

# THE ENERGY INDUSTRY TIMES

December 2014 • Volume 7 • No 10 • Published monthly • ISSN 1757-7365

www.teitimes.com

## A smart meter tsunami?

Industry and policy are again looking in the same direction.  
Page 13



## Coordinating offshore wind

Better coordination on offshore grids could deliver big savings.  
Page 14



## Final Word

Junior Isles explains why dinosaurs became extinct.  
Page 16



## News In Brief

### Clouds over Hinkley Point C

The future of the Hinkley Point C nuclear plant in Somerset, UK, is under a cloud amid a financial crisis at Areva and uncertainty over securing investment in the project.

Page 2

### EPA clean energy plans pose reliability risk

US President Barack Obama's plans to cut pollution from power plants hit another hurdle last month when the North American Electric Reliability Corporation (NERC) expressed concerns about its potential impact on the grid.

Page 4

### China needs strategy to meet new 2030 carbon limit

China will have to make significant changes to its energy strategy if it is to meet its recently announced goals on greenhouse gas emission limits.

Page 6

### Ineos bets on shale gas revolution

Chemicals giant Ineos says that the use of domestic shale gas resources could transform the economics of its production plants, including Grangemouth in Scotland.

Page 7

### CCS sector pushes for recognition

Political support for and recognition of carbon capture and storage technology is growing as large-scale projects come to fruition ahead of next year's climate talks.

Page 8

### Profits fall among challenged utilities

Europe's utility firms have warned investors to expect continued tough trading conditions amid persistently low consumption and production of energy across the region

Page 9

### Technology: Malaysia goes big on supercritical

Manjung 4 is now the largest supercritical plant in South East Asia. *TEI Times* hears what its start-up means for the industry.

Page 15

## Advertise

advertising@teitimes.com

## Subscribe

subscriptions@teitimes.com  
or call +44 208 523 2573

# Climate change effort gaining traction

Cheikhrouhou: capitalisation of the Green Climate Fund is "foremost an unmistakable sign of trust-building"



Significant pledges to the Green Climate Fund and a joint announcement by China and the US on carbon emissions bode well for a new climate agreement in Paris next year. However, some still question the significance of these developments. **Junior Isles**

Record pledges to the Green Climate Fund and the joint announcement by China and the US on cutting carbon emissions indicate that global warming is still high on the political agenda and lend hope to the possibility of reaching a new global climate change agreement in Paris next year.

The Green Climate Fund concluded its first Pledging Conference in Berlin, Germany, with governments pledging a total of up to \$9.4 billion. The Green Climate Fund was established to act

as a central vehicle for climate finance, under which industrialised countries would assist developing countries with new finance for public and private sector projects and programmes.

Pledges were made by 21 countries, including contributions from four developing countries. Their combined contributions provide for the largest amount the international community has ever mobilised for a dedicated climate finance mechanism within a

timeframe of less than five months.

Hela Cheikhrouhou, Executive Director of the Fund said the result of the capitalisation of the Green Climate Fund is "foremost an unmistakable sign of trust-building".

The initial capitalisation of the Fund is critical to the intergovernmental negotiations on climate change at the UN COP20 summit in Lima on December 9 and at COP21 in Paris next year, where it is hoped that a new global agreement to replace the Kyoto

Protocol will be signed.

There is still a long way to go if a new climate deal is to be signed in Paris. The US and EU had to overcome stiff resistance from Australia and Saudi Arabia at last month's G20 summit in Brisbane to commit the world's biggest economies to back the green climate fund. One EU official described the talks as "trench warfare". Nevertheless, headline announcements saw the US and Japan

Continued on Page 2

## IEA warns carbon budget will be consumed by 2040

Paris-based International Energy Agency (IEA) has highlighted several "signs of stress" in its recently launched World Energy Outlook 2014 (WEO 2014).

The IEA said the energy sector must tackle longer-term pressure points before they reach breaking point and warns against the risk of current events distracting decision makers from recognising and tackling the longer-term signs of stress that are emerging in the energy system.

Speaking at the launch in London, UK, IEA Executive Director Maria van der Hoeven said: "World events have made this year's World Energy Outlook a hotly anticipated one. We see turmoil in parts of the Middle East, tension between Russia and Ukraine... and even a deal between

China and the United States on climate. Also, it is the first time that the WEO extends its outlook to 2040."

A critical "sign of stress" it says, is the failure to transform the energy system quickly enough to stem the rise in energy-related CO<sub>2</sub> emissions (which grow by one-fifth to 2040) and put the world on a path consistent with a long-term global temperature increase of 2°C.

In the central scenario, the entire carbon budget allowed under a 2°C climate trajectory is consumed by 2040, highlighting the need for a comprehensive and ambitious agreement at the COP21 meeting in Paris in 2015.

Fatih Birol, the IEA's Chief Economist said: "In the last 110 years we have already used 50 per cent of the

budget and if there are no major changes in policy, we will completely consume the budget by 2040.

"Low carbon investments need to increase by four times compared to today, and we are far from that. But there is some effort – I believe the joint commitment by the US and China represents a giant leap for mankind."

Birol added: "In order to see a 2°C world, we need more renewables, more efficiency, more nuclear power and more carbon capture and storage, according to the choice of each country."

The IEA outlined the role that nuclear can play in improving energy security in some countries and tackling climate change. In an in-depth focus on nuclear power, WEO 2014 sees

installed capacity grow by 60 per cent to 2040 in the central scenario, with the increase concentrated in just four countries (China, India, Korea and Russia). Despite this, the share of nuclear in the global power mix remains below its historic peak. The IEA also notes that nuclear avoids almost four years' worth of global energy-related CO<sub>2</sub> emissions by 2040.

The report sees a positive outlook for renewables, as they are expected to account for nearly half of the global increase in power generation to 2040, and overtake coal as the leading source of electricity. Wind power accounts for the largest share of growth in renewables, followed by hydro-power and solar technologies.

See page 12 for WEO 2014 data

2 | **Headline News**

Continued from Page 1

pledging \$3 billion and \$1.5 billion, respectively.

In a communiqué issued in Brisbane, the G20 urged nations to come forward with specific pledges to cut emissions by the first quarter of 2015 ahead of Paris.

Hopes of reaching an agreement at COP21 were given further impetus earlier as China and the US agreed at a meeting in Beijing in mid-November to new limits on carbon emissions starting in 2025.

As China's President Xi Jinping agreed to a date for peak CO<sub>2</sub> emissions for the first time and also promised to raise the share of zero-carbon energy to 20 per cent of the country's total, President Barack Obama said the United States would cut its own emissions by 26-28 per cent by 2025.

The announcement was described by Timothy E. Wirth, former US Undersecretary of State for Global Affairs and the vice chairman of the United Nations Foundation, as "the political breakthrough we've been waiting for".

"If the two biggest players on climate are able to get together, from two very different perspectives, the rest of the world can see that it's possible to make real progress," he said in a statement.

Mark Kenber, CEO of The Climate Group, said: "Barack Obama and Xi Jinping deserve recognition for their climate leadership. Not only are the two biggest polluters taking new and unprecedented commitments to reduce greenhouse gas emissions, but they're announcing them together. It shows that both countries recognise their individual responsibilities and the importance of their joint leadership on climate."

Other observers, however, question whether the news is anything more than just symbolic.

China has set a date of around 2030 as the time at which CO<sub>2</sub> emissions will peak but it did not specify a peak emissions level.

The peak date was also in line with forecasts already made by several state-backed think-tanks, with the China Academy of Social Sciences saying in a study that slowing rates of urbanisation would likely mean that industrial emissions would peak around 2025-2030 and start to fall by 2040.

"The statement is an upbeat signal to motivate other countries but the timeline China has committed to is not a binding target," said Li Junfeng, an influential Chinese climate policy adviser linked to China's state planning agency, the National Development and Reform Commission.

Li Shuo, a campaigner with environmental group Greenpeace in Beijing said the vague wording of "around 2030" also did not help, and could mean any time between 2027 and 2033. He added that China's targets should serve as "the floor and not the ceiling".

Tao Wang, climate scholar at the Tsinghua-Carnegie Center for Global Policy in Beijing commented: "It is a very good sign for both countries and injects strong momentum (into negotiations), but the targets are not ambitious enough."

The US's new commitment was also questioned. It has already pledged to cut its carbon emissions by 17 per cent by 2020. Further, it is not clear if the new proposals will pass a Republican-dominated Congress.



- Areva hits financial difficulty
- EDF in talks with Saudi Electric

### Junior Isles

The future of the Hinkley Point C nuclear plant in Somerset, UK, is under a cloud amid a financial crisis at Areva and uncertainty over securing investment in the project.

Shares in Areva, a shareholder in the project and the designer of the proposed reactors, plummeted by almost a quarter in November after the French engineering giant suspended profit predictions partly because of delays at a similar power station under construction in Finland.

Delays and massive cost overruns at the Olkiluoto 3 nuclear plant in Finland have proved instrumental in forcing Areva to consider whether it needs a new cash injection to shore up its balance sheet.

As well as providing the two EPRs (European Pressurised Reactor) for the proposed £25 billion Hinkley Point C power station, Areva currently holds 10 per cent of the equity in the project.

In a statement the company said: "In

the framework of the ongoing budget process, it is currently working on an enhancement of its performance plan to adapt to market conditions, which remain unfavourable.

"Areva is undertaking a review of its strategic outlook and mid-term funding plan, which will be examined in the framework of its governance. The financial outlook for the 2015-2017 period... will be presented by the 2014 annual results release."

Areva's troubles must no doubt be a serious concern for the British government.

Peter Atherton, a leading energy company analyst at Liberum Capital in the City said: "If I was sitting in Whitehall this would scare the daylights out of me. Areva is designing and building the first two EPRs [European Pressurised Reactors] in Europe and both projects have gone disastrously wrong."

Last month, French state-owned power utility EDF said it would delay the opening of its new nuclear reactor in Flamanville in northern France to

2017 from 2016 after Areva said it was having difficulty delivering crucial equipment.

EDF, which holds a 45-50 per cent share in Hinkley C is still looking for further investors in the project. According to reports, the company is in talks with state-controlled Saudi Electric, one of Saudi Arabia's biggest power companies.

The utility has been in discussions for more than a year with possible minority investors and wants to reach an agreement on the plant's ownership in the first quarter of 2015. However, there is still no sign of a final agreement on ownership structure.

Two state-owned Chinese companies – China General Nuclear Corporation and China National Nuclear Corporation – are expected to take a combined equity stake of 30-40 per cent in the consortium but have yet to sign contracts.

It is thought that the Chinese companies' demands are complicating the negotiations. They are demanding that Chinese manufacturers are given

a big slice of the contracts for the project and that EDF hands over another site, at Bradwell in Essex, where they can build their own reactor to their own design.

The coalition government has been criticised over the high cost of the Hinkley C. Last month, the opposition Labour party called for it to be referred to the Whitehall auditor to examine whether the £24.5 billion price tag represents the best possible deal for taxpayers.

Former US energy secretary Steven Chu warned that although the British government is right to proceed with new nuclear plants, they risk becoming a financial drain.

"Unless we can learn to build nuclear on schedule and on budget it will be a financial drain. Other countries have learned how to do this: South Korea has built 10 plants exactly the same and the 10th plant was only 60 per cent of the cost of the original one. The cost came marching down because they just kept doing the same thing," he said.

## Utility outlook weak but stable

The outlook for Europe's embattled utilities has stabilised, according to credit ratings agency Moody's.

In a new industry outlook report on the sector, Moody's Investors Service says reduced pressure on conventional generation earnings coupled with less political and regulatory intervention has changed the outlook for the unregulated EMEA electricity and gas utilities sector to stable from negative over the next 12-18 months. The outlook has been negative since 2010.

"Our new stable, but weak, outlook reflects the view that much of the

downside risk for EMEA's utilities sector has already crystallised in lower earnings expectations," said Niel Bisset, a Moody's Senior Vice President and author of the report.

"Following a further decline in 2014, we see sector profitability overall stabilising from 2015 to reflect reducing pressure on generation earnings and less political and regulatory intervention."

According to the report, entitled: 'EMEA Electric & Gas Utilities: Easing pressure on generation earnings and less intrusive political and

regulatory intervention support stable outlook', the decline in the profitability of conventional generation is expected to slow from 2015, following years of steep declines.

In a separate report, Moody's estimates that in the next 3-5 years these utilities will devote about 20 per cent on average of their total capital expenditure to renewables. It noted, however, that although a greater focus on renewables and the growing energy services sector will diversify earnings, utilities are likely to become exposed to developer and new market risks.

Moody's also predicts a more positive outlook for gas fired generation in the UK as a result of the new Capacity Market. "We see the Capacity Market as credit positive for owners of existing generation assets, though developers of new plants could struggle to compete in the upcoming first auction in December of this year," said Matthew Huxham, Moody's Assistant Vice President and Analyst. "However, it is unlikely to have a material impact on the credit quality of utilities, such as Centrica (A3 negative) and SSE (A3 negative)," added Huxham.

## Russia keeps gas options open

China and Russia deepened their energy ties last month with a second gas deal that would secure almost a fifth of the gas supplies China needs by the end of the decade and reduces Russia's reliance on the European market.

The deal, signed between Russian President Vladimir Putin and Chinese President Xi Jinping, is slightly smaller than the \$400 billion pact reached earlier this year shortly after Russia annexed Crimea.

Russian oil firm OAO Gazprom is negotiating the supply of as much as 30 billion cubic metres (bcm) of gas

annually from developments in West Siberia to China over 30 years, it said. At the same time, another Russian producer, OAO Rosneft, agreed to sell a 10 per cent stake in a Siberian unit to state-owned China National Petroleum Corp.

Following the news of the latest gas supply deal, Peter Kiernan, Energy Analyst at The Economist Intelligence Unit said: "The deal is not final, but should the two gas supply agreements made this year come to fruition it would make China the largest export market for Russian gas, with volumes potentially reaching 68 bcm per

year. That is well beyond the 40 bcm that Russia exported to Germany last year (Germany is currently Russia's largest gas export market).


"It is clear that when it comes to energy exports Russia is increasingly looking east."

Gas supply between Russia and its neighbouring Ukraine, and more recently the EU, has been a contentious issue. The agreement with China follows the signing of a deal between Russia, Ukraine, and the EU that will see Moscow resume vital gas supplies to Ukraine.

Worth \$4.6 billion in total, the

package calls for Ukraine to pay \$3.1 billion in two tranches by the end of the year to cover debts for previous supplies from Russia's Gazprom. Kiev will also have \$1.5 billion, some from existing accords with the EU and IMF, to pay for about 4 bcm of new gas until March, for which Russia is in-sisting on cash up front.

"Unprecedented levels of EU aid will be disbursed in a timely manner, and the International Monetary Fund has reassured Ukraine that it can use all financial means at its disposal to pay for gas," the European Commission said in a statement.



**CONNECTING & POWERING BUSINESS**

2 - 4 MARCH 2015  
DUBAI WORLD TRADE CENTRE, UAE

+1,300 Exhibitors • 58,000 sqm of products  
+40 Technical Seminars • 3 Free Conferences

Register free today

[www.middleeastelectricity.com](http://www.middleeastelectricity.com)

Strategic Partners: DUBAI MUNICIPALITY, GOVERNMENT OF DUBAI  
Lanyard Sponsor: MarelliMotori  
Gold Sponsors: alfanar, onsite energy, Türkiye  
Organised by: informa exhibitions

**ADBA | NATIONAL CONFERENCE** | 9 DEC 2014 LONDON

**AD 2015-2020: WHAT CAN WE ACHIEVE?**

**KEY TOPICS:**

- Future of biomethane
- On-farm AD
- Financing AD
- Efficient operation of AD



**KEY SPEAKERS:**

- Amber Rudd, Minister, DECC
- Charlotte Smith, Farming Today
- Iain Watt, Forum for the Future
- Julian O'Neill, Biogen
- David Joffe, The CCC
- Ian Burrow, RBS

“ It’s an annual ‘must do’ for us. ”  
Kevin Clarke, Imtech

For information on exhibition and sponsorship opportunities please contact: **Jamil Ahad** +44 (0) 20 3176 4414 or **Rachel Fenton** +44 (0) 20 3176 5418.

Book now to avoid disappointment! [adbiogas.co.uk/events](http://adbiogas.co.uk/events)  
Tel: +44 (0) 20 3176 0503 | email: [enquiries@adbiogas.co.uk](mailto:enquiries@adbiogas.co.uk)

**5th Electric Energy Storage**

**Overcoming Financial and Technological Barriers with Energy Storage While Distinguishing What Actions Need to be Made In Order to Meet Storage Levels for 2020 and Beyond**

January 14-16, 2015 | The Westgate Hotel 1055 Second Ave San Diego, CA, 92101

**Speakers:**

<b>Neal Bartek</b> Smart Grids Project Manager <b>San Diego Gas &amp; Electric</b>	<b>Bob Lane</b> Director, FERC, CAISO & Reliability Compliance <b>San Diego Gas &amp; Electric</b>
<b>Steve Berberich</b> Chief Executive Officer <b>CAISO</b>	<b>Ino Gonzalez</b> Principle, ERCOT Market Design <b>ERCOT</b>
<b>Eva Janossy</b> Director, Model Development and Analytics <b>OPG Energy Markets</b>	<b>Aloke Gupta</b> Energy Division <b>California Public Utilities Commission</b>
<b>Bruce Fraser</b> Director, Energy Supply Business <b>PG&amp;E</b>	<b>Praveen Kathpal</b> Vice President <b>AES Corporation</b>
<b>Robert Blair</b> Vice President Business Development <b>GCL Solar Energy, Inc</b>	<b>Alan Cordova</b> Solar and New Initiatives Manager <b>EDP Renewables North America LLC</b>

Contact: Tyler Kelch  
T: 312 894 6310 | E: [TylerKe@marcusevansch.com](mailto:TylerKe@marcusevansch.com)

**marcusevans** conferences

PLATTS | McGRAW HILL FINANCIAL | [www.platts.com/ceepower](http://www.platts.com/ceepower) | Register by December 5 & **SAVE \$700**

February 17-18, 2015 | Marriott Prague | Prague, Czech Republic

**9th Annual CENTRAL & EASTERN EUROPEAN POWER**

Maintaining energy security cleanly in a stalled market place

**WHY ATTEND:**

- ▶ **Assess the impact of a changing regulatory landscape**  
In order to achieve the EU's goals of reducing CO2 emissions, dirty power stations are at threat. Hear from the experts as they answer the questions: How well is the region performing at achieving these goals, and what still needs to be done?
- ▶ **Identify the key market drivers influencing growth and investment in the market**  
Investment in the region has dramatically slowed, we will identify the key factors that have caused this and the potential paths back to growing the market with Q&A sessions that will allow you to ask the questions you want answered.
- ▶ **Even more networking opportunities**  
Platts understand the need for effective and valuable networking time, and this event will be no exception. Built into each day are a number of dedicated social functions designed to stimulate participant interaction, this includes an evening drinks reception on day one.

**HEADLINE INDUSTRY THOUGHT-LEADERS:**

	<b>Pavel Rezacsek</b> Market Analysis and Prognosis Director <b>CEZ</b>
	<b>Ferenc Leber</b> Director for Generation and Technical Issues <b>MVM</b>
	<b>Dr. Thomas Klopfer</b> Head of Corporate Development (Strategy) <b>RWE East</b>
	<b>Daivis Virbickas</b> CEO <b>Litgrid</b>
	<b>David Kučera</b> CEO <b>Power Exchange Central Europe</b>
	<b>Zsolt Bertalan</b> CEO <b>HUPX</b>

Sponsored by: **WARTSILÄ** | Supported by: **CEEMARKETWATCH**, **THE ENERGY INDUSTRY TIMES**, **commodity**

BOOK NOW | [www.platts.com/ceepower](http://www.platts.com/ceepower) | [conf\\_registrations@platts.com](mailto:conf_registrations@platts.com) | +44 (0)20 7176 6300 | +44 (0)20 7176 8512

# EPA clean energy plans pose reliability risk

Plans to cut carbon pollution from existing power plants could put the reliability of the USA's bulk power system at risk, says NERC.

Siân Crampsie

US President Barack Obama's plans to cut pollution from power plants hit another hurdle last month when the North American Electric Reliability Corporation (NERC) expressed concerns about its potential impact on the grid.

In a new report, NERC raises concerns about a number of elements in the 'Clean Power Plan', which was announced by the Environmental Protection Agency (EPA) in June 2014. It questions some of the EPA's assumptions and has called for further detailed analysis to demonstrate whether the plan is feasible in the timeframe proposed.

"The bulk power system is undergoing a fundamental transformation

toward increasing dependency on natural gas, wind and solar resources," said Gerry Cauley, president and chief executive officer at NERC. "The Clean Power Plan substantially accelerates that shift and proposes a very different mix of power resources than we have today."

The Clean Power Plan calls for individual US states to begin submitting implementation plans as early as mid-2016 and regional implementation plans by mid-2018. Its aim is to cut carbon emissions from the power sector by 30 per cent below 2005 levels by 2030 by targeting existing power plants.

Reductions in carbon dioxide (CO<sub>2</sub>) emissions would be required as early as 2020.

The EPA estimates that existing

power regulations, combined with the Clean Power Plan, will reduce coal-fired generation by between 108 and 134 GW by 2020.

NERC says in its report that "the number of estimated retirements identified in the EPA's proposed rule may be conservative... Developing suitable replacement generation resources to maintain adequate reserve margin levels may represent a significant reliability challenge, given the constrained time period for implementation".

NERC also expresses concerns over EPA's assumptions over heat rate improvements for existing generators, and says that the Clean Coal Plan will accelerate a shift towards gas-fired generation and renewables. This, it says will require more investment in

electric transmission and gas pipeline infrastructure.

"The proposed timeline does not provide enough time to develop sufficient resources to ensure continued reliable operation of the electric grid by 2020," NERC says in its report. "More time for implementation may be needed to accommodate reliability enhancements."

The Clean Power Plan has also drawn criticism because of its potential impact on the price of energy.

Last month Energy Ventures Analysis released research indicating that EPA regulations would push a typical household's annual electricity and gas bill up by \$680, or 35 per cent, between 2012 and 2020.

Commissioned by coal group Peabody Energy, the study identifies a

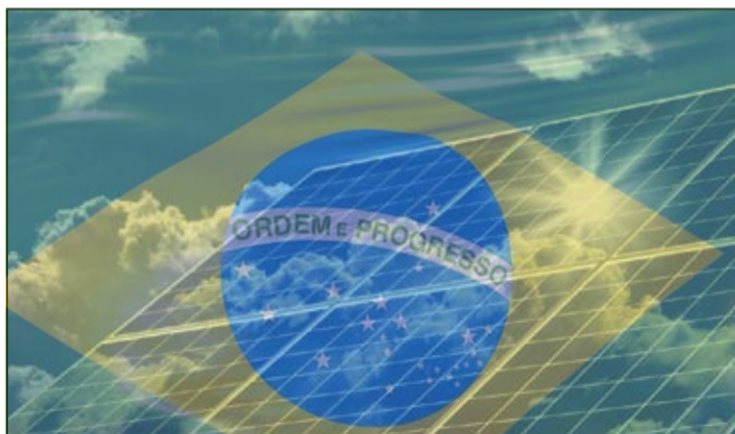
\$177 billion increase in electricity costs and a \$107 billion increase in natural gas costs in 2020 compared with 2012 brought by the cumulative effects of EPA regulations and energy market impacts.

The study also notes that US power markets would see a shift in electricity generation from coal to natural gas, causing upward pressure on natural gas demand and prices.

The study also highlights potential flaws in some of EPA's assumptions. "For example, existing coal-fuelled generating facilities are already operating at very efficient levels and, collectively, will not be able to achieve an additional six per cent heat rate improvement," said Seth Schwartz, Energy Ventures Analysis President.

## Sun shines on Brazilian solar

- Competitive auction attracts 400 projects
- Brookfield Renewable Energy Partners acquires 488 MW portfolio



Brazil is attracting investors from around the world to its burgeoning renewable energy market.

The country last month held its first renewable energy auction with a separate solar energy category. The solar category attracted bids from more than 400 projects and was hailed as "the most competitive energy auction" that Brazil has ever held by Mauricio Tolmasquim, president of the Energy Research Agency.

"The sale was a milestone for the entrance of solar energy in the Brazilian energy mix," Tolmasquim told Bloomberg.

Brazil has set a goal of having 3.5 GW of solar capacity in operation by 2023, up from the current level of less than 100 MW. Crucially, the solar projects awarded concessions in the auction will operate without subsidy and are among the lowest-priced solar projects in the world.

The solar auction awarded a total of 1048 MW of capacity with an average price of R\$215.12/MWh

(\$85.63/MWh). A separate wind energy auction awarded a further 769 MW of capacity at an average price of R\$142.34/MWh.

Italy's Enel Green power and two Brazilian developers – Solatio Energia and Renova Energia – won a total of 801 MW of solar capacity between them in the auction and will invest a combined R\$3 billion.

In a separate development, Brookfield Renewable Energy Partners announced that it would acquire a renewable energy portfolio totalling 488 MW from Energisa SA for a total consideration of R\$2.4 billion.

"This is an attractive opportunity to acquire a diversified portfolio of renewable operating assets in a market we know well, and with an average contract duration of 10 years," said Richard Legault, President and CEO of Brookfield Renewable. "Brazil remains a long-term growth market in need of new supply, and we remain well positioned to find accretive growth opportunities."



Spain's REE is to receive compensation from Bolivia's government following the 2012 nationalisation of the Bolivian electricity grid firm Transportadora de Electricidad.

Bolivia has agreed to pay \$36.5 million to REE as compensation for its 99.94 per cent stake in Transportadora de Electricidad, which was nationalised without warning on May 1, 2012,

and passed to state-owned Empresa Nacional de Electricidad.

The compensation equates to just over 18 per cent of the amount that the Spanish grid firm had demanded as compensation. It comes after REE served an international arbitration notice to the Bolivian government in February demanding payment for its losses.

Bolivia has a tradition of nationalising assets on May Day and in 2010 expropriated three electricity generation companies and one distribution company.

TDE owns almost 2000 km of high-voltage transmission lines and 22 electricity substations, equivalent to 73 per cent of the transmission lines on the national interconnected system.

## SunEdison shifts to wind with First Wind acquisition

SunEdison is to become the world's largest developer of wind and solar power after agreeing a \$2.4 billion deal for First Wind.

SunEdison will partner with its subsidiary, Terraform Power, splitting First Wind's portfolio of development pipeline and operational assets. The deal marks SunEdison's entry to the US wind energy market and will enable it to raise its 2015 project installation guidance from 1.6-1.8 GW to 2.1-2.3 GW.

The deal includes over 1.6 GW of pipeline and backlog wind projects, which are due to be operational in 2016-2017 and which will be added to Terraform's project list, as well as 6.4 GW of project development opportunities. Terraform, which is 64 per cent owned by SunEdison, will also take control of 521 MW of operational assets.

"The acquisition of First Wind

transforms both SunEdison and TerraForm Power into diversified renewable energy companies and will make SunEdison the leading renewable power plant developer in the world," said Ahmad Chatila, President and Chief Executive Officer of SunEdison. "By bringing together First Wind's proven development and operational capabilities and SunEdison's global corporate infrastructure and renewable energy development and finance experience, we will be well-positioned to capitalise on the significant growth opportunities in the global wind power markets and drive returns to shareholders of both SunEdison and TerraForm Power."

SunEdison's acquisition comes as prices for renewable energy are falling and approaching grid parity. The firm has therefore said that it can continue to grow in the US even without the support of tax credits for wind

and solar.

It has also expressed an interest in expanding overseas in countries such as the UK, Canada, Mexico and India.

In October SunEdison said it had closed a \$130 million non-recourse debt financing arrangement with CorpBanca and BBVA for the construction of a 69.5 MW solar power plant in Chile. It has also announced a joint venture agreement with Renova Energia to develop, own, and operate 1 GW of utility scale solar photovoltaic (PV) energy in Brazil.

Recent data released by SolarReviews.com shows that the average cost of solar energy has continued to fall over the last year in spite of stable solar panel prices and the imposition of anti-dumping tariffs.

The investment tax credit for solar is scheduled to be cut at the end of 2016.

# THE ENERGY INDUSTRY TIMES

www.teitimes.com

editorial reprints 2014

Have you been mentioned in one of our  
TEIT TIMES editorials and would like  
to use it as a tool to market your  
expertise or products to the industry?



If so, a great way to do this is by ordering a reprint.  
We can create a personalised editorial reprint to your  
requested quantity.

**Contact us today for your personal quote**  
email: [enquiries@teitimes.com](mailto:enquiries@teitimes.com)

# China needs strategy to meet new 2030 carbon limit

China has announced that it will cap carbon emission limits by 2030 but a new energy strategy will need to be put in place if it is to succeed. **Syed Ali**

China will have to make significant changes to its energy strategy if it is to meet its recently announced goals on greenhouse gas emission limits.

Institute of Public and Environmental Affairs director Ma Jun claimed the development of renewable resources in China "has been slow" and said the Chinese government should offer greater incentives to boost wind and solar power generation.

He told *The Weekend Australian*: "The use of renewable energy is facing obstacles. Hydropower is popular in China and has probably reached a peak, so there is little capacity left there."

Mr Ma's comments followed last month's announcement by Chinese President Xi Jinping that China will cap carbon emissions by 2030 and boost renewable energy production to at least 20 per cent.

Mr Ma also said the country would not meet its 2030 promise without reforming the coal industry. "The

campaign to control coal production and consumption has not been rolled out nationally.

"It is still not clear that in some areas where the government has put controls on the coal industry that it will work and whether they will help the renewable energy sector.

"If the government does not put those coal controls in place nationally then emission reduction will enjoy no success at all."

In recent changes, the Chinese government said new taxes would be levied on coal sales within China and that power utilities needed to cut their import levels by 50 million tonnes this year.

A new energy strategy, released following the news that China will cap carbon emissions, sets out the path towards achieving the 2030 goal.

The Energy Development Strategy Action Plan (2014-2020) released by the State Council, promises more efficient, green and innovative energy

production and consumption, with a cap on annual primary energy consumption set at 4.8 billion tonnes of standard coal equivalent until 2020.

Annual coal consumption will be held below 4.2 billion tonnes until 2020, 16.3 per cent more than the 3.6 billion tonnes burned last year, according to the National Coal Association.

The share of non-fossil fuels in the total primary energy mix will rise to 15 per cent by the same year from 9.8 per cent in 2013, according to the plan.

Installed capacity of hydro, wind and solar power is expected to stand at 350 GW, 200 GW and 100 GW, respectively.

The share of natural gas will be increased to more than 10 per cent while coal will be reduced to less than 62 per cent. Production of both shale gas and coalbed methane could reach 30 billion m<sup>3</sup> by 2020.

Construction of new nuclear power plants in eastern coastal areas will

begin at a proper time after feasibility studies of building such plants in inland regions. Installed nuclear capacity will reach 58 GW and that under construction will top 30 GW by 2020. Nuclear plans received a boost last month when Candu Energy, a division of SNC-Lavalin, signed a framework joint venture agreement in China that could lead to construction of nuclear power plants using recycled uranium.

General Electric Co. has signed agreements with two Chinese companies in the natural gas and coal sectors as part of an effort to help China develop clean energy. GE and Chinese private company ENN Energy Holdings Ltd signed a memorandum of understanding for a strategic partnership that will concentrate on areas including the joint development of gas-based distributed power projects. Separately, GE and the China Coal Resources Group signed a letter of intent to cooperate on a large-scale, efficient clean coal utilisation projects.

## Indonesia to add 35 GW by 2020



**Maritime Affairs Minister Indroyono Soesilo**

Indonesia says it will kick-off its programme to add 35 GW of new generating capacity by 2020 next year.

Under the current plan, it is expected that state-owned power utility PLN will build 15 GW, with the other 20 GW being handled by independent power producers (IPPs).

PLN's President Director Nur Pamudji said: "The government has set a target of building power generators with a capacity of 35 000 MW up to 2020. However, PLN is only able to build 15 000 MW of the target." He noted, however, that the 15-20 GW portions between PLN and the IPPs could change later, depending on the generating technology selected.

In November, the government said 5000 MW of the planned 35 GW would come from a new mega power project to be built at Bunton beach in Bunton village, Adipala district.

Maritime Affairs Minister Indroyono Soesilo said that development of the first 2000 MW stage of the \$7.5 billion coal fired power plant complex, which would be among the largest in the world, was expected to begin next year so that it could begin commercial operation by 2018.

Last month the county also said it is considering building nuclear power plants with an initial capacity of 5000 MW by 2025.

## India eyes \$250 billion to bring power to all

India's new government hopes to attract \$250 billion (Rs 15 lakh crore) investment within 4-5 years to give a boost to the energy sector and provide electricity to all households by 2019.

Speaking at the India Economic Summit in November, Power Minister Piyush Goyal, who also holds portfolios of Coal and New and Renewable Energy ministries, said the investments would increase coal production, strengthen the electricity transmission network and get gas-fired power plants back on stream.

To meet the increasing electricity generation requirements, Goyal said, Coal India Ltd (CIL) is expected to double its production to around one billion tonnes by 2019. Goyal's statement came as the Ministry of Coal announced that CIL has signed 161 fuel supply pacts with power plants for a total capacity of 73 675 MW.

At the summit, Goyal said the government is also pushing ahead with ambitious plans for the renewable sector, especially solar energy, where the generation capacity is to be increased to 100 000 MW by 2022.

"We are expecting around \$250 billion investments in the next 4-5 years... About \$100 billion will be in the renewable energy," Goyal said.

The renewables sector made some significant advances recently, with the Indian Renewable Energy Development Agency recently signing a Memorandum of Understanding (MoU) with the US Export-Import Bank that will explore options for utilising up to \$1 billion to finance the sale of US clean energy exports to India.

At the end of October SunEdison, Inc., a leading global solar technology manufacturer and provider of solar energy services, signed a MoU with the Rajasthan government aimed at developing Rajasthan as the global hub for solar energy. SunEdison intends to establish 5 GW of capacity in the state in the form of multiple mega solar projects.

In another important development, Reliance Power announced its 100 MW concentrated solar power (CSP) plant has been synchronised to India's electricity grid. The project, which uses Areva technology, is claimed to be the world's largest Fresnel type CSP plant.

The contract for the project was awarded to Rajasthan Sun Technique Energy, a wholly owned subsidiary of Reliance Power, in December 2010 under the first phase of the Jawaharlal Nehru National Solar Mission promoted by India's government.

## Australia climate change action under fire

- Renewables investment down 70 per cent
- Emissions up 4 million tonnes

An independent Climate Council report has criticised Australia's efforts on tackling climate change.

According to a study entitled 'Lagging Behind: Australia and the Global Response to Climate Change' released in November, the country had moved from being a leader to a laggard in renewable energy. It said Australia is falling behind China and the United States in tackling climate change.

The report said new investment in renewable energy had fallen by 70 per cent in 2014 due to a lack of clear federal government renewable energy policy. "When you compare that with the US and China, which are powering ahead - China particularly at record levels - it's a pretty sorry state of affairs," the Council's Tim Flannery said.

The Council also says any emission

reductions achieved over the past few years in the nation's electricity sector have effectively been cancelled out since the repeal of the carbon pricing mechanism. In the first 100 days since the carbon price repeal, Australia's electricity generation related emissions were up 4 million tonnes on the equivalent period last financial year.

Australia's Conservative government has been widely criticised by green groups for repealing in July a two-year-old carbon tax levied on Australia's worst industrial carbon gas polluters aimed at reducing to the nation's greenhouse emissions.

The former Labor government had used a tax imposed on around 350 of Australia's biggest carbon polluters of AU\$24.15 (\$21.36) per tonne of carbon pollution for the past two years to encourage them to reduce their

carbon footprint.

Australia's climate action was again thrust into the spotlight at the G20 leaders summit in Brisbane last month, as Prime Minister Tony Abbott failed in his attempt to keep climate change off the agenda.

The country plans to cut emissions to five per cent below 2000 levels by 2020, and at the end of October said it is establishing a A\$2.55 billion (\$2.25 billion) Emissions Reduction Fund to give polluters financial incentives to reduce emissions to help meet the target.

But in a report released in November, the independent Climate Institute said changing circumstances and growing scientific evidence meant that Australia needed to ramp up its ambitions and aim to reduce new emissions by 40 per cent of 2000 levels by 2025.



**Prime Minister Tony Abbott failed in his attempt to keep climate change off G20 agenda**

# Ineos bets on shale gas revolution

Chemicals firm, Ineos, is investing heavily to ensure future supplies of low cost natural gas and its plans may help to kick-start the UK's shale gas industry.

| Siân Crampsie

Chemicals giant Ineos says that the use of domestic shale gas resources could transform the economics of its production plants, including Grangemouth in Scotland.

The firm is currently building a £400 million (\$640 million) shale gas import facility at Grangemouth to enable imports of cheap fuel from the USA, but has announced plans to invest \$1 billion in exploration and appraisal of shale gas resources in the UK.

It has applied for several petroleum exploration and development licences (PEDLs) – mostly in northern England and Scotland – and says these could transform it into the biggest player in

the UK's nascent shale gas sector.

The move represents a step change in Europe's shale gas industry, which has so far been slow to develop because of regulatory uncertainty and environmental concerns.

Jim Ratcliffe, Ineos Chariman said that shale gas "could revolutionise UK manufacturing" and sought to reassure opponents to the controversial fuel that the firm's experience and expertise mean that it is "a very safe pair of hands".

Ineos is already the owner of two shale licences in Scotland comprising over 120 000 acres and is clear that a competitive future for its chemicals business will depend on access to cheaper fuel sources than are currently available in the UK.

"Ineos has decided to invest in domestic shale gas exploration in order to provide raw materials for its chemicals plants," said Peter Kiernan, Energy Analyst at The Economist Intelligence Unit. "It is making the bet that it will be able to access a lower priced and domestically sourced supply of gas to enhance its competitiveness."

Recent estimates indicate that \$53 billion of investment between 2016 and 2032 would bring up to 4000 wells online in the UK, according to Air Energi. However it would be several years before commercial quantities of gas would flow because of the UK's stringent regulatory environment surrounding shale gas.

Ineos' move will put it under the spotlight of environmentalists who

oppose the use of hydraulic fracturing – or fracking – techniques for shale gas extraction. Greenpeace labelled Ineos' strategy as "speculative bets on unproven and risky resources".

The European Academies' Science Advisory Council (EASAC) in November said that with effective regulation, technological advances and good well management, shale gas could be extracted without negatively impacting the environment, water resources and local communities. Concerns over methane leakage and the challenge of public acceptance can be mitigated by the use of best practice, it added.

Ineos has already sought to overcome opposition to fracking operations by announcing a revenue-sharing scheme

for local home and landowners that they described as a "game changer".

"Giving six per cent of the revenues to those living above our shale gas operations will give them a real stake in the success of the venture and encourage the development of the whole shale gas industry," said Ratcliffe.

Ineos said that those living in a shale gas community of approximately 100 km<sup>2</sup> in size would typically benefit from the output of 200 wells and split £375 million.

"Giving six per cent of revenues to those directly above shale gas wells means the rewards are fairly shared by everyone. It's what they do in the USA and we think it is right to do this here. It democratises the shale gas revolution," said Ratcliffe.

## Denmark, Germany consider coal closures

Denmark and Germany are mulling the closure of coal-fired power plants as a means of meeting climate goals.

Danish Climate and Energy Minister Rasmus Helveg Petersen recently told reporters that he had asked government officials to examine how the country could phase out coal in a decade's time. "It would benefit the climate and it would be a very, very good signal to send," said Petersen.

German minister Rainer Baake of the Greens likewise told media that the German cabinet was considering steps to reduce greenhouse gas emissions that included boosting energy efficiency and shutting down coal-fired power plants.

Coal accounts for around 45 per cent of Germany's energy mix and 20 per cent of Denmark's supplies. Denmark has already outlined plans for wind

energy to grow to account for 50 per cent of the mix by 2020, while Germany has embarked on plans to phase out nuclear power and set targets for renewables to make up 40 to 45 per cent of power generation by 2025 and 55 to 60 per cent by 2035.

However Germany remains likely to miss its goal of reducing greenhouse gas emissions by 40 per cent on 1990 levels by the end of the decade, and critics of its 'Energiewende' renewable energy plans will force the country to rely more, rather than less, on fossil fuels.

Germany is also considering the introduction of a capacity market mechanism similar to that recently introduced in the UK, aimed at ensuring reserve capacity remains adequate.

Such a move would enable existing coal-fired plants to stay on-line as

reserve capacity, something that environmental groups such as WWF believe will happen in the UK.

According to WWF, recent economic modelling carried out by Imperial College found that with current policies, nearly half of the UK's existing 40-50 year old coal-fired generating capacity could still be operating in 2030. This directly contradicts current government assumptions that existing coal will close as a result of age and/or because of local air pollution legislation by the mid-2020s.

"Imperial College's economic modelling shows that it is unwise to simply assume that coal-fired power stations will all close in the 2020s," said Dr. Rob Goss, the report's lead author. "If government wants old coal stations to close it needs to ensure that happens through legislation."

## UK moves to boost winter reserves

The UK's National Grid is finalising contracts with three power plants to provide additional reserve capacity over the winter months.

The network firm recently released its outlook for winter 2014/15 in which it said that generating margins had declined in recent years because of planned generator closures, plant breakdowns and new plant not coming on-line as quickly to replace them.

National Grid has therefore sought Supplemental Balancing reserve (SBR) contracts with the Littlebrook, Rye House and Peterhead power plants. Together with Demand Side Balancing Reserve (DSBR) that National Grid has already contracted, these three plants will provide an additional 1.1 GW of de-rated capacity and will increase the average cold spell (ACS) margin from 4.1 to 6.1 per cent.

According to ICIS, continued low wholesale power prices indicate that market participants are not anticipating significant power supply disruptions. "UK power market participants were initially alarmed at the prospect of going into winter with less nuclear generation than usual, and this caused one of the top ten price moves in the ICIS Power Index for the whole of the year to date," noted Zoe Double, Head of Power at ICIS. "The UK also has less coal-fired generation than last year, and the fire at the Didcot plant, which burns gas, has also caused concern that the plant may not be

operational this winter.

"However, National Grid already acted to secure additional demand, both from power generation with the Supplemental Balancing Reserve in September, and also from large industrial users reducing their demand in the Demand Side Balancing Reserve."

ICIS also notes that continued energy efficiency improvement is also helping a long-term reduction in energy demand in the UK, but some analysts believe that more could be done to reduce energy wastage.

Richard Black, director of the Energy and Climate Intelligence Unit (ECIU), said that energy efficiency, interconnection and demand side management were likely to be essential to ensuring the UK's energy security. "The events of the last few months show that no form of power station is completely reliable, whether it's gas-fired, coal-fired or nuclear," said Black, referring to outages at two UK nuclear plants and fires at two other power stations.

"But just building more power stations would add to people's bills," continued Black. "So the future for Britain has to lie in an efficient, flexible grid, making more use of demand management and interconnections with Europe to even-out peaks and troughs and cope with unexpected failures. Policy needs to prioritise options that boost our energy security, keep bills low and combat climate change – and reducing energy waste is clearly a no-brainer."



Petersen: asked government officials to examine how Denmark could phase out coal

# CCS sector pushes for recognition

Political support for and recognition of carbon capture and storage technology is growing as large-scale projects come to fruition ahead of next year's climate talks.

Siân Crampsie

Governments and international policy-makers are showing increased signs of confidence in the potential for carbon capture and storage (CCS) technology to play a key role in combating climate change.

Last month the Intergovernmental Panel on Climate Change (IPCC) published its 'Climate Change 2014: Synthesis Report', in which it identified CCS as an essential low carbon technology needed for decarbonising the power sector.

The news came as the Global Carbon Capture and Storage Institute (GCCSI)

released an annual status report showing that activity in the sector has risen sharply since 2011.

"We welcome the findings of the [GCCSI] report in demonstrating just how much progress has been made on CCS," said Luke Warren, CEO of the Carbon Capture and Storage Association (CCSA). "The findings will help towards building much needed confidence amongst governments, the general public and critically, the financial investment community. The message is clear – CCS is here and ready for deployment."

In October leaders from the European Union (EU) agreed a framework

for climate and energy policies to 2030, including CCS in the final Council Conclusions. The move signals the increasing prominence of CCS in delivering a secure energy future for Europe, said the CCSA.

However some nations have argued that political support for CCS is still too low. In November, 56 countries belonging to the UN Economic Commission for Europe (UNECE) said that fiscal incentives for carbon capture should be part of the global climate change agreement scheduled for discussion in Paris in December 2015.

"A post-Kyoto international agree-

ment should accept a broad array of fiscal instruments to encourage CCS/CCUS, but the selection of instruments should be left to the discretion of national governments," said the UNECE in a statement.

Governments should also work together to financially sponsor demonstration projects, said UNECE.

According to the IPCC, the cost of limiting carbon dioxide (CO<sub>2</sub>) emissions would be 138 per cent more without the use of CCS.

In its 2014 global status report, the GCCSI says that not only has CCS experienced its most active construction period to date, but also that the

technology is being deployed across a wide range of industries.

There are now 22 projects in construction or operation around the world, an increase of 50 per cent since 2011. There are also a further 14 large-scale CCS projects in advanced planning, including nine in the power sector.

GCCSI said that 2014 and 2015 would be watershed years for the CCS sector, with two large-scale projects in the USA due to start operating next year, following on from the startup of the Boundary Dam project – the world's first large-scale CCS plant – in Canada in October 2014.

## IPCC releases scientific report

"Substantial and sustained" reductions in greenhouse gas emissions will be required to limit the impacts of climate change, according to a synthesis report released by the Intergovernmental Panel on Climate Change (IPCC).

The report – a distillation of the IPCC's Fifth Assessment Report, produced by over 800 scientists over the last 13 months – gives a comprehensive assessment of the risks of climate change and the measures needed to avoid or adapt to them.

It notes that human influence on the climate system is "clear and growing", adding that options are available to adapt to and mitigate climate change.

It has been released ahead of climate negotiations in Peru this month that will conclude in Paris in December 2015.

"The IPCC clearly shows there is now no room left to slow or delay the process of urgently reducing our carbon emissions by leaving the era of fossil fuels behind us and switching to clean forms of energy," said Leo Hickman, WWF-UK's Chief Adviser on Climate Change. "Our leaders must now grasp the economic opportunities and co-benefits, such as clean air and green growth, that the IPCC spells out

are available to all those that choose this path.

"On a global level, they must work hard in the year ahead to secure a bold and meaningful climate deal in Paris at the end of 2015. The IPCC has shown in exhaustive detail what the dire consequences will be for the climate – literally, our planet's life support system – if our leaders choose to ignore their compelling, stark scientific conclusions."

The IPCC report says that continued emissions of greenhouse gases will cause further warming and long-lasting changes in the climate system, resulting in "profound impacts affecting all levels of society and the natural world".

R. K. Pachauri, Chair of the IPCC, called for the global community to galvanise and coordinate efforts on climate change. "Many of those most vulnerable to climate change have contributed and contribute little to greenhouse gas emissions," Pachauri said. "Addressing climate change will not be possible if individual agents advance their own interests independently; it can only be achieved through cooperative responses, including international cooperation."



## Nuclear will give Eskom much needed boost

- Third international deal in two months
- Moody's downgrades SA debt

South Africa is galvanising its nuclear power programme with the signing of another international cooperation framework agreement.

The country's energy minister has inked a deal with China, paving the way for the possible use of Chinese nuclear technology in South Africa's programme to expand nuclear generating capacity.

It follows the signing of similar agreements in recent months with France and Russia.

In a statement the South African government reaffirmed its commitment to expand nuclear power production by 9.6 GW, as outlined by the 2010-2030 Integrated Resource Plan, in order to ensure energy security and underpin economic growth.

"We have stated that the nuclear new build programme offers important opportunities for South Africa as it will enhance job creation, skills

development and the revitalisation of our nuclear industry," said Energy Minister Tina Joemat-Pettersson.

"We will be looking for significant localisation that can contribute to broad industrialisation and the development of a thriving knowledge economy in South Africa," continued Pettersson.

South Africa is keen to boost its generating capacity in the short and long term in order to maintain economic growth as well as investor confidence.

The country's capacity margin has fallen again to dangerously low levels caused by its ageing electricity infrastructure and a funding deficit for state-owned utility Eskom's capital investment programme.

Last month Moody's downgraded South Africa's debt rating because of poor growth prospects. It also cited "ongoing energy shortages as well as

rising interest rates, further deterioration in the investor climate and a less supportive capital market environment" as reasons for the downgrade from Baa1 to Baa2.

The government is trying to provide more support for Eskom, embarking on a \$2 billion partial privatisation programme to raise funds.

Eskom has a R225 billion (\$20.6 billion) funding gap over the next five years. Earlier this year the government announced a raft of measures for the utility, including a R20 billion capital injection.

■ SolarReserve says that the 96 MW Jasper solar PV project is fully operational, two months ahead of schedule. The project is part of South Africa's renewable energy independent power producer programme (REIPPP) and its power will be sold to Eskom under a 20-year power purchase agreement.



## Nuclear "turning point" for Iran

Russia's pledge to build at least two nuclear reactors in Iran has been labelled as a "turning point" in their relationship by the two nations.

Russia signed a contract to build the two reactors in November, just two weeks ahead of a deadline for Tehran to sign an agreement on its nuclear programme with six world powers.

Russia could build up to eight reactors for Iran, according to the deal between the two countries.

The construction of the first two reactors at the Bushehr nuclear power

plant, which was completed by Rosatom in 2013, will be monitored by the International Atomic Energy Authority (IAEA). And as is the case at the existing Bushehr plant, Russia will supply uranium fuel and then take it back for reprocessing – a provision intended to prevent Iran using the spent fuel to build atomic weapons.

The deal also envisions the possible construction of two further reactors at Bushehr and up to four more at an undetermined location.

Tehran was due to sign a Joint Plan

of Action in late November with the p5+1 nations but last minute negotiations in Vienna resulted in a further extension of the deadline until July 1, 2015. Signing the deal would signal that Tehran had given enough proof that its nuclear programme is solely peaceful and would lead to sanctions against Iran by the West being eased.

According to a report obtained by Reuters, the IAEA said that Iran had taken positive steps under the agreement, including lowering its stockpile of low-enriched uranium gas.



# Profits fall among challenged utilities

■ Weak market conditions persist with warm weather

■ M&A outlook strong

| Siân Crampsie

Europe's utility firms have warned investors to expect continued tough trading conditions amid persistently low consumption and production of energy across the region.

Mild weather conditions have in recent weeks exacerbated the challenging business environment and forced several utilities to adjust their outlook or shareholder returns.

Germany's RWE blamed persistently low wholesale power prices for a 31 per cent drop in operating profit for the first nine months and confirmed a bleak full-year outlook. Operating profit fell from €4.2 billion to €2.9

billion in the period while earnings before interest, tax, depreciation and amortisation fell from €6 billion to €4.7 billion in the first nine months of this year compared with the same period in 2013.

Britain's SSE plc posted a 6.2 per cent lower pre-tax profit for the first half of the year and said that full-year earnings would be towards the lower end of its guidance.

Denmark's Dong Energy said that its net losses for the third quarter had risen to 573 million crowns (\$96 million) from 378 million crowns a year ago because of warm weather conditions.

Utilities have suffered because a drop in energy demand, combined with a

rise in the amount of subsidised renewable energy generation, has caused wholesale power prices to plummet, making many thermal power plants uneconomic to operate.

The market conditions have forced utilities to divest assets, cut costs and refocus their businesses.

E.On last month reached a deal to sell its 20 per cent share in Finnish natural gas company Gasum Oy to the Finnish state for €200 million.

The sale is part of E.On's strategy to optimise its portfolio and follows the divestment of its 34 per cent share in the Fennovoima nuclear power plant in Finland and the sale of its Finnish energy companies, E.On Kainuu Oy

and Karhu Voima Oy in 2013.

In November E.On posted a 25 per cent fall in profit for the first nine months of this year. The drop – from €1.9 billion in the first nine months of 2013 to €1.4 billion – was due to divestments and adverse currency effects, the firm said.

Meanwhile Vattenfall subsidiary Nuon Energy has sold its thermal assets in Utrecht, the Netherlands, to Dutch energy firm Eneco. Eneco will buy Nuon's heat network and the Lage Weide and Merwedekanaal power plants.

According to EY, Europe's weak energy market conditions will help to drive mergers and acquisitions in

2015. Europe has become attractive for foreign investors looking to buy prized assets, while European firms are looking to developing markets for growth opportunities, said EY.

"The P&U [power & utilities] sector is transforming and companies are realigning their businesses, optimising their asset portfolios and expanding into allied services to protect market position and target growth," said Matthew Rennie, EY's Global Transactions Leader for Power & Utilities. "However, in response to changing business environment, cost reduction and operational efficiency is back at the top of the agenda for P&U companies."

## Cape Sharp Tidal launched, as Siemens exits sector

The companies behind a new tidal energy joint venture say that their plans will help Nova Scotia to build a marine energy industry.

OpenHydro and its Canadian partner Emera Inc. have formally launched Cape Sharp Tidal, a joint venture business tasked with deploying a fully grid connected 4 MW tidal array in the Bay of Fundy, Canada.

Cape Sharp Tidal will deploy the latest evolution of OpenHydro's 16 m, 2 MW Open-Centre Turbines in a project that has the potential to be one of the world's first multi-megawatt arrays of interconnected tidal turbines.

"The incredible force of the Bay of Fundy gives us the potential to build a tidal industry here in Nova Scotia, and to take Nova Scotia experience and knowledge around the globe," said Chris Huskison, President and CEO of Emera.

Cape Sharp Tidal's ultimate goal is to develop a tidal array of up to 300 MW in Nova Scotia. The project will move forward in phases, subject to the required approvals.

The firm says that its local partner, Irving Shipbuilding, is in the preparation stage and working towards fabrication and mobilisation of the turbines for the first phase, which is due to start operating in 2015.

Meanwhile, the marine energy sector in the UK is not developing as fast as expected, prompting Siemens to announce its exit from the industry.

The company recently outlined its proposal to divest its ocean power generation business, in particular Marine Current Turbines (MCT), based in Bristol, United Kingdom.

This restructuring would affect 45 employees in the Hydro & Ocean unit in Siemens Division Wind Power & Renewables. It is expected that the divestment will need several months to be completed.

The proposal follows a strategic review to explore available options for the emerging business.

Siemens said in a statement: "The market and associated supply chain has not developed at the speed that Siemens expected. A dedicated tidal power industry of critical size will develop in the near future. But due to the limited resources it would be a niche market for Siemens."

In case negotiations with potential buyers are not successful, Siemens says it will consult with all potentially affected employees.

"In the event of restructuring then redeployment within Siemens will be prioritised and complete support will be offered for redeployment or outplacement," said the statement.

## Enel continues restructuring effort

- Successful sale of Endesa stake
- Bids received for Slovak unit

Enel of Italy has raised €3.13 billion from the sale of a 22 per cent stake in its Spanish power subsidiary, Endesa.

The firm has sold shares in Endesa to retail and institutional investors as part of restructuring efforts that also include the sale of its 66 per cent stake in Slovak power producer Slovenske Elektrarne (SE) as well as of assets in Romania.

The sale of a stake in Endesa will help Enel cut debt. Demand for the shares exceeded the number of shares assigned and Enel last month increased the number of shares available to retail investors, it said.

Enel's strategy also included taking

control of Endesa's Latin American assets, a move it completed just weeks earlier and one that will give the Italian firm greater access to the fast-growing South American markets.

Enel said in November that it had received three bids for its 66 per cent stake in SE. The firm has not revealed the identity of the bidders, but media reports indicate that CEZ has expressed an interest in the tender and that Slovnaft AS and Hungary's MVM Group have made a joint bid.

According to previous statements made by Enel CEO Francesco Starace, Enel hoped to have all bids for the Slovak and the Romanian assets it put up for sale in July in by the end

of November. Enel is aiming to raise at least €4.4 billion from those sales and cut its debt, which stood at €41.5 billion at the end of March.

According to Moody's Enel's sale of a stake in Endesa will reduce net debt but will introduce complexity to the group's structure.

"The planned transaction is slightly credit positive overall for Enel because it will reduce the company's net debt, add transparency to the valuation of its residual stake and is consistent with the group's strategy to reallocate capital from mature European electricity markets into faster growing markets," said Niel Bisset, Senior Vice President at Moody's.

## Wind turbine firms post strong results

Wind turbine firms are reaping the rewards of stable global growth in the wind energy sector.

Gamesa said that a sharp acceleration in sales activity in the third quarter of the year helped it to double its net profit in the first nine months to €64 million. It reported a seven per cent rise in revenues in the first nine months, with strong sales contributions

from Latin America and India.

Nordex also reported a strong third quarter as well as a doubling of sales volume in the Americas, helping it to achieve a 20 per cent rise in sales in the first nine months of the year.

Nordex reported sales of €1266 million in the period while consolidated operating earnings almost doubled to €59.9 million in the first nine months

of 2014, compared with €31 million for the same period of 2013. It said that sales in Europe and South Africa rose by nine per cent.

The firms also say they have benefited from efficiencies brought by greater capacity utilisation as activity increased over the reporting period.

However Siemens Energy said that its fourth-quarter profits had been hit

by charges in its wind power division, which reported a loss for the period.

Siemens Wind reported a loss of €66 million compared to a profit of €179 million in the fourth quarter a year earlier. The primary factor was €223 million in charges for inspecting and replacing main bearings in onshore wind turbines, and repairing offshore and onshore wind blades, it said.

In addition, the profit contribution from Siemens Wind's higher-margin offshore business was significantly lower than in the prior-year period.

Elsewhere, Suzlon said it had achieved the milestone of 25 000 MW of installations globally and posted its third consecutive positive EBITDA at Rs114 crore in the second quarter ending 30th September.

## 10 | Tenders, Bids & Contracts

### Americas

#### Amec Foster Wheeler signs HRSG contract

BHI Co., Ltd., a licensee of Amec Foster Wheeler's Global Power Group, has been awarded a contract by a prominent US power producer to design and supply two heat recovery steam generators (HRSGs) in the US. The HRSGs will be part of a large power plant expansion in the north-east region.

Commercial operation of the units is scheduled for the second quarter of 2017.

Amec Foster Wheeler will act as a subcontractor to BHI on this project providing a liaison project manager, technical advisor services, and warranty support.

#### CG to expand Paraguay power grid

Avantha Group Co. CG has signed a contract with Paraguay's state utility, Administracion Nacional de Electricidad (ANDE), for eight single- and three-phase transformers totalling 420 MVA, for the expansion of the country's 220 kV and 66 kV electricity network.

CG will manufacture the transformers in Mumbai, India and supply them in three lots. Spare parts, supervision of the installation and commissioning and onsite training are a part of CG's scope.

#### B&V orders Siemens power island

Siemens is to supply the power island equipment for a new 869 MW combined cycle power plant in Ohio, USA.

The Oregon Clean Energy Center (OCEC) in northwestern Ohio will be based on Siemens' H-class gas turbine technology and will be one of the most efficient power plants in the state when it is commissioned in 2017.

Siemens won the order from Black & Veatch, the engineering, procurement and construction (EPC) contractor for the project. Siemens will engineer and deliver the thermodynamic cycle design and power island configuration as well as perform ongoing service at the plant under a long-term service and maintenance agreement.

#### Alstom signs major maintenance agreement

Alstom has signed an agreement with TransAlta Corporation to provide maintenance services for the Canadian utility's coal fired power plant fleet in Alberta province.

The agreement covers 10 major maintenance projects over three years at TransAlta's Keephills and Sundance power plants as well as the servicing of critical power assets such as boilers, steam turbines and generators.

The contract is expected to deliver estimated direct cost savings of C\$34 million (\$30 million) over the full term of the agreement.

#### Siemens wins sixth Panda Power order

A Siemens-Bechtel consortium has won an order from Panda Power Funds for the construction of the 778 MW Stonewall combined cycle power plant in Virginia, USA.

The order is the sixth awarded to Siemens by Panda Power for combined cycle power plants in the USA. Siemens will deliver the power island equipment, including two SGT6-5000F gas turbines, one SST6-5000 steam turbine with a

SCon-4000 condenser, two SGen6-1000A generators, one SGen6-2000H generator and two NEM duct-fired heat recovery steam generators along with the complete electrical system and SPPA-T3000 instrumentation and control system.

Bechtel will be responsible for the engineering and procurement for the balance-of-plant, and installation, construction and commissioning of the facility.

Commissioning of the plant is scheduled for spring 2017.

### Asia-Pacific

#### Japan orders first Siemens H-class

Siemens has received its first order from Japan for the delivery of two H-class gas turbines.

The German firm will supply two SGT5-8000H gas turbines for the Kobe Steel (Kobelco) combined cycle power plant in Moka City, Tochigi Prefecture. Siemens will supply two SGT5-8000H gas turbines, each with a capacity of 400 MW, along with the associated auxiliary systems.

The 1200 MW plant is expected to receive its environmental approvals in mid-2016.

#### Gamesa gains ground in China

Gamesa has further consolidated its presence in the Chinese wind energy market with two new supply contracts.

The Spanish firm has won orders from CGN Wind Energy, a subsidiary of China's General Nuclear Power Group, and from Everbright Group, a Chinese specialist renewable energy firm.

For CGN Gamesa will supply and install 32 of its G97-2.0MW turbines at the Yangchajie wind complex in Yunnan province. The turbines will be specifically configured for high-altitude operation and will be delivered in January 2015.

#### EGAT orders Hitachi substations

Hitachi has signed a contract with Thailand's state utility EGAT for the supply and construction of the Chaitya Phum substations.

Hitachi will execute the EPC contract in partnership with a local Thai firm, supplying 500 kV and 200 kV GIS as well as carrying out associated work, civil engineering, installation and commissioning.

The work will be completed in 2016 and will help to improve the reliability of Thailand's power network.

#### Hainan opts for pumped storage

Alstom has won a contract worth €57 million from The Hainan Pumped Storage Power Generation Co. Ltd. to equip Hainan Province's first pumped storage power station.

Alstom will provide three 200 MW units – pump turbine, motor generator with other key equipment – to the 600 MW new plant. The first unit is due to enter commercial operation in December 2017.

#### Abengoa to develop 215 MW biomass power plant

Abengoa has been selected by Eco Energy (Bee) to develop what is claimed to be the largest commercial biomass power plant in the world of new construction.

The 215 MW plant in Ghent, Belgium, will cost more than €315 million and burn 100 per cent biomass

(wood chips and agro-residues) fired in a circulating fluidised bed.

Abengoa will be responsible for the engineering, design and construction of the plant.

### Europe

#### Schneider consortium wins solar contract

A consortium comprising Schneider Electric, Eiffage and Krinner has won a contract to construct a 300 MW solar farm and an extra-high voltage substation in Cestas, France.

Work on the €285 million project was due to begin in November. Eiffage subsidiary Clemessy will carry out engineering studies while Eiffage will carry out connection work and earthworks. Schneider Electric will be responsible for the electrical conversion chain and Krinner for screw-in foundations and photovoltaic structures.

The PV farm will come on-line in October 2015.

#### Atos signs major smart metering contract

Atos has been selected by Salzburg AG, one of the main energy and infrastructure service providers in Austria, as its lead partner to manage the transition of 470 000 electricity meters to smart meters and monitor the needed infrastructure.

An international team comprised of Atos and Atos Worldgrid consultants from four countries are currently working on the transition. The smart meters will be installed by the end of 2019 in accordance with EU Directive 2020 and will serve 100 per cent of consumers in Salzburg.

#### TVO orders fuel assemblies

Areva has been selected by Finland's Teollisuuden Voima (TVO) to supply fuel assemblies to the nuclear reactors in operation at the Olkiluoto nuclear power plant.

From 2016 to 2019, Areva will deliver a total of four reloads of its Atrium fuel design.

#### EDF and Dong seek contractors

EDF EN France subsidiary Eolien Maritime France and Dong Energy have invited bids for the transportation and installation of offshore wind turbines at Courseulles-sur-Mer, Fécamp and Saint-Nazaire offshore wind farms.

The scope of work consists of the load-out, transportation from assembly hubs to the corresponding offshore sites and the installation of approximately 238 wind turbines.

The deadline for the offer submission is December 15, 2014.

#### Gamesa to deliver first G114-2.5 MW units

Gamesa is to install six of its new G114-2.5 MW turbines at a wind farm in Sweden after signing a contract with infrastructure firm John Laing.

The contract is the firm's first for this turbine model. The six units will be installed at the Rammeldalsberget wind farm located in county Västernorrland, in central Sweden.

Delivery of the wind turbines is scheduled to begin in October 2015, while commissioning of the facility is expected in the first quarter of 2016.

### International

#### Samsung C&T to build Kirikkale power plant

Korean company Samsung C&T has signed a \$600 million engineering,

procurement and construction contract with ACWA Power International to build a combined cycle power plant in Turkey. The project, to be completed by May 2017, will see Samsung CT build a 950 MW power plant in Kirikkale, 60 km east of Turkish capital Ankara.

#### MTU wins emergency genset order

Rolls-Royce subsidiary MTU Friedrichshafen has won an order for supplying Ostrovets 1&2, the Belarusian Nuclear Power Plant (NPP), with emergency diesel gensets.

MTU will deliver 10 gensets, each with a power output of 6300 kW, to the new nuclear plant that is being built by Russia's Rosatom. It is Belarus' first nuclear power plant and is due to start operating in 2018.

#### Vestas marks Croatian first

Vestas has been awarded a contract to provide 14 wind turbines for the Ogorje wind power plant in Croatia.

Under a contract awarded by Aiolos Projekt, a company majority owned by private French group Akuo Energy, Vestas will supply its V112-3.0MW turbine units to the project.

The project will mark the first use of the V112-3.0MW in Croatia. Vestas is scheduled to deliver the wind turbines in the third quarter of 2015, with commissioning scheduled for the end of that year.

#### SEC orders Alstom FACTS

Saudi Electricity Company (SEC) has awarded Alstom Grid a €47 million contract to supply Flexible AC Transmission Systems (FACTS) to strengthen the Saudi grid.

Alstom will supply a Static VAR Compensator (SVC) to the Jeddah substation as well as two capacitor banks to the Wadi Jaleel substation in Mecca. The SVC (-150/+300 MVar at 110 kV) will substantially improve and increase power transmission stability and quality across Saudi Arabia's power transmission network.

The project is expected to be completed by 2016.

#### ABB wins Ain Djasser III contracts

Ansaldo Energia has placed orders with ABB to supply a plant automation system and substation expansion for the new Ain Djasser III gas-fired power plant in the northern province of Batna, Algeria.

ABB will provide a distributed control system for the 340 MW open cycle power plant based on the Symphony Plus total plant automation platform. ABB will also expand the 220 kV air-insulated substation that feeds the power produced by the Ain Djasser plants into the Algerian transmission grid.

ABB supplied the original substation in 2008 and will expand it to cope with the large increase in power when the third plant starts production.

#### Nordex signs second Lithuanian contract

Nordex says it is to supply 19 turbines for the Mazeikiai wind farm in north-west Lithuania's.

The company project will supply its N117/2400 turbines as well as carrying out services under a premium service contract for a minimum of 15 years.

Work on installing the turbines, which will be mounted on 120 m towers, is to commence in spring 2015.



## Oil

# Opec production ceiling sends prices lower

- Oil prices could reach as low as \$60-70/b
- Russia could suffer "catastrophic consequences"

David Gregory

Saudi Arabia and its oil-producing Gulf allies had their way at the November 27 Opec ministers' meeting in Vienna, sticking with a production ceiling of 30 million b/d, which the 12-member group usually exceeds.

The decision overrode calls from Opec's poorer nations for a cut in production but Saudi Arabia would not bend, arguing that the well-supplied oil market would correct itself. Saudi Arabia has learned in the past that as the organisation's swing producer, it frequently loses market share when it cuts production and other members do not.

The announcement that Opec's production target would remain the same sent crude prices lower. On November 26, main benchmark Brent crude settled at \$77.75/b, down by some 30 per cent from a high of \$115/b last summer. In the aftermath of the meeting, Brent slipped below \$75/b.

Saudi oil minister Ali al-Naimi was quoted as saying: "It was a great

decision," as he left the five-hour meeting.

One analyst told *The Energy Industry Times* that Saudi Arabia's position on the oil price could be a sign of its concern over the success that shale oil has had in the US and that lower crude oil prices could keep the shale oil industry from advancing in countries like China and Argentina and in Europe. A country like China might not invest so heavily in developing a shale oil and gas industry as long as crude oil is available at \$70/b, the analyst said.

Booming supplies of oil from North America, created by the technology of hydraulic fracturing (fracking) has boost oil supplies in the US to the point that companies are lobbying to be allowed to export crude, something they currently cannot do.

US oil imports have fallen steadily, making more crude available on the international market. Higher supplies, coupled with slipping demand in major consumer countries like China have hit crude prices creating a glut

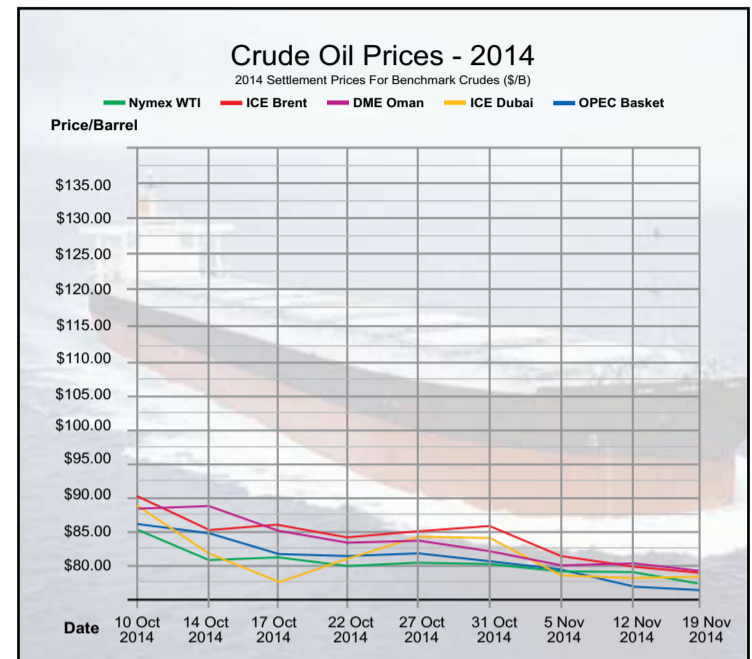
not seen for some time.

Opec countries produced about 30.3 million b/d in October, compared to 30.6 million b/d in September. During those months Saudi Arabia produced 9.6 million b/d and 9.78 million b/d respectively. Opec produces about one-third of global daily demand of around 90 million b/d.

The question is how will some Opec members weather continuing low prices? Countries like Iran and Algeria need oil prices of around \$130/b to keep up with government budgeted spending. Venezuela and Nigeria need prices at around \$120/b.

Saudi Arabia and the other Opec member Gulf states can fare better with lower oil prices as they have large financial reserves accumulated over the decades. It was only in the days of the global economic meltdown of 2008 when crude price oil sank to nearly \$30/b that the Gulf States needed to worry, and at that time they were arguing that \$75/b was a fair price.

The chaos in Libya has created a



looming financial crisis for the North African country. The higher the price of oil, the better for Libya, but output and exports from there are unsteady.

Russia is likely to experience some tough days as lower oil prices take hold. Analysts have predicted that Russia could lose money at a rate of \$100 billion per year if prices remain at current levels. It has been estimated that every decline by \$1 in the price of oil translates into a loss of \$2 billion for Russia.

Moscow does not intend to reduce production although it has been suggested that it might cut back by 300 000 b/d. Russia President Vladimir Putin has warned that his country could suffer "catastrophic consequences" from lower oil prices, the falling value of the ruble, and sanctions leveled by the US and EU against Moscow for its actions in Ukraine.

Two-thirds of Russia's annual budget

comes from taxes on oil and gas companies, and the 2015 budget is calculated on an oil price of \$100/b. Russian finance officials reportedly told the country's parliament that an oil price of \$80-90/b is expected for the medium to long term, leaving Moscow short of money for at least the 2015-17 period.

It now remains to be seen what the consequences of Opec's decision will take. Some western analysts have commented that the price could reach as low as \$60-70/b. There is the prospect that producers may now begin to undercut each other in a contest for market share.

This is of course, good news for the consumer and for economies that are still struggling to find their way out of the economic downturn of six years ago. There may come a time when the price of a barrel of oil might steady-out at \$75/b, which compared to \$100/b does seem a little more fair.

## Gas

# Many energy challenges facing sub-Saharan Africa

The International Energy Agency's World Energy Outlook suggests that Africa's energy potential remains very much an undiscovered country.

Mark Goetz

Africa's "energy sector is vital to its development and yet is one of the most poorly understood parts of the global energy system," the International Energy Agency (IEA) said in the Africa Energy Outlook, which was published last month as part of its World Energy Outlook (WEO) series. The African Energy Outlook concentrates to a large extent on sub-Saharan Africa.

Africa is huge and undeveloped, and its sub-Saharan population, now estimated at 940 million, is expected to reach 1 billion by the end of this decade. Only 37 per cent of the region's people live in urban areas, which the WEO says "has important implications for the approach to solving the energy challenges". Many sub-Saharan inhabitants suffer from "energy poverty", the report states.

More people live without access to electricity in sub-Saharan Africa than in any other region of the world –

some 620 million people, the report says. This is nearly half of the global total and 80 per cent of these are in rural areas. Sub-Saharan Africa is also the only region of the world where lack of access to electricity is increasing.

Primary energy demand in Africa as a whole stood at 739 million tons of oil equivalent (mtoe) in 2012, according to the WEO. Of this, North Africa accounted for 23 per cent.

"Since 2000, energy demand in sub-Saharan Africa has increased by half – reaching 570 mtoe in 2012 – but still accounts for only 4 per cent of the world total," the report says.

Despite its current situation, sub-Saharan Africa has a huge potential as an energy producer.

Over the last five years, the WEO reported, about 30 per cent of global oil and gas discoveries were made in sub-Saharan Africa. "These discoveries are having a transformation of the world's understanding of the region's oil and gas resources," it said.

Yet despite the new found resources "the challenge to turn these discoveries into production and the resulting revenue into public benefits is formidable", the report said.

Some 7 per cent of the world's conventional oil resources and 6 per cent of natural gas resources lie within sub-Saharan Africa.

The traditional sources of supply that exist in West Africa are now being joined by new – and significant – discoveries in East Africa, particularly oil in Kenya and Uganda, and natural gas in Mozambique and Tanzania.

The region has an estimated 65 billion barrels of proven oil reserves, equivalent to about 5 per cent of the world total. Three-quarters of those oil reserves are located in Nigeria and Angola, the next largest area of reserves is in South Sudan and Uganda.

Roughly 14 billion barrels of oil equivalent was discovered in sub-Saharan Africa during 2012 and in

2013 the region produced 5.7 million bpd of oil. Of that, 5.2 million bpd was exported. By contrast, the region imported 1.0 million bpd of petroleum products.

Africa is estimated to have natural gas reserves of 52 trillion cubic metres (tcm), of which 31 tcm are sub-Saharan. Proven gas reserves in the sub-Saharan have increased by 80 per cent since 2000 and currently stand at 9 tcm, of which 70 per cent is in deepwater and 18 per cent on land. A sixth of the region's gas reserves are in the form of associated gas and until recently much of that gas was flared. It is estimated that 1 tcm of gas has been flared.

During 2012, the region used some 27 billion cubic metres (bcm) of gas and according to the report approximately the same volume was exported and also flared.

Flaring has come to be seen as a tremendous waste of resource. The report said that over the last five years the volume of flared sub-Saharan

gas has declined from near 35 bcm/year to 28 bcm/year. Most of that reduction of some 6 bcm/year has taken place in Nigeria, which is now flaring only 17 bcm/year.

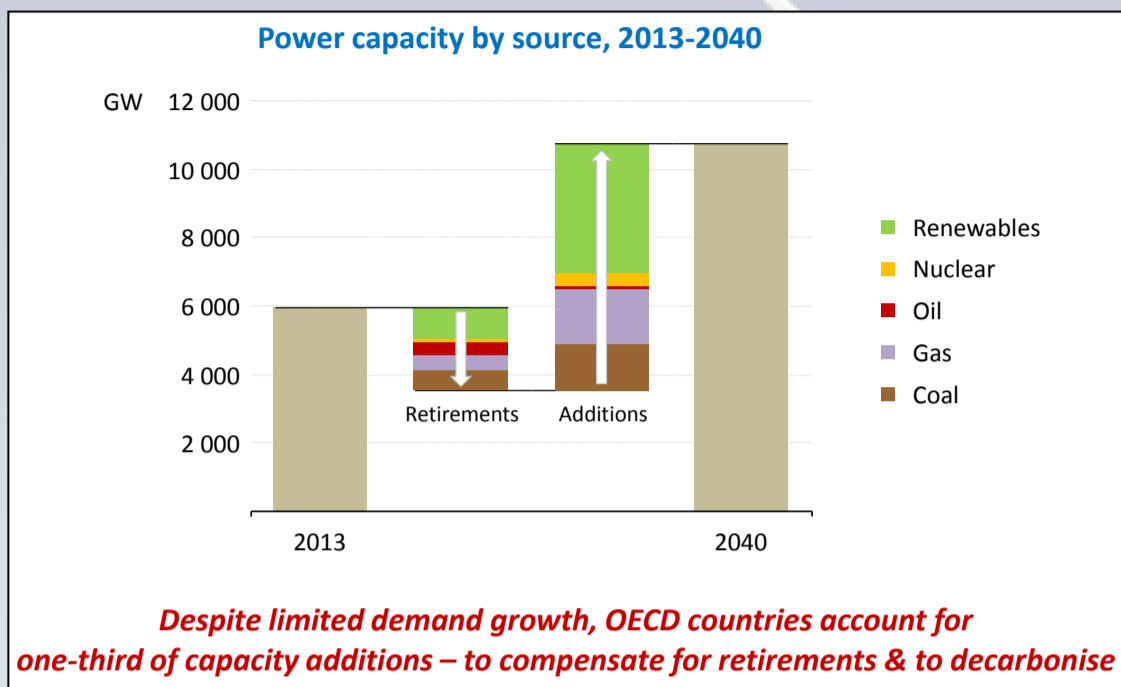
That is more than many countries consume in a year.

The report commented on Nigeria's enormous natural gas resources but added that, as in much of sub-Saharan Africa, development of gas resources has not been a priority until recently.

Both Mozambique and Tanzania have in a short time come to be viewed as major future gas exporters. The WEO said the challenge for those two countries now is to prove up the resources by progressing production and export projects through the approval process.

The international companies that have discovered huge volumes of gas offshore of both countries are working together towards the creation of multi-train LNG export facilities that they plan to bring into operation in the early 2020s.

**Retirements add to the investment challenge in the power sector**

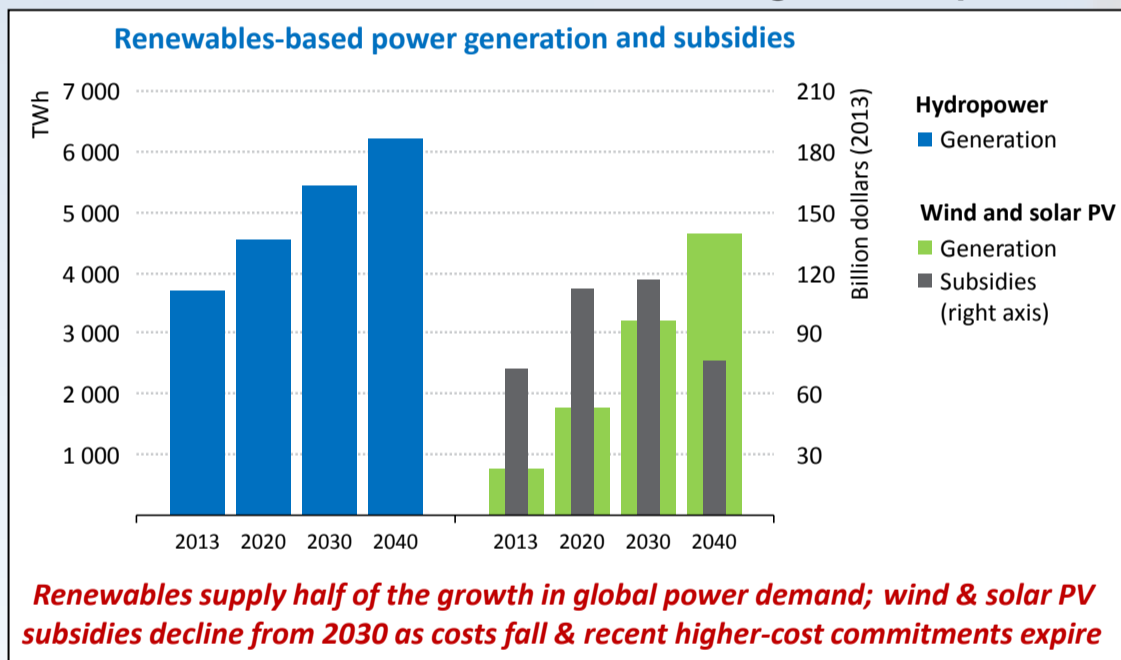


For more information, please contact:

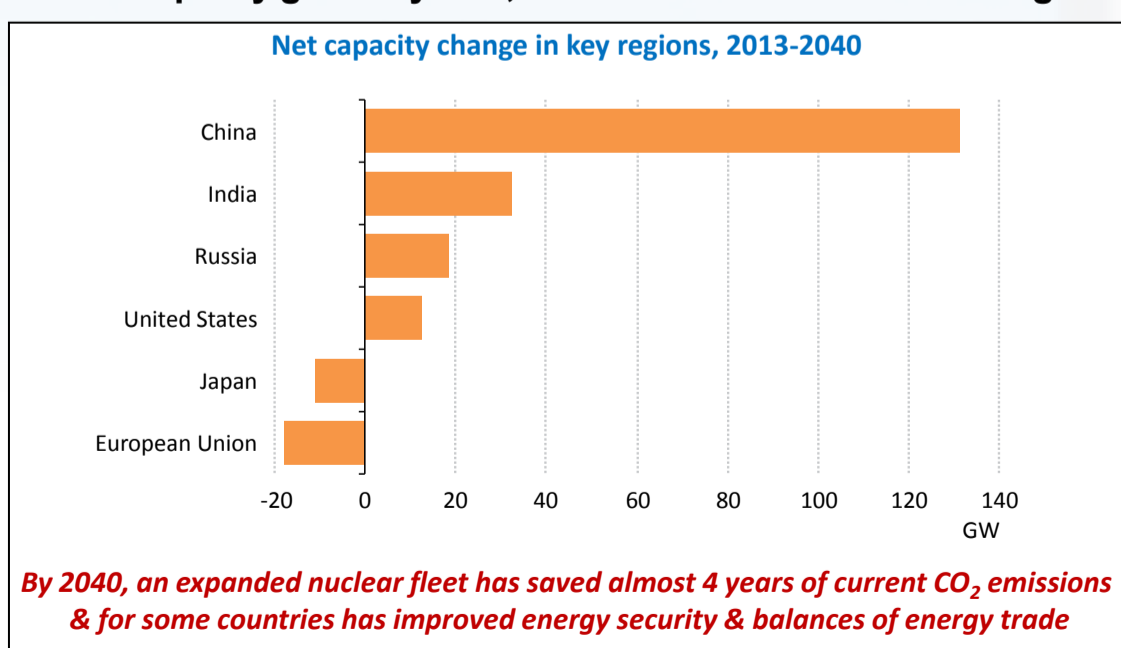
**International Energy Agency**  
9, rue de la Fédération  
75739 Paris Cedex 15  
France.

Email: [bookshop@iea.org](mailto:bookshop@iea.org)  
website: [www.iea.org](http://www.iea.org)

**Renewables overtake coal to become the leading source of power**



**Nuclear capacity grows by 60%, but no nuclear renaissance in sight**



Power and productivity  
for a better world™



This section is supported by ABB

# Preparing for a smart meter tsunami?

For a very long time, European legislation for smart metering was in place and the technology was available but the deployments were lagging.

**Oliver Ittisberger** looks back at the last year and finds that industry and policy are again looking in the same direction, at least for now.

The end of the year is often a time for reflection: how far we have come, where do we stand and what lies ahead? With smart metering in Europe, we are at a halfway point. It has now been just over five years since the so-called '3rd Energy Package' came into force, and according to the provisions in that package, 80 per cent of European households should be enjoying the benefits of smart metering in five years' time. How far are we along that path and where are the deployments and the policy debates taking us?

Around the time that the 3rd Energy Package was being passed, there was a general feeling that a "smart meter tsunami" was going to wash over Europe. Here was a technology that was going to fundamentally change distribution network operations and was the greatest consumer empowerment tool to be introduced in the energy sector in the last 100 years. Moreover, smart metering was going to bring digitalization and telecommunications to an industry still enamored with copper and steel. The meter was going to move from being a mechanical cash register to a high-tech operational component of the network.

The smart metering tsunami didn't hit Europe; it changed direction in the middle of the Atlantic and swept over North America. At Landis+Gyr, in 2008 our turnover in EMEA was more than half of the company's total. By 2013 it had fallen to less than 40 per cent – with corresponding increases in North America. The reason was simple: in contrast to Europe, the US had a decisive government that was willing to financially drive investment in energy infrastructure.

Watching these developments unfold, the smart metering industry began sounding the alarm that the EU was not going to meet the 80 per cent by 2020 target. Of course, we knew that having 8 in 10 European households equipped with a smart meter is not a goal in and of itself. However, all of the other European policy goals: renewables, CO<sub>2</sub> reduction, and energy efficiency were dependent upon investments in the grid, and the key was the "last mile" from the substation to the point of consumption, where the network is

blind. Smart metering is the foundation of the smart grid, and smart grids are the pre-requisite for the efficient, secure and carbon-free energy supply system Europe is striving for.

While the smart metering industry in Europe was gasping for air commercially, the European Commission was still chugging along with task forces, policy papers, communications on smart grids, recommendations on smart metering and seemingly innumerable reports by the Joint Research Centre on CBA's, Pilot Projects, etc. Seldom was the "Brussels Bubble" more evident than in the disconnect between the policy discussions in Brussels and smart metering developments on the ground.

To be fair, most of the problems were in the Member States, and there were, of course, some very good policy recommendations, both from the Commission and from the energy regulators, but very seldom were they timely. They were either too late, in the case of the smart metering recommendations, published three years after agreement on the 3rd Energy Package, or were too far ahead of concrete developments in the Member States.

At times, the policy discussions were even counter-productive: a minimal number of rollouts were taking place, in other Member States tenders were being published, and suddenly a discussion was started in Brussels on data management models. The last thing that either the electricity industry or smart metering providers needed was that kind of policy uncertainty.

In June of this year, the Commission published its long-awaited Benchmarking Report on smart metering. The industry was right: the EU is not going to meet the 80 per cent by 2020 target. We even doubt that the EU will achieve the 72 per cent coverage the Benchmarking

Report predicts.

Nonetheless, something changed in 2014. In the course of the year both the industry and policy makers, independently of one another, saw that smart metering is really coming to Europe. It will be more like a rising tide than a tsunami, but it is coming. Although the deployments are taking longer and coming with lower volumes than the industry anticipated, we are seeing a record number of tenders scheduled for the coming year.

The Commission is now also looking at not simply getting smart metering into the field, but rather what kind of smart meters, i.e. what are the functionalities, are being deployed. In the Commission's opinion, the systems deployed thus far, have been "little more than expensive billing systems". They are right.

Only with a robust functionality will smart metering be the backbone of the smart grid. It must be able to support demand side response measures, the integration of micro-generation and small scale renewables, and perhaps more importantly, provide the infrastructure base upon which new business models for retailers, energy services companies, aggregators, etc. can be developed. Some call this the "smart market". Although the name may be a misnomer, the idea is correct: smart technology will open up business and customer service opportunities impossible in the conventional energy supply system.

Now with five years to go before that "policy goal-laden year" of 2020, both the industry and policy makers are beginning to look beyond smart metering to the smart grid – separately and together.

Landis+Gyr made a number of acquisitions in 2014 that move it from a smart metering solutions provider into the smart grid space. In May, Landis+Gyr acquired PowerSense, a smart grid sensor and monitoring company and for the first time is moving beyond the substation into the low and medium voltage network. A month later, we announced the acquisition of GRIDiant, a data analytics company focused on the distribution network. It is the natural progression beyond smart metering, but in contrast to the policy debates, we were not ready to go there until the time was ripe.

Interestingly enough, at the same time, the interest of the policy makers has returned to smart metering, but with the intention of creating a platform for future consumer services. A number of different initiatives at the EU level are examining things such as functionalities and services beyond the metering system.

In its Benchmarking Report, the Commission noted that only half of the Member States were following the recommended smart metering functionalities. To be honest, none of these recommended functionalities are cutting edge or Earth-shattering. They are as basic as providing information directly to the consumer and supporting advanced tariff systems.

Two inter-related issues are increasingly in the focus of policy-making in Brussels, and in both of these smart metering will have a decisive role to play: the energy retail market and demand response. After over 20 years of working on the framework for the energy wholesale market, the Commission is now devoting a substantial amount of brainpower and ink to retail markets. That is encouraging, because that is where end-consumers will see the most direct benefit of European policy. Therefore, it is not surprising that the Commission is also examining the functionality needed for the smart meter to not only communicate with the network operator, but also to enable and deliver direct consumption information and energy services into the home.

If the most basic benefit of smart metering is accurate bills, consumers, who will most likely pay for the smart metering systems via grid-use fees, deserve to get a whole lot more. Likewise, demand response and bringing flexibility into the energy supply system are also getting a lot more attention these days and will continue to do so. The Commission's Smart Grids Task Force has been working on a report on demand side flexibility and the Council of European Energy Regulators (CEER) is devoting its annual conference in 2015 to energy market flexibility and demand response.

It is not that the industry and politics are moving in lock-step. On one hand, that would be too good to be true but on the other probably not all that healthy. Now at least, however, we are looking in the same direction, and the policy debates reflect developments that the smart metering industry as a whole is examining. For a very long time, European legislation for smart metering was in place and the technology was available but the deployments were lagging. Regulation will never keep pace with technological developments but it suffices to be on the same path.

Are we in for another "accordion" action, where investments on the ground fall behind the technology available and the policy discussions, and all come together again years later? I hope not, but for right now the squeeze-box is close together. We'll see where we are in 2020.

*Oliver Ittisberger is Landis+Gyr's Executive Vice President for EMEA (Europe, Middle East and Africa).*

**Ittisberger: Are we in for another "accordion" action?**



# Coordinating offshore wind

A study published by the European Commission shows that a more coordinated approach to building a grid to support offshore wind would deliver significant savings. **TEI Times** looks at the main highlights of the study.

In line with the goal of a EU single energy market, increasing electricity trade between countries in Europe is being facilitated by a growing number of high voltage direct current (HVDC) grid interconnections. Recent developments saw the Norwegian government issue in October the necessary licenses for the construction of the 1.4 GW NordLink HVDC interconnector. Notably, it is the first transmission link between Norway and Germany. At the same time, Norway also granted a licence for the longest sub-sea electricity interconnector in the world (known as NSN), to be built between the UK and Norway.

When complete, these connectors will not only improve cross-border electricity trade for a more unified European power market, they will also allow better sharing of renewable sources between countries.

Speaking at the time of the announcement of the NSN licence, UK Energy and Climate Change Secretary

Ed Davey said: "This is excellent news for both the UK and Norway. This new cable will allow the UK to import huge amounts of clean green hydroelectricity – enough to power up to 4 million homes – to back up our wind and solar power. This bolsters our energy security and will help keep consumers' bills down. It's a massive win-win for consumers and the climate."

Yet this sharing of renewable resources, particularly offshore wind, is something that the European Commission believes can be achieved more effectively if there is a coordinated development of offshore electricity infrastructure.

The Commission carried out a study, in conjunction with industry partners, GDF Suez, Ecofys, PwC and Tractebel Engineering, looking at the benefits of developing a meshed offshore network in northern Europe. The findings of the study were published in July in a report entitled: 'Study Of

The Benefits Of A Meshed Offshore Grid In Northern Seas Region'.

According to the Commission, investment in network infrastructure is needed, both onshore and offshore to cope with the changes occurring in Europe. Its Second Strategic Energy Review has identified a North Sea offshore grid, interconnecting national electricity grids and connecting offshore wind farms to shore, as one of six infrastructure priorities for the European Union. The North Sea offshore grid was also identified as a priority area under the EU regulation No 347/2013 on guidelines for trans-European energy infrastructure.

Today's "business-as-usual approach" to the development of offshore electricity infrastructure is characterised by limited coordination between EU member states. All wind farms are connected individually to shore and there are a limited number of point-to-point interconnectors, that all require coordination between no more than two countries.

An alternative is a coordinated approach, wherein several neighbouring wind farms are clustered and connected together to shore and countries are better interconnected through interconnectors linking several countries. The report adds that modern technology would even allow for a meshed grid, where wind farm clusters are connected to offshore hubs that are connected to each other and to various countries. It says that several studies showed that a coordinated development of offshore electricity infrastructure could deliver significant financial, technical, and environmental benefits at the EU level.

The goal of the study is to assess the potential benefits of a meshed offshore electricity grid in the North Sea, the Irish Sea and the English Channel at horizon 2030 for a range of scenarios. A key objective is to estimate the benefits of the meshed grid compared to those for the radial offshore generation connection approach.

In order to develop relevant scenarios for the analysis of the benefits of the different network configurations, several studies were carried out by the main players in the sector. The studies include: ENTSO-E's Ten Year Network Development Plan 2014, its previous TYNDP 2012, as well as its Scenario Outlook & Adequacy Forecast 2013-2030; North Seas Countries' Offshore Grid Initiative (NSCOGI); European Wind Integration Study (EWIS); Offshore Grid project; THINK Topic 5 (Offshore Grids: Towards a Least Regret EU Policy); as well as the development plans of several European TSO.

Three categories of benefits were evaluated in the Commission's study: environmental, techno-economical, and strategic. Environmental benefits are CO<sub>2</sub> emission reduction, reduction of renewable energy sources (RES) curtailment, and other environmental benefits. Techno-economical benefits are generation cost savings and socio-economic welfare, generation investment cost savings,

and reduction of losses. The strategic benefits are security of supply (SoS) and competition benefits.

Most of the benefits are evaluated based on simulations, where every hour of a full study year is simulated (in this study 2030).

As there is uncertainty about the load and generation in 2030, all analyses are carried out using three load-generation scenarios. Special attention is given to a detailed representation of offshore wind farms. The two offshore configurations are combined with the three load-generation scenarios and corresponding onshore network. In total, six models are obtained: scenario 1 – radial; scenario 1 – meshed; scenario 2 – radial; scenario 2 – meshed; scenario 3 – radial; and scenario 3 – meshed.

For each load and generation scenario, the reference model, corresponding to the radial configuration of the offshore grid, is compared to the more advanced (meshed) offshore grid configuration.

In the coordinated meshed scenario, more offshore hubs are needed and fewer cables are connected to shore, but they have a higher rating. The study shows that the net effect is that the infrastructure investment cost is €4.9-10.3 billion higher for coordinated network development. Significantly, however, this investment pays for itself through the techno-economical, environmental, and strategic benefits that are realised.

In the coordinated case, fewer cables making landfall and shorter cable lengths are needed and CO<sub>2</sub> emissions are reduced. The annual savings in 2030 including costs of losses, CO<sub>2</sub> emissions and generation savings are €1.5-5.1 billion for coordinated offshore grid development.

According to the report, these monetised benefits make the coordinated offshore grid profitable in all scenarios. The key drivers for these reductions of the total annual cost of electricity supply are the opportunities for energy trading/exchanges between member states through the offshore infrastructure and the resulting better integration of offshore wind capacity and of the different generation pools in the region. When states also coordinate their reserve capacity, an additional €3.4-7.8 billion saving in generation investment is obtained.

The Commission's study shows that a more coordinated approach at the EU level to developing a meshed grid infrastructure to support offshore wind appears to make sense from all aspects. The challenge is how to achieve such coordination.

'Study Of The Benefits Of A Meshed Offshore Grid In Northern Seas Region', by Stijn Cole, Pierre Martinot, Stéphane Rapoport (Tractebel Engineering), Georgios Papaefthymiou (ECOFYS) and Valerio Gori (PwC). Published July 2014 by the European Commission Directorate-General for Energy, Directorate B – Internal Energy Market Unit B1 – Internal Market I: Networks & Regional Initiatives

## Recent HVDC developments

In October the Norwegian government issued the necessary licenses for the construction of the 1.4 GW NordLink HVDC project, the first power connection between Norway and Germany.

The 623 km long submarine cable – owned by Statnett (50 per cent), TenneT (25 per cent) and KfW (25 per cent) – is expected to be completed by the end of 2018. The link will run between the Tonstad (NO) and Wilster (DE) substations.

"This link will make the exchange of renewable energies possible, in particular of hydroelectric and wind energy," said German Minister of Economy and Energy, Sigmar Gabriel. "NordLink will contribute to the [energy] supply security on both sides."

Norway also licenced National Grid NSN Link Limited's proposed subsea cable link with the United Kingdom. The announcement by the Norwegian Ministry of Petroleum and Energy means that Statnett, who is partnering UK-based National Grid's interconnector business in the project, now has all the necessary licences to allow the cable to be built.

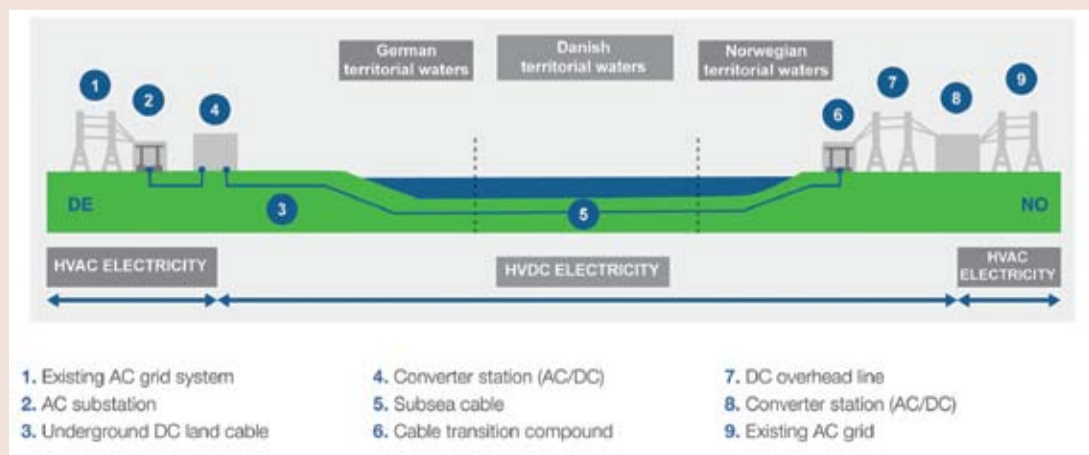
At about 740 km, the NSN interconnector would be the world's longest subsea interconnector and require investment of more than £1 billion (\$1.6 billion). National Grid is awaiting the outcome of a submission to UK regulator Ofgem which will determine the commercial framework for the link which, if granted, will see a "Cap and Floor" operating model. The decision is expected before the end of this year.

The interconnector, which is scheduled for completion in 2020, will see up to 1400 MW of electricity passing between Kviteseid in Norway and Blyth in Northumberland, potentially bringing low cost hydropower from Norway into the UK.

At the end of October, Ofgem also set out proposals to allow £1.1 billion funding for a new subsea link in the north of Scotland.

The new link will connect 1.2 GW of new renewable electricity generation following completion in 2018. This additional capacity will increase the resilience of Britain's energy infrastructure. It will connect the electricity grid on either side of the Moray Firth.

The proposals are now under consultation and a final decision on funding will be made this month (December).



# Malaysia goes big on supercritical

Manjung 4 is now the largest supercritical plant in South East Asia. Its start-up not only demonstrates that supercritical coal plants can be built at large scale but that there is now little reason for utilities to opt for less efficient sub-critical technology. **Junior Isles**



**Manjung 4: South East Asia's largest supercritical coal fired plant**

Grid synchronisation of the Manjung 4 power station plant on September 20th marked an important milestone for Malaysia and supercritical coal fired power plants. Not only will the 1000 MW unit bring much needed power to Peninsular Malaysia, as the single largest unit in South East Asia it demonstrates that there is now little reason to opt for sub-critical technology in a world where coal fired generators are coming under increasing environmental pressure.

Electricity demand in Malaysia, one of Asia's 'tiger economies', has been growing steadily for several years. The country's electricity generation has doubled in the past decade, according to government data and the Malaysian states anticipate that electricity demand will grow by more than 3 per cent annually at least through 2020. To meet projected electricity demand, the government anticipates an additional 6 GW of new generation will come online between 2015 and 2020.

Most of the country's installed generating capacity is made-up of coal and gas fired plant, with gas accounting for more than half of the total generating mix. But challenges in the gas sector have had a knock-on effect on the country's power sector. Tight natural gas supply in Peninsular Malaysia in recent years, caused by the state's decline in production since 2006, has resulted in unreliable gas supply.

Malaysia's government has long pursued a five-fuel policy (gas, coal, oil, distillate, hydro) and has also made efforts to promote renewable generation (solar and biomass) but in the short-term coal remains the main alternative to gas.

With the reliability of gas supply becoming a serious issue in Peninsular Malaysia in 2011, state utility Tenaga Nasional Berhad (TNB) took the decision to build a new supercritical unit next to the existing Manjung 1, 2, and 3 units.

Notably, the new unit has an electrical efficiency of close to 40 per cent – some five per cent higher than the adjacent sub-critical units.

Even though the plant's efficiency is not as high as is technically possible for the utility at the time, it was more important to have a plant with the ability to burn a wide variety of coals.

Jean-Marc Jaillet, Alstom's Project Director for the plant commented:

"Technically we could have proposed a plant with a higher efficiency by changing the steam parameters but it would have been more expensive and optimised for one particular coal. TNB preferred a plant that could be operated with a wide range of coals.

Having a choice of coal source was a big issue when the decision on building Manjung 4 was taken five or six years ago. Coal prices had almost tripled between 2004 and 2011 and obtaining high quality coal during the European winter season was a challenge.

"The good, low sulphur Indonesian coal goes to Europe during the winter, where prices are higher due to the demand," noted Jaillet. "So they wanted the possibility to burn other types of coal, e.g. from Australia, China or South Africa. Some 15 different coals are specified in the contract."

In terms of coal design parameters, the boiler can burn either bituminous or sub-bituminous coals with a calorific value ranging from 5000-6600 kcal/kg; moisture content of 9-35 per cent; 0.1-0.94 per cent sulphur and a fixed carbon content of approximately 35-54 per cent.

According to Jaillet, designing a plant with a wide coal specification was the most important aspect of Manjung 4. It called for some innovative thinking in the boiler design and the installation of the latest flue gas clean up equipment.

Alstom's contract, awarded in 2011, covered the engineering, procurement, construction and commissioning of a 1000 MW steam turbine, a generator, supercritical boiler and auxiliaries as well as the ALSPA Series 6 distributed control system and advanced environmental control systems such as a fabric filter and flue gas desulphurisation system to cut emissions.

The boiler is designed to operate using supercritical steam. Supercritical steam conditions represent a physical point just above the triple point of water. When the boiler pressure reaches above the critical pressure of 221.2 bar and temperature of 374°C, two-phase mixtures of water and steam cease to exist, and are replaced by a single supercritical fluid. These steam conditions allow a once-through boiler design where the high steam temperature and pressure results in greatly increased efficiency compared to a drum-type boiler.

Manjung 4 operates with a superheater outlet pressure of 282.4 bar, superheater steam temperature of 600°C. Main steam flow is 3226 t/h. Reheater steam pressure and temperature are 60.6 bar and 605°C, respectively. Reheater inlet temperature is 364°C. Reheater steam flow is 2687 t/h.

The boiler has a once-through vertical tube furnace wall, two-pass design equipped with the TFS 2000 firing system, which is the Alstom low-NOx tangential firing system with tilting fuel and air nozzles.

The tangential firing introduces swirl in the combustion of the boiler. One of the benefits of tangential firing is that it introduces some air staging to reduce NOx emissions and protect the furnace walls from corrosion, while optimising combustion.

An unusual aspect of the Manjung 4 boiler is that it has a double furnace to create two fireballs. "Due to its size, we could not extend it upwards so we had to expand horizontally," said Jaillet. "Essentially, there are two furnaces side-by-side without a partition between. So although it is a rectangle, there are eight burners in the corners to create the two fireballs and on eight levels, meaning 64 burners in total. It is a proven design but there aren't many like this in the world."

The low NOx firing system in the boiler and higher efficiency serve to substantially reduce emissions compared to the existing units. Emissions are well within World Bank limits – NOx emissions are below 500 mg/Nm<sup>3</sup>, while CO emissions are less than 200 mg/m<sup>3</sup>.

In addition to lowering NOx emissions, another important function of the tilting burners is that they allow control of the furnace outlet reheat temperature to enable operation over a wide load at high efficiency.

According to Jaillet, Manjung 4 can technically operate at around 30 per cent load (300 MW), much lower than the 55 per cent specified by TNB. Efficiency is still as high as 37.5 per cent at 50 per cent load. "They typically operate at full load during the day and at the minimum 55 per cent load at night. Below that, they believe it is better to shut down the plant and start-up a smaller plant."

Whether operating in full or part-load, performance in terms of SOx and particulates emissions is also impressive for a coal fired plant.

A seawater FGD system ensures SO<sub>2</sub> emissions are below 200 mg/Nm<sup>3</sup>. This is a significant improvement compared to the three existing units where only 65 per cent of the flue gas could be treated with the technology available at that time. Meanwhile a fabric filter ensures particulates in the flue gas are less than 50 mg/Nm<sup>3</sup>. The fabric filter is an Alstom Optipulse pulse-jet fabric filter system. Notably it is the first 1000 MW fabric filter reference in Asia. The main advantage of this filter, compared to a traditional electrostatic precipitator, is that it maintains its performance for all types of coal.

The plant's low emissions compared to conventional coal plant are largely a direct result of the higher efficiency of supercritical technology. Manjung 4 generates 14 per cent more power for each tonne of coal compared to units 1, 2 and 3.

With the need to tackle global warming high on government agendas around the world, supercritical technology is thus becoming the technology of choice for countries still dependent on coal. Industry estimates that every one per cent increase in efficiency reduces CO<sub>2</sub> by 2-3 per cent. Alstom notes that state-of-the-art supercritical technology saves 35 per cent of the specific CO<sub>2</sub> emissions compared with today's worldwide average. Such statistics can only serve to strengthen the case for supercritical technology.

The economic case is also compelling. While capital costs are marginally higher than sub-critical plants, this is more than compensated for by the improved performance over the plant's lifetime. This is driving other projects in the region.

Following Manjung 4, Malaysia has signed contracts for three other 1000 MW type projects. The first of these is Tanjung Bin 4, again with Alstom. The company says it is also discussing several projects in Indonesia and Thailand based on the Manjung 4 platform concept.

"They can see that now there is no reason not to buy supercritical. The price is similar [to sub-critical] and you gain 5 per cent on efficiency. With fuel representing two thirds of the cost of running a power plant, if you can save five per cent on fuel it's a big saving over the life of the plant," said Jaillet.

Jaillet sums up the case well: "Why buy Windows XP when you can have Windows 7 or 8 for the same price."



Junior Isles

# Welcome to Jurassic Park

One keynote speaker at this year's European Utility Week (EUW) described working with the utility sector as "sometimes like working in Jurassic Park". He said: "You are alive and still running around but you haven't yet realised that the end is coming."

It would not be the first time that utilities have been described as dinosaurs. In a sector that is undergoing fundamental changes, utilities in deregulated markets have to find ways to adapt their business models and operating strategies if they are to survive.

Speaking on the sidelines of the conference, Thomas Zimmerman, Chief Executive, Siemens Business Unit Smart Grid Solutions & Services, Energy Management Division, said: "The industry is undergoing a huge transformation and speed is accelerating. North America, Europe and the emerging markets are all different but all have a common theme – they have to transform their energy systems to fit a new world that is much more complex. One thing that has really accelerated during the last year is the discovery of the end customer – especially in Europe and the US."

The relationship between utilities and customers is an area that some see as key to the survival of energy companies. Capturing new customers or ensuring they do not lose existing ones is now more important than ever.

"Like with the changes we saw in telecoms some years ago, it is no longer enough to be in touch on a monthly basis, or less," commented Zimmerman.

US-based Opower, a specialist in cloud-based customer engagement software for the utility industry, recently published a report that quantifies for the first time the value

of strong customer relationships for European utilities. The report – 'The Value of the Engaged Energy Consumer' – was conducted in collaboration with more than 95 of its utility partners in nine countries, including leading European utilities.

Commenting on its findings, John Webster, VP Marketing and Strategy, Opower EMEA said: "Many utilities are failing to keep up with customers' expectations about quality of service. And while adopting a more customer-centric approach will be a challenge, our report clearly quantifies the value of the engaged energy consumer."

The report claims that utilities can increase the return on their customer

developers and telecoms companies have provided functions and applications that users did not even know they wanted. Similarly, energy companies will have to do more than just deliver electricity.

The problem is, it is not immediately obvious what else energy companies can offer. Smart meters are a starting point for at least obtaining the vast amounts of data that will enable utilities to examine customer behaviour. Indeed, there is a growing call for 'big data' analytics in the sector.

US-based 'software-as-a-service' company Simple Energy recently announced its expansion into Europe to offer software services to refine

managers and prosumers.

Laurent Schmitt, Vice President of Strategy and Innovation at Alstom Grid said: "We are working with a few academic institutions to pilot it in a city environment. The platform will collect real-time data for use by utilities. For example it could collect data from the smart meter and other sources such as PV installations and electric vehicle charging points. These are things the utility may not own but need to know about because they have a significant impact on the grid."

Jochen Kruesel, Global Head of ABB's Smart Grids Industry Sector Initiative noted: "Integrating distributed generation into the market is an evolving field and using the smart metering infrastructure to gain access to highly distributed generating units is one very important area."

Speaking at one of the EUW sessions entitled: 'The Death Spiral', Steve Berberich, President and CEO of the California Independent System Operator noted that with the advance of [rooftop] solar, consumers are now producers as well as consumers.

"They are now 'prosumers' and have to know more about power and what's being produced, and will have to think more about onsite energy support. [But] do you know how long studies show a consumer thinks about their electric bill?" he asked. "Just 10 minutes per year – and that includes paying it. It's a big reach for consumers to change that mental effort. But if they don't it won't work; we are going to have to automate what they do"

There is a more tangible case for the wider deployment of smart grid technology than just smart meters *per se*.

"Studies show savings can be made through the adoption of innovative technologies, not just smart meters, for better operation of distribution grids," noted Kruesel. "Information from meters and other smart devices is already increasingly being used for better identification of outages for improved outage management."

On the retail side, however, energy companies have their work cut out on how to make returns. Simply rolling out smart meters is not enough. There has to be more thought about why someone would want a smart meter. Using smart phones as an analogy, it was the functionality and applications that made them must-have items.

"Everyone is talking about customer engagement but there should be more focus on how to find things that customers are interested in," said Kruesel. "You need to think about what could make them enthusiastic instead of expecting them to become engaged. I keep hearing that the customer has to become engaged but why should he? I don't know anyone who wants to spend time with electricity."

For energy companies to succeed in this market, they will have to outwit more consumer savvy organisations and, as Berberich put it, "own the other side of the meter".

Zimmerman agrees. "If utilities don't re-invent themselves there's a big danger that the likes of Google, the aggregators and other players will eat their lunch."

There are many theories as to why the dinosaurs became extinct. Perhaps they were wiped out by a cataclysmic event or maybe they were just too dumb to survive.

**"If utilities don't re-invent themselves there's a big danger that the likes of Google, the aggregators and other players will eat their lunch"**

relationships by 20 to 55 per cent, and add an incremental of up to €40 annually to their bottom line for every household they engage.

The question is how to engage customers who demonstrate no interest in electricity beyond cost? The subject was touched on at the Renewable UK conference last month. As Graham Campbell, New Business Manager, Scottish Power Energy Networks said: "Cost is the single most important thing to consumers. Why is it society thinks it's fine to spend £50-60 a month on a mobile phone that perhaps only has 60-70 per cent reliability but thinks it's absurd to pay an equivalent amount for electricity?"

The reason is, mobile phones have gone beyond offering its users the ability to have a phone conversation while on the move. Smart phone

the utility-consumer relationship in a way that makes business sense for European utilities. The company says it uses behavioural science, big data analytics, and digital marketing techniques to change how people think about energy.

Mike Ballard Senior Director Utilities Strategy (EMEA) at Oracle also noted that providing software-as-a-service for things such as big data analytics is a growing trend. "We are increasingly being asked to help with reducing the cost of running the business and helping utilities get the most value out of the projects they are delivering. Typically this also means they want that value returned in months [instead of years]."

Basically, companies like Oracle are now providing software-as-a-service, where utilities buy a service that is ready to use instead of investing time and resources into developing their own.

"It would not be a bespoke service but taking a more subscription-based approach means they can pay for only the things that return value," said Ballard. They can avoid being locked-in to an infrastructure and set of solutions that they have to continually invest larger amounts of money into in order to get out the same amount of value."

Last year Siemens launched Omne-tric, its joint venture with Accenture, so it could offer such IT solutions along with its smart grid and energy technology products. "In the US there has already been 40-50 per cent rollout of smart meters. The key challenge for the utilities and municipalities now is to create additional value from the data that is available, so applied data analytics is really the thing," said Zimmerman.

He noted that here data analytics goes beyond just learning about customer behaviour. "There are two dimensions. The customer engagement topic is picking up rapidly but the other use is to further optimise the grid." This is an area that has much clearer and more immediate benefits to energy companies.

Alstom recently announced projects aimed at expanding its e-teraODM platform for Grid Operational Data Management. The real-time energy analytics platform supports decision-making for grid operators, aggregators, city energy

