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Sleepless nights?

Energy storage and digitalisation are two areas that are keeping energy executives awake at night. ***Page 13***

Getting closer

Europe's Clean Energy Package should bring markets closer together but some of its provisions need further clarification. ***Page 14***

Final Word

We live in a rebellious climate, says Junior Isles. ***Page 16***

News In Brief

Wind to become "truly global market" in five years
The Global Wind Energy Council forecasts that 300 GW of new wind capacity will be added globally by 2024.
Page 2

Opportunity Zones offer tax breaks
A tax break offered to investors in so-called 'Opportunity Zones' may provide extra capital for renewable energy developers in the USA as other support mechanisms are phased out.
Page 4

Coal still part of balanced energy mix
The Philippines still sees coal as an important part of its future energy mix, as developers continue to outline plans for future coal fired power plants.
Page 6

Ofgem addresses supplier rules
A series of company collapses in the UK's energy retail sector has forced the regulator to revise the rules for new entrants.
Page 7

Congo wins support for green mini-grid
The Democratic Republic of the Congo is to boost off-grid renewables with the implementation of a green mini-grid programme.
Page 8

EC fines GE over 'misleading' LM information
GE will pay a €52 million fine following an investigation by the European Commission into information provided by the American firm during its 2017 takeover of LM Wind.
Page 9

Technology: GT26 gets a HE upgrade
GE has launched a significant upgrade for the GT26 gas turbine. The high efficiency (HE) upgrade will deliver improved efficiency, power output and flexibility while reducing maintenance costs for its customers – the first of which will be Uniper, at its plant in Enfield, UK.
Page 15

National Plans will not deliver renewables target

WindEurope's Giles Dickson says none of the plans properly spell out policy measures

The EU has concluded negotiations on its Clean Energy Package but recent research shows that National Plans might not deliver the previously agreed 32 per cent renewables target. **Junior Isles**

Europe's draft National Energy and Climate Plans are insufficient to deliver the EU's 32 per cent renewables target for 2030, according to analysis released by WindEurope.

The analysis shows that some EU countries are pledging to deploy good volumes of wind in their Plans. But the Plans are badly lacking in the detailed policy measures that will deliver these pledges – which means the pledges are not meaningful, says the organisation.

WindEurope CEO Giles Dickson said: "Europe has a clear target: 32 per cent renewable energy by 2030. Each country has now drafted a National Plan saying how they'll contribute to this. But none of the Plans properly spell out the policy measures by which countries will deliver on the objectives they outline."

European countries agreed last year to draw up National Energy and Climate Plans to ensure Europe delivers on its climate and energy targets. WindEurope's analysis rates every country either insufficient or poor for the policy measures outlined in the draft Plans.

Most of the draft Plans give no long-term visibility on renewable energy auctions, doing little to support investment certainty. Only Germany provides an auction schedule to 2030. Nor does any country commit to simplifying rules on planning and permitting, such as common sense restrictions on distance or wind turbine tip height. This is key, as obtaining permits for new wind farms is becoming increasingly difficult and more expensive in many parts of Europe.

The National Plans are supposed to detail not only new renewables capacity but also what countries will do with renewables that come to the end of their operational life between now and 2030. For wind the latter is up to 60 GW. But no country provides policies to deal with this. And only six countries even recognise the issue (Belgium, Denmark, France, Germany, Italy and Spain), said WindEurope.

Another issue the Plans need to address is how to get more renewables into heating and transport. This is essential for the decarbonisation of energy, because heating and transport accounts for three quarters of energy consumption. But the draft Plans provide few detailed proposals or measures for electrifying heating and transport. No European country has planned to simplify corporate renewable Power Purchase Agreements (PPAs), which is explicitly mandated in the Renewable Energy Directive.

The report came as the EU ratified its Clean Energy for All Europeans

Continued on Page 2

Financial sector warned on climate risks

A recent report has warned that climate change could wipe out $20 trillion worth of assets globally.

According to the report by the Network for Greening the Financial System (NGFS), there is still a significant amount of analytical work to be done in order to equip central banks and supervisors with appropriate tools to identify, quantify and mitigate climate risks in the financial system. To address the issue, the NGFS says it will prepare a number of technical documents.

The report provides a number of recommendations for central banks and supervisors, including integrating climate related-risks into financial stability monitoring and micro-supervision. It also recommends bridging the gap by making climate-related data publicly available.

Following this report, an open letter, published on behalf of the Bank of England, Banque de France and the Network for Greening the Financial System, called for the financial community to act on recommendations provided by the NGFS to ensure the transition to a low carbon economy.

The letter, in support of the report, states that the catastrophic effects of climate change are "clearly visible" around the world and that financial policy makers and prudential supervisors cannot ignore the "obvious" risks.

Banks have already been taking action to reduce carbon-related assets. In recent months, there has been a growing wave of financial institutions announcing they would either tighten rules on financing new coal fired plants or not finance them at all.

In April, Standard Bank became the latest finance corporation to stop financing coal fired power plants in the future, unless they met strict parameters set by the bank. It was the second to do so in the space of a week.

Energy expert Chris Yelland said it appeared as if all the major banks were pulling out of funding coal fired plants. "Nedbank, First Rand, and now Standard Bank – which has been on the cards for some time – have all pulled out." Standard explicitly stated it would not be funding the Thabametsi or Khanyisa plants in South Africa. "It is a significant move by all the banks as they are under pressure not to finance independent coal power producers," said Yelland.

In late March, UBS Group AG said it would no longer provide project-level finance to new coal fired power plants around the world, as it outlined tighter rules on funding such transactions.

Switzerland-based UBS noted it will only finance existing coal fired operators – defined as being more than 30 per cent reliant on coal – that have a transition strategy that supports the Paris climate agreement, or transactions that are related to renewable energy. UBS said its carbon-related assets amounted to $2.7 billion in 2018, down from $6.6 billion a year before. Climate-related sustainable investments totalled $87.5 billion, up from $74 billion in 2017.

Continued from Page 1

Package (CEP) aimed at enabling the bloc to realise the energy transition, follow up on the 2030 climate legislation and meet the Paris Agreement commitments.

At the end of March, the European Parliament completed the parliamentary approval of the new Electricity market Regulation and Electricity market Directive as well as of the Regulations on Risk Preparedness and on the Agency for the Cooperation of Energy Regulators (ACER). The Governance of the Energy Union Regulation the revised Energy Efficiency Directive, the revised Renewable Energy Directive and the Energy Performance of Buildings Directive entered into force last year.

According to the EU, the revised Directive will put consumers at the heart of the transition – giving them more choice and greater protection. Consumers will be able to become active players in the market thanks to access to smart meters, price comparison tools, dynamic price contracts and citizens' energy communities. At the same time, energy poor and vulnerable consumers will enjoy better protection.

The revised Electricity Regulation is designed to enable electricity markets to integrate renewables and attract investment in resources like energy storage and demand response that can compensate for variable energy production. The market must also provide the right incentives for consumers to become more active and to contribute to keeping the electricity system stable.

The new Electricity Regulation also brings stricter and harmonised rules for capacity mechanisms, thus reconciling the EU objectives of security of supply and emission reduction. Enhanced regional coordination will improve market functioning and thereby competitiveness while making the system more stable.

Under the new rules, new thermal power plants emitting more than 550 gCO_2/kWh will not be allowed to benefit from the capacity mechanism, while existing power plants emitting more than the 550 gCO_2/kWh threshold will be allowed to participate in capacity mechanisms until July 2025 only.

The Risk-preparedness Regulation increases the resilience of the EU electricity system and the Regulation on the Agency for the Cooperation of Energy Regulators (ACER) enhances ACER's role of coordinating regulatory authorities of Member States.

Announcing the finalised CEP, Commissioner for Climate Action and Energy Miguel Arias Cañete said: "Today's approval of the new electricity market design will make energy markets more flexible and facilitate the integration of a greater share of renewable energy. An integrated EU energy market is the most cost-effective way to ensure secure and affordable supplies to all EU citizens. I am particularly pleased that we have agreed on a common framework for capacity mechanisms that will ensure such mechanisms will be in line with our climate objectives in the future while taking into account legitimate security of supply concerns."

The regulation now has to be formally approved by the Council. It will then enter into force immediately (with a date of application of 1 January 2020 for the Electricity Regulation) and has to be transposed into national law within 18 months.

Wind to become "truly global market" in next five years

The Global Wind Energy Council forecasts that 300 GW of new wind capacity will be added globally by 2024. The falling costs of offshore wind and energy storage are both contributing factors.

Junior Isles

Wind power installations globally in the next five years will amount to more than 300 GW, including roughly 40 GW of offshore wind, according to the 14th edition of the Global Wind Report by the Global Wind Energy Council (GWEC).

In 2018, market-based mechanisms, such as auctions, tenders and Green Certificates were the main drivers behind new capacity. Aside from regulation and government targets, future growth is expected to be driven by changing business models of industry participants, corporate procurement outside of mature markets, and value-focused solutions, such as hybrid generation plants, GWEC said.

GWEC Market Intelligence Director Karin Ohlenforst commented: "2018 was a good year for the global wind industry, with installations remaining above 50 GW."

New capacity in 2018 was 51.3 GW, slightly below the level of the previous two years. GWEC expects a jump in installations to 65.4 GW this year and to 66.8 GW in 2020. Annual wind capacity additions will then range between 58.7 GW and 65.1 GW in 2021-2023 (*see page 11*). In that period, offshore wind is expected to reach the 10 GW mark for annual installations for the first time. GWEC's forecast is for 9.9 GW and 10.1 GW of offshore wind additions in 2022 and 2023, more than double the 4.5 GW of new capacity in 2018.

"If governments remain committed, offshore wind will become a truly global market in the next five years," said Ohlenforst.

In a separate report WindEurope said Europe invested €27 billion in new wind farms in 2018. According to its annual 'Financing and Investment Trends', the amount invested is similar to previous years but thanks to cost reductions, especially in offshore wind, it will finance a record 16.7 GW of new wind capacity. The report says that 1 MW of new onshore wind capacity now requires only €1.4 million capital expenditure, down from €2 million in 2015. And 1 MW of new offshore wind capacity requires €2.5 million, down from €4.5 million in 2015.

The UK was the biggest investor, mostly in offshore wind. Sweden was second. Investments in Southern and Central and Eastern Europe were only 4 per cent of the total, though Spain and Poland will pick up this year.

WindEurope CEO Giles Dickson said: "Wind energy got 60 per cent of all the new investments in power generation capacity in Europe last year. And it was a record year for the amount of new wind energy capacity financed. Cost reduction means investors now get more MW per euro they invest. And lenders are more comfortable with the risks so the costs of finance are falling too."

Wind power growth is also being facilitated by reducing energy storage costs. Recent statistics prepared by research firm BloombergNEF (BNEF) show that the levelised cost of electricity (LCOE) for lithium-ion batteries has dropped 35 per cent to $187 per MWh, which creates new opportunities to balance a renewables-heavy generation mix.

Falling storage costs will see the market for the technology grow significantly in the coming years. A report released by Wood Mackenzie Power & Renewables last month showed how energy storage has been creeping into decarbonising markets over the past five years.

According to its 'Global energy storage outlook 2019: 2018 year-in-review and outlook to 2024', the global energy storage market is forecast to reach 158 GWh in 2024, marking a 13-fold expansion from 2018, with the US and China taking leading positions in terms of deployments.

Commenting on the report, Ravi Manghani, Wood Mackenzie Power & Renewables Research Director, said: "From 2013 to 2018, we saw fledgling market growth. This was reflected in a global GWh compound annual growth rate (CAGR) of 74 per cent, although we did observe relatively small deployment totals of 7GW/12GWh for the period.

"Nevertheless, these developments have shifted the minds of global regulators, policy makers, grid operators, asset operators and developers, in terms of how energy systems can be balanced... More than half of the GWh during this period came online in 2018 alone, beckoning an inflection in storage demand."

The US and China will be responsible for around 54 per cent of all deployments by 2024. Next will come Japan, Australia and South Korea, followed by Germany, Canada, India and the UK.

Study shows 100 per cent renewables competitive with conventional system

A new study claims to prove that the transition to 100 per cent renewable energy is economically competitive with the current fossil and nuclear-based system, and could reduce greenhouse gas emissions in the energy system to zero even before 2050.

The study by the Energy Watch Group and LUT University is the first of its kind to outline a 1.5°C scenario with a "cost-effective, cross-sectoral, technology-rich global 100 per cent renewable energy system that does not build on negative CO_2 emission technologies". The scientific modelling study simulates a total global energy transition in the electricity, heat, transport and desalination sectors by 2050. It is based on four and a half years of research and analysis of data collection, as well as technical and financial modelling by 14 scientists.

The simulation "Global Energy System based on 100 per cent Renewable Energy", co-funded by the German Federal Environmental Foundation (DBU) and the Stiftung Mercator, comprises state-of-the-art modelling, developed by LUT University and computes a cost-optimal mix of technologies based on locally available renewable energy sources.

It determines the most cost-effective energy transition pathway for global energy supply on an hourly resolution for an entire reference year and structured in 145 regions. The global energy transition scenario is carried out in five-year time periods from 2015 until 2050. The results are aggregated into nine major regions of the world: Europe, Eurasia, MENA, Sub-Saharan Africa, SAARC, Northeast Asia, Southeast Asia, North America and South America.

Some key findings of the study were:

- The transition to 100 per cent renewable energy requires comprehensive electrification in all energy sectors. The total electricity generation will be four to five times higher than electricity generation in 2015. Accordingly, electricity consumption in 2050 will account for more than 90 per cent of the primary energy consumption. At the same time, consumption of fossil and nuclear energy resources in all sectors will cease completely.
- The global primary energy generation in the 100 per cent renewable energy system will consist of the following mix of energy sources: solar energy (69 per cent), wind power (18 per cent), hydropower (3 per cent), bioenergy (6 per cent) and geothermal energy (2 per cent).
- By 2050, wind and solar power will account for 96 per cent of the total power supply of renewable energy sources. Renewable energies are produced virtually exclusively from decentralised local and regional generation.
- 100 per cent renewables are more cost-effective: The energy costs for a fully sustainable energy system will decrease from €54/MWh in 2015 to €53/MWh in 2050.
- The transition in all sectors will reduce the annual greenhouse gas emissions in the energy sector continuously from roughly 30 Gt CO_2-eq. in 2015 to zero by 2050.

"The report confirms that a transition to 100 per cent renewables is possible across all sectors, and is no longer more expensive than the current energy system," said Hans-Josef Fell, former Member of the German Parliament and President of the Energy Watch Group.

"Thanks to the developed model and the extensive existing database, EWG and LUT can now also develop national roadmaps for the transition to 100 per cent renewables, tailored precisely for the individual countries' respective context," Fell added.

EDF nuclear operations could be re-nationalised

The French government is set to re-nationalise EDF's nuclear activities, according to a French media report.

Le Parisien claims President Emmanuel Macron is poised to approve the re-nationalisation, rolling back the partial privatisation of the electricity provider in 2004, which left the state with an 83.7 per cent stake.

According to reports, the government has been looking at how to restructure EDF to isolate its volatile nuclear business from the pressures of the stock exchange and provide a boost to the rest of the firm. The authorities want to return EDF's nuclear operations to the public sector but not necessarily buy out minority shareholders in EDF's other activities.

The restructuring measures would be an attempt to ring-fence the nuclear division, including its nuclear reactors, wholesale market activities and possibly large hydropower dams, *Le Parisien* reported.

EDF Chief Executive Jean-Bernard Levy said in February the government had asked him to make restructuring proposals by the end of 2019.

The strategy committee of EDF's board will review a restructuring plan for the group on May 28, the French daily reported, adding that this would be followed by presentations to a group of 200 top managers on June 7 and to union representatives on June 20.

EDF shares rose as much as 4.3 per cent following the news.

In response to the reports, Dr Doug Parr, Chief Scientist at Greenpeace UK, said: "Those of us who have been following the disastrous failure of nuclear power to compete in a free market in the UK will not be surprised that France isn't finding it easy either... And renewable energy costs have now plunged well below the level nuclear can ever hope to compete with. Only governments, using cash from the unwitting tax-payer, have pockets deep enough and hearts soft enough to keep this industry limping on."

Opportunity Zones offer developer tax breaks

■ New opportunities emerge as PTC and ITC wane ■ Energy storage support scheme proposed

Siân Crampsie

A tax break offered to investors in so-called 'Opportunity Zones' may provide extra capital for renewable energy developers in the USA as other renewable energy support mechanisms are phased out.

The Opportunity Zones programme provides tax benefits for those investing in low income areas in the USA, and may help provide renewable energy developers with an attractive and competitive source of capital, according to FTI Consulting.

Renewable energy developers in the US are currently facing the closure of the investment tax credit (ITC) and production tax credit (PTC) schemes supporting renewable energy projects. Both schemes are being phased out.

Chris LeWand, Global Clean Energy Practice Co-Leader at FTI Consulting, commented: "While real estate is the most prevalent target of opportunity zone investments, commitments are being made to renewable energy projects as well, and these are incremental to the capital pool traditionally available."

Opportunity Zones are part of a federal programme. By offering the ability to defer and eliminate up to 15 per cent of unrealised capital gains taxes, and to remove taxes on capital gains going forward for so-called "Qualified Opportunity Funds" (QOFs), the programme aims to boost investment as a way to revitalise struggling areas.

"There will be a high level of demand for shovel-ready renewable energy projects, as only investments made in 2019 will benefit from the full 15 per cent capital gains reduction," added LeWand. "However, post-2019, Opportunity Zones will continue to offer significant benefits to investors from a capital gains deferral or avoidance perspective. Moreover, as the PTC expires and the ITC steps down in subsequent years, Opportunity Zones may provide a means for certain renewable energy investors to enhance returns, given the tax incentives available."

Last month US lawmakers unveiled proposals that include energy storage technologies in the ITC scheme.

Rep. Mike Doyle (D-PA) introduced the Energy Storage Tax Incentive and Deployment Act into the US House of Representatives, proposing to make standalone energy storage projects eligible for the same 30 per cent ITC offered to solar photovoltaic (PV) schemes.

The proposals would grant full ITC eligibility to investments in residential, commercial and utility-scale energy storage schemes, with the same ramp-down now set for solar – 30 per cent through 2019, 26 per cent in 2020, and 22 per cent in 2021.

The incentive would then be phased down annually before levelling off to a standard, permanent 10 per cent tax credit after 2021 for commercial projects and would zero out for residential projects.

The proposals were widely welcomed by the storage industry.

"It's clear that the combination of solar energy with storage is the next step in the development of a reliable and clean electrical grid," said Enrico Ladendorf, the founder of Houston-based energy storage software intelligence firm Pason Power. "This proposal would enable the deployment of solar and energy storage to benefit parts of the country with less consistent sunshine primarily by not requiring the batteries to only charge from solar production.

"Also, with the current state of the prices of batteries, an ITC credit applied to standalone batteries has the potential to make the business case for standalone storage even stronger."

Argentina prepares RenovAr 4

Argentina's government has confirmed it is working on developing the next round of the country's RenovAr renewables tender scheme.

Argentina's Treasury said last month that Round 4 of RenovAr would be introduced later this year and will include renewable energy capacity as well as transmission grid investment projects.

RenovAr was introduced in 2016 and has so far brought forward 3.7 GW of wind power capacity from 63 projects and $5 billion in investments. It has also spurred the development of a local supply chain to support the wind energy sector and underpin long-term market development.

Argentina's Undersecretary for Renewable Energy and Energy Efficiency, Sebastian Kind, told delegates at a reent wind energy conference in Spain last month that the details of the round four tender were still being examined. He also explained that the exact amount of renewable energy capacity to be procured had not yet been determined

IFC backs Brazil gas-to-power complex

The IFC has agreed terms for a loan that will play a major role in helping Brazil to diversify its energy sources.

The bank says it will provide a $288 million, 15-year loan to UTE GNA I Geração de Energia (GNA I) for the development, construction and operation of an integrated liquefied natural gas to power (LNG-to-power) facility in Porto de Açu, in the State of Rio de Janeiro, Brazil.

The GNA I project, expected to start commercial operation in 2021, consists of an integrated 1.3 GW combined cycle gas turbine (CCGT) power plant, an LNG import marine terminal, a transmission line, and the expansion of an existing substation. The project is part of the largest LNG-to-power complex in Latin America, and is being built by Gás Natural Açu (GNA) at Port of Açu.

Siemens announced last month that it has secured an order for the turnkey construction of the facility's CCGT.

Siemens – which owns one-third of GNA – will provide its H-class gas turbine technology for the plant, which it will operate and maintain under a long term service agreement. The project is Siemens' first fully integrated LNG-to-power project of this scope.

Siemens will build the CCGT in partnership with Brazilian construction company Andrade Gutierrez. Siemens is responsible for the delivery of the complete power island with three H-class gas turbines, one steam turbine, four generators and heat recovery steam generators and instrumentation and control systems.

According to the IFC, GNA I will support the diversification of Brazil's energy matrix, enhancing system resilience, promoting energy security, and contributing to reliable and affordable energy. GNA I will also displace coal and other carbon intensive thermal power plants, reducing Brazil's carbon footprint by an estimated 139 000 tons of CO_2 equivalent emissions annually.

GNA I is the stepping stone to the first fully integrated private natural gas hub in Brazil and one of only a few in Latin America. The development of such a hub is critical for increasing the competitiveness of Brazil's natural gas sector, which has recently been opened to private sector investment.

GNA I is IFC's third LNG-to-power investment in Latin America, after AES Cólon in Panama, and CELSE's Port of Sergipe in Brazil. LNG-to-power has been identified as a global strategic aim for IFC in supporting countries to reduce carbon intensity of power grids, favour further penetration of renewables, and diversify generation.

PV marches on in Americas

Government support mechanisms are spurring the growth of solar photovoltaic (PV) capacity in the Americas.

According to Frost & Sullivan, auctions and net metering schemes, coupled with increasingly competitive prices for solar equipment, are driving growth in key markets, including the USA, Chile, Mexico, Argentina and Colombia.

Annual installations of PV capacity in these markets are expected to grow at 5.5 per cent, generating $141.2 billion in annual investment by 2022, Frost & Sullivan says in its latest market research. The annual installed capacity reached 12.8 GW in 2017, and the total generation capacity, which currently stands at 59.0 GW, is likely to more than double to 141.3 GW by 2022.

"The multiple supportive mechanisms and electricity regulatory frameworks across the region have made market participants diversify strategies, encouraging business model innovation. Solar PV and storage expansion will become increasingly attractive propositions as battery system costs decline further," said Maria Benintende, Senior Analyst for Energy & Environment at Frost & Sullivan.

In the USA, the solar market is forecast to expand at 8 GW to 10 GW per year until 2022. Despite the restraint due to import duties, utility-scale installed capacity will continue increasing due to low system costs.

In March, a local government in the US state of Virginia gave the green light to the construction of a 340 MW solar farm development by sPower. Meanwhile RES announced it has broken ground on its Southern Oak solar farm in the state of Georgia.

At 160 MW, Southern Oak will be the largest bifacial solar project in the USA, using LONGi's bifacial modules and NEXTracker's single axis tracker racking system.

According to Frost & Sullivan, annual additions of distributed generation (DG) PV installations will outstrip utility-scale at a compound annual growth rate of 9.9 per cent, driven by supportive policies, falling technology costs, increased end-user awareness, market maturity, and higher electricity prices. Benintende notes that in Brazil, Mexico, and Chile, especially, maturing DG schemes are creating significant opportunities for equipment suppliers, installers, and other energy participants.

"Renewable auctions are key to solar development in the region," noted Benintende. "The investments in solar in 2018 are estimated to have touched $4.2 billion across the Latin American countries; however, to make the most of their potential, suppliers need to develop a strong local strategy."

In Argentina, PV has become an attractive technology thanks to renewable energy auctions and the emergence of a market for power purchase agreements (PPAs). However, current bottlenecks in transmission grids, coupled with financial and economic constraints, increase risks, affect funding and, therefore are slowing down solar PV expansion.

Coal still part of balanced energy mix

Progress with plans for new coal fired plants illustrate the Philippines' desire to keep coal as part of its energy mix.

Syed Ali

The Philippines still sees coal as an important part of its future energy mix, as developers continue to outline plans for future coal fired power plants.

In April, San Miguel Corp. (SMC) announced that it intends to continue developing clean coal power plants.

SMC Global Power said it plans to expand its portfolio through strategic development of greenfield power projects and acquisition of existing power plants.

In setting up new projects, SMC said it would not close the door on coal fired power plants, particularly clean coal technology, which it says "remains the most reliable and cost-efficient fuel source for greenfield power projects".

The company said it would therefore continue to consider putting up the 4x150 MW circulating fluidised bed (CFB) coal fired power plant in Mariveles, Bataan, and the 600 MW coal power plant in Pagbilao, Quezon.

Separately, Aboitiz Power Corp. also indicated it would continue to invest in thermal power generation. Last month it inked a $300 million facility agreement with four international banks to partially finance its acquisition of a share in AC Energy Inc.'s thermal portfolio.

"The proceeds of the loan will be used to partially finance the acquisition by Aboitiz Power of a 49 per cent voting stake and 60 per cent economic stake in AA Thermal Inc.," the power firm said.

Under the deal, Aboitiz Power will take stakes in GNPower Mariveles Coal Plant Ltd. Co., the owner and operator of an operating 2x316 MW coal plant in Mariveles, Bataan, and in GN-Power Dinginin Ltd. Co., the developer and owner of a 2x668 MW supercritical coal plant project in Dinginin, Bataan currently under construction.

Aboitiz Power COO, Emmanuel Rubio, said: "Aboitiz Power is committed to addressing the country's energy trilemma of adequate supply, cost of power, and protection of the environment. This is part of our strategy to reach our 4000 MW net attributable capacity by 2020 through our balanced mix strategy."

The company also announced that it has opened a new coal fired power plant in Toledo City, Cebu, which will add 170 MW of supply in Visayas. The second unit of the project will be online in May to add another 170 MW.

The project uses CFB technology and best available control technology to minimise emissions.

Meanwhile, final work is ongoing on the 335 MW Unit 3 expansion of the Masinloc power plant. The plant being built by SMC is expected to commence commercial operation during 2Q of 2019.

While announcing its continued commitment to coal, SMC noted, however, that it is also focused on investing in battery energy storage systems (BESS) and renewable energy projects as part of its objective to operate in an environmentally responsible manner while considering energy security and affordability.

"SMC Global Power also actively seeks to identify and pursue renewable energy investments in hydro electric and solar projects, subject to the outcome of viability and feasibility analyses," the firm said. Last year, SMC President and COO Ramon Ang said the company is targeting up to 10 000 MW of new renewable energy capacity in the next 10 years.

Vietnam eyes more wind power capacity

The Vietnamese government is aiming to raise wind power capacity to 1000 MW by 2020 and 6200 MW by 2030 with a view to optimising the use of this renewable energy for enhancing the country's socio-economic development and energy security.

In a bid to step up green growth and sustainable development, Vietnam has been accelerating wind power expansion with existing wind farms yielding a combined capacity of 197 MW.

In addition, construction on many wind farms has begun, which is expected to increase the total capacity to 263 MW. Many more projects are waiting for approval from authorities. Once granted, these would add a total capacity of 412 MW.

As much as 4236 MW to be produced by wind farms nationwide has been added to the country's power development plan while there are some 10 279 MW of wind projects registered.

Most recently, German wind, solar and decentralised project developer EAB New Energy GmbH announced the inauguration of the 37.6 MW Mui Dinh wind power plant. Ninh Thuan has attracted many wind and solar power projects, with a combined capacity of 2800 MW. As many as 18 solar projects and three wind power plants are under construction in the locality. Nine projects with a combined capacity of 600 MW were scheduled to go into operation this month.

Vietnam has set a goal of 10 per cent renewables integration by 2030 and took an important step to facilitating that goal with the award of a battery storage feasibility study to GE's Energy Consulting business. The study is being funded by the US Trade and Development Agency (USTDA).

Australia continues to transform energy sector

- First ever delivery of green hydrogen to Japan
- Online platform will make it easier for small solar generators to sell power on spot market

Syed Ali

Australia is making progress in transforming its energy sector, with significant announcements that demonstrate its continued shift towards a cleaner, more advanced power sector.

In late March Queensland celebrated the state's first ever delivery of green hydrogen to Japan, marking a significant step forward for its hydrogen industry. The Queensland government also said it plans to release its Hydrogen Strategy later this year.

Exported by JXTG, Japan's largest petroleum conglomerate, the hydrogen was produced at QUT's solar cell facility, located at the Queensland government's Redlands Research Facility.

"This demonstration of renewable hydrogen being successfully exported overseas is an exciting first step in producing and exporting hydrogen at a commercial scale in the future," Queensland Premier Annastacia Palaszczuk told Parliament during a hydrogen showcase event. "My government's commitment to backing renewable resources combined with our existing gas pipeline infrastructure and export facilities make us the ideal state to lead the future production and export of hydrogen," she added.

Palaszczuk also announced $250 000 in funding for the establishment of a renewable hydrogen pilot plant at the Redlands Research Facility.

The use of solar to produce hydrogen is further evidence of the importance of solar in the country's energy future. In a move that will be significant in advancing solar deployment, in April Oxamii, a startup based in Adelaide, announced that an online platform to connect medium to small-scale solar energy producers with independent electricity buyers will launch in the coming months in South Australia.

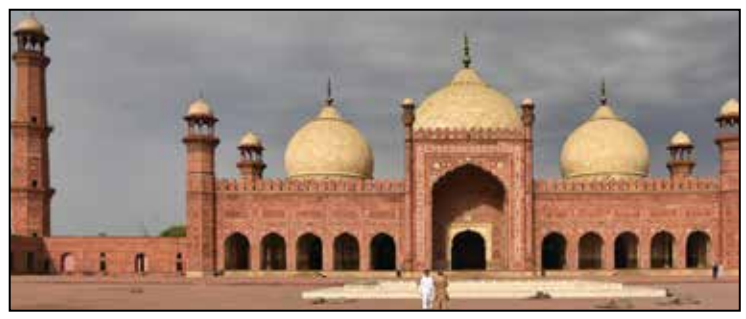
The company said it has developed a system to make it easier for owners of solar arrays producing a minimum of 200 kW to sell power on the spot market.

Founders Aaron Yew, Luke Marshall and Ray Carclaw have secured a number of investors for the online platform and plan to launch before July.

Their platform connects buyers and purchasers by making Oxamii the agent that monitors energy flows, calculates bills and manages loads for its customers.

Oxamii is targeting farmers who have existing solar energy they want to sell on the market, or farmers looking at gaining a second source of income through establishing a solar farm.

■ Australian researchers are developing short-term weather forecasts for solar farms to help them precisely predict output as little as five minutes in advance. The $A1.2 million project, which officially started in April, will use data generated by real-time sky cameras, satellite images and statistical modelling to design a world-first, short-term forecasting model to more accurately predict weather conditions from five minutes up to two hours. University of South Australia Professor of Environmental Mathematics John Boland said inaccurate short-term forecasts relating to wind and solar generation have cost Australia's renewable energy sector about $5 million in the past decade. He said precise self-forecasting would also help solar farms with battery storage capabilities predict when best to sell or store their electricity.



Pakistan looks to boost renewables share

Pakistan is planning to increase the share of renewables in its total power generation mix to 30 per cent by 2030 under a plan suggested by the country's new government.

In a recent announcement the World Wind Energy Association (WWEA) proposed to lift that share from the current 4 per cent by enhancing generation from wind, solar, small hydro and biomass plants. The share of large-scale hydropower (more than 50 MW) is also set to expand to 30 per cent from around the current 25 per cent.

Pakistan's Cabinet Committee on Energy is expected to approve the country's 2019 renewable energy policy that will include all future renewable energy projects. According to WWEA the government's plan to have around 18 GW of installed renewable energy capacity by 2030 could limit the expansion of coal fired capacity of over 5 GW. It also noted that the new policy should include a strategic action plan creating a favourable environment for coordination between various departments in the renewable energy sector.

During the last week of February, the Cabinet Committee on Energy (CCoE), chaired by the Finance Minister, approved proposals from the Ministry of Energy (Power Division) for all future renewable energy projects to be treated under the Renewable Energy Policy 2019. The new policy, whose guiding principles have already been approved by the CCoE, is being reviewed by different stakeholders and will be formally adopted by the CCoE later.

EPRs set for more delays

Finland's Olkiluoto 3 EPR nuclear plant suffers a fresh setback.

Siân Crampsie

There are likely to be further delays to the startup of the Olkiluoto 3 (OL3) nuclear power plant in Finland after the Areva-Siemens consortium in charge of building the project announced a schedule review.

OL3 owner Teollisuuden Voima Oyj (TVO) said that Areva-Siemens are planning to publish an overall rebaseline schedule for the final phases of the 1600 MW project in June. The European Pressurized Water Reactor (EPR) project is already a decade behind its original schedule and under the most up-to-date- programme, had been due to start generating electricity in January 2020.

TVO said in a statement that modification outage work during the first quarter of the year had not progressed according to schedule and therefore fuel would not be loaded into the reactor before the end of August 2019.

According to the schedule, nuclear fuel was planned to be loaded into the reactor in June 2019 and the first connection to the grid was planned to take place in October 2019.

"Although this new schedule review informed by the plant supplier is disappointing of course, it is crucial that the commissioning tests will be performed with utmost care. We will have a modern and safe plant, and the final phases of the commissioning will be done in cooperation with the plant supplier," explained Jouni Silvennoinen, TVO's Director of the OL3 project.

In March 2018 TVO signed an agreement with Areva-Siemens over costs and losses caused by delays to the project. The settlement included compensation of €450 million, to be paid in two instalments.

In November last year, Areva-Siemens became liable for a further €18 million in compensation payments after further delays to the project were announced.

Last month French newspaper *Le Monde* reported that the Flamanville EPR project is likely to experience further delays because the French Nuclear Safety Authority is expected to order the repair of defective welds or additional studies to ensure their longer-term reliability.

Local media suggested that the repairs could add up to two years to the project schedule.

Construction began at Flamanville in 2007, and it was originally expected to commence operation in 2012 but it may not now open until early 2020 or 2021. It was originally expected to cost €3.5 billion, but the cost has now risen to €11 billion.

Ofgem addresses supplier rules

- Ofgem plans further consultation on retailer standards
- Price cap squeezes supplier margins

A series of company collapses in the UK's energy retail sector has forced the regulator to revise the rules for new entrants.

Ofgem says that fees for energy companies wanting to enter the UK retail market will rise five-fold this summer and they will also have to show that they have sufficient funds to trade for 12 months.

The move follows the collapse of 11 small UK energy suppliers over the last 12 months. There are concerns that new market entrants are not robust enough financially to withstand swings in wholesale market prices. Others have been accused of offering unsustainably low prices and poor customer service.

Other criteria to be imposed under Ofgem's new rules for market entrants include showing that their directors, major shareholders and senior managers are "fit and proper" to hold a licence to operate, and that they are able to provide a proper level of customer service.

Ofgem also said it would carry out a further consultation this year on standards within existing suppliers.

Energy UK's Chief Executive, Lawrence Slade said: "We welcome measures from Ofgem to introduce tougher entry tests for new suppliers entering the retail market. We want to see a future retail market where competition thrives and customers benefit from increased choice and service, and aren't left picking up the tab when suppliers with unsustainable business models fail."

The number of new suppliers in the UK's domestic energy market has risen sharply in recent years, from 14 in 2011 to 73 in June 2018. Over this period, the combined market share of the so-called 'Big Six' energy suppliers fell from almost 100 per cent to 75 per cent.

The recent introduction of an energy price cap has put increased pressure on companies operating in the already fiercely competitive market. Professor David Elmes, leader of the Warwick Business School Global Energy Research Network, said that the price cap was making it "increasingly hard for large and small companies to see a viable future" and made it hard for Ofgem "to keep a market going".

Energy market analysts ICIS indicated last month that the energy price cap – which limits the maximum price suppliers can charge consumers for energy – is likely to fall in October 2019 due to falling wholesale energy prices.

Pension fund sees growth in renewables

Plans by Norway to allow a major pension fund to invest in unlisted renewable energy infrastructure schemes are expected to gain parliamentary approval this summer.

The Government Pension Fund Global (GPFG) is the world's largest pension fund at $1 trillion, according to the Institute for Energy Economics and Financial Analysis (IEEFA), and has announced a major policy change that will enable it to take advantage of growth in the renewables sector.

The policy change is a "significant step" and will be presented for parliamentary vote in Oslo in June, IEEFA said.

In an official statement, Norway's Minister of Finance Siv Jensen emphasized that the approach was based on financial rather than environmental considerations, "[It] is not a climate policy measure, but part of the investment strategy for the Fund."

"After a three-year diligence process, the Government Pension Fund Global has confirmed that investments in unlisted renewable energy have a sound cash position, healthy exit strategies and a positive outlook," said IEEFA finance director Tom Sanzillo. "This is a growth industry. Investments by the fund now allow it to take advantage of this growth and to use its resources to develop the market for decades.

"Moreover, Norway will tighten its coal criteria which will lead to the divestment of large mines and coal-exposed power companies. This is a strong step for the health of the Fund and the planet."

Norway's decision to tighten its criteria for divesting from companies invested in coal mining and coal fired power generation could lead to divestment from companies such as Glencore Plc, Anglo American Plc, BHP Group Ltd., RWE AG and Uniper SE, among others.

Tees CCGT gets go-ahead

The UK is set to add around 2 GW of new gas fired generating capacity after authorities approved a major new project in the north of England.

The Tees combined cycle power plant is the second power project this year to gain a development consent order from the UK government following approval of the 299 MW Millbrook Power open cycle gas turbine (OCGT) project.

Tees will have a maximum capacity of 1700 MW and will make use of the existing gas and National Grid connections on the site of the former Teesside power station in Middlesborough. Developer Sembcorp Utilities UK said that consent for the project was "a significant step forward".

"It's an important stage in what has been a considerable effort over the past year to get to this point," said Stephen Hands, Senior Vice President and Site Director at Sembcorp Utilities UK.

"However, we believe this plant, which would also be carbon capture ready, could play an important role in the regeneration of the Tees Valley by helping to attract major new, energy intensive business to the area."

Gas power plants can provide flexible and rapid sources of generation to back up intermittent renewables but development of new gas capacity in Europe has been slow due to low power prices.

Drax Group announced that its proposed Millbrook power plant in Bedfordshire had been approved in March 2019. The plant will be designed to go from cold to full load in less than 20 minutes, enabling it to respond quickly to support the grid.

"Rapid response gas power stations are agile enough to ramp up quickly and support the grid at times of peak demand, making them highly complementary to intermittent renewable sources of power, like wind and solar," said Andy Koss, Drax Power CEO.

Eskom addresses project finance challenges

South African utility Eskom has set aside capital to address rising costs and delays at two coal fired power stations that are still under construction.

Siân Crampsie

Eskom board chairman Jabu Mabuza told local media last month that the state-owned utility has allocated R4.5 billion ($310 million) to address the challenges it is facing at the Medupi and Kusile power projects.

The move follows a review of the two projects by Eskom under mounting pressure to abandon the builds, which are five years behind schedule and over budget. Addressing the media at Eskom's Lethabo power plant in the Free State, Mabuza said that the company would press ahead with fixing design problems at both sites because the benefits of continuing outweighed the costs of not continuing.

The decision comes in the wake of several weeks of power shortages in South Africa that have forced Eskom to implement power alerts and load shedding.

The shortages were prompted by repeated faults in its power plant fleet, including newly-commissioned units at Kusile in Mpumalanga Province. The company is continuing to struggle to overcome its ongoing operational challenges because of its precarious financial position.

In March the South African government conceded that the power crunch was largely due to a lack of maintenance of Eskom's ageing infrastructure and that the utility had not spent enough on maintaining equipment over the past five years. Public Enterprises Minister Pravin Gordhan also said that the delays at Medupi and Kusile were due to the power stations being badly designed and badly constructed.

According to Eskom, it will cost an additional R18 billion ($1.25 billion) each to complete Medupi and Kusile, and at least another 60 to 66 months to do so. It estimates that the penalties it could pay to halt construction of the power stations would be around R8 billion.

The two power plants have so far cost R290 billion to build, double their original budget. When completed, they will add 9600 MW to South Africa's grid.

In March Eskom said that more than one-quarter of its 45 GW of installed generating capacity was off-line for unplanned maintenance, forcing it to load shed up to 4000 MW. The utility is unable to service its debts because of falling revenues, and received a $5 billion bailout from the South African Treasury in February.

Last month the treasury said that the New Development Bank (NDB) would provide a project loan of $480 million for environmental protection equipment at Medupi, which was due to start operating in 2015.

NDB has also agreed $180 million of funding with Eskom to support 670 MW of renewable energy capacity development.

Saudi Arabia set to be wind heavyweight

Strong political commitment to renewable energy will help power Saudi Arabia to becoming a regional heavyweight in the wind power sector.

New research from Wood Mackenzie Power & Renewables shows that developers in Saudi Arabia will build 6.2 GW of wind capacity – 46 per cent of the region's total wind capacity addition – between 2019 and 2028.

However, in spite of cost parity between wind and solar photovoltaic (PV) technologies, political commitment in Saudi Arabia appears to favour solar, Wood Mackenzie said in its report, 'Middle East Wind Power Market Outlook, 2019-2028'.

"Despite offering comparable prices and more rigorous industrial development opportunities, the wind power capacity target is set at 16 GW by 2030 and solar PV at 40 GW, indicating the government's preference for the latter," noted Sohaib Malik, Wood Mackenzie Power & Renewables Senior Analyst. "Moving forward, the Renewable Energy Project Development Office (REPDO) will award 850 MW of wind capacity in 2019, which is expected to be commissioned in 2021-2022, and increase the local content requirement in future tendering rounds."

Wood Mackenzie also states in its report that Saudi Arabia will fall short of its current 2030 renewable energy target. It recently revised its targets upwards and earmarked 70 per cent of targeted capacity to the Public Investment Fund (PIF), the Saudi sovereign wealth fund, with the remaining capacity to be awarded through REPDO.

"A central concern is the PIF's lack of track record in the renewables sector and its limited in-house sectoral expertise," said Malik. "REPDO, on the other hand, completed two renewables request for proposals after predeveloping the sites."

PIF is believed to have an estimated $230 billion of assets, which it plans to boost to $2 trillion under Vision 2030, driven by investments in various sectors from electric vehicles to public infrastructure.

"There is little doubt about the Fund's financial muscle, however, its past investment strategy focused on established firms in traditional industries," Malik said. "Aspirations to develop a value chain for wind and photovoltaic [PV] technologies locally is a different ball game and requires the PIF to acquire new capabilities for effective oversight of these ventures."

Growth in the wider Middle East's wind power market is expected to slow down in 2019 amid regional volatility but demand will return to steady growth post-2020, according to Wood Mackenzie.

ADB supports Uch-Kurgan upgrade

A $100 million finance package has been agreed by the Asian Development Bank (ADB) to assist the modernisation of the Uch-Kurgan hydropower plant in the Kyrgyz Republic.

Uch-Kurgan is the oldest of the six hydropower plants installed along the Naryn River cascade. ADB's assistance, consisting of a $60 million loan and a $40 million grant from the Asian Development Fund, will enable the modernisation of ageing equipment and improve power generation capacity at the plant.

The project will help to strengthen the Kyrgyz Republic's energy self-sufficiency and increase its potential for renewed energy exports to neighbouring countries in Central Asia. ADB will also administer a $45 million loan from the Eurasian Development Bank for the project.

"The modernisation of the Uch-Kurgan hydropower plant supports the government's strategy to rehabilitate existing power plants to increase clean energy production," said ADB Principal Energy Specialist Sohail Hasnie. "The Kyrgyz Republic has the potential to generate about 150 TWh of clean electricity per year, but it's producing only about ten per cent of that amount at the moment.

"We expect the Uch-Kurgan to produce 20 per cent more power when the work is completed."

The Kyrgyz Republic is a clean energy hub in Central Asia, supplying 90 per cent of the region's hydropower. In 1995, the Kyrgyz Republic exported more than 2000 GWh to Kazakhstan, Tajikistan, and Uzbekistan, which have since declined to less than half that, ADB said.

Uch-Kurgan hydropower plant, located 271 km southwest of the country's capital Bishkek, began operating in 1962 and was used as a baseload plant. Since then, no major improvement works have been undertaken.

The modernisation project will restore full operation of all four generating units of Uch-Kurgan with an increased total capacity of 216 MW, from the original generating capacity of 180 MW. It will also finance the reinforcement of the plant's hydraulic steel structure and dam infrastructure while making all eight bottom outlet gates operational.

Removal of undertaking silt and sedimentation will also be carried out to help restore proper operation of the plant's hydromechanical equipment.

Congo wins support for green mini-grid

The Democratic Republic of the Congo is to boost off-grid renewables with the implementation of a green mini-grid programme.

The programme will serve as the pilot to an innovative private-led electrification approach to deploy renewable-based mini-grid solutions across the country, and will be supported by a $20 million facility from the African Development Bank (AfDB).

The AfDB funding will support renewable-based, mini-grid solutions to the off-grid cities of Isiro, Bumba and Genema. In the longer term, the programme is aiming to supply power to cities with sizeable populations, some of them with a few hundred thousand inhabitants, without any access to modern energy.

With limited grid coverage – around 10 per cent nationally – many Congolese rely on kerosene or diesel fuel for their lamps, cookers and electricity generators. Less than one per cent of rural and 35 per cent of urban areas have access to electricity from the national grid. Sub-Saharan Africa averages 24.6 per cent on-grid electricity coverage, according to AfDB.

Upon completion, the envisioned mini-grids that range from 3 to 10 MW will directly connect 21 200 households and 2100 SMEs and public buildings, benefitting at least 150 000 people.

Amadou Hott, the AfDB's Vice-President for Power, Energy, Climate Change and Green Growth said the Bank's financial support to DR Congo's off-grid electricity programme would transform the country's energy sector and deliver high development impact.

He observed that while helping to eradicate the use of diesel fuel in the target communities, the programme will also foster the country's transition to low-carbon growth.

Despite Africa's significant resources endowments, close to 600 million people on the continent, mostly in sub-Saharan Africa, are still without access to electricity. Meeting the universal electricity access objective within the next decade will require the roll-out of off-grid and mini-grid solutions at scale, Daniel Schroth, acting director of renewable & energy efficiency at the African Development Bank, said recently.

The AfDB is a strong supporter of Africa's power sector and has developed financing instruments for engaging the off-grid and mini-grid sector through its sponsorship and anchor investment in the Facility for Energy Inclusion (FEI), a $500 million debt financing facility targeting small scale renewable projects.

Senvion stabilises with loan deal

The signing of a 12-month, €100 million loan facility has given Senvion the lifeline it needs to continue operations and complete its planned business transformation.

Siân Crampsie

German wind turbine maker Senvion has shored up its finances with a €100 million loan facility from its main lenders and bond holders.

The loan came in mid-April and just days after Senvion said it had filed an application in Germany for self-administration proceedings, a pre-emptive insolvency process.

In a statement dated April 17, Senvion said the 12-month, €100 million debtor-in-possession (DIP) facility has "received board approvals and allows substantial drawings already this week, thus enabling the company to stabilise its business operations and provide funds to its non-insolvent subsidiaries."

The company added that it would stay in the self-administration proceedings, which enable its management to retain control of the business with oversight from a supervisor acting on behalf of creditors.

"We would like to thank both our lenders and main bond holders for their support in agreeing to provide us with a DIP facility that will enable us to continue our operations," said Chief Executive Yves Rannou.

Rannou said that the loan facility was "particularly helpful" as the company had managed to significantly increase installations in the first quarter of 2019, installing 366 MW worldwide in the period, more than twice as much as a year ago.

Deployments included 120 MW in Chile and Argentina and nearly 110 MW in Australia. Senvion also built and installed its first turbine in India.

Senvion embarked on a restructuring programme in January 2019 and maintains that it has a fundamentally sound and strong business model. The trading environment for wind turbine makers has been challenging, however, with strong competition and falling prices globally.

Senvion has also faced delays and penalties related to big projects. It has over €1 billion of debt. Its transformation plan includes programmes to refocus operations, concentrate on the most attractive markets, streamline the product portfolio, improve installation execution and realise efficiency gains in the service business.

At the end of first quarter 2019, Senvion's total installed capacity under service amounted to 14.1 GW. It maintains close to 80 per cent of this capacity, with an order book of around €2.8 billion.

Saft targets China for battery scale-up

Battery firm Saft says that a new joint venture will help it to expand its operations and meet growing demand for its products in China's electric vehicle (EV) and energy markets.

Saft, a subsidiary of French energy giant Total, has created a joint venture with Chinese firm Tianneng Energy Technology (TET) to expand lithium ion (Li-ion) battery manufacturing in China.

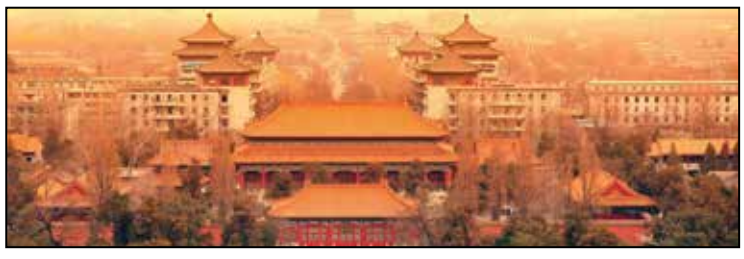
The joint venture will be 60 per cent owned by TET and 40 per cent by Saft, with manufacturing based at the Changxing gigafactory, with a potential capacity of 5.5 GWh. It will primarily focus on the development, manufacturing and sales of advanced Li-ion cells, modules and packs for China and worldwide markets.

E-bikes and EVs, as well as energy storage solutions (ESS) will be the target markets, Saft said.

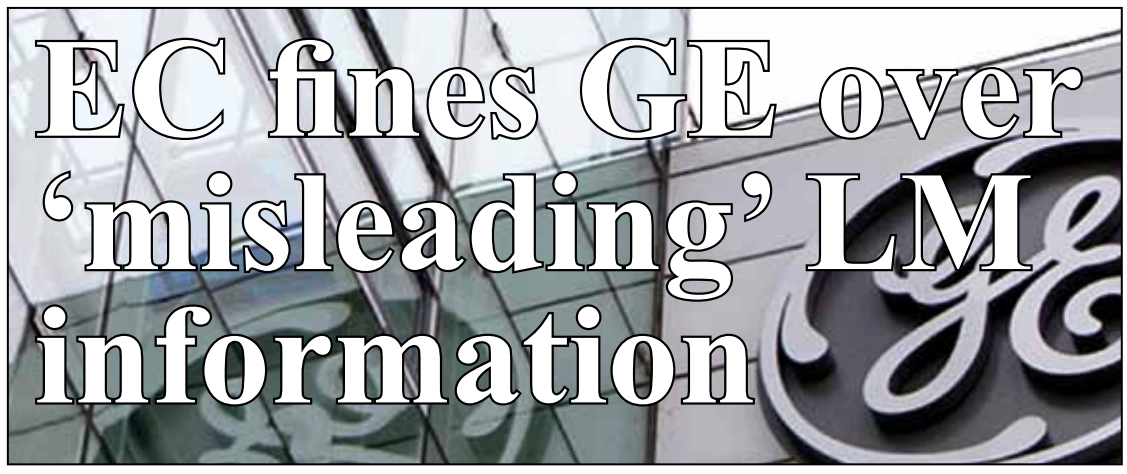
"This is a first strategic move driven by Total, following the acquisition of Saft in 2016, to grow Saft's activity in China, the world's largest renewables market, as well as in the ESS segment as an essential component to the large scale development of intermittent renewable energies," said Patrick Pouyanné, Chairman and CEO of Total. "The joint venture will allow Saft to join forces with a Chinese partner, a world leading lead acid battery manufacturer, willing to develop its lithium-ion activities.

"It will also give Saft access to China's booming battery market as well as highly-competitive mass production capacity to accelerate its growth."

"We are delighted to start building a long-term partnership with Tianneng with a shared industrial vision," said Ghislain Lescuyer, Saft CEO. "This joint venture will allow us to make a step-change and significantly increase our footprint in the Chinese Li-ion market that will represent over 40 per cent of the global demand by 2025 and to develop our worldwide activities."



EC fines GE over 'misleading' LM information



- LM merger approval stands
- Fine in line with "serious infringement"

GE will pay a €52 million fine following an investigation by the European Commission into information provided by the American firm during its 2017 takeover of LM Wind.

The European Commission says that GE provided misleading information to regulators who were reviewing the $1.65 billion takeover of the Danish rotor blade manufacturer. "Our merger assessment and decision-making can only be as good as the information that we obtain to support it," said Commissioner Margrethe Vestager, in charge of competition policy. "Accurate information is essential for the Commission to take competition decisions in full knowledge of the facts.

"The fine imposed… on General Electric is proof that the Commission takes breaches of the obligation for companies to provide us with correct information very seriously."

EU merger regulations require companies to provide correct and non-misleading information for merger investigations. According to the European Commission, GE notified it of its plans to buy LM Wind in January 2017, but said that it did not have any higher power output wind turbine for offshore applications in development beyond its existing 6 MW turbine.

However, through information collected from a third party, the Commission found that GE was simultaneously offering a 12 MW offshore wind turbine to potential customers.

GE then withdrew its notification of the acquisition of LM Wind, and later GE re-notified the same transaction, this time including complete information on its future project.

The European Commission approved the deal in March 2017.

The Commission can impose fines of up to one per cent of the aggregated turnover of companies, and takes into account the nature, gravity and duration of infringements.

"GE committed an infringement by negligently providing incorrect information in the merger notification form," the Commission said in a statement. "The Commission considers that this infringement is serious because it prevented it from having all relevant information for the assessment of the transaction.

"Moreover, the Commission considers that GE, with whom it had continuous contacts during the merger review process, especially on the subject of GE's pipeline products in this market, should have been aware of the relevance of the information for the Commission's assessment, and of its obligations under the merger regulation. Therefore, GE's breach of procedural obligations was a serious infringement.

"On the basis of these factors, the Commission has concluded that an overall fine of €52 million is both deterrent and proportionate."

Statkraft tie-up with redT for solar-plus-storage

Statkraft is to join up with energy storage firm redT energy plc in a new partnership that will offer solar-plus-storage solutions for UK commercial and industrial clients (C&I).

The two companies have signed heads of terms to partner on the project that will see them install solar panels with redT battery storage at no upfront cost. The move will mark the first time such a product, financed under a power purchase agreement (PPA), is offered on the UK market, according to a statement from redT last month.

The companies will initially install 10 MWp of solar photovoltaic (PV) capacity and 6 MWh of battery storage capacity, and are aiming to increase the size of the portfolio to 100 MWp and 60 MWh over the next three years.

They will sell the generated electricity from the facilities under 25-year power purchase agreements (PPAs) with Statkraft. The latter will also provide flexibility optimisation services using its in-house virtual power plant.

"With this roll out of low cost solar coupled with heavy cycling, flow machine technology, we hope to accelerate the deployment of energy storage providing low-risk energy savings to commercial energy users, and creating an effective, hedge against rising energy prices," said Neil O'Brien, executive chairman of redT.

Statkraft and redT estimate the C&I users opting for the new product will be able to reduce energy costs by up to 20 per cent over the 25-year term of the PPA.

- Statkraft says it will stop investing in wind power in Norway after it commissions three new wind farms in the country. It plans to complete the Fosen, Kvinesdal and Remmafjellet projects before shifting focus to building mainland-based wind farms in other countries in Europe, South America and Asia. The move is due to falling power prices in its home market.

Americas

Holtec plans Indian Point decommissioning

Comprehensive Decommissioning International (CDI), a joint venture company of SNC-Lavalin and Holtec International, has signed a Decommissioning General Contractor Agreement for the Indian Point nuclear power plant in New York state, USA.

Entergy has agreed to sell Indian Point Units 1, 2 and 3 to a Holtec International subsidiary, which will take over the licenses, spent fuel, and Nuclear Decommissioning Trusts (NDTs) for the three units. CDI will be responsible for the decommissioning of all three reactor units.

Engie places 361 MW order

Vestas has received a 361 MW order to supply and install 86 V150-4.2 MW wind turbines for the Campo Largo Phase 2 wind park located at Sento Se and Umburanas municipalities, in Brazil's Bahia state.

The project's wind turbines will be locally produced under the Brazilian Development Bank (BNDES) FINAME II rules. The nacelles will be manufactured in the facilities that Vestas holds in State of Ceara, and the blades and towers will also be produced in the country.

The project is Engie's first with Vestas in Brazil. Turbine delivery is expected to start in the second quarter of 2020, whilst commissioning is planned for the first quarter of 2021.

Nordex receives Argentine order

Nordex has received an order to provide 38 turbines from its Delta4000 series for the Chubut Norte II, III & IV wind farm in Argentina.

The order marks the first overseas contract for Nordex's Delta4000 series. It was placed by Genneia, a leading Argentine independent power producer, for which Nordex is currently installing the Argentinean Pomona I & II projects.

Located in the southern Province of Chubut near Puerto Madryn, the newly-ordered 166.4 MW wind farm will consist of 38 N149/4.0-4.5 turbines with an installed capacity of 4.380 MW each. Installation of the turbines is scheduled for the third quarter of 2019.

Asia-Pacific

Voith wins Snowy River contract

Voith Hydro has won a contract to equip the Snowy 2.0 pumped storage power station in Australia.

Voith will supply electrical and mechanical components for the 2 GW power plant, which is being developed by Future Generation, a joint venture between Salini Impregilo, Clough and Lane.

The order includes the supply of six reversible pump turbines, each with a rated output of 333 MW. Three of the units will be variable speed. It also includes six motor generators, the auxiliary systems and the complete power plant automation.

Snowy 2.0 will provide the Australian national electricity market with 175 hours of continuous large-scale storage. It will connect the two existing dams of the Snowy Scheme, Tantangara Dam and Talbingo Dam, through underground tunnels and an underground power station with pumping and generating capacity.

The first power out of Snowy 2.0 is expected early as 2024.

Vestas rises with Mercury

New Zealand-based electricity firm Mercury has signed an engineering, procurement and construction contract with Vestas for the 119 MW Turitea wind farm.

The Turitea wind farm will be Mercury's first wind asset, adding to its existing portfolio of hydro and geothermal energy resources. It will comprise 33 Vestas V112-3.45 MW turbines delivered in 3.6 MW power optimised mode.

Commissioning at the Turitea wind farm is scheduled to commence in the second half of 2020.

NTPC tackles NOx

GE Power India has been awarded a Rs 142 crore ($21.34 million) order by Indian government-owned power utility NTPC for the supply and installation of low nitrogen oxide (NOx) combustion systems on 10 GW of thermal power plant capacity.

The contract is the largest of its kind to be awarded by NTPC and will involve in-combustion system modification of plant boilers by staging the combustion air in the furnace to reduce the generation of fuel and thermal NOx during the combustion process.

The modifications will reduce NOx emissions by 30-40 per cent. The project will be implemented over a 30-month period.

Pöyry assigned Thai wind project

B. Grimm Power Public Company Limited, one of Thailand's fastest growing independent power producers, has awarded Pöyry the owner's engineering services assignment for its latest renewable energy project, the 16 MW Bo Thong wind farm, in Mukdahan province, Thailand.

Pöyry's assignment includes EPC bid evaluation and negotiations, energy yield assessments, project management, design review, and site monitoring during construction and commissioning. The project's target commercial operation date (COD) is September 2020.

MHPS signs China TLA

Mitsubishi Hitachi Power Systems has signed a Technology License Agreement (TLA) with Chinese firm CSIC Longjiang GH Gas Turbine Co., Ltd. (GHGT) for its H-25 Series gas turbines.

The TLA enables manufacture of the H-25 technology in China, where increasingly stringent environmental regulations are driving the uptake of natural gas and small capacity gas turbines.

The deal will enhance MHPS' competitive position in the growing Chinese market, the firm said.

Foxwell places Changhua order

Vestas has received an order from Foxwell Energy, a subsidiary of Foxlink Group, and TCC Green Energy, a subsidiary of TCC Group, for the 43 MW Changhua wind park in Taiwan.

The project includes the supply and supervision of twelve V105-3.6 MW wind turbines as well as two separate service contracts. Turbine installation is expected to commence in the first quarter of 2020.

Europe

EMF selects SGRE for offshore projects

Eolien Maritime France (EMF) has chosen Siemens Gamesa Renewable Energy (SGRE) as its preferred supplier to supply and service nearly 1 GW of offshore wind projects in France.

The two companies have signed a framework agreement for the supply of up to 1000 MW for two offshore wind farms in France that EMF is developing as a result of the first offshore wind call in France in 2012.

The wind farms are expected to use SWT-7.0-154 DD wind turbine technology and are subject to contract and a final investment decision by EMF. SGRE's planned offshore wind turbine manufacturing facility currently under development in the Port of Le Havre will produce the turbines for the projects.

The agreement also includes a future provision for SGRE to perform wind turbine service for a period up to 15 years.

SGRE on track for Hollandse Kust Zuid deal

Siemens Gamesa Renewable Energy (SGRE) says it is in final negotiations to supply its new offshore wind turbine technology to Vattenfall's Hollandse Kust Zuid (HKZ) 1 & 2 offshore wind farm.

SGRE is proposing the installation of its SG10.0-193 DD turbines at the HKZ site in the Dutch North Sea. It has also signed a contract with Vattenfall for the HKZ 3 & 4 wind farms, which is subject to the outcome of an auction and final investment decision.

HKZ 1 & 2 will be the world's first zero-subsidy offshore wind farm. SGRE says that its new 10 MW technology, announced in January 2019, will contribute to a lower levelised cost of energy (LCOE) in the offshore wind energy sector.

Eurowind selects Siemens for Thorup-Sletten

Siemens Gamesa has signed an order with Eurowind Energy for supplying turbines for the Thorup-Sletten project, the largest onshore windfarm in Denmark.

Siemens Gamesa will provide 18 units with a total combined output of 77 MW. The turbines will be installed west of the Aggersund bridge in northwestern Jutland, starting in October of this year.

Nexans wins WindFloat deal

Nexans says it will supply the turbine cables and accessories for the WindFloat Atlantic floating offshore wind farm in Portugal.

The 25 MW wind farm is expected to demonstrate the viability of floating offshore wind (FOW) technology, and will be the first in the world operating at 66 kV.

Nexans will supply pre-terminated and factory-tested turbine cables as well as the full scope of T-connectors terminating the dynamic inter-array cables.

The WindFloat Atlantic project, due online in 2019, will feature three MHI Vestas V164-8.4 MW turbines installed on ballasted, triangular, semi-submersible foundations.

International

Wärtsilä to supply Nigerian works

Technology group Wärtsilä will reduce the carbon footprint of a Nigerian cement facility with the supply of a 48 MW power plant.

BUA Group has placed an order for a new power plant using five Wärtsilä 34DF dual-fuel engines running mainly on liquified natural gas (LNG) following its decision to build a new cement line in Sokoto, northwest Nigeria.

The plant will not be connected to the grid. The Wärtsilä equipment is scheduled for delivery at the end of 2019, and the new plant is expected to become operational in mid-2020.

GE to provide IEC with HA technology

Israel Electric Corporation (IEC) has awarded GE a contract for the Orot Rabin modernisation project.

Located in Hadera, IEC's Orot Rabin project will utilise GE's HA gas turbine technology as part of the conversion of the existing power station from coal to gas generation. The order also includes the steam turbine, generator, HRSG and balance of plant equipment, as well as a 15-year multi-year services agreement.

When operational, the Orot Rabin power plant will provide more than 630 MW to the Israeli grid, becoming the largest and the most efficient gas power plant in the country and delivering up to four percent of Israel's current total power generation capacity.

It will be the first in the country to use HA technology.

West Africa boosts energy access

GE Renewable Energy's Grid Solutions has signed two deals to build energy systems in Benin and upgrade three substations in Côte d'Ivoire.

In Benin, GE will design and supply the first Advanced Distribution Management System (ADMS) for the Société Béninoise d'Energie Electrique (SBEE) and undertake the rehabilitation of substations and telecommunication infrastructure at the National Distribution Control Center in Cotonou.

In Côte d'Ivoire, GE will rehabilitate and expand three 225 kV substations in Ferke, Man and Taabo to improve the electricity supply in the northern, western and central part of the country.

ADMS is engineered with adaptive algorithms and predictive analytics to help utilities operate the grid more efficiently and enable automation. The system will be able to predict issues, identify the faults on the grid and propose a restoration plan.

Marubeni signs Amin PPA

A consortium led by Japanese firm Marubeni Corporation has signed a 23-year power purchase agreement with Petroleum Development Oman (PDO) for the 105 MW Amin solar photovoltaic (PV) IPP project.

The Japanese-Omani consortium won the bidding process to develop, finance, build, operate and maintain the project, which will be Oman's first large-scale solar plant.

Marubeni owns 50.1 per cent of the consortium, with the remainder owned by OOFDC (30 per cent), Bahwan (10 per cent) and MCS (9.9 per cent).

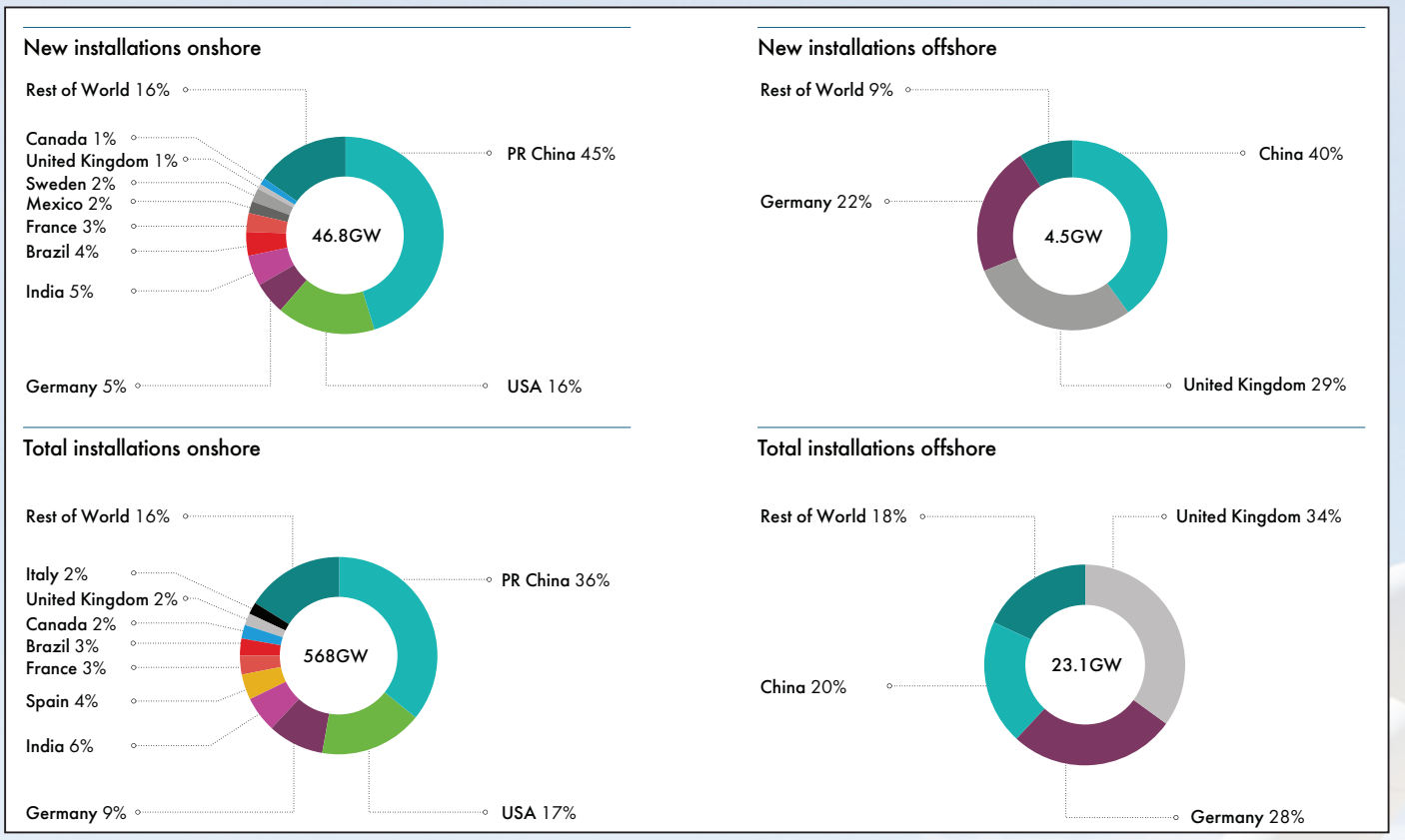
MHPS wins Sharjah order

Mitsubishi Hitachi Power Systems (MHPS) has received an order for construction of a 1026 MW gas turbine combined cycle (GTCC) power plant for the Emirate of Sharjah in the United Arab Emirates (UAE).

The new power plant in the coastal city of Layyah will be equipped with two M701F gas turbines and is due on line in 2021. It is the first in Sharjah to be financed by export loan with support from a Japan's export credit agency (ECA).

MHPS will carry out full turnkey construction of the new facility with its project partner Elsewedy Electric.

Wind energy market status 2018



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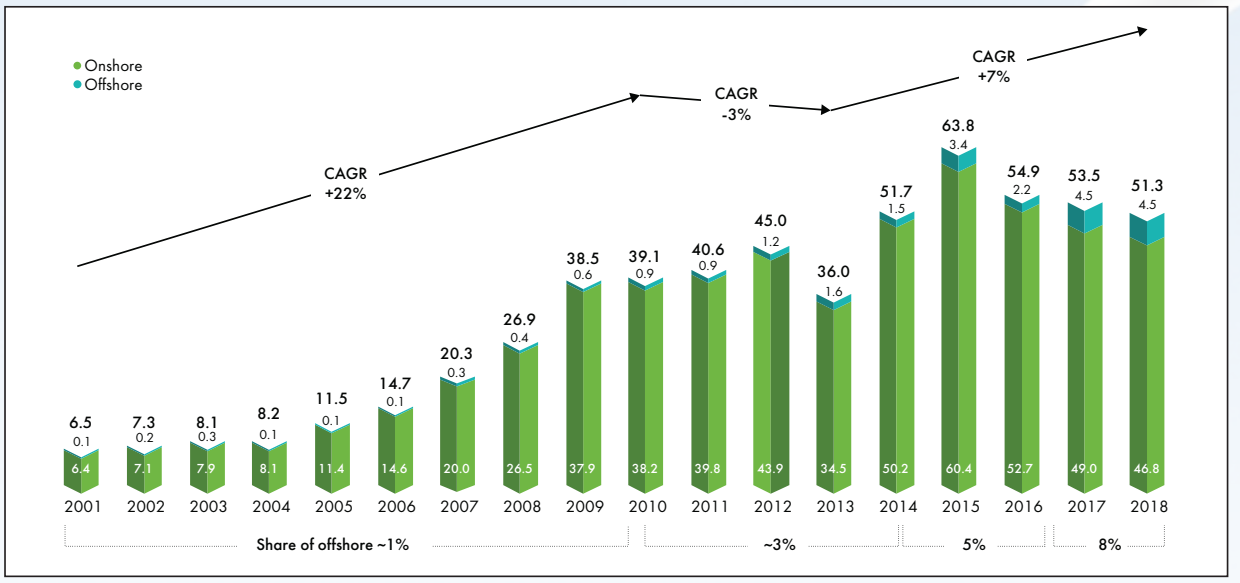
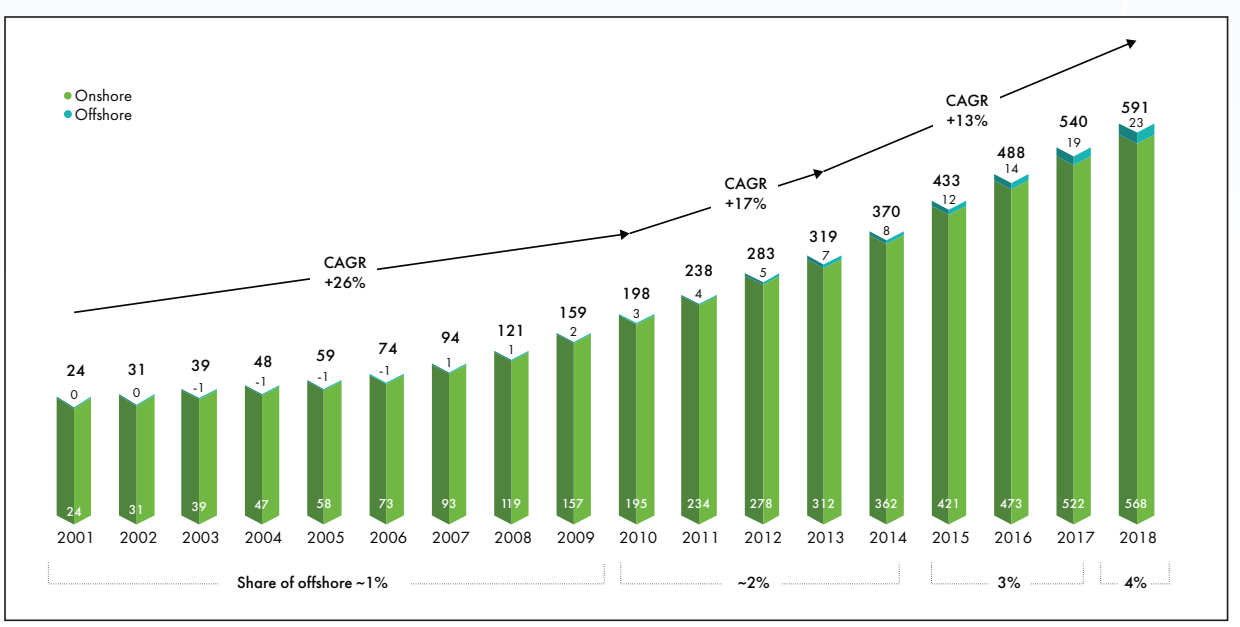
Historic development of new installations, GW



Historic development of total installations, GW

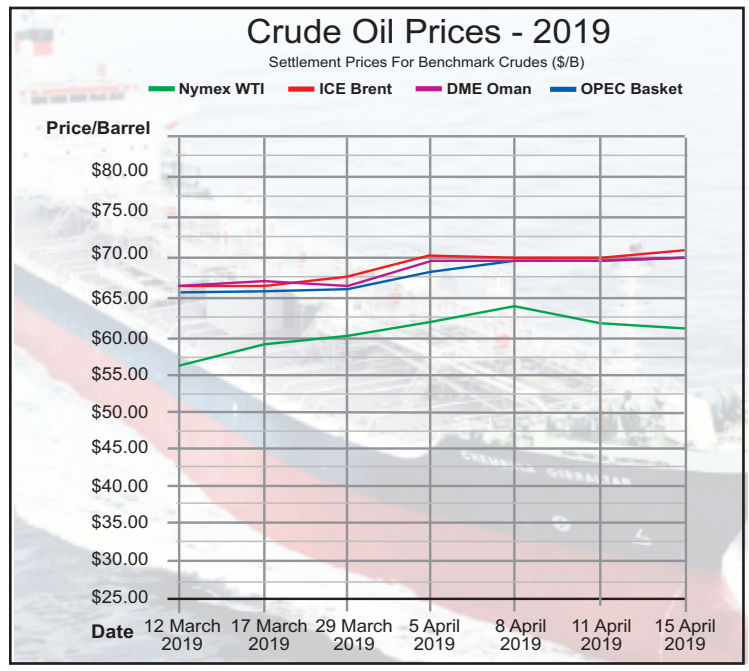


Source: GWEC Global Wind Report 2018, April 2019

Oil

US restrictions on Iranian crude adds uncertainty on prices

- US aims to bring Iranian crude exports down to "zero"
- Saudi Arabia sees no need to raise output immediately



Mark Goetz

There could be some erratic movement in the price of crude oil in the weeks ahead now that the US government has announced it will not extend the waivers granted to eight Iranian crude oil customers last November that are due to expire in May. The US State Department announced in late April that its goal is to bring Iranian crude exports down to "zero", a move that has made Iran resent US President Donald Trump even more and prompted Tehran to again threaten to close the Strait of Hormuz at the mouth of the Persian Gulf.

Iran is currently exporting about 1.1 million b/d, down from 2.8 million b/d in May 2018, and efforts to reduce current volumes of exports will cause serious economic difficulties for the regime. In announcing the end to waivers, the US State Department warned countries that continue to purchase Iranian crude could find themselves confronting US consequences.

The big importers of Iranian crude, China, India, Japan and South Korea, are not expected to find it difficult to secure alternative sources of supply, but it could be hard for Iran's neighbour Turkey to make the switch. Iraq has already stated that it has no alternative to the natural gas and electricity supplies it receives from Iran, despite continuing pressure from the US to stop doing business with Iran. Iraq's southern Basra district relies on Iranian gas supplies to generate just enough energy to prevent rioting.

In deciding to cancel the waivers, it appears that President Trump is looking to gain the approval of Opec leader Saudi Arabia. As oil prices have risen in recent weeks as a cutback in production by Opec and its allies, aka Opec+, take effect, Trump has urged Saudi Arabia to boost production in order to lower prices. Crude prices in the US have been moving in the lower $60/b range for several weeks, translating into higher retail gasoline prices, which never sits well with American motorists.

The move against Iran is undoubtedly welcome by Saudi Arabia and the UAE, Tehran's primary opponents on the southern side of the Persian Gulf, but whether it will move them to boost production remains to be seen. Saudi Arabia has seriously cut output, exceeding in March the amount it had agreed to cut under its deal within Opec+.

Opec production during the month of March fell to 30.02 million b/d, down by 534 000 b/d, of which 324 000 b/d came from Saudi Arabia, pushing its output for March down to 9.8 million b/d. The other big drop in March came from Venezuela, where the political and economic crisis, and US sanctions, forced output to drop by 289 000 b/d to 732 000 b/d. Another volatile member of Opec is Libya. Production is more than 1 million b/d there for now, but a new round of intense fighting could impact oil production and exports, removing more oil from the market.

The decision by Opec+ to remove 1.2 million b/d from the market during the first six months of 2019 has now gone to 1.5 million b/d actually being taken off the market due to Saudi Arabia's additional cuts, helping the price of Brent crude rise from the low $50/b range in January to the mid-$70/b range in late April.

Despite Trump commenting that Opec could "more than make up for" any shortfall in the oil market caused by a decline in Iran crude supplies, Opec plans to wait and see that happens next.

Saudi Arabia's Minister of Petroleum Khalid al-Falih said he saw no need for Saudi Arabia or Opec to raise output immediately because the waivers have been eliminated. Rather he referred to the standard Saudi position that more oil would be supplied to any customer that requested it. Falih said he is relying on oil market fundamentals, not prices, and will remain focused on bringing the global oil market back into balance.

The International Energy Agency (IEA) said in late April that markets are adequately supplied and global spare capacity is at comfortable levels. Because of the Opec+ cuts, spare capacity is around 3.3 million b/d, with 2.2 million b/d held by Saudi Arabia, and some 1 million b/d held by the UAE.

The IEA also said US crude output would likely increase by 1.6 million b/d during 2019, which will put US output at some 12 million b/d.

The IEA also noted that global economic growth is becoming increasingly fragile, and consumers and producers should take steps to avoid higher prices that could prove painful to all.

Gas

Romania approves development plan for Black Sea gas discoveries

Approval of the Midia Gas Development project could lead to Romania exporting gas to other European countries.

David Gregory

Romania's National Agency for Mineral Resources (NAMR) has approved a $400 million development plan put forward by Black Sea Oil & Gas (BSOG) for the Midia gas project in the Black Sea. The Midia Gas Development (MGD) will produce 1 billion cubic metres (bcm) of natural gas annually, about 10 per cent of Romania's domestic gas demand.

Romania is almost self-sufficient in meeting domestic demand, which amounts to about 11 bcm/year. State-owned Romgaz and OMV Petrom, a subsidiary of Austria's OMV, account for about 95 per cent of the gas produced. Small volumes are imported from Russia.

Romania holds the third largest gas reserves in Europe after the Netherlands and the UK, but gas production has declined in recent years due to a lack of domestic demand. This has complicated the country's situation as a potential gas exporter because without domestic demand there is little incentive to invest in developing its resources.

Furthermore, the government has introduced new energy regulations that could jeopardize foreign investment in the gas sector. The regulations put a cap on some gas prices for local producers until 2022 and there is also a 2 per cent turnover tax on all energy firms except state-owned coal fired power plants. Producers also have to sell 50 per cent of their production to a centralised marketplace.

The regulations could stall several of Romania's promising offshore prospects. BSOG has objected to the new regulations and called for them to be removed. ExxonMobil, which had planned to start developing the Neptun project, has put it on hold. Romania, meanwhile, says it needs to protect domestic customers.

Romania could make a significant contribution to the EU's efforts to provide energy security throughout Eastern Europe, but reforms within its upstream and gas transport industry may need to take place.

The European Union is keen to establish a new gas transport network and distribution systems that will ensure security of gas supply for Eastern Europe by making alternative sources available via new pipelines.

MGD and other gas exploration projects in Romania's offshore could eventually lead to Romania exporting gas to other European countries through the planned Bulgaria-Romania-Hungary-Austria (BRUA) pipeline. BRUA is one of the European Commission's Projects of Common Interest, but there is little support within state-owned gas distributor Transgaz for BRUA or new pipelines inside Romania. Hungary has also said it was not economically viable to extend BRUA into Austria.

Whether the project materialises as imagined by the EU is now a question.

Meanwhile, BSOG appears determined to move ahead with MGD. BSOG is a Romania-based oil and gas company majority-owned by Carlyle International Energy Partners and the European Bank for Reconstruction and Development (EBRD). The company and partners made a final investment decision (FID) on the MGD project in February despite the new government regulations and NAMR approved the development plan in mid-April.

The project is the first gas development offshore Romania since 1989 and focuses on the Doina and Ana fields, discovered in 1995 and 2007, respectively. The fields lie some 120 km offshore in 70 m of water and hold an estimated 10 bcm of gas.

The project, due to deliver first gas in February 2021, will consist of five offshore production wells – one subsea well at Doina and four platform wells at Ana. A subsea gas production system over the Doina well will connect with an 18 km pipeline to an unmanned platform at the Ana field, from where a 126 km pipeline will transport gas to an onshore 1 bcm/year capacity gas processing plant at Corbu.

The processed gas will then be delivered to Romania's gas transmission system operated by Transgas at a metering station located within the gas processing plant under the terms of a 15-year contract.

As the new regulations stipulate that 50 per cent of all offshore gas must be sold to a centralised market, BSOG has arranged a long-term contract to sell 500 000 m^3 of its annual output to a Romanian subsidiary of Engie.

BSOG last year completed engineering studies and the front-end engineering and design (FEED) for the project. This year, detailed engineering will be completed, fabrication for the Ana wellhead platform will begin at the Agigea shipyard, and civil construction at the Corbu gas processing plant will get under way.

BSOG operates two Romanian offshore concessions: XV Midia Shallow Block and XIII Pelican Block. It is partnered with private investment group Petro Ventures, which holds 20 per cent in the blocks, and Italy's Gas Plus with 15 per cent.

What's keeping us awake at night?

This year's Issues Monitor, recently published by the World Energy Council, reveals that energy storage and digitalisation are two key areas that are keeping energy executives awake at night. **Junior Isles** reports.

With the numerous challenges facing the energy sector as it goes through a transition, there is plenty for energy executives to worry about. For the last 10 years, the World Energy Council's 'Issues Monitor' has tracked the key issues that executives are working on day-to-day, as well as the major areas of uncertainty, i.e. those that "keep them awake at night".

In an era referred to by the Council as the 'Grand Transition', energy leaders must pay attention to the many different signals of change and distinguish key issues from the noise. In producing this year's Monitor, over a period of about six months the Council evaluated nearly 2300 survey responses, synthesized expert analyses from member committees and conducted supplemental research across about 90 countries.

An important part of the Monitor is tracking innovation. Two of the key areas of high uncertainty that have emerged from this year's report compared to 2018, are digitalisation and electricity storage – both being driven by the rapid rise of intermittent renewables. The 2019 Issues Monitor found that that many of the issues surrounding renewables are fairly globally aligned, with all the regions saying that work related to renewables integration is among the top action priorities.

Commenting on the findings, Christoph Frei, Secretary General of the World Energy Council, said: "Digitalisation and storage are absolutely at the top of the 'keep me awake at night' issues on the electricity side. The fact that we have an increasing amount of intermittent renewable energy makes storage very important. Digitalisation is also absolutely critical when it comes to aligning the demand side with supply, as well as leveraging current assets in a similar way to storage.

"If you take Germany, there are 40 million households and every one has a fridge. If each fridge is 100 W, that's 4 GW. This is 5 per cent of peak load in Germany. Through digitalisation, you can 'talk' to those fridges and perhaps switch them off for an hour or so and take them off the peaks. This means they can act like a massive battery; it's like a 5 per cent of peak load battery. And that's only fridges; there is also cooling and car batteries, etc."

The Monitor states that digitalisation and artificial intelligence have now moved from being a 'Critical Uncertainty' to become an 'Action Priority'. This, it said, is a clear signal that the sector has gained more experience in making use of this technology and the implementation is now of high interest.

The concern in boardrooms, says Frei, is not just about understanding the innovations that are out there but also about how to deal with those innovations. "Executives are saying: 'this is new stuff; it's moving fast. How do I deal with this as a company? I have to educate new teams. Do I do it in an organic way or in a start-up way?' It's a case of figuring out what's on the horizon and how to deal with it."

He noted that one of the companies in the survey listed three benefits of digitalisation. The first is direct efficiency gains simply through better use of assets. The second is through managerial efficiencies – more information from more sensors enables better decision-making. The third, he says, is improved capital allocation – digitalisation allows the use of assets in the best way.

In terms of practical steps to address the key issues, executives are taking a range of approaches, according to Frei. "Firstly, companies create their own internal innovation emphases. At the Council, we have our innovation horizon time and companies can also tap into that to get a sense of which areas are critical to them and what the innovations are in those areas that they need to think about.

"The second aspect is how to demonstrate a project. Usually, you would try a small pilot or trial before going into detail. You have to think how to connect internal pieces – you have digitalisation on the trading side, digitalisation to manage the grid, and digitalisation on the supply side. They have to think of how to virtually connect those to share data better. Essentially they have to think of how to best create an effective innovation strategy to take advantage of digitalisation."

With regards to storage the Issues Monitor reveals two major concerns. First, innovation presents a massive opportunity. For utilities looking to e-mobility as a way to increase sales, utilities are hoping that the cost of batteries will fall faster. The other big issue is around the transmission and distribution infrastructure and how the system will function when the wind stops blowing or the sun hides behind the clouds.

It is more than just a case of having backup supply. Utilities need technology in their systems that can react rapidly to abrupt changes to avoid instabilities. "These are the issues that companies are looking at," said Frei. "In what parts do I need physical storage? How can I access that storage? What other physical assets, such as capacitors, do I need in the network to manage those rapid changes or provide frequency control? These are the types of questions we hear around storage and innovation."

While issues surrounding renewables emerged as global concerns, the Monitor showed that other significant worries and related work varied by region.

For example, Frei noted that decentralisation is higher up the agenda in places like Africa. The survey responses show greater impact and urgency in this area compared to last year. Decentralised systems are viewed as a solution to deliver socio-economic dividends faster and at lower costs than the conventional past solutions. They can offer an attractive option for closing the energy access gap more quickly by helping to meet energy demand in remote and rural areas, through on-grid and off-grid systems. The Monitor notes that policymakers need to evolve regulatory frameworks to integrate new opportunities and respond to evolving energy supply options to allow for their sustainable deployment.

Frei: things that were absolutely not on the agenda 8-10 years ago are front and centre today

Resilience issues such as the energy-water nexus was not a concern in markets like Europe but was high on the agenda in places like Africa and the Middle East.

Cyber security, meanwhile, is a huge worry in Europe, North America and parts of Asia but is not important in regions or countries where there is less mature infrastructure.

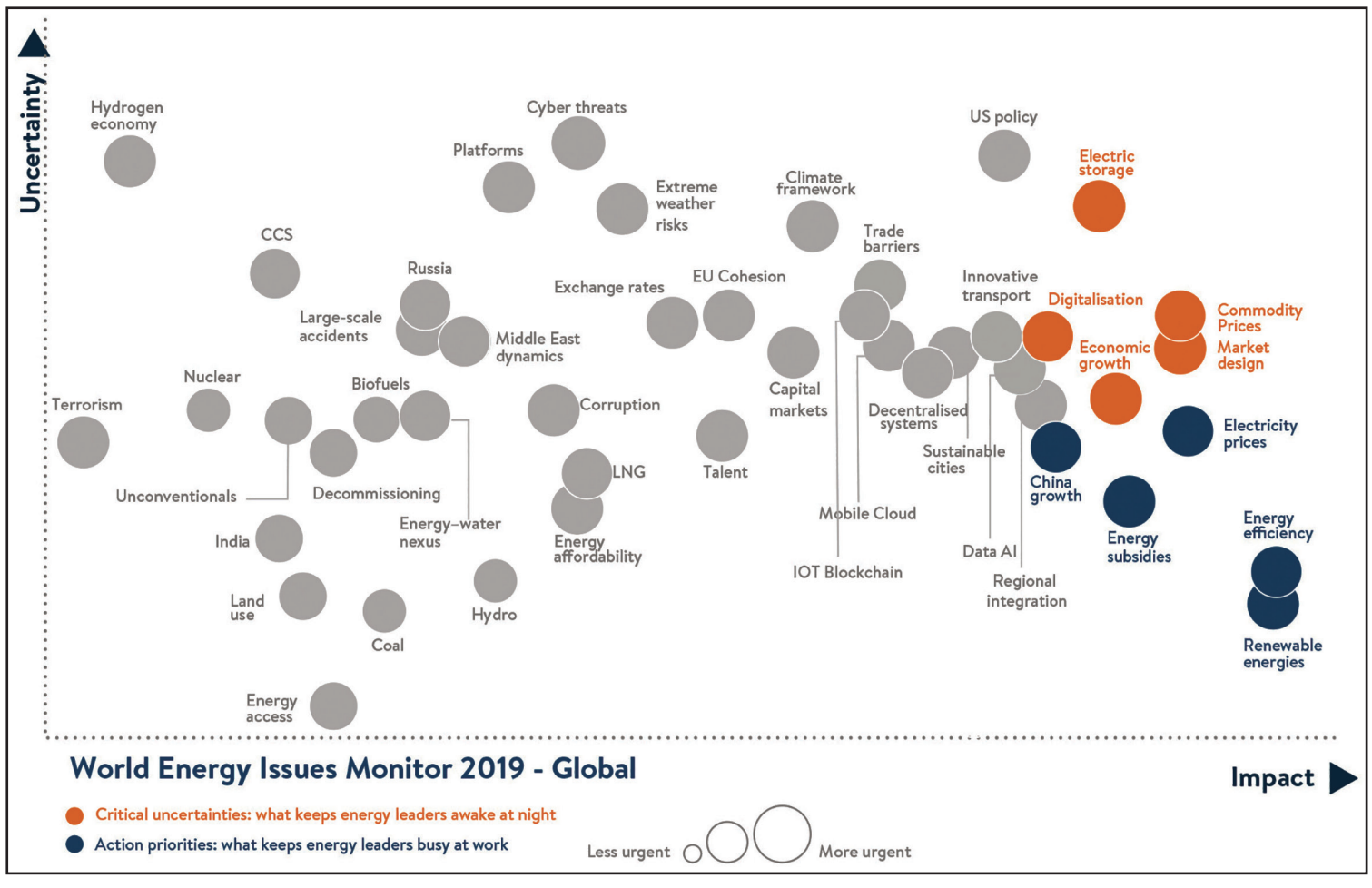
Market design was another area that is keeping executives awake at night. As Frei said: "What does it take from a market design point of view to enable renewable integration or support digitalisation? Who owns that data or who has access to which portions of the data? How do you protect privacy? These are all part of the larger market design discussion."

Questions around sector coupling e.g. between electricity and heat or transport are also high on the agenda of executives. "There is excitement around 'power-to-x', said" Frei. "It's one of those areas where we have really seen some policy pickup. We are seeing a lot of pilots in Germany and Japan as well as framework agreements between, for example, Japan and New Zealand and Australia and Japan."

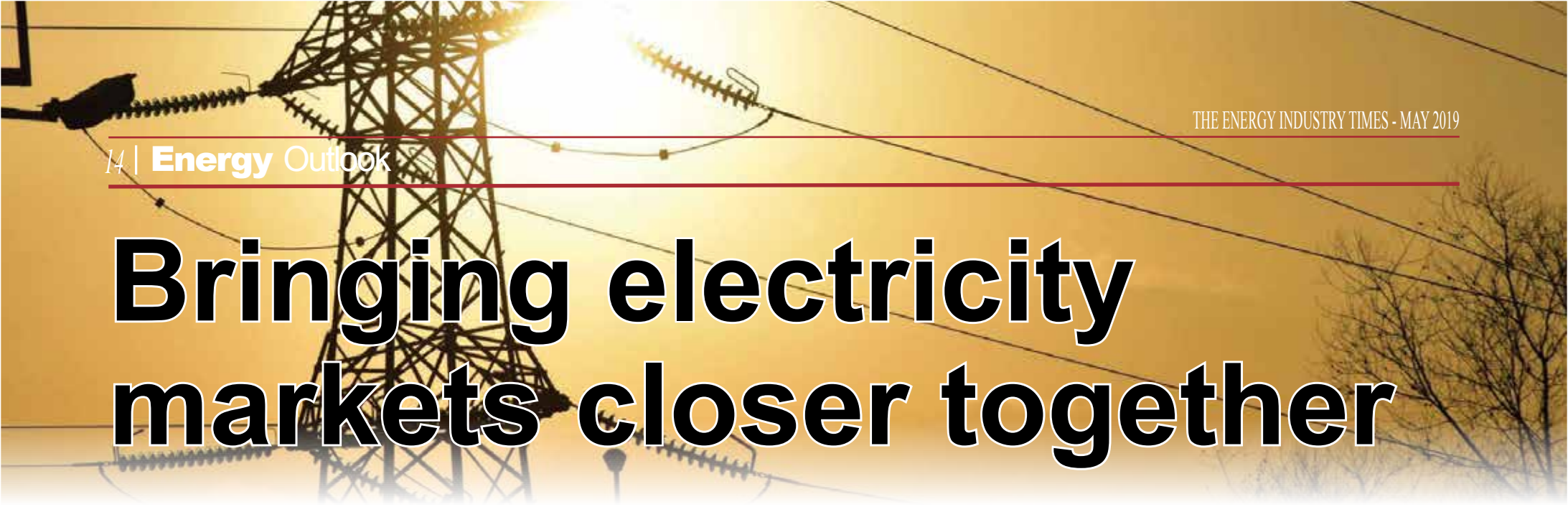
This year's Issues Monitor clearly shows, as it has done in recent years, an ongoing transition that is being driven by the 3Ds (decarbonisation, decentralisation, digitalisation).

"You can see things that were absolutely not on the agenda 8-10 years ago, are front and centre today. The Issues Monitor is a very powerful place to show those dynamics and see what is actually happening," Frei noted.

No doubt many of these issues will be discussed at the Council's World Energy Congress in Abu Dhabi in September this year. Commenting on the choice of location for the congress, the Council concluded: "As a relatively young nation but with a strong energy heritage, the opportunities that innovation and digitalisation offer here are massive."



Global perspective on the energy transition



Bringing electricity markets closer together

Europe's electricity sector has identified its priorities and key policy recommendations with regard to the different elements of the Clean Energy Package (CEP). Eurelectric elaborates on the key CEP objectives and outlines what it sees as the main drivers and enablers to achieve these objectives.

Blandine Malvault and **Marion Labatut**

The Paris agreement has set clear objectives to limit the rise of global temperatures and to pursue efforts to stay below 1.5°C. The European Union (EU) has so far committed for 2030 to a reduction of emissions of at least 40 per cent below 1990 levels, while establishing targets for energy efficiency and renewable energy sources (RES).

In view of defining its trajectory towards 2050, the European Commission published its 'Strategic long-term vision for a prosperous, modern, competitive and climate-neutral economy', last November. The document outlines six scenarios for 80 and 90 per cent greenhouse gas (GHG) emissions reductions and two scenarios where Europe moves towards carbon-neutrality by 2050.

Change and commitment are also visible at the level of Member States. While Sweden has pledged for carbon-neutrality, Austria has announced to have a 100 per cent renewable production of electricity by 2030. France has also introduced legislation to achieve carbon-neutrality by 2050.

The electricity sector is leading Europe's energy transition. Today, 60 per cent of the electricity produced in Europe comes from carbon-neutral sources and the EU electricity sector forcefully spearheads the energy transition. Speeding up its own decarbonisation process, the industry has pledged to become carbon-neutral well before 2050 and to help other sectors decarbonise through electrification. This will require massive investments throughout Europe and rely on the involvement of governments and regulators to ensure speedy implementation of the Clean Energy Package (CEP). The different starting points of Member States in terms of energy mix will also have to be taken into account to ensure a fair and inclusive transition. The commercial availability of transition-enabling technologies will also be critical.

Eurelectric's recent 'Decarbonisation Pathways' study finds that the electrification of transport, buildings and industry is the most sensible way to curb emissions. In practice, this means that to achieve deep decarbonisation of the EU economy, 60 per cent of all final energy consumption has to be electric. To get there, electricity will massively turn to renewables. By 2045, the electricity generated from RES is indeed expected to be over 80 per cent.

Eurelectric's study shows the magnitude of the investments needed to deliver on this journey. On average, a total capital investment of €89-111 billion per year in generation and storage will be necessary. According to the European Commission Long Term Strategy, if Europe moves towards reaching net zero emissions by 2050 additional annual investments in power grids will amount to around €90-100 billion.

Over the past few years, there have been efforts to establish a single European electricity market that allows for price signals to trigger investments. Some headway has certainly been made. For instance, the 2009 Third Energy Package introduced network codes to harmonise wholesale market rules, improve cross-border capacity management and streamline system operation.

Yet, there is still a patchwork of nationally regulated energy systems, which hinders the prospect of a real level playing field at European level. National solutions are mostly a reality for what concerns support schemes for RES, capacity mechanisms, generation taxes and retail price regulation.

The recently adopted Clean Energy Package continues to improve the level of integration in the European electricity market. Miguel Arias Cañete, EU Commissioner for Climate Action and Energy, celebrated the agreement, saying: "The agreement on the future electricity market design is a vital part of the package. The new market will be more flexible and facilitate the integration of a greater share of renewable energy. An integrated EU energy market is the most cost-effective way to ensure secure and affordable supplies to all EU citizens. The new rules will create more competition and will allow consumers to participate more actively in the market and play their part in the clean energy transition."

The functioning of short-term markets is also significantly improved by the CEP. It notably: ensures the non-discriminatory access to balancing markets; requires participants to manage all imbalances; and offers the possibility to act in the market either individually or through aggregation. These changes are key in a system where variable RES play an increasing role. Market players and consumers must get the right signals to provide flexibility and be remunerated for this service. Moreover, the CEP establishes a clear framework for the implementation of capacity mechanisms, which requires adequacy assessments (analysis of the security of supply situation) being made at both national and European level.

Nevertheless, a number of provisions in the CEP need further clarification. This is particularly the case with those related to capacity allocation and congestion management. It has been emphasized in the two last editions of 'ACER Market Monitoring Report' that interconnectors have not been utilised to their full potential. Therefore, the electricity regulation of the CEP introduced an obligation on Transmission System Operators to allocate a minimum of 70 per cent of interconnector capacity to the market to maximise the benefits of market integration. Yet, Eurelectric and other stakeholders cautioned against such an approach throughout the legislative process, arguing that cross-border capacities should be maximised in a cost-effective manner. It is unsure if this 'one-size-fits-all' approach will ensure the most efficient use of interconnection capacity.

The CEP recognises the central role of distribution system operators (DSOs) in the energy transition. With 90 per cent of new renewables being connected to distribution networks and the planned development of electric vehicles, DSOs will be the ones enabling decarbonisation and electrification of the economy. The recent EY report developed in cooperation with Eurelectric outlines different stages of the DSO evolution towards new business models supporting the transition. The integration of decentralised and new sources, the access to flexibility through new platforms and the full digitalisation of the grid are the new frontiers of distribution system operation.

A clear sign of this is the creation of the EU DSO entity. This novel European organisation for distribution system operators will contribute to the drafting of new network codes, especially in the area of flexibility and cyber security.

With the CEP, consumers are also put at the centre of the clean energy transition. The right to self-produce and self-consume is enshrined in the new legislation, together with the customer's access to a range of tools to value their flexibility. For instance, the Electricity Directive allows the development of innovative demand response services, giving consumers control over their electricity consumption. Moreover, it provides a clear framework for demand response aggregators to operate in the electricity market, making them responsible for the imbalances they might cause. This last provision allows for an efficient overall framework.

The CEP also introduces the concept of "Citizen Energy Communities" and "Renewable Energy Communities". These Communities will, among other things, give consumers the opportunity to organise themselves and invest in their own means of generation. Eurelectric welcomes the new framework set up by the CEP in this regard, as it elaborates key provisions for an efficient development of Energy Communities.

While acknowledging the participation of a new category of actors in the market, the text also requires that they are put on a full level playing field with other actors. Energy Communities are therefore subject to fair, proportionate and transparent procedures and to balancing responsibility. Moreover, they shall be subject to an appropriate network tariff reflective of any use of the distribution grid.

The text also requires that consumers who are part of such structures should be entitled to maintaining their rights and obligations as final consumers. Some clarifications will still be required when it comes to the implementation of these new provisions, especially when many Member States already have some communities in place. Eurelectric is actively engaging in this assessment and will soon publish its analysis.

The actual implementation of the CEP is now critical. The European Commission is working on the required implementing/ delegated acts, and Member States and national regulators must also follow suit. Eurelectric will monitor the implementation, for example we are currently actively contributing to the discussion on how to implement Citizens Energy Communities.

As part of the governance regulation, the national energy and climate plans should become valuable tools in assessing collective progress towards 2030 targets and electrification. Eurelectric is currently analysing the draft plans and will advise the Commission based on the findings. For instance, it is of critical importance that these plans are clear about how to increase the level of electrification but also that they assess the potential impact of other policy tools on the EU Emissions Trading System, the European CO_2 market.

Beyond the improvements brought by the CEP, major investment challenges lie ahead. In a world with ramping shares of renewables, a low level of wholesale price, including an increase of close to zero or negative prices, there is a need to ensure energy, flexibility and reliability are properly valued. In several countries, there are inadequate price signals both for the closure of plants and for new investments, including those that are needed to ensure security of supply and flexibility. It is unlikely that the CEP will provide the necessary long-term investment signals for a cost-efficient energy transition.

Eurelectric will soon publish its analysis of the investment environment in the EU power sector and its diagnosis of the improvements brought by the CEP. Under the mandate of the incoming European Commission, Eurelectric will also focus on the review of the energy and environment state aid guidelines, taking stock of the great achievements of the power sector, and the challenges and opportunities lying ahead.

Infrastructure will also be a key issue: which type of infrastructure should be deployed and where should structural funds go? An electric, interconnected and digital network will be the backbone of a society where transport is increasingly electric, buildings become smarter and efficient, and where industrial sectors adopt electrification, clean hydrogen or power-to-X. This topic will be critical under the next mandate of the European institutions.

This is the year of revitalisation. With new policymakers making their debut in Brussels, we all take stock of what was achieved and establish forward looking goals. Who will lead the electrification agenda?

On 20 and 21 May, in Florence, utility CEOs and industry captains will come together with thought leaders, disruptors, customers, policymakers, consultants and think-tanks at this year's Eurelectric Power Summit to discuss the multi-level aspects of "New Leadership". Climate change, customers' proactivity, industry adaptations, technological innovations – all have a say about tomorrow's New Leadership.

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GT26 gets a HE upgrade

GE has launched a significant upgrade for the GT26 gas turbine. By incorporating advanced technology from its F- and H-class machines as well as 3D printing, the high efficiency (HE) upgrade will deliver improved efficiency, power output and flexibility while reducing maintenance costs for its customers – the first of which will be Uniper, at its plant in Enfield, UK.

Junior Isles

In spite of arguments by environmentalists that fossil fuels should stay in the ground, gas is predicted to continue to play a significant role in the power generation landscape for the foreseeable future.

In its 2019 'Energy Outlook', BP says that by 2040, the power sector will account for around 75 per cent of the increase in primary energy. It also forecasts that 85 per cent of the growth in energy supply will be generated through renewable energy and natural gas, with renewables becoming the largest source of global power generation by 2040. According to the Outlook natural gas is the only fossil fuel that will continue to grow its share of global energy demand before plateauing and then showing a decline after 2035.

International Energy Agency forecasts are slightly less bullish but predict that the share of natural gas in electricity generation remains steady at about 20 per cent. Nevertheless, it is clear that renewables and natural gas will dominate the generation landscape, with renewables underpinning growth in the sector.

The situation is even more acute in Europe, where, according to a recent report by Wood Mackenzie Power & Renewables, coal generation was overtaken by wind and solar for the first time in five key European markets last year.

It said that the uplift in renewables squeezed out supply from coal and gas in every market except the UK. Although the UK's renewable share reached an all-time high, nuclear outages highlighted the market's reliance on gas.

It is no wonder then, that generators are still looking at ways to increase the value of their gas fired assets, and gas turbine manufacturers are working to improve the competitiveness of their installed gas turbine fleet.

In a move that GE is seeing as a major step forward, in March it announced the launch order for its new GT26 HE (high efficiency) gas turbine upgrade with Uniper for the utility's Enfield Power Station in greater London, United Kingdom.

The upgrade marks the first time that GE has taken technology and capabilities from its F and H class fleets to create a solution for operators of the GT26, developed by Alstom. Since GE's acquisition of Alstom, it also represents the first upgrade that blends GE and Alstom technologies and expertise across all major components of a gas turbine.

Commenting on the rationale behind the introduction of the GT26 HE, Michael Rechsteiner, CEO of GE's Power Services business in Europe, said the new market dynamics mean there will be more opportunity for gas going forward. He noted this was especially the case in Europe, which is preparing for nuclear phase-outs in some countries and is seeing higher CO_2 prices.

"We believe the installed capacity of gas [fired generation] in Europe will grow slightly in the next 10 years," he predicted. "Actual generation from gas assets in the future, however, will be flat. Gas turbines will have a totally different operating regime... in the past they were optimised for base load. Today, with very low electricity prices and renewables coming up, they have to be able to compensate for fluctuating renewables. So our units today need the capability to be parked at low load, start-up quickly and ramped up and down. This is why we came up with the high efficiency solution to help our customers."

The GT26 has an installed base of about 90 units across 21 countries in four regions, but mostly in Europe. Although designed for base load operation, a significant portion (28 per cent) of these are now in low utilisation. At the same time, GE has about 1400 F- and H-class gas turbines in operation.

Amit Kulkarni, general manager of F-Class turbines for Power Services, commented: "We had to look at how to make them [the GT26] competitive in the market. This is the first upgrade where we are bringing H technology into an F-class machine.

"When we talk about upgrades, we typically do modules – we do components. For example, the hot gas path of the turbine or the combustor or compressor. The HE upgrade is the entire gas turbine – the turbine, compressor and the combustor. It is the biggest upgrade the GT26 has seen in 20 years – since it was developed."

While there has been investment over the years to drive efficiency and output, Kulkarni says the HE upgrade is "a huge step-change".

Although the GT26 architecture has been maintained, with the same rotor and structural parts, the rotating parts and combustion components have been changed.

GE has re-designed the first three stages of the low-pressure (LP) turbine. The blade and vanes have improved aero profiles and the flow path around the first stage has been enlarged. The intricate cooling design featured in the H-class has also been utilised.

GE has adopted thermal barrier coatings from the H-class that will allow higher turbine inlet firing temperature and subsequently better efficiency.

To improve durability, vane 2 has been coated with new, more oxidation resistant, material and stage 1 blades feature heat shields that have an abradable coating that permits improved clearance control and subsequently improved performance.

GE has also incorporated 3D printing, or additive manufacturing, into some of the components. This allows very intricate cooling designs that cannot be achieved with traditional manufacturing processes. Kulkarni noted: "The lance at the top of the SEV (sequential EV) combustor has 3D printed parts. The frame at the bottom is also 3D printed."

GE has also put a great deal of effort into improving the machine's operating range through the use of devices such as high and low frequency dampers. However it manages to maintain low NOx levels across the wider operating range, in spite of the higher firing temperature in the turbine.

"We have done some interesting things with the burner that allows better air-fuel mixing so we can stay within emissions compliance, while giving a wider operability window," said Kulkarni.

The HE upgrade also has a brand new compressor, with 3D aerofoils.

All of these changes have served to improve combined cycle base load efficiency by 2 per cent. Based on a gas price of $7/million Btu, according to GE's calculations this translates to as much as $4 million in fuel savings annually per unit. Meanwhile, efficiency in part-load is improved by 1 per cent, yielding up to $1 million in fuel savings a year per unit.

Plant output is increased by between 15-55 MW per unit, depending on the unit being upgraded and site conditions. This in turn improves revenue opportunities.

Another key benefit is extended inspection intervals, which are increased from 24 000 hours to 32 000 hours. This reduces maintenance and operating costs.

Such benefits were sufficient to entice Uniper to enter into an agreement with GE that would see its Enfield plant become the site for validation and demonstration of the upgrade. The unit at Enfield has been in operation since 1999 and the upgrade will also add another 15 years to the unit's life.

Eckhardt Rümmler, CEO, Uniper SE, said in a statement: "In Great Britain's very competitive and challenging power generation environment, investing to keep our plants competitive by lowering operational and maintenance costs, at the same time as increasing efficiency and flexibility, is critical for the long-term success of our fleet."

During the press launch, Pedro Lopez Estebaranz, Director of Operations CCGT Asset Operations, Uniper Kraftwerke GmbH, said: "The HE has the potential to be a game-changer for us... we have been maintaining and upgrading our gas fleet to operate better in the market. We had been operating Enfield as a mid-merit plant, running for 3000-4000 hour per year. Last year we had in the region of around 150 starts, which is normal in the UK market. Increasing the efficiency will allow us to operate for much more hours."

Uniper is seen as an ideal partner to launch the product. It has an installed base of 4.2 GW of GE units across Europe and has another three GT26 units in the UK – one more at Enfield and two at Grain power station – which are potential candidates for rollout of this technology. Notably, it has also been co-developing products with GE since 2012, which makes it comfortable about hosting the first unit.

"It is not the first time we have tested new technology working with GE," said Lopez. "We have strong engineering capabilities that enable us to understand the technical risks when implementing validation units, we have done in the past.'

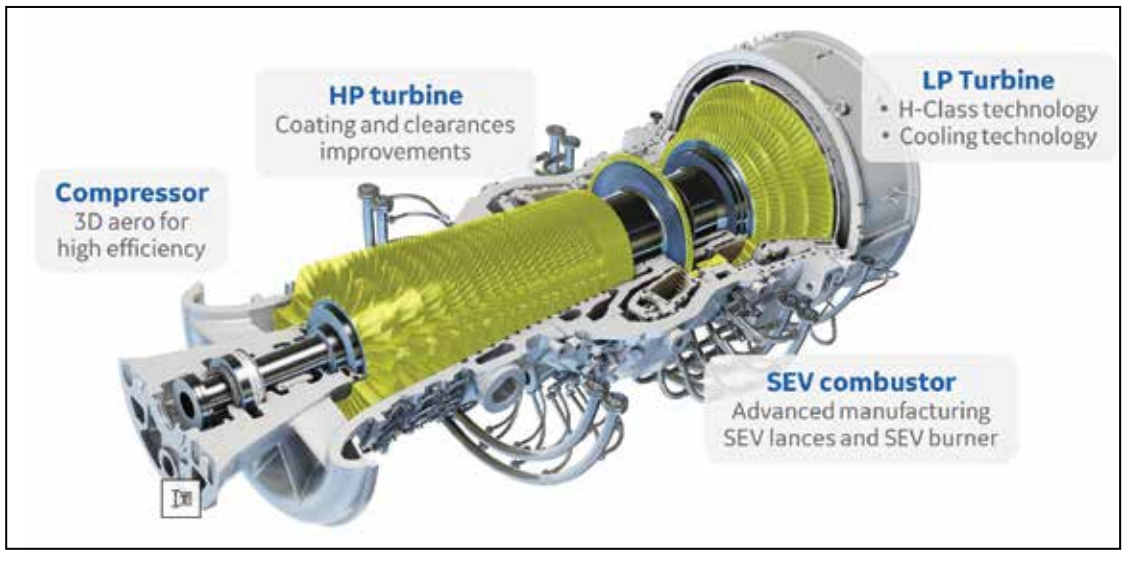
While some tests have already been performed on GE's test rig in Germany on components such as the combustor, the validation of the entire unit will be at Uniper's Enfield site. Installation is expected during a scheduled outage in June 2020 and the validation will run for about four months after re-start of the unit. Results are expected in 2021.

Following what is expected to be successful validation, GE is anticipating wider rollout to other existing units.

Rechsteiner said: "We've had a lot of interest from customers in many countries. After the UK, the next one will be in Italy. Elsewhere in Europe, there's also Germany and Spain. There is also interest from Singapore, Malaysia and even Japan. We will not make any other commitments until we have had the results from Enfield but we are negotiating with customers already."

With regards to the future of the GT26 and any further potential upgrades, he concluded: "For the next couple of years, this is it because this is really a huge step forward in the development of this machine."

The GT26 HE upgrade at a glance



Junior Isles

A rebellious climate

Extinction Rebellion (XR) protesters are a nuisance – not only do they disrupt daily commuters, they are also a drain on valuable police resources. Yet they serve a useful purpose. Their demonstrations have probably done more to put climate change back in the spotlight than cyclone Idai, which devastated Mozambique, Malawi and Zimbabwe. Even cyclone Kenneth, which again battered Mozambique just weeks later, did little to intensify the climate change debate.

There is no doubt that extreme weather events are a growing concern and that carbon emissions are, according to scientists, reaching a tipping point that could see irreversible climate change.

In its recently published Issues Monitor, the World Energy Council cited resilience to extreme weather risks as one of the main challenges keeping energy executives awake at night.

Weather risks are obvious in countries such as Cameroon where extreme droughts could affect hydropower generation. The World Energy Council's survey did in fact reveal that energy leaders in Cameroon are worried that in the future climate change could worsen the intensity and frequency of droughts in the region.

The report also noted that climate change is causing increasingly irregular rainfall, rising temperatures, and desertification in Niger, a country that is already highly vulnerable to natural hazards, particularly droughts, floods, and landslides.

And the concern is not just in developing countries. In 2018, natural disasters such as heavy rains, typhoons and earthquakes caused enormous damage in Japan, and uncertainty about large-scale accidents caused by future large-scale earthquakes and volcanic eruptions is still high. According to the Monitor, there is growing awareness that extreme weather caused by climate change may further increase the damage caused by heavy rains and typhoons.

The Council stated that with one degree Celsius of warming so far, "the Earth has seen a crescendo of extreme weather", including heatwaves, droughts, floods and deadly storm surges made worse by rising seas. Importantly, it also states that the chance of capping global warming at "well below" two degrees Celsius are becoming less likely.

"Even taking into account voluntary national pledges to slash carbon emissions caused by burning fossil fuels, the planet is currently on track to warm by an unliveable 3°C to 4°C by century's end," it states. "This makes it all the more important, not to regard Paris as the end of the discussion, but as the starting point for an ambitious global climate protection framework for the future."

In late March the International Energy Agency (IEA) released its second 'Global Energy and CO_2 Status Report'. It made bleak reading. According to the study global energy-related CO_2 emissions rose by 1.7 per cent in 2018, hitting a historic high of 33.1 Gt. It was the highest rate of growth since 2013, and 70 per cent higher than the average increase since 2010.

This was in spite of rapid growth in wind and solar generation, which grew at double-digit pace with solar alone increasing by 31 per cent.

In its latest assessment of global energy consumption and energy-related CO_2 emissions for 2018, the IEA found that energy demand worldwide grew by 2.3 per cent last year, nearly twice the average rate of growth since 2010 and the fastest this decade. This demand, however, was largely met by fossil fuels. For the second year running fossil fuels met nearly 70 per cent of demand growth.

Coal use in power alone surpassed 10 Gt CO_2, mostly in Asia. China, India, and the United States accounted for 85 per cent of the net increase in emissions, while emissions declined for Germany, Japan, Mexico, France and the United Kingdom.

Coal fired power plants were the single largest contributor to the growth in emissions, accounting for 30 per cent of global CO_2 emissions. For the first time, the IEA assessed the impact of fossil fuel use on global temperature increases. It found that CO_2 emitted from coal combustion was responsible for over 0.3°C of the 1°C increase in global average annual surface temperatures above pre-industrial levels. This makes coal the single largest source of global temperature increase. The global average annual concentration of CO_2 in the atmosphere averaged 407.4 ppm in 2018, up 2.4 ppm since 2017. This is a major increase from pre-industrial levels, which ranged between 180 and 280 ppm.

Commenting on the findings, Dr Fatih Birol, the IEA's Executive Director, said: "Despite major growth in renewables, global emissions are still rising, demonstrating once again that more urgent action is needed on all fronts – developing all clean energy solutions, curbing emissions, improving efficiency, and spurring investments and innovation, including carbon capture, utilisation and storage."

The impact of coal fired generation is clear and the technology is there to address the issue. Renewables have come a long way but it would appear that they cannot be integrated fast enough to bend the emissions curve at the necessary speed. With renewables subsidies being steadily phased out, perhaps it is now time for governments to look at how to incentivise or fund the retrofitting of carbon capture on existing coal fired plants.

But this is still only half the story. National energy and climate plans need to address how to get more renewables into heating and transport. In the EU, this is essential for the decarbonisation of energy – three quarters of total energy consumed is in these two sectors. Certainly, decarbonising heat and transport, as well as industry, will be much more challenging than it has been for the electricity sector.

Unfortunately, although their motives are honourable it is likely that most XR protesters are unaware of the difficulty of achieving what they are asking.

In London, XR insists that it will continue its disruptive protests until the UK government agrees to meet and discuss its demands – a key one being that the UK must reduce carbon emissions to zero by 2025. Putting the power industry aside, refitting every household with some form of heat pump or electric boiler, as well as having a charging infrastructure in place for 100 per electric vehicles, would be nigh on impossible. Then there is the tremendous cost to the already hard-pressed working-class household.

XR protesters in London are also perhaps unaware that the UK is a world leader in terms of how much it has cut CO_2 emissions. The IEA report shows that in 2018 its emissions declined for a sixth consecutive year, hitting some of the lowest levels recorded since 1888 and 39 per cent below 1990 levels. This is predominantly due to the switch from coal to renewables – electricity generation from renewables saw a record year, accounting for 35 per cent of generation. At the same time the share of coal fell to 5 per cent, a record low.

Indeed emissions across Europe fell by 1.3 per cent, or 50 Mt, largely driven by a drop of 4.5 per cent in Germany, as both oil and coal combustion fell sharply. The drop in coal consumption was concentrated in the power sector, where generation from renewables reached a record high of 37 per cent of the electricity mix.

Unfortunately, the same cannot be said of India, China and the US. While per capita emissions in India remain low at only 40 per cent of the global average, in 2018 CO_2 emissions in the country rose 4.8 per cent from the previous year – a faster rate than any other major energy-consuming nation. In China, emissions grew by 2.5 per cent, or 230 Mt, to 9.5 Gt, while in the US the emission reductions seen in 2017 were reversed, with an increase of 3.1 cent.

On this basis, the efforts of London's XR protestors are perhaps mis-directed and the authorities might consider another approach to the disruptions they cause. Rather than arresting protestors, only to see them return the next day, it would be far more effective for everyone to fly them to India, China or the US where they are needed most. And plant a few trees to offset the carbon footprint of the flight.

Cartoon: jemsoar.com