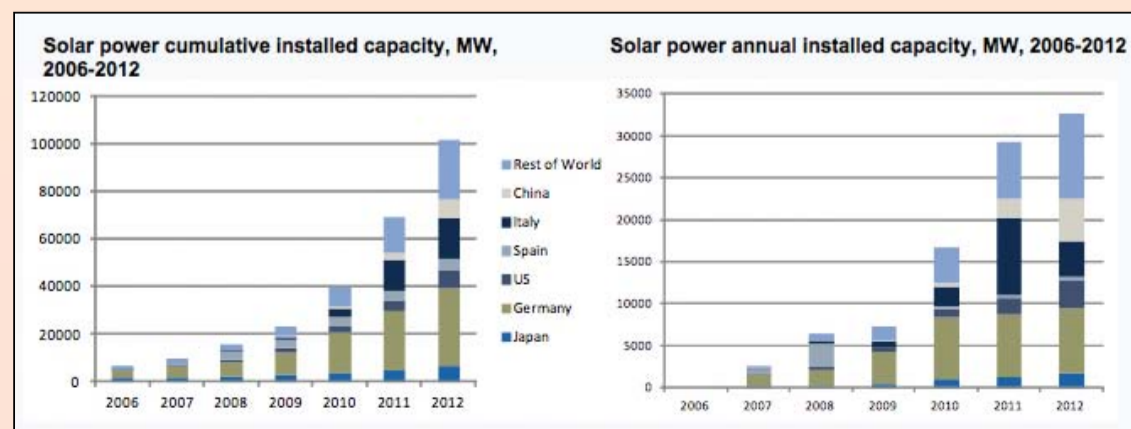


Bakhareva:
The solar panel mass-market is where the Chinese have no rivals

part of the story. Another, more important reason is generous financial incentives for solar PV producers. Capital costs have been subsidised to up to 50 per cent. Further, eligible solar producers are exempt from business income tax for the first three years of operation and have a further reduction of 50 per cent of payable income tax in the next three years. Solar PV products export tax is also refunded.

In addition to favourable capital and tax policy, some provinces also subsidise the cost of electricity for solar producers. Electricity constitutes one of the key operational expenses in polysilicon production. Although electricity costs do not play an important

Global solar growth



Technology

Keeping a lid on methane and CO₂

One of the largest biomethane production plants in Germany has been in operation since May this year. The plant demonstrates what is possible with the right regulatory framework. **Junior Isles**

From an economic and environmental standpoint, biomethane has much to offer. It is very similar to natural gas but is derived from biogas as opposed to fossil resources.

Unlike fossil fuel derived methane, biomethane is produced from fresh organic matter in landfills or biogas plants. Although biogas plants produce carbon dioxide and some other greenhouse gases, they prevent the release of methane – one of the most potent greenhouse gases – and reduce the amounts of other greenhouse gases that are released when organic matter is left to decompose naturally. Biomethane is therefore deemed to be carbon neutral.

Accordingly, it is being hailed by its proponents as “the energy source of tomorrow”. According to German company NordMethan GmbH, a subsidiary of Weltec Biopower GmbH, a manufacturer of stainless steel biogas plants, the recent commissioning of the biomethane refinery in Arneburg, Saxony-Anhalt, Germany, underlines this statement. It also demonstrates what the company believes is a technology with huge potential.

“The future belongs to plant concepts such as the biomethane refinery in Arneburg, which ensure sustainable energy supply and create jobs. The biomethane refinery in Arneburg demonstrates that we must provide the right answer to the growing demand for biomethane for the various utilisation paths,” said Jens Albartus, Director of Weltec Biopower.

The popularity of biomethane has certainly grown in Germany where a favourable policy environment has boosted its use for supplying both the gas network and combined heat and power plants.

Introduced in 2000, the German Renewable Energy Act (Erneuerbare-Energien-Gesetz or EEG) was designed to encourage cost reductions based on improved energy efficiency from economies of scale over time. EEG provided the much-needed initial boost for renewable energies in the country.

The EEG is based on three main

principles:

- Investment protection through guaranteed feed-in tariffs and connection requirement, where every kilowatt-hour that is generated from a renewable energy facility receives a fixed feed-in tariff. Furthermore, the network operators must feed in this electricity into the grid preferentially to the electricity generated by conventional sources such as nuclear power, coal and gas. Renewable energy plant operators receive a 20-year, technology specific, guaranteed payment for the electricity they produce. In particular, small and medium-sized enterprises (SMEs) were given new access to the electricity market, along with private landowners. The Federal Ministry for Environment, Nature Conservation and Nuclear Safety (2010) states that anyone who produces renewable energy can now sell his ‘product’ for a 20-year fixed price.

- No charge to Germany’s public purse. At the moment, the promotion of renewable electricity is still necessary. The EEG rates of remuneration clearly show what electricity from wind, hydro, solar, bio and geothermal energy actually costs. Unlike fossil fuels, there are no external costs such as damage to the environment, climate or human health. The remuneration rates are not subsidies as such since they are not paid for by taxes. On the contrary, the “polluter pays principle” (OECD, 2006) is distributed to the consumer: whoever consumes more pays more. The remuneration rates are paid for by every consumer through their electricity bills.

- Innovation by decreasing feed-in-tariffs. Periodically lowering rates of remuneration for new plants (a gradual decrease of 1 per cent per year) exerts cost pressure on manufacturers. Thus, technologies are becoming more efficient and less costly.

The law has certainly helped increase biomethane production in the country. At present, 116 plants with a feeding capacity of 72 260 m³ of biomethane per hour are supplying the natural gas network in Germany. In



The Arneburg biomethane refinery is one of the largest of its kind in Germany

addition, 36 biomethane plants are currently under construction and another 38 are planned.

According to Weltec, feeding biomethane directly into existing natural gas distribution systems represents an ideal method for transport. “That,” says the company, “is why biomethane plants in rural areas are significantly more efficient to use than biogas plants and a reutilisation no longer has to take place close to the biogas plant.”

Most current biogas plants directly supply biogas to a combined heat and power (CHP) station which is located next to the source, i.e. the biogas plant itself. As a result, the heat generated in the process can only be utilised by a heat consumer located in the immediate area.

According to Weltec, the biomethane refinery in Arneburg, which is one of the largest in Germany, reflects the entire know-how of the industry. Operated by NordMethan and designed by Weltec, it was built in just eight months and has been supplying the public grid since May.

The plant is located in the Altmark Industrial and Commercial Zone. Altmark is a region traditionally characterised by agriculture, with a high proportion of grassland. This makes it an attractive site for the refinery, as it ensures supply of the raw material. Since 2009, the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) has accordingly been promoting the area as one of Germany’s 25 bioenergy regions.

Another strategic advantage of the location is that the zone boasts an excellent transport infrastructure, which facilitates the delivery of substrate

and digestate to and from the site.

The biomethane plant has four anaerobic digesters (AD) with a total capacity of 4900 m³, six digestate tanks with a storage capacity of 5000 m³ and a liquid reservoir.

The digesters are fed by a solid matter dosing feeder that loads maize silage (fermented, high-moisture stored fodder), whole-plant grain, sugar beets as well as dry chicken dung, chicken manure, liquid manure and water as substrates into the stainless-steel digesters. In total, the substrates delivered by local farmers to the installation amount to more than 70 000 t/year.

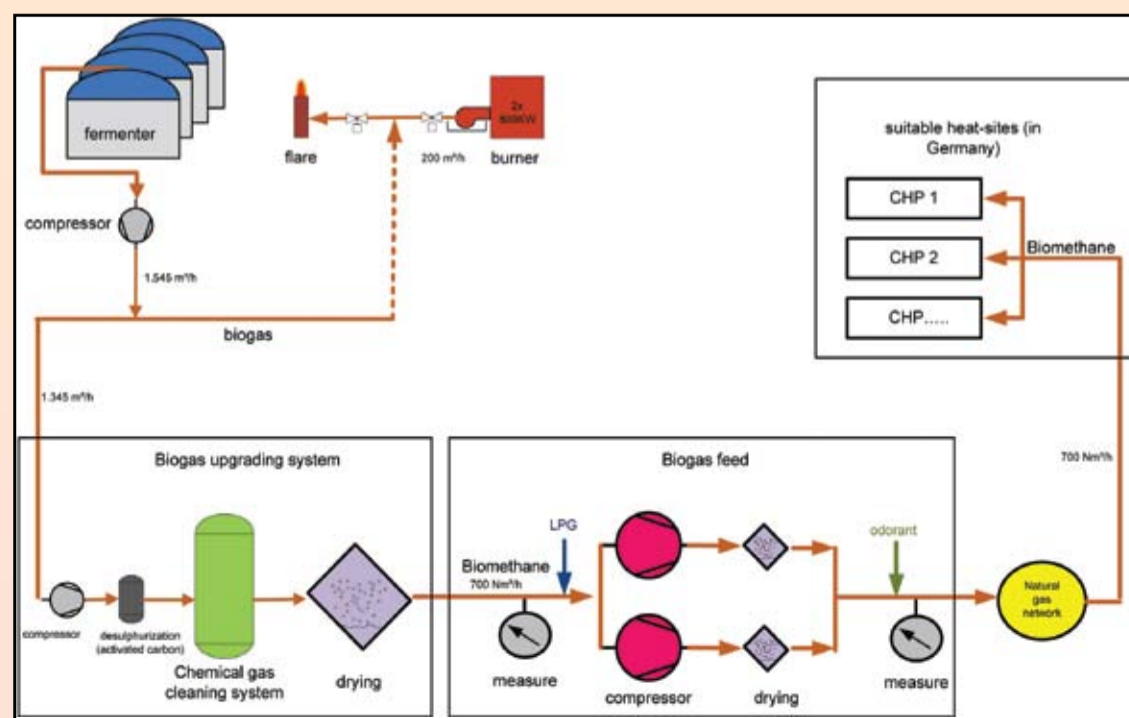
This produces about 1600 m³/h of raw biogas, of which 200 m³ is fed to the burners that generate the heat needed in the biogas-to-biomethane conversion process in the biomethane refinery.

The remaining 1400 m³ of biogas undergoes ‘cleaning’ using a chemical amine treatment to produce about 700 m³/h of processed biomethane with methane content of 99.8 per cent. The biomethane produced for 8600 h/annum is enough to provide power for 5000 homes.

Others countries are looking to imitate Germany’s success in the biogas sector. For example, since establishing a baseline as part of its Anaerobic Digestion Strategy Action Plan in 2011 the number of plants in the UK has grown steadily to 110 up from 68. A further 100+ plants have received planning permission.

Certainly the use of AD can benefit society on several levels but the right regulatory framework and the availability of funding are essential if it is to continue its promising growth.

Biogas/biomethane flow schematic



Biomethane production

Biomethane is derived from biogas. Its production basically follows the natural process of methane production. Biogas plants collect various types of organic matter (substrates) like renewable raw materials, liquid manure or organic waste. Maize is one important substrate for the production of biogas. The substrate is fermented in air-tight tanks to create ideal conditions for the anaerobic microbes that produce biogas during digestion.

Biogas is then stored on the top of the digester tank or is extracted to nearby gas holders. Biogas consists of about 54 per cent of high-grade energy-rich methane, with the remainder being mainly carbon dioxide (CO₂), oxygen, nitrogen and trace gases.

It therefore has to undergo a special biogas conditioning process to separate the methane from the CO₂ to produce biomethane. Depending on the production processes and the type of organic matter used, biogas may also require treatment to remove toxic gases such as hydrogen sulphide and volatile siloxanes.

The biomethane produced is chemically very similar to natural gas and can therefore be fed directly to the public gas distribution system and flexibly used in the same way as natural gas.



Junior Isles

Stirrings from the deep

There are few industries that can stir up emotion like the energy industry. And sometimes the somewhat extreme behaviour we have seen is not just limited to hard core environmental activists. Even politicians, advocates of resolving issues through debate, discussion and going about things in “the right way” can lose it – if you push the right buttons.

Today there are two words that are sure to act as touchpaper in any energy debate: nuclear and fracking.

While some would argue that violence is never the way to solve a debate, anyone at a particular parliamentary session in Taiwan last month must have been secretly thrilled by the impromptu entertainment. I certainly would have paid for a ringside seat to witness the fracas that took place among the country’s politicians.

Associated Press television showed legislators throwing punches and hurling water bottles at each other as two lawmakers wrestled on the floor. Meanwhile, more than a dozen activists in bright yellow shirts chanted and waved signs on a nearby balcony, several of them splashing water onto lawmakers below.

The bizarre scenes came ahead of an expected vote that would authorise a referendum on whether to

finish a fourth nuclear power plant in the country.

Nuclear has always been a hot issue in Taiwan – but fisticuffs in parliament? It was not even as if someone was reacting to being struck by an egg, à la John Prescott.

The fight on August 2 pitted the pro-referendum allies of President Ma Ying-jeou’s ruling Nationalist Party against anti-nuclear forces affiliated with the main opposition Democratic Progressive Party.

Although it does not present the same level of danger as a reactor meltdown, fracking is another technology that is causing huge environmental concern

While nuclear supporters claim serious power shortages are inevitable if the fourth plant is not completed, those against say nuclear power is an unacceptable safety risk for the earthquake-prone island.

The debate has become even more contentious since the Fukushima disaster in Japan in 2011 and unfortunately will continue to be so, especially with the ongoing problems at the Fukushima Dai-ichi

nuclear power plant.

In mid-August the operator of the tsunami-crippled station said about 300 tons (300 000 litres) of highly radioactive water had leaked from one of the hundreds of storage tanks there – its worst leak yet from such a vessel.

Tokyo Electric Power Co. (Tepeco), the plant’s operator said the contaminated water leaked from a steel storage tank at the plant. It has not determined how or where the water leaked, but

suspects it was through a seam on the tank or a valve connected to a gutter around the tank.

Tepeco says that because the tank is about 100 m from the coastline and the leak therefore poses no immediate threat to the sea. But Hideka Morimoto, a spokesman for Japan’s nuclear watchdog, the Nuclear Regulation Authority, said water could reach the sea via a drain gutter.

However, the leak is much more serious than the public was at first led to believe. Water is also believed to be leaking from other parts of the site in addition to the tanks.

Days after the initial reports, the Japanese nuclear energy watchdog raised the incident level from one to three on the international scale that measures the severity of atomic accidents. This acknowledges that the power station is in its greatest crisis since the meltdown two years ago.

The lack of clarity about the leakages and Tepeco’s denial that water is finding its way into the sea has annoyed many scientists.

Dr Ken Buesseler, a senior scientist at Woods Hole Oceanographic Institution, was reported as saying: “We’ve been saying since 2011 that the reactor site is still leaking, whether that’s the buildings and the ground water or these new tank releases. There’s no way to really contain all of this radioactive water on site.

“Once it gets into the groundwater, like a river flowing to the sea, you can’t really stop a groundwater flow.”

According to experts, the concern is that while some of the radioactive elements like caesium that are contained in the water can be filtered by the earth, others are getting through.

Dr Buesseler explained: “Our biggest concern right now is if some of the other isotopes such as strontium 90 which tend to be more mobile, get through these sediments in the groundwater.

“They are entering the oceans at levels that then will accumulate in seafood and will cause new health concerns.”

While scientists say the situation does not pose an immediate health hazard to humans, some types of fish from the area have been considered unsafe for human consumption.

As the effects of the Fukushima nuclear disaster continue to reverberate around the world, in some ways it is little wonder that Taiwanese politicians, even with the cameras rolling, have resorted to fistfights over nuclear energy.

A new *Godzilla* movie is due to be launched next year, which according

to its producers will be tied to a “different contemporary issue” rather than the original atomic bomb testing. Perhaps it will be linked to Fukushima. *Godzilla*’s exact origins vary, but it is generally depicted as a prehistoric sea monster created by nuclear radiation.

Godzilla may be a fictional character but the environmental impact that our energy choices can have on society is one of the main reasons energy can provoke such strong reactions.

Although it does not present the same level of danger as a reactor meltdown, fracking (hydraulic fracturing) is another technology that is causing huge environmental concern as well as getting some politicians into a spot of bother.

Last month, UK Member of Parliament and former Green Party leader Caroline Lucas was arrested along with a group of activists during an anti-fracking protest in West Sussex, UK.

Around 200-300 protesters gathered in Balcombe at the drilling site of UK shale gas exploration and production company, Cuadrilla. An attempt to block the road by linking arms and chaining bicycles together ended up with 25 protesters being arrested for offences including “assault and obstruction of the highway”.

In a statement issued after her arrest, Lucas said she joined the protest because the government has “completely ignored” the public’s views on fracking.

In a letter published in the *Sunday Times* newspaper, NGOs – including the Wildlife Trusts, RSPB, WWF and Greenpeace – said protests in Balcombe, Sussex are not an isolated case of local dissent, but represent the concern shared by many of their members about the threat fracking poses to communities and the environment.

Those opposed to the technology used to extract gas from shale rock cite the threat of contamination to groundwater that can be caused by the chemicals used in the mixture pumped into the wells during drilling. Also, Cuadrilla was forced to halt operations at its Preese Hall site in Lancashire in 2011 when fracking operations caused tremors in the Blackpool area measuring 2.3 and 1.5 on the Richter scale. Although hardly Fukushima levels, they were sufficient cause for concern.

Following the incident the government placed a temporary moratorium on shale gas exploration, but since lifting the ban at the end of last year has made every effort to promote the exploitation of a resource that has transformed US fortunes.

In their joint letter to the *Sunday Times*, the NGOs said rather than addressing the concerns, the government has aggravated them by “streamlining” planning and processes for granting environmental permits to encourage shale gas extraction, and promising “the most generous tax regime in the world” for the industry.

UK Prime Minister David Cameron has been criticised for promising that fracking will create thousands of jobs and bring down energy bills. Caroline Flint, Labour’s shadow energy secretary, said the prime minister was framing the debate as “if it’s jam tomorrow” when production of shale gas was still in exploratory stages.

The shale gas debate will doubtless continue to divide the nation and only time will tell whether today’s boon will be tomorrow’s bane. In the meantime it will continue to stir up emotions that run as deep as a Cuadrilla well.

