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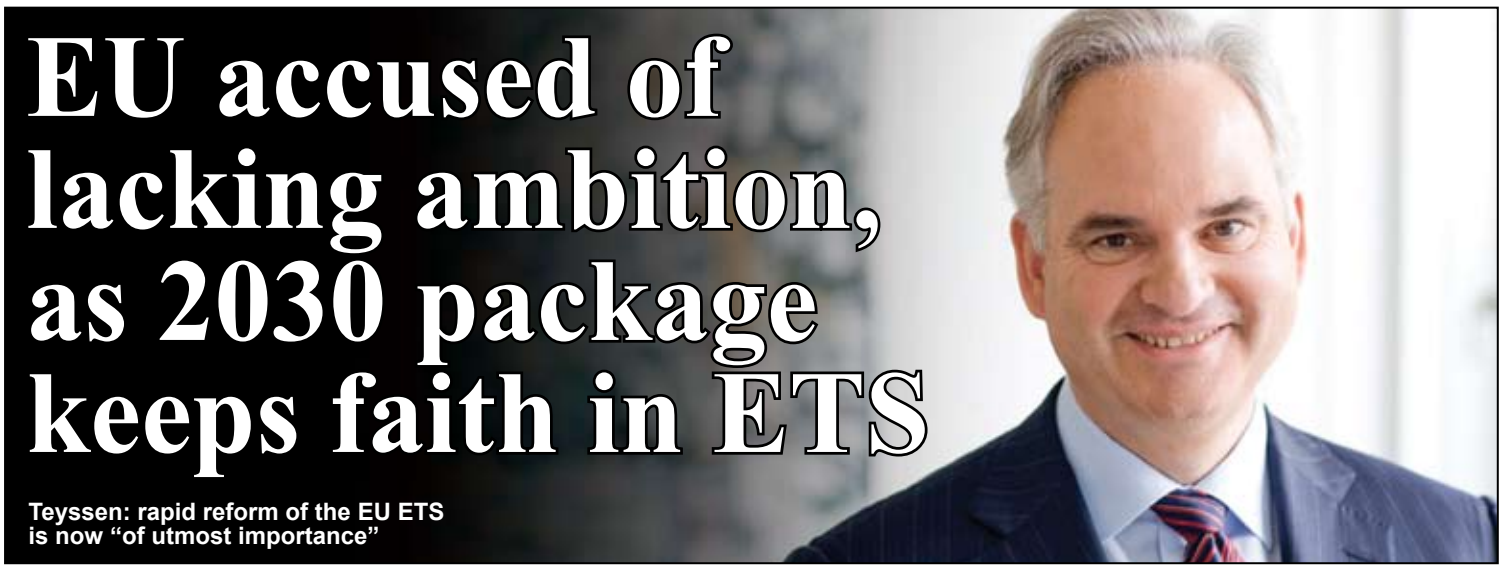

Teyssen: rapid reform of the EU ETS is now "of utmost importance"

The EU's 2030 climate and energy package is not all things to all people but at least demonstrates the region's desire to continue with market-based mechanisms as the central strategy for cutting carbon emissions. At the same time it sets a lead for others to follow ahead of Paris 2015. **Junior Isles**

As expected, the EU's 2030 climate and energy package has received a mixed reception from the electricity industry.

Last month, the European Council agreed to increase the EU's carbon reduction target to at least 40 per cent in 2030 compared to 1990 levels. The Council also agreed that Member States should be free to choose the most appropriate technologies to reduce emissions with the target of "at least 27 per cent" renewable energy in the mix by 2030, binding only at an EU level. A target of 27 per cent for energy efficiency was also set.

Notably, the Council also said that a well-functioning, reformed Emissions Trading System (ETS) will be the main European instrument to achieve the carbon reduction target.

Eurelectric, the association representing Europe's electricity producers, welcomed the news. It said it was particularly pleased to see the clear decision to strengthen the EU ETS mechanism; the annual factor cap on the maximum permitted emissions will be changed from 1.74 per cent to 2.2 per cent from 2021 onwards.

Eurelectric President Johannes Teyssen said the decision sets a clear greenhouse gases reduction target for all Member States and "provides the necessary investment signal for low-carbon technologies".

He said: "Of utmost importance is now a rapid reform of the EU ETS, as stipulated by the majority of Member States."

Eurelectric's Secretary General Hans ten Berge said: "Eurelectric is pleased to see that the Heads of States and governments learned the lessons of the 2020 climate and energy framework and decided to deliver the energy efficiency and renewables targets through market-based, cost-efficient policies."

The package is also seen as a way for bringing greater energy security to the region. Britain's energy secretary, Ed Davey, hailed the package as a blow to Vladimir Putin, saying it will reduce the Europe's dependence on Russian gas.

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Russia-China energy deals will ease effect of sanctions

A raft of cooperation deals ranging from finance and investment to energy and high-speed railways signed between Russia and China will provide Moscow with some relief from the sanctions imposed on it by Europe and the US.

In mid-October during his first visit to Russia as Prime Minister, Li Keqiang and his Russian counterpart Dmitry Medvedev oversaw the signing of 38 agreements.

The Chinese premier said Beijing will deepen cooperation with Moscow in nuclear power and energy in an integrated way that covers upstream, midstream and downstream industries.

Russia hopes greater cooperation with Asia will help it ride out the sanctions imposed by the west following the conflict with Ukraine. Resource-hungry China meanwhile is seeking to diversify its sources of energy amid booming domestic consumption. The two countries inked a 30-year, $400-billion agreement in May that will eventually involve Russia supplying 38 billion m³ of gas annually to China.

The second edition of Grenoble Ecole de Management (GEM)'s Energy Market Barometer published in late September showed that experts were divided on the impact of the Ukraine crisis.

About three quarters (76 per cent) of French energy experts believe the current Ukraine-Russia conflict worsened Russia's reliability as a natural gas supplier. In comparison, German experts are more optimistic, with only 47 per cent believing that Russia's reliability slightly worsened.

With regards to the EU, French experts expect more severe consequences; 81 per cent believe that the security of natural gas supply has worsened. In comparison, 47 per cent of the German experts believe that the security of supply for the EU has declined.

"The findings are surprising, as Germany depends much more on natural gas supplies from Russia, than France does. It is possible that the German experts' judgment was influenced by the fact that Russia has been a reliable energy supplier and partner in the past. In any case, it is not in Russia's interest to put at risk its position as the main natural gas provider in Europe," explained Joachim Schleich, researcher at Grenoble Ecole de Management and the barometer coordinator.

The EU's 2030 climate and energy package signed last month should help Europe reduce its dependency on Russia gas imports. Britain's Energy Secretary said the package would lower the EU's gas imports from Russia by 12 per cent in 2030.

Davey, who is keen to reduce dependence on Russia, recently moved to restrict Russian activity in the North Sea as part of the sanctions against Moscow.

Russian billionaire Mikhail Fridman's Luxembourg-based investment fund LetterOne (L1) announced in March that it was buying RWE Dea, which pumps oil and gas in the UK, Germany, Norway, Denmark and Egypt, for €5.1 billion. However, his attempt to buy RWE Dea, the oil and gas arm of German utility RWE, could now be subject to delays or might even collapse, according to the *Financial Times*.

The transaction was cleared by the German government in August but RWE said in September that it was still waiting for a "comfort letter" – in effect a statement of no objections – from the UK government. It said that it was "uncertain" whether the letter would be issued. Such a letter is required when a British oil and gas production licence is transferred to a new owner.

Citing a person familiar with the matter the *FT* reported that Davey was "not minded" to provide the letter, in light of sanctions against Russia.

In a statement, L1 said that regarding its acquisition of RWE Dea, "the normal processes continue to be followed and as a result discussions with the Department of Energy and Climate Change are ongoing".

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"We are strategically moving away," said Davey. "Europe will not be as dependent on Mr Putin as before and I think that's a very important national security and energy security message."

Key to agreeing the package was a move to appease coal-dependent Poland and other eastern EU nations who argued that a 40 per cent cut in emissions would affect them disproportionately, driving up energy prices and sapping industrial competitiveness.

The deal was struck after it was agreed that these countries would be compensated through a new reserve of 2 per cent of the EU ETS allowances, which will be set aside to address particularly high additional investment needs in low income Member States.

In another important development, carbon capture and storage (CCS) has been explicitly included as eligible under a new NER400 funding programme.

Luke Warren, Chief Executive of the CCSA commented: "CCS remains the lowest cost route to meeting decarbonisation targets and we are pleased that this message has found its way into the final Conclusions."

The package is seen as an important precursor to the signing of a global climate deal in Paris next year.

Mark Kenber, CEO of The Climate Group said: "Europe is the first major economy to agree on its climate targets ahead of the Paris conference in 2015 and its leaders should be commended for that. It gets the ball rolling and paves the way for others to follow suit in the coming months."

He warned, however, that while the target on greenhouse gas emissions is an important first step, it is still not enough to put the EU on a path to net zero emissions by mid-century. He also called the targets on renewables and energy efficiency "frankly disappointing".

Others also claimed the package lacks ambition. The European Wind Energy Association claimed European Heads of State "missed the opportunity" to set an ambitious target for renewable energy.

The European Photovoltaic Industry Association was slightly more upbeat, saying that while the renewables target is too low to unlock the full potential of solar, it represents an important signal that investments in solar photovoltaics will continue.

Advocates of energy efficiency were similarly dismayed. Cogen Europe said the deal "demonstrates that heads of state and government are still failing" to grasp the economic importance of energy efficiency.

Cogen Europe Managing Director Fiona Riddoch said: "Since the early 2000s, the highly energy-efficient solution of cogeneration has not experienced significant market growth at EU level. The 2020 package certainly did not give any impetus to the cogeneration sector, while the effects of 2012's Energy Efficiency Directive still remain to be seen."

Leo Hickman, Chief Adviser, Climate Change, WWF-UK commented: "Agreeing on a 27 per cent energy efficiency target is very disappointing as it is a reduction of the current policy effort in energy efficiency.

"A year out from the signing of a global climate deal, we needed meaningful ambition. Sadly, our leaders blinked."

CCS not yet dead

The IEA's Maria van der Hoeven believes CCS is essential

The start up of Boundary Dam and more funding in the EU 2030 climate energy package keep alive hopes of commercial carbon capture and storage, says **Junior Isles**

Two significant achievements last month demonstrate that carbon capture and storage is still seen as an important tool in cutting carbon emissions – even if progress towards commercialisation has slowed drastically in recent years.

The start-up of SaskPower's Boundary Dam project at the beginning of October has been hailed as a major milestone in CCS development. The 110 MW retrofit of the coal-fired power plant in Saskatchewan, Canada, is the world's first commercial post-combustion carbon capture project in a coal-fired power plant. It will trap around 1 million tonnes of carbon dioxide (CO_2) per year. The captured CO_2 will be injected into nearby oilfields to enhance oil recovery.

The International Energy Agency (IEA) welcomed the launch of the project, calling it a "historic milestone" along the road to a low-carbon energy future.

IEA Executive Director Maria van der Hoeven said: "CCS is the only known technology that will enable us to continue to use fossil fuels and also de-carbonise the energy sector."

IEA analysis has shown that without significant deployment of CCS, more than two-thirds of current proven fossil-fuel reserves cannot be commercialised before 2050 if the increase in global temperatures is to remain below 2 degrees Celsius.

Countries around the world have invested more than $20 billion into similar projects in recent years. Several CCS projects are currently under construction or in advanced stages of planning.

Many projects, however have suffered delays and huge cost over-runs and operators are struggling to make an economic case for CCS without a strong price for carbon.

At the start of October Southern Co. said it will cost at least another $59 million to finish the plant it is building in eastern Mississippi's Kemper County, pushing the total cost above $5.6 billion. The plant and associated lignite coal mine, which is expected to start-up next year, were originally supposed to cost $2.8 billion.

Project economics have been even more challenging in Europe, where power generators are already under pressure. EU ministers, however, gave the technology a boost in the recent 2030 climate and energy package.

The European Council says the existing NER300 facility will be renewed, including CCS and renewables, with the scope extended to low carbon innovation in industrial sectors, and the initial endowment increased to 400 million allowances (NER400). Investment projects in all Member States, including small-scale projects, will be eligible.

Luke Warren, Chief Executive, Carbon Capture & Storage Association said: "The explicit inclusion of CCS within the new NER400 funding scheme is a vital step in making sure that our power sector and energy intensive industries get the support they need to maintain their competitiveness. For many industries, CCS remains the only large-scale option for reducing carbon dioxide emissions."

UK capacity market generates huge gas interest

- Total of 513 separate applications received for first auction
- Half of approved capacity to come from gas

The embattled gas-fired generation sector looks set for some level of recovery, at least in the UK, with the announcement that the bulk of the capacity that has been pre-qualified for the capacity auction is made up of gas fired generation.

A huge number of applications have been received for the UK's first ever capacity market auction in December this year, with the amount of generation capacity pre-qualifying already far in excess of the total amount the government plans to procure.

A total of 513 separate applications were received for the first auction, equating to nearly 70 GW of de-rated capacity. The government says this will ensure the auction is competitive and will secure electricity supplies in the years ahead at the lowest possible cost to bill payers.

National Grid has already accepted more than 62 GW as eligible to participate. A further 5 GW was initially unsuccessful but it is expected that the majority of these will be able to prequalify successfully following the dispute resolution process.

Those successful at pre-qualification included approximately 9 GW of new capacity. Some 7 GW of this is made up of eight potential new large gas power stations. Of these, over 5 GW was from the independent sector.

The capacity auctions are aimed at encouraging energy companies to fill the gap, mainly by building new gas-fired plants, which can be turned on and off quickly to back up renewable energy supplies.

Figures supplied by National Grid suggest that of the 62.5 GW of generating capacity approved for the scheme, about half is from gas plants and less than a quarter from coal power stations.

Gas-fired generators in the UK and across the rest of Europe have suffered as a result of low demand and market conditions that have combined to push gas down the merit order.

According to the *Platts Power in Europe Project Tracker*, which shows electric power generation capacity and construction in Europe, less than 4 GW of natural gas-fired power plants are being built in West Europe, the lowest level in more than 10 years.

According to Platts, some 35 GW of fully approved combined cycle gas turbine capacity remains firmly shelved, with "little or no discernible forward momentum". Dozens of similar projects have been cancelled or suspended in recent years, while a handful of operational plants are up for sale.

Hinkley Point C still not a done deal

The Hinkley Point C nuclear plant to be built in the UK by EDF is facing a legal battle after gaining EU approval of a government support scheme that will guarantee a minimum price for electricity from the plant for 35 years.

Joaquín Almunia, the EU competition commissioner said the final decision had been taken, despite initial doubts, because the UK had shown there was a "genuine market failure" which meant that "without public support this investment could not take place".

Austria, however, has accused the European Commission of misinterpreting the rules over state aid for the planned multi-billion pound power station. The country opposed the EC's approval of the Contracts for Difference (CFD) scheme for the project, stressing that EC competition law allowed for state aid in energy to be proportional and only for infant technologies, which was not the case with Hinkley Point.

Austria's chancellor, Werner Faymann, has written to EC president Jose Manuel Barroso warning him to "expect a lawsuit at the highest court", i.e. the European Court of Justice. Austria, which has long been opposed to nuclear power, claims that subsidising a mature technology for such a long term will distort the market and so breach the rules governing state aid.

Britain's government is subsidising the new plant by creating a 'strike price', or minimum guaranteed price, of £92.50/MWh for 35 years, which is about twice the current wholesale price of electricity.

The National Audit Office (NAO) the financial watchdog, which scrutinises public spending on behalf of parliament has launched an investigation into the deal.

The NAO move follows pressure from the House of Commons Environmental Audit Committee (EAC). Labour MP Joan Walley, Chair of the Committee, wrote to the NAO in October re-iterating the Committee's earlier call for an investigation into whether the deal represented value for money.

Commenting on the inquiry, Greenpeace UK Executive Director John Sauven said: "Every aspect of the Hinkley deal cries out for a thorough inquiry by the government's auditors… This is an extraordinarily bad use of public funds and ministers will have a tough time trying to justify it."

Following the Commission's announcement, EDF said it expects to close the final investment decision at the end of this year or early next.

Hinkley Point C will cost £24.5 billion to build, EU officials revealed – significantly more than the £16 billion quoted last year by EDF. The lower figure was in 2012 prices and excluded interest payments made during construction and other pre-building costs, said EDF.

EDF is presently negotiating the stakes its Chinese partners and French nuclear engineering company Areva will take in the project, said EDF Energy CEO Vincent de Rivaz.

Greens question impact of fuel switching on emissions

■ Analysis questions fracking role ■ Power sector leads GHG tables

Siân Crampsie

New analysis by Energydesk and Greenpeace has questioned the popular belief that the growth of natural gas for power generation at the expense of coal is the reason for the drop in US greenhouse gas emissions.

Using data from the US Energy Information Administration (EIA), Energydesk found that wind power was the largest single cause of the fall in US carbon emissions from coal use, followed by energy efficiency savings.

Energydesk says that of the 16 per cent fall in US carbon emissions since 2007, only around a third (30 per cent) came from switching from coal to gas, for the simple reason that natural gas still emits CO_2.

By contrast, 40 per cent came from the switch from coal to renewables and the remaining 30 per cent from improved efficiency. Increased generation from wind power plants alone was responsible for 32 per cent of the drop – a slightly larger contribution than that made by gas.

Greenpeace says that the analysis does not take into account emissions of methane from fracking operations.

Meanwhile, a modest recovery in the coal-fired power sector led to a slight rise in greenhouse gas emissions in the USA in 2013, according to the US Environmental Protection Agency.

Power plant emissions had been falling in the USA, dropping by just under ten per cent since 2010 as a fall in natural gas prices caused by the shale gas boom prompted a switch from coal to gas. But in 2013 emissions from large industrial facilities were 20 million metric tons higher than the prior year, or 0.6 per cent, driven largely by an increase in coal use for power generation.

The data was reported under the EPA's Greenhouse Gas Reporting Programme. It shows that in 2013 power plants remained the largest source of US greenhouse gas emissions, with over 1550 facilities emitting more than 2 billion metric tons of carbon dioxide, roughly 32 per cent of total US greenhouse gas pollution.

The data also indicated that methane emissions from fracking – the process used to extract shale gas from underground formations – fell by 73 per cent between 2011 and 2013. The EPA predicted that the improved performance was set to continue once its 2012 methane emission standards for the oil and gas industry are fully implemented.

GNF advances in Chile

Energy Minister Maximo Pacheco: Chile "is a country with clear rules of the game"

Gas Natural Fenosa says that its acquisition of a controlling stake in Chilean utility Compania General de Electricidad (CGE) will give it a market-leading position in a key new Latin American market.

The Spanish energy firm last month announced a takeover offer for CGE, a leading provider of electricity and gas in Chile. Under the $3.3 billion deal, Gas Natural will offer to acquire 100 per cent of CGE's stock, taking a minimum initial stake of 51 per cent.

The Spanish energy company is paying 4700 pesos (about $8) for each of CGE's outstanding shares. It says that the transaction will increase its geographic footprint as well as contribute to a more balanced business/risk profile.

Chile's Energy Minister Maximo Pacheco said the deal showed that Chile "is a country with clear rules of the game, a country where there are opportunities". Gas Natural noted that Chile is a "stable market with investor-friendly regulatory frameworks" with attractive country and industry fundamentals.

CGE distributes around 40 per cent of the electricity used in Chile with sales of 13.2 TWh. It is the largest gas distributor in the country, with 1.1 million customers in Chile and Argentina, and also operates in the LNG market in Chile and Colombia.

The acquisition is therefore a good strategic fit with Gas Natural, says the firm, and will reinforce its leadership in gas distribution in Latin America, strengthen its electricity distribution platform in the region and enable it to integrate its global LNG operations with the Chilean market.

Gas Natural already has operations in other large Latin American economies, including Colombia, Brazil and Mexico. Its presence in Chile will enable it to participate in future power generation projects in the country, where economic growth is driving electricity demand.

Gas Natural expects the deal to be completed during the second half of November.

Brazil embarks on smart solution

Brazilian utility Light is continuing efforts to improve the efficiency and reliability of its electricity grid with a R$750 million ($313 million) smart grid project, the largest so far in Latin America.

Light last year invested R$400 million in its distribution system and last month announced an agreement with Landis+Gyr for the supply, installation, operation and maintenance of a smart grid solution that includes 1.1 million endpoints.

The new technology will enable improved measurement and automated management functions on a single secure platform, and will also facilitate adoption of electric vehicles and wind and solar micro-generation technologies.

As a result of the project, Light will be able to take advantage of enhanced monitoring and control points throughout its network, helping to reduce commercial losses. In the future the utility also hopes to provide its customers with greater pricing options and more information on their energy consumption patterns, helping them to manage their usage more efficiently.

"The goal of Light is to provide an intelligent electricity network to 1.6 million consumers, equivalent to around 40 per cent of our total customer by 2018," said Paulo Roberto Pinto, President of Light, which serves more than 4 million customers in Rio de Janeiro state.

US energy firms target Peru

Peru is becoming an attractive destination for energy sector investors, according to the US Commerce Department, which is leading a renewable energy and energy efficiency trade delegation to the country this month. **Siân Crampsie**

Some 15 US companies, including MWH Global, Solar Reserve, SunEdison, GE and EnerNoc, will be meeting key government officials and private sector firms in Lima, Peru on November 4-5 to discuss investment opportunities.

Under Secretary of Commerce for International Trade Stefan M. Selig said: "Vast natural resources, strong economic growth, and increasing energy demand have positioned Peru as an attractive export market for US clean energy companies."

Peru ranked eighth in the International Trade Administration's (ITA) 2014 Renewable Energy Top Markets Report, which examined potential export markets for the sector through 2015. ITA identified expanded export opportunities for ethanol, solar, small hydropower, wind power, and smart grid companies. The country is also hosting the United Nations Framework Convention on Climate Change annual meeting (COP20) in December.

US clean energy firms have already seen success in the country. In September New York-based ContourGlobal inaugurated its Cupisnique and Talara wind farms, making it the largest wind farm owner and operator in Peru.

With a combined investment of nearly $250 million, the Cupisnique and the Talara wind farms are the first operational projects in the northern region of the country and were connected to the National Interconnected Electric System (SEIN) in August. Each of the projects benefits from a 20-year Power Purchase Agreement entered into under Peru's Renewable Energy Resource Program.

"Peru is blessed with abundant wind resources, which makes wind generated electricity significantly less expensive than many of the fossil fuel power plants in the country," said Alessandra Marinheiro, Chief Executive Officer ContourGlobal Latam.

Five-Year Plan focuses on gas and renewables

■ Plans for offshore energy exploration ■ Wind and solar to increase significantly

Syed Ali

China has outlined a 13th Five-Year Plan (2016-2020) on energy, which will increase offshore oil and gas exploration and raise output targets of renewables, especially wind and solar power, according to a senior official with the National Energy Administration.

By the end of 2020, the nation will form five energy production bases in Shanxi province, Ordos Basin, eastern Inner Mongolia, Southwestern China and the Xinjiang Uygur autonomous region. Meanwhile, China will establish a nuclear power development belt in East China and an offshore energy exploration belt along the coast.

With an increasing focus on renewable installed capacity and gas, China's gas power generation capacity will rise from 43.8 GW in 2013 to 85.5 GW by 2020, according to recent figures from GlobalData.

According to the Five-Year Plan, the country's total wind power installed capacity will reach 200 GW by 2020, doubling the level in 12th Five-Year Plan period, while solar power will be more than 100 GW, five times the target level of the 12th Five-Year plan period.

A recent report in the *China Daily*, claimed that the government's subsidies to the renewable energy industry will be capped in the future. An industry insider was quoted: "The new-energy power generation companies should actively improve technology to cut costs in order to gain market share, instead of depending on government subsidies."

Media reports claimed that subsidies on PV power will fall from CNY0.9/kWh (14.7 ¢/kWh) to CNY 0.6/kWh and subsidies on wind power will fall from CNY0.6/kWh to 0.4/kWh by 2020.

Although the Plan sees a continuation of the shift away from coal, coal will still have the dominant role in the fuel mix.

In its recently published 'A moving target – assessing the impact of China's environmental policies', Wood Mackenzie forecasts that coal's role in the power mix is likely to decline from 72 per cent to 64 cent by 2030 as a result of the Air Pollution Prevention and Control Action Plan (APPCAP).

David Brown, Northeast Asia Power Markets Manager, explained: "Tackling chronic air pollution is a clear government priority but not the only one: economic growth, energy security and low cost energy remain paramount. Although initial policy goals focused on expanding the role of gas through demand targets or caps on coal consumption, policy releases throughout 2014 have now evolved to focus on emissions control rather than mass fuel switching to gas."

Meanwhile China moved to re-impose tariffs on imported coal in early October in an effort to help domestic coal producers in the short term. Experts said the decision would, however, also pose hardships for Chinese traders and foreign companies in the long run.

An immediate fallout of the decision by the world's biggest coal producer and consumer would be a sharp reduction in coal imports from Australia, the US and Russia, they said.

■ SunEdison, Inc., a leading solar developer and technology provider, has announced a joint venture agreement with JIC Capital, to facilitate non-recourse financing and develop, construct and own up to 1 GW of utility-scale solar photovoltaic (PV) projects in China over the next three years. China has approximately 19 GW of installed solar energy capacity, with a target to reach 35 GW by 2015 and 100 GW by 2020.

Philippines to boost wind targets

The Philippines National Renewable Energy Board (NREB) is proposing to boost the installation targets for wind power projects by 300 MW according to an NREB official.

NREB is the advisory body tasked with the effective implementation of renewable energy projects in the country. It is seeking a meeting with Energy Secretary Carlos Jericho Petilla to endorse the proposal.

"We are proposing an increase in wind allocation by 300 MW so it will be 500 MW. It's a proposal because there are a lot of interested players," said NREB member Ernie Pantangco.

Although the current installation target for wind is 200 MW, NREB chairman Pedro Maniego Jr., said total wind projects in the pipeline already exceed 700 MW and can be finished by 2015.

Completion of the projects would bring a much needed addition of generating capacity to a country that is in urgent need of power.

Last month American energy giant AES Corp. said it is now working on the engineering, procurement and construction (EPC) contract for the 600 MW expansion of its 630 MW Masinloc coal-fired power plant in Zambales.

The company expects to commence construction next year and complete the expansion by 2018, said Neeraj Bhat, AES market business leader for the Philippines.

Hong Kong to further reduce emissions

The Hong Kong government plans to further reduce emissions from its power sector.

Last month it published the Fourth Technical Memorandum (TM) for Allocation of Emission Allowances in Respect of Specified Licences, which aims to further reduce the emissions of three key air pollutants from the power generation sector in 2019 and beyond. The reduction of emissions will help further improve air quality in both Hong Kong and the Pearl River Delta region.

Emissions from the power sector accounted for 47 per cent, 28 per cent and 16 per cent respectively of territory-wide emissions of sulphur dioxide (SO_2), nitrogen oxides (NO_x) and respirable suspended particulates (RSP) in 2012 in the region.

The new TM, which is issued under the Air Pollution Control Ordinance, will cap the annual emissions of SO_2, NO_x and RSP from the power generation sector from 2019 at 9220 tonnes, 25 480 tonnes and 700 tonnes, respectively.

Compared to the corresponding emission caps in the third TM for 2017 onwards, the emissions of the three air pollutants will be reduced by 11 per cent, 2 per cent and 7 per cent, respectively.

A spokesperson for the Environmental Protection Department (EPD) said: "In setting the new emission caps, we have taken into account the scope for further emission reductions by the two power companies given the latest electricity demand forecast for 2019."

To meet the new emission caps under the new TM, the power companies need to continue to maximise the use of the existing natural gas-fired electricity generation units and adopt the best practicable means to reduce emissions. This includes prioritising the use of coal-fired electricity generation units that have been equipped with advanced emission reduction devices, maintaining the performance of emission control equipment, continuing the use of low-emission coal as far as possible and phasing out the use of heavy fuel oil.

Hong Kong's two power companies will also take up surplus electricity generated from renewable energy (RE) sources to reduce coal-fired electricity generation.

In line with the previous three TMs, provision has been made in the new TM to allow up to one per cent of the total emission allowances of the power generation sector for potential newcomers to the local electricity market, and the same determination mechanism also caters for the possible intake of RE by the newcomers.

The Environment Bureau launched in March this year a three-month public consultation on the Future Fuel Mix for Electricity Generation for Hong Kong. Since the decision on the long-term fuel mix will have significant implications for setting emission allowances for electricity generation in 2020 and beyond, the EPD will review the TM again in 2015 when the results of the fuel mix review are available.

The new TM is due for commencement before the end of 2014. The new set of emission allowances will come into effect on January 1, 2019, i.e. at least four years after the commencement of the TM.

UK CFD auction draws criticism

The UK's new renewable energy support mechanism is under way but is still drawing fierce criticism over value for money and the division of the budget.

Siân Crampsie

Lawmakers in the UK have criticised the subsidy contracts awarded to eight renewable energy projects because they could over-reward developers and will not provide consumers with value for money.

The committee of ministers says that there was not enough competition among bidders vying for the contracts, which are worth up to a combined £16.6 billion ($26.7 billion).

Its criticisms echo assessments made in June by the UK's National Audit Office, which also analysed the implications of the early contracts for difference (CFD) process.

The early CFDs were awarded to five offshore wind power schemes and three biomass projects ahead of the main CFD auction planned for this autumn. Ministers on the Public Accounts Committee criticised the amount of support given to offshore wind and said that the early CFD awards "may provide higher returns than needed to secure investment".

They also expressed concern that the early CFDs would reduce the amount of funding available for renewable projects competing for subsidies in the main CFD auctions.

Energy Secretary Ed Davey has defended the early CFD contracts, arguing that they were necessary to secure new capacity and give investors confidence in the CFD process. Winners of contracts included Dong Energy for 2.1 GW of offshore wind – accounting for nearly half of the 4.5 GW of early CFD capacity awarded – and Drax for the conversion of 645 MW of coal-fired capacity to biomass.

CFDs are part of the UK's electricity market reform (EMR) package and will become the key support mechanism for large-scale renewable energy projects. They guarantee generators a minimum price for their electricity, known as the strike price, but also require them to repay revenues when electricity prices rise above the strike price.

Last month project developers submitted applications for CFDs ahead of the first main CFD auction this winter. Firms will find out if they have qualified for the auction in mid-November and if there are no disputes or appeals, the sealed bid auction will take place on 3-9 December, with winners announced on January 6th. Reviews and appeals could delay the process by up to two months.

The UK's Department of Energy and Climate Change (DECC) announced in October that it had been able to increase the annual CFD budget by £95 million, a move that was widely welcomed by the renewables sector.

However the Renewable Energy Association (REA) pointed out that DECC's £10/MWh reduction in the 'reference price' – the estimate of how much electricity will cost per MWh between 2015 and 2021 – would wipe out the gain in budget.

CFDs have also drawn criticism because the lion's share of the annual budget will go to more expensive, less established technologies such as offshore wind, wave and tidal schemes, with less competition likely in the auction for these projects.

In addition, there is concern that the CFD process will favour large, vertically integrated energy companies and deter new entrants and small and medium-sized enterprises that have been particularly successful in the large-scale solar sector.

The REA has also called for quarterly, rather than annual auctions to prevent investment hiatus, particularly for technologies such as solar which have relatively short investment cycles.

"The allocation process is still too risky and complicated for most of the renewable energy independents and SMEs that are trying to break into the UK's consolidated energy market, further entrenching the dominance of the vertically integrated utilities," said REA CEO Dr. Nina Skorupsha.

"Secondly, in both the short term and the long term, Ministers have failed to deliver value for money," continued Skorupsha. "In the short term, the cheaper, more established technologies have been given less than a quarter of the available budget in the first round, with the rest going to the less established technologies. In the longer term, these younger, less established technologies will struggle to achieve cost reductions without minima to guarantee their continued growth."

Holland identifies offshore sites

The Dutch government is moving forward with plans to develop its offshore wind sector with the selection of three areas for development.

The Netherlands has plans to achieve an installed capacity of offshore wind of 3450 MW by 2020 and the government wants to develop areas off Borssele and off the coasts of South Holland and North Holland. It says that it wants to develop a limited number of large wind farms in order to reduce the costs of offshore wind as well as the impact of the wind farms.

The news is positive for wind turbine developers that are investing in creating a new generation of large-scale wind turbines.

Last month MHI Vestas said that its V164-8.0MW prototype set a new benchmark for power production by producing 192 000 kWh in a 24 hour period. The firm says that it will continue to document the performance of the turbine in order to receive type certification.

Alstom also reported a milestone for its 6 MW Haliade turbine, installed off the Ostend coast at Belgium's Belwind facility. It says that the unit produced its first kWh and that "the tests conducted have so far helped to optimise the turbine's installation and commissioning procedures at sea".

Alstom says that the Haliade should obtain final certification in the last quarter of 2014.

Such turbines will form the basis of many offshore projects in Europe in the next few years, including France's planned offshore schemes and the UK's Round 3 projects.

Last month the Scottish government granted consent to four major offshore wind projects that together generate up to 2.3 GW of energy. The developments in the Forth and Tay regions – Neart Na Gaoithe, Inch Cape Offshore Limited, Seagreen Alpha and Seagreen Bravo – will now be able to apply for CFD contracts and could start generating electricity by 2018.

The UK government has also granted consent for the Burbo Bank offshore wind farm development in Liverpool Bay. Developer Dong Energy has signed a conditional agreement with MHI Vestas for 32 V164-8.0 MW wind turbines for this project.

The UK's offshore sector was also boosted by news that Abu Dhabi-based Masdar will invest £525 million for a 35 per cent stake in the Dudgeon offshore wind farm, currently owned by Statoil and Statkraft.

Commission welcomes Nord. Link and NSN progress

- Norway approves links
- Commission reports on internal energy market

The European Commission says that two planned electricity interconnectors linking Britain with Norway and Germany will help "enormously" with the integration of renewable energy in northwest Europe.

The Norwegian government last month granted licences for the construction of the two cables – Nord. Link, joining Norway with Germany, and the North Sea Network (NSN), between Norway and Britain.

The integration of the Norwegian, German and British electricity markets, which at the moment are not directly connected, will ensure the improved security of supply in Germany and Britain, increase market efficiency, and further integrate renewables, said the Commission, which recently reported on the progress of the Internal Energy Market (IEM).

The Commission noted that while progress towards the completion of the IEM has been made, further steps need to be taken and challenges addressed. In particular it highlighted the need for more investment in strategic cross-border infrastructure and to strengthen regional cooperation.

"If energy markets are well connected and common rules are in place there's not much room left to use energy supplies as a political instrument," said Günther H. Oettinger, Vice-President of the EU Commission responsible for energy. "With proper price signals and sufficient infrastructure, energy is produced where it's cheapest and sent to where it is needed. All this translates into secure energy supplies all over Europe and lower bills for consumers."

NSN will be the world's longest subsea electricity interconnector and would allow the UK to export renewables and import hydropower. It is slated for completion in 2020, pending a final investment decision by Statnett and National Grid in spring 2015.

Nord.Link would be the first interconnector between Germany and Norway, again enabling the exchange of electricity generated by renewables and hydropower. The 1.4 GW, 623 km long link could be completed by the end of 2018.

"The interconnector would be of great benefit to the power systems of both countries – low carbon hydro power from Norway could help UK manage our intermittent renewable generation and Norway could import surplus electricity from UK during dry periods," said Alan Foster, Director of European Business Development for National Grid.

Power sector investment can boost African growth

■ Better governance and management needed ■ Payoff for investment "huge"

Siân Crampsie

Electrification rates in sub-Saharan Africa could be enhanced through a better functioning energy system, says the International Energy Agency (IEA).

More than two-thirds of the population – 620 million people – in the region live without access to electricity, while even more – 730 million people – rely on 'traditional' fuel sources for cooking, including fuel wood and charcoal.

The IEA believes that improving access to modern energy systems would unlock "faster economic and social development" and enable citizens to "fulfil their aspirations".

"The energy sector is acting as a brake on development, but this can be overcome and the benefits of success are huge," said IEA Executive Director Maria van der Hoeven.

The IEA has analysed sub-Saharan Africa's energy sector as part of its *World Energy Outlook* series, and believes that the region's energy resources are more than sufficient to meet the needs of its population, but that they are still largely underdeveloped.

Speaking at a Chatham House conference on energy and economic competitiveness in London last month, Dr Kandeh Yumkellah UN Under Secretary-General, Special Representative of the Secretary General, and CEO, Sustainable Energy for All, said: "I call it the fallacy of riches. We have oil and gas but live in darkness."

The payoff of increased investment in the region's energy sector would be "huge" in terms of social and economic development, said IEA Chief Economist Fatih Birol.

Investment in sub-Saharan Africa is increasing, but the majority goes to projects aimed at exporting resources, rather than those designed to boost regional infrastructure.

The region accounted for almost 30 per cent of global oil and gas discoveries made in the last five years, and also has significant renewable energy resources, notes the IEA.

Dr Yumkellah noted: "Sub-Saharan Africa accounts for 7 per cent of world's [conventional] oil resources and 6 per cent of natural gas… we have become very important in the oil and gas landscape... Tanzania and Mozambique are becoming big players; everybody is heading there these days."

The IEA believes that Africa's sub-Saharan economy could quadruple in size by 2040, with a near doubling of the population to over 1.75 billion and 80 per cent growth in energy demand.

It says that if $450 billion of additional investment is made in the power sector over this period, and greater regional cooperation is achieved, economic growth would improve while an additional 230 million people would gain access to electricity.

Governance reforms and improved management of energy resources and revenues are also needed, says the IEA.

Additional reporting by ***Junior Isles***

Oman diversifying into renewables

Oman is diversifying into renewable energy in a bid to limit the use of oil and gas in power generation.

The sultanate has revealed plans for a $200 million wind farm in the southern governorate of Dhofar.

The wind farm will have a capacity of 50 MW, enough to meet about half of Dhofar's demand in the winter, and is due to start operating in early 2017. The project will be coordinated by Abu Dhabi Future Energy Co (Masdar) and financed by a grant from Sheikh Mohammed bin Zayed Al Nahyan , the Crown Prince of Abu Dhabi, officials from state-owned Rural Areas Electricity Co (RAEC) said.

RAEC plans to launch seven more renewable energy projects in 2015, including five solar farms costing $7.8 million.

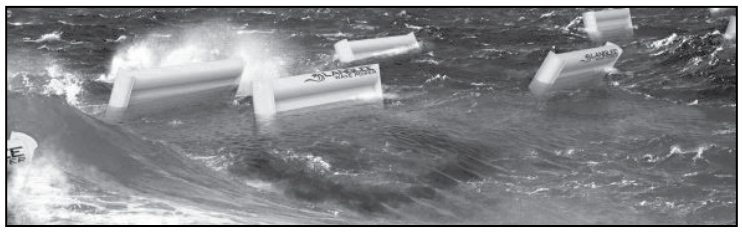
It is one of several utilities in the Gulf region aiming to grow its nascent renewables sector.

Last month the European Bank for Reconstruction and Development (EBRD) agreed to finance Jordan's first solar power plant, a 20 MW photovoltaic (PV) facility near Ma'an.

The plant will be built by SunEdison and will be co-financed by a $25 million loan from the US Overseas Private Investment Corporation (OPIC), said EBRD, whose key objectives in Jordan are the development of sustainable energy resources and increasing energy security.

Saudi Arabia is also developing solar energy and in September said that it had allocated land for solar farms in five regions, including Qaisomah, Rafha and Mahd.

Wave energy plant consented in Kenya



A 100 MW wave energy plant will be built on Kenya's shores after the country's Ministry of Energy gave official consent to the project.

Israel-based Wave Electricity Renewal Power Ocean Ltd. (WERPO) has signed a power purchase agreement with utility KPLC and plans to install the facility in partnership with local company Sea Wave Gen.

According to WERPO, which was recently acquired by Blackbird International Corporation, the production costs of energy from the facility will be $0.02/kWh, while it will sell the energy to KPLC for $0.08/kWh.

Kenya is keen to expand its renewable energy base and has so far attracted investors in the geothermal energy and wind energy sectors.

WERPO is currently building a 150 kW wave energy plant in China and has established 11 joint ventures with local partners in nine different countries.

Zimbabwe investing to boost capacity

Zimbabwe is investing in existing and new generating capacity in an effort to curb blackouts that are crippling its mining and industrial sectors.

Utility Zesa Holdings is planning to raise $300 million to refurbish thermal power plants in Harare, Bulawayo and Munyati, with a combined installed generating capacity of 120 MW. It says that power supplies will remain critical until 2018, when more power becomes available through the expansion of the Kariba South and Hwange plants.

Other new build projects include a proposed 600 MW thermal power plant in Gwayi. The power purchase agreement for this project, between the Zimbabwe Electricity Transmission and Distribution Company and China Africa Sunlight Energy gained approval last month from the Zimbabwe Energy Regulatory Authority.

China Africa Sunlight Energy is a consortium of a private Zimbabwean company, Oldstone Investments and Shandong Taishan Sunlight Investments of China. They have proposed a $2 billion project that includes the Gwayi-Insukamini transmission line, coal extraction, construction of the Gwayi-Shangani Dam and an industrial park.

The first 300 MW of capacity could be on-line in the first half of 2017, according to local reports.

The expansion of Kariba South will add 300 MW to the grid, while Sino-Hydro will add two new 300 MW units to the Hwange coal-fired power plant at a cost of $1.5 billion.

Tenders have also now been opened for 300 MW of solar projects in Gwanda.

Zimbabwe produces around 1300 MW of power, compared with a peak demand of 2200 MW.

The Hwange power plant has a design capacity of 920 MW, but produces less than half that due to ageing equipment and years of inadequate funding to maintain the plant.

South Africa lines up nuclear deals

South Africa has signed new nuclear cooperation deals as it prepares to embark on a 9.6 GW new build programme.

The Department of Energy has sealed agreements with France and Russia and also says that it is carrying out preparatory work for the procurement process for the nuclear programme.

"There will be a procurement process and the work that the department is doing is preparation towards that," Deputy Director General (DDG) for Nuclear Energy at the Department of Energy, Zizamele Mbambo, told local reporters.

The agreements with France and Russia cover areas such as research reactor development, infrastructure development, training, funding and other areas of cooperation, and paves the way for the potential use of French or Russian technology in South Africa.

Last month the Department of Energy reiterated its intention to commence the rollout of the new nuclear build programme as a way of securing new capacity and diversifying the country's electricity generation mix.

South Africa derives around five per cent of its electricity from nuclear power and is desperate to add new capacity in order to sustain economic growth.

Earlier this year the government announced a new support package for utility Eskom to help it raise debt and continue its capital investment programme.

Eskom has been battling to keep the lights on because of low reserve margins, ageing infrastructure and a funding deficit for its capital expenditure plan. Key power plant projects have been delayed and run over budget, while another major project – replacing the steam generator at the Koeberg nuclear plant – is facing a legal challenge.

South Africa has targeted the development of 9.6 GW of nuclear capacity by 2030 and says that it intends to sign nuclear cooperation agreements with other nations, including Japan and China.

"South Africa remains committed to the use of nuclear power because it is safe, environmentally friendly, and sustainable in the long run," said the Department of Energy in a statement. "Government stresses that our new nuclear build programme is also about revitalising the local nuclear industry so that we can actively participate in the global supply chain as an exporter of nuclear services and components."

■ Algeria has indicated its intention to build its first nuclear power plant by 2029. Energy Minister Youcef Yousfi said on the sidelines of a conference that the country was investing in research and training in preparation of its goal.

Uncertainty clouds French giants

French energy giants are facing a period of uncertainty as the spectre of privatisation and unexpected management departures bear down.

Siân Crampsie

The French government is replacing Henri Proglio as chief executive of EDF as it prepares for its transition away from nuclear power and a potential sale of some of the state's majority stake in the company.

In October, Proglio was sidelined by an announcement by the French government that it would not renew his contract, which comes to an end on November 22nd.

Proglio, who was appointed by Nicolas Sarkozy in 2009, is to be replaced by former Vivendi boss Jean-Bernard Lévy, who for the last two years has run French defence group Thales.

Lévy has been credited with turning around Vivendi when it came close to bankruptcy in 2002 and may have to see EDF through a period of transition as government assets are privatised.

In its last budget, the government said it would sell up to €4 billion in shareholdings to raise money to pay down debt, or to invest in other companies. This could possibly include selling off parts of the government's stakes in energy companies such as GDF Suez and EDF.

The state owns 84 per cent of EDF and the nuclear giant is expected to be among those assets slated for sale as part of a broader objective to raise €10 billion over the next 18 months.

Emmanuel Macron, economy minister said the change of management at EDF was driven by a "new framework" created by the government's legislation laying out a reduction in France's dependence on nuclear power and an increase in renewable energy sources. Macron said, however, that the government had "no intention" of privatising EDF.

France's lower house has also approved a law that would reduce nuclear power's contribution to French electricity generation from 75 to 50 per cent by 2025.

Meanwhile, Areva's supervisory board has expressed its confidence in the group's executive board following the sudden departure of Chief Executive Luc Oursel on health grounds.

Oursel announced on October 20th that he had chosen to take a leave of absence to pursue treatment and "fight a personal battle" against an illness. The firm's supervisory board has given Philippe Knoche the same powers as those of the Chairman of the Executive Board to help manage the period of transition, it said.

Oursel's decision was announced just hours before the sudden death of Total Chairman and CEO Christophe de Margerie, who was killed in an airplane accident at a Moscow airport.

De Margerie had joined Total in 1974 and was appointed CEO in 2007. He was described by Pierre Blayau, President of Areva's supervisory board as "a leading figure, listened to and admired all around the world" and "one of the great captains of industry".

Total has named Thierry Desmarest as Chairman of the Board and Patrick Pouyanné as Chief Executive.

B&W considers power split

Babcock & Wilcox is examining whether the separation of its power generation business and its government and nuclear operations would enhance shareholder value and business focus.

The US firm says that there is no guarantee that a split would happen and that it would provide additional detail in early November after the release of third-quarter results. Its board of directors is evaluating the separation, which would result in the creation of two publicly-traded companies.

B&W's power generation division is focused mainly on the coal-fired power plant sector, which is shrinking in some regions because of environmental legislation. Its nuclear division supplies plant components as well as design and engineering services, while its government division includes facilities management and other technical services to government and industry.

ABB and Vestas tie-up to help rural African communities

ABB and Vestas say they will work together to electrify off-grid communities in Africa.

The two companies have announced plans to deploy wind-diesel generation systems coupled with microgrid systems to help rural communities in developing markets gain access to affordable, clean electricity.

The initiative is part of Vestas' Wind for Prosperity initiative, a commercially-based business model designed to bring affordable, reliable and stable wind-generated electricity systems to rural populations in developing countries.

ABB will provide microgrid power stabilisation systems that will help ensure good quality power is available to consumers, while Vestas will provide factory-refurbished wind turbines for the hybrid power systems.

Vestas' Wind for Prosperity programme is focused initially on rural Kenya, where 13 communities that are home to over 200 000 people have been identified as potential project areas. Planning is being coordinated with the Kenyan Ministry of Energy, the Kenya Power and Light Company, and other government agencies.

The scheme is expected to supply electricity at significantly lower cost than diesel-only power production.

In addition to Africa, Wind for Prosperity partners are also exploring potential projects in other geographies with similar needs. The initiative plans to install hybrid power generation systems in 100 communities reaching at least one million people in the next three years.

Siemens chases American dream

Kaeser: price for Dresser is "on the high side"

- Dresser deal locks-in shale gas position
- Acquisition adds to Rolls-Royce deal

Siemens is hoping its acquisition of Dresser-Rand will strengthen its presence in the US energy market.

The German engineering firm's deal to pay $83 per share in cash for Dresser-Rand, which makes compressors and turbines for the oil and gas industry, comes just four months after Siemens spent €950 million on Rolls-Royce Holdings Plc's energy business.

The Dresser and Rolls-Royce deals will increase Siemens' oil and gas revenues to $11 billion from less than $7 billion. However the price it is paying for Dresser is seen as high, equivalent to a premium of about 37 per cent over Dresser-Rand's share price in July before reports about a potential bid boosted the stock.

"Siemens has largely missed out on the US oil and gas... boom over the past years," JPMorgan capital goods analyst Andreas Willi wrote in a note. "Siemens' increase in exposure comes potentially late in the cycle and value creation from this deal may have to depend very much on execution."

Siemens Chief Executive Joe Kaeser recognised the high price paid in a conference call with journalists but said that the move was largely strategic. "We do agree the price has been on the high side but, then again, it matters more what value we created," he said, adding that Dresser would contribute to profits from day one.

Dresser makes turbines and compressors that are used to extract, process and move oil and gas and the boom in unconventional plays in the US has made the firm a target for takeover.

The firm has also been coveted by GE and Sulzer, according to press reports, and there remains the potential for competing offers to be placed before Siemens' $7.6 billion offer is approved by Dresser shareholders.

Areva, Schneider team up for storage

Areva says that a European Union-funded project to develop a new energy storage solution will help it to diversify its technology portfolio.

The French firm has signed a research and development (R&D) agreement with Schneider Electric to develop and demonstrate flow battery technology, which can store and produce electricity by combining hydrobromic acid and hydrogen.

The project aims to optimise an existing 50 kW flow battery prototype designed by EnStorage and increase its capacity to a 150 kW demonstration module. Under their agreement, both companies will test the flow battery technology under real conditions.

Demand for energy storage is rising as utilities seek competitive and efficient solutions to integrate renewable energy. "This storage technology will provide the flexibility and stability needed to facilitate renewable integration," said Frederic Abbal, EVP of Schneider Electric's energy business.

Areva will lead the project, manufacturing, integrating and installing the storage solution while Schneider Electric will design, manufacture and install the complementary power conversion system.

"The energy storage market is fast-moving and highly competitive," said Louis-Francois Durret, Areva Renewables CEO. "In order to meet the energy needs of tomorrow Areva is diversifying its technology portfolio with the flow battery technology and broadening its cooperation agreement with its partner, Schneider Electric."

- Alevo has opened a 4 million ft² facility in North Carolina, USA, for the manufacture of battery technology that it claims can "reduce the 30 per cent waste that currently exists in electric grid delivery systems". In addition to facilitating greater use of renewable energy systems, Alevo said that its battery systems could help utilities using coal fired power stations to "substantially reduce greenhouse gas emissions through the efficiencies gained — and so meet the new tough EPA Clean Power targets".

Americas

Siemens wins Canada HVDC

Manitoba Hydro has placed an order with a Siemens consortium for the construction of the converter stations for the Bipole III high voltage direct current (HVDC) link.

Under the C$800 million order, Siemens will supply the complete HVDC core technology for the 1400 km-long, 2300 MW link's converter stations, while its partner, Mortensen Construction, will build the converter stations.

The converter stations will be located at Keewatinohk, near Hudson Bay in northern Manitoba, and Riel, close to Winnipeg, and connected via a 500 kV overhead line. The link will be commissioned in mid-2018 and will improve the overall system reliability of Manitoba Hydro's system.

Brazil orders Gamesa units

Gamesa has won a contract to supply 68 MW of wind turbines to the Guirapa complex in Bahia state, Brazil.

Gamesa will supply, install and commission 34 of its G97-2.0 MW turbines at Guirapa, which has been developed by Sequoia Energia in partnership with the utility Companhia Hidroeletrica do Sao Francisco (CHESF).

Delivery of the turbines will be made during 2015, with commissioning scheduled for the second half of the year.

Taxway places wind turbine order

Taxway S. A. has placed an order with Vestas for 16 wind turbines for the Kiyu wind farm in Uruguay.

Vestas will deliver the V112-3.0 MW units in the first quarter of 2015. The contract includes delivery, installation and commissioning as well as a five-year service agreement.

Wärtsilä to supply cross-border CCGT

Wärtsilä has been awarded a contract to build a combined cycle power plant in Mexico that will use natural gas from the USA and provide electricity for Guatemala.

The firm will supply a 139 MW Flexicycle power plant based on seven Wärtsilä 50SG gas engines for Energia del Caribe S. A. It will be built near Monterrey, Mexico and will enter operation in 2016.

Siemens signs wind service agreements

Siemens has signed two long-term wind service and maintenance agreements covering 132 SWT-2.3 turbines at two wind projects in Washington State, USA.

Under terms of the agreements with Summit Power Group, Siemens will provide an additional 15 years of service and maintenance for 43 turbines operating at the Harvest wind project and for 89 units at the neighbouring White Creek wind project. Both are located near Roosevelt, Washington.

Siemens has been servicing the turbines at both sites since the start of commercial operation – 2007 for White Creek and 2009 for Harvest.

Mexico orders MAN gensets

Mexican energy firm Aldener ADM S. A. de C. V. has placed an order with MAN Diesel & Turbo for two MAN 18V28/32S generating sets.

MAN Diesel & Turbo signed a contract with Aldener with a scope of supply that includes two 18V28/32S generating sets, control panels and some mechanical modules. The engines will be shipped in the last quarter of 2014 and will help to expand the existing Guerrero Negro power plant.

Asia-Pacific

BHEL wins supercritical EPC

Bharat Heavy Electricals Limited (BHEL) has won a contract from Tamil Nadu Generation and Distribution Corporation (Tangedco) for the construction of a 1320 MW supercritical thermal power plant.

The 2 x 660 MW coal-fired facility will be built at Ennore SEZ in Tamil Nadu, India by BHEL under an engineering, procurement and construction (EPC) contract. It will be built on a reclaimed ash pond.

Samsung C&T signs Vietnam deal

Samsung C&T Corp. has signed a memorandum of understanding (MOU) to build a 1200 MW thermal power plant in Vietnam.

The Vung Ang 3 coal-fired plant in north central Vietnam is expected to cost $2.4 billion to build, with work on the plant expected to start in earnest in late 2017 after feasibility studies and project financing-related matters are settled, Samsung C&T said.

The plant will be developed on a build-operate-transfer basis and will be operational by mid-2022.

Marubeni sets sights on Myanmar

Marubeni has signed a memorandum of understanding (MOU) with the Ministry of Electric Power of the Republic of the Union of Myanmar (MOEP) to develop a 1800 MW-2000 MW coal-fired power plant.

Marubeni will conduct a feasibility study of the proposed power plant, which would be based on ultra-supercritical technology and built in the Tanintharyi region in the southern part of Myanmar. The project would also include the construction of transmission lines from the power plant to Bang Saphan district in central Thailand.

Marubeni will carry out the feasibility study with Thailand's EGAT International and two local companies from Myanmar and Thailand.

Europe

Nordex celebrates double order

Nordex has received two orders from new customer, Fronteris Group, for the supply of turbines for two wind farms in southern Germany.

Nordex will provide the projects with its N117/2400 wind turbine, which are expected to achieve an above-average capacity factor of up to 34 per cent. Both projects include 15-year service agreements and are due to be completed at the end of 2015.

Alstom, Vattenfall sign Moorburg service deal

Alstom and Vattenfall have signed a service frame agreement for the Moorburg power plant in Germany.

Under the 12-year contract Alstom will provide scheduled maintenance measures as well as short notice emergency maintenance works on the steam turbines, generators as well as the turbine control and measurement technology.

The 1650 MWe hard coal fired power plant is due to start operating at the end of 2014 and will produce both power and heat for the city of Hamburg.

VINCI places WTE order

Yokogawa France has won an order from VINCI Environment UK to supply control and safety instrumented systems for a waste-to-energy facility that is being built for SITA Cornwall Ltd. in the UK.

The Cornwall Energy Recovery Centre is scheduled to start operating in 2016 and will be able to handle 240 000 tons of residual waste per year as well as generate 16 MW of electricity.

For the control of the boilers and all auxiliary facilities at this plant, Yokogawa will supply the Centum VP integrated production control system and the ProSafe-RS safety instrumented system. In addition to being responsible for the engineering of the facility's automation systems, Yokogawa France will support both the installation and commissioning of these systems.

ABB to upgrade Kontek HVDC

ABB has won an order worth around $16 million from Energienet.dk and 50 Hertz to upgrade the 600 MW Kontek high voltage direct current (HVDC) transmission link between Germany and Denmark.

The project scope includes installation of ABB's state-of-the-art MACH control and protection system, remote operator work stations, training and spare parts. The link was originally delivered by ABB in 1995 and the modernisation will help enhance the operational reliability of the link and reduce maintenance needs.

The upgraded link is scheduled to go into full operation in 2016.

International

GE technology helps Iraq

GE has signed a contract with ENKA to supply power generation equipment for a new 750 MW combined cycle power plant being developed by Qaiwan Group in Iraq.

GE will provide four 9E gas turbines and one steam turbine to the project in Sulaimaniyah, which will support Iraq's goal of strengthening the electricity infrastructure in the Kurdistan region.

"The Bazyan power plant is expected to address the growing demand for power in the Kurdistan region," said Saad Hassan, CEO of Qaiwan Company. "Our objective is to enhance its operations through a combined cycle plant with reliable and advanced technologies that contribute to greater efficiency in the long run."

Gamesa to supply 18 MW in Turkey

Gamesa has signed an agreement with Ayres Elektrik Üretim A.Ş. for the supply of 18 MW of wind turbines for the Ovares project in Izmir province, western Turkey.

The scope of the agreement encompasses the supply, assembly oversight and commissioning of nine G97-2.0 MW turbines. In addition, Gamesa will operate and maintain the facility for two years.

The wind turbines are scheduled for delivery early next year, while the facility is expected to be commissioned during the second quarter of 2015.

This contract win marks a milestone in Gamesa's strategy of reinforcing its local footprint, as the turbine towers will be manufactured by a Turkish supplier. Gamesa has installed 94 MW of turbines in Turkey since starting up operations in this market in 2010.

Medupi progresses

Alstom has reported that its work on the Medupi power station in South Africa has taken a major step forward with the successful completion of a site integration test (SIT).

The SIT validates and verifies the distributed control system (DCS) installed by Alstom, certifying that it is ready for first fire and synchronisation.

The 6 x 800 MW coal fired power plant near Lephalale in Limpopo province has a target synchronisation date of December 2014.

Nareva selects GE wind turbines

GE is to supply 56 of its 1.7-100 wind turbines for its first wind farm in North Africa.

The 100 MW wind farm will be located near Akhfennir in southern Morocco and is being developed by Energie Eolienne du Maroc (EEM), a subsidiary of Nareva Holding.

The wind turbines will help Morocco meet its renewable energy goals and complements the government of Morocco's Integrated Wind Energy Project, which aims to add 2000 MW of wind energy by 2020.

Akhfennir is one of the wind farms in the first phase of the Moroccan Integrated Wind Energy Project in which five sites have been identified for development.

DEWA awards substation contract

Dubai Electricity and Water Authority (DEWA) has awarded the contract to build a new 400 kV substation to support the Mohammed bin Rashid Al Maktoum Solar Park in Seih Al Dahal to an unnamed bidder.

The AED250million ($68 million) project will link the 100 MW first expansion phase of the solar park to DEWA's grid by the second quarter of 2017.

Siemens, ABB, Alstom, Mitsubishi Corp. and Gulf Jyoti Intl had all expressed a firm interest in the contract, according to DEWA.

Namibia picks Shanghai Electric

Shanghai Electric has been selected by Namibia as the preferred bidder to build a $1.2 billion gas fired power plant, according to NamPower.

The plant is expected to have a capacity of 1050 MW and will supply electricity to both Namibia and South Africa. It will be fuelled by natural gas from the Kudu field, which lies about 170 km offshore.

The project is a key part of plans to increase Namibia's electricity generation supplies. Installed capacity currently stands at 507 MW while demand is about 534 MW. Electricity demand is expected to rise to 800 MW by 2018.

Ghana picks Sumitomo

Sumitomo Corp. will build a 340 MW combined cycle power plant in Ghana to help the country meet an increasing demand for electricity.

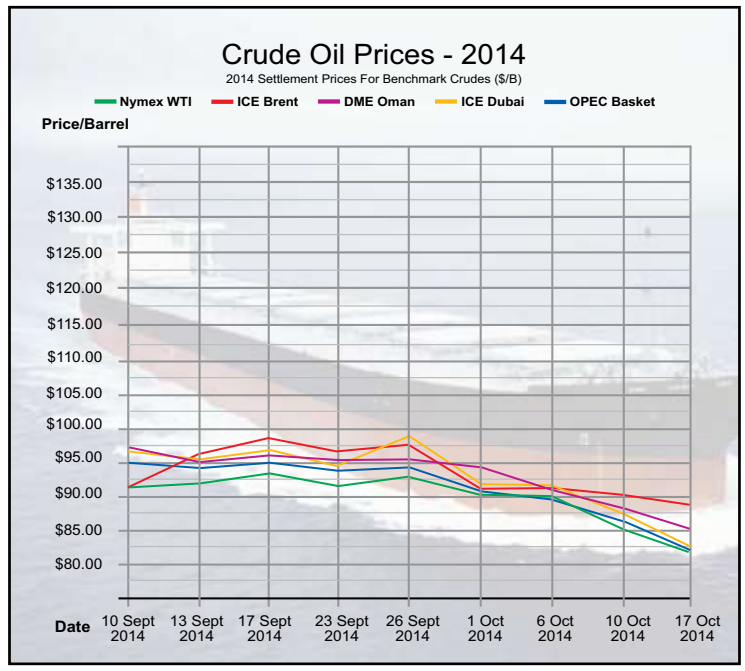
The $828 million facility will be built in Kpone, 25 km from Accra. Construction is scheduled to start in late 2014 and commercial operation is set for mid-2017.

Electricity demand in Ghana is growing at around seven per cent per year. The country relies on hydropower plants for half of its electricity needs but the output of these is restricted during the dry season.

Oil

Opec faces tough decision as crude prices slide

- Debate expected over price and production
- Impacts from lower prices will be complex



David Gregory

Later this month the members of Opec will gather in Vienna to assess the oil market and consider what, if any, action it might take. For some time now, the group's 13 members have been content to let target production ride at 30 million bpd, but now with crude prices slipping well below $100/b, a satisfactory price for Opec's main producer Saudi Arabia, a debate over price and production is expected to take place.

But what may matter most to Saudi Arabia is market share. Last month Saudi Aramco cut its prices to Asia to ensure that its crude remained competitive in a market where demand is also beginning to slide. Iran followed Aramco's move with cuts of its own, prompting market commentators to ask whether this might spark a price war inside Opec as growth in global demand declines.

So far, Saudi Arabia has expressed no open concern about the decline in oil prices, giving rise to conspiracy theories that by maintaining production, Riyadh is colluding with the US – where oil and gas production continues to surge – to do damage to the economies of Russia and Iran, both of which are facing international sanctions due to political circumstances and both of whose economies depend on high crude prices.

Undoubtedly, countries whose economies depend on high crude prices are going to feel the pinch. In mid-October, Venezuela called for an extraordinary meeting of Opec to address the price issue. Libya's Opec delegate said late last month that production needs to be cut by 500 000 b/d. The market is oversupplied by 1 million b/d, he said.

According to figures published in the *Wall Street Journal*, Venezuela's government budget requires a Brent crude price of $121/b. Iran requires $140/b. The Arab Gulf states can get by on $65-75/b, according to the newspaper, with Saudi Arabia needing $93/b. And if need be, considering Riyadh's mega-billions in assets, the country could probably survive at a price similar to that required by its Arab neighbours.

Brent crude settled at $84.71/b on October 22, compared to $115/b in June. The US WTI closed at $80.52/b and the Opec basket was put at $81.94/b.

The cut-off point has yet to be determined. At what price would Saudi Arabia actually move to reduce production and steady the price? And what would it expect from its Opec partners in return? If Riyadh is guarding market share, it will not be willing to slash its own output at the risk of other Opec members cheating on any new quota.

While lower crude prices may be poised to run havoc in the economies of Opec members, lower prices are expected to provide some comfort to oil consumers, which have for years suffered from high prices. Lower prices could actually work to boost the lagging global economic recovery that just might consequently increase demand for oil.

European economies are seen as benefitting from lower crude prices and so too the US, where shale oil and gas have already made a big impact. US shale oil is seen as the prime element in global oversupply, and there has been some speculation that lower prices will eventually come back to US shale producers, forcing them to reduce their activity and cut production.

"The impacts from lower prices will be complex and varied," Bill Kroger, an analyst with Houston-based Baker Botts, told *TEI Times*.

"The major oil and gas operators working in the shale plays are making long term investments to develop hydrocarbons over 10, 20 or more years. They expect prices to fluctuate over the long run, and short-term variations probably will not disrupt their plans. If anything, these operators may find opportunities to pick up additional strategic shale play assets at more reasonable prices from more leveraged, shorter-term operators," he said.

According to Kroger, there is not enough appreciation for US shale play resiliency, a quality that he attributes to a decade of learning and investment by operators.

"The shale plays produce different types of hydrocarbons – crude, gas, NGLs, or a mix of all," Kroger said. "They have different cost structures; deliver their products to different markets; and use different modes of transportation. The methods and techniques for fracking wells in the different plays can be different, so can the design and engineering of the horizontal wells. So, activity in these plays will be different depending on how prices, and costs, move."

And he agrees that lower energy prices can be good for the US economy and could stimulate consumer demand.

"An increase in economic activity can be good for all industries, including the energy industry. Increased output, for example, can be good for power prices, and one of the major inputs for the power industry is natural gas," he said.

"It's silly at this point to be alarmist or negative on what this all means for the energy industry. There are a lot of exciting technologies and activities taking place in energy, and the years ahead should be good ones," Kroger said.

Gas

Algeria has shale gas hopes

Algeria is putting an optimistic face on its future gas production, which has seen a decline over the last year but questions remain as to whether it will be able to meet the targets it is setting for itself.

Mark Goetz

Last month Algerian energy minister Youcef Yousfi said that gas production had risen for the first time since Islamic militants attacked the In Amenas gas facility in January 2013 and he predicted that the country's gas output would increase by 40 per cent within five years.

"Algeria may start producing shale gas in 2022, if the drawn-up plan could be executed under the right conditions," Yousfi was quoted in the media as saying. "By 2025, we could also achieve a production level of about 10 billion cubic metres of shale gas," he said.

Algeria's efforts to boost research and development of new gas resources – especially unconventional – are being undertaken by state-owned hydrocarbon company Sonatrach and in partnerships brought about with changes in the country's hydrocarbon law, Yousfi said.

Several unsuccessful licensing rounds in recent years prompted the Algerian government to amend its hydrocarbon law and give attention to development of its shale gas resources. For some foreign investors, the changes were not enough to draw the large participation that it had hoped for when it offered 31 blocks in its latest licensing round earlier this year.

According to the US Energy Information Administration (EIA), Algeria possesses the third largest shale gas reserves in the world, and Algerian specialists have reported that their research shows the country has five basins as potential shale reservoirs that are highly prospective. Based on that research, Algeria estimates that it has unconventional gas reserves amounting to 4940 trillion cubic feet, or some 140 trillion m^3.

The problem, however, will be developing the resource. To do so, it is expected that Algeria will need help from experienced foreign operators, who so far have shown little interest in working in Algeria under the current legal conditions. Security also continues to be a concern even though work has resumed at In Amenas.

Algeria is a main supplier of natural gas to Europe, which is looking to reduce its energy dependence on Russian gas. Algeria operates three gas pipelines to Europe – the Maghreb-Europe pipeline, the Trans-Mediterranean, and the Medgaz pipeline – it also ships large amounts of LNG to European customers.

The country's proven natural gas (conventional) reserves are put at 4.5 trillion m^3 and during 2013 production amounted to 78.6 bcm, down by 3.3 per cent from 81.5 bcm in 2012 and compared to 82.7 bcm in 2011. In 2008, Algeria produced 85.8 bcm, according to BP statistics.

Clearly if Algeria is to maintain its position as an important gas supplier, it must get busy at developing its gas resources, but whether it can launch a shale gas industry and boost production by 10 bcm within 10 years may require some adjustments.

Analysts and companies say Algeria needs to open up the industry more to foreign investment and make changes in the hydrocarbon law that will set the wheels in motion. But the country's political establishment is well entrenched and analysts are skeptical about its ability to introduce changes that could in turn challenge the system.

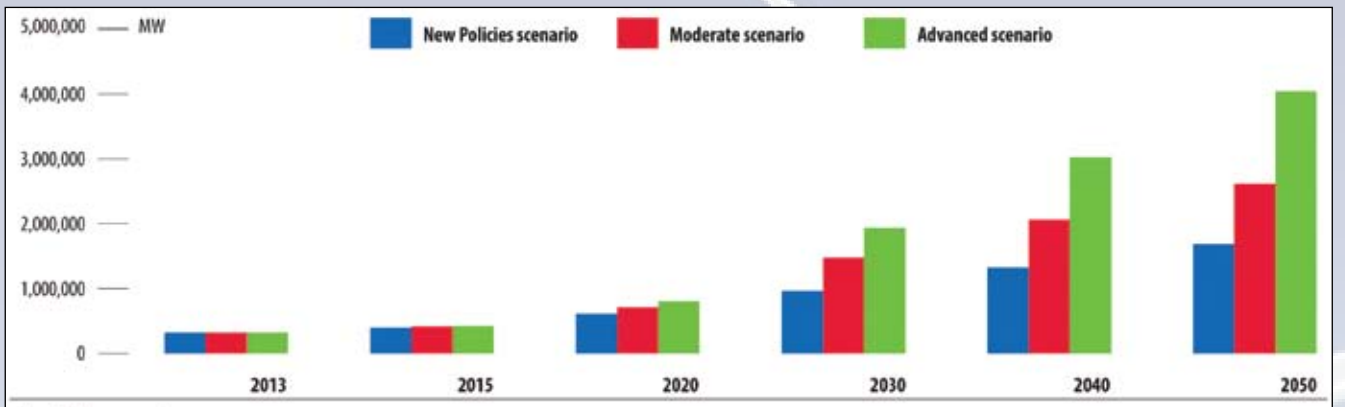
The Algerian government is hoping to avoid the political unrest seen in other Arab states with a new investment plan for the hydrocarbon industry, which is responsible for more than 90 per cent of the country's revenues.

"We are working on broadening our mineral reserve base with intensive exploration in all regions of the country," Minister Yousfi stated last month.

According to a report released by the Algerian Press Service in July, work is under way to boost output at a number of producing fields, including Tinhert, Hassi Bahamou and Hassi Mena. New projects include the delayed Reggane project, Twat and Timimoun.

Meanwhile, Sonatrach plans to invest $3.48 billion in the construction of gas pipelines that will expand the country's capacity to transport gas from remote fields to markets. The work is part of the 2015-19 development plan and concentrates on pipelines running from gas deposits in the Berkine, Illizi, Reggane and Timimoun basins.

Global cumulative wind power capacity



	2013	2015	2020	2030	2040	2050
New Policies scenario						
MW	318,128	396,311	610,979	964,465	1,324,814	1,684,074
TWh/a	620	972	1,499	2,535	3,482	4,426
Moderate scenario						
MW	318,128	413,039	712,081	1,479,767	2,089,261	2,672,231
TWh/a	620	1,013	1,747	3,889	5,491	7,023
Advanced scenario						
MW	318,128	420,363	800,615	1,933,989	3,024,473	4,042,475
TWh/a	620	1,031	1,964	5,083	7,948	10,624

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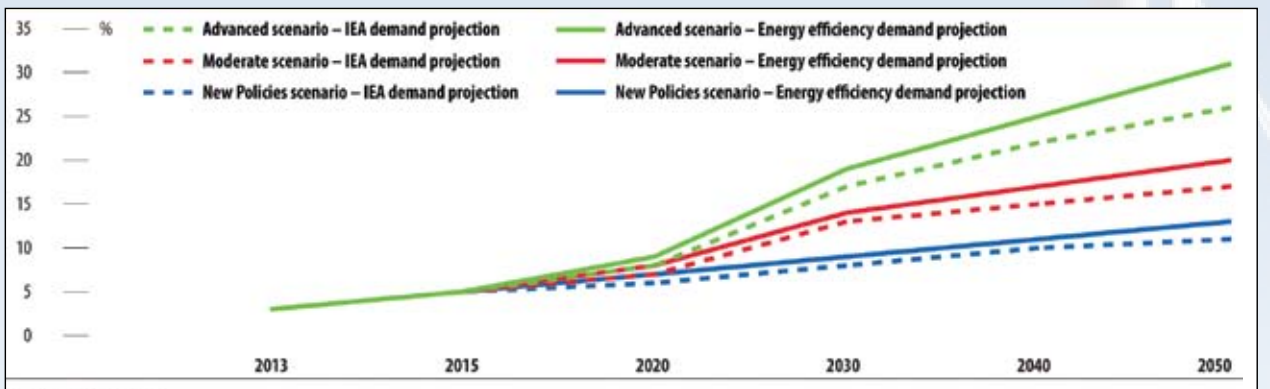
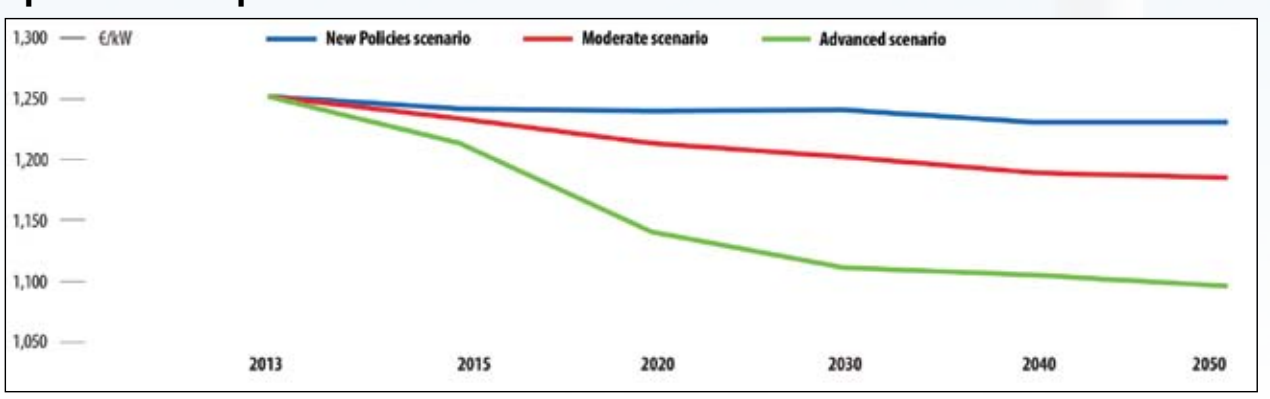
Wind power share of global electricity demand



	2013	2015	2020	2030	2040	2050
New Policies scenario						
IEA demand projection	3%	5%	6%	8%	10%	11%
Energy Efficiency demand projection	3%	5%	7%	9%	11%	13%
Moderate scenario						
IEA demand projection	3%	5%	7%	13%	15%	17%
Energy Efficiency demand projection	3%	5%	8%	15%	17%	20%
Advanced scenario						
IEA demand projection	3%	5%	8%	17%	22%	26%
Energy Efficiency demand projection	3%	5%	9%	19%	25%	31%

Specific costs per kilowatt installed



Source: Global Wind Energy Outlook 2014

Getting smart about distributed generation

According to a recent report by the Global Smart Grid Federation, Smart grid programmes can mitigate the challenges countries face when integrating distributed generation and renewable energy sources. ***TEI Times*** **reports.**

Electricity markets have experienced substantial changes during the last decade. Nations continue to demonstrate a growing interest in developing renewables and distributed generation (DG) from conventional energy sources such as gas and diesel engines. As a result, the sector is experiencing a paradigm shift towards a more dynamic and distributed electricity network.

From a technological perspective, maintaining power quality, managing voltage and frequency levels, increasing consumption, standardisation and interoperability issues are major challenges related to distributed generation. Many countries are addressing these problems by funding smart grid R&D projects and by exploring the potential of active demand and distributed storage in mitigating the cost related to grid expansion and replacement.

In order to gain a clear view of the challenges facing different network geographies and the solutions being put forward, the Global Smart Grid Federation (GSGF) carried out a survey across its member countries. The final report is largely based on the information provided by Denmark, Ireland, Japan, Canada, Korea, Australia and the USA.

In all cases, the introduction of DG changes the characteristics of a power system. A number of technical constraints and factors arise which are impacted by the amount of DG connected. Key areas are equipment ratings, system short circuit considerations, voltage and frequency changes, power quality, protection systems, losses and system reliability and safety.

While network operators are addressing the issues in different ways, the importance of a grid that can eventually be more flexible to allow more participants is widely acknowledged.

Denmark is the European leader in the development of smart grids. Twenty two per cent of all demonstration and development projects relating to intelligent power grids in the EU take place in Denmark. This perhaps comes as no surprise. The Danish government has set a target to meet its entire energy needs for 2050 using renewable energy. At present DG is mostly represented by wind energy and industry cogeneration (with a small share of hydro).

For Energinet.dk, the country's Transmission System Operator (TSO), the main challenges include balancing consumption and production and maintaining voltage stability to ensure the stability of the power system. For the Distribution System Operators (DSOs), the main challenges consist of handling increased loads in the distribution grid due to higher electricity consumption and increased local production capacity, while at the same time maintaining high-quality delivery to consumers.

Denmark has put a smart grid concept in place to address the issues. The concept is based on the mobilisation of currently unused and potentially cheaper resources, i.e. flexible electricity consumption and production. Mobilisation involves using the properties of electricity consuming and electricity producing resources to control active power output, as well as activating their potential voltage control properties. The concept also creates a framework that will allow all the players involved to create additional value by activating what is today an unused resource (i.e. the flexibility of the electricity consumption and production of smaller customers).

> In all cases, the introduction of DG changes the characteristics of a power system

Like Denmark, Ireland is also moving towards a high dependence on wind. Ireland's transmission and distribution system is a small synchronous system in comparison to continental Europe, with limited connectivity to the Great Britain network through two HVDC links.

The immediate issues it faces as it moves towards meeting its 2020 renewables target are frequency response, voltage control/regulation and the inertia monitoring capability associated with high levels of renewable generation. Additionally, protection coordination is becoming more challenging. With increasing short circuit levels with the increase of DG on the local grid, maintaining power quality in islanding situations is also a concern.

In order to address these issues, Ireland's TSOs, EirGrid and SONI, have established the (DS3) programme. Both DSOs and TSOs on the island are currently focused on a major smart grid project titled the North Atlantic Green Zone (NAGZ).

The significance of the project is underlined by the fact that it was one of only two smart grid projects to achieve Project of Common Interest (PCI) status under the terms of the European Union Connecting Europe Fund. This marks it out as a test concept with direct applicability across the EU member states.

The project is located in the North West of Ireland where there is an abundant wind resource, with the next landfall to the west being the USA. The distribution grid is weak in the geographical catchment area simply because the main centre of population is on the Eastern seaboard. The focus of the project is to reduce customer outage minutes in a given year, reduce the impact of curtailment by implementing smart changes in the zoned area of the electrical gird and to implement other energy services to allow more power to flow out of the area.

One of the main goals of the operators is to move beyond pilot or trial stage and implement proven technologies into the live system. Once implemented, the solutions that will evolve in the NAGZ have the potential to be implemented across the Irish system to push Ireland into a fully implemented smart grid system.

Meanwhile, across the Atlantic Canada is also rapidly advancing its smart grid programme. While it is important to weigh the costs and benefits of DG within a sustainable energy framework as a whole, Canadian utilities are more specifically concerned with the technical feasibility of integrating large amounts of intermittent power into the existing grid infrastructure. Without storage, which is an expensive addition to any distributed generation project, the power output from DG installations is typically highly variable, both hourly and seasonally.

Changes in protection schemes, voltage stability, standardisation of interconnectivity and access to real-time data from DG to facilitate better decision-making or automation on the grid are some of the principal concerns. Furthermore, many parts of Canada's electricity system are ageing, which means it needs to invest significantly in refurbished or new electricity infrastructure by 2030.

A smart grid is very much the solution and aim of Canadian utilities to achieve the desired customer priorities and interoperability with legacy infrastructure. It will also be appropriate for use with respect to geographical location and other needs such as demand response, facilitation of distributed generation, facilitation of electric vehicles, optimisation of asset use, and problem detection and mitigation.

Many of Canada's power utilities have smart grid strategies in progress to address the issues in their systems. Hydro One in Ontario is one of the first jurisdictions in North America to equip every home and small business with a smart meter. It also continues its Advanced Distribution System trial, modernising its distribution system and realising its vision of a smarter grid.

Notably, New Brunswick Power (NB Power) has entered into a multi-year agreement with smart grid multi-national solutions provider, Siemens, to integrate smart grid technology into the province's electrical system and to create a Centre of Competence, with an estimated staff of 40, based in Fredericton, New Brunswick.

As part of the initiative, the two companies will work together to accelerate the benefits of NB Power's Reduce and Shift Demand strategy. The new technology will help NB Power to understand customer usage in real-time and collaborate with customers to reshape electricity demand on the electricity system.

Toronto Hydro, meanwhile, has a programme where it captures and processes interval data for transformer smart meters, bi-directional meters used for solar panel electricity generation (energy used and energy generated) and electric vehicle charging stations. It is currently rolling out a community energy storage project focused on: improving power quality, energy flow and reliability; reducing peak demand and offering temporary relief in neighbourhoods at risk; removing the need for diesel generators; facilitating the integration of renewable technologies like solar panels and electric vehicles; helping to keep voltage levels constant for commercial and industrial customers; and actively monitoring grid conditions and responding dynamically.

In the US the growth in DG has led to technical and integration challenges for utilities. The variability of DG output is causing voltage challenges on distribution systems, while poor forecasting capabilities makes renewables output hard to predict. In a distribution grid that already experiences the most service disruptions, the US appears to be underinvesting in its distribution grids.

Despite the number of smart grid projects in the distribution grids across the country, the investment gap between now and 2020 is estimated by the American Society of Civil Engineers (ASCE) to be $57.4 billion. Accordingly, a regulatory investigation into grid modernisation, as well as an analysis of the barriers to implementing smart grids is under way.

Indeed on a global scale the implementation of smart grids, in line with the growth in DG and renewables, is dependent on favourable policy and political will. It will be essential as the world continues its inexorable shift to a cleaner, more efficient and flexible electricity system

A smart grid ensures that renewable energy sources can be better integrated into the grid thanks to a two-way flow of energy (orange line) and a bidirectional flow of communication data (blue green line). Whereas the generation of power in conventional power supply networks depends on consumption levels, a smart grid also is able to control consumption – depending on the availability of electrical power in the grid
(Image courtesy of Siemens AG)

Renewable attractions

There have been some interesting movements in the latest Renewable Energy Country Attractiveness Index published by EY. China has regained the top spot from the US while Europe has experienced mixed fortunes. *TEI Times* extracts some key highlights from the report.

New clean energy investment appears to be gathering momentum again. Industry estimates of $63.6 billion in Q2 2014 represent the strongest quarterly performance in two years, increasing the likelihood that full-year figures will show a rebound in global investment.

Most sectors and geographies experienced an uplift in Q2, indicating that opportunities in the renewables sector are global and not just limited to a select number of mature markets.

The latest Renewable Energy Country Attractiveness Index (RECAI) published by EY (Ernst & Young) highlighted what is becoming a consistent theme. It revealed that the likes of Brazil, Chile, South Africa and Kenya moved up the index as policy support remains focused and the deployment outlook strengthens.

There were some significant changes, however.

Aggressive targets, sustained levels of support and efforts to open up the market to foreign investors has seen China reclaim the top spot in the index for the first time since May 2013, after several months of edging closer to the US.

There has been a significant transformation in the last year as China's new government set about opening up the market to foreign investors. Earlier this year, the National Development and Reform Commission (NDRC) detailed 80 infrastructure projects that will be open to private investment, more than half of which are energy-related with some 35 in renewable generation.

The government has also set aggressive technology targets for 2017, demonstrating its commitment to continued high levels of capacity deployment, largely driven by its pollution-reduction programme but also reflecting the sector's strategic economic value.

A renewed focus on offshore wind also opens up a new market for private sector participation, particularly given the current lack of construction experience and undeveloped supply chain in the country.

Similarly, increased support for distributed solar projects and a reported 8 GW target for 2014 alone, could replicate the phenomenal growth already seen in China's utility-scale solar sector. Having dominated the onshore wind and utility-scale solar PV sectors, China is now setting its sights on other sectors, such as offshore wind, tidal and distributed solar. Looking ahead, notably the country is planning a $40 billion project to develop 15 GW of tidal power.

While a fall to second place for the US should not undermine the significant deployment and investment opportunities the market still has to offer, the RECAI shows that it does reflect the increasingly crippling effect that congressional gridlock and drawn-out approvals are having on its ability to provide investors with the necessary long-term certainty.

Recent months have seen at least three instances of partisan politics keeping the sector in limbo, impacting both specific initiatives and investor confidence more broadly; firstly the failure to renew the PTC for wind and other technologies in the Senate; secondly, blockage of the proposed $150 million loan guarantee for the flagship Cape Wind offshore wind project; and thirdly a Republican funding bill designed to topple the Clean Power Program targeting 30 per cent carbon emission reductions by 2030.

Germany and Japan retained their third and fourth places, respectively. The report said, however, both markets should be watched closely over the coming months as the latest amendments to Germany's Renewable Energy Sources Act (EEG) take effect and the nuclear debate is re-opened in Japan.

A notable re-shuffling in the top 10 saw India move up one spot to sixth place, as the UK slid to seventh. India's new government looks set to galvanize public and private investment in the sector as it sets out to develop its long-term energy strategy.

India's jump up to sixth place reflects the development of a more strategic and long-term vision for the country's renewable energy sector by the new government, with ambitions increasingly measured in billions of dollars and gigawatts of capacity. The recent launch of a major grid upgrade programme and the reinstatement of tax incentives for wind projects are also expected to have a tangible near-term impact on investment and deployment activity.

Meanwhile, mixed signals, dwindling budgets and political apathy contributed to the UK's slide down the rankings. With proposals to cut subsidies for large-scale solar earlier than planned now attracting legal challenge, and a dwindling budget for future projects under the new CfD FIT regime already resulting in the cancelation of offshore projects.

Indeed Europe has experienced mixed fortunes.

After sitting dormant just outside the top 10 for the past year as investors tried to weigh up what the future held for its renewable markets, Italy has slipped down to 15th place. Retroactive solar PV subsidy changes have been announced, prompting investor exodus, the threat of legal challenge and the onset of some inevitable restructuring.

> A notable re-shuffling in the top 10 saw India move up one spot to sixth place, as the UK slid to seventh

The formalisation of the "reasonable profitability" criteria replacing Spain's long-standing subsidy regime represents yet another setback for this troubled market, taking it down to 22nd place.

This still higher-than-expected ranking for a market many investors now consider unbankable partly reflects an improving economic picture and high asset base. Further, it will be interesting to see whether distressed deals, sub-sidy-free renewables or greater European energy market interconnection can rekindle interest in Spain in the years ahead.

The Netherlands jumped up to 13th position having secured one of the biggest project finance deals of the year to date following financial close of the 600 MW Project Gemini offshore wind project, worth €2.8 billion ($3.7 billion). The $430 million financing of Westmeerwind's 144 MW onshore project also reinforces the market's ongoing attractiveness for large-scale wind projects.

Outside of Europe, the successful repeal of Australia's carbon pricing legislation in June and ongoing uncertainty over the future of the country's Renewable Energy Target has prompted another slip down the rankings for Australia to 10th place.

The road ahead remains uncertain as investors make clear that planned investment will stall in the absence of clear signs that renewables will receive some form of government support. The final decision has not yet been made, but a further winding back of support mechanisms seems likely. In the meantime many projects are stalled pending the outcome of the review.

Australia's loss is Brazil's gain. The Latin American country jumped up to ninth place, spurred by sustained high levels of interest in the country's latest energy auctions and an increasingly strategic approach to developing its burgeoning solar sector.

Also in South America, Chile continues its climb up the index, as it continues to attract mega-scale solar and wind projects that indicate a robust outlook for increased generating capacity. Combined with neighboring movements, Chile therefore replaces Italy in 12th place.

Elsewhere, the opening of Round 4 of South Africa's renewable energy procurement programme sees a further 1.105 GW of capacity up for grabs. The robust project pipeline supported by this structured auction process, and an increasing energy imperative reinforced by rolling blackouts for the second time this year, has lifted South Africa to 16th place.

Financial close on the $684 million required for the 121MW Ashalim solar thermal plant in Israel, and the receipt of technical bids for five wind projects totaling 850 MW in Morocco have helped take these markets up to 27th and 28th place, respectively.

The removal of import duties on solar PV equipment in Kenya, although sparking outrage from domestic manufacturers, is likely to improve deployment prospects by pushing down project costs and offering developers greater flexibility. Coupled with a new 560 MW geothermal tender, Kenya rose to 36th place in the rankings.

EY's RECAI surmises that the significant movement in its September 2014 index reinforces the fact that attractive renewable energy prospects are no longer the remit of only a few mature markets but are truly global.

EY's Renewable Energy Country Attractiveness Index (RECAI) is published quarterly.

RECAI scores and rankings at September 2014

Technology-specific indices rankings

Rank	Previous ranking	Country	Score	Onshore wind	Offshore wind	Solar PV	Solar CSP	Biomass	Geothermal	Hydro	Marine
1	(2)	China	75.1	1	2	1	4	1	12	1	19
2	(1)	US	73.8	2	3	2	1	3	1	3	9
3	(3)	Germany	67.0	3	4	5	26	8	9	10	27
4	(4)	Japan	64.4	10	9	3	27*	2	3	4	12
5	(5)	Canada	60.3	4	11	7	24	12	19	5	4
6	(7)	India	60.2	8	19	4	3	15	13	7	11
7	(6)	UK	59.2	7	1	11	27*	5	18	26	1
8	(8)	France	58.5	12	8	8	17	10	15	16	5
9	(10)	Brazil	57.0	6	26	14	9	4	32	2	24
10	(9)	Australia	56.7	16	17	6	6	22	11	18	10
11	(11)	South Korea	55.4	21	13	10	25	11	28	17	3
12	(13)	Chile	54.3	25	24	9	2	20	10	14	14

A flexible Temple of power

Texas has started operating its first Flex-Plant. **Junior Isles** visited the plant during its inauguration to take a first-hand look at Temple I – a plant that is breaking new ground in several areas.

Temple 1 is ideally suited to the fast growing Texas market

It is a warm day in Texas – fortunately not as warm as it can get. Yet the conditions are ideal for the new Temple I combined cycle power plant near Austin, Texas, to show its worth.

The new 758 MW plant owned by Panda Power Funds not only has features that allow it to maintain high power output on hot days, it also has the flexibility to provide that power in a way that complements the state's significant wind generating capacity.

Panda Power Funds has grown rapidly – from no plants under construction just four years ago, to three in operation today and another three under construction representing a total of 3950 MW.

It also has two more projects at an advanced stage of development, which will add another 1609 MW during the 2017/18 timeframe. In the last two years alone, the company has financed about $4.0 billion in power projects across the US.

Just two weeks after the start-up of Temple I, Panda Power also fired up what is essentially a sister project in Sherman, Texas. And it will not be long before a third combined cycle plant begins operation. Work on the Temple II project is ongoing and the plant is expected to start commercial operation next summer, to add another 758 MW to the site.

Although it has quickly grown from a zero base, Panda Power has a long history. Its predecessor Panda Energy was formed in 1982 as an independent power producer (IPP).

Bill Pentak, Vice President of Investor Relations and Public Affairs, Panda Power Funds noted: "Back then there were probably around 200 IPPs in the US; today there are only a handful that we really consider to be our competitors. Those that have adapted to the market have survived. Those who didn't, did not. One of the strengths we have as a company is not only understanding the power market but also our ability to adapt."

Being able to adapt to the market in many ways dictated the choice of technology for Temple I. Texas is one of the fastest growing states in the US, with four of the fastest growing cities in the country. With a population that is expanding at more than 1000 people per day, demand growth is projected to outpace growth in supply.

The target reserve margin in the ERCOT transmission system region serving Texas is 13.75 per cent. At a load growth rate of 2-3 per cent, Panda predicts that margins will fall to about 5 per cent by 2023.

"There's a big need for power. With reserve margins declining and coal challenged as a generating fuel, we see a great opportunity to capture a first mover advantage in Texas," Pentak said. "The system-wide offer caps will be going to $9000/MWh in 2015. So it's all about growth."

With ERCOT essentially being an island, unable to import power, Pentak believes that its high efficiency CCGT units are the "perfect solution". Not only will they be high up the dispatch merit order, they will also be able to dispatch power at short notice and ramp up and down. Next year the plant is expected to operate at a 56-57 per cent capacity factor.

Temple I uses Siemens' Flex-Plant technology; it is the first time the technology is being deployed in Texas and only the third time in the US.

The gas turbines are the first in the US with 'Shaping Power' to enable higher power output on hot days

Siemens provided the thermodynamic cycle design and power Island engineering, delivered the main plant equipment and also has a long-term service agreement for the main generation components. Bechtel was responsible for the balance-of-plant engineering, overall plant construction, procurement, and led the commissioning of the facility.

The power island includes two SGT6-5000F gas turbines, one SST6-5000 steam turbine, two SGen6-1000A generators, one SGen6-2000H generator and an SPPA-T3000 instrumentation and control system. Siemens also supplied two Benson duct-fired heat recovery steam generators (HRSGs) manufactured by NEM USA Corp.

The Flex-Plant 30 is capable of being synchronised to the grid in 10 minutes, making it suitable for complementing Texas' considerable wind power generation. Baseload is reached in less than 60 minutes.

Notably, it can achieve 60 per cent of its 758 MW baseload power output in less than 25 minutes, while still maintaining air compliance standards i.e. carbon monoxide (CO) emissions less than 10 ppm and nitrogen oxide (NOx) emissions less than 2 ppm. Further, the fast start capability results in 84 per cent less CO per start and 89 per cent NOx compared with a conventional SCC6-5000F combined cycle plant.

Another noteworthy feature of this project is that the gas turbines are the first in the US to be equipped with what Siemens calls Shaping Power, a feature that enables higher power output on very hot days.

"This will be highly beneficial in a state like Texas, which has extremely hot summers," said Pentak. "A few years ago we had triple-digit weather for more than 40 days."

Jacki Engel, Product Line Manager, Siemens Energy Solutions Americas noted: "You start to see the benefits of Shaping Power above 70°F."

Gas turbines suffer significant derating at high ambient temperatures. Siemen's Shaping Power technology allows the gas turbine's inlet guide vanes (IGVs) to be opened on hot days. This increases mass flows through the topping cycle to provide additional exhaust gas flow for the bottoming cycle, resulting in overall higher output.

Each gas turbine has a 13-stage axial flow compressor with can-annular combustors and a 4-stage turbine. The plant has a multi-shaft 2-on-1 configuration, where exhaust gas from the turbines enters the HRSGs to generate steam that is then fed to a single steam turbine.

The HRSGs are an integral part of the Flex-Plant as they allow unrestricted gas turbine ramping and high plant efficiency. The HRSGs are horizontal, three-pressure natural circulation once-through boilers with reheat. Each HRSG is capable of delivering 99.5 kg/s of high pressure steam at 159 bar and 567°C

The Benson technology essentially replaces the thick-walled drum in the HP section of a conventional boiler. Eliminating thick-walled components enables the boiler to warm faster, allowing it to receive energy faster from the gas turbine.

Commenting on the plant's flexibility, Engel said: "Those are the major components but it's all about the [overall] integration. Keeping the end [goal] in mind, other key things are the two-stage attemperation scheme and the steam turbine warm-up strategy. There's also an auxiliary warm-up boiler that allows the high metal temperatures to be maintained over a long period of shutdown so the plant can be started very quickly. This is all brought together and controlled by a T3000 control system."

In addition to its efficiency and flexibility, the Temple project has broken new ground in other ways. For Panda Power, it was its first combined cycle power plant as a private equity fund but more significantly, it was seen as a breakthrough in project financing for the power sector.

Financing was secured during a challenging time. "It was a big challenge across the US and in Texas," said Pentak.

"It was the first time in six years that a capital-intensive construction project had been financed with a term loan.

This was done in 2012 when we were still coming out of the great recession. It was a tremendous challenge to figure out how to get these power projects financed."

Unlike most IPP projects, Temple I was financed without a long-term power purchase agreement (PPA).

"Instead," said Pentak, "We placed a revenue-put, or floor, on the project that guaranteed a certain amount of revenue that ensured we could make debt payments, cover operation and maintenance and had enough to ride the market above that. This provided a level of insurance for investors.

When we took that to Wall Street, they became comfortable in financing the project."

Obtaining financing without a PPA is a noteworthy achievement and Pentak believes this is the way forward. "We believe the era of long term PPAs is mostly done," he said, adding that other projects in the company's fleet were financed in the same way.

"We don't think we will have any problems selling the power. There's a tremendous need and we have people that are talking to us now."

Certainly the demand is there – both in terms of capacity and the flexibility required to help balance wind generation. With Temple I and Sherman now in operation and several other projects either under construction or at an advanced stage of development, Panda is well placed to meet the market's needs and verify their belief that Flex-Plant technology is the "the perfect solution".

Junior Isles

A golden age of pyrite?

Not so long ago, the International Energy Agency (IEA) predicted that we could be entering a "golden age for gas". While it still stands by its prediction, more or less, in Europe there is nothing golden about gas.

Addressing the global prospects for gas at the FT Gas Summit in London in October, the IEA's Chief Economist, Fatih Birol maintained that Asia will drive global gas demand and noted the strong growth in North America. But there was a warning. He noted that gas is being squeezed by coal in Asia and by renewables in Europe.

"In terms of fuels… natural gas will grow but not as strongly as many of us forecasted. Asia has strong growth in energy but if you want to build a power plant in East Asia that uses LNG, it is 2.1 times more expensive than coal. Many countries therefore go for coal, with all its consequences," he said.

More worryingly, however, he predicted that gas use in Europe would not return to pre-2010 levels for another 18 years.

The problems facing gas fired generation have been well documented – difficult economic conditions have slowed electricity demand; an increase in renewables generation driven by pro-green government policies; low carbon prices combined with cheap coal, which has led to coal being favoured over gas for generation.

A cartoon shown in more than one presentation at the European Turbine Network's (ETN) International Gas Turbine Conference in Brussels best captured the situation. It showed combined cycle gas turbine (CCGT) plants being pushed off a cliff by coal plants, low demand and renewables.

Europe's gas fired generation sector is certainly on a cliff-edge. Utilities have been closing or mothballing gas fired plants in many parts of the region. More startlingly, at the FT conference it was noted that only one heavy-duty gas turbine has been sold in the whole of Europe in the last year.

Similar tales of woe were also the centre of debate at the ETN conference. Power OMV's Senior Vice President, Dieter Krapp, presented a slide that cited figures from IHS Cera. It showed that the utilisation rate of gas fired power plants dropped to just 28 per cent in 2013 – such plants are designed to operate in baseload. In the EU28, gas represented just 16.8 per cent of the generation mix in 2013 compared to 24 per cent in 2008.

> In terms of fuels… natural gas will grow but not as strongly as many of us expected...

Inevitably, this has led to consolidation in the industry. In recent months GE Energy has bought Alstom, while Siemens has purchased parts of Rolls-Royce's power business and last month also acquired Dresser Rand.

As if things were not bad enough, the situation is now being compounded by geopolitics and the fallout from the Russia-Ukraine crisis.

In many ways, Europe has itself to blame if there is a gas supply disruption as a result of the Russia-Ukraine gas stand-off. Indeed more than one speaker at a Chatham House conference in London accused the EU of being "completely complacent" if not negligent. One said: "Since June until now, the EU has only fixed a date for the next meeting."

During a panel debate at the ETN conference, Mechtilde Wörsdörfer, Director for Energy policy, DG Energy, European Commission, denied the accusation. "We have learned from the Ukraine crises of 2006, 2008 and 2009. We have taken steps such as the Security of Supply Directive and the Gas Coordination Group. Also, some of the infrastructure has been improved but probably not enough."

She admitted, however, that a number of issues that are in these regulations such as emergency plans have not been implemented.

"In our 2009 Security of Supply Regulation we stated that every member state should have an emergency plan. But when we checked, seven or eight were missing… Emergency plans haven't been implemented in the case of Bulgaria, Romania and some of the most vulnerable countries," said Wörsdörfer.

So is there any hope for gas and gas fired generation in Europe? For gas turbine manufacturers, one current ray of hope is in the small gas turbine sector. If the market for heavy-duty gas turbines is in trouble, it seems to be the opposite for small machines. The market for small gas turbines, especially for the oil and gas sector, continues to report strong growth.

Looking forward, shale gas could be a big factor in realising a golden age for gas. Although shale gas exports from the US in the near- to medium-term are more likely to find their way to Asia as opposed to Europe, shale gas from the US combined with the possibility of shale gas from China in the longer term could drive down gas prices globally.

Birol said: "One thing that could surprise us, is if we see a major breakthrough in unconventional gas in China, which I would not exclude. This could lead us to a golden age of gas."

In his keynote presentation in Brussels, Rodrigo Pinto Scholtbach, Gas, Coal and Power analyst at the IEA noted: "China is the only country that might be able to replicate US shale gas. In terms of reserves, they have 25 bcm more than the US." While he stressed, that it still has many technical and geological problems in exploiting its extensive reserves, Scholtbach said China could produce 125 bcm of unconventional gas in 2035.

Apart from lower prices through greater availability another light at the end of the tunnel for Europe's gas fired generation sector might be the gap that will be left by the closure of nuclear plants.

"A big chunk of Europe's nuclear power plants will be retired within the next 20 years… this may leave room for manoeuvre for gas [plants] if the price is competitive compared to other forms of generation," said Birol. It is a big if.

As long as carbon prices are low coal will remain further up the merit order, although it is highly unlikely that coal fired plants will continue to challenge gas in the long term. Renewables on the other hand, with their government support, look set to continue to be the favoured option.

Several delegates at the ETN conference expressed dismay at the EU's continued support for renewables over other forms of generation. Bernard Quoix, Head of Rotating Machinery Department, Total E&P said: "Why do we keep shooting ourselves with this green terrorism? Why is there a 27 per cent target for renewables?"

Beatte Raabe, Secretary General of Eurogas said: "A technology neutral approach is where we need to go; then CCGT will not be pushed off the cliff. With all the advantages they have, they need to be given the possibility to play them out.

"With an ETS system that is not overlapped by other policies... things will develop [by] themselves. In the meantime on the power side we may need a capacity remuneration mechanism so that the lights don't go out."

No one can predict the future but the golden outlook for gas seems somewhat tarnished.

Gas was once seen as the gold among fuels. As fossil fuels go, it is clean and with its operational flexibility, gas fired generation is still seen by many as the perfect form of base load capacity for complimenting renewables. Unfortunately in Europe, at least for now, the 'gold' appears to be no more than pyrite.

Charles Dickens wrote in *Nicholas Nickleby*: "Gold conjures up a mist about a man, more destructive of all his old senses and lulling to his feelings than the fumes of charcoal."

In Europe the lure of gas certainly conjured up a mist, and the fumes of charcoal we now smell are those from all the coal that is being burned.