# THE ENERGY INDUSTRY TIMES

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# Critics question UK energy cost review

Clark: the review will consider how the UK can take advantage of changes to the power system

Critics have called into question the thoroughness of a recently launched independent review aimed at curbing the rising cost of energy in the UK. **Junior Isles**

An independent review launched by the UK government aimed at reducing energy prices has come under fire from critics.

The criticism follows the selection of Oxford University academic Professor Dieter Helm as the leader of the panel and news that his team will have only 30 days to complete the review.

Electricity bills for UK industrial users are the third highest among 15 European countries and rising household bills have seen Britain slip from being the second cheapest to seventh, according to the government.

Professor Helm, an economist specialising in utilities, infrastructure, regulation and the environment, commented: "My review will be independent and sort out the facts from the myths about the cost of energy, and make recommendations about how to more effectively achieve the overall objectives."

The ambitious review builds on the commitment made in the Industrial Strategy Green Paper and will consider the whole electricity supply chain – generation, transmission, distribution and supply. It will look for opportunities to reduce costs in each element and consider the implications of the changing demand for electricity, including the role of innovative technologies such as electric vehicles, storage, robotics and artificial intelligence.

Business and Energy Secretary Greg Clark said: "All homes and businesses rely on an affordable and secure energy supply and the government is upgrading our energy system to make it fit for the future. We want to ensure we continue to find the opportunities to keep energy costs as low as possible, while meeting our climate change targets, as part of the Industrial Strategy.

"The review will consider how we can take advantage of changes to our power system and new technologies to ensure clean, secure and affordable supplies over the coming decades. Professor Helm will bring invaluable expertise to the review, and

*Continued on Page 2*

# Utilities recognising need for comprehensive cyber security strategies

A new report from Navigant Research reveals that a growing number of utilities are realising the need for comprehensive cyber security strategies that move beyond one-off, point-to-point solutions and toward more integrated, harmonious methods.

As electric power systems around the world increasingly embrace decentralisation, automation, and digitalisation, their efforts are also expanding the surface area for cyber attacks.

This, says the report, has led to an exponential growth in the number of attacks and threat actors. As a result, the market for cyber security solutions is expected to show healthy growth as the related markets for automation, communications, and smart devices continue to mature.

The report, 'Cyber security for the Digital Utility', analyses the global market for smart grid cyber security solutions, with a focus on five application areas: transmission upgrades, substation automation, distribution automation, smart metering, and smart grid IT & analytics.

According to the Navigant report, global smart grid cyber security spending is expected to grow from $1.8 billion in 2017 to nearly $3.2 billion in 2026.

Research published in Positive Technologies' Q2 2017 'Cybersecurity Threatscape' report, showed that the United States and Russia remain the most frequent victims of cyber attacks, but over a quarter (28 per cent) of attacks in Q2 2017 affected dozens of countries and hundreds – sometimes even thousands – of companies.

According to Positive Technologies' statistics, 67 per cent of attacks were performed for direct financial gain. Over half of attacks were non-targeted and primarily relied on malware to spread.

The epidemic of WannaCry ransomware showed that even vigilant users, who do not open suspicious messages or links, can still fall victim. Intel data indicates that over 530 000 computers were infected. The Bitcoin wallets of the WannaCry developers received over 50 BTC (equivalent to $128 000) of payoffs from victims, although damage to companies exceeded $1 billion.

Another massive malware campaign, conducted in late June, involved NotPetya This epidemic was unique in that the perpetrators did not seek financial gain; they did not attempt to send out the disk recovery key in response to ransom payments. Instead, the malware was intended to knock systems offline, cause digital sabotage, and delete files. Over 40 victims paid ransoms totalling the equivalent of $10 000.

At the end of July researchers attending the Black Hat cyber security conference in Las Vegas showed how to hijack robots so that they stop working or alter products or injure humans, and how to halt energy production by wind farms.

Jason Staggs, a researcher, discovered serious flaws at wind farms. Controllers did not encrypt all their messages, sometimes used default passwords and did not separate the networks, so that if a hacker took over one turbine, he or she could "rule them all".

Staggs estimates that disabling a wind farm for just one day could cost the energy provider up to $700 000. "If the electric utility decides not to comply… the attacker is able to cause damage to the turbines."


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I look forward to seeing his recommendations."

Professor Helm will look specifically at how the energy industry, government and regulators can keep the cost of electricity as low as possible, while ensuring the UK meets its domestic and international climate targets. The government's ambition is to have the lowest energy costs in Europe, for both households and businesses.

Some observers, however, have questioned that ambition and Prof Helm's selection. The report is due to be delivered by the end of October, and Prof Helm has reportedly been paid for only 30 days' work.

"A review by one man backed by an unpaid challenge panel and operating against a rushed timetable seems a way of simply finding out what Dieter Helm thinks," said Doug Parr of Greenpeace. "It is unambitious compared to the review we were expecting." He also questioned why there was no representative on the panel to speak for household consumers.

Hannah Martin, head of energy at Greenpeace UK, added: "Dieter has a well-known preference for gas and has historically failed to grasp the full potential of renewables." She claimed that with the costs of offshore wind and solar plummeting, the review needs "somebody with the vision to grasp the opportunities offered by clean energy to provide jobs, lower bills and slash carbon pollution".

Other experts, however, noted that many of the experts on the panel were long-standing supporters of decarbonisation and clean technologies, while also noting that Helm himself recognised the huge opportunity to transform the power system through smart grid technologies, electric vehicles, and solar and battery systems.

Energy expert Jeremy Chang of Pinsent Masons said Helm's job represented a complex challenge, which needs to take account not only of the development of smart technologies but also the impact of Brexit on the energy market, with issues such as freedom of movement and a weaker currency potentially affecting the sector.

Chang said the review would have more of an impact on the UK's long-term energy strategy than any immediate effect.

Speaking in the law firm's *OutLaw.com*, he said: "We have some of the highest energy prices in Europe. Whatever the outcome is of this review, it won't be a short-term solution to deal with price rises, for example those recently announced by British Gas. If you're looking at creating a stable regulatory environment this is the right approach, but it doesn't help people on the ground today."

■ Industrial users may benefit from lower energy prices that could result from greater competition when Shell enters the UK electricity supply market. In August, the oil and gas major applied to Ofgem for a licence to sell directly to industrial end-users within Great Britain. In addition to supplying Shell's assets in Great Britain, the company intends to supply power to other large industrial complexes from early next year. Shell Energy Europe already operates in 14 European power markets, including Germany, Italy and Turkey.


# UK must safeguard nuclear industry post-Brexit

With the British Parliament reconvening after the summer break, the complex issue of how Brexit, and the specific decision to leave Euratom, will affect the UK nuclear industry needs to be addressed urgently. **David Flin**.

The decision of the UK to leave Euratom as a consequence of Brexit is having a major negative impact on the UK nuclear industry. Both R&D and safeguarding will face significant issues, and it is not clear how the UK will overcome the problems these face.

Dr Jenifer Baxter, Head of Energy and Environment for the Institution of Mechanical Engineers, recently told *TEIT Times* that the departure from Euratom brings with it four main areas of concern for the British nuclear power industry that need to be addressed.

The first is that the UK will have to develop its own safeguards system to monitor all fissile material. Euratom does this for all its members. "Leaving Euratom will require a replacement safeguards regime meeting IAEA regulations," said Dr Baxter. "The ONR [Office for Nuclear Regulation] has to ensure its independence, and it must be clear it is not considered to be part of the government. It has to be internationally accepted."

The second area of concern is the possible loss of the single market. Currently, it is not necessary to apply for licences to move all goods or to obtain human resources and services from across Europe. The movement of goods in particular is significant, because it will be necessary to resolve the issue for a wide range of goods, from fuel and reactor material to protective equipment.

Dr Baxter commented: "It would be possible to make arrangements for this, but it will take significantly longer and introduce additional costs and delays. It can also impact research work."

Another worrying area, says Dr Baxter, is Nuclear Cooperation Agreements. A number of countries, such as USA, Canada, and Australia, require these. Euratom holds a nuclear cooperation agreement with them, but the UK will have to forge new agreements with these countries. Some countries do not require nuclear cooperation agreements, but licences to move material could take up to a year to arrange.

The fourth concern is collective research activities. Dr Baxter explained: "The UK has a lot of expertise in its universities, and leaving both Euratom and the EU could make UK universities a lot less attractive. The biggest problem will be with R&D activities. Some funding from the EU will soon be coming to an end, and the details of if and how this will be replaced needs to be settled."

Uncertainty about what will happen next is a problem for technological development, research development, and ongoing projects. This, notes Dr Baxter, means a transition period will be needed. "There should possibly be a delayed exit from Euratom to ensure the new safeguards regime is in place and has the confidence of the international community."

The UK will need to make priority nuclear agreements with other countries and the EU27, which could take 3-5 years. It will also be important to maintain access to research findings.

As Parliament reconvenes, it will need to quickly put in place plans to deal with these problems.

■ Ministers have called key nuclear power players for crunch talks on plans to meet Britain's energy demands with small modular reactors (SMRs), amid mounting fears over delays. In mid-August, industry giants including NuScale, Rolls-Royce, Hitachi and Westinghouse were called on to present their plans in meetings in the coming weeks The government signalled a key role for the technology in efforts to secure energy supply and meet climate change targets two years ago but little has happened since then.

# China expands nuclear ambitions

China is becoming a major player on the global stage after expanding its civil uranium supply chain to meet demand from domestic and worldwide projects.

State-owned China General Nuclear Power Corp (CGN) the country's largest nuclear power group recently put together agreements in most of the uranium-producing countries, including Namibia, Kazakhstan, Australia and Canada.

Yu Zhiping, general manager of CGNPC Uranium Resources Co Ltd, a subsidiary of CGN also confirmed that the nuclear fuel fabrication plant in Kazakhstan, a joint venture between Kazatomprom and CGN, is expected to be operational by 2019.

Industry observers believe that Chinese corporations have the potential to become major global players when it comes to civil nuclear technology after strengthening their supply chains.

Joseph Jacobelli, a senior analyst of Asian utilities and infrastructure at Bloomberg Intelligence in Hong Kong, said: "Strategically, it is important for any country with ambitious nuclear power generation expansion plans to secure fuel resources."

In late July, CGN revealed that it was eyeing Poland as a potential destination for nuclear exports, as part of its expansion in Europe, as well as the United Kingdom, the Czech Republic and Romania.

"CGN attaches substantial significance to the Polish nuclear power market and is willing to become a long-term strategic partner of the country," said Shu Guogang, Vice-President of CGN. Polish authorities have been consulting with CGN on cooperating and building the country's first nuclear power station, according to a statement on the CGN website.

The two parties signed a Memorandum Of Understanding (MoU) on cooperation on civil nuclear energy use earlier in July, which Shu said would bring mutual benefits to both countries.

The MoU is further evidence that the drive by Chinese electric power industry to diversify abroad is gradually expanding, said Jacobelli.

"CGN's experience and financing capability and capacity means the company should be able to lock in one or more overseas deals in the next few quarters. Whether the company can nail more deals in Eastern Europe is difficult to say at this stage because of the complex nature," he said.

■ China Shenhua and China Guodian Corporation have submitted a merger proposal to the State Council. If approved the new company, National Energy Investment Corporation (NEIC), will become the world's largest power utility company (in terms of installed capacity) ahead of EDF and Enel.

# Gas turbine promises 65 per cent plant efficiency

German industrial giant Siemens says an advanced version of its H-class gas turbine clears the way for combined cycle gas turbine (CCGT) plant efficiency levels beyond 63 per cent with a mid-term goal to reach 65 per cent.

The company has announced that it is validating the technologies of its new HL-class gas turbine at Duke Energy's Lincoln County site in North Carolina, USA.

According to Siemens the turbine is an evolutionary development of its proven SGT-8000H technology, combining a series of new but already tested technologies and design features with the best of past experience.

The HL series consists of three engines: SGT5-9000HL, SGT6-9000HL and SGT5-8000HL. In simple cycle operation the air-cooled SGT-9000HL gas turbine will provide a capacity of 545 MW for the 50 Hz market and 374 MW in the 60 Hz version. SGT5-8000-HL will provide 453 MW in simple cycle operation.

"All engines reach more than 63 per cent combined cycle efficiency," said the company in a statement.

The increased efficiency is achieved by allowing the turbine to operate at higher firing temperature. In order to achieve this, Siemens' specialists have developed advanced combustion technologies, innovative multi-layer coatings, super-efficient internal cooling features as well as an optimised water-steam cycle. Furthermore, optimised sealings minimise cooling and air leakage.

At the same time, evolutionary 3D-blading is enabling higher aero-efficiency for the compressor.

Willi Meixner, CEO of the Siemens Power and Gas Division commented: "It took us 10 years from 2000 to 2010 to increase the efficiency of our combined cycle power plants from 58 to 60 per cent, a further six years to reach 61.5 per cent in 2016 and now we are taking the next step to 63 per cent and beyond."

The development is significant in a market where gas fired generation will play a key role in complementing intermittent generation from renewable energy sources.

"Worldwide we see renewables are growing rapidly, but gas fired power plants will still play a vital role in the energy mix for the next decades," said Meixner. "Our HL-class offers a simple-cycle ramp-up of 85 MW per minute. Therefore, highly efficient and flexible gas turbines like our HL-class are the perfect fit to energy systems with a rapidly increasing share of fluctuating renewables."

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# Mexico reforms attract renewables financing

■ Projects reach financial close ■ Acciona to build Reynosa

Siân Crampsie

Renewable energy developer Zuma Energia says that its ability to secure finance for Mexico's largest wind farm demonstrates that the country's energy reforms are working.

Zuma recently announced that it secured $600 million in project finance for the 424 MW Reynosa wind farm in Tamaulipas state. The firm is also developing two solar farms in Mexico.

The Mexican government last year implemented sweeping reforms across the energy sector in a bid to attract overseas investment and boost renewable energy generation.

In August, the European Investment Bank (EIB) said it was considering a $50 million financing package for the 180 MW Zacatecas wind farm in northern Mexico, while the International Finance Corporation (IFC) has agreed a $45 million loan to support the development of the Solem I and II solar photovoltaic (PV) plants.

The Mexican Secretariat of Energy (Sener) also announced last month that the country's development banks would help finance nearly 1 GW of wind and solar projects awarded in the country's second long-term electricity auction in September 2016.

Among the projects to be supported by Sener are the Solem solar plants and the Reynosa and Mezquite wind projects.

Zuma, which is 80 per cent owned by Actis, has contributed $125 million of equity to Reynosa alongside its partner, Mesoamerica. Santander and EKF, the Danish export credit agency, have also helped finance the wind farm.

The Solem I and II PV plants were among the first renewable energy projects to reach financial close under Mexico's reformed power sector framework, according to IFC. They are being developed by Cubico Sustainable Investments Ltd and Alten RE Developments America, and will have a combined generating capacity of 350 MW.

According to PwC, Mexico's renewable energy sector will attract as much as $70 billion in foreign investments between 2015 and 2029.

Zuma has awarded the engineering, procurement and construction (EPC) contract for Reynosa to Acciona, who will build the foundations for 123 wind generators, each with a capacity of 3.45-3.6 MW, on 120 m towers, as well as roads and accesses.

Acciona will also install the medium voltage network for the entire wind farm, the 400 kV high voltage network with three substations and 40 km of double-circuit lines.

# Mainstream embarks on Chile venture

Chilean venture Aela Energía is proceeding with construction of two wind farms after reaching financial close on the projects.

Aela Energía, a joint venture between Mainstream Renewable Power and Actis, has obtained $410 million in financing for the two wind farms, which have a combined capacity of 299 MW.

Mainstream said that the project financing for the Sarco and Aurora wind farms will be provided by a group of multilateral and commercial banks including Inter-American Development Bank and its member affiliate Inter-American Investment Corporation (IADB-IIC), Mitsubishi UFJ Financial Group, Sumitomo Mitsui Banking Corporation, Korean Development Bank, Caixa, and KfW and Banco Santander as VAT lender.

Project financing will account for 70 per cent of the total financing for the projects, while the equity partners will provide the other 30 per cent.

"These projects were awarded through a competitive tendering process in which wind energy prices came in below fossil fuel prices, clearly demonstrating that renewable energy is cheaper than fossil fuel generation," said Bart Doyle, General Manager of Mainstream Chile.

He added that Mainstream has been awarded further supply contracts equivalent to almost 1 GW of wind capacity in Chile. The contracts position Mainstream "as the leading independent renewable energy company focused on high-growth emerging markets", Doyle said.

The 170 MW Sarco wind farm in the Atacama region of Chile and the 129 MW Aurora project in Los Lagos region are due to be completed in the second half of 2018 and will use Senvion wind turbines.

■ Chilean utility AES Gener SA could sell some of its assets in order to generate cash for the additional costs related to the construction of its Alto Maipo hydroelectric project. Chief Executive, Javier Giorgio told the media last month that the company has ruled out increasing its debt to fund the build, which is just over 50 per cent complete.

# Odebrecht shelves Rio Grande


Development of a major new hydropower complex in Peru has been halted by the project's sponsor.

Odebrecht Energia del Peru is reported to have shelved plans for the 750 MW Rio Grande hydropower plant on the Maranon River after being ordered by environmental authorities to provide more information on the project.

According to Direccion General de Asuntos Ambientales Energia (DGAAE), Odebrecht has asked the environmental impact statement filed for the project be withdrawn.

Earlier this year Odebrecht was ordered by DGAAE to respond to almost 150 comments on its environmental assessment relating to project description, environmental management strategy, compensation, community and contingency plans, and citizen participation. The $2 billion project includes the 600 MW Rio Grande I and 150 MW Rio Grande II plants.

■ Protestors have stopped work on the 700 MW Sao Manoel hydropower project on the Teles Pires River in Mato Grosso state, Brazil. The protestors, from the indigenous Munduruku tribe have asked for the return of artefacts uncovered during plant construction by Terra Nova, a joint venture owned by Furnas, EDP Energias do Brasil, and CWE Investment Corp.

In the pipeline: 28 offshore wind projects are under construction

# Falling costs spur US offshore wind

■ Onshore wind costs fall by two-thirds
■ Development pipeline tops 24 GW

Declining costs for offshore wind energy technology is spurring growth in the USA's nascent offshore sector.

The US Energy Department's National Renewable Energy Laboratory (NREL) says that the country's offshore wind project development pipeline amounts to over 24 GW of potential installed capacity.

The pipeline includes 28 projects that are under construction, at financial close, approved, permits submitted, and undergoing planning, NREL said in the 2016 Offshore Wind Technologies Market Report. It also includes nearly 2 GW of proposed floating offshore developments.

Most of the near-term activity is concentrated in the Atlantic off the Northeast coast, but projects have been proposed in the Southeast Atlantic, the Pacific, the Gulf of Mexico, and the Great Lakes.

Declining costs for offshore wind are partly behind the growth of the sector, but several states, including Massachusetts, New York, and Maryland, have enacted policies to support the development offshore wind.

Costs for onshore wind are also continuing to decline, according to the Department of Energy (DOE). Average prices for wind energy power purchase agreements (PPAs) fell to roughly $20/MWh last year, with some of the lowest prices in heartland states like Texas, Oklahoma and Iowa.

DOE's data also shows that the average PPA price for wind has fallen by two-thirds since 2009, and confirms other data showing a two-thirds decline in the levelised cost of energy (LCOE) from wind.

"The Department of Energy's research shows that wind power is a bright spot on the American energy landscape," said Tom Kiernan, CEO of the American Wind Energy Association (AWEA). "US wind projects are already among the most productive in the world, and this new data proves we have even greater potential to deliver affordable, reliable and clean electricity to the American people."

The two main factors driving down the cost of wind energy are reduced wind plant costs and higher productivity. DOE data show that it costs 33 per cent less, on average, to install a new wind project today compared to the peak reported in 2009 and 2010.

"This is a remarkable achievement, as cost reductions have been achieved while adopting longer turbine blades, using advanced materials, and making other improvements that would ordinarily tend to increase costs," AWEA said in a statement.

AWEA added that wind power is now the leading source of renewable energy capacity in the USA. The wind industry deployed 8203 MW in 2016, for a total of 82 143 MW of installed capacity at the end of the year.

■ American Electric Power (AEP) has announced plans to invest $4.5 billion in the development of a 2000 MW wind farm in the states of in Arkansas, Louisiana, Oklahoma and Texas. The Wind Catcher Energy Connection project will be the largest, single-site wind project in the US and includes the construction of a new, 560 km-long extra-high voltage power line.

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# Industry urges renewable energy decision

■ Electricity retailers put pressure on PM ■ Significant wind and solar thermal projects still get under way

Syed Ali

Company executives have urged Australian Prime Minister Malcolm Turnbull to decide on a clean energy target in order to drive investment and boost supply of electricity from renewable energy sources.

During a meeting in Canberra in August, the biggest electricity retailers put pressure on the Prime Minister to decide a new energy policy. Turnbull has been moving slowly on the clean energy target after a clash within the Coalition government over a proposal opposing a road map that could see 42 per cent of electricity coming from renewable sources by 2030.

Despite a lack of direction in federal energy policy, the country continues to execute significant projects.

In late August, AGL Energy (AGL) announced that it is set to begin construction on the 453 MW Coopers Gap wind farm after closing the financing with the sale of the project to the Powering Australian Renewables Fund (PARF), a partnership between AGL and Queensland Investment Corporation (QIC). Upon completion in 2019, the project will become the largest wind farm in Australia.

Global company SolarReserve also announced a significant project last month. The company said it would build what it claims to be the biggest solar thermal plant of its kind in the world.

The Aurora Solar Energy Project located in Port Augusta, about 300 km north of the South Australian capital Adelaide, will have a capacity of about 135 MW under normal operating conditions with the ability to increase that output in favourable conditions. It will incorporate eight hours of storage or 1100 MWh.

The plant will deliver 495 GWh of power annually – providing fully dispatchable baseload electricity to the network. The government will pay a maximum of $78/MWh for electricity from the plant.

Construction of the $650 million plant will start in 2018. South Australia, State Premier Jay Weatherill said the project would be ready to start in 2020 and would supply 100 per cent of the State government's needs.

It will be situated about 150 km northwest of Jamestown, where Elon Musk will install the world's largest lithiumion battery at Hornsdale Wind Farm.

Meanwhile, the government of New South Wales (NSW) has given the go-ahead to 275 MW of solar projects proposed for the eastern Australian state.

The approval for the four photovoltaic schemes was granted by the state's Planning Assessment Commission, NSW's minister for planning and housing Anthony Roberts said in a press statement.

Together with the latest four schemes, New South Wales has given the green light to 16 large-scale solar projects with a combined capacity of 1131 MW. Once operational, the plants' output is seen to be enough to power 423 000 homes.

The addition of the fresh solar capacity is in line with Australia's goal to source from renewables 20 per cent of its power by 2020.

# Coal and gas to meet Bangladesh demand

Bangladesh is investing in coal and gas to meet its needs for new generating capacity.

The government recently said it plans to begin setting up 22 coal fired plants within the next four years to achieve the targets set out in its long term energy road map.

"The target of meeting 30 per cent of the total power demand from coal-based plants by 2030 has been set in line with the Power System Master Plan 2016," said State Minister for Energy and Mineral Resources Nasrul Hamid. "We expect that construction work on the 22 power will begin in 2019."

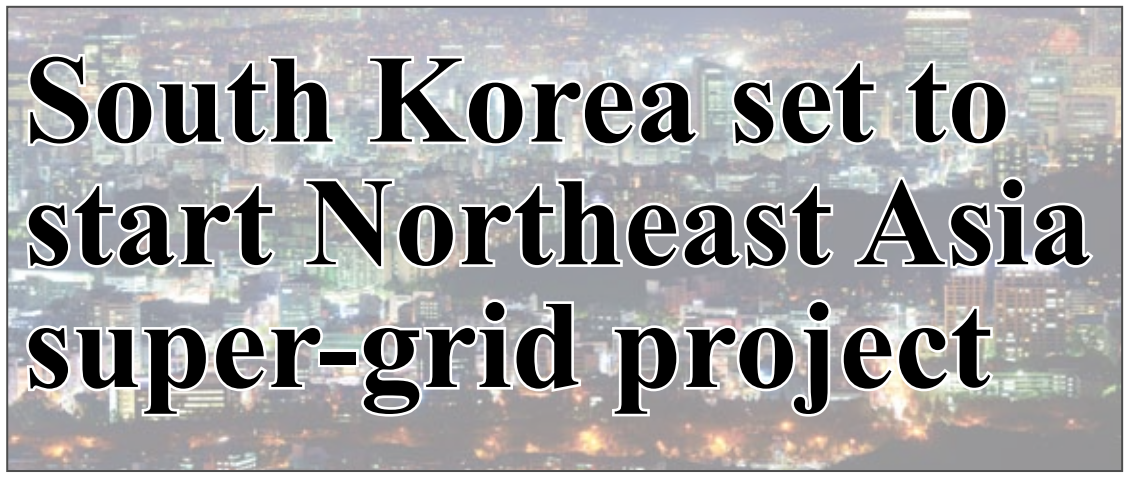
Out of the 22 plants, seven would be built by the government, seven by private sector and the remaining eight in joint venture, he said.

The state minister said the target of producing more power from coal would be met in phases, according to the *BSS* news agency.

He said producing electricity from coal would also help keep power tariffs at an affordable level because coal is cheaper than other available sources of power generation.

Bangladesh is also investing heavily in gas. At the start of August, Summit Power International Pte Ltd, the Singapore-based incorporated power producer announced collaborations to develop $1.0 billion of gas-to-power generation as well as an offshore liquefied natural gas (LNG) import terminal.

"We are delighted to announce these significant projects valued at more than US$1.0 billion over the next three years," chairman of Summit Power International Aziz Khan said in a statement.



# South Korea set to start Northeast Asia super-grid project

South Korea is set to take part in the Northeast Asia super-grid project in a partnership with SoftBank Group, a Japanese tech giant founded and headed by its Korean-Japanese Chairman Masayoshi Son.

The project aims to build a power grid that links electricity supply networks of five neighbouring countries – Korea, Japan, China, Russia and Mongolia. The scheme is part of the ambitious push dubbed the "Smart Energy Belt of One Asia" proposed by Son.

More specifically, the energy sharing scheme would see the construction of wind and solar energy farms in Mongolia to deliver power to neighbouring countries through land or subsea power grids, thus helping newly elected President Moon Jae-in fulfil his vision of ending the country's reliance on nuclear and coal.

"Korea's energy policy should be redefined from square one. We need more alternative power sources to solve the nation's power supply problem," Moon said.

Rep. Song Young-gil of the ruling Democratic Party of Korea and President Moon's special envoy to Russia for the Eastern Economic Forum in Vladivostok in September, is expected to meet Son in Japan prior to the forum.

Heading the Northward Economic Cooperation Committee established under the presidential office, Song is likely to carry the project forward as a core task.

In June, Korea Electric Power Corp. (Kepco) CEO Cho Hwan-eik also met Son to discuss a possible partnership in promoting the super-grid project.

Last year the two companies kicked off a programme to pioneer a new energy market using Kepco's big data and SoftBank's internet of things (IoT) technology. The companies share a common vision that the super-grid in Northeast Asia would reduce air pollution and greenhouse gas emissions. They also agree the power grid project would pave the way for the establishment of a joint economic community in the region.

Under its vision to promote the grid as the company's future growth engine, Kepco signed a series of memoranda of understanding with other major energy companies, including State Grid Corp. of China and Russia's state-run power company Rossetti.

# Solar shines in Malaysia

The growing interest in Malaysia's solar power sector was recently highlighted when the country received bids for nearly 1640 MW of solar capacity in response to a request for proposal (RfP) for large-scale solar projects.

The auction will award 360 MW of capacity in Peninsular Malaysia and 100 MW in the federal territory of Labuan for a combined 460 MW. The best offer received in that round was of MYR339.8 ($79.1)/MWh for a 30 MW solar project on the peninsula. The highest bids were for MYR 530/MWh for Labuan projects of 5 MW and 2 MW. Projects are expected to be completed in 2019-2020.

Malaysia has introduced several initiatives to promote solar energy and has targeted to produce 2500 MW or 10 per cent of its electricity requirements from this source by 2020. It is part of the government's plan that will see a reduction in the dominance of gas and coal as renewables play a greater role. Today, the overall usage of renewable energy is only about 22 per cent, especially in Sarawak where hydropower is abundant.

Those initiatives are having a notable impact. In August national state-owned utility Tenaga Nasional Bhd (TNB) secured MYR339 million financing for its first large-scale solar project , located on 97ha in Kuala Langat, Selangor. The national utility firm said in a statement that its unit TNB Sepang Solar Sdn Bhd (TSS) had together with Affin Islamic Bank Bhd achieved financial close for financing the project.

Once completed and fully operational by November 2018, TSS's project in Mukim Tanjung 12 will become the country's largest solar farm, generating and transmitting 50 MW of electricity to the national grid.

TNB Vice President (energy ventures) Datuk Nor Azman Mufti described the project as a booster to TNB's aspiration in championing renewable energy (RE) in Malaysia.

"As many utility companies around the world are shifting towards RE, TNB also aspires to be the Asean leader in renewable energy by 2025," he said.

# Fossil fuel funding jeopardising UK climate goals


■ Export finance is fossil fuel focused ■ Cafod calls for policy clarity

The Catholic Agency for Overseas Development (Cafod) says that the UK's government's ability to deliver on its climate change goals is in jeopardy because of its funding of overseas fossil fuel-based projects.

The aid agency believes that the UK spent more than double the amount on fossil fuels as it did on renewable energy overseas over the five years to 2014. It also says that there is a large variance in spending between different government departments, indicating a lack of policy consistency.

"The Conservatives made manifesto commitments they would continue to lead international action against climate change and extreme poverty, but supporting fossil fuels overseas puts that leadership at risk at a time when international leadership is needed now more than ever on the Paris Agreement," said Dr Sarah Wykes, lead analyst on climate change and energy at Cafod. "We'd like some clarity from the government on how it plans to make its energy spending consistent with its promises to tackle climate change and help the world's poorest people access modern energy services."

According to Cafod, more than 46 per cent of UK spending on energy in developing countries went on fossil fuels, compared to 22 per cent on renewable energy from 2010-2014. In total, the UK spent $9.73 billion supporting energy overseas over that period.

Cafod also says that over 99 per cent of spending via UK export finance went on fossil fuels. This compares with the Department for International Development, which spent more aid money on supporting renewable energy (32 per cent) than it did on fossil fuels (22 per cent).

Cafod, which campaigns for politicians and decision-makers to tackle climate change because of its impact on poor communities, has urged the government to clarify how it will overhaul spending on overseas energy projects. Its analysis of UK government spending, carried out in conjunction with the Overseas Development Institute (ODI), also shows that of the money spent on energy in developing countries, only eight per cent went towards improving people's access to energy.

"To tackle climate change we have to leave fossil fuels in the ground and switch rapidly to renewable sources of energy," said Dr. Wykes. "Yet the UK carrying on a business as usual spending pattern overseas in recent years suggests a huge inconsistency in policy and a missed opportunity to promote greater investment in renewable technologies."

■ London Mayor Sadiq Khan has published a draft London Environment Strategy that includes plans for the city to reach an installed solar energy capacity of 2 GW by 2050. The Mayor's proposals include implementing incentives for domestic and community solar power schemes and adding solar capacity to local authority buildings.

# Polish energy firms seek partner for Ostroleka

Polish energy firms Energa and Enea may seek a third partner for the construction of a new coal-fired power plant, they say.

The two companies have confirmed plans to invest in the 1000 MW Ostroleka C project and plan to select a construction contractor in early 2018. The PLN6 billion ($1.68 billion) project is a key element of the Polish government's energy security plans.

State-owned Energa abandoned plans for the Ostroleka C plant in 2012 because of difficulties with finance. It is now hoping that a proposed capacity market scheme in Poland will help to support the plant.

The financing model for Ostroleka C should be ready by the end of 2017, and Energa and Enea hope to have the plant operational by mid-2023.

It will be built at the site of two existing Ostroleka units in Ostroleka, Masovian.

Energa invited bids for the construction of the new unit at the end of 2016.

# Giant Estonian offshore wind farm takes shape

Plans for the construction of Estonia's first offshore wind farm are taking shape.

Developer Nelja Energia and its subsidiary, Hiiumaa Offshore Tuulepark, have signed a cooperation agreement with Hiiu municipality that seals a letter of intent signed three years ago.

The agreement commits the developers of the proposed Loode-Eesti offshore wind project in the Baltic Sea to make a contribution to the development of Hiiumaa Island on completion of the wind farm. It also states that wind turbines will not be installed less than 12 km from the shores of the island.

The Loode-Eesti offshore wind farm will consist of 100-160 wind turbines installed in the sea to the north of Hiiumaa with a capacity of 700-1100 MW.

Nelja Energia is also developing a 400 MW wind farm off the coast of Lithuania.

# Flexibility contracts will help distribution network, says UKPN

UK Power Networks says new flexibility services contracts will help it operate its distribution network and is a key step forward for a traditional DNO keen to modernise its business.

Siân Crampsie

The UK's distribution network operators (DNOs) are planning a major transition that will enable them to take on new, active roles in managing smart, flexible grids.

UK Power Networks (UKPN), the country's largest DNO, has invited operators of distributed energy resources to submit expressions of interest for new flexibility services contracts.

The company has also joined other DNOs, industry bodies, academics and government departments to launch a consultation regarding the creation of a smart electricity grid and the use of flexible, distributed energy technologies.

The consultation is part of the Energy Networks Association's (ENA) Open Networks project and will look at how the UK's electricity grid can maximise the use of distributed assets, deliver access to markets, encourage new business models, and maximise the benefits of competition and third-party involvement.

The initiatives are a major step forward for network operators, which are currently bound by strict regulations governing their activities as network asset managers.

The drive to create a more smart, flexible grid capable of managing intermittent renewable and distributed generation resources will require changes in regulations that allow DNOs to become more active 'distribution system operators' (DSOs), UKPN says.

UKPN has identified ten locations across its network where the installation of distributed generation resources, including batteries, fast-response generators, or demand-side aggregators, will help it to improve network management. It plans to run a tender to contract for flexibility services to start as early as January 2018.

UKPN says that its new flexibility services contracts have rarely been used on local distribution networks before and will benefit both the grid and the owners of the distributed resources. Follow-on tenders for the contracts will be run on a regular basis, it said.

UKPN's Sotiris Georgiopoulos said: "This is a hugely important time for the energy industry as we transition towards a more low-carbon economy, which is why it is vital that we commit to working together and listening to everyone involved.

"Our objective is to enable flexible energy systems and new technologies, while continuing to deliver the secure, stable and cost-effective electricity network our customers expect. The work we are doing to open up our network presents a wealth of new opportunities for flexible energy resources."

"The smart grid transition has the potential to create a whole new range of market opportunities for new technology and service providers, many of whom will be participating in the UK market place for the first time," said David Smith, CEO of ENA.

"Our energy networks increasingly need to access the latest technologies and services in order to ensure continued reliable and cost-effective electricity supply as part of a decarbonised system."

# Government plans to sell Belene to private sector

Bulgaria is to sell its troubled nuclear power project in Belene to private investors. The government says it will launch a tender in early 2018 for the 2000 MW project, which was cancelled in 2012 because of financing constraints.

The government is aiming to sell up to 90 per cent of the project to private investors willing to complete construction of the power plant without state guarantees or long term power purchase agreements.

The move follows a 2016 ruling by an international arbitration court that Sofia should pay more than €550 million ($623 million) in compensation to Russian nuclear giant Rosatom for two nuclear reactors it ordered for Belene in 2006.

Construction of Belene was initially started in 1987 but was stopped in 1991 due to pressure from Bulgaria's neighbours and concerns over safety and the environment.

The project was revived in 2002 and Bulgaria selected Atomstroyexport in 2006 to build two 1000 MW VVER-1000 reactors at the site.

# Turkey ramps up renewables

■ Kalyon-Hanwha plan solar production ■ Siemens-Türkerler-Kalyon win competitive bid

Siân Crampsie

The developers of a 1 GW solar power plant in Turkey say they will lay the foundation stone for a solar panel production facility this November in line with the development of the giant solar project.

The Turkish-Korean Kalyon-Hanwha consortium on 20 March 2017 won the bid for the construction of what is Turkey's biggest solar power plant. The consortium placed the lowest bid of €0.0699/kWh for the Karapınar solar farm, which will start operating in early 2019.

Kalyon-Hanwha is obliged to build a production facility in order to meet local production requirements. The factory will cost $450 million to build and will comprise facilities for producing ingot, wafer, solar cells and solar panels.

Kalyon Holding Energy Group President Murtaza Ata told state-run Anadolu Agency that the consortium's factory will be founded in the Ankara Organized Industry Zone, with an initial production capacity of 500 MW. "We plan to raise this capacity to 1000 MW in a gradual manner," Ata said. "We plan to start solar panel production by the end of 2018."

The facility is part of Turkey's YEKA initiative, which is designed to domesticate the country's renewable energy sector and support the country's ambitions to develop 20 GW of onshore wind capacity by 2023 and improve energy security.

In early August, a consortium led by Siemens-Gamesa won the tender for a project to install 1 GW of onshore wind energy capacity.

Siemens-Gamesa, with its consortium partners Türkerler Holding and Kalyon A.Ş, will also build a wind turbine production facility.

The Siemens-Türkerler-Kalyon consortium bid $3.48/kWh for the YEKA wind farm, beating bids from other consortia that included GE, Enercon, Nordex and Vestas. The project will increase Turkey's installed wind energy capacity by 17 per cent.

Under its contract with the Turkish government, the Siemens-Türkerler-Kalyon consortium will install 1000 MW of onshore wind capacity in five pre-designated regions: Kayseri-Niğde, Sivas, Edirne-Kırklareli-Tekirdağ, Ankara-Çankırı-Kırıkkale and Bilecik-Kütahya-Eskişehir.

At least 50 MW must be installed in each region. Siemens has not yet released further details of its plans but says it will build the wind turbine factory within 21 months.

■ The International Atomic Energy Agency (IAEA) has completed a site and external events design (SEED) review of the Akkuyu nuclear power plant. An IAEA team visited Turkey for the five-day review to discuss matters related to the plant's design, including protection against hazards such as tsunamis, geotechnical risks, earthquakes, and aircraft crashes, as well as issues relating to the foundation and soil.

## Plans revived to export renewable energy to Europe

Plans to tap North Africa's vast renewable energy resources for export to European markets have once again been revived.

Renewable energy developer TuNur has filed a request with the Tunisian Ministry of Energy to build a 4.5 GW solar energy complex in the Sahara Desert to supply the growing European market for renewable energy.

TuNur, a private London-based company backed by Nur Energie and Tunisian and Maltese investors, says that the first phase, comprising 250-500 MW of capacity exported to Malta, could be operational by 2020.

TuNur wants to base the 4.5 GW plant on concentrating solar power (CSP) technology equipped with molten salt storage, and will build it near Rjim Maatoug in southwest Tunisia.

Export of the energy would be via three high voltage direct current (HVDC) cables to Malta, Italy and France.

The first cable would link Tunisia with Malta, which is already connected to the European grid via Italy. This connection will help to reinforce Malta as a Mediterranean energy hub, TuNur said. The second cable will link Tunisia with central Italy, with a shoring point north of Rome.

This cable has been under development for several years and is currently being evaluated as a European Project of Common Interest.

The third cable, linking Tunisia with the south of France is currently being evaluated.

Kevin Sara, CEO of TuNur, said: "The economics of this project are compelling; the site in the Sahara receives twice as much solar energy compared to sites in central Europe. Thus for the same investment, we can produce twice as much electricity.

"In a subsidy-free world, we will always be a low-cost producer, even when transmission costs are factored in."

In 2009, a consortium of European companies founded the Desertec Initiative, an ambitious €400 billion project to build large-scale renewable energy plants in North Africa and export the energy to Europe. The project flopped, however, due to concerns over cost, risk and political instability in the region.

TuNur's plans rely on the use of large amounts of marginal land and the region's high levels of solar irradiation.

## Barakah nuclear plant reaches milestone

The Emirates Nuclear Energy Corporation (ENEC) has called the installation of the final steam generator at the Barakah nuclear power plant an "extraordinary milestone".

The installation of the steam generator for unit 4 at the nuclear project coincides with the installation of the reactor vessel for that unit, ENEC said, and brings the construction project to 82 per cent complete.

ENEC Chairman, Khaldoon Al Mubarak, praised the focus of the project partners on quality, safety and efficiency, and said that the Barakah plant would contribute "to a diversified energy mix and sustainable, long term economic growth" in the United Arab Emirates. "The installation of the final reactor vessel and steam generators, as per the 2009 prime contract, is a great achievement," Al Mubarak added.

The Barakah facility is scheduled for completion in 2020, with construction having started in 2012.

A Korea Electric Power Corporation (Kepco) led consortium is building the four 1400 MW nuclear reactors, which will provide around one quarter of the UAE's electricity needs when complete.

According to ENEC, unit 4 at Barakah is now more than 52 per cent complete, while unit 1 is more than 96 per cent. Unit 2 is 85 per cent complete and unit 3 is more than 75 per cent complete.



# Oman plans to replace retiring plant

■ OPWP extends Barka, Al Kamil
■ New capacity procurement process proposed

Oman is making plans to retire some of its ageing power generation capacity as well as offer contract extensions to independent power plants whose contracts are expected to expire in the next seven years.

The 326 MW Wadi Al Jissi and 405 MW Ghubra independent power projects will be decommissioned next year.

Meanwhile the Oman Power and Water Procurement Company (OPWP) is finalising negotiations with Al Kamil IPP and Barka IWPP to extend power plant contracts for three years.

The natural gas-fired Wadi Jissi power project is owned and operated by the Wadi Al Jissi Power Company and the project will discontinue operation in September 2018. The first phase of the project, which is located in Wadi Jissi in Sohar, started power generation in 1982, with various facilities added over the years.

The 405 MW contracted capacity of the Al Ghubra Independent Water and Power Project (IWPP) is also due for retirement next year. "This will reduce to 340 MW when the two steam turbines are retired in April, 2018, and all remaining units will be retired on 30 September 2018," stated a seven year-outlook report released by OPWP.

Between 2017 and 2023, the Sultanate's total contracted capacity of 6897 MW in 2017 will rise up to 8944 MW by 2019, before falling back to 7394 MW by 2022. The expected fall in contracted capacity is due to a number of contract expirations during the seven-year period.

OPWP wants to extend Al Kamil's and Barka's contracts to the end of 2021. Both plants could be available for further extensions beyond 2021 by participating in OPWP's proposed competitive contract procurement process.

# Macquarie reiterates green ambition on sealing GIB deal

Macquarie has completed its much-criticised purchase of the Green Investment Bank and has pledged to use "deep pools of capital" to further the Bank's clean energy purpose.

Siân Crampsie

Macquarie has reiterated its ambition to use the Green Investment Bank as its primary vehicle for investing in clean energy projects across Europe after completing its £2.3 billion acquisition from the UK government.

Macquarie announced in April that it would purchase GIB in partnership with Macquarie European Infrastructure Fund 5 (MEIF5) and Universities Superannuation Scheme (USS), and says that the bank will now be called the Green Investment Group.

Macquarie added in a statement that the Green Investment Group would remain one of the leading investors in green infrastructure in the UK and Europe, with added scope to further expand internationally. The sale of the organisation, established by the UK government in 2012, has been widely criticized, however.

"The completion of this sale is disastrous news for everyone who cares about the future of renewable energy. This was a bad deal for the taxpayer and a bad deal for the planet," said Jonathan Bartley, Green Party co-leader. "The government was repeatedly warned that selling the GIB to Macquarie could result in asset-stripping and leave the bank unfit for purpose. The sale means taxpayers no longer have a say if this turns out to be true."

However the government said that the sale of GIB had ensured that all the taxpayer funding invested in GIB since its creation, including set-up costs, had been returned with a gain of approximately £186 million. It added that the deal secured the future of the GIB "with an ambitious new owner committed to growing the business".

"We led the world in setting up the Green Investment Bank and it is now being copied by others," said Climate Change and Industry Minister Claire Perry. "Now that it's in the private sector, it will be able to operate on an international level to tackle the global challenge of climate change."

Perry also noted that the green 'special share' held by the Green Purposes Company Limited would now come into force, meaning that five independent trustees have the power to approve or reject any proposed changes to GIG's green purposes in the future.

Macquarie has committed to the Green Investment Bank's target of leading £3 billion of investment in green energy projects over the next three years. The firm now has one of Europe's largest teams of green energy investment specialists, Macquarie said.

Edward Northam, Head of the Green Investment Group, said: "This new chapter provides the best of both worlds: a deep sector specialism coupled with access to a global platform and deep pools of capital. We have ambitious plans for the growth of the Green Investment Group, starting with a continuation of our role as a leading investor in the UK and building on that through an additional international focus."

# ECP buyout will allow Calpine to continue with "strategic objectives"

Calpine says that its proposed acquisition by a private equity firm will enable it to continue as the USA's "premier competitive power company".

The power company has agreed a $5.6 billion sale deal with a consortium led by Energy Capital Partners (ECP) and says that the move "is in the best interests" of shareholders and stakeholders.

The deal follows an exhaustive review of strategic alternatives, the company said in a statement.

"We are excited to partner with Energy Capital, a leading private equity investment firm focused on North American energy infrastructure and power assets," said Thad Hill, President and Chief Executive Officer of Calpine. "With ECP, Calpine will be able to operate as it always has – executing on our strategic objectives of providing safe and reliable power and serving our retail and wholesale customers with differentiated products and services. We will also continue to strengthen our wholesale power generation footprint, while benefiting from ECP's support, industry expertise and long-term investment horizon."

ECP's partners in the deal are Access Industries and Canada Pension Plan Investment Board. They have offered $15.25 per share in cash, representing a 51 per cent premium over Calpine's share price of $10.07 on May 9, 2017, the day prior to initial media speculation of a transaction.

Like other US power companies, Calpine's financial performance has been affected by its exposure to the "spark spread" – the difference between the price of the gas that it buys and the electricity that it sells. The majority of the firm's 26 000 MW fleet of power plants is natural gas firing.

Calpine's share price has also been affected by competition from renewable energy technologies, which have depressed power prices.

Tyler Reeder, a partner at Energy Capital Partners, stated: "We look forward to joining forces with Calpine's talented team as they continue executing their strategy. We see significant value in Calpine's operational excellence and strong and stable cash flows.

"We do not expect to make any changes to the way Calpine operates its business and intend to remain focused on providing the high level of service to which Calpine's wholesale and retail customers have become accustomed. Finally, we do not intend to make any changes to the Company's financial policy or previously announced $2.7 billion deleveraging plan."

ECP is the largest shareholder in Calpine's rival Dynegy.

The agreement includes a 45-day "go-shop" period, during which Calpine can actively solicit and enter into negotiations with parties that might offer better deals.

The deal is also subject to regulatory and shareholder approval and is expected to close in the first quarter of 2018.

# Nuclear tax refund boosts German utilities

E.On and RWE have announced plans to increase shareholder dividends after receiving a large tax refund from the German government.

The companies have benefited from a June ruling by Germany's highest court that a tax on nuclear fuel was unconstitutional.

The decision entitled E.On, RWE and EnBW to billions of euros in refunded taxes.

RWE has been awarded a refund of €1.7 billion and E.On €2.85 billion. RWE said in August that it would pay shareholders a special dividend of €1 per share, while E.On announced that it would increase its dividend next year.

The refund has also helped RWE to record a surge in profits, posting a half-year net income of €2.7 billion, up from €457 million last year. Adjusted net income, which does not include the refund, totalled €809 million, a 35 per cent rise on 2016.

Adjusted earnings before interest, tax, depreciation and amortisation stood at €3.2 billion, compared to €3 billion last year, RWE said, adding that it had also reduced net debt by €1.2 billion to €21.5 billion.

E.On said that the refund had helped it to reduce its economic net debt from €26.3 billion at the end of 2016 to €21.5 billion at the end of June.

Both companies have come under severe financial pressure in recent years because of the forced closure of Germany's nuclear power plants and the *Energiewende* – the planned accelerated transition to a low carbon economy.

# Qatari investment revives SolarWorld

- Firm keeps German facilities open
- 25 MW order announced

Solar firm SolarWorld says that it will continue producing solar products in its German facilities after agreeing a rescue deal with investors from Qatar.

SolarWorld filed for bankruptcy earlier this year but has agreed to the sale of its assets and business to SolarWorld Industries, a new joint venture established by Qatar Solar Technologies and SolarWorld founder Frank Asbeck.

SolarWorld Industries will have a lower cost base than its predecessor and will also focus on the production of premium products based on monocrystalline PERC solar cells. It has already signed a deal with one customer for 25 MW, Asbeck said.

"I am delighted that after tough negotiations, we have succeeded in developing a future for SolarWorld production," Asbeck added. "With this restart, we will ensure that solar products are still being developed and produced at a highest level in Germany.

"In addition, we want to open our research department more for industry partners in order to jointly promote solar technology."

SolarWorld Industries will start with a production capacity of 700 MW and just over 500 employees. It has purchased the two German manufacturing plants for €100 million.

The firm's predecessor fell foul of price competition from Chinese solar panel manufacturers. It led a campaign by the European solar energy industry to get the European Commission to impose anti-dumping duties on Chinese imports.

Qatar Solar Technologies, a subsidiary of the non-profit organisation Qatar Foundation, has been a shareholder in Solarworld since 2013.

## Americas

### Vestas supplies Mexico project

Zuma Energia has placed an order with Vestas for wind turbines for the 424 MW Parque Eolico Reynosa project in the northeastern state of Tamaulipas, Mexico.

Vestas will supply 123 of its V136-3.45 MW turbines for the project, with delivery slated to start in late 2017. It will also be responsible for turbine installation and will provide a 15-year service contract.

The project is part of the capacity awarded in Mexico's second long-term electricity auction, held by the government's Secretariat of Energy and National Energy Control Centre in September. Acciona is building the wind farm.

### AbbVie opts for dual fuel

MAN Diesel & Turbo is to supply American pharmaceutical company AbbVie Inc. with two dual-fuel engines to provide energy for AbbVie production plants in Puerto Rico.

MAN will supply two MAN 9L 51/60 engines which will run on diesel fuel and provide 19 MW for AbbVie's plants. The engines will replace two existing, two-stroke MAN engines at the site and are scheduled to be commissioned in 2018.

### Adon selects Powin Energy

Adon Rnewables has chosen Powin Energy to provide energy storage systems for a portfolio of seven solar plus storage projects in Hawaii.

At each site, the energy storage system will store energy generated by the solar panels for use in the evening or overnight by its energy customers.

Powin will provide its Energy Stack140 system for the projects, which will be located at sites including Boy Scouts of America and Aqua Kauai Beach Resort.

## Asia-Pacific

### SolarReserve to build CSP down under

SolarReserve has won a contract to build a 150 MW concentrating power plant (CSP) in South Australia.

The state's premier, Jay Weatherill, has announced that construction on the Aurora plant will start in 2018 and is set for completion in 2020. The project will include 1100 MWh of molten salt energy storage capacity.

SolarReserve has signed a 20-year generation project agreement (GPA) with the South Australian government. A GPA provides the USA-based developer with payments for the plant's energy output as well as for its available capacity during peak demand periods.

"Aurora will provide much needed capacity and firm energy delivery into the South Australian market to reduce price volatility," said SolarReserve chief executive Kevin Smith.

The Aurora plant will be based on solar tower CSP technology.

### Tekmar snaps up China contract

Tekmar Energy has won a contract to protect array cables on the 400 MW Binhai North H2 offshore wind farm project in China.

Binhai North H2 is currently being built in Jiangsu province by Huadian Heavy Industry on behalf of State Power Investment Corporation.

Cables and cable protection systems will be installed this summer and the project is slated for commissioning by the end of 2017.

### Wärtsilä signs Bangladesh contract

Wärtsilä has signed a contract with Bangladesh-based Summit Group to supply a 300 MW power plant in Gazipur.

The new facility will consist of 18 Wärtsilä 46 engines operating on heavy fuel oil. The order is a fast-track delivery and will be fully completed in nine months, Wärtsilä said.

### Vestas success in China

China Datang Corporation Renewable Power Co., Ltd. has awarded Danish wind turbine maker Vestas Wind Systems a contract to provide 45 wind turbines for a project in China.

Vestas will supply its V110 model to the Shandianhe project in Guyuan County of northern China's Hebei Province. It will also provide supervision of turbines installation and an Active Output Management 4000 (AOM4000) service contract, it said.

Delivery and commissioning of the turbines are expected to begin in the fourth quarter of 2017.

### Samsung wins PTT contracts

Samsung Engineering says it has received contracts from two subsidiaries of PTT, the Thai state-owned oil and gas company.

The contracts have a combined value of $500 million and relate to a petrochemical project and a power generation project in Rayong. Both projects will be delivered on an engineering, procurement, construction and commissioning (EPCC) basis, and will be completed in 2020 and 2019, respectively.

### ABB boosts Himalayas reliability

ABB will upgrade 20 substations in India's northern state of Himachal Pradesh, located in the foothills of the western Himalayas.

The substations will be equipped with the latest control and protection technology to enable future digitalisation.

The order, placed by the local state utility, Himachal Pradesh Electricity Board Limited (HPSEBL), supports India's Smart Grid Vision and the government's ambition to provide reliable power to the country's most remote regions.

ABB will deploy its Relion electronic relays for the protection, control, measurement and supervision of power systems at all 20 substations.

Six of the substations will also be equipped with ABB's state-of-the-art MicroSCADA (Supervisory Control and Data Acquisition) system, which will ensure the optimised control and reliable operation of the substation through seamless integration and connectivity between different devices and systems.

### Engie selects GE for Willogoleche

GE has secured an order from Engie for 32 wind turbines for a 119 MW project in South Australia.

The US firm will supply 24 of its 3.8 MW units and eight of its 3.4 MW turbines for the Willogoleche wind farm, which will be constructed by Civil & Allied Technical Construction Pty Ltd (CATCON).

The project is GE's first in Australia with Engie. Completion is planned for mid-2018.

## Europe

### Ffestiniog set for refurb

Engie plans to refurbish the 360 MW Ffestioniog pumped storage hydropower plant in Wales.

The company has awarded German engineering firm Voith Hydro a contract for the refurbishment of Units 1 and 2, including an option for the refurbishment of the facility's two other units at a later stage.

The project will extend the operational life of the two units for at least another 20 years, ensuring that the power plant continues to play a key role in the UK's energy mix.

The project is set to be completed by early 2020.

### GMG wins Rampion deal

E.On has awarded Global Marine Group (GMG) a contract to install a fibre optic cable at the Rampion offshore wind farm.

The 400 MW Rampion project is under construction in waters 13 km off the coast of Sussex, southern England. The fibre optic cable will run from the shore to an offshore substation, providing a vital communications link for the wind farm.

GMG subsidiary CWind will execute the contract. Installation of the cable was due to be completed in August 2017.

### Minesto finds new foundations

Minesto has awarded Jones Bros Ruthin (Civil Engineering) Co Ltd the contract to construct the foundation for Minesto's first commercial-scale tidal energy power plant.

Deep Green is a proposed commercial-scale tidal energy project located in Holyhead Deep off the northwest coast of Wales. The array will be installed in phases, starting with a 0.5 MW demonstrator.

Minesto awarded the contract to Jones Bros following the announcement by the previous contractor in July that it could no longer fulfil its commitments to the project. It has agreed to move the installation schedule for the first foundation forward.

Arup will complete and verify the design of the foundation, Minesto said, adding that the demonstration project will now be installed in 2018.

### Baltic plans cable upgrade

ABB has won an order from Baltic Cable AB, a subsidiary of Norway based Statkraft, to upgrade the Baltic Cable high-voltage direct current (HVDC) transmission link between Germany and Sweden.

The 250 km-long link runs beneath the Baltic Sea with a capacity of 600 MW and 450 kV. ABB will upgrade the control and protection system of the link to enhance the performance and reliability of the link and also extend its lifespan.

## International

### Siemens wins Iraq O&M

Siemens has expanded an existing service agreement with KAR Group in Iraq to provide comprehensive operations and maintenance (O&M) for two newly added SSC5-2000E power plant units at the Khormala plant in the Kurdistan region.

The 930 MW natural gas-fired power plant meets nearly 30 per cent of the power demand targeted by the Kurdistan Regional Government (KRG). The extension of the service agreement is set to improve operational flexibility, availability, and performance of gas turbines for the next 15 years.

### EETC awards substation contract

The Egyptian Electricity Transmission Company (EETC) has contracted Siemens to develop two substations to strengthen the country's electricity grid.

Siemens will design, engineer, construct, supply, install, and commission the 500/220 kV substations. It will supply gas insulated switchgear as well as power transformers, control systems, and telecommunication equipment.

The substations will be installed in Samanoud and Aboul Matameer and will transmit electricity generated by the new Burullus power plant in Kaft El Sheikh Governorate.

Siemens has formed a consortium with El Sewedy Electric for the project, which is expected to be complete within 15 months.

### ABB supplies Jordan PV projects

ABB's central inverter solutions have been selected to power the Mafraq I and II solar photovoltaic (PV) power plants in Jordan.

The two power plants will have a combined output of 102 MW and will be built by Fotowatio Renewable Ventures (FRV). ABB will provide 62 of its 2 MVA outdoor type central inverters, 30 of its 4 MVA and two of its 2 MVA medium-voltage step-up stations.

ABB is also supplying its outdoor type oil transformers and 36 kV SafeRing-type Ring Main Units delivered with outdoor enclosure. Commissioning is also included in the delivery. The two plants are scheduled to be operational in mid-2018.

### GE lands Israeli hydro deal

GE has won an order worth over $100 million to deliver equipment for the 344 MW Kokhav Hayarden hydropower plant in Israel.

GE Renewable Energy will design, produce, supply and install all electro-mechanical and hydro-mechanical equipment for the pumped-storage complex and provide balance of plant services for the plant's two 172 MW units.

It will also deliver operations and maintenance (O&M) services under a 20-year agreement with Star Pumped Storage Ltd.

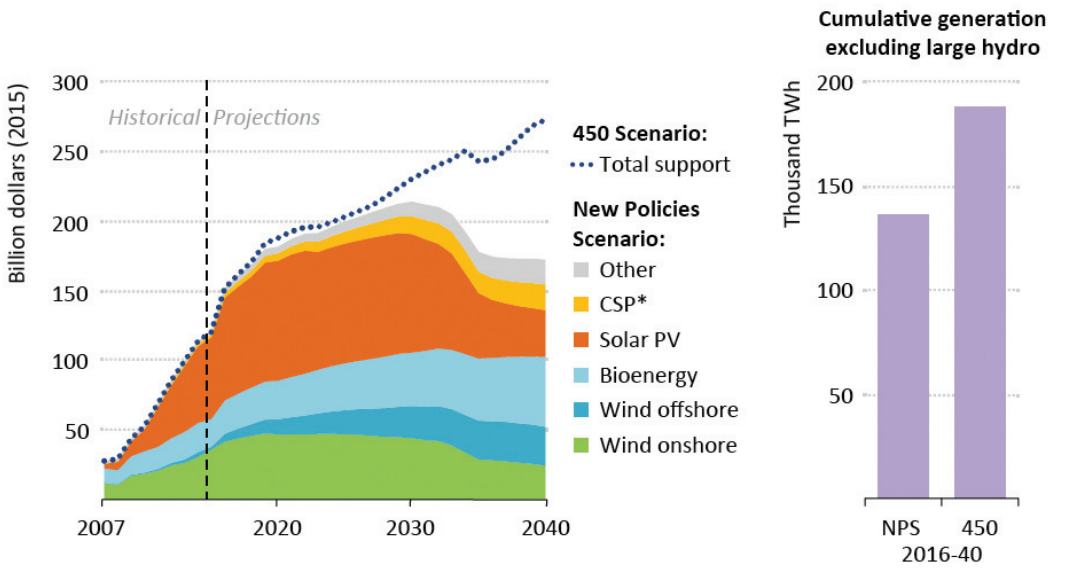
The plant will be built by a consortium led by Chinese firm Sinohydro Corp Ltd. Development is expected to take 52 months, with commissioning of the facility scheduled for 2021.

### MHPS to upgrade Cairo North

Mitsubishi Hitachi Power Systems, Ltd. (MHPS) has signed a contract with Cairo Electricity Production Company (CEPC), a subsidiary of the Egyptian Electricity Holding Company (EEHC), to upgrade the Cairo North combined cycle power station Module I.

The 750 MW gas-fired power station will be upgraded tp increase output, improve energy generation efficiency and reduce downtime losses through the extension of inspection intervals. MHPS will supply upgraded parts for the M701F gas turbines, spare rotors, upgraded control system and parts for the steam turbine and generators. MHPS will also dispatch technical advisors to support installation and commissioning. The project will be delivered in 2018.

## Renewables-based electricity support and cumulative total generation in New Policies and 450 Scenarios




*While support for renewable electricity will be needed for years to come, transitioning to a low-carbon pathway can be achieved for just 15% more support*

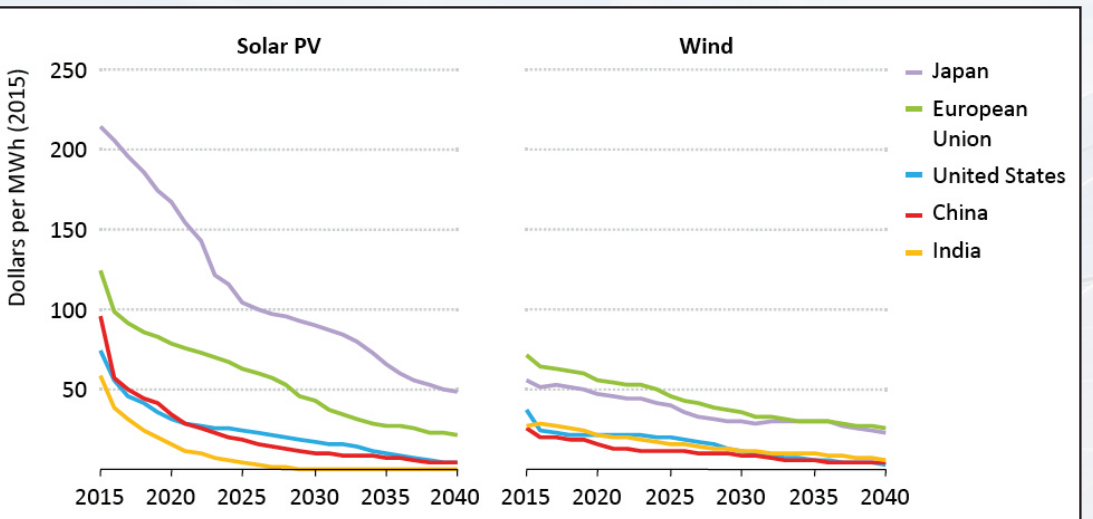
World Energy Outlook 2016, © IEA/OECD, Figure 11.15 , page 471

For more information, please contact:

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

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

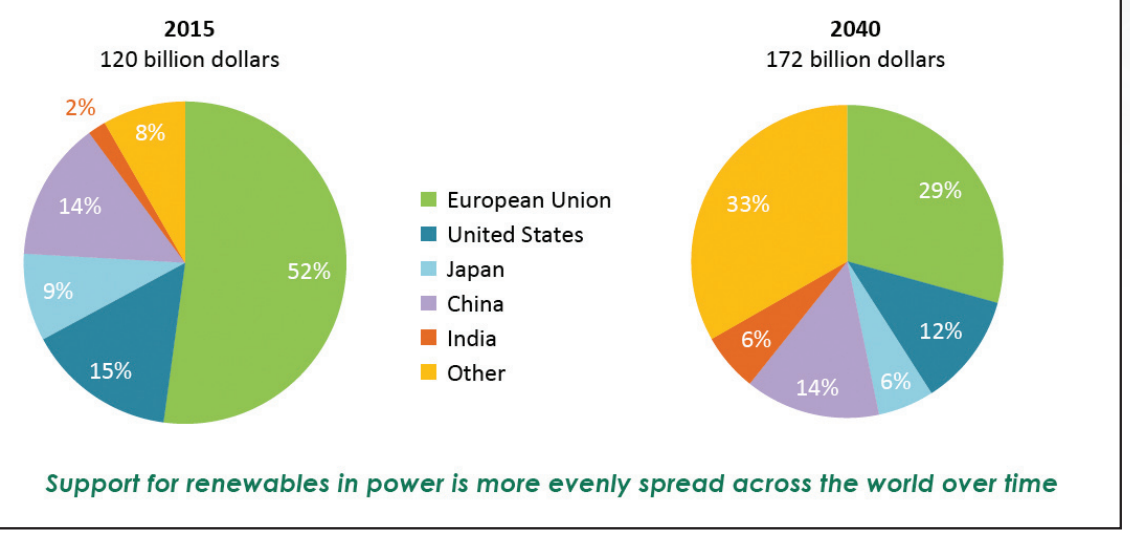
## Estimated average subsidy rates for new solar PV and wind power plants in the New Policies Scenario




*The rate of subsidy needed for new PV and wind power falls dramatically in the coming years*

World Energy Outlook 2016, © IEA/OECD, Figure 11.16, page 472

## Global subsidies to renewables-based electricity generation in the New Policies Scenario, 2015 and 2040




*Support for renewables in power is more evenly spread across the world over time*

World Energy Outlook 2016, © IEA/OECD, Figure 11.17 , page 473

*This section is supported by ABB*

***Source: World Energy Outlook 2016***

**Oil**

# Opec begins to question production cut

- November meeting to discuss whether to drop plan
- US production will reach record 9.9 million b/d in 2018

David Gregory

Even with plans to extend its production cut until the end of the first quarter of 2018, Opec appears to be increasingly unsure as to whether the plan to reduce the volumes of Opec and non-Opec oil pumped daily into the market will actually bring the market back into balance.

Crude oil prices throughout the first half of August have remained in the $50/b range and appears they will stay there as long as Opec and non-Opec crude production remain above the compliance target and US shale oil continues to pump at its steady pace.

Increased production from Nigeria and Libya – both of which are exempt from the reduction plan – accounts for nearly half of the 1.2 million b/d cut that Opec itself has pledged to make. Opec produced 32.84 million b/d in July, up by 230 000 b/d. Its target output among participating members is 32.5 million b/d.

Kuwaiti Oil Minister Essam al-Marzouq said in mid-August that the top subject at the next Opec meeting in November would be whether to continue with the 1.8 million production cut agreed with non-Opec or to drop it. This has been the question since the two groups agreed to extend the cuts beyond its first six months period a year ago. Yet despite Opec officials' continuing optimistic comments, the market balance and the increase in prices that oil producers seek remains elusive.

There has been some improvement in prices according to the latest monthly report from the US Energy Information Administration (EIA).

Brent averaged $48/b in July this year, up by $2/b over June and $4/b higher from July 2016. But the US agency forecast that the price of Brent would likely average $51/b in 2017 and $52/b in 2018 – not exactly the price that Opec and other producers are looking for. West Texas Intermediate (WTI) would average $2/b less than Brent during both years, the EIA said.

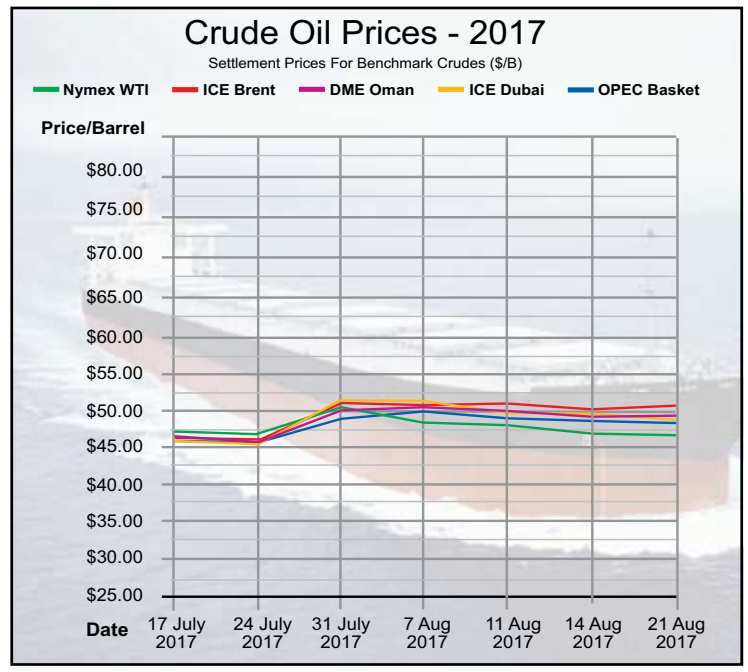
For its part, US crude production isn't helping the situation. US oil output during 2016 averaged 8.9 million b/d and is forecast to average 9.3 million b/d in 2017. The EIA forecasts that US production will reach 9.9 million b/d in 2018, "which would mark the highest annual average production in US history, surpassing the previous record of 9.6 million b/d set in 1970," the report said.

Furthermore, the agency forecast that global petroleum and liquid fuels inventories will remain unchanged in 2017 and would increase by an average of 200 000 b/d in 2018.

This goes some way to explaining why the EIA sees the price of Brent at $52/b in 2018.

According to new data for non-OECD countries for 2015 that has been incorporated into its August monthly *Oil Market Report*, the Paris-based International Energy Agency (IEA) said global oil demand for 2015-2018 would be reduced by an average of 330 000 b/d.

It put demand growth up by 1.5 million b/d during 2017, with total demand averaging 97.6 million b/d. It said demand growth for 2018 would decline to 1.4 million b/d when demand would average 99.0 million b/d, but noted that during the fourth quarter of 2018, demand would reach 100 million b/d.




Without strict compliance to production limits, more production cuts or a major increase in demand, it looks like the balanced market that would put crude prices in the $60/b may be some way off. However, the IEA was not entirely pessimistic, commenting that global stocks have indeed fallen during the second quarter of this year by 500 000 b/d, adding that preliminary data for July – "particularly in the US where stocks fell by 790 000 b/d" – is supportive.

But it added that at the end of the second quarter, OECD commercial stocks stood at 3021 million barrels, still more than 219 million above the five-year average although they have fallen below 2016 levels.

The IEA said that "as an exercise, if OECD stocks fell by 500 000 b/d until the end of the first quarter of 2018 when the current [Opec/non-Opec] output agreement expires [OECD] stocks would still be about 60 million barrels above the five-year average.

The IEA said the compliance rate with Opec's output cut fell in July to a new low of 75 per cent after reaching 77 per cent in June. Furthermore, it said the compliance rate for non-Opec countries partnered with Opec was 67 per cent. It said that together the 22 countries involved in the cut are producing some 470 000 b/d in excess of their commitment.

"There would be more confidence that re-balancing is here to stay if some producers party to the output agreements were not, just as they are gaining the upper hand, showing signs of weakening their resolve," the IEA commented.

**Gas**

# New Egypt gas law designed to open private sector

A new law regulating Egypt's gas industry opens a number of possibilities that will put the country on track towards expanding its energy sector.

Mark Goetz

Egypt's goal of becoming a regional LNG hub in the East Mediterranean moved a little closer to becoming a reality last month when President Abdul Fatteh al-Sisi signed a new law regulating the country's gas industry.

The new law opens a number of possibilities that will put Egypt on track towards expanding its energy sector as private companies will be able to import gas and sell it to domestic customers.

Furthermore, there are growing indications that long-discussed plans to import natural gas from nearby Cyprus and Israel for the domestic market and for re-export as LNG will finally begin to take shape. The new law, which comes into effect later this year, sets the stage for these proposed commercial agreements to materialise. Recent media reports have stated that Shell, which owns and operates one of two LNG plants in Egypt, has been discussing with the partners of Israel's Leviathan gas field – Noble Energy of the US and Delek Group and Ratio of Israel – the purchase of gas for the purpose of supplying the under-utilised LNG facility at Idku.

Shell is already partnered with Noble and Delek in the Aphrodite field offshore Cyprus, and according to *TEI Times* sources, the purchase of gas from both countries would see Leviathan gas routed by pipeline to the nearby Aphrodite field from where it would be transported by subsea pipeline to Idku. Should that scenario unfold, then Egypt would indeed be on its way towards becoming a regional hub.

The new law also gives impetus to talks between Noble and Delek and Egypt's Dolphinus Holdings about transporting Israeli gas to Egypt, either through the offshore pipeline that once supplied Egyptian gas to Israel or through a new pipeline to Jordan that would then route the gas to Egypt through the Arab Gas Pipeline, which was once intended to transport Egyptian gas to Jordan, Syria, Lebanon and Turkey. Egypt's gas shortage forced it to halt gas exports through the pipelines and the LNG plants.

The new regulatory law has been under preparation since October 2015 and is part of Egypt's ambitious plan to further develop its own natural gas resources and provide sufficient supplies in order to cope with the country's growing demand for electricity. A recent report in the Egyptian media said that year-on-year electricity production from natural gas-powered plants increased by some 2597 GWh to total 14 409 GWh, a 22 per cent increase from 11 812 GWh in July 2016.

Since becoming President in June 2014, al-Sisi has sought to reform Egypt's energy sector by reducing subsidies on fuel and electricity that were bankrupting the country. He also renegotiated contracts with foreign operators that paid them higher prices for the natural gas they produced, thus prompting more investment and increased production.

Egypt was forced to import LNG in 2015 in order to meet its natural gas demand, but it now expects to end those imports by 2019 as more domestic production comes on-stream. Earlier this summer, Egyptian Petroleum Minister Tarek el-Molla said production from three new gas fields in Egypt's Mediterranean offshore would raise gas production to 6.2 billion cubic feet per day by the middle of June 2018.

Egypt currently produces around 5.2 billion $ft^3$/day (bn cfd), up from a low of 3.89 bn cfd in May 2016 as a result of increased investment by operators. This will increase to 2.7 bn cfd by 2020 and put Egyptian gas production at more than 7 bn cfd. In the meantime, however, exploration and development will have to expand in order for Egypt to make up for less output from older, depleting fields.

The new law stipulates the creation of an independent Gas Market Regulatory Authority that will oversee all activities covered in the law. Third parties, particularly private companies, will have the right to import, store, trade and distribute natural gas in Egypt using government pipelines and infrastructure. The firms will be charged a fee for their use of government facilities and the collected revenues are to be invested in expanding the country's energy infrastructure.

Once in place, the law will eliminate the state monopoly over the gas sector. It should provide transparency and flexibility in the local market, thus encouraging market expansion and put Egypt on course towards becoming an important regional player.

# Circulating opportunities

Following Sumitomo Heavy Industry's purchase of Amec Foster Wheeler's circulating fluidised bed business, *TEI Times* caught up with Tomas Harju-Jeanty to discuss the deal and the opportunities it presents. **Junior Isles**

It is always a big decision to spend hard-earned money to acquire a new business, especially during challenging market conditions. But there are times when some acquisitions make perfect sense for all involved. According to Tomas Harju-Jeanty, CEO at the newly formed Sumitomo SHI FW (SFW), the recent acquisition of Amec Foster Wheeler's (Amec FW) circulating fluidised bed (CFB) boiler business by Sumitomo Heavy Industries is one such deal.

"While there has been less consolidation in the industry than I would have expected, I think that Sumitomo was ready to take the opportunity when it appeared. One of the biggest reasons was the long-term friendship and cooperation that Foster Wheeler has had with Sumitomo Heavy Industries for around 20 years," he says, adding: "During this period the Foster Wheeler CFB has become the core business for Sumitomo's Energy and Environment business area."

The sale of Amec FW's CFB boiler business, the largest part of its Global Power Group (GPG), closed at the end of June and will ensure the continuation of Sumitomo's own CFB business. Since becoming a licensee of FW's boiler technology in 2001, Sumitomo has sold 66 FW boilers under the license.

**Harju-Jeanty believes that with both large scale and small scale CFB technology, SFW is well positioned for growth**

SFW believes that with both large scale and small scale CFB technology, it is well positioned for growth, even in a power generation market that has been sluggish following the global economic crisis that began in 2008. The demand for energy and power generation technology has historically been driven by GDP growth and although the link is significantly weaker now than it has been in the past, economic growth is still a main driver.

> ... flexibility will see CFBs taking a larger share of the solid fossil fuel market... even if GDP growth is not as strong as it was during the boom years

"This is not an insignificant number considering there about 478 Foster Wheeler CFBs in total sold today. So it's very close to their business," notes Harju-Jeanty. "And the long term relationship helped integration. The companies know each other, the key people know each other and the collaboration has been tight over so many years. It's only been two months but the integration is getting there in an efficient way."

Geographically, the deal makes sense. Amec FW CFB business's global set-up had four operating units – one in Asia, two in Europe and one in the US– and the deal helps Sumitomo to expand beyond Asia.

"Sumitomo had operated mainly in Japan and wanted to expand their global footprint beyond Japan and Asia. GPG's global CFB operation, execution and sourcing networks provided them with a good route to deliver that strategy."

In terms of technology the two companies also shared the same thinking. Both are firm believers in the opportunities that CFBs present in the solid fuel markets – whether fossil or renewable solid fuels.

Harju-Jeanty points out that during the licensee period, the two companies enjoyed "a very close" relationship – one which the former President of Power Systems and Technology at Amec FW's Global Power Group says was closer than was typical, especially in terms of technology.

"We'd been working on projects and quite closely on common product development. Over the past several years, the Japanese small biomass generation feed-in tariff has seen Sumitomo developing smaller scale biomass CFBs to a larger extent than FW typically pursued. FW focused on larger units and the scale-up of the technology," said Harju-Jeanty. "With their domestic market calling for smaller-sized biomass units, Sumitomo has not been a licensee that simply executes what the licensor provides them [with] in terms of technology, but developed a competitive smaller size product that we commonly benefit from."

"After the 2008 crisis, we recognised that when economic growth started to take place in 2010/2011, energy demand was not exactly in synch with GDP change any more. But it's still obvious that GDP growth reflects economic activity, which drives energy consumption. With growth not being so aggressive in Asia and stalled in the West, it creates a challenge" Harju-Jeanty observes. "However, we think that CFB has good opportunities even in this market environment."

In terms of burning solid fuels, the flexibility of CFB technology is unparalleled. CFBs are able to burn a broad range of solid fossil fuels such as hard coal, lignite, anthracite and petcoke, as well as biomass and recycled and waste fuels.

Harju-Jeanty believes this flexibility will see CFB taking a larger share of the solid fossil fuel market. "Even if GDP growth, one of the main drivers, is not as strong as it was during the boom years of 2005-2008, we think that our opportunity comes from the technology being able to take a larger share of the total solid fuel market.

"Environmental concern is also a key driver. CFBs provide a highly efficient alternative for utilising renewable solid fuels. The ability to co-fire coal and other fuels with biomass, means we can reduce base power carbon emissions by up to half compared with conventional generation."

This, he says, could see the technology significantly increase its share of the fossil fuel power generation market over the next 5-10 years from around 10 per cent today. "Whether it grows to a 20 or 25 per cent share is always hard to say. But due to its ability to provide cost-efficient, reliable base load production in markets that need to support renewables, we believe that its environmental performance, fuel flexibility and operating reliability will allow us to grow our share of the fossil fuel market."

Harju-Jeanty sees opportunities in several regions. For countries that use fossil fuels, key markets will be Asia and the Middle East. "Now that we have taken CFB technology to supercritical utility scale, we are working on a number of opportunities with generators that develop high efficiency, supercritical generation in these areas. So several Asian countries, Saudi Arabia, Turkey and other Middle-East countries – are going to be our key focus areas."

SFW also noted it has been awarded a contract aiming to build two 550 MW lignite-fired supercritical units for a large utility's power generation facility in Central Europe. According to Harju-Jeanty, the contract demonstrates that the benefits of supercritical CFB technology is increasingly being recognised in Europe. "Also in Eastern Europe where fossil fuel firing is still a key part of the mix, we are working to add opportunities."

In Europe, biomass has provided the main opportunities for CFBs and Harju-Jeanty expects this to continue. Japan and Korea will also continue to offer biomass opportunities for the new company, he adds. "The biomass and recycled and waste fuel market is no longer strictly European and US but is also very much an Asian market for us today."

Looking at other potential markets, Africa is also on the radar. "Opportunistically, it is a very interesting market for us."

It is clear that what some see as market challenges, SFW sees as opportunities. "Our job is to provide the solution to the operator's challenge, explains Harju-Jeanty. "When a generator comes to us, he has two ingredients in his business – the heat from the fuel available to him, and the power he has to generate from that fuel under his contract. Our job is to create a technical solution to utilise the fuel in the most reliable, efficient and environmentally optimised way."

It is an opportunity that he relishes as head of the new company. "We are really very happy about this combination of Foster Wheeler's CFB business with Sumitomo Heavy Industries. We are strongly at home with SHI – we now have an owner that is a technology company… and operates in exactly the same way as us from the former CFB part of the Foster Wheeler Global Power Group.

"Sumitomo's approach to technology, R&D and product development supports our business very, very nicely."

# Staying on top of the business energy market

**Kurt Bligaard Pedersen,** CEO at Gazprom Energy, discusses how the business energy supplier aims to further its customer-centric approach, and boost its presence in other territories.

The UK's energy market has long been dominated by a few select players, coined as the 'Big Six'. But in recent years, we've seen an increasing number of customers turn their focus towards others in the market. Between 2009 and 2014 the Big Six's collective market share went down by 7.4 per cent, with many businesses viewing smaller suppliers' offerings as more attractive, including cheaper bills.

In fact, the latest Cornwall Insight report shows that the business gas market specifically is seeing some changing dynamics. Gazprom Energy took the market share leadership position at 20.5 per cent up from 18.3 per cent; this was the highest share for any provider since 2005. However, this doesn't mean we're looking to be one of the big six or dominating the entire UK energy industry. Instead, we want to be the leading provider of business energy specifically, and we aim to do this by building on our existing customer service provision.

As a supplier of gas and electricity specifically to businesses, we understand that they want a service tailored specifically to their needs and this is something which differs from the smallest to the largest of business customers. For example, the needs of a small business are generally focused around price security and the ease of setting up an energy contract, whereas a large, energy-intensive business or one with a chain of premises has much more strategic and complex needs. A specialist energy provider can work with the business to develop a bespoke service based on their requirements.

We want to grow our position as a leader within the business gas and electricity market by 'thinking like the customer', or what we call 'TLC'. This has long been our ethos, meaning that we don't make any business decisions without applying the thought – what would the customer want from a gas or electricity supply? What are their challenges? How can we help overcome them? Using a number of strategies, we aim to underpin our intended growth and increasingly put customers at the centre of everything we do.

More effective energy buying will be part of the strategy. The energy market is volatile, and this year alone has seen events that have had a dramatic impact on market prices. Take for example Opec's recent plans to gradually reduce oil production by 1.3 million barrels per day to raise its price. Experts cite a strong correlation between the cost of oil and natural gas, suggesting that gas bills could go up. The planned closure of Rough, the UK's largest natural gas storage site, is another event that has made many fear a rise in energy costs. The closure means that the UK may need to import 1.75 billion cubic metres (bcm) of additional gas this winter, sourced mostly from mainland Europe and Qatar. This could lead to a price premium.

It's only by establishing how these events may impact price, and using this to inform purchasing that an energy manager can make energy buying as efficient as possible. But this doesn't come without a heavy admin burden. For a long time energy managers have had to manually handle energy price data in complex spreadsheets, which require regular updates to stay current.

But we know that given technological advancements, it doesn't have to be this way. Our recently launched InSight tool allows professionals to view live energy prices, track trends, model future scenarios and produce bespoke reports.

From working closely with customers, we see how little time energy managers have to carry out strategic activity due to reporting requirements. We wanted to change this, not only to free up their time, but to also support their strategic energy decisions by giving them access to all of the key information.

It is also important to provide the right support for all businesses. An energy supplier might make it easy for customers to buy from them, but the service is below par if it can't meet the individual needs of the business, with regards to factors such as pricing terms and buying support. At Gazprom Energy we don't have one single go-to-market strategy, instead we've clearly segmented the needs of our specific customer types. A small business for example may not be able to invest hours of time every week into managing energy, nor can it cope with energy prices getting any higher.

Our fixed rate energy contracts are designed with that in mind. Our aim is to make energy management quick, easy and predictable, giving SME owners more time to focus on other important tasks. However, they're still after a great deal. We've found that small businesses are increasingly looking to monitor their energy usage too, but can often struggle due to not having the resources to do so. Automated meter reading (AMR) solutions for gas and electricity can help business owners get an accurate view of their energy usage and look at ways to become more efficient.

Larger businesses are of course more likely to have a function dedicated to energy management, and those with multiple sites in different locations have more complex energy requirements. Our flexible purchasing contracts for gas and electricity allow customers to trade according to market conditions that best suit them. And with the introduction of InSight, customers can now do that using a live feed of energy prices plus five years' worth of historic data that they can base buying decisions on.

Energy is undoubtedly a universal requirement for businesses and homes. But that doesn't mean that energy needs are universal too. It's this ethos that we base our customer service on, to ensure that we can meet individual demands of businesses big or small.

Offering various tools and services, such as daily market updates, monthly calls, and regular visits, we continually look at tailoring our customer service. But whether a business is a large corporate with a whole department dedicated to energy, or a small enterprise with little time to invest in it, executives share the desire to keep it simple. We aim to keep sight of this when looking at how we can maintain a customer-centric approach.

From its headquarters to the website, all aspects of a business can have a knock-on effect on customer service. That's why we're sure to invest even in the foundations of our organisation, such as our office environment, to give employees the resources to put customers first.

Now that we have a more mature business in the UK our focus is to drive higher efficiency and replicate the success we've had in the UK on the continent. The aim is to increase our market share to 10 per cent in other territories, namely France and the Netherlands.

But we can't support international expansion without investing in our Manchester headquarters. Nothing shows our plans for growth more evidently than our new office, currently under construction in Manchester.

Skills is a key focus for our UK investment, as we carry out projects such as leadership training to help employees unlock their potential in business. With two universities and several further education colleges, Manchester continually produces graduates who see the appeal of staying in the city. With ongoing training, we nurture these recruits into assets for the business. This is the model that we aim on emulating in other countries; essentially making the most of the talent on offer and furthering their skills to support current and future continental business.

**Pedersen: more effective energy buying will be part of the strategy**

# Keeping the lights on

Many utilities are now turning to alternative technologies, such as fuel cells, to mitigate the challenges of power outages. By installing alkaline fuel cells at end-customer sites, utilities can provide clean backup power, with the added ability to push electricity back to the grid enabling improved load balancing and higher quality of service.

**Gil Shavit,** Chairman, GenCell

**By installing fuel cell solutions like the GenCell G5 long-duration UPS at end-customer sites, utilities can provide clean backup power**

In the last few months, the world has seen significant changes – new heads of state in several countries; Britain's exit from Europe; shocking terrorist attacks and cybercrime of international proportions. These things all have an impact on utilities markets and demonstrate how integral the industry is to the health of nations.

Due to strict regulation in many countries, utilities have been required to invest heavily in their operations at a time when electricity sales are generally flat or in decline. That's not to suggest that these utilities aren't profitable, but it does add an additional layer of complexity to their businesses.

In North America for instance, Obama's Clean Power Plan saw considerable amounts of money spent on renewable energy sources such as solar and wind. There was also additional pressure placed on utilities to meet a new set of governmental standards, but with President Trump's decision to remove the US from the Paris climate agreement, the impact of this decision is not yet clear.

Add these challenges to more fundamental initiatives to upgrade and better balance the grid, utility businesses of 2017 have significant challenges to meet. What's more, the introduction of smart meters and a new consumer awareness to energy consumption has led many leading utility companies to investigate new innovative technologies to support their businesses.

One of the most critical challenges is to improve grid reliability. That said, the grid can go down for many reasons and not all of them are avoidable.

In the 2017 Infrastructure Report Card, the American Society of Civil Engineers assigned a "D+" to the US energy infrastructure. It stated that the delivery of electricity in the US relies on an aging and complex patchwork of systems with various ownership and stakeholders. And with the power grid at full capacity, maintenance is paramount.

In 2015, Americans experienced a reported 3571 of total outages, with an average duration of 49 minutes. Momentary blackouts cost the US economy $60 billion, while sustained blackouts cost $50 billion, with some lasting as long as eight hours or more.

Whilst electricity blackouts are likely to stay with us for some time yet, many utilities are now turning to alternative technologies, such as fuel cells, to provide immediate, reliable and long-term backup power to mitigate the challenges of power outages.

By installing fuel cell solutions like the GenCell G5 long-duration UPS (uninterruptible power supply) at end-customer sites, utilities can provide clean backup power, with the added ability to push electricity back to the grid enabling improved load balancing and higher quality of service (QoS). Providing important peace of mind and utilising the technology's ability to start in-phase, fuel cells are ideally suited to back-up applications.

Supporting the modern 'Energy Cloud', fuel cells are also an important contributor for local peak demand response or 'peak shaving'. Utilities are also installing fuel cells to backup other critical systems such as internal communications, command-and-control rooms and substations. These fuel cells, like the GenCell G5rx, are uniquely designed for installation at utility substations, operating as a direct source of backup power or to recharge back-up battery rooms and keep them at full power. In the case of GenCell's solution, for up to 10 times longer.

Fuel cells achieve this by enabling substations to keep their breakers and controls in an operational mode, so that utilities can quickly restart power and minimise distribution time to end-users once the grid recovers.

Each of the various types of fuel cell has its own inherent strengths and weaknesses that make them more suitable for specific markets and applications.

GenCell's alkaline fuel cell technology (AFC), which is being adopted by utilities, was originally developed for space applications where reliability and durability are essential requirements. But to achieve those key attributes, space applications featured platinum and palladium electrodes and other costly components. As a result, alkaline fuel cells were unaffordable for earth-bound power generation markets.

This is where GenCell made several important breakthroughs. By completely re-modelling the traditional AFC system, redesigning many components using less costly materials, GenCell was able to eradicate platinum as an electro catalyst. While maintaining the life and efficiency of the AFC, removing the need for platinum has allowed GenCell to break the cost barrier that previously prohibited the widespread adoption of this technology.

In addition, the inclusion of unique $CO_2$ scrubbers enable the fuel cells to use the oxygen in ambient air. These innovations enable the GenCell G5rx to provide utility companies with all the sought-after benefits of fuel cells, but at a price point that is competitive with UPS batteries and diesel generators.

Fuel cells are a compelling technology for utilities, but who is using them? Earlier this year, San Diego Gas & Electric (SDG&E), part of Sempra, a leading North American energy company, announced that it had been working alongside GenCell to test how fuel cells could contribute to their efforts to be the cleanest, safest, most reliable energy company in America.

In addition to SDG&E, another notable and recent adopter of fuel cell technology is Israel's national utility provider, IEC (Israel Electric Company). IEC provides roughly 85 per cent of Israel's electricity.

With many other utilities around the world adopting or seriously evaluating the use of fuel cells within their operations, it's clear that this technology will be an important solution to one of the industry's key challenges.

But there are still barriers to wide and rapid adoption, and it's mainly an issue of education. When talking to prospects, our first job is often to correct what they think they know by demonstrating that the technology employed today is vastly different to that of the 1970s and 1980s. With previous commercialisation issues now resolved, we show them that the modern fuel cell is both robust and affordable.

This type of conversation is no doubt common to all fuel cell manufacturers. But for many utility companies around the world, the fuel cell business case is so compelling that after investing a little time to understand it, the cost of a fuel cell to minimise the impact of grid downtime becomes an obvious and sensible decision.

Companies of all types and sizes are already incorporating hydrogen and fuel cells into their businesses. Leading companies such as Apple, Verizon and Coca-Cola are using stationary fuel cells to generate power. Toyota, Honda and Hyundai are coming to market with hydrogen fuel cell powered vehicles for consumers and trucking.

Metropolitan areas and airports are beginning to migrate to emission-free hydrogen fuelled buses too. In the USA, the UK and Europe, hydrogen refilling stations are being built, overcoming the challenges of hydrogen distribution for consumers. Indeed, the US Department of Energy notes that hydrogen and fuel cells are on the verge of a "tipping point".

As we transition into a greener economy increasingly fuelled by hydrogen, fuel cell solutions for backup and power-on-demand are overcoming the significant weaknesses of other clean technologies such as solar and wind. And thanks to cutting edge introductions that have solved previous fuel cell affordability, this technology is now also complementing or even replacing, legacy backup solutions such as batteries and diesel generators, in use at utilities throughout the world.

## What is a fuel cell?

First invented in 1839 by William Grove, a fuel cell is an electrochemical energy conversion device that produces electricity by combining hydrogen and oxygen into water. Like batteries, fuel cells convert potential chemical energy into electrical energy and generate heat as a by-product.

But, batteries store chemical energy within them – rather than being self-generated – which means that they can only operate for a limited duration until discarded or recharged. If supplied with an unlimited amount of fuel, fuel cells can continuously generate electricity (hydrogen) and oxygen.

There are five primary types of fuel cells:

- Alkaline Fuel Cells (low temperature)
- Proton Exchange Membrane Fuel Cells (low temperature)
- Phosphoric Acid Fuel Cells (medium temperature)
- Molten Carbonate Fuel Cells (high temperature)
- Solid Oxide Fuel Cells (high temperature)

As a completely clean power generation process, fuel cells are very attractive to utilities not only from a financial perspective in minimising downtime, but also in supporting their drive to become more sustainable.

Fuel cells produce zero-emissions, are silent and vibration free. They are also suited to both extreme environments and urban settings, so they are highly flexible. Further, they are highly reliable, require very low maintenance and can be operated remotely.

# Food for thought

Junior Isles

Half a loaf is not always better than none – sometimes it is better to deliver nothing at all than to serve up something that is half-baked.

In early August the UK government announced an independent review into the cost of energy, with the aim of ensuring the UK has the lowest energy prices in Europe. On the face of it, it appears to be a much-needed move to address what has long been a major gripe among the voting public. One could be forgiven, however, for believing it is no more than a PR exercise being executed in half-hearted fashion.

Certainly the move is timely. It comes as retail energy prices are once again rising, despite falling wholesale prices. In August British Gas, the UK's largest supplier, announced it was increasing electricity prices on its standard domestic tariff by 12.5 per cent. The company was the last of the Big Six energy suppliers to raise prices following price hikes by the others in the spring.

In last year's industrial strategy and in this year's Conservative manifesto, the government promised to conduct a root and branch investigation of the whole electricity supply chain – from generation to supply – amid growing public concern over rising energy prices.

Domestic electricity bills in Britain have gone from being the second cheapest in Europe in the mid-2000s to the seventh cheapest today. For industrial users they are the third highest among 15 European countries, according to the UK government.

The Conservative manifesto promised that the resulting report would be the first step towards "competitive and affordable energy costs". According to the government, the review will be an ambitious study recommending ways to meet its objectives of keep energy prices as low as possible while continuing to meet the UK's climate targets.


Cartoon: jemsoar.com

**the largest driver of electricity costs may turn out to be the charges imposed by government policies**

Yet that ambition is questionable. Oxford University academic Dieter Helm will chair the review, supported by a five-strong advisory panel.

Some observers have questioned whether Prof Helm and his team can fulfil such a wide-ranging agenda given its staffing and the limited time the government has allotted to the task. The report is due to be delivered by the end of October.

"A review by one man backed by an unpaid challenge panel and operating against a rushed timetable seems a way of simply finding out what Dieter Helm thinks," said Doug Parr of Greenpeace. "It is unambitious compared to the review we were expecting."

The choice of Prof Helm is also controversial in some quarters due to his past criticism of wind and solar power. In an interview with *The Guardian* newspaper: Hannah Martin, head of energy at Greenpeace UK, said: "Dieter has a well-known preference for gas and has historically failed to grasp the full potential of renewables.

"At a time when the costs of offshore wind and solar are plummeting this review needs somebody with the vision to grasp the opportunities offered by clean energy to provide jobs, lower bills and slash carbon pollution."

Fears over a bent against renewables have been allayed by Helm's choice of his supporting team – which includes renewables supporters – but only to some degree. The team will not have time for any significant number of meetings.

Further, one member of the panel told the *Financial Times* that participants "had little idea of what the structure of these meetings would be", or how they were expected to contribute to the final report. "As I understand it, we are a sort of challenge panel," the individual said. "Dieter writes the report and we're invited to say 'have you thought of this or that?' But it will be his work at the end of the day, and he will say what he wants to."

Some constraints the government has put on the panel are also worrying. It has mandated that the review will not propose detailed tax changes. Notably, the Department for Business, Energy and Industrial Strategy (BEIS) also said the review should consider only "system issues" and not comment on the status of individual projects. A government spokesperson for BEIS said: "We didn't want Prof Helm to spend two months simply arguing against the Hinkley project as that doesn't meet the task in hand."

That smells more of rotten eggs than freshly baked bread. How any review into energy prices can be conducted without addressing the £20 billion price-tag of Hinkley C is inconceivable. In June the National Audit Office said BEIS's deal for Hinkley Point C "has locked consumers into a risky and expensive project with uncertain strategic and economic benefits". The plant will receive an estimated subsidy of £30 billion and is expected to add £15 to annual electricity bills up to 2030.

A separate report on UK energy policy published by the House of Lords Economic Committee earlier this year, noted: "Hinkley Point C is a good example of the way policy has become unbalanced and affordability neglected. It does not provide good value for money for consumers and there are substantial risks associated with the project."

Clearly in this latest review, the government seems keen to avoid putting the spotlight on what might be regarded as failures in policy at worst and short sightedness at best. Still, there is every likelihood it might reveal unexpected findings in terms of where the blame lies for high energy prices.

The Economic Committee report noted that poorly designed government interventions, in pursuit of decarbonisation, "have put unnecessary pressure on the electricity supply and left consumers and industry paying too high a price".

Energy consultancy Cornwall Insights estimates that renewable subsidies, energy efficiency initiatives and smart meters will account for approximately 22 per cent of the average UK household electricity bill of £550 this year.

Commenting on the upcoming review Lord Hollick, who chairs the House of Lords Economic Committee, said: "Ironically, the largest driver of electricity costs may turn out to be the charges imposed by government policies."

This could ease the pressure on energy suppliers dismayed at wholly shouldering the blame for high prices. Iain Conn, Chief Executive of Centrica, the owner of British Gas, said the government could be "a little bit more open" with consumers about how its own policies to move to a low-carbon economy were pushing up bills. "It is frustrating to always end up being blamed for it [rising bills]," Conn said.

If the independent review proves Conn to be correct, the government will have shot itself in the foot – to some degree. It is likely that the truth behind rising energy prices lies somewhere between what both camps – government and energy companies – are arguing.

No doubt some useful recommendations will come out of the review in terms of the way ahead for the industry. The review's specific aim is to report and make recommendations on how government objectives can be met in the power sector at minimum cost and without imposing further costs on the exchequer. In that context the review will consider the implications of the changing demand for power, including from industry, heat and transport.

However, it is unlikely to have any immediate or even near term effect on slowing the rate at which energy prices are rising. More likely it will never have any effect at all. Government-instigated energy reviews seldom amount to much in terms of, noticeable impact and there is little to instil confidence that this latest review of energy pricing will be any different. For consumers, the end result is likely to be much of the same, another half-baked crust that's hard to swallow.