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New York summit rallies support for global climate agreement

"Change is in the air," said UN Secretary General Ban Ki-moon

The United Nations Climate Summit in New York has put climate change back into the spotlight as climate negotiators prepare to reach a legally binding global agreement on climate change in Paris next year, writes **Junior Isles**

The recent Climate Summit in New York, US, called by UN Secretary General Ban Ki-moon may have induced some impetus to talks during the months of negotiations that lie ahead of next year's COP21 Paris summit.

More than 120 heads of state and government attended the New York summit to announce their vision and commitments, as well as actions that will reduce emissions, enhance resistance to climate change and mobilise financing for climate action.

"Change is in the air," said Mr Ban, noting that the actions announced at the summit by governments, businesses, finance and civil society show that many partners are "eager to confront the challenges of climate change together".

Mr Ban said the billions of dollars in private sector pledges announced at the summit marked "an entirely new, co-operative global approach to climate change".

Some of the world's biggest banks, insurers and pension funds said they would help channel $200 billion by the end of next year to combat climate change, a step the UN said would help push the global climate negotiations forward.

This included a move by Bank of America to commit $1 billion in capital to help make clean energy investments easier to finance, especially in developing countries.

Jose Manuel Barroso, president of the European Commission, said over the next seven years, the European Union would provide €3 billion (nearly $3.9 billion) to help developing countries become more sustainable. France's president François Hollande pledged to contribute $1 billion, matching a $1billion contribution Germany unveiled in July.

Not all, however, were convinced that the announced pledges represented progress. Dipti Bhatnagar of Friends of the Earth said: "The climate summit was a fool's paradise out of touch with the climate emergency we are facing. The finance pledges made at the summit had no specifics, no timelines, and nothing saying if they are about new and additional climate finance or simply aid pledged in the past and diverted from its original destination."

Hollande urged the US and China to do more to combat global warming. US President Barack Obama made no specific financial commitments during his speech on global warming but pressed world leaders to follow the

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China plans national ETS as climate debate heats up

China has decided to accelerate the roll out of its first national carbon emissions trading scheme (ETS) but remains divided on how best to cut absolute emissions.

Last month government officials announced the country would introduce a national ETS in 2016, which when completed will likely eclipse Europe's ETS as the world's largest.

"We've brought forward this plan because it's been prioritised in the central government's economic reforms," Wang Shu, an official with the climate division of the National Development and Reform Commission (NDRC), China's top planning agency said, confirming an earlier statement from Sun Cuihua, a senior climate official with the agency. "The central government is pushing reforms, so everything is speeding up."

China is no stranger to carbon trading, currently operating seven regional pilot schemes. With the most recent of these launched only this year, the roll out of a national scheme in 2016 is seen by some as an ambitious timeline, although not impossible.

Commenting on the news, Jian Wei Lim, Analyst for Chinese Carbon Markets at ICIS Tschach, said: "Previously, many Chinese companies were unwilling to invest much resources or time in setting up a proper carbon management team due to the uncertainty of the continuity of carbon trading in China. However, a national carbon market in 2016 is a very ambitious target due to many possible problems such as the transition from the pilot schemes to the national scheme, involving the non-pilot regions, the need for supporting functions (e.g. verification companies), etc.

"Nevertheless, if any country in the world is able to launch a national carbon market in such an ambitious timeline, it would be China."

China has committed to cutting its intensity of carbon emissions by as much as 45 per cent before 2020 from 2005 levels and its effort to curb emissions is seen as pivotal to reducing global warming. According to *Financial Times* calculations, at current trends, and without any drastic changes to planned economic growth, the country's carbon emissions are expected to peak around 2050.

For the last several months, China's climate experts have been debating how this can be brought forward. Last month Xie Zhenhua, China's chief climate change negotiator within the NDRC, told the *FT*: "If we want the carbon dioxide emissions peak to happen earlier, we may have to impose absolute controls. So we are preparing controls on energy consumption and carbon dioxide emissions. But at the moment we are debating, we are still preparing a plan and getting ready for action."

Some senior climate advisers are calling for absolute caps on emissions starting during the country's next five-year plan (2016-2020). But China's heavy industry – overseen by the NDRC – strongly opposes any move that might restrict China's development.

Other ideas include regional caps, which would fit into national policies for addressing air pollution in prosperous eastern cities but might do little to reduce China's overall emissions, or to solve the problem of global warming.

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US' lead on the issue.

"The United States has made ambitious investments in clean energy and ambitious reductions in our carbon emissions," Obama said. "Today I call on all countries to join us, not next year or the year after that, but right now. Because no nation can meet this global threat alone."

Sending out a call: Obama says no nation can meet the gobal threat alone

China, meanwhile, offered $6 million to help poorer countries deal with climate change. Last month it was announced that for the first time China now emits more carbon pollution per person than the EU.

China produced 7.2 tonnes of planet-warming carbon dioxide a head last year, compared with 6.8 tonnes in the EU. Its total CO_2 emissions outstrip those of both the EU and the US combined, scientists reported. China is now responsible for 28 per cent of global emissions, followed by the US with 14 per cent and the EU with 10 per cent.

Notably, just ahead of the summit, the World Bank said that 73 countries, including China, Russia and the European Union, 11 regional governments and more than 1000 companies expressed their support for a price on carbon. The US, however, decided not to join the 73 countries in supporting a price on carbon, which Congress had indicated it would reject.

In order to keep the momentum, the World Bank said it would also convene a new "carbon pricing leadership coalition" to encourage countries to advance carbon pricing solutions after the Summit ended.

Several oil and gas majors including Saudi Aramco, China's Sinopec and France's Total, also unveiled an "oil and gas climate initiative" to reduce gas flaring and boost the role of renewable energy.

Meanwhile global state and regional governments networks announced the Compact of States and Regions that will for the first time provide a clear picture of global state and regional governments' overall contribution to greenhouse gas emission reduction in order to help tackle climate change.

Chen Ying, a research fellow at the Institute for Urban and Environmental Studies under the Chinese Academy of Social Sciences, said the New York meeting would help muster political will for talks at the Lima Climate Change Conference in December, where countries are expected to discuss details of the new global climate change pact one year ahead of the Paris meeting.

"We hope the countries can reach an agreement in 2015 and will not repeat the failure of the Copenhagen summit," said Chen.

Governments agreed nearly five years ago in Copenhagen to keep global average surface temperature warming below 2°C from pre-industrial times. There has already been nearly 1°C of warming since then.

ABB's 'Next Level' strategy has an eye on project risk

"We are shifting our centre of gravity," says Spiesshofer

ABB has set out its 'Next Level' strategy aimed at delivering its financial targets for the 2015-2020 period. Lowering risk in projects handled by its Power Systems Division will be a key part of that strategy. **Junior Isles** reports.

ABB says its Next Level strategy and financial targets for the 2015-2020 period will drive profitable growth by shifting its centre of gravity toward high-growth end markets, enhancing competitiveness and lowering risk in business models.

During its Capital Markets Day in London last month, ABB said it expects to grow operational earnings per share (EPS) 10-15 per cent CAGR and deliver attractive cash returns on investment (CROI) in the mid-teens over the 2015-2020 period. It aims to grow revenues on a like-for-like basis on average 4-7 per cent per year, faster than forecasted GDP and market growth.

The company also says it plans to steadily increase over the same time period its profitability now measured in operational EBITA within a bandwidth of 11-16 per cent while targeting an average conversion of the annual free cash flow above 90 per cent. The new financial targets take effect on January 1, 2015.

"Our Next Level strategy will focus on actions centred on accelerating ABB's organic growth momentum, margin accretion as well as enhanced capital efficiency to deliver greater shareholder value," ABB CEO Ulrich Spiesshofer said. "We are shifting our centre of gravity towards higher growth segments while enhancing competitiveness and lowering risk particularly in our Power Systems division."

Notably, the company is looking to lower risk in offshore wind grid connection projects. ABB has experienced difficulties at projects such as Dolwin 1 and 2, which has resulted in delays and subsequent charges.

Speaking on the sidelines of the Capital Markets Day conference, Claudio Facchin, head of ABB's Power Systems said: "The challenges we face are related to us taking the overall responsibility for the EPC contract and not having the right resources and competencies in place at the right point in time to execute the project. The delays and charges were related to the construction of the platform not to our HVDC technology, cables or design of the converter station. It was not as easy as expected to adapt an offshore oil platform [to a platform] for this type of application."

He added: "We are still learning through the whole value chain. There was also a gap between the expected terms and conditions from a commercial standpoint from the customer and what the supply chain is accustomed to."

The company says it will now focus on partnering to reduce risks in planning, installation and execution. Spiesshofer said "every single large project" is now being reviewed to better anticipate project needs.

ABB is targeting an operational EBITA of 7-11 per cent for its Power Systems division during the 2015-2020 period. This target will be in effect from January 1, 2016, after concluding the "step change" programme.

ABB also announced that as of January 2015, its regional structure will be reduced from eight to three regions responsible for customer collaboration, shared services and the related countries. "These moves will improve customer focus as well as productivity, result in clear responsibility and accountability and drive market oriented collaboration," said Spiesshofer.

Ukraine-Russia dispute spurs calls for binding energy efficiency targets

In the shadow of the Ukrainian crisis, Europe could cut its gas dependency by a third if it made energy efficiency improvements the centrepiece of its strategy, according to a new report from the think-tank Institute for Public Policy Research (IPPR).

IPPR says a new target for improving Europe's energy efficiency by 35 per cent by 2030 would cut the EU's gas dependency by a third – equivalent to the proportion of the EU's gas demand currently met by Russia. The report says a decisive strategy for reducing European reliance on gas imports in this way could slash Europe's fuel bill by €500 billion through to 2030.

Joss Garman, IPPR Associate Fellow, said: "The crisis in Ukraine has reignited the debate in Europe over whether the package of energy policies that the continent's leaders are aiming to agree in October should include a binding 2030 target on energy efficiency."

Rupert Redesdale, CEO of the UK's Energy Managers Association, who will be speaking at the EMEX event in London in November noted: "The EMA believes the business case for a new energy efficiency target laid out in the IPPR report is convincingly made. A kilowatt-hour saved is a kilowatt-hour that does not need to be generated. We must think about energy holistically. Cleaner generation, smarter usage and energy efficiency measures all increase our energy security."

The benefits of energy efficiency go well beyond the simple scaling back of energy demand, according to a new report from the International Energy Agency (IEA).

IEA analysis has shown that energy efficiency can boost economic growth while reducing energy demand. But despite the vital role that energy efficiency could play, IEA assessments suggest that under existing policies, two-thirds of the economically viable energy efficiency potential available between now and 2035 will remain unrealised. This is partly because energy efficiency is undervalued.

The new study, 'Capturing the Multiple Benefits of Energy Efficiency', challenges the assumption that the broader benefits of energy efficiency cannot be quantified. It shows how it is possible to move beyond qualitative assessments, providing examples of how existing methodological tools can be applied to measure and even monetise the value of energy efficiency to the economy and society.

Smart grids aid distributed generation

The results of a study by the Global Smart Grid Federation (GSGF) confirm that most nations worldwide are experiencing a significant increase in the integration of distributed generation and that the costs associated with renewable distributed generation are decreasing. It also said that smart grids have a significant role to play in this global trend

The study called 'Grid Connectivity of Distributed Generation' noted that from a technological perspective, maintaining power quality, managing voltage and frequency levels, network losses, increased loads, standardisation and interoperability are major issues related to the integration of distributed generation on the distribution system level.

"Many countries are publicly funding R&D projects related to smart grids and distributed generation integration to address these issues. In order to mitigate considerable expenses related to the replacement of ageing grid infrastructure and the investment in additional capacity, several countries are exploring the possibilities of active demand participation to facilitate distributed generation integration," it stated. "In addition, electricity storage both on the transmission (e.g. pumped hydro) and distribution (e.g. electric vehicles) level is receiving substantial interest.

Last month Siemens announced that it has started a new project – IREN2 (Future Viable Networks for Integration of Renewable Energy systems) – in Wildpoldsried in the Allgäu region in connection with Germany's transition to a new energy mix.

The project will investigate innovative power grid structures and their operational management based on technical and economic criteria. The goal is to discover how energy systems with distributed power generation and additional components like battery storage devices, block district heating power plants, biogas plants, and diesel generators can be technically and economically optimised.

■ A report released by the UK's Public Accounts Committee (PAC) has called on the government to take steps to ensure that smart meter roll out delivers the promised financial benefits for consumers. David Owen, UK Managing Director, Maingate commented: "The overriding theme of the report is the concern that some consumers may not realise the expected reductions in energy consumption and the corresponding cost savings."

Brazil strained by power crunch

Spot prices are rising and the energy crunch has become a major topic in the run up to Brazil's next Presidential election.

Siân Crampsie

Brazil is ramping up investment in its electricity sector in an attempt to avert the on-going energy crisis.

The government last month postponed for a second time an auction for new capacity to give developers more time to submit proposals for fossil fuel fired power plants as well as hydropower plants.

The auction will now take place at the end of November. It has so far attracted 50 GW of capacity, about half of which is for thermal plants burning coal, natural gas or biomass.

The remaining capacity so far enrolled in the auction is mostly wind and solar, and only approximately 1000 MW of hydro.

Delaying the auction will enable an additional 460 MW of hydropower to participate, according to the Ministry of Mines and Energy. It will also enable some of the thermal plants to finalise contracts such as long-term fuel supplies.

Brazil is in the midst of an energy crisis brought on by its worst drought in 80 years and rising demand for electricity. Hydropower generates around three-quarters of the country's electricity needs but the country's reservoirs are now at historic lows.

Brazil's Electric System National operator (ONS) says that reservoirs for hydropower dams in the southeast and Midwest regions are at an average of 34 per cent of their total capacity, down from 60 per cent a year ago. Levels could reach 18.5 per cent by November.

And although Brazil has been successful at increasing the level of thermal power generation in its mix since the last energy crisis in 2001, the energy crunch has caused spot prices to soar. In August the average spot price was Reals581 ($241) per MWh, more than triple the Reals153 price in August 2013.

The Ministry of Mines and Energy expects electricity demand to grow at an average of nearly five per cent per annum over the next few years. President Dilma Rousseff's policy of keeping prices low for consumers will not help to curb consumption nor help the finances of Brazil's utilities.

Rousseff cut electricity prices as a means of boosting the economy in early 2013. The move was popular with consumers and she has pledged to maintain the policy in her re-election campaign for the October elections.

The supply shortage is good news for Brazil's wind sector, however, which is likely to add over 7 GW of new capacity to the grid between 2015 and 2018, according to the Brazilian Wind Energy Association (ABEeolica).

Investment in the wind sector in 2014 will reach $8.8 billion, said the association, while between 2015 and 2018 it will reach almost $14.9 billion.

Alstom said last month that it had started operating a third shift at its wind turbine factory in Camaçari, Bahia state, in order to expand production from 600 MW per year to 900 MW per year.

In the first half of 2014 the Mines and Energy Ministry approved 3.7 GW of new wind farm capacity alongside 658 MW of biomass-fired capacity and 533 MW of hydropower. Altogether the 180 projects will require $8.3 billion of investment.

Investment in transmission capacity is also ongoing. At the end of August ABB said it had commissioned the HVDC converter stations for the Rio Madeira high voltage direct current (HVDC) link.

The 2400 km-long, 3150 MW power connection is the longest transmission link in the world and will bring electricity from two hydropower plants in the northwest of the country to São Paulo.

CNNC signs Atucha 3 deal

Argentina is edging closer to the construction of a third nuclear reactor at its Atucha complex with the signing of a commercial framework contract between Nucleoeléctrica Argentina and China National Nuclear Corporation (CNNC).

Under the deal CNNC will provide a $2 billion long term financing facility as well as technical support, services and equipment for an 800 MWe Candu 6 reactor.

Nucleoeléctrica meanwhile will carry out design work, construction and commissioning of the proposed plant, which will be built near the town of Lima, 115 km northwest of Buenos Aires.

Under the contract a number of commissions will also be created to discuss and develop contracts relating to the project. It follows the signing of a high level agreement between the Argentine and Chinese president in July 2014.

Nucleoeléctrica Argentina and CNNC also signed two agreements in February covering operations and technology, as well as the use of Chinese goods and services in Argentine exports.

Argentina has three nuclear reactors that generate about one-tenth of its electricity. Atucha 2 achieved first criticality early in June 2014 and was expected to reach full power this month.

Enersis boosts Edegel stake

The Enel Group has increased its presence in the Peruvian power sector by taking control of power generation firm Edegel.

Enel's Chilean business has purchased a 39.01 per cent stake in Generandes Perú S. A. for $413 million from Inkia Americas Holdings Limited.

Generandes Perú holds a 54.2 per cent stake in Edegel, which has an installed generating capacity of just over 1.5 GW.

Enel's Chilean group Enersis now has a 58.6 per cent shareholding in Edegel, an increase on the 37.5 per cent it indirectly owned through its subsidiary Endesa Chile. Enersis also directly controls 96.5 percent of Peru's Empresa Electrica de Piura S.A.

The consolidation of Enersis' shareholding in Edegel is part of its strategy to re-acquire minor shareholdings, which is being financed by funds from a capital increase carried out in March last year.

EPA extends emissions consultation

- Senate requests more time
- Wind, solar reaching grid parity

Pressure from lobbying groups and lawmakers has forced the US Environmental Protection Agency (EPA) to push back a deadline for commenting on President Barack Obama's latest proposals for curbing greenhouse gas emissions.

The EPA said in September that it would allow an extra 45 days for people, states and interested groups to give the administration their opinion on the proposed regulations. It stressed that the move would not delay the implementation of the new rules, which aim to limit GHGs from existing power plants.

The proposals have drawn strong reactions from both environmentalists in favour of the move and coal and industrial groups opposed. The decision to delay the deadline for comments came after half the senate called for an extension. "The complexity and magnitude of the proposed rule necessitates an extension," senators wrote in a letter to EPA administrator Gina McCarthy in September.

A number of other political leaders want to see the clean power plan scrapped – or at least delayed beyond Obama's last term in office – and have requested the EPA to re-submit the plan because crucial information has been omitted. A number of states are also suing the EPA and dispute the agency's authority to adopt sweeping regulations.

Investment in new coal-fired capacity is already suffering because of strong growth in the USA's natural gas sector. Recent data from the US Energy Information Administration (EIA) suggests that coal-fired generation is continuing to lose ground to natural gas as well as renewable energy.

In the first half of 2014, 4.35 GW of new capacity was added to the US grid, but none of this was coal. The EIA is expecting 580 MW of new coal capacity to be added in the second half – the Kemper integrated gasification combined cycle plant in Mississippi and a small conventional steam lignite coal plant in North Dakota.

In contrast, gas fired combined cycle plants made up more than 50 per cent of capacity additions, while solar plants contributed over a quarter and wind plants one-sixth, according to the EIA.

"So far this year, the US power industry has added 675 MW of new wind power capacity," EIA Administrator Adam Sieminski said in a statement. "Wind power additions are expected to increase later this year to a total of about 5.6 GW of new generating capacity for the year, four times the amount in 2013."

Last month Lazard published a report showing that large wind and solar farms are now cost-competitive with traditional energy sources such as coal and nuclear, even without subsidies.

The trend has been driven by falling costs and increasing efficiencies for solar panels and wind turbines. "The economics of alternative energy have changed dramatically in the last decade," said George Bilicic, Vice Chairman and Global Head of Lazard's Power, Energy & Infrastructure Group. "Utilities still require conventional technologies to meet the energy needs of a developed economy, but they are using alternative technologies to create diversified portfolios of power generation resources."

Japan continues energy sector restructuring post-Fukushima

■ Moves to cut LNG price ■ Solar projects not going forward as planned

Japan's recent decision to launch its first trading hub for liquefied natural gas (LNG) represents a further step in the country's effort to diversify its energy sources and restructure the sector in the wake of the nuclear accident at Fukushima in March 2011.

The move means that large LNG handlers such as Tokyo Electric Power (Tepco) and Mitsubishi Corp can now trade non-deliverable forwards – a type of futures contract without any physical settlement – on a new platform called Japan OTC Exchange (JOE), rather than striking private, bilateral deals.

Japan is the world's largest gas importer and it is hoped that the move will help reduce gas prices. With all of its nuclear fleet still closed following the accident, LNG-fired power plants are expected to account for more than half of power generation in the current fiscal year. This is pushing up the price of electricity and increasing the country's trade deficit.

The news came as Tepco, the owner of the crippled Fukushima Daiichi nuclear plant, said it plans to grant rival Chubu Electric Power Co. negotiation rights in its attempt to select a partner to replace Tepco's 10 GW of ageing fossil fuel-fired plants.

Tepco and Chubu Electric are the dominant electricity suppliers in Japan's first and third-largest economic regions, but the potential deal is further evidence of a post-Fukushima trend of cooperation between Japan's power utilities and the state itself, and a move away from rigid local and regional power monopolies.

Tepco was expected to give negotiation rights to Chubu Electric serving central Japan shortly, with the aim of reaching an agreement within this business year after working out details such as fuel procurement and rebuilding power generation facilities.

Osaka Gas Co., which has a cooperative relationship with Chubu Electric in fuel procurement, could also join the partnership between Tepco and Chubu Electric.

If the partnership is realised, Tepco's procurement of LNG would increase from around 25 million to nearly 40 million tons annually, giving the company more power in price negotiations with vendors.

The two utilities will also replace old thermal power generation facilities around Tokyo Bay with new facilities to produce electricity more efficiently to save more in costs.

In the meantime Japan continues to debate how large a role nuclear power should play in the country's electricity generation. Japan's future energy mix is one of the key roles of newly appointed industry minister Yuko Obuchi.

The country has been placing a strong focus on solar but many of the projects are not moving forward as planned.

From April 1 this year, the Ministry of Economy, Trade and Industry (METI) has required solar projects to secure land and equipment within six months of getting approvals. Last month the government revealed, however, that so far, 647 projects have been cancelled or abandoned by developers after getting approval in fiscal 2012.

Yoichi Kimura, an official in charge of clean energy projects for METI, said at a taskforce meeting that 1820 MW of solar power capacity had been cancelled. This represents 9.7 per cent of the total non-residential solar capacity approved in fiscal 2012.

METI plans to investigate another 351 cases, representing 2700 MW, which have yet to secure either land or equipment after approvals in fiscal 2012, according to Kimura.

METI is conducting similar investigations for projects approved in fiscal 2013.

■ Kyocera Corp announced that it will install one of the world's largest floating solar power plants in Kato City, Hyogo Prefecture, Japan. Kyocera TCL Solar LLC, a special purpose company established by Kyocera and Century Tokyo Leasing Corp., will build the 1.7 MW solar power plant by procuring a 'floating mounting system' from France-based Ciel & Terre International. Construction of the plant is scheduled to be completed in April 2015.

Green growth slows carbon emissions

China's carbon emissions have declined by 5 per cent this year, the biggest drop in recent years, according to Chinese Premier Li Keqiang.

"China's economy maintained medium-high growth in the first half of this year while its carbon emissions have achieved the largest reduction this year, down by 5 per cent year-on-year," Li said during talks with Gaston Browne, Prime Minister of Antigua and Barbuda.

Li stressed the Chinese government attaches great importance to climate change and has made arduous efforts in this regard. He said China's 1.3 billion people must understand the importance of energy and the environment in order to realise modernisation.

"China will speed up a green and low-carbon economy through reform and innovation in order to follow a sustainable development path," Li said.

According to the *2014 China PV Development Report*, China's installed capacity of photovoltaic (PV) systems will reach 1 GW by 2050, accounting for about 25 per cent of the country's total installed capacity.

PV exports from the country, however, continue to face difficulty according to experts attending last month's 2014 China PV Summit. While China's exports of PV products are predicted to stabilise this year, with exports estimated at 17.6 GW, Li Junfeng, a member of the China Renewable Energy Industries Association (CREIA), said PV exports to Europe and the US are unlikely to grow at the same rate as a few years ago.

Against a backdrop of slow global economic recovery, various countries are paying greater attention to new energy, so trade disputes on new energy products will undoubtedly increase in the future, he said.

India expecting $100 billion in renewables investment

India is expecting $100 billion of investment in the renewable energy sector in the next four years as it firms up a new energy policy framework.

The government is working on a renewable energy policy to attract investments in renewables by providing tax breaks and cheaper loans.

Speaking at the Economist India summit in September, Power, Coal and Renewable Energy Minister Piyush Goyal said: "We expect $100 billion in the renewable energy sector in the next four years."

Goyal's announcement follows the government's decision to drop a plan to impose anti-dumping tariffs on solar cells imported from the US, China, Taiwan and Malaysia.

In late August, the Ministry of Finance rejected the recommendation from the Directorate General of Anti-Dumping and Allied Duties – part of India's trade ministry – that had ruled in May that imported equipment was being under-priced and was damaging local manufacturers.

India has ambitious plans in the solar power sector, as it looks to cut its dependence on imported fossil fuels. In mid-September Goyal said that the country's first ultra mega solar power park with a capacity of 2500 MW will come up in Andhra Pradesh.

The government said that the imposition of an anti-dumping duty would kill the solar mission. "Imposition of any such duty would have led to escalation in the tariff from solar plants," Goyal said.

Goyal added that imports were necessary, as its domestic manufacturing capacity of 700-800 MW is not sufficient to meet the requirements of its solar mission.

"We ensured within the framework of WTO to provide adequate support to not only fulfil the current manufacturing potential but also plan for a five-year significant ramp up from what they (domestic manufacturers) have now," said Goyal.

The Indian Solar Manufacturers Association (ISMA), which represents India's solar equipment manufacturers, said it is committed to expansion and enhancement of manufacturing in the country as part of broader goals of the government to boost local manufacturing.

ISMA spokesman Dhruv Sharma added: "At the same time we are also very sensitive to the challenges faced by government because of [the] energy deficit."

In addition to plugging its energy deficit, India is also looking to narrow its fiscal deficit and sees its energy sector as instrumental to its strategy.

Last month the government said its plan to raise about $10 billion by reducing its ownership in several state-run companies, would kick-off with sale of a 5.8 per cent stake sale in Steel Authority of India Ltd. This would be followed by either a 5 per cent sale of Oil & Natural Gas Corp. or 10 per cent of Coal India Ltd. These two combined could raise about $6.6 billion, two-thirds of the target set for the current fiscal year ending March.

The government also plans to sell stakes in National Hydroelectric Power Corporation, Rastriya Ispat Nigam Ltd., Hindustan Aeronautics Ltd, Power Finance Corporation Ltd. and Rural Electrification Corporation Ltd.

Areva-Siemens and TVO trade blame as OL3 delayed

The French-German consortium has called on its client to take a more active role in the project to prevent yet more problems at the site.

Siân Crampsie

The Areva-Siemens consortium building Finland's fifth nuclear power plant says it will continue to pursue its claim for compensation after announcing further delays to the project.

The consortium said last month that the Olkiluoto 3 (OL3) EPR project would be completed in mid-2016 and be fully operational in 2018 after commissioning.

The news marks the eighth delay at the site and means that the plant will start operating nine years later than originally planned. Finnish utility TVO, which owns the plant, says that it wants to find ways to speed up work.

Areva-Siemens says that the principal driver of the latest delay was gaining approval for the reactor instrumentation and control system. The process took four years and final approval by TVO in April 2014 gave the consortium "a key visibility element to schedule the completion of the project".

TVO said in a statement that such a late start-up date was "hard… to accept" and that it would now evaluate the information it had been given by Areva-Siemens. It told *Reuters* that the delays were due to the planning of the plant taking too long.

Areva has urged TVO to take a more active role in the project and says that the updated schedule is based "on key assumptions and commitments concerning TVO's cooperation". It added: "From the beginning of the project, the role of the owner is essential to the progress on the project, [particularly] during the commissioning phase which is to come".

Construction on the 1600 MW OL3 plant began in 2005 but ongoing delays and cost overruns resulted in Areva-Siemens submitting a claim for compensation with the International Chamber of Commerce's arbitration court.

The French-German consortium's claim now stands at €2.7 billion, while TVO has submitted a counter-claim of €1.8 billion.

Siemens has a 27 per cent share in the consortium, which is working under a fixed-price contract, and says that its portion of the work – the conventional island – is almost complete.

The delays and cost overruns to the Olkiluoto 3 project have cast a shadow over TVO's plans to build a fourth unit at the site.

Last month Finland's government delayed a decision on whether to grant an extension to a general permit issued to TVO to build OL4 after the Ministry of Employment and Economy recommended that the utility's application be declined.

However it has backed an application by a Finnish-Russian consortium to build a new reactor in the north of the country, a move that prompted the Green Party to exit the coalition government.

The proposed new 1200 MW plant at Pyhajoki would be Finland's sixth reactor but has caused controversy because of Russia's involvement in Fennovoima, the firm developing the project.

The government has told Fennovoima that it must increase the level of Finnish shareholders in the project from 52 per cent to at least 60 per cent. Several investors have pulled out of the €4 billion project and the ongoing crisis in Ukraine has complicated the search for new shareholders.

Nuclear outages bring supply challenges

- Belgium prepares for shortages
- National Grid requests additional supplies

Belgium is bracing itself for a "very real risk" of power shortages this winter.

The country's transmission system operator Elia has presented a report to the government indicating that between 49 and 116 hours of power outages could occur between the beginning of Nov-ember and the end of March because of ongoing problems with three of the country's nuclear power plants.

The government has played down the likelihood of severe shortages but has called on end users to conserve energy.

In March GDF Suez shut down the Doel 3 and Tihange 2 reactors following tests on the reactors' pressure vessels. In August Electrabel shut down Doel unit 4 because of damage to its turbine after an oil leakage.

In July GDF Suez said that it needed to carry out more tests on its two reactors, while Doel 4 could start operating again in early 2015, according to Belgium's Ministry of Energy.

"Statistically, the most difficult months are January and February," said Secretary of State for Energy, Catherine Fonck. "For this period, if Doel 4 restarts, we are left with an average risk of shortage of five hours, and not more than 49 hours."

Belgium's concerns over tight margins are also mirrored in the UK after EDF Energy reported that four of its reactors might be out of action until the end of the year.

The French firm closed two reactors at Heysham 1 in August after a crack was discovered in a boiler spine and also shut down two similar reactors at Hartlepool as a precaution. It now believes that they could be brought back on line between October and December.

The news caused a rise in baseload electricity prices for October from £44.50/MWh to £46.55/MWh and added to concerns over the margin of spare capacity in England and Wales this winter.

The unexpected plant shutdowns – which also include E.On's Ironbridge and SSE's Ferrybridge power plants – have led National Grid to issue a tender for additional balancing reserve services.

National Grid said that the move was "a sensible precaution" given the uncertainty about generation plant outages. Ofgem, the energy regulator, says the margin of spare capacity over peak demand could be as low as five per cent this winter.

National Grid has tendered for supplemental balancing reserve (SBR) providers that would be required to be available between 6am and 8 pm between November and February.

It also said that it had received a positive response to its pilot tender for demand side balancing reserve (DSBR).

Cobra given the nod

A new interconnector planned by the Dutch and Danish transmission system operators will help to support the uptake of renewable energy in north-western Europe.

TenneT and Energinet.dk have given their final approvals for the development of Cobracable, a 300 km-long subsea direct current electricity link between their grids. They have touted the project as a "green" cable as it will allow for the integration of more wind energy and help both countries meet sustainable energy goals.

The interconnector will have a transmission capacity of 700 MW and will run from Eemshaven in the Netherlands to Endrup in Denmark. TenneT and Energinet.dk will own the €600 million project on a 50-50 basis and have already been awarded a €86.5 million subsidy by the European Commission under the European Energy Programme for Recovery (EEPR).

Cobracable won the EEPR grant because of the cable's potential to be integrated into a future offshore electricity grid in the North Sea. It will also improve security of supply in the region and promote competition in the electricity market.

TenneT and Energinet.dk say they will now set to work on securing the required permits and putting the project out to tender. The expectation is that the contracts will be awarded in late 2015, followed by the start of construction work in 2016, and completion of the cable in early 2019.

Meygen signs seabed lease

Atlantis is preparing to start construction on the first phase of the MeyGen tidal stream project after signing a seabed lease with the UK's Crown Estate.

The 25-year lease is the largest marine energy lease to be awarded by the Crown Estate, which manages the UK's coastal seabed, and is also the first in the Pentland Firth and Orkney Waters regions of Scotland.

Atlantis will start construction on phase 1A of the project in the fourth quarter of 2014 and projects first power to the grid from the four 1.5 MW turbines to start in the first half of 2016.

Subsequent phases of the project will increase its size to 398 MW.

In August Atlantis announced that it had agreed terms with a funding syndicate for a funding package for the initial phase of MeyGen.

■ The latest Renewable Energy Country Attractiveness Index (RECAI) compiled by Ernst & Young (EY) shows that the UK's appeal as a destination for renewable energy investment is now at its lowest level for almost five years. Proposals to change subsidies for solar energy as well as competition for finance from emerging markets are the main reason for the UK's decline in the index, which also notes that Brazil, Chile, South Africa and Kenya are developing robust renewable deployment pipelines and consistent policy support.

Eskom counts on state support

- Financial and regulatory package to keep the lights on
- Westinghouse questions Koeberg contract

Siân Crampsie

A support package for Eskom from the South African government will help the utility raise more debt and continue its investment programme.

The government said that the measure would ensure that the energy security of the country would be maintained and also support GDP growth. It includes an equity injection and an increase in Eskom's debt.

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

"Eskom is facing significant challenges that threaten its sustainability," said the Treasury in a statement. "These include a funding gap that requires closing to ensure security of supply. The main contributors to this gap include the fact that Eskom will not be generating enough revenues to cover the costs of electricity supply.

"Further, Eskom has been incurring additional costs to keep the lights on by running the more expensive power plants (open cycle gas turbines) excessively due to a deterioration of performance of some of its coal plants and delays in the build programme."

The Treasury has not decided the level of equity injection but said that Eskom would raise additional debt in the region of R50 billion ($4.5 billion) over and above its original plan of R200 billion in its medium-term plan.

Its funding gap is estimated to be R225 billion over the next four or five years. "While higher debt levels do have a negative impact on Eskom's balance sheet, it is necessary to reduce the immediate impact on electricity consumers," said the Treasury.

The government said it would also support Eskom's application to energy regulator Nersa for an increase in tariffs, a key mechanism for ensuring that the utility has adequate revenues to carry out its new build programme and repay debt.

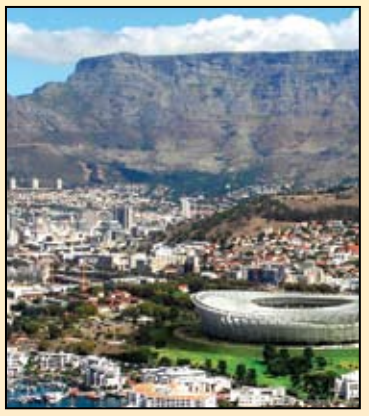
Eskom has pledged to accelerate a number of demand management measures to reduce the current pressure on the electricity system, and has also agreed to improve the efficiency of its operations through more effective maintenance of existing power stations, limiting cost overruns in the new build programme, improving procurement outcomes and management of working capital.

Other measures to be taken by the government include a refinement of energy policy and regulatory governance mechanisms to help keep the lights on and give certainty regarding the energy industry, and supporting Eskom in the expansion of its independent power producer programme.

In late August Westinghouse Electric Company said it was launching a legal challenge over a contract awarded to France's Areva group by Eskom for the replacement of the Koeberg nuclear power plant's six steam generators.

Westinghouse has filed a request with the High Court of South Africa for the procurement process and associated work by Eskom to be suspended.

Westinghouse is also asking the court to order Eskom to provide relevant documentation supporting its decision to reject a Westinghouse bid for the Koeberg contract.



Cape Town: Eskom has been struggling to keep the lights on

Innovation drives residential "power plants"

Distributed energy resources (DER) are disrupting the traditional utility business model and giving consumers more control over their energy supplies, new research has found.

Renewable technologies such as solar photovoltaics (PV) and residential options such as combined heat and power, energy storage and electric vehicles (EVs) have become increasingly accessible for home owners and are changing the relationship between utilities and their residential customers.

Navigant Research says that technology innovation coupled with falling costs and attractive new financing mechanisms have spurred growth in this market segment. Worldwide, home owners and other residential customers are on pace to invest more than $625 billion, cumulatively, in DER from 2014 through 2023.

"The growing affordability of DER technologies is giving customers greater control of their energy consumption – turning some homes into miniature power plants that generate all the power they consume and even deliver power back to the grid," says Neil Strother, principal research analyst with Navigant Research. "Solar PV panels are the most visible technology reshaping the residential power landscape, but there are many others, as well."

Some of these technologies, such as residential combined heat and power, are in the early stages of market development, according to the report, while solar panels are more mature.

Residential energy storage systems, vehicle-to-grid and vehicle-to-home systems that enable plug-in electric vehicles (EVs) to receive and provide power from and to the grid, and increasingly sophisticated home energy management tools are all likely to deliver more capability to homes and integrate onsite generation and storage in new and innovative ways.

Zimbabwe, Ghana seek Chinese funds

Chinese firms are proving successful at developing opportunities in Africa's growing power markets.

In Ghana, a subsidiary of Shenzhen Energy Group has signed a memorandum of understanding (MOU) with the Volta River Authority (VRA) to develop a 1200 MW power plant, while in Zimbabwe three Chinese firms signed an MOU to set up a coal mine and 1200 MW power plant.

Shenzhen subsidiary Sunon Asogli Power Ghana is aiming to bring the coal-fired power plant on-line by 2018.

In Zimbabwe, Shanghai Electric would partner Shenergy and Nan Jiang Group to form Southern Africa Shanghai Energiser Company (SASEC), which would mine coal and build the power plant in Zimbabwe's western coal mining belt. The country is desperate to attract financing to help it overcome energy shortages and is looking increasingly to China for assistance.

Chinese firm Sino Hydro has already started work on adding 300 MW to the Kariba hydropower plant, and was also awarded a $1.3 billion contract in June to add 600 MW to the Hwange coal fired power plant.

Chinese firms lost out in September, however, when Zimbabwe's State Procurement Board (SBP) cancelled tenders for the construction of 300 MW of solar energy capacity.

China Jiangxi Corporation and Intratek, a local firm partnered with Chinese investors, had been awarded contracts to construct 100 MW each of solar capacity. SBP recalled the contract, however, because the firms had failed to maintain their original tender prices.

Firms pledge 3200 MW for Nigeria

- Posco aims to expand in Africa
- Nigeria investigates coal potential

The addition of new power generating capacity to Nigeria's grid will help the country's economic growth prospects, according to the government.

South Korea's Posco Engineering and Brazilian firm Benco Energy Limited last month signed contracts to build major new power plants.

The contracts are the latest in a string of proposed investments in Nigeria's electricity sector following reforms carried out over the last year.

Posco has signed a $1.14 billion contract with the Ebonyi state government and Hodges and Bakers Field to build a 2700 MW independent power plant. Posco will carry out the engineering, procurement and construction (EPC) and says that construction will take 28 months.

The plant will be the largest independent power plant in the country. The contract is also the largest ever won by Posco for an overseas energy plant order and the firm has pledged to "aggressively expand" its activities in sub-Saharan Africa.

"The potential for the power plant market in Africa is limitless," said Yeon Gyu-sung, Posco E&C energy business division head.

Benco has signed a memorandum of understanding with Nigeria's federal government to build a 700 MW gas-fired power plant in Bayelsa state.

The plant would cost $800-900 million and is expected to take three years to build once details and contracts have been finalised.

Nigeria is also hoping to broaden its power generation mix with the use of coal.

In August the Minister of Mines and Steel Development Musa Sada said that a target of 30 per cent of coal-fired generation by 2015 had been set, and that the government was working on determining the level of coal reserves in the country.

Nigeria has abundant gas reserves but expansion of the natural gas pipeline infrastructure has been slow and therefore affected investment in the power sector.

AMEC looks to Chinese cooperation

AMEC is paving the way for long-term cooperation between Chinese and British firms in the nuclear energy field after signing an agreement with China National Nuclear Corporation (CNNC).

The two firms have signed a memorandum of understanding to cooperate across the civil nuclear sector and have pledged to work together to secure global opportunities in new build, operational support, lifetime extension and decommissioning and waste management services.

The deal will give AMEC greater access to the lucrative Chinese nuclear power sector and came as AMEC signed a contract with PGE EJ1 of Poland to be the contract engineer for the country's first nuclear power plant.

The contract with PGE EJ1, a subsidiary of Polish state-controlled Polska Grupa Energetyczna SA (PGE), is worth a reported $400 million and will run for at least 10 years.

AMEC and CNNC will work predominantly in the UK and China. "This is the first stage in what we hope will be a long term relationship between British and Chinese companies in the field of nuclear energy," said Clive White, President of AMEC's Clean Energy Europe business.

Poland has shortlisted two sites – Choczewo and Zarnowiec – as possible locations for a 3000 MW nuclear power plant. AMEC, as owner's engineer, will help select the EPC contractor, oversee project management and supply chain contract management, as well as regulatory aspects.

The Polish government wants the first nuclear power plant to be operational by 2024.

Earlier in September three Polish firms – Tauron, Enea and KGHM – finalised an agreement with PGE to purchase 10 per cent stakes in PGE EJ1 to support construction of the $11 billion project.

■ Atkins has completed its acquisition of Nuclear Safety Associates (NSA), an engineering and technical services firm based in North Carolina, USA. Atkins said the purchase would bring it expertise in nuclear safety, design engineering, and professional security services as well as its well-established project and client base in the US nuclear market.

Cleco considers buyers

Spanish utility Iberdrola and Australian investment bank Macquarie are in the running to purchase Cleco, an electricity supplier based in Louisiana, USA.

The *Financial Times* reported that both firms have been in discussions with Cleco, which has been the subject of takeover rumours since June. The newspaper said that a deal could be "announced within weeks" according to people familiar with the matter.

Cleco has 284 000 customers throughout Louisiana and operates 11 generating plants with 3340 MW of nameplate capacity. It operates an additional 1271 MW for its partners and is valued at around $3.4 billion.

In June Cleco announced that it was considering its options after receiving attention from Canadian firm Borealis.

Borealis is no longer in discussions with Cleco, however.

There have been several acquisition deals in the US utility sector in recent months, partly because of falling energy prices.

Iberdrola currently operates three main businesses in the US energy sector: Iberdrola Renewables, Iberdrola Energy Holdings and Iberdrola USA Networks Inc.

Support for carbon pricing

Large corporations routinely incorporate costs associated with carbon pricing in their financial analyses and investment decisions, according to a report from CDP.

The not-for-profit organisation says that the report is the first of its kind and provides powerful evidence of a global corporate consensus that carbon will be priced, and that companies would welcome regulatory certainty with respect to climate change policy and carbon pricing.

Around 150 large listed companies now incorporate an internal carbon price ranging from $6/tonne to $80/tonne. Some 29 of these are based in the USA where there is no national regulatory carbon pricing mechanism.

In addition, companies participating in the EU's emissions trading scheme (ETS), disclosed that they would like to see stabilisation and improvement of this system to help protect long term investments and improve profitability.

CDP collated the data in an annual request for information on the business implications of climate change. It found that major companies such as Alstom are closely watching emerging Chinese emissions trading systems, while over 200 firms said they are directly engaging with policymakers on carbon pricing legislation.

Some 40 nations around the world, as well as 20 US states, regions or cities have either set up or are planning to set up carbon pricing mechanisms as a means of encouraging low-carbon technology development.

However at a federal level in the USA, lawmakers have repeatedly blocked efforts to price carbon emissions because of the potential effects of such a system on the economy.

US president Barack Obama is now hoping to issue regulations under the Clean Air Act to limit carbon emissions from fossil fuelled power plants but is again meeting strong opposition.

E.On invests in start-ups

■ Opens San Francisco office
■ Sells Hungarian CCGTs

E.On has expanded its venture capital activities through two new partnerships.

The German energy firm has become an investor and partner in Leeo, a San Francisco start-up company that provides smart home solutions, and has also made an investment in Thermondo, a Berlin-based start-up focused on the heating sector.

The investments will help E.On to uncover and develop innovative products to offer its customers. While the company's domestic generation business is suffering, E.On reported in August that its German retail business had performed well, with an average net gain of one new customer every eight minutes.

E.On also said that it had opened an office in San Francisco to enable it to invest more actively in Silicon Valley.

"Our partnerships with Leeo and Thermondo create promising opportunities for us to offer new and innovative products and services that make our customers' lives even more convenient and efficient," said Urban Keussen, Senior Vice President for Technology and Innovation at E.On.

Leeo develops and provides smart home solutions consisting of simple plug-and-play devices and related data services. The company develops products and services for itself as well as select enterprise partners.

Thermondo provides an online platform for customers to compare various heating system manufacturers and technologies and then installs the systems.

Separately, energy firm Dalkia has signed an agreement to buy two Hungarian combined cycle power plants from E.On by the end of 2015. The deal will increase Dalkia's Hungarian generating portfolio by 760 MWe and enable E.On to streamline its business in the country.

The deal, the value of which has not been disclosed, involves E.On Hungaria Zrt.'s power plants supplying the towns of Debrecen and Nyiregyhaza in eastern Hungary. Dalkia's Hungarian unit Dalkia Energia Zrt will supply heat to 110 000 Hungarian households and several thousand public institutions following the acquisition.

E.On said that the sale of the power plants is part of plans to focus on corporate customers, operating its nationwide supply network and developing alternative energy.

Wirsol seals Bluesky merger

Proposed changes to renewable energy funding in the UK will make the country a cornerstone for growth, says German firm Wirsol.

Wirsol AG says that it is planning to take advantage of growth opportunities in the UK's rooftop solar photovoltaic (PV) sector through a merger with Bluesky Energy Solutions Ltd.

Wirsol is already active in the onshore wind and solar energy markets and says that recent proposed changes to funding in the UK's solar energy sector will make the market a "long term cornerstone for growth".

Bluesky, a supplier and installer of domestic heating and renewable energy solutions, said that the merger would enable it to address the 2 kW-8 MW market. "We have the financial muscle to tackle large scale commercial installations which were previously precluded due to our size; this is now a problem of th past," said Lee Walton, managing director of Bluesky.

Earlier this year the UK government announced plans to alter funding arrangements for PV projects using the renewables obligation (RO) scheme, and to encourage growth in the commercial rooftop PV sector.

In Germany, Wirsol has agreed an exclusive arrangement with EnBW to develop PV projects. "This merger with Bluesky further endorses our commitment to the sector and specifically the UK market," said Peter Vest, Managing Director of Wircon, Wirsol's parent company.

He added: "The team have a strong background within the PV Rooftop Sector which, coupled with the strength of Wirsol's history and ability to deploy, will enable the business to grow significantly over coming months and years."

Wirsol has installed over 8000 projects globally. In January it sold its UK subsidiary Wirsol Solar UK, including a 166 MW large-scale ground-mounted project pipeline, to Conergy because of financial difficulties. The remainder of Wirsol's assets went to Wircon.

Americas

Voith upgrades Priest Rapids dam

Voith Hydro has been awarded the contract to rehabilitate and upgrade the turbines at the Priest Rapids dam on the Columbia River in Washington state, USA.

Work on upgrading the plant's ten vertical Kaplan turbines will start in 2016 and will take ten years. Each turbine is rated at 100 MW.

Voith will undertake the majority of the work at its York, Pennsylvania facility.

GE chosen for Coldwater peaking

Michigan South Central Power Agency (MSCPA) has chosen GE's low emissions reciprocating engines to replace outdated diesel units to meet the city of Coldwater's energy needs.

The peaking project corresponds with the expansion of Mastronardi Produce's Coldwater greenhouses by 28.8 acres, and GE's natural gas-fuelled engines will be supplied by Inland Power Group for the Coldwater Board of Public Utilities (CBPU) to produce 13 MW of peak power generation. The project also will provide the capability for the CBPU to partner with Mastronardi Produce to supply carbon dioxide (CO_2) and heat for the greenhouse.

The project will use three GE Jenbacher J624 two-stage gas engines and the plant will be able to capture CO_2 emissions from the engines to help grow produce in the greenhouses.

Water Wall Turbine selects The Switch

Vancouver-based Water Wall Turbine Inc. (WWT) has selected The Switch to provide a 500 kW full-power converter for its innovative self-floating power plant.

WWT's innovative system extracts potential and kinetic energy from large, fast-moving water currents for conversion into electric energy. It will deploy The Switch's 500 kW power converter at WWT's prototype project in Dent Island Resort off the west coast of British Colombia, Canada.

The vessel will power the resort, replacing existing diesel generators as the primary energy source, and is integrated with battery energy storage. Additional 1 MW plants are being planned for other remote resorts and communities in British Columbia.

System testing of the integrated equipment is planned for the first quarter of 2015.

ABB installs PowerStore in Alaska

ABB is to install its PowerStore flywheel technology in Alaska to support the integration of renewable energy and help stabilise the grid.

ABB's solution incorporates two 1 MW PowerStore grid stabilisation generators that are based on a fast-acting, spinning flywheel with ABB inverters to store short term energy to absorb and/or inject both real and reactive power onto the microgrid of Kodiak Island.

The project is being executed for Kodiak Electric Association (KEA), which recently expanded a wind farm and also needed to overcome stability issues arising from the upgrade of a crane at a port on the island.

Areva wins Browns Ferry fuel contract

The Tennessee Valley Authority (TVA) has awarded Areva a contract to supply nuclear fuel to three boiling water reactors at the Browns Ferry Nuclear plant in Alabama.

First fuel deliveries under the $250 million contract will begin in 2017. The scope includes nine nuclear fuel reloads of the Atrium 10XM design as well as the supply of core monitoring technology and related services.

TVA will also have the option to later select Areva's next generation Atrium 11 design, which is currently being introduced to the US market. Already used by three European utilities, this fuel design has been developed to offer utilities a more economical fuel solution and greater flexibility in their operations.

Asia-Pacific

Elecnor wins Moree PV contract

Elecnor has won a $123 million contract to build the 72 MW Moree solar photovoltaic (PV) plant in New South Wales, Australia.

The project will be one of the largest of its kind in Australia and will consist of 232 960 solar panels across an area of 191 hectares.

The Moree solar farm will start operating in the second quarter of 2015.

Thai pumped storage set for Voith equipment

Voith has been awarded a contract to supply the complete electromechanical equipment for a pumped storage power plant in Thailand.

Under the contract Voith will expand the Lam Ta Khong plant with two motor generators, two 255 MW vertical pump turbines, automation systems and the electrical and mechanical balance of plant systems.

The contract was awarded by the Electricity Generating Authority of Thailand (EGAT) and is valued at €50 million. The project will double the capacity of the plant to 1000 MW.

MHPS consortium to design Tepco IGCC

Tokyo Electric Power Company (Tepco) has awarded a contract to a consortium led by Mitsubishi Hitachi Power Systems (MHPS) for the design of an integrated coal gasification combined cycle (IGCC) power plant.

The consortium, which also includes Mitsubishi Heavy Industries (MHI), Mitsubishi Electric and Mitsubishi Heavy Industries Mechatronics Systems (MHI-MS), will construct two 500 MW class IGCC plants in the Fukushima Prefecture to help promote local industrial recovery.

The first IGCC plant will be constructed at Tepco's Hirono power station in Futaba-gun, while the second will be built at the Joban joint power-operated Nakoso power plant in Iwaki City.

MHPS is primarily responsible for designing the gasification and combined-cycle power generation equipment, while MHI is in charge of gas refining equipment and Mitsubishi Electric will handle power generation and electrical equipment.

MHI-MS will design the wastewater treatment facilities.

EVN awards Thac Mo contract

Alstom has been awarded a contract worth around €13 million by Electricity of Vietnam (EVN) to extend the Thac Mo hydropower plant.

Alstom's scope includes design, manufacturing, testing, supply, erection and commissioning of electromechanical equipment consisting of one 75 MW vertical Francis turbine, generator, control systems and electrical balance-of-plant equipment.

The existing Thac Mo power station has two 75 MW Francis type turbines and was commissioned in 1995. It supplies power to the national grid of EVN covering the southern part of Vietnam.

Pöyry to assist large scale PV

Energy Absolute Public Company Limited has tasked Pöyry with engineering assignments for the EA Solar Lampang photovoltaic (PV) power plant in Thailand.

The 130 MW solar farm will consist of 424 800 solar panels installed on a mounting structure with a single axis tracking system. Pöyry's assignments will include technical assistance to the client during the implementation phase until the start of operation, and annual operation monitoring for the whole loan period.

The project is located in Lampang province, northern Thailand and will be Asia's largest solar PV power plant incorporating a tracking system.

Europe

SHE awards Caithness-Moray HVDC contract

ABB has won an order worth more than $800 million from Scottish Hydro Electric (SHE) Transmission plc to provide the Caithness-Moray high-voltage direct current (HVDC) power transmission link, which will connect the electricity grid on either side of the Moray Firth in northern Scotland.

ABB will design, engineer, supply and commission two 320 kV land-based HVDC Light converter stations, one rated at 1200 MW at Blackhillock in Moray and another rated at 800 MW situated at Spittal in Caithness.

ABB's scope of supply also includes submarine and underground cables covering a total transmission length of nearly 160 km. The link is scheduled to become operational in 2018.

Emerson wins Kozienice control order

Emerson Process Management will install its Ovation control system at a 1075 MW ultra-supercritical coal fired power unit under construction at the Kozienice power plant in Poland.

At the new unit, the Ovation system will monitor and control all major plant components, including the boiler and turbine. Emerson will also engineer a number of other specific applications needed for compliance with Polish grid requirements.

The new unit is expected to start operating in 2016 and is being built by Mitsubishi Hitachi Power Systems (MHPS) for owner Elektrownia Kozienice S.A., a subsidiary of ENEA Wytwarzanie S.A.

Greek island to connect with ENTSO-E

Alstom has been awarded a contract worth €35 million by the Greek Transmission Utility Independent Power Transmission Operator (IPTO) for the turnkey supply of four gas-insulated substations (GIS) in Greece.

The project will connect three Cycladic islands – Mykonos, Paros and Syros – directly to mainland Lavrion, located in the southeastern coast of Attica, Greece. It will help the islands to meet energy demand in the peak summer months as well as phase out the use of fuel-powered generating plants.

The project is also expected to reduce the cost of energy on the islands.

Alstom will supply three GIS substations (170 kV) to replace small existing power plants on the islands of Mykonos, Paros and Syros. These substations will be connected to a fourth substation, also to be supplied by Alstom, in Lavrion near Attica. The turnkey project includes design and manufacturing of Alstom equipment such as GIS, transformers, reactors, capacitors and digital substation automation system.

RES Offshore supports Moray project

RES Offshore has won a contract with Moray Offshore Renewables Ltd to provide management contractor services for the first offshore wind project within the Moray Firth round 3 zone.

RES Offshore will contribute towards the ongoing front end engineering design (FEED) and procurement processes as the project progresses towards final investment decision, providing specialist engineering and project management services.

Project Director for Moray Offshore Renewables Ltd Dan Finch said: "This project will be a game-changer for the industry by leading commercial-scale deployment in deeper water."

Moray Offshore Renewables is a joint venture between EDP Renewables and Repsol Nuevas Energias UK. It was awarded the rights to develop offshore wind in the Outer Moray Firth off the northeast coast of Scotland and plans to develop up to 1116 MW of capacity across three sites using 6-8 MW turbines.

International

ABB to enhance Saudi power supplies

The Saudi Electricity Company (SEC) has awarded ABB a contract worth $14 million to supply equipment for a new substation that will enhance power supplies to Riyadh and Saudi Arabia's central region.

ABB will supply power transformers, shunt reactors and station service transformers. The new substation will enable power transmission from a new combined cycle power plant being built to help meet rising demand for power in the country.

Trio agree on Nigeria project

Lafarge Africa, Wärtsilä and the World Bank's IFC have agreed to build a 220 MW gas-fired power plant in Nigeria to boost electricity supplies.

The three firms will cooperate on the construction of a 220 MW power plant adjacent to an existing Lafarge Africa 90 MW power facility used to power cement operation in Nigeria.

Finnish firm Wärtsilä will build and manage the plant, which will export energy to the national grid under a power purchase agreement.

Siemens wins Saudi GIS order

Alfanar Construction has placed an order with Siemens for the delivery of 111 switch panels for installation in five gas insulated switchgear (GIS) systems in Saudi Arabia.

The order is valued at more than €90 million and marks Siemens' entry into the direct engineering procurement and construction (EPC) business for GIS systems in Saudi Arabia. The switchgear are destined for five 380 kV substations in Saudi Arabia's northern Al-Jouf region.

The switch panels will be shipped in the second half of 2015.

Oil

Crude prices slide as fundamentals take hold

- IEA reduces projection for oil demand in 2014 and 2015
- Conflicts having little impact on production

David Gregory

Crude prices slipped below $100/b in September in response to weaker demand and greater supply. ICE Brent crude settled at $96.65/b on September 15 and WTI hit $92.92/b. The slide in prices occurred within the context of the market being in contango – when future prices are greater than the prompt price, a situation that has not occurred for several years.

The Paris-based International Energy Agency (IEA) said oil supplies are abundant within the context of slow economic growth and little sign of oil growth demand, in the September issue of its monthly *Oil Market Report*. The agency said it had reduced its projection for global oil demand in 2014 and 2015 by 900 000 b/d and 1.2 million b/d, respectively, putting oil demand for 2015 at 93.8 million b/d.

Global oil supply declined by 400 000 b/d in August to 92.9 million b/d compared to a year ago, the IEA said. Non-Opec supply is forecast to increase by 1.6 million b/d in 2014 and by 1.3 million b/d in 2015 to reach 57.6 million b/d. The call on Opec crude is expected to be around 30 million b/d in 2015, with the balance in demand made up by natural gas liquids (NGLs) supplied by Opec members.

"US production continues to surge and Opec output remains above the group's official 30 million b/d supply target," the IEA said. "Latest data on oil deliveries show further signs of a clear slowdown in global demand growth. Against this backdrop, it is not surprising that prices have been easing, with front-month Brent figures slipping below $100/b for the first time this year."

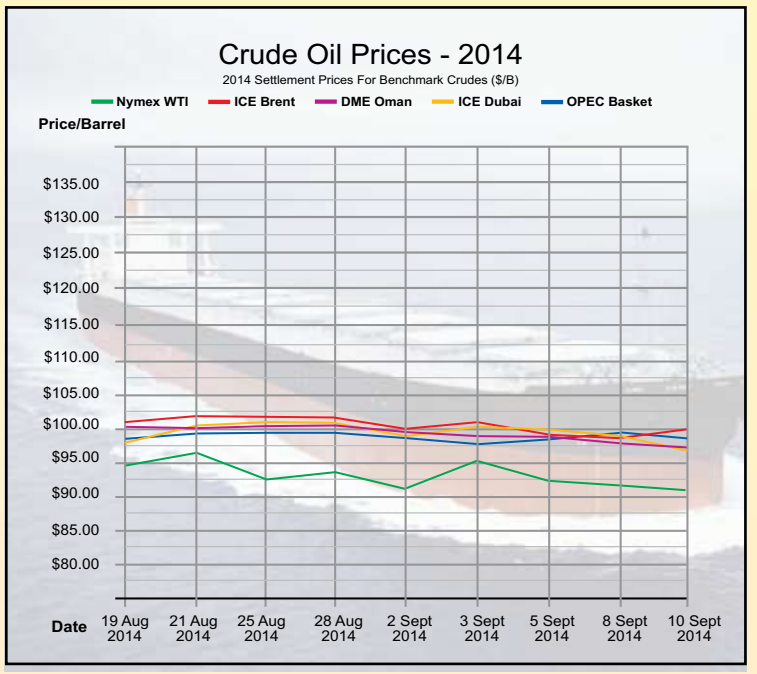
The IEA said the continuing conflicts in Iraq and Libya are having little impact on the global oil market. Libyan crude output is growing and oil is returning to the market. Media reports projected that it would reach 1 million b/d before the end of September. In early 2013, Libya was producing 1.2 million b/d, near its pre-2011 revolution rate.

The total production from Iraq, including the northern area controlled by the Kurdistan Regional Government (KRG) amounted to 3.1 million b/d in August, down by only 60 000 b/d from July. Exports from Iraq's southern oil fields from its Gulf terminals fell in August to 2.38 million b/d from 2.44 million b/d in July due to bad weather and infrastructure problems.

Kurdistan is exporting crude through Turkey although Baghdad has threatened the KRG and companies that buy the oil with legal action. However, the differences between Baghdad and Irbil over oil policy may change with the creation of a new government

Iraq continues to be racked by fighting with ISIS, which controls large parts of central and western Iraq, including the 310 000 bpd Baiji refinery and Iraq's northern export pipeline to Turkey.

Opec leader Saudi Arabia reduced its crude production by 408 000 bpd during August, according to Opec's latest *Monthly Oil Market Report*. Saudi Arabia produced 9.597 million bpd during August compared to 10.005 million in July.



The IEA put Saudi output at 330 000 b/d lower in August to 9.68 million bpd, "seemingly in response to lower requests from customers".

The agency reported that official data showed exports at 6.95 million b/d in June and 6.99 million b/d in May, the lowest levels since September 2011. "Exports had been running at more than 7 million b/d since October 2011," the IEA said.

Saudi exports to the US market slipped to just over 1 million b/d during June compared with 1.4 million b/d in the January-May period. The latest tanker tracking data suggest a sharp drop in Saudi shipments in August, the IEA said.

Throughout the summer, Saudi Arabia has also been burning large volumes of crude – at a rate of 800 000 b/d – to meet demand at power plants. Throughput to domestic refineries is running at record rates of more than 2 million b/d.

Saudi Arabia is the traditional swing producer within Opec with a capacity to produce 12.5 million bpd. It increased production in response to the decline of Libyan production during the last year in order to keep the market stable. However, it remains to be seen if Riyadh will reduce production further on its own should Opec decide that some action be taken by the organisation to address falling prices when it next meets in November.

Commenting last month on the decline in the price of oil, Saudi Oil Minister Ali Naimi said: "Prices of oil always go up and down, so I really don't know why the big fuss about it this time."

Gas

East Mediterranean Energy enters next phase

The start of a new drilling programme offshore Cyprus by Italy's Eni is set to kick off the next phase of energy exploration and development in the East Mediterranean.

Mark Goetz

Almost a year after Noble Energy announced appraisal well results that estimated the gas resource in the Aphrodite discovery in Block 12 at 5 trillion cubic feet (tcf), Eni has spudded a new well in the East Mediterranean.

Eni's well in the Onasagoras structure in Block 9 is only the third to be drilled offshore Cyprus and it will take some 80 days to complete. Cyprus is hoping the new well will be successful enough to warrant the onshore LNG export facility that it eventually hopes to see at its energy centre at Vassilikos.

As it stands, the 5 tcf in Block 12 is not enough to make construction of a 180 km pipeline to the island and an onshore LNG facility viable. A new gas discovery of significant size would enable Cyprus to put its stalled onshore LNG export project back on the table and resume its quest to become a regional energy hub.

Eni, working in a joint venture that includes South Korea's Kogas, is scheduled to drill three more wells in its offshore acreage, which includes Blocks 2, 3 and 9. According to a statement released by the government earlier this year, two other structures within those blocks are being evaluated and could warrant a further two exploration wells. The Eni drilling programme will last 12-18 months and will include appraisal drilling if new discoveries are made.

The outcome of Eni's drilling programme will determine the course of energy development in the East Mediterranean. By the time the programme ends in 2016, Cyprus will know whether it has a future as a hydrocarbon producer.

Under the terms of its renewed exploration contract, Noble Energy is obliged to drill another exploration well in Block 12 before the end of 2016. Noble officials in Cyprus have stated previously that drilling could begin sometime in the first half of 2015. France's Total, which holds Blocks 10 and 11, is due to drill in mid-2015.

While things have been quiet in Cyprus, in Israel Noble and its main partner Delek are making plans to start exporting gas, first to regional markets and later through an FLNG vessel. There is a chance that government delays on decisions regarding industry regulation may hold up the final investment decision (FID) on the Leviathan field, where the resource is estimated at 22 tcf.

Noble has discovered more than 40 tcf offshore Israel, of which 40 per cent can be exported.

Plans for a partnership that would have seen Australia's Woodside Petroleum enter the Leviathan project fell apart earlier this year and since then Noble and Delek have been concentrating on exports to the region. In September the Leviathan partners announced a letter of intent had been signed with Jordan to supply it with 45 billion m^3 of gas over a 15-year period. Earlier this year, letters of intent were signed by the Tamar partners to supply gas to the Union Fenosa Gas LNG plant in Damietta, Egypt, and by the Leviathan partners to the BG/Petronas LNG plant at Idku in Egypt.

Egypt is unable to supply gas to the two plants, which have a combined production capacity of 12.7 million tons/year, due to the growing demand for electricity in the country.

There is also a possibility that if the deals with the LNG companies go through, some of the gas destined for the LNG plants could find its way into the domestic Egyptian market, which is suffering a serious gas shortage.

The excitement generated by the start in February 2013 of a licensing round for Lebanon's offshore sector has faded as the country is unable to find the political stability required for the cabinet to approve two decrees needed to set a closing date for the round.

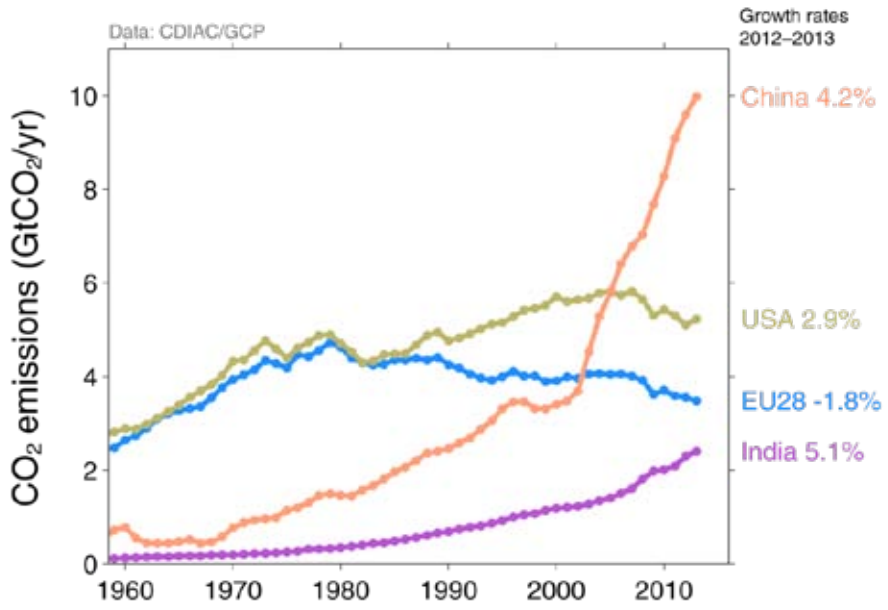
One decree concerns the model exploration and production agreement, the other the demarcation of the country's 10 offshore blocks. In August the minister of Energy and Water, acting on the advice of the Petroleum Administration, postponed the closing date for the bidding round for the fifth time.

Without these decrees, the 46 companies that qualified to bid in the round will not know the terms or the exact coordinates of the blocks they are bidding for.

This time no new closing date was set. Instead, the ministry announced that the round would close six months after the cabinet approved the two decrees – whenever that will be.

Top fossil fuel emitters (absolute)

The top four emitters in 2013 covered 58% of global emissions
China (28%), United States (14%), EU28 (10%), India (7%)



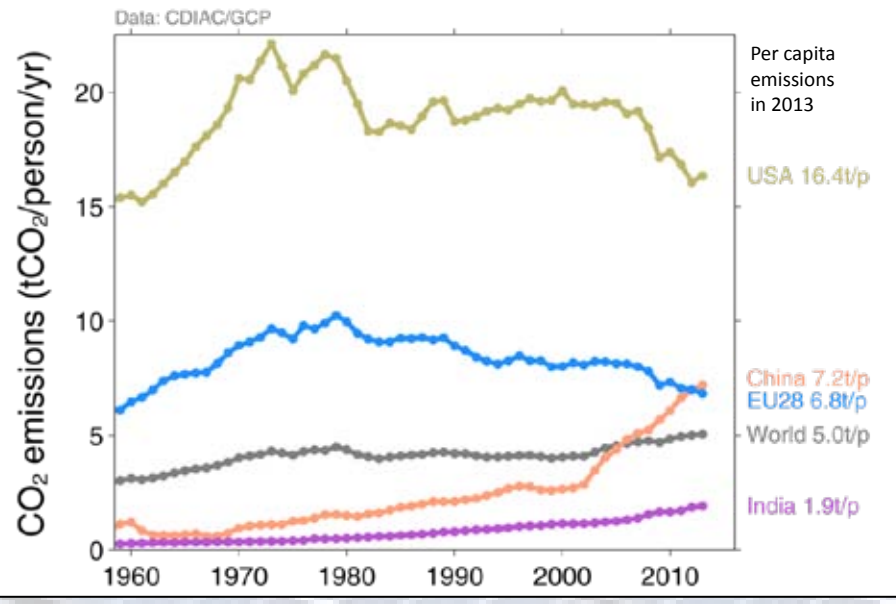
Bunkers fuel used for international transport is 3% of global emissions
Statistical differences between the global estimates and sum of national totals is 3% of global emissions

More information, data sources and data files:

www.globalcarbonproject.org
Contact: c.lequere@uea.ac.uk

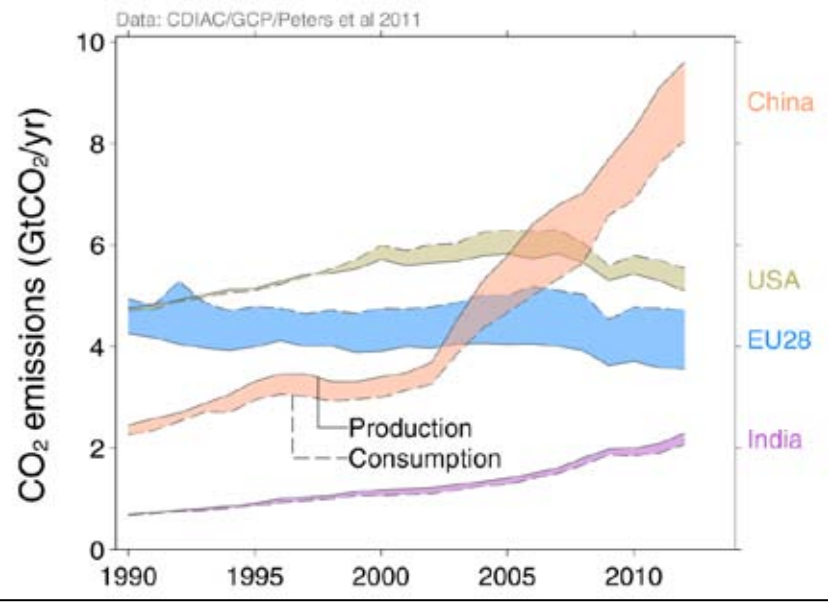
Top fossil fuel emitters (per capita)

China's per capita emissions have passed the EU28 and are 45% above the global average



Consumption-based emissions (carbon footprint)

Allocating emissions to the consumption of goods and services provides an alternative perspective on emission drivers



Source: Global Carbon Budget 2014

Renewables challenge cross-border trading

Europe's electricity market has changed drastically over the last decade. **Aleksandar Sasha Cvetkovic** examines the main challenges this transformation has created for Europe's electricity traders.

The rapid expansion of electricity generation from renewable energy sources has created a fresh challenge for electricity traders. Historically, Europe has operated "country-integrated" grid structures with large power plants near to consumers. In recent years, however, the market structure has been changing.

There has been a strategic move in some countries to phase-out nuclear power, with subsidies being offered to encourage the development of renewable energy resources. While the supply of energy from the renewable energy sector has some way to go to overtake more traditional sources, the level of investment currently being made, and the speed of change indicates that in the future there is likely to be greater decentralised production from more widespread renewable energy resources.

Europe plans to have larger centralised renewable plants, producing energy in locations according to their geographic suitability (wind energy offshore in the North and photovoltaic systems in the South). However, renewable production is often heavily reliant on the weather, which is not easy to predict. Even with the best weather forecast mechanisms, renewable production is much more dependent on unforeseeable natural events; e.g. a Saharan desert dust blown north to Europe can severely reduce solar power production, contradicting the best forecasts.

Consequently, there are huge challenges to predicting the electricity generation output for the local areas that are reliant on solar or wind power plants. The fluctuation in the level of electrical energy generated in different geographies, and from more uncontrollable sources, requires an increasing reliance on cross-border trading to balance variations in supply and demand. The generation of energy in one part of Europe to supply it to another, often across several borders, will inevitably require an expansion of the European transmission network.

A number of countries are working to expand their network capacity to support an increase in cross-border trading. However, the time frame for achieving this is uncertain due to costs, approval deadlines, a lack of public acceptance and complex inter-country procedures. This situation is made more difficult because some countries with autonomous energy supply do not see an immediate requirement to invest in interconnections for a more Europe-wide grid.

A "Super Grid" is often talked about to describe a powerful, flexible European transmission network where power can be transported over long distances without bottlenecks. Until this becomes a reality, cross-border electricity traders will face limited inter-country transmission grid (interconnection) capacities.

Interconnection flow is additionally limited by the traditional system for calculating capacity. According to EU law the maximum available interconnection capacity should be made available to energy traders, provided that secure network operation is guaranteed. However, many Transmission System Operators (TSOs) still calculate interconnection capacities one border at a time, before energy flows are known, before energy trades are placed, and without considering other neighbouring borders in the interconnected network. As a result, the so-called Available Transmission Capacity (ATC) includes high security margins that considerably restrict possible cross-border flows.

This situation is changing and the future EU Target Model for electricity market integration prescribes the calculation of interconnection capacities using a Common Grid Model (CGM) and a flow-based (FB) calculation method. The FB method considers the relationships between all interconnectors of a network, reflects the actual situation on the grid more accurately and maximises the available capacity. FB capacity calculations are more accurate, but also more complex. Therefore, the challenge will be to gain the necessary operational experience and introduce a single calculation method on a pan-European basis.

To date, each TSO has generally allocated its interconnection capacities through bilateral agreements or via market-based allocations. These allocations have then been traded as separate products via explicit auctions for different reservation periods and for each border individually. Explicit auctions have been independent from the actual trading making it difficult to match capacity with supply. The situation is further complicated by different gate closure times. This means that cross-border explicit allocation auctions occur at different times from energy trades, making the process inefficient.

> Renewables increase the need for short-term intraday trading, and therefore a method of efficiently calculating and presenting energy balances is key

A more effective alternative would be to use implicit, rather than explicit auctions where the interconnection capacity is automatically included in the energy trade. In effect, this means that market coupling mechanisms facilitate both the availability of supply and the capacity to carry it at the same time throughout the day. This method has already proved a great success with the day-ahead market coupling of 17 northwest and southwest European markets in 2014. The next step is to see this process rolled out across the continent towards Switzerland, Italy and central/southeastern Europe as soon as possible.

Of course, the procedure of matching capacity and supply on a near-to-real-time basis requires a significant degree of coordination, synchronisation and harmonisation of operational procedures, product types, interconnection capacity calculations and gate closure times. Achieving this degree of harmonisation across Europe will present a significant challenge, but is certainly necessary for the creation of a single, liquid and consistently regulated market.

It is extremely challenging to accurately predict energy demand and required capacity in advance, and it is better to act on a near-to-real-time basis. As a result, several countries have already introduced an intraday allocation of the cross-border capacity.

Efficient cross-border trading can only be facilitated with the introduction of an implicit allocation of capacity with continuous trading across all of Europe. Continuous trading allows for short-term adjustments to be performed at any time during the operational day with no fixed auctions and gate closures.

Cvetkovic: "out-of-the-box" solutions are needed

Functioning intraday continuous implicit cross-border trading could reduce the use of expensive resources from balancing markets to meet short-term adjustments. TSOs need to worry less, since with efficient intraday market mechanism with implicit capacity, intraday traders would quickly even-out potential imbalances, before there is a need for TSO interventions to stabilise the network frequency. The challenge here is to establish a fair and transparent capacity allocation mechanism through the exchanges.

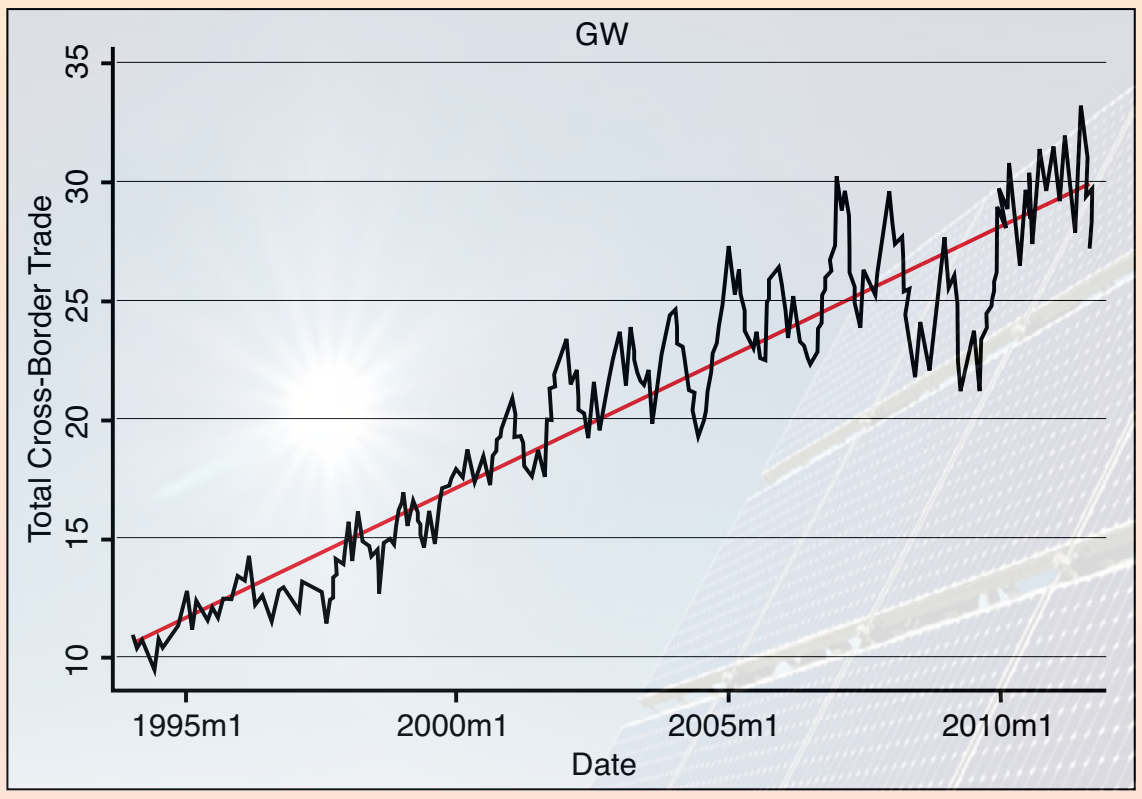
Inconsistent or discriminatory regulatory issues (transmission and cross-border fees, imbalance-settlement prices) in some countries present further barriers and risks for cross-border trading. Administrative and bureaucratic issues can be problematic, as can the lack of a common language. High transaction fees, and the length and complexity of the application process to obtain a license for electricity trading can also prove to be a hindrance.

Different message formats, communication methods, and workflows to exchange relevant energy data are challenges that software solutions can solve. Even as we move toward a more integrated market we will continue to have specific national market implementations, some of those because of market conditions, but often due to the "not invented here" effect.

Renewable energy sources increase the need for short-term intraday trading, and therefore a method of efficiently calculating and presenting energy balances is key. It is also beneficial to reduce the number of different systems involved, thereby decreasing complexity and operation risk. Therefore, in order to cope with increased cross-border trading the software industry will need to implement new, particularly innovative, integrated, out-of-the-box solutions that support trading across multiple borders in multiple standards, and offer a common workflow process across different market structures and present the required information to the operator near-to-real-time.

Aleksandar Sasha Cvetkovic is responsible for Energy Logistics and Settlement solutions at Brady Plc, a provider of trading and risk management software to the global energy and commodity markets.

Cross-border trade has been growing steadily in the EU since 1995. *Source: OECD based on data from ENTSO-E*



Can shale gas secure Europe's energy future?

Europe is facing significant challenges when it comes to energy. While committed to ambitious climate goals, it is struggling with its competitiveness while managing geo-political instability. Shale gas could have an important role to play, argues **Marcus Pepperell**

Energy is becoming an increasingly significant focus for the European Union. Over the past year it has become one of the most important and visible policy areas.

The European Commission remains committed to the overarching objective of securing a sustainable, affordable and reliable energy supply. In response Jean Claude Juncker's proposed new team will see climate change and energy merged and wrapped into a bigger portfolio created to promote an energy union. Former Polish Prime Minister Tusk, who originally promoted the idea has also been appointed President of the European Council. This shows that energy integration and in particular energy security will both be a priority alongside Europe's ambitious climate targets.

As a potential source of indigenous energy, shale gas could play an important role in any future energy mix. With the US Energy Information Administration estimating that Europe could hold trillions of recoverable cubic feet of reserves it could help address some of the energy challenges that Europe is facing, balancing economic and environmental needs and ensuring we have access to the energy we need at a price we can afford.

The European Union remains committed to a lower carbon future and will continue to seek reduction in its CO_2 emissions of 40 per cent below 1990 levels, in line with its 2030 Climate Framework. Renewables will also remain a priority with a target of 27 per cent of its energy supply. The key issue is where the remaining 73 per cent of Europe's energy will come from.

Europe's energy prices are also some of the highest in the developed world and the difference is widening. Prices are three to four times higher in the EU than the US and Russia and 12 per cent higher than in China, creating a significant burden on households and businesses, driving up production costs and its ability to remain competitive in the global market place.

Beyond the cost to individuals and families, energy intensive industries make up some of the EU's biggest employers. Key sectors such as petrochemicals, aluminium, fertilisers and plastics, are being particularly badly hit, leading to some deciding to cut costs elsewhere or to even consider leaving the Single Market and open new operations where costs can be significantly cheaper.

Domestic production of traditional fossil fuels is also in decline. Europe therefore has to import an increasing amount of its energy from abroad. Today, it imports 53 per cent of the energy it consumes. This figure rises to 66 per cent when it comes to natural gas and almost 90 per cent for crude oil. This creates significant energy security issues, which have focused minds given recent events in Ukraine.

> Member States have the right to determine the conditions for exploiting their energy resources, as long as they respect the need to preserve, protect and improve the quality of the environment

Europe is facing an energy paradox, characterised by significant investment in a heavily subsidised renewables sector countered by the increased use of high carbon coal. The EU's consumption of lignite for example, the most carbon intensive fossil fuel, has increased by almost 10 per cent since 2010 and its coal consumption rose by 3.3 per cent between 2012 and 2013.

The result is that carbon reductions delivered by significant investments in renewable energy are being cancelled out by growing, coal-based power generation. This is not a cost-effective or efficient way to decarbonise and risks entrenching coal in the European energy mix.

Europe will continue to rely on fossil fuels. One policy option is to utilise natural gas, since it is a lower carbon-intensive fuel that could potentially fill the gap until renewables gain a greater share of the energy mix. With a carbon footprint 41-49 per cent lower than that of coal, gas could help Europe meet its CO_2 reduction targets.

This is where shale gas could play an important role. Both the Intergovernmental Panel on Climate Change (IPCC) and the International Renewable Energy Agency (IRENA) have made recent comments indicating that it could help in reducing global reliance on more carbon-intensive energy sources and complement the development of the renewable energy sector.

European leaders have met on multiple occasions in 2014 to discuss industrial competitiveness. Energy intensive industries are struggling due to energy costs and many are migrating to the US where as a result of the shale gas boom energy prices have dropped drastically. BASF for example announced in May 2014 a possible investment of $1.4 billion in the US directly linked to rising production costs in Europe.

While shale gas development in Europe is unlikely to cause gas prices to drop as dramatically as has happened in the US, it will reduce the bloc's reliance on imports and strengthen its negotiating position on import costs. A recent study carried out by Poyry Management Consulting states that developing shale gas could reduce energy prices compared to a 'no shale' scenario, and relatively lower prices would in turn reduce costs for industry.

What has changed fundamentally in 2014 is Europe's response to its energy security. Events in Ukraine, the imposition of economic and travel sanctions and the evolution of the geo-political agenda have focused minds. The publication of the European Energy Security Strategy in May 2014 highlights the need for a 'hard-headed strategy for energy security which promotes resilience to those shocks and disruptions to energy supplies in the short term and reduced dependency on particular fuels, energy suppliers and routes in the long-term'.

The concern is that Europe is becoming increasingly dependent on external sources in order to satisfy demand. EU-28 dependency on energy imports grew from less than 40 per cent of gross energy consumption in the 1980s to reach 53.4 per cent by 2012.

Europe is hugely reliant on Russia as the main supplier of crude oil and natural gas. Russia is also Europe's primary source of imported coal, closely followed by the United States, which accounted for 23 per cent of coal imports in 2012.

Overall the EU's natural gas import dependency has risen to 67 per cent in 2011 and is projected to continue increasing, putting the EU in greater direct competition with global demand for natural gas. Some member states rely on a single supplier and often a single supply route for up to 80-100 per cent of their gas consumption.

Production from indigenous energy resources has also dropped in Europe. EU gas production, for example, saw a decrease of 5.5 per cent from 2011 to 2012. The UK saw a sharp decrease in production (-14 per cent), followed by Germany (-12 per cent) in the same year.

Given this domestic decline and increasing reliance on imports Europe needs to develop its own energy resources. An indigenous energy source such as shale gas becomes an increasingly attractive option as a possible substitute for more carbon intensive fossil fuels and to reduce dependency on non-EU energy suppliers.

However, Europe still does not know the full extent of its shale gas reserves and what might be commercially viable. This is why exploratory drilling is essential. Once the amount is known, Europe can ascertain how shale gas could contribute to addressing its energy challenges.

Member States have the right to determine the conditions for exploiting their energy resources, as long as they respect the need to preserve, protect and improve the quality of the environment. Consequently, exploration for shale gas is taking place across Europe including Denmark, Germany, Spain, Hungary, Lithuania, Poland, Portugal, Romania, Sweden and the UK. Only three countries, Bulgaria, France and the Czech Republic, have moratoria in place against shale gas development.

The UK and Poland in particular have made significant progress to introduce and facilitate measures to promote shale gas development. In the UK for example, the 14th Landward Licensing Round for onshore oil and natural gas exploration licenses is ongoing, and oil and gas companies plan to drill 20-40 shale gas wells in the coming years.

Poland is also active. Almost 60 wells have been drilled across three different basins around the country in recent years. The government is also currently defining its future energy framework and has recently passed several pieces of legislation that will ensure a stable regulatory environment for investors.

Other countries are taking a more measured approach. Denmark, for example, which has always had an innovative approach to its energy policy within a sustainable context, has recently come out in favour of shale gas as part of its national energy mix, having undergone a thorough consultation and evaluation process. The Netherlands is similarly considering developing its estimated shale gas reserves, but will first carry out an in depth strategic environmental assessment.

Europe is facing significant challenges when it comes to energy. While committed to ambitious climate goals, it is struggling with its competitiveness while managing geo-political instability.

Shale gas could have a potential role but public debate against exploration has been largely emotive, focused on the issue of risk. However, all forms of energy production comprise some element of risk, and every source of energy, including renewables, has an environmental footprint.

Risk can be managed; industry is continually adapting to new technologies and new opportunities and is committed to ensuring industry good practice. Where there are very real economic reasons for Europe to explore its shale gas potential, Europe needs to ensure there are rules and regulations in place that can mitigate this risk without compromising environmental values.

Energy is an integral part of how we live and work. Europe has therefore recognised the need for a mature and pragmatic approach to its energy requirements. Europe does not have to compromise its environmental ambitions to achieve its climate objectives but it is essential to recognise the necessity to manage immediate energy needs within a holistic policy framework.

Marcus Pepperell is spokesperson for Shale Gas Europe, a platform managed by FTI Consulting for all actors involved in the exploration and development of shale gas, tight gas and coalbed methane. For further information: www.shalegas-europe.eu/

Pepperell: An indigenous energy source such as shale gas becomes an increasingly attractive option as a possible substitute for more carbon intensive fossil fuels

Gotland gets smart about wind

Bottlenecks in the distribution system can restrict the flow of electricity from wind turbines to consumers. A pioneering smart grid project under way in Gotland, Sweden, will address this issue and more, says Junior Isles

In May, Ventyx, an ABB company, joined an innovative initiative to create one of the world's smartest electricity networks – a project called Smart Grid Gotland (SGG). Ventyx is to provide a new distribution management system (DMS) that will encompass network control, demand response management, demand forecasting and business analytics to support the project, enabling large quantities of wind and other renewable and distributed energy sources to be integrated into the grid, while maintaining reliability and providing better operational performance.

Gotland is the largest island in the Baltic Sea, some 90 km from the Swedish mainland. Sweden plans to increase its renewable electricity production primarily through wind power, as generated on the island. The SGG project intends to upgrade the existing power system on the island to a true smart grid system that will, among other things, enable a greater use of renewable energy sources (RES) in Gotland's network and handle the balance between production and consumption.

SGG is a collaboration including ABB, Ventyx, Schneider Electric, the Royal Institute of Technology (KTH), Svenska Kraftnät (Swedish TSO), local energy company Gotland Energi AB (GEAB) and Vattenfall, which owns 75 per cent of GEAB.

The project, which is being managed by ABB and Vattenfall, was started in 2012 in response to the European Union's climate change target to reduce carbon emissions by 20 per cent by 2020. It is being partly financed by Swedish Energy Agency.

SGG basically has three elements. It will: address how to use the existing network to integrate more wind; improve the power quality within the network; and test customer demand response programmes.

Explaining the first of the project's goals, Mattias Wedberg, Project Manager with Ventyx said: "There is an HVDC link to the mainland but the network is weak and has reached the 195 MW limit of the amount of wind generation it can handle. We will be seeing how we can bring an extra 5 MW of wind into the system."

Most of the island's wind power is generated in the south. The bulk of the wind power generation is exported to Visby via a 70 kV AC line with an HDVC Light link in parallel to support increased transmission capacity when necessary. The southern HVDC Light station can be operated as a dynamic reactive power compensator to increase system stability. This function supports the smart grid and increases system stability when large amounts of renewable production are present.

The network in the south of Gotland is modern and SGG will mainly introduce increased measurement and control in the region to support more renewable energy generation. The south HVDC station voltage control will be connected to the system controller in Visby and a control for optimum voltage control is being implemented as part of the SGG initiative, further increasing network stability.

This, however, will first require basic investments to upgrade the existing 30 kV overhead lines to 70 kV. Some reinforcements to substations are also needed to handle the increased electricity production.

In the central region of the island the SGG project will see the upgrade of two 70 kV substations with new protection and control for increased availability and communication. The distribution grid will also be partly rebuilt using the latest grid technology for increased controllability allowing better supervision, higher reliability and improved communication with end consumers.

Gotland's network is weak in terms of both transmission and distribution, often experiencing power cuts. ABB, which joined the project in 2013, is looking at how to reduce the frequency of these outages.

As part of its work, ABB will be installing a new substation, rural grid equipment and a "zone concept" for the medium voltage network, where circuit breakers and protection equipment will be deployed in the field to reduce outage extent and quickly restore power. Schneider will install smart meters in homes to assist in detecting LV faults, which the ABB Ventyx DMS can read so engineers can be dispatched to fix a problem.

Wedberg explained: "Dividing the grid into many zones minimises the area where the problem is. We can then disconnect this area and backfeed from another substation. This means all the customers, except in the actual location of the problem, can still receive power. The use of this zone concept with our DMS means we can isolate and solve a problem without any intervention by an operator; so it becomes a self-healing network.

"For example if you are away and there is a power-cut in your home, you as a customer can be informed by the smart meter before you reach your home and the problem will probably be fixed even before you arrive. Our DMS is also connected to the smart meter so the operator will also know in real-time what has happened."

ABB is expected to deliver the equipment for this part of the project within the next six months.

The effect of a greater amount of solar power, which is expected in the future, is also being investigated. In an effort to find new ways of detecting and resolving anticipated power quality issues related to micro production, a 1000 m² ground-based photovoltaic plant began operation in October 2013 near Visby. The complex consists of three single-phase installations, each of 3.2 kW and one three-phase installation of 2 x 22.5 kW. The single-phase installations symbolise a house rooftop installation, while the three-phase installation represents the roof of a barn.

According to GEAB, the aim is to use the increasing amount of micro production in a more efficient way. Jenny Larsson, CEO of GEAB said: "The results of the installation will give us important input into how we can use micro production to reinforce the grid and thereby increase the power quality here on Gotland."

When renewables such as wind and solar are the main source of power generation, other means of increasing network stability apart from backup generating units may be necessary. Further, when the generation is intermittent it is important to manage situations when generation is high but load is low and vice versa.

The project partners had originally planned to purchase battery storage units to investigate how they could help wind integration, address power quality and allow the network to run in island mode. This part of the project, however, has now been put on hold. Instead the consortium will later rent units from the University of Uppsala, which is looking to purchase batteries for use on the island.

Although balancing power will be available from other areas of the grid at certain times, the SGG consortium believes it is also important to involve consumers. The ability to alter the consumption pattern of consumers enables the most efficient usage of the renewable generation.

Part of the SGG project therefore involves testing the technical solutions and market models that will allow consumer participation based on more dynamic price signals.

This aspect of the project has in fact been already running for about one year and the plan is to add more customers and new load devices. At the moment there is a pilot demand response solution with equipment in about 300 homes controlling heaters and water boilers. The partners are now hoping to add smart meters and equipment to perform functions such as recording energy consumption in real-time, assessing grid status and power quality, etc.

While industrial consumers are not yet participating, Wedberg says the partners are looking at companies that could have electric vehicles that can be charged at night.

Having just completed studies on the project, Wedberg says equipment will now start to be deployed in the field for testing and verification of the theoretical studies.

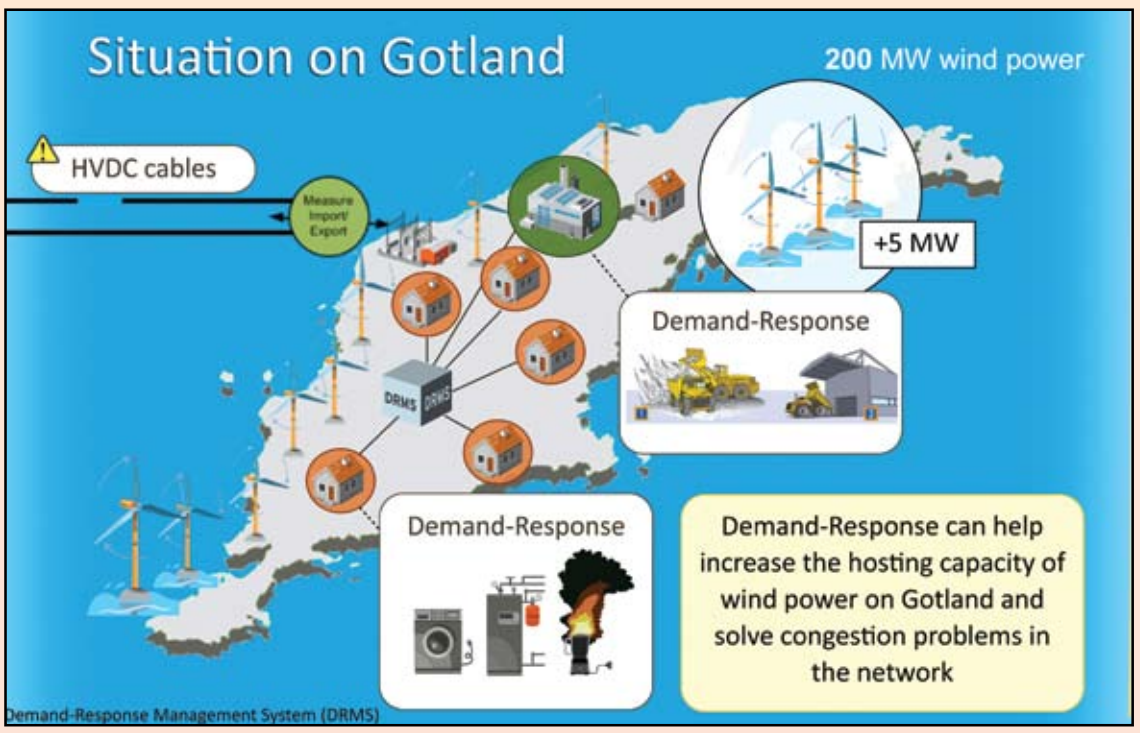
The world will be watching closely as SGG enters this important phase. Although there are a limited number of islands in Europe, it will attract wide international interest. Being on an island, significantly, it will enable the testing of individual components and entire systems together. Consequently, it is an important step towards a full-scale implementation of smart grids in Sweden.

"It is a full-scale project. It's like a miniature Sweden where you can test everything in real-life on a small island," noted Wedberg.

Certainly it is a very important project for both the project consortium and the industry. "This project has high focus in ABB and I think it is also one of the biggest R&D projects in Vattenfall," said Wedberg.

"There has been big interest worldwide. People involved in other smart grid projects want to visit us to see how we are doing and check-out our solutions to see how they can use them in their future projects. So it's really a great project."

The ability to alter the consumption pattern of consumers allows the most efficient use of renewable generation



Junior Isles

Sometimes things are easier done than said

The annual World Nuclear Association (WNA) Symposium has been known to attract more than its fair share of Greenpeace protesters. This year, the turnout was pretty poor and somewhat muted – just two lone, silent campaigners outside the venue handing out leaflets. Perhaps they now see nuclear as a greenish energy source; or maybe they believe Fukushima has already done a fairly decent job of derailing the industry.

Inside, with the industry celebrating its 60th anniversary, as expected the mood was more positive. Jean-Jacques Guatrot, Chairman of the WNA noted that three years after the disaster at the Fukushima Daiichi plant in Japan, the situation is "slowly improving".

He said: "There are 437 reactors currently connected to the grid globally, with another 70 under construction. Two major events expected in the coming months will also send a major signal to the industry – they are the final decision on Hinkley Point C and the restart of the reactors in Japan."

Still, there was no way to ignore the significant challenges facing the industry. The numerous benefits of nuclear such as highly reliable base load power, stable and low fuel costs, zero carbon emissions, are perhaps equally matched by the disadvantages, which include high capital costs, long lead times, the problem of nuclear waste disposal and high and often uncertain construction costs.

Certainly, the challenges appear almost too great in today's deregulated markets around the world. This explains the fact that nearly 56 per cent of the plants currently under construction are in Asia – China in particular – and other countries where the energy sector is still regulated.

Arguably, financing remains the most important part of any project development; without financing there is no project. In the past, governments took a major role or even full responsibility for funding and guaranteeing nuclear new build projects. With market liberalisation, however, financing projects has become a major obstacle.

> When people are trying to prepare a project… we are the guys who get the most wiggle at the end of the rope

Attracting investors to such a high cost, high-risk proposition as nuclear is no easy task. Dr Nadira Barkatullah, Director of Economic Regulation at RSB (Regulation & Supervision Bureau) in the United Arab Emirates noted that of the leading utilities that have nuclear assets, perhaps only EDF, with a market capitalisation of $76 billion, could put a couple of nuclear plants on its balance sheet. "More than that," she said, "would be "fairly testing."

So where will the money come from? Although multi-lateral organisations would be a natural fit for these types of project, most have a policy against providing financing for them. For many countries export credit agencies have been taking the lead in bringing finance to projects but there is a general trend that financing in the sector is moving towards private/public partnerships.

According to Dr Barkatullah, the most difficult issue for newcomers wanting build nuclear plants, is investment cost uncertainty. She estimated that overnight costs – EPC costs, contingency costs and owner's cost – can vary between $2 billion and $6 billion for a 1000 MW plant, depending on where the plant is being constructed, type of technology, nature of the site etc.

"First-of-a-kind technology can add as much as 30 per cent to the overnight cost. The low average cost in Asia is a result of the cheap labour and material costs in China," she noted.

Dr Barkatullah stressed, however, that overnight costs are not very interesting for economists. "It's [more about] when the time factor comes into play, and you talk about construction risks," she said.

"Construction risk is rated as the top risk in the industry, and the industry has to do better. If you look at a 5-10 per cent interest rate on a 6-year construction period, a two-year delay can add as much as 75 per cent to the overnight cost.

"This brings credit rating pressure. Moody's has rated construction of new nuclear plants as credit negative. This adds to the risk premium and the cost of finance increases."

Arguably the vendor is the organisation most affected by financing. According to Jerry Hopwood, Vice President, Marketing and Product Development at Candu Energy, vendors are "right at the end of the rope" when trying to get projects off the ground.

"When people are trying to prepare a project and the project is trying to settle itself, moving forward and back and the rope is wiggling, we are the guys who get the most wiggle at the end of the rope.

"In the end the project will either go or not go, and we have invested a lot of time and effort of our own in something where there's always uncertainty until financing comes along."

Much of the difficulty in attracting financing is down to risk. Hopwood noted that vendors have a critical role to play in bringing risks down.

"Every project will have some sort of unique characteristic or first-of-a-kind risk. Our job is to make sure that this is small and manageable. We have to bring lessons learned from operating experience and show why the plant will deliver returns. As technology providers, we also have to manage the supply chain," said Hopwood.

"Very importantly at the start of a project, licensing risk can be very high because it is unknown. The more we work with regulators and go through the process of gaining agreement with the licencing body in advance, the more we can reduce the project risk and thus the big spending on a project. And finally we have to be constantly aware of our role in the management of the project."

Vendors may understand what they need to do but are they getting the message across to the financial institutions? George Borovas, Partner, Shearman & Sterling LLP observed that while commercial banks are studying the nuclear sector, they often remain sceptical as they try to understand the risks.

He believes it is of vital importance to engage financial institutions early on in the project and help them better understand the risks.

Notably, he stressed the point of speaking their language. "You have to remember, it's about their business and not about your business," said Borovas. A number of examples clearly illustrated his point.

"We talk about the latest technology; the bank hears first-of-a kind risk. We talk about a proven safety record; a bank remembers Chernobyl, Three Mile Island, Fukushima. We talk about consortiums; a bank thinks about interface risk. We talk about construction schedule; a bank worries about delays and cost overruns.

"Localisation is a very important one. It's great for the economy but creates supply chain risk. The industry says we are well regulated; the bank says 'yes but I want to understand the host country regulator'. We talk about the government support for the industry; the bank worries about a changing political environment, such as a German-style phase-out.

"We talk about CFDs [contracts for difference) and long term power purchase agreements; the bank thinks about state aid investigations. We say these are long-term assets and the bank says 'OK, predict the electricity market price 35 years from now'. Finally we talk about new nuclear programmes; the bank thinks about where is the most country commitment and what are the resources – really asking the simple questions: Do they really want this? Do they really need this?"

Borovas' message to the industry was clear – de-risk projects as much as possible, engage financial institutions early on and get their feedback. "Understand and explain the project risks as it is being developed. De-mystify a lot of what you are talking about – no nuke-speak. Don't go in there and start speaking in technical terms. Speak simple language about what it is you are doing."

Sounds straightforward. Indeed things are generally easier said than done but occasionally it is the other way around.