

## **NEWS OCTOBER 2019**

Equinor has completed its divestment of a 16% shareholding in Lundin for a direct 2.6% interest in the Johan Sverdrup field and a cash consideration of around \$650mn.

Eni (40%, operator) and its partners Pertamina (30% and Neptune (30%) have been awarded the West Ganai exploration block in the Kutei Basin, offshore Indonesia. The block includes the Maha discovery with in – place gas resources estimated in excess of 600bn cf of gas.

Although set to become the world's third largest gas producer by 2027, the long term. One key contributing factor is lower forecast domestic gas production, particularly in shale gas and coal bed methane (CBM), according to recent research by Wood Mackenzie. Production is expected to double from 149bn cm in 2018 to 325bn cm in 2040, but this is 39bn cm lower than the market analyst's previous outlook.

Eni, through its affiliate NAOC (Eni 20% operator; NNPC 60%; Oando 20%) has made a significant gas and condensate find the deeper sequences of the Obiafu – Obrikom fields, in OML61, onshore the Niger Delta. The find amounts to about 1tn cf of gas and 60mn barrels of associated condensate in the deep drilled sequences, reports Eni.

BP has unveiled plans to deploy continuous measurement of methane emissions in its future BP – operated oil and gas processing projects. Continuous measurement, including instruments such as gas cloud (GCI), will be rolled out to all new major projects worldwide. The technology has also been tested and installed in existing facilities such as BP's giant natural gas Khazzan field in Oman. The company recently completed a pilot project at its West of Shetland Clair field using a fixed – wing remote piloted air system (RPAS), or drone, to test a new way of remotely monitoring methane emissions on its offshore assets.

Saudi Arabia's King Salman has appointed his son Prince Abdulaziz bin Salman as the new Energy Minister, replacing Khalid al – Falih. Prince Salman has been the Saudi Minister of State for Energy Affairs since 2017, having previously worked in the roles of Assistant Oil Ministry and Deputy Oil Minister.

Russia's Novatek has signed a memorandum of understanding with Petronet LNG regarding future natural gas cooperation. The MoU envisages delivering LNG supplies from Novatek's portfolio to the Indian market, including natural gas supplies for power generation, as well as investment by Petronet LNG in Novatek's future LNG projects. The two companies also plan to jointly market LNG as motor fuel in India, including joint investment in developing a network of service stations and a fleet of LNG – fuelled trucks.

The Papua New Guinea (PNG) Minister for Petroleum Kerenga Kua has stated that the PNG government has cleared Total, ExxonMobil and Oil Search to proceed 'full steam ahead' with implementation of the PNG LNG project. With the government validating the original Papua LNG gas agreement terms, which were signed in April 2019, the project partners can now proceed with confidence into front – end with confidence into front – end engineering and design activities.

BP is to sell all its Alaskan operations and interests to Hilcorp for \$5.6bn. The transaction includes interests in the giant Prudhoe Bay field and Trans Alaska Pipeline Systems.

**China's e-bus fleet to surpass 1mn mark by 2023**

Fuelled by public policy and declining battery costs, global electric bus adoption is set to triple by 2025. The Chinese market – the most promising in this sector – will surpass the 1mn e-bus mark by 2023 and reach 1.3mn by 2025, according to new research from Wood Mackenzie.

China dominates the heavy – duty electric vehicle (EV) segment, accounting for 98% of the global e-bus market through 2018. To support this high concentration of e-buses a total of more than 50,000 e-buses charging points will be installed by the end of 2019. This figure is set to more than double by the end of 2025.

Timotej Gavrilovic, Wood Mackenzie Contributing Research Analyst, says: ‘In 2018, 23% of bus purchases in China were electric Overall bus purchases in the country are expected to remain stable, with 420,000 new purchases by 2025. Electric bus purchases are expected to increase along with further market growth and continuing government support, reaching 40% of new bus purchases globally in 2040.

According to the Wood Mackenzie report, a combined 40,000 electric heavy-duty vehicles will be on the roads in the US and Europe by 2025. The current market will expand to 7,300 e-buses by the end of 2019, representing pilot schemes across both regions that will add up to nearly \$6bn in market value.

The deployment of e-bus charging infrastructure has already started to surge in China. However, growth in the US and Europe is limited by the size of existing pilots – where one to five charging points are typically enough to support several buses. Despite this, the total number of charging points for all three regions will more than double to a total of 108,000 charging points by 2025.

Over 68,000 depot chargers will be installed globally from 2019 to 2025 to meet EV bus charging demand, with more than 9,000 located in Europe and the US, reports Wood Mackenzie.

### **Refiners invest in digital technologies**

Oil refiners have continued to increase investments in digital technologies, according to a new report from Accenture.

Based on a survey of 145 oil industry professionals at refineries globally, the Digital Re – Definery report indicates that over the past year the number of refiners reporting that digital technologies delivered a margin improvement of more than 10% in refining operations dropped from 11% to 3%. The number reporting that the technologies delivered margin improvements of 7-10% dropped from 19% to 11%; and the number reporting that digital delivered margin improvements of 2-6% dropped from 46% to 38%.

When asked what technologies drove the greatest margin improvements in their operations over the last three to five years, advanced data analytics was cited in their top three selections by 62% of respondents, followed by platforms (46%) and Internet of Things (IoT) sensors and edge computing (43%).

However, only 3% of refiners – compared with 6% in 2018-reported seeing significant value from digital, defined as over \$100mn, with the largest proportion 28% estimating that digital is driving around \$5mn or more in value for their refining business.

The report suggests that the challenges of achieving scale for digital initiatives across an asset base is stopping refiners from capturing the full value that digital can offer.

Nevertheless, digital spending continues to increase at roughly the same rate as previous years, with 56% of respondents reporting that they are investing more in digital technology than they were 12 months ago. When asked what areas in their operations digital technologies are having the most positive impact, 59% cited production planning and execution in their top three selections, followed by maintenance and reliability (50%) and engineering and capital projects (30%).

The report indicates that, as with most transformation programmes, people are the cornerstone of success. However, the number of refiners seeing resistance from their people and the culture in their organisation as a barrier to wider digital deployment rose sharply this year, to 48% from 33% last year. According to the report, addressing the last mile of digital transformation by ensuring greater adoption across the organisation, while challenging, is now fundamental to the success of digital in refining operations.

### **Oil prices surge after attacks halve Saudi oil production**

Oil prices rose some 20% after an attack on Saudi Arabia's Abqaiq oil processing plant and the Khurals oil field on 14 September led to a 50% reduction in the country's oil production.

Iran – aligned Houthi rebels in Yemen were initially reported to be the two Saudi Aramco reported would reduce output by around 5.7mn b/d. However, the US blamed Iran, issuing satellite images and citing intelligence reports to back its claim; a charge that Iran denied.

The incident cut global oil supplies by some 5%. The oil price soared to above \$71/b when the trading floors opened on Monday 16 August, although settling around \$69/b later on.

Commenting on what is reportedly the biggest attack on oil infrastructure since the Gulf War, Bjornar Tonhaugen, Head of Oil Market Research at Rystad Energy, said: 'The bullish reaction in oil prices will likely be limited by Saudi Arabia's vast quantities of crude exports, a large portion of which is at the main export terminal Ras Tanura. The country also has strategic storage facilities in Rotterdam, Okinawa and Sidi Kerir (Egypt).'

'In a scenario where the damages result in a longer duration of the 5.7mn b/d production shut – in , say for 10 days or more, the situation for Saudi Arabian crude flows to the market will be critical, in our view, as there are limits globally to the volume of export replacement barrels. Strategic Petroleum Reserves in the OECD countries would then be called upon. The US stands as one the few countries that would be able to increase exports in the short term. We believe US crude exports could potentially be increased by about 1mn b/d, from 3-4mn b/d, if prices allow for higher utilisation of the current crude exports capacity. Other countries with available capacity to increase exports by a few hundred thousand barrels per day each include UAE, Russia, Kuwait and Iraq.'

### **US shale revolution has 'reshaped' global energy landscape: IEA**

The shale gas boom 'transformed' the United States into the world's top oil and gas producer, according to the IEA's latest review of the country's energy policies. As a result, the agency said, the US energy policymaking approach has shifted from a mindset of scarcity on one 'seeking to maximise the benefits of energy abundance.'

The IEA review claims the US government policy reflects a strategy to boost energy production, benefit from greater energy exports, keep consumer bills under control and demonstrate leadership in energy technologies. One core component of this strategy is to reduce regulatory hurdles to expending production of energy resources.

Though the country's carbon dioxide (CO<sub>2</sub>) emissions are projected to fall over the next 10 years, the IEA also encourages a further strengthening of this trajectory. The agency warns that despite CO<sub>2</sub> savings made by switching to natural gas and renewable for electricity generation, nuclear retirements and less – stringent emissions regulations could jeopardise progress.

The abundance of low – cost natural gas in the US energy mix has resulted in gas – fired generation overtaking coal – fired generation in the country's power sector. Equally, falling costs and increased policy support for renewable have driven growth in wind and solar capacity. As a result, the IEA says, coal and nuclear plants that had long been the cornerstones of the US electricity sector are facing closure.

'Since the last in – depth review five years ago, the US has reshaped energy markets both domestically and around the world,' said Dr Fatih Birol, the IEA's Executive Director, as he presented the report alongside Rick Perry, the US Secretary of Energy, in Washington DC.

'In this context, the IEA commends the lifting of the US ban on crude oil exports as well as efforts to streamline regulatory approvals for LNG exports, which have helped bolster global energy security by diversifying supply options for importers, 'Birol added.

In the report, the IEA notes that future production growth and exports will depend on the complementary build out of oil and gas pipeline. In August, the Environmental Protection Agency announced that it would relax federal rules on methane by permitting oil and gas firms to police themselves when it comes to out of production infrastructure.

However, some major oil and gas firms distanced themselves from the decision, rather than welcoming it as expected. According to the New York Times, this is because the industry fears that it will be less successful in arguing that gas should replace coal in power generation without constraints on harmful emissions.

Ultimately, the IEA recommends policy and regulatory responses in the electricity sector that fully leverages the growth in variable renewable' while ensuring the power system remains resilient.

### **Europe 'could increase onshore wind capacity by 100 times'**

A new report, by researchers from the University of Sussex in the UK and Aarhus University in Denmark, suggests that Europe has the capacity to produce enough energy for the whole world until 2050 from onshore wind farms.

The study reveals that if all of Europe's capacity for onshore wind farms was realised, it could produce 100 times more than the amount currently generated from onshore wind farms. The installed nameplate capacity would be 52 TW – equivalent to 1 MW for every 16 European citizens.

The research team conducted digital spatial analysis of Europe to conclude that 46% of the continent's landmass-totalling nearly 5mn km<sup>2</sup> – would be suitable, theoretically, for new wind turbines. Over 11mn turbines would need to be built over this area to achieve the maximum capacity.

Land was excluded from the available total on the basis of several factors, such as use for housing and roads; land restrictions due to military or political reasons; and unsuitable terrain not suitable for wind power generation. The higher level of detail facilitated through the use of Geographical Information Systems (GIS) allowed them to identify more than three times the onshore wind potential in Europe than previous studies.

Co – author Benjamin Sovacool, Professor of Energy Policy at the University of Sussex, said: ‘The study is not a blueprint for development but a guide for policymakers indicating the potential of how much more can be done and where the prime opportunities exist. Our study suggests that the horizon is bright for the onshore wind sector and that European aspirations for a 100% renewable energy grid are within our collective grasp technologically.’

He continued: ‘Obviously, we are not saying that we should install turbines in all the identified sites but the study does show the huge wind power potential right across Europe which needs to be harnessed if we’re to avert a climate catastrophe.’

Peter Enevoldsen, Assistant Professor in the Center for Energy Technologies at Aarhus University, added: ‘Even without accounting for developments in wind turbine technology in the upcoming decades, onshore wind power is the cheapest mature source of renewable energy, and utilising the different wind regions in Europe is the key to meet the demand for a 100% renewable and fully decarbonised energy system.’

According to the IEA, onshore wind – generated electricity increased by an estimated 12% in 2018, remaining the largest non – hydro renewable technology and generating more than all the others combined.

### **Industry projections for nuclear generation capacity revised upwards**

The world Nuclear Association (WNA) has revised its projections for nuclear generating capacity growth upwards for the first time in eight years. The organisation says the improved forecast follows the introduction of nuclear – friendly policies in countries such as China and India.

The WNA’s Nuclear Fuel Report also cites modified energy policies in France – which has delayed the planned reduction of nuclear in its electricity mix, and permitted lifetime extensions of existing reactors beyond 40 years – as one reason for the revised projections. Meanwhile, the process of granting a second operating licence extension for some nuclear reactors in the US has begun, allowing the country’s reactors to operator for 80 years.

The report’s ‘upper’ and ‘reference’ scenarios show global nuclear capacities growing over the period to 2040 at a faster rate than at any time since 1990. This increase is primarily attributed to comprehensive reactor building programmes in India, China and other countries in Asia.

While projected growth in the ‘reference’ scenario is moderate, with capacity growing to 569GW by 2040, in ‘upper’ the present level of nuclear capacity is expected to almost double to 776 GW.

In comparison, the IEA’s 2018 World Energy Outlook predicted that installed nuclear capacity could grow by 25% from 2016 – when it totalled about 414GW – to around 518GW by 2040. Under the report’s contribution of global power generation would be about 10% in 2040.

At present, the global nuclear industry is targeting a ‘harmony’ goal of providing at least 25% of electricity by 2050. Reaching this means that nuclear generation must triple globally by 2050.

‘Achieving the harmony goal... will require a rapid ramp – up of new nuclear build, higher than projected in the upper scenario, which in turn would lead to the need of greater amounts of uranium, enrichment fuel fabrication, transport and used fuel services,’ says WNA Director General Agneta Rising. ‘Nuclear fuel cycle participants should be prepared to meet a potential large increase in demand to meet the harmony goal.’

Worldwide nuclear generation in 2018 increased for the sixth successive year, reaching 2563 TWh, more than 10% of global electricity demand, according to the WNA's latest annual: World Nuclear Performance Report. Though despite recent growth, the 2018 total is still below the record high recorded in 2006.

### **Solar energy is cheaper than grid power in over 300 Chinese cities**

Solar power has now reached 'grid parity' – the point which renewable can generate energy at a cost equal to the price of power from the grid – in 344 Chinese cities, according to a new study published in Nature Energy.

Prior research had indicated that solar would reach this crucial tipping point in many Western nations by 2020, but suggested that it could take decades in China, which still generates the vast majority of its energy from coal.

However, the study – led by Jinyue Yan from the Royal Institute of Technology in Stockholm – credited a combination of technological advances, government support and cost reductions for China's early grid parity achievement. The country is now both the largest global generator of solar power and the biggest installer of solar panels.

The US Energy Information Administration projects that China's solar capacity will grow more than 7% per year between 2015 and 2040, while wind capacity will grow at nearly 5% annually during that period.

In the report, Yan and his colleagues looked at the prospects for building commercial and industrial – scale solar projects without state support in 344 cities to assess whether grid parity could be achieved. The researchers estimated the total lifetime price of solar PV systems in each of the urban areas – taking net costs and profits into account.

Ultimately, the team not only discovered that solar installations could supply electricity at less than grid prices in every city – they also found that 22% of the cities could build solar systems capable of producing electricity more cheaply than coal.

### **Australia set to achieve renewable target one year early**

Australia will meet the obligations of its Large – scale Renewable Energy Target (LRET) one year ahead of schedule, Australia's Clean Energy Council has announced.

The target, introduced in 2001, was for Australia to generate 33 TWh of power from large – scale renewable energy by 2020. The Clean Energy Regulator stated in 2016 that 6,400 MW of renewable capacity would need to be built between 2017 and 2019 to generate enough electricity to meet the target.

With the completion of Goldwind's 148 MW Cattle Hill Wind Farm in Tasmania, the Regulator has confirmed that enough renewable energy capacity has now been approved to guarantee that the target would be met.

Renewable projects have received a total of AUD\$24bn of investment in the last 18 months alone. Overall, renewable energy contributes approximately 21% of Australia's total generation.

Kane Thornton, Chief Executive of the Clean Energy Council, said meeting the target had been a massive effort for the clean energy industry for close to two decades, which had transformed

renewable energy from one of the most expensive kinds of energy generation to the cheapest. 'It shows what is possible when our major political parties agree to put aside their difference and work together to achieve a shared, ambitious goal,' Thornton said.

'The LRET is the most successful emissions reduction policy of all time for Australia's electricity system,' he continued. 'At a time when people are becoming increasingly concerned about climate change, the LRET has been one of the bright spots which is making our electricity system cleaner, cheaper and more reliable.'

Thornton said with the news that the industry will far exceed the target, the question should now turn to what comes next. 'The industry doesn't need new subsidies – we just need certainty. Renewable energy can continue to create opportunities for regional parts of the country for many decades with the right policies in place.'