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Coronavirus will not stop EU Green Deal

The Commission's Eric Mamer says work is being prioritised



The European Union insists its Green Deal will go ahead as fears grow that it will be derailed by the coronavirus pandemic. **Junior Isles**

The European Union's Green Deal plan to fully decarbonise its economy by 2050 will go ahead despite the coronavirus pandemic, the European Commission has said.

The reassurance comes amid calls for the deal to be scrapped and fears that governments will shy away from long-term efforts to curb emissions as they shift their attention to combating the disease. The Commission has admitted it is having to re-order its priorities but insisted the show must go on even as Frans Timmermans, the Commission's Executive Vice President in charge of the Green Deal, began a self-imposed quarantine, which was due to last until March 20th.

"At this point in time, we do not

have any comment to make on any knock-on effect that this could have on legislative work in general," said Eric Mamer, chief spokesperson of the European Commission, during a press briefing. He also suggested that a reshuffling of priorities was underway at the EU executive because of constraints posed by teleworking.

"For legislative activity to work, we need to have the institutions able to operate," Mamer admitted, saying Commission services and other EU institutions would have to prioritise their work in order to accommodate the current needs.

Vivian Loonela, the EU Commission's spokesperson for the European Green Deal added: "The long-term work on the Green Deal continues

in parallel" to the corona virus fire-fighting "and continues to be one of the priorities as well. We have preparations ongoing for the next initiatives and this work is continuing. That work is under way through our colleagues who are teleworking."

Mamer also stressed that it does not mean Europe should "forget about the Green Deal" to focus on the coronavirus, as suggested by Czech Prime Minister Andrej Babiš. Nor will the Commission put its carbon trading scheme on hold, as Poland requested through its Deputy Minister for State Assets, Janusz Kowalski.

Austria's Federal Minister for Climate Action, Leonore Gewessler, rejected the call by Babiš to scrap the deal. She said: "I do not agree with

Andrej Babiš." Although she insisted that the coronavirus crisis must be overcome "now," Gewessler said politicians had a responsibility to offer a long-term perspective to their citizens.

"Climate change is an existential threat which can be tackled with an economic programme, the Green New Deal," Gewessler told *EURACTIV*.

Pascal Canfin, a French lawmaker who chairs the European Parliament's environment and public health committee, said: "Failure to respond to the climate crisis will not help solve the coronavirus so those who use this pretext against the green deal are irresponsible."

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Coal plant closures drive steep fall in carbon emissions

Carbon emissions from the global power sector fell at the fastest rate in at least 30 years as electricity companies turned their backs on coal, according to a report from climate think tank Ember.

The firm's analysis finds coal fired power generation declined 3 per cent in 2019, leading to a 2 per cent fall in the sector's CO₂ emissions.

The report's authors said, however, that a shift away from fossil fuels was not yet the new normal and warned that governments must rapidly speed up the transition to sustainable energy sources to avoid the worst impacts of global warming.

Dave Jones, lead author of the report, said: "The global decline of coal and power sector emissions is good

news, but governments have to dramatically accelerate the electricity transition so that global coal generation collapses throughout the 2020s."

The report noted that although nuclear plant restarts in Japan and South Korea slowed demand for coal, China bucked the trend by increasing its coal usage by 2 per cent.

Last year's fall in coal fired power was the largest since 1990, when the International Agency began reporting figures, and was driven in part by a switch to renewables in Europe and more competitive gas pricing in the US. Coal generated 24 per cent less electricity in Europe and 16 per cent in the US.

Numerous countries in Europe have set deadlines for phasing out

coal fired generation.

The UK, which relied on coal for 40 per cent of its generation as little as six years ago, has set a target to phase out coal completely by 2025. Last year coal accounted for just 2 per cent of generation and the country took another big step to achieving its goal with the recent announcement that British electricity generation company Drax will stop using coal at its station near Selby next year, four years ahead of the government's official target.

Under the company's plans, commercial power generation from coal will end in March next year but its two coal units will remain available for emergency energy needs until September 2022.

Coal represented about 3 per cent of Drax's power generation in 2019, down from 30 per cent in 2016.

Drax, which has the capacity to provide electricity for around 13 million homes, has converted four of its six former coal fired units at its Selby site in North Yorkshire in the past decade to use biomass wood pellets.

"Ending the use of coal at Drax is a landmark in our continued efforts to transform the business and become a world-leading carbon negative company by 2030," said Chief Executive Will Gardiner.

"Drax's journey away from coal began some years ago and I'm proud to say we're going to finish the job well ahead of the government deadline," he added.

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Last month the EU unveiled its plan to steer industry towards the bloc's goal to cut greenhouse gas emissions to net zero by 2050 – a target that will require huge investments to retrofit factories with low-carbon equipment. Since then, however, companies have said they will scale back production in Europe amid supply chain disruptions and falling demand.

Some campaigners fear governments will abandon long-term efforts to curb emissions or lift the carbon burden they impose on polluting sectors in a bid to relieve firms hit hardest by the outbreak.

Thierry Breton, the European Commissioner for the EU's internal market, told an online event European companies were reviewing



Breton: "we should deliver and we should work on greener solutions"

their operations to address issues including carbon costs before coronavirus disrupted supply chains.

Lower production means Europe's industrial emissions are expected to fall by more than 20 million tonnes of carbon dioxide this year, according to consultancy Energy Aspects. However, EU carbon prices have tumbled amid the pandemic, meaning less funding is available to help the industrial sector decarbonise.

One source of support is a EU innovation fund made up of revenues from carbon allowance auctions in the coming years that was valued at some €11 billion (\$11.76 billion) at the end of 2019, when the CO₂ price in the EU Emissions Trading Scheme was roughly €25 per tonne. Carbon prices are now nearer €16 per tonne, putting the fund's value at roughly €7 billion.

Breton said, however, that the Green Deal is not over. "We should deliver and we should work on greener solutions."

In a draft text leaked at the end of February the Commission said it plans to review the bloc's 2030 target "by September 2020" and explore options to increase it to 50-55 per cent, up from 40 per cent currently.

The draft text, which still needs to be approved by the EU Council and Parliament, also includes a contentious proposal to redefine the decision-making process by allowing the Commission to impose tighter climate targets every five years to ensure the EU meets the 2050 net zero emissions objective.

Known as a "delegated act", this type of legislation gives Brussels the power to set revised emission targets based on "the best available science", according to the document. It can only be rejected if a qualified majority of EU governments and MEPs block the proposal within four weeks of it being proposed.

The use of a delegated act, over one of the most sensitive parts of Europe's environmental policy, will spark concern from EU governments who have been divided over how quickly to cut emissions in the coming decades to meet the 2050 target.

UK onshore wind revival ahead of COP26

With COP26 approaching, the UK is once again looking to onshore wind to aid its effort to become carbon neutral by 2050.

Junior Isles

UK Prime Minister Boris Johnson has given the go-ahead to onshore wind as the government comes under growing pressure to adopt a strategy to hit its target of net-zero carbon emissions by 2050. The announcement comes as the UK's climate plans come under increasing scrutiny in the run up to the COP26 global climate change talks in Glasgow in November.

In a plan set out to climate groups in Downing Street, onshore projects will be allowed to compete for government subsidies alongside other renewable energy technologies, such as offshore wind.

Johnson's predecessor, David Cameron, imposed a moratorium on subsidies for land-based wind turbines in

2016, which effectively killed off the construction of new onshore projects. The decision led to new onshore wind capacity falling to its lowest level in a decade in 2019.

Public support for onshore wind, however, has skyrocketed in recent years, while the price of electricity produced by wind farms has fallen. The government's system of Contracts-for-Difference (CFDs) provides a fixed price for electricity to low-carbon projects. Last autumn some offshore wind projects agreed to prices as low as £39.65/MWh. Onshore wind has traditionally been cheaper than offshore wind.

The CFD programme requires bidders to offer power at a set strike price. If the wholesale power price dips below this, the government makes up

the shortfall. If the wholesale price is higher, the extra revenue is paid back to the authorities. The contracts last 15 years.

Secretary of State for Business and Energy Alok Sharma announced that the next round of the next CFD scheme, which opens in 2021, will be open to renewable technologies including both onshore wind, solar, and floating offshore wind.

Windfarm developers, however, will need to comply with tough new proposals on community consent to qualify for the auction process. Those hoping to build a windfarm in England will also need the consent of the local community through existing planning codes.

Further details about the size and timing of the auction is needed, but UK

trade body RenewableUK believes that onshore wind inclusion in the next CFD tender will deliver new capacity at prices similar to the low prices seen for offshore wind in last year's CFD.

"The government is pressing ahead with action to meet our net zero emissions target quickly and at lowest cost to consumers and businesses," said RenewableUK's Chief Executive Hugh McNeal.

"Backing cheap renewables is a clear example of the practical action to tackle climate change that the public is demanding, and this will speed up the transition to a net zero economy. As one of the UK's cheapest power sources, new onshore wind projects will be a huge boost for jobs and investment in local economies across the UK."

EU pushes hydrogen economy

The EU is to push hydrogen as part of its latest attempt to help the transition to a climate-neutral EU by 2050. Last month European Commission President Ursula von der Leyen announced the 'Clean Hydrogen Alliance' as part of its new industrial strategy.

Interest in using hydrogen as a form of energy storage or as a replacement for fossil fuels in power generation, industry and transport is increasing globally as governments come under pressure to impose strict constraints on emissions. However, the technology to produce it cleanly through electrolysis of water remains expensive and its uptake has been therefore slow.

The latest industrial strategy is at least the fifth such initiative from Brussels since 2005 but previous attempts have failed because of diverging national interests. This time there will be a Europe-wide approach.

The initiative will be modelled on the European Battery Alliance, which brought together more than 200 companies, national governments and

research organisations around battery manufacturing. The scheme is widely celebrated as a success and has managed to bring cash and expertise into the sector.

"The Alliance will build on existing work to identify technology needs, investment opportunities and regulatory barriers and enablers," the Commission said in a statement.

To promote technology development while maintaining competition, the Commission intends to adapt its competition rules on a case-by-case basis, looking at the "geostrategic" environment in which European companies operate.

The new "Clean Hydrogen Alliance" is set to launch in the summer, the official said, noting the initiative enjoys broad backing from EU member states and companies involved in the hydrogen value chain.

Germany and the Netherlands are among the EU countries that have signalled the strongest interest in hydrogen. In February, Germany floated

a draft hydrogen strategy, announcing plans to promote the clean gas in transportation, and pour millions of euros into research to develop the technology.

The UK is also making notable progress. A key part of the North West's decarbonisation approach is the work taking place to develop a hydrogen network, which is being spearheaded by the North West Hydrogen Alliance (NWA).

In March the North West Energy & Hydrogen Cluster announced plans to set out a roadmap for low carbon skills in the region. Working with businesses, universities, colleges and training providers the plan will highlight where skills gaps exist and where investment is needed.

This comes as a report from the Engineering Construction Industry Training Board (ECITB) revealed that over £40 billion could be invested in the engineering construction industry by 2050 – with around £7 billion of that potentially set to come to the

North West.

The ECITB's 'Towards Net Zero' report outlines how the UK must deploy a range of technologies, such as carbon capture and storage, and hydrogen, as well as attracting new talent and upskilling existing workforces in order to decarbonise the industrial and energy sectors.

The North West is bidding to become the UK's first net zero carbon cluster. Led by the North West Business Leadership Team (NWBLT), the North West Energy and Hydrogen Cluster could deliver 33 000 jobs and save 10 million tonnes of CO₂ per year.

In March PowerHouse Energy Group plc, the UK technology company pioneering hydrogen production from waste plastic using its proprietary DMG® technology, announced that planning permission has been granted to Peel Environmental (part of Peel L&P) ("Peel") and Waste2Tricity (Protos) Limited ("W2T") for its facility at Protos Energy Park in Cheshire.

Flexibility crucial to meeting energy transition goals

The shrinking amount of traditional fossil generation in the power mix over the next decade will increase the flexibility needs of utility and power markets, according to Wood Mackenzie.

In a press note last month, the firm identified five key themes to watch in the global grid edge in 2020 and beyond: regulatory reform; evolution of market models; grid edge investment to complement electrification; increasing reliance on flexible resources for grid-balancing; and de-risking investments so the distributed energy resources (DER) market can scale.

Ben Kellison, Wood Mackenzie Research Director, and Elta Kolo, Wood Mackenzie Research Manager, commented: "Today, the US power system alone has more than 50 GW of behind-the-meter (BTM) flexible resources at its disposal from DERs enrolled in

demand response programmes."

The firm says regulations governing how DERs are compensated for capacity and energy services are trending away from simple, fixed, time-agnostic rates, such as net energy metering and volumetric charges.

According to Wood Mackenzie, this shift will increase the exposure of DERs to local power market and emerging distribution grid market constructs that dynamically determine the value of energy, capacity and ancillary services.

"In the US, the Federal Energy Regulatory Commission (FERC) is pushing regional market operators to formalise market designs that are inclusive of DERs. FERC has mandated operators under its jurisdiction to survey interconnection practices within their footprints and assess the economic

benefits of ensuring individual resources and aggregations are on an equal footing with traditional system-balancing resources," said Kolo.

Like other regulators around the world, FERC recognises the value of flexibility located at the grid edge. As these distributed resources scale, their operations will begin to impact not just their owner's balance sheet but also market prices.

Kellison added: "In the UK, the full unbundling and deregulation of utilities has not stopped distribution network operators from working to leverage DER flexibility to improve network reliability and efficiency. UK Power Networks has adopted an approach it terms "flexibility first" in assessing the need for network capacity expansion through the end of its next regulatory period in 2023."

Flexible power grids will drive the need for technologies such as energy storage. In a separate report Wood Mackenzie said the global storage market is set to grow from approximately 4 GW of annual deployments in 2019 to more than 15 GW in 2024.

"Costs have fallen, direct incentives and clean energy targets are proliferating and competitive markets and vertically-integrated electricity providers are beginning to recognise the potential of energy storage," it said.

While solar and wind can displace carbon-emitting forms of energy supply, storing energy will be critical when renewable generation is not prolific. Energy storage can play a role in balancing supply with demand on the electric grid and opportunities for BTM residential and non-residential energy storage are growing.

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Offshore sector offers economic growth, AWEA says

■ Virginia sets 5.2 GW target ■ Ørsted opens innovation hub

Siân Crampsie

The USA's growing offshore wind sector is set to spark an economic boom with investments worth \$57 billion planned over the next decade.

The American Wind Energy Association (AWEA) has reported that it expects sector investments to deliver \$5.5 billion to \$14.2 billion per year in economic output by 2025 and \$12.5 billion to \$25.4 billion per year by 2030, and that employment levels in offshore wind will reach 45 000 by 2025 and 83 000 by 2030.

In its latest US Offshore Wind Power Economic Impact Assessment report, AWEA anticipates that 20-30 GW of offshore wind capacity will be

operational by 2030. Most of the capacity will be installed along the east coast of the US, with states such as Connecticut, Maryland, Massachusetts, New Jersey, and New York setting ambitious targets for deployment out to 2035.

Last month the state of Virginia passed a bill setting a target of 5.2 GW of offshore wind capacity by 2034.

The bill establishes requirements regarding the development by Dominion Energy Virginia of qualified offshore wind projects having an aggregate rated capacity of not less than 5200 MW by January 1, 2034.

"State leaders are seeing the environmental and economic promise of offshore wind and are stepping in to provide the vision and policies to help

this industry quickly achieve scale," said AWEA CEO Tom Kiernan. "Offshore wind, following on the rapid proliferation of land-based wind over the past decade, is positioned to achieve significant growth and deliver jobs and economic output along the East Coast and throughout the rest of the country."

"Offshore wind is key to the future of clean energy development in the US and will add to a thriving wind power industry that already represents the largest source of renewable energy in the country," added Kiernan. "The offshore wind industry will create tens of thousands of jobs and provide billions of dollars to the economy, while delivering on its enormous untapped potential to power major population

centers up and down the East Coast."

The AWEA report considers a base scenario of 20 GW of operating offshore wind power by 2030 with annual 2 GW deployment and domestic content increasing from 21 per cent in 2025 to 45 per cent. Project capital costs of \$3900/kW and annual operation and maintenance (O&M) costs of \$94/kW in 2025 would decline to \$3250/kW and \$79/kW, respectively.

A high scenario assumes 30 GW of offshore wind is installed in 2030 with annual 3 GW deployment and domestic content increasing from 32 per cent in 2025 to 60 per cent within five years. Project capital and annual O&M costs are the same as the base scenario.

In March, developer Ørsted opened an innovation hub in Providence,

Rhode Island, to help foster cooperation and accelerate the development of the US offshore wind sector.

The hub will enable Ørsted to meet US-based start-ups and other companies in the supply chain to discuss early-stage technologies to address issues the industry faces.

Ørsted could potentially help these companies bring solutions to the market faster to help accelerate and scale the US industry, Ørsted head of strategy, digital and innovation Thomas Nygaard Hamann said.

Ørsted has US federal lease areas in the US northeast and in the mid-Atlantic, where a total of six wind farms are in development. The northeast wind farms are joint ventures with Eversource.

Strong renewables growth predicted for Brazil



Renewables will account for nearly 25 per cent of Brazil's total electricity generation by the end of the decade

Signals for strong growth of both solar and wind technologies in Brazil are continuing, according to analysis from Fitch Solutions.

Fitch has revised up its forecasts for renewables in Brazil and forecasts that 21 GW of solar, 30 GW of wind capacity and 16 GW of biomass could be added to the grid over the next decade.

The positive outlook for the solar sector is supported by robust growth in distributed generation solar systems, as well as strong growth in utility-scale solar capacity. Meanwhile the wind sector project pipeline continues to grow as a result of both auctions and private power purchase agreements.

Future opportunities will also emerge in the offshore wind energy sector, Fitch says.

Other factors assisting growth in solar include a favourable net metering system for small-scale solar systems

and a large project pipeline for utility-scale solar.

"We now forecast the non-hydro renewables sector generation will grow at an average annual rate of 5.9 per cent between 2020 and 2029, with the sector accounting for nearly 25 per cent of Brazil's total electricity generation by the end of the decade," Fitch said in a research note. "Wind and solar power will account for the majority of growth within the sector."

According to data from the Brazilian Association for Solar Photovoltaic Energy (ABSOLAR), Brazil has seen investments of over BRL1.2 billion (\$230 million/€211.7 million) in solar distributed generation (DG) systems for its rural regions. Brazil has surpassed 2.5 GW of overall DG capacity, of which solar accounts for 2.3 GW, with 200 942 systems connected to the grid.

Coal firms litigate over merger denial

■ Trump-appointed commissioners block merger
■ Firms turn to federal courts

Arch Coal and Peabody Energy say they will continue to pursue plans for a merger after the US antitrust regulator blocked their proposed tie-up.

The two companies are planning to litigate a decision made by the Federal Trade Commission (FTC) to deny their merger plan and seek a restraining order and injunction to freeze its progress.

In a statement Arch Coal said that the FTC had "incorrectly defined the market" and that it would seek legal recourse through the US federal court system "over the coming months".

The FTC's commissioners voted four-to-one to challenge the merger, noting that the deal would eliminate the "substantial head-to-head competition" that exists between the USA's two largest coal companies. "That loss of competition would likely raise coal prices to power generating utilities

that provide electricity to millions of Americans," said Ian Conner, Director of the FTC bureau of competition.

Arch Coal and Peabody proposed the merger to protect their business operations in the face of growing competition from natural gas and renewable energy. "We view the need for this combination as self-evident," said John W. Eaves, Arch's Chief Executive Officer. "The proposed joint venture promises to enhance the cost-competitiveness of our thermal operations, enable us to serve the evolving needs of domestic power generators well into the future, and protect the value of our thermal assets for our shareholders."

"In short, it will create a stable, durable supply platform for our thermal customers even as we continue our organisational pivot towards global metallurgical markets."

"The proposed joint venture offers a clear and compelling path to strengthen both our and our customers' ability to compete in today's marketplace with electricity produced from coal," said Peabody President and Chief Executive Officer Glenn Kellow. "We believe that the commission has reached an incorrect decision that should be rapidly remedied within the court system to allow customers and others to benefit from the combination."

The transaction was announced in June 2019 and would combine the companies' Powder River Basin and Colorado assets. Ownership of the joint venture would be structured with Peabody owning 66.5 per cent and Arch owning 33.5 per cent. It is expected to realise annual synergies of \$120 million over an initial 10-year period.

Peru boosts renewables

Peru's government says that the country will add 39 MW of new renewable energy capacity to its grid in 2020.

Two wind farms and a biomass fired power plants are under construction and are due to start commercial operations this year, the government said last month. They are two 18.4 MW onshore wind energy projects developed by Grenergy Renovables SL, and

a 2.4 MW biomass fired power plant.

All of the projects were selected in the Peruvian government's fourth auction to supply electricity under 20-year power purchase deals.

The wind farms, Duna and Humbos, which have brought in investments of more than \$47 million (€41 million), will operate in the region of Cajamarca.

The \$2.5 million Callao biomass-fired plant use solid urban waste and is being developed by local company Empresa Concesionaria Energia Limpia SAC, a subsidiary of waste manager Petromas.

These facilities will be joined by new hydropower plants including the 19.8 MW Manta and the 205.8 MW San Gaban III, by 2023 at the latest.



Indonesia is studying how to meet its green energy goals while maintaining low electricity prices.

Syed Ali

The Indonesian government says it aims to complete a study into replacing several aging fossil fuel fired plants with renewable energy plants this year.

The study, which began in January, not only includes mapping potential renewable sources but also future growth in targeted regions, the Energy and Mineral Resources Ministry's Director General for electrification, Rida Mulyana, said. It is being conducted by state-owned electricity company PLN as the operator of the aging plants.

"We are still gathering data right now," said Rida, who is also a PLN commissioner. There are a lot of plants and they are quite spread out. We can't

study them randomly, but this has to be done one by one. This needs time."

Indonesia has 2246 diesel fired power plants (PLTD) that are over 15 years old, 16.2 per cent of which are in Aceh, ministry data shows. These plants have a combined installed capacity of 1778 MW.

Indonesia also has 23 coal fired power plants (PLTU) that are over 20 years old and 46 combined cycle power plants (PLGU) of similar ages. The former have a combined capacity of 5655 MW and the latter 5912 MW. Most of these aging plants are located on Java Island.

Southeast Asia's largest economy aims to make renewables contribute 23 per cent to its power production by

2025, yet regulatory obstacles are slowing progress. Existing regulations stipulate that Indonesia should have reached a 17.5 per cent renewable power mix by 2019, yet the country achieved only 12.36 per cent that year.

Energy Minister Arifin Tasrif said the government's aim was to simultaneously supply energy at competitive prices and chase Indonesia's renewable energy commitments.

Arifin has repeatedly said that the country's regions should use locally available energy sources, particularly renewables, instead of solely relying on fossil fuels – a principle enshrined in the country's 2007 Energy Law.

PLN, however, is under pressure from the government to sell electricity

as cheaply as possible for the benefit of low-income households and major industries.

The government imposes price limits for PLN electricity through Energy Ministerial Regulation No. 28/2016 on electricity tariffs. This has forced PLN to invest in fossil fuelled power plants, whose fuel is kept at below-market prices through other regulations. The government's Domestic Market Obligation (DMO) policy requires coal miners to sell a quarter of their production domestically at \$70 per ton. The government is also allocating Rp18.7 trillion (\$1.18 billion) for fuel subsidies this year.

PLN aims to have the lowest electricity rates in ASEAN. Currently, it sells

household electricity at an average of Rp 1467/kWh, the second lowest in Southeast Asia after Malaysia.

■ Construction on the 174 MW Asahan III hydropower plant in North Sumatra has resumed after authorities settled administration problems that have extended the facility's development period by nine years. The facility was initially expected to be completed by 2014, but the date was pushed to 2023 due to permit-related setbacks and a corruption case. Completion of the plant would increase the share of renewable energy in northern Sumatra's power grid from 33.7 per cent to 35.6 per cent by 2023, well above the nationwide target of 23 per cent by 2025.

EVN needs nearly \$4 billion for power projects

Vietnam Electricity (EVN) needs investment capital of VND93.2 trillion (\$3.97 billion) in 2020 for power projects, according to the group.

EVN says it will use Official Development Assistance (ODA) and foreign loans to meet the investment demand for power sources and grid projects.

The company says it will focus on completing key projects such as the expansion of the Duyên Hải 3 thermal power plant and Đa Nhim hydroelectric plant, and the 500 kV Vũng Áng-Dốc Sỏi-Pleiku transmission line. The key projects include power transmission projects for small solar power and hydropower plants and projects to transport electricity from China and Laos.

According to a recent report from Fitch Solutions, Vietnam's power expansion will continue to be largely driven by coal, despite increasing pressure on the fuel.

Coal will remain the most practical option in the short-term to stimulate affordable electricity generation growth at the pace and scale needed by the country, it said, particularly as the country deals with looming threats of power shortages.

The National Steering Committee for Power Development has recommended scaling the share of coal down for the upcoming PDP VIII, eliminating nearly 15 GW of planned coal projects and for coal to account only 37 per cent of Vietnam's electricity by 2025.

"We note that the government initially had a coal capacity target of 106 GW by 2025, and for an additional

55 GW of coal capacity from 2017 to 2030. There is yet to be a decision made on capacity targets, and Fitch believes that the government is likely to retain an ongoing commitment to coal at present," it stated.

In late February, *Vietnam News Agency* reported that the capacity of coal fired power plants in Vietnam will be reduced to 8760 MW in 2025 and 6340 MW in 2030 due to the slow implementation of several projects and objections in some localities to coal fired power plant development.

In 2020, coal fired generation will make up about 33.2 per cent of the total, gas fired generation 14.8 per cent, hydropower 30.1 per cent, and small hydropower and renewable energy 20.3 per cent. By 2025, these figures will be 37.1 per cent, 13.7 per cent, 18.2 per cent, and 25.5 per cent, respectively.

■ The Ministry of Industry and Trade (MoIT) has called for more solar power producers in Vietnam to enjoy fixed feed-in-tariffs (FIT) instead of a bidding mechanism. The ministry had been considering a bidding plan for all solar projects without power purchase agreements (PPAs) signed before 23 November last year in the country. However, it now thinks that could have a negative impact. It has therefore sent a report to the government, suggesting that solar power projects approved before 23 November 2019, that begin operating before 1 January 2021, should enjoy fixed feed-in-tariffs (FIT) of 7.09 ¢/kWh for plants on land and 7.69 ¢/kWh for floating plants.

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India removes tariff caps on renewable projects

India is to remove upper limits on renewable tariffs in a move described as “the single most important action at this time to revive the solar sector.” **Syed Ali**

India's Ministry for New and Renewable Energy (MNRE) has said that the upper ceiling tariffs or tariff caps will no longer be prescribed in future bids for renewable projects.

It has directed Solar Energy Corporation of India (SECI), National Thermal Power Corporation (NTPC), state distribution companies (DISCOMs), and other implementing agencies that they must procure renewable energy (RE) power either through single renewable source or various combinations of renewable sources with or without storage as per their procurement policies.

Commenting on the development,

Raj Prabhu, CEO of Mercom Capital Group said: “Removing tariff caps could be the single most important action at this time to revive the solar sector and send a message to the investment community that the government is serious about its solar targets.”

In June 2019, Mercom reported that reverse auctions drove down tariffs, and developers are fighting for every penny to make a decent return on their investment. In this ultra-competitive environment, tariff caps have added a new challenge for them. A tariff cap is set by the auctioning agency and acts as an upper limit when bidding

for a project. So, a developer can only bid lower than the set tariff, which becomes a challenge if the tariff cap is deemed too high for a project developer to make a healthy return on investment.

“Looking at the trend, tariff caps were increased anywhere from 3 per cent to 14 per cent to attract participation from the developers who were reluctant to participate because of low tariff caps, said Mercom.

For example, Maharashtra State Electricity Distribution Company Limited (MSEDCL) reissued a tender for 1350 MW of solar projects to be

developed across 30 districts. The tender was initially floated in September 2019 and the ceiling tariff was raised to Rupees3.30 (\$0.04)/kWh, up from Rupees3.15 (\$0.044)/kWh.

Just last month, MSEDCL announced that a recent tender for the long-term procurement of power from 500 MW of intra-state grid-connected solar power projects (Phase V) has been undersubscribed.

The tender received bids amounting to 350 MW against the 500 MW tendered. Avaada Energy and Tata Power quoted for 250 MW and 100 MW, respectively.

The request for selection (RfS) for this 500 MW of solar power was issued in December 2019.

According to the government of India, installed renewable power capacity in India crossed the 84 GW threshold in December 2019 (84.4 GW), with wind power capacity reaching 37 280 MW, solar capacity 32 530 MW, biomass capacity 9940 MW and small hydropower capacity 4650 MW. India has set a target of 175 GW of renewable power capacity by 2022, including 100 GW from solar, 60 GW from wind, 10 GW from biomass and 5 GW from small hydropower.

S. Korea solar industry faces major setback

South Korea's solar industry is facing a major setback after the top two solar businesses shutdown all polysilicon plants in the country, a move that will inevitably have an impact on the Moon Jae-in administration's initiative to grow its renewable energy sector.

“We have decided to cease production of polysilicon, which recorded deficits for several years,” Hanwha Solutions said after a board meeting in late February.

The announcement came shortly after its rival OCI, the country's leading and world No. 2 polysilicon manufacturer, said it would halt domestic production because it is unable to match the price of cheaper Chinese products.

OCI locally produced 52 000 tons and Hanwha Solutions 15 000 tons a year of polysilicon, but all production stopped as of February 20, 2020.

Power bills account for 45 per cent of the cost of producing polysilicon, which makes it difficult to compete with Chinese competitors as electricity rates in China are only a seventh

of Korea's.

China meanwhile, plans to make a 50 per cent cut in its 2020 subsidies budget for new solar capacity and completely remove support for new offshore wind farms to ease the financial burden on its budget.

News service Caixin Global reported that the National Energy Administration (NEA) will allocate CNY1.5 billion (\$214.7 million) for subsidising new photovoltaic (PV) projects, of which CNY1 billion will go to large-scale projects awarded through auctions. The remaining CNY500 million will be set aside for distributed generation (DG) schemes. The total envisaged subsidy amount in the solar segment is 50 per cent lower than in 2019. China brought online 30 GW of solar PV capacity in 2019, down from 44 GW in 2018.

In addition to cancelling support for new offshore wind farms in 2020, China will also end subsidies for onshore wind projects in 2021, according to the report.

China makes green hydrogen move

Chinese power producer Beijing Jingneng Power Co Ltd has announced plans to develop a 5000 MW complex in Inner Mongolia that combines wind and solar power generation with hydrogen production and energy storage.

The state-owned company intends to invest some CNY23 billion (\$3.23 billion) in the project, according to a recent government report released by Chinese online media start-up *The Paper*. It says that the facility will be capable of producing between 400 000 and 500 000 tonnes of hydrogen annually.

Building works are set to begin this

year, while the complex is expected to begin operations in 2021.

The news comes as China ramps up its investment in wind power projects. In late February China Three Gorges (CTG) started construction on what the state-owned utility describes as offshore wind “super projects” with a combined capacity of 2200 MW. CTG says it will invest \$8.27 billion in the projects.

The 800 MW offshore wind farm in Rudong in Jiangsu Province, and the 1.4 GW offshore wind farm in Yangjiang, Guangdong Province, are the two largest projects with a combined investment of CNY42.4 billion.

Japan's goal to decrease fossil fuel use by 2030 may be hard to achieve

Operators in Japan are making an effort to maintain coal, oil and gas fired thermal generation by making it more cost-effective and less emissions-heavy, rather than switching to greener alternatives, according to energy research and business intelligence company Rystad Energy.

After the country shut most of its nuclear power generation following the Fukushima nuclear disaster, the country's share of coal, oil and gas use in the power mix has jumped to above 80 per cent.

To alleviate this jump in hydrocarbon use, the Japanese government set a target to increase its non-fossil fuel energy share to 44 per cent by 2030, as announced in a long-term strategy issued last June.

Although renewable energy projects are slowly increasing in the country and some planned coal fired power stations have been cancelled, gas is still expected to see the most growth in the coming years, said Rystad Energy Management Consultant Walton Zhang.

“Despite the huge gains in coal fired plant efficiency, even the most efficient coal fired power plant will emit

nearly twice as much carbon dioxide as a gas fired power plant, a reality which Japan appears to be well aware of. An analysis of all thermal generation assets brought online in the country since 2010 shows Japan's clear preference for gas fired power solutions with advanced technologies,” said Zhang.

But although burning gas has taken over coal in the power mix, coal still plays a significant role, retaining about a 30 per cent share in power production. Rystad says that percentage does not look likely to shrink substantially anytime soon as the country continues to focus on improving thermal power plant efficiency.

The country's Strategic Energy Plan allows coal fired power plants designed at or above ultra-supercritical pressure to be eligible for approval. Furthermore, three of Japan's largest banks announced recently that their lending policies would permit the funding of ultra-supercritical coal fired power plants.

Nevertheless, the country's efforts to reach its renewables goal received a boost in March. Ørsted and Tokyo Electric Power Company Holdings

(Tepeco) agreed to establish a joint venture company, Choshi Offshore Wind Farm K.K., to work together on the Choshi offshore wind project.

The companies will submit a joint bid in the Round 1 auction once the Japanese government officially designates the Choshi-city offshore wind promotion area, and further work together on future offshore wind opportunities in the area.

Tomoaki Kobayakawa Tepeco Representative Executive Officer and President, said: “In April this year, Tepeco will launch its renewable energy business arm, Tepeco Renewable Power, to make renewable energy a core generating source. The partnership with Ørsted and the establishment of Choshi Offshore Wind Farm K.K. will help drive business growth for the Tepeco group and Tepeco Renewable Power.”

At the beginning of 2019, Tepeco and Ørsted signed a memorandum of understanding to cooperate on offshore wind projects and have since been working to establish a framework and organisational structure for joint development of the Choshi offshore wind project.

Industry calls for renewables acceleration in Germany

Germany risks not being able to meet a 65 per cent renewable energy target if it does not speed up deployment of wind and solar energy, experts warn.

Siân Crampsie

Renewable industry representatives in Germany are continuing to put pressure on the government to speed up the roll-out of renewable energy to ensure that the country meets its 2030 climate goals.

Organisations including the Federal Association of Renewable Energy (BEE) and Wind Energy Association (BWE) wrote last month to German Chancellor Angela Merkel calling for barriers to renewable energy development to be removed and for a cap on solar energy deployment to be lifted.

The letter was sent in mid-March ahead of a planned meeting between federal and state governments in Germany that was later cancelled due to the coronavirus pandemic.

The issues highlighted by the renewable energy sector that were due to be discussed have been moved in to a new working group, a move that BEE called “incomprehensible”.

BEE President Dr Simone Peter said: “The fact that decisions are once again not being made and postponed is a sign of climate policy poverty that is damaging the credibility of the federal government. Right now it has to be about

lifting investment blocks and proving decision-making ability.”

Germany’s onshore wind energy sector is in crisis, with installation levels dropping in 2019 to 1078 MW, down by 55 per cent on 2018 levels and by 80 per cent on 2017. The industry last year held crisis talks with the government but is still waiting for concrete measures to be put in place to overcome barriers to deployment.

Those barriers include slow permitting procedures and growing levels of public opposition to wind farms.

The government has proposed several measures to overcome the backlog of

projects stuck in the planning system, including the introduction of a 1000 m distance rule for new wind turbines.

Merkel’s coalition has agreed to lift a rule that support for solar power would only be paid until a cumulated 52 GW of PV capacity has been installed. With 50 GW already built, the solar industry fears that additions will come to a halt as soon as the 52 GW cap is reached.

“If again no agreement can be reached regarding wind power today, then at least the solar cap needs to go immediately,” said Carsten Körnig, Managing Director of Germany’s

solar industry federation BSW-Solar. “It is completely unacceptable that the entire solar sector is taken hostage by the CDU in order to resolve the conflict on wind power.”

Last month EnBW said it would build a 187 MW solar power plant northeast of Berlin in Werneuchen.

The company plans to install approximately 465 000 high-performance (390 Wp) solar modules at four fields, covering an area of 164 hectares. The Weesow-Willmersdorf solar park will have the modules facing south on a 20-degree angled mounting structure with a height of 3 m.

Total buys into Erebus wind floater

Total has positioned itself in the floating offshore wind energy market with the acquisition of a majority stake in the Erebus project off the coast of Wales.

The French oil giant has signed an agreement with developer Simply Blue to buy an 80 per cent holding in the project, which will have a capacity of up to 96 MW with turbines installed in

water depths of up to 70 m in the Celtic Sea.

The deal makes Total one of the latest oil majors to buy into the floating wind market and also indicates growing interest in the technology from the mainstream energy sector.

“With its entry into floating offshore wind, Total confirms its ambition to contribute to the development of

renewable energy worldwide,” said Patrick Pouyanné, Chairman & CEO of Total. “Floating offshore wind is an extremely promising and technical segment where Total brings its extensive expertise in offshore operations and maintenance. Total has the appropriate skills to meet the technological and financial requirements that determine the success of future floating

offshore developments.”

The Erebus project will use floating foundations from Principle Power, the same technology used by the Engie and EDP-led Windplus consortium. Windplus is behind the WindFloat Atlantic pilot off the coast of Portugal, which includes the world’s largest floating turbine.

Norwegian oil firm Equinor has

pioneered floating offshore wind development with the 30 MW Hywind Scotland project. It is now developing the 88 MW Hywind Tampen project that will help to power two of the company’s North Sea drilling operations.

Shell acquired the offshore wind developer Eolfi last year. Repsol is a junior partner in the Windplus consortium.

Dutch trio warms up for H₂ venture

- Up to 10 GW of offshore wind planned
- H₂ supplies for gas grid, transport

The developers behind a new large-scale green hydrogen (H₂) gas project in the north of the Netherlands say they are open to adding new partners to their venture.

Energy giant Royal Dutch Shell Plc, gas grid operator Gasunie and port operator Groningen Seaports have announced plans for construction of an 800 000 t/year H₂ production hub and could invite new partners to the project as they kick off the feasibility study.

The so-called NorthH2 project involves construction of a 3-4 GW offshore wind energy complex in the North Sea by 2030, with possible expansion to 10 GW by 2040. The offshore hub would power an electrolysis plant in Eemshaven, enabling large-scale and long-duration storage of the energy.

The hydrogen could be used in

various applications in the energy supply value chain, including injection into the gas grid, in the transport sector and as storage capacity for Holland’s capacity reserve market mechanisms. First production could take place in 2027, depending on permits, available locations for the hydrogen facilities and the final investment decisions, the partners said.

“This project offers opportunities throughout the entire hydrogen chain,” said Marjan van Loon, President-Director of Shell Nederland.

“In addition, it fits well with our New Energies aspirations and our ambitions to find new ways to reduce CO₂ emissions and deliver more and cleaner energy, at home, on the go and at work. In order to realise this project, we will need several new partners.

“Together we will have to pioneer

and innovate to bring together all the available knowledge and skills that are required. The energy transition calls for guts, boldness, and action.”

The Netherlands has a leading position in the shift to a hydrogen economy,” Han Fennema, CEO of Gasunie, said. “We have the North Sea for the production of wind, the ports as logistical hubs, and the industrial clusters that want to make the switch to green molecules and a suitable transport network.

“This comes together perfectly in the northern Netherlands at the Groningen Seaports where the conversion to hydrogen takes place, with storage in Zuidwending and an ambitious province. With these partners, and hopefully even more partners soon, we are helping the market to accelerate the transition to renewable energy.”

11 MW giant spins at Østerild



An 11 MW prototype offshore wind turbine has succeeded in producing energy at a test site in Denmark, Siemens Gamesa Renewable Energy (SGRE) has reported.

The technology company says that its SG 11.0-193 DD Flex wind turbine has produced 11 MW of power at the Østerild Test Centre, marking a milestone in the development of the company’s offshore wind portfolio.

Unveiled in November 2019, the SG 11.0-193 DD Flex turbine features a 193 m diameter rotor using the 94 m long Siemens Gamesa B94 Integral Blades. Constant digital observations are processed by the control system, increasing capacity to up to 11 MW,

SGRE said.

The SG 11.0-193 DD Flex turbines will have their commercial offshore debut at Vattenfall’s Hollandse Kust Zuid 1-4 offshore wind farms in the Netherlands.

SGRE has also been named as the preferred turbine supplier for two offshore wind power projects in the German North Sea with a total capacity of 1142 GW. At both the 900 MW Borkum Riffgrund 3 and the 242 MW Gode Wind 3 sites, SGRE will deploy its new SG 11.0-200 DD offshore wind turbine model.

The preferred supplier award includes five-year service and maintenance agreements.



- GWEC & RE100 to match buyers and sellers
- Record year for offshore wind

The Global Wind Energy Council has joined forces with The Climate Group's RE100 initiative to accelerate corporate renewable power purchase deals.

The two organisations are aiming to match their respective members on the demand and supply side of the wind energy industry to create new opportunities for power purchase agreements based on renewable energy.

The deal will be particularly impactful in emerging and developing markets across Asia, Africa and Latin America, where many RE100 members have significant operations but limited options for sourcing renewables, GWEC said. The organisations say they will take a cooperative approach to addressing the barriers to corporate sourcing of renewable energy, including joint efforts to encourage greater ambition among private companies, and to

streamline procurement processes in private markets for wind and renewable power.

Ben Backwell, CEO of GWEC, said that the deal would also help to "accelerate the energy transition" in emerging and developing wind markets. "Corporate commitment to scaling up renewable energy sourcing and streamlining procurement processes will be crucial to enable the energy transition, and this is particularly significant in the Asia-Pacific region where there is significant industrial activity that still relies on fossil fuels," Backwell said.

"The RE100 membership has grown rapidly in the last year, with over 40 per cent of new joiners from the Asia-Pacific," said Sam Kimmins, Head of RE100, The Climate Group. "We are delighted to partner with the Global Wind Energy Council to grow our reach even further. We'll be applying

lessons learnt across Europe and North America to accelerate change on a truly global scale – enabling many more companies to seize the benefits of 100 per cent renewable power."

Last month GWEC reported that the global offshore wind industry installed a record 6.1 GW of new capacity in 2019, bringing total capacity to 29 GW.

Europe remained the largest market for offshore wind, accounting for 59 per cent of new installations in 2019, while the Asia-Pacific region accounted for the remaining 41 per cent. China remains the overall leader in new installations for offshore wind, adding more than 2.3 GW capacity in 2019, with the UK and Germany in second and third place, installing 1.8 GW and 1.1 GW, respectively.

Offshore wind accounted for approximately 10 per cent of new wind power installations in 2019, an increase from 5 per cent in 2015.

AfDB backs Nigerian rural programme

Nigeria's Rural Electrification Agency (REA) has launched a project designed to help the country meet its target of universal energy access by 2030.

Backed by the African Development Bank (AfDB), the National Electrification Project (NEP), will address critical energy access deficits by channelling private sector investments into mini grid and off-grid solutions.

It will benefit from joint financing of \$200 million from the AfDB and Africa Growing Together Fund (AGTF), funds which will de-risk and scale-up private sector investment in the off-grid sector, nurturing a business ecosystem conducive to the rapid electrification of Nigeria's off-grid communities, AfDB said.

AfDB's Acting Vice President for Power, Energy, Climate Change and Green Growth, Wale Shonibare, said: "Over 500 000 people will have access to approximately 76.5 MW of increased installed power, of which 68 MW will be solar generated."

Eight universities will have access

to reliable energy, Shonibare added, and 150 female students will receive training on renewable energy solutions. In addition, 20 000 micro-, small- and medium-sized enterprises (MSMEs) will be supplied with appliances and equipment.

Managing Director of REA, Ahmad Salihijo, said that four components are currently structured under the facility namely: Solar Hybrid Mini Grids under the minimum subsidy tender (MST), which will cost \$70 million; Energy-Efficient Appliances for Productive Use (\$20 million); phase three of the Energising Education Programme (\$100 million), and technical assistance and capacity building (\$10 million).

Nigeria is the largest economy in sub-Saharan Africa, but structural and financial issues in the power sector have constrained growth and investment. Nigeria has the potential to generate 12 522 MW of electric power from existing plants, but most days is only able to generate around 4000 MW.



Eskom wins tariff hike case

Power prices in South Africa could rise after national utility Eskom won a court battle over a regulatory decision on tariffs in 2018/19.

The country's regulator, Nersa, had issued a ruling preventing Eskom from increasing its power prices in 2018/19, a move that the utility says prevented it being able to recover R27 billion (\$1.53 billion) in costs in that year.

Eskom challenged the ruling and the High Court has ruled in favour of the company, and also found last month that Nersa's decision was procedurally unfair, irrational and unreasonable. The court has sent the determination back to Nersa for rework, and ordered Nersa to bear the costs of Eskom's application.

It is not clear yet whether Nersa intends to appeal this judgement.

Eskom is also pursuing several other actions against Nersa rulings made for financial years 2019-2022, for which Eskom requested 16 per cent annual increases in tariffs to enable it to cover the costs of its operations. Nersa awarded it only 9.41 per cent, 8.10 per cent and 5.22 per cent increases for these years.

Eskom insists that its electricity prices are far from being cost reflective, and that they need to rise by some 30 per cent in order to become cost reflective. Thereafter, Eskom says electricity prices in South Africa would stabilise, with only inflationary increases in subsequent years.

Eskom has also made a Regulatory Clearing Account (RCA) application to Nersa for the 2018/19 financial year in order to claw back an additional R27.3 billion.

ACWA signs Uzbek agreements

- Deals signed for CCGT, wind capacity
- Uzbekistan plans to add 8 GW of renewables

ACWA Power is set to play a leading role in the development of Uzbekistan's power sector following the signing of deals worth up to \$2.5 billion with the country's government.

The company has inked three agreements covering the development of a 1500 MW combined cycle power plant, 500-1000 MW of onshore wind capacity and the development of a training centre to enhance local technical skills.

The CCGT project is part of Uzbekistan's ambitious plan to fast track foreign direct investment in essential key sectors and implement an energy diversification strategy. The project will be located in Shirin City in the Sirdarya region and will be developed on a build, own, operate, transfer basis.

ACWA Power will take the lead in constructing, engineering, operating

and maintaining the plant and has signed a 25-year power purchase agreement and investment agreement worth \$1.2 billion for the project.

JSC National Electric Grids of Uzbekistan will be the sole off-taker for the plant's output.

An implementation agreement worth \$550 million-\$1.1 billion has also been signed with the Ministry of Energy for the development, financing, construction, operation and maintenance of a 500-1000 MW wind farm.

"These newly agreed power projects represent a historic milestone for Uzbekistan and support our mission to strengthen energy security through self-sufficient power sources," said Minister of Energy of Uzbekistan, Alisher Sultanov.

Last month the Uzbek government said it was aiming to deploy 5 GW of

solar and 3 GW of wind power capacity over the next 10 years.

In an update to its renewables programme, the country's Ministry of Energy said that it is currently selecting foreign direct investors to undertake these projects, including ACWA Power.

It added that it intends to open a tender for the construction of 1000 MW of wind farms in Karakalpakstan, while 1000 MW of solar will be added through a programme aided by the Asian Development Bank (ADB).

Uzbekistan has set a goal of producing 25 per cent of its total power from renewables by 2030. The country recently launched a tender for the construction of 400 MW of solar parks in the Samarkand and Jizzakh regions. A tender for a 100 MW solar farm in the Navoiy region was previously won by Masdar.

Uniper energy strategy targets carbon neutrality by 2035

Germany-based energy giant Uniper is following a coal exit plan that will see it invest in new growth aimed at helping it become carbon-neutral in Europe by 2035. **Junior Isles reports.**

Uniper, Germany's third-largest publicly listed energy company has said that it intends to make its power generation portfolio in Europe climate-neutral by 2035.

Speaking at its annual results press conference for the 2019 financial year in Düsseldorf, Germany, Uniper CEO Andreas Schierenbeck said the company will gradually reduce its own portfolio's carbon emissions, while offering its customers products and services that are increasingly climate-friendly.

Between now and 2022, Uniper will invest more than €1.2 billion in projects that accelerate the transition to a lower-carbon world. The announcement is part of a fundamental strategic reorientation, which the company is calling "Empower Energy Evolution".

"At the operational level we have

seen very positive developments in Germany with the adoption of the coal phase-out law. Now we know the situation and what it means for us... it gives us new scope for action. In parallel we have our own ambitious plan to end coal fired generation."

By 2025, Uniper plans to shut down 2.9 GW of coal fired generation in Germany but said the commissioning of its Datteln 4 modern coal fired plant is continuing. Schierenbeck noted that the plant achieved a load of 1100 MW on March 9th and is expected to begin commercial operation this summer. Uniper says the plant will run until 2035 or 2038.

Under Uniper's coal phase-out strategy, coal plant closures in Germany alone will reduce its carbon emissions by around 40 per cent. This goes a

significant way to its goal of reducing its carbon emissions from 22 million tonnes today to net zero in 2035.

Uniper says the exit from coal will make the role of gas in its portfolio even more important.

The company, which operates in all stages of the gas value chain, is well positioned to play an important role in supply security and gas conversion. It said the coal and nuclear phase-out in Germany is expected to lead to wider margins and better utilisation of its gas fired power plants.

Uniper says that the continuing growth in renewables would pose challenges for the grid, which will create new opportunities to offer products and services to networks. This is already happening in the UK through auctions for emergency reserve

generating capacity, it said, and would increasingly be seen in Germany.

"Uniper was awarded four six-year contracts for the Killingholme and Grain power stations in the UK to provide stability services," said Schierenbeck. "Germany needs a similar mechanism. We're using Irsching, one of our facilities, to build a [gas fired] generating unit that from 2022 will serve as a safety buffer for the system operator... and, as at our own facilities, we want to help industrial customers convert to gas fired systems."

Schierenbeck added: "A decisive aspect of decarbonisation will be replacing conventional gas with green gas or hydrogen. Uniper is now a power-to-gas pioneer, a technology that makes green hydrogen possible. We anticipated the trend toward gas, initiated



Schierenbeck says the exit from coal will make the role of gas in its portfolio even more important

projects, and we are now ready for scale-up and sector coupling.

"Today gas generation and mid-stream generates nearly 60 per cent of our earnings; we want to achieve more growth in these businesses."

Uniper says it surpassed its 2019 financial targets, posting adjusted EBIT of €863 million in the 2019 financial year, in line with the previous year's level of €865 million. Schierenbeck said this was "at the upper range" of its expectation.

Adjusted EBIT benefited from the fact that higher power prices and output enabled the company's hydro and nuclear power stations to earn more. Another positive contribution came from the business in Russia and from the reinstatement of the UK capacity market, it said.



EDF has added around 190 000 customer accounts to its UK retail business after sealing a deal with Sweden-based energy company Vattenfall.

EDF has acquired the residential customer base of iSupplyEnergy, Vattenfall's UK electricity and gas sales arm. The deal follows Vattenfall's decision to exit the UK's energy retail business in order to focus on developing its core UK renewable power generation, heating, B2B sales and distributions businesses.

Vattenfall entered the UK retail sector in 2017 with the purchase of iSupplyEnergy, which is based in southern England with 250 employees. Earlier this year it was fined £1.5 million by regulator Ofgem for overcharging customers by breaching a price cap im-

posed on default energy tariffs.

EDF has just over five million residential gas and electricity customers in the UK. In a statement an EDF spokesperson said: "As the largest producer of low carbon energy in the country, EDF is committed to growing its retail business in the UK so it can support as many customers as possible on the journey to net zero emissions."

■ Vattenfall has agreed the sale of its entire UK electric vehicle business to Statkraft. Statkraft will take on Vattenfall's existing electric vehicle charging network staff in the UK and will manage, operate and maintain its charging stations. It will continue to power the charging network using 100 per cent renewable energy from its own portfolio.

Sumitomo, Highview partner on cryo storage

Sumitomo Heavy Industries (SHI) has marked its entry to the global clean energy storage market with a \$46 million investment in Highview Power.

The two companies have announced a partnership to develop long-duration cryogenic energy storage technology and develop projects globally, based on Highview's CryoBattery technology.

Under the partnership deal, SHI subsidiary Sumitomo SHI FW (SFW) will become SHI's technology centre

and hub for the CRYOBattery business, thereby expanding the technology's geographical footprint in Europe, Asia, and the Americas. The move will help Highview to accelerate its global growth initiatives, it said.

Javier Cavada, President and CEO of Highview Power, explained: "By partnering with a large technology company with the reputation of SHI, we will be able to benefit from their vast know-how, resources, and operating experience in diversified

markets."

Highview's technology uses liquid air as the storage medium and can deliver anywhere from 20 MW/100 MWh to more than 200 MW/2 GWh of energy. Last year it announced plans to build its first project in the USA—a 50 MW/800 MWh project in northern Vermont.

Highview currently operates two pilot plants in the UK and has announced plans to build a 50 MW/250 MWh plant in northern England.

Centrica accelerates EVs

UK energy giant Centrica is aiming to boost the adoption of electric vehicles in the UK with a three-year partnership with Volkswagen Group (VW).

Under the partnership, the two companies will provide home-charging hardware solutions for new EV owners through Elli, the central provider of charging hardware and related services for VW.

The partnership will support the roll-out of VW's 80 electric and plug-in hybrid models as well as the UK's net-zero climate targets, Centrica said.

"Getting carbon out of transport by accelerating EV adoption is critical for net zero. We're proud to play our part by helping enable the EV transition for Volkswagen, one of the world's most forward thinking and

ambitious automotive companies," said Sarwjit Sambhi, CEO of Centrica Consumer.

"Centrica is committed to a pathway for the energy transition in line with the Paris agreement through focusing on three things—helping our customers reduce their emissions, reducing the emissions of the energy system as a whole, and reducing our own. We made material progress on all of these during 2019 and are committed to a plan for delivering net zero by 2050."

The partnership will see Elli work exclusively with Centrica's British Gas brand to deliver a package of home charging installations, after-sales services and preparatory electrical upgrades across the UK. This will help customers to transition to EV

smoothly and cost effectively, initially across the Volkswagen, SEAT, Škoda and Volkswagen Commercial Vehicles with plans for Audi to join later this year.

Volkswagen Group has committed to introducing 80 electric and plug-in hybrid models by 2025. It said that the deal with Centrica would help to give UK consumers "more confidence" as they switch to EV transport.

■ Jaguar Land Rover has entered into a partnership with Tata Power to provide end-to-end EV charging solutions in India. Tata Power will provide a range of AC and DC chargers, which will range from 7 kW to 50 kW capacity, across Jaguar Land Rover's retail network of 27 outlets in 24 cities and at customers residence and office.

10 | Tenders, Bids & Contracts

Americas

AEP extends Westinghouse contract

American Electric Power (AEP) has extended a contract with Westinghouse Electric for nuclear fuel and related services for its two pressurized water reactor units at the D.C. Cook Nuclear Plant in Bridgman, Michigan. Under the agreement, Westinghouse will deliver 15 additional regions – or batches of fuel assemblies – of the Westinghouse Upgrade fuel to Unit 1 and Westinghouse OFA fuel with balanced vanes mid-grids and Optimized ZIRLO™ advanced cladding to Unit 2.

Ramboll joins offshore project

US energy company Dominion Energy has selected Ramboll to support the development and engineering aspects of the Coastal Virginia Offshore Wind (CVOW) project in Virginia.

Ramboll will be Dominion's Owner's Engineer for the project, providing consultancy on all development and engineering aspects of the wind farm, which is expected to start operating by the end of 2026.

Guyana boosts supplies

Guyana Power & Light Inc (GPL) has signed a contract with Wärtsilä for the construction of a 46.5 MW dual-fuel power plant at the Garden of Eden generating complex.

The project will use five Wärtsilä 34DF dual fuel engines and will provide an immediate boost to the country's electricity system, as well as support near-term integration of renewables into the grid.

The engines will initially run on liquid fuel, transferring to natural gas when that becomes available. As part of the project, Wärtsilä will also supply a 69 kV sub-station to be integrated within the existing Garden of Eden sub-station.

The Wärtsilä plant is being delivered on a fast-track basis and is scheduled to be completed in mid-2020.

Asia-Pacific

MHI Vestas equips Akita Noshiro

MHI Vestas Offshore Wind has obtained a firm order to equip the 139 MW Akita Noshiro offshore wind project in Japan.

The company will supply 33 of its V117-4.2 MW wind turbines for the project, involving construction of wind farms at two sites – Akita port and Noshiro port.

MHI Vestas will deliver 13 turbines for the Akita port site and 20 for Noshiro. The order includes service and maintenance agreements with a maximum term of 20 years, subject to the options being exercised.

Vestas secures Senvion service deal

Vestas has secured a service agreement with Nexif Energy for maintenance of phase 1 of the 212 MW Lincoln Gap wind farm in South Australia.

Under the deal, Vestas will deliver a long-term Active Output Management 5000 contract for the 35 Senvion M140 3.6 MW wind turbines installed at the site. Delivery of service will commence immediately and will include the additional benefits of scheduled maintenance for the substation, all high voltage equipment and the facility roads.

The Lincoln Gap contract adds to Vestas' existing portfolio of

107 MW Senvion turbines in Australia under long-term, full-scope service agreements.

Europe

Vestas secures Danish clean sweep

Vestas has secured orders for the entire 135 MW wind volume of Denmark's second technology-neutral renewable energy auction in 2019.

The company has won a 63 MW order to supply, install and commission 16 wind turbines for two on-shore wind projects in central Jutland, bringing its total orders for projects secured in the second auction to 135 MW.

The latest order was placed by Eurowind Energy, which is developing the St Soels and Veddam Kær projects.

The St. Soels project will comprise seven V126-3.45 MW turbines delivered in 3.6 MW Power Optimised Mode, while the Veddam Kær project will feature nine V136-4.2 MW turbines.

Both projects will be co-located with solar PV capacity.

Earlier in March Vestas received an order from Wind Estate for the Overgaard II wind repowering project.

Keravan invests to reduce emissions

KPA Unicon and Keravan Lämpövoima Oy, a subsidiary of Keravan Energia, have signed a contract with Unicon Condenser to install a flue gas condenser at an existing 80 MW biomass power plant in Kerava, Finland.

The new equipment will improve the efficiency and reduce emissions from the 80 MW power plant. The delivery will include a process equipment building, new stack, emission measurement equipment and water treatment plant.

The flue gas condenser and its auxiliaries will be installed in late 2020 and the project will be handed over in the spring of 2021.

OX2 selects Nordex for Ljungbyholm

Wind energy developer OX2 has placed an order with Nordex for the 48 MW Ljungbyholm wind farm in Sweden.

Nordex will supply 12 of its N149/4.0-4.5 wind turbines for the project and has also signed a 30-year premium service contract with OX2.

Ljungbyholm will be built near the town of Kalmar in southern Sweden, with the turbines installed on 125 m-high tubular steel towers. Construction is due to start in the spring, with completion scheduled for mid-2021.

EGP signs up Voith for global refurb

Voith and Enel Green Power (EGP) have signed an umbrella agreement for the supply of complete turbine governor modernisation services.

Under the agreement Voith will assist EGP with the modernisation of its hydropower plant fleet across the Americas and Europe. EGP expects that its affiliates in 13 countries will take advantage of the framework agreement over the next three years.

GE bags TVO deal

GE has been selected by Teollisuuden Voima (TVO) to continue providing maintenance services at the Olkiluoto nuclear power plant in Finland for the duration of the plant's OL1 and OL2 reactors' lifetime.

The agreement will cover maintenance and services on the plant's two

steam turbines and generators to help ensure reliable operation of the facility through 2038. Additionally, GE Steam Power will manufacture and install a GTD water-cooled generator rotor to help extend the generator's operating life and support capacity increases.

Under the agreement, GE will perform yearly planned maintenance inspections on the steam turbine and generator, as well as engineering and on-site outage support. The new generator is scheduled to be delivered and installed in 2023 during the plant's annual outage.

Itron tech boosts Boras Elnat

Itron has signed a contract with Boras Elnat, an electricity provider in the city of Boras in Västra Götaland County, Sweden, to deploy its Industrial IoT network and replace the utility's existing meters with 46 000 smart electric meters.

The deal will enable Boras Elnat to meet new regulatory demands that will take effect in Sweden in 2025, and will enhance the company's visibility into the operation of its electricity distribution network with access to near real-time information on energy use and grid operations.

It will also enable Boras Elnat to lay the foundation for future smart city and energy efficiency initiatives to meet the utility's evolving needs.

Ørsted picks 11 MW giant

Ørsted has conditionally selected Siemens Gamesa's 11 MW offshore wind turbine platform for two projects in the German North Sea.

The SG11.0-200 DD offshore wind turbine features a 200 m diameter rotor utilising the 97 m long Siemens Gamesa B97 IntegralBlade and will be installed at the 900 MW Borkum Riffgrund 3 and 242 MW Gode Wind 3 offshore wind farms, subject to a final investment decision by Ørsted.

A five-year service and maintenance agreement is included in the preferred supplier award, Siemens said.

The final number of turbines for both projects remains to be determined. Ørsted expects the installation of Gode Wind 3 to begin in 2023, with commissioning being completed in 2024. The installation of Borkum Riffgrund 3 is expected to begin 2024, with commissioning being completed in 2025.

Prysmian seals RTE contract

France's Réseau de Transport d'Électricité (RTE) has awarded Prysmian Group a contract worth over €150 million for the development of two submarine and land export power cable systems to connect the offshore wind farm located in between the islands of Yeu and Noirmoutier to the French mainland power grid.

The offshore wind farm is being developed by the company Les Eoliennes en Mer d'Ile d'Yeu et Noirmoutier. Prysmian will provide its comprehensive turnkey approach for the design, supply, installation, and commissioning of two HVAC 225 kV three-core extruded export submarine cables with single-wire armouring which will reach the landfall area at La Barre-de-Monts beach.

Prysmian will be also be responsible for the supply and jointing of two HVAC 225 kV extruded land cables circuits that will link the landfall area to the substation at Soullans.

Delivery and commissioning are scheduled for 2023.

Zenobe battery potential

Batteries will be used to provide a reactive power service as part of a landmark trial in the South East of England.

Zenobe Energy will use batteries with 10 MW capacity to provide a reactive power service to National Grid ESO via UK Power Networks' distribution network.

The trial is part of the Power Potential project, a world-first project to enable generators on the distribution network to automatically provide reactive power services to National Grid's transmission network.

James Basden, Founder Director at Zenobe Energy, said: "This initiative will enable increased uptake of green energy in the region, without costly infrastructure upgrades, illustrating the vital role battery storage will continue to play in the development of a flexible and efficient electricity network that is fit for the future."

The Power Potential project aims to create a new reactive power market for distributed energy resources (DERs) and generate additional capacity on the network. The Power Potential project could save energy consumers over £400 million by 2050 and generate up to an additional 4 GW in the southeast region of the UK.

ABB ensures DolWin reliability

ABB has won a €10.6 million order for ABB Ability digital products and services at the DolWin5 (Epsilon) offshore transmission platform.

The company will provide a comprehensive system for IT infrastructure, OT security, plant-wide condition monitoring, SCADA and remote access services to facilitate stable power transmission from offshore wind farms in the North Sea to the German power transmission system.

The DolWin5 (Epsilon) platform will deliver 900 MW from three wind farms, 100 km off the German coast. In addition to a converter platform offshore, there is an onshore converter station located in Emden/Ost in Germany.

International

Siemens nails Belarus market

Siemens has received an order from Belarus for the installation of five gas turbines.

The order is the company's third in three months from the country and relates to the construction of a new peak load and backup power plant in Beloozersk, Brest region.

The order covers five SGT-800 industrial gas turbines, including associated auxiliary and electrical systems, and was placed by Brest Republican Unitary Enterprise of Electricity Industry (Brestenergo). With an electrical capacity of 254 MW, the new plant will help further strengthen the power grid's reliability and stability. Commissioning is scheduled for December 2021.

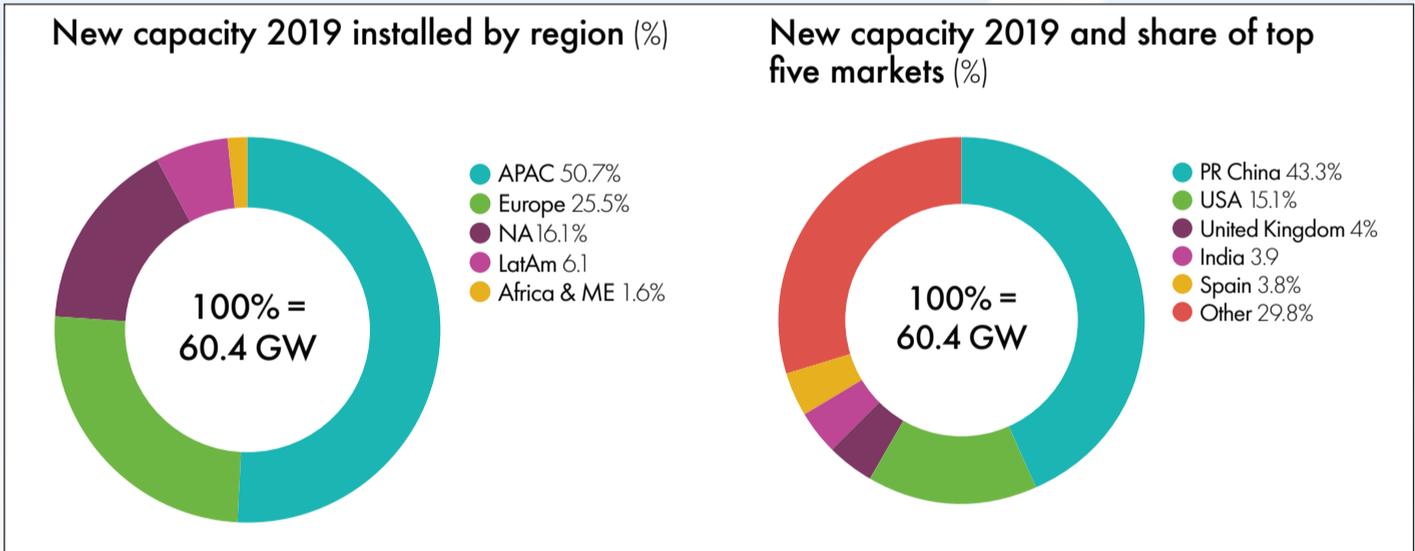
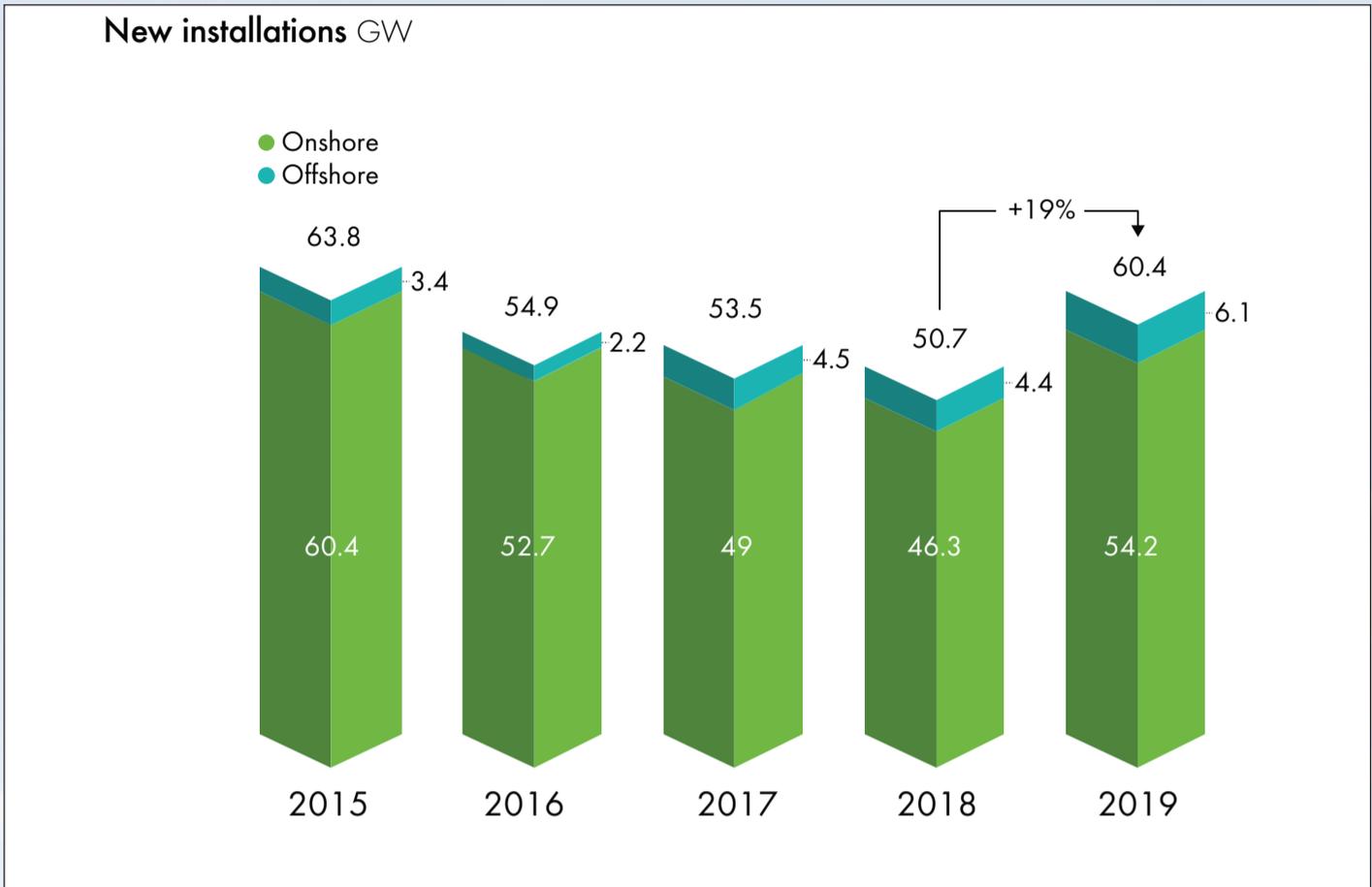
Nordex gears up for Kirkklareli build

The Nordex Group has received an order from Turkey to supply and install 27 of its N149/4.0-4.5 turbines for the 120 MW Evrencik wind farm.

Installation of the first turbines at the site in the province of Kirkklareli in Eastern Thrace is due to commence in October 2020, according to developer Evrencik Elektrik. Nordex will source the rotor blades, anchor cages, towers and generators for the 27 turbines locally. This means that Evrencik Elektrik will benefit from a higher feed-in tariff.



Global wind power market status 2019



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Oil and gas in the time of Coronavirus

The Coronavirus outbreak combined with an end to the Opec+ cooperation has led to a collapse in oil prices and lower gas prices. But the current crisis may eventually act as a catalyst for a LNG industry that can operate independently of the oil market.

Gary Lakes

The energy world has been in a situation similar to this before, although then the circumstances weren't complicated by a deadly virus that was forcing people to abandon life as they know it. This time things are complicated by a pandemic.

The prospect of over-production, a record oil glut, free-falling demand and collapsing prices coupled with the fact that businesses are being forced to close their doors, lay-off workers, and anxiously face an unpredictable future portend a scenario that could change the oil and gas industry forever.

As the coronavirus pandemic

spreads, the world is switching off, with little sign as to just how great the impact on the economy and society will be. Meanwhile, the oil industry is looking at chaos, initially brought on by the coronavirus, but now exacerbated by a battle for market share.

As yet, no one is able to say where the bottom is, and health experts are saying the world may expect the virus to be around for 18 months. By that time, there is no telling where oil, gas and energy demand will be.

The last time the oil industry addressed a price war was in 2014, and little good came from it. Saudi Arabia opened the oil taps then with the intent of pushing non-Opec producers, particularly US shale oil companies, out

of the market and boosting the price of oil. Initially it worked. A lot of US shale producers were forced to halt production and it shook-out the industry, but as far as the US goes, the plan didn't really succeed. The technology kept coming, making it possible for shale companies to produce at cheaper costs, leading to today's US oil production figure of 13 million b/d.

The move didn't work for Saudi Arabia and other Opec producers either. The flood of oil created a glut and forced the price of oil down, resulting in a decline in revenues that developing countries dependent on oil earnings could ill afford. Even Saudi Arabia, which was forced to draw upon some \$250 billion in foreign currency reserves to cover its costs during that period, has yet to recover that loss. Other Opec countries suffered from the glut and the collapse of oil prices. It is estimated that they lost some \$450 billion in revenues collectively during that period.

By the end of 2016, with prices down to around \$40/b, Saudi Arabia and its Opec partners were ready to make an agreement with non-Opec producers, the largest being Russia, to start restricting output. Production cuts were put in place in 2017 for a six-month period, but were continually extended in order to 'balance the market'.

At a ministerial meeting of Opec+ (Opec and non-Opec countries) in Vienna in early March, Russia declined Saudi Arabia's suggestion that further reductions in production be made and extended to the end of the year, prompting Riyadh to declare an end to Opec+ cooperation and announce that it would boost production. Then Riyadh slashed contract prices, in effect starting a price war that is expected to bring new economic damage not only to Saudi Arabia, but to Opec members. Questions are already being asked about whether Opec can as an organisation survive the consequences.

How Saudi Arabia concluded that this was the time to engage in an oil price war with Russia and the US is baffling. The coronavirus prompted a steep drop in demand for crude oil and the Saudi move has led to the collapse of the price of benchmark crudes like Brent and WTI to under \$30/b. Meanwhile, natural gas prices have fallen to under \$2.00/million Btu.

Some energy market analysts are expressing fears that oil prices could fall to \$10/b. That would spell disaster for many developing countries. Saudi Arabia itself needs the oil price to be at

least \$89/b in order to meet its fiscal requirements, according to the IMF and S&P Global Ratings. The UAE needs around \$70/b, Iraq around \$60. Algeria needs more than \$110/b and Libya \$100/b. Iran needs oil to be at nearly \$200/b, and Russia around \$40/b. How an oil price war will benefit any of these countries remains a mystery.

In early March, the Executive Director of the International Energy Agency (IEA), Fatih Birol, and the Secretary General of Opec, Mohammed Sanusi Barkindo, issued a joint statement expressing their concern about the coronavirus and its impact on the stability of economies and markets, particularly in developing countries such as most of the members of Opec.

Commenting on the impact of a pandemic and the collapse of oil prices on vulnerable developing countries, they noted that "if current market conditions continue, their income from oil and gas will fall by 50 per cent to 85 per cent in 2020, reaching the lowest levels in more than two decades, according to recent IEA analysis." Such a situation would likely have major social and economic consequences, notably for public sector spending in vital areas such as healthcare and education, the statement said.

Because natural gas contracts are usually linked to the price of oil, gas prices have fallen as well, falling to around \$1.60/million Btu in the US, where prices have been down due to the fact that there is huge supply. Abundant gas supplies provided by numerous suppliers has proved beneficial to countries that have long-term LNG supply contracts in which the price is linked to oil prices. For example, deliveries to countries with long-term contracts like Japan, South Korea and China were priced beneath spot prices in mid-March, as oil prices crashed.

The current crisis may eventually act as something of a catalyst for a LNG industry that can operate independently of the oil market. Oil demand is falling now but will inevitably return once the pandemic is over, yet LNG suppliers are growing and more terminals are being built to take delivery that is being promoted as a bridging fuel away from coal and oil. In the 2020s, numerous export facilities are planned, in Qatar, Australia, Africa, Russia and the US, where production of shale gas has created a boom in LNG export plants and where many more are waiting for government approval and a final investment decision (FID).

However, the coronavirus and oil price war combination present a problem as questions are raised about future markets and financing, and many of those planned projects could be postponed to a time when the world economy is in a more stable place. And it is possible that gas can displace crude oil. Currently there is an abundance of both and it is possible that the crisis now in full swing could shake out the energy market and create an enthusiastic environment for gas and renewables, although the market isn't doing anything positive for either in the market right now.

For its part, US gas keeps on coming. The Energy Information Administration (EIA) stated in its latest 'Short-Term Energy Outlook' that dry natural gas production set a record last year, averaging 92.2 billion cubic feet per day (Bcf/d), and forecast that output would average 95.3 Bcf/d in 2020.

Another aspect of this situation is what opportunities it could awaken for renewables once the dust settles. Opportunities arise out of crises. The world is aware that the crisis looming over all of this is climate change, which is expected to be every bit as disruptive to human society as the coronavirus.

In a post on the IEA website, Executive Director Birol said that as the world grapples with the coronavirus and turmoil in the global markets, governments must not lose sight of "the challenge of our time: clean energy transitions."

Birol said that while the current situation is serious, the effects will likely be temporary, but he said the threat posed by climate change, which requires the reduction of global emissions significantly this decade, will remain. "We should not allow today's crisis to compromise our efforts to tackle the world's inescapable challenge," he said.

He said the economic stimulus packages that governments are drawing up offer an excellent opportunity to build a secure and sustainable energy future. He called for large scale investment in clean energy technologies, which will result in a lasting difference for the future. Governments should pursue measures to improve the energy efficiency of buildings, which create jobs, reduce energy bills and helps the environment, he said, adding that the steep drop in oil prices presents a great opportunity for governments to lower or remove oil subsidies for fossil fuel consumption, which amount to around \$400 billion worldwide.



Birol expressed concern about the coronavirus and its impact on the stability of economies and markets

Digital transformation: opportunity or confusion?

There is much confusion around the digital transformation. Some argue the best way forward is to think big, start small and scale fast.

Deepak Khajouria and Scott Affelt

Digital transformation is creating significant opportunity for the energy industry to apply digital solutions to improve operation, performance and reliability of assets. However, one of the most challenging aspects of the digital transformation is trying to understand the terminology.

Terms such as artificial intelligence (AI), machine learning (ML) and others are often used interchangeably but in many cases, incorrectly. No doubt computers and machines are now able to perform many tasks that previously could only be done by humans. The thought of having IBM's Watson make important decisions on plant operation and maintenance to improve performance and reliability without human intervention sounds great. But in reality, at this point, most of successful machine learning applications today are actually "taught" or "supervised" by humans or subject matter experts (SME) and use some form of supervised ML.

In our experience, of the US companies that have started an AI/ML journey, over 70 per cent have either stopped, drifted away from their initial digital vision, or have been unable to justify further investment based on lower than expected benefits.

AI is an area of computer science that enables machines to perform tasks which were done by humans more intelligently, whereas ML is a subset of AI and means machines can learn independently from the past/current and solve future problems that didn't exist before or predict much earlier and accurately as compared to humans by leveraging computing power.

Within machine learning, there are two distinct types – supervised and unsupervised. Both are ways in which machines – or algorithms – can be applied to raw data sets and learn relationships between the various data. Supervised ML is the most common and practical type, as it leverages the SME's knowledge to both "learn" better and faster.

The North American energy market has experienced a massive shift with the emergence and competitiveness of renewables, energy efficiency, low gas prices, imbalance challenges in demand and supply due to renewables, etc. This has resulted in a steady increase in utilities, independent power producers (IPPs), grid operators and distributors looking for ways to apply AI/ML to

remain competitive.

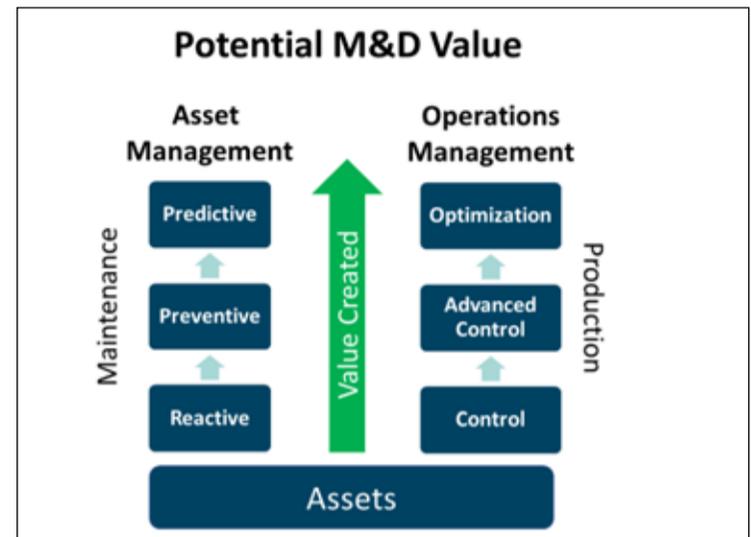
The applications have been varied across markets and sectors but mainly focus on distinct three categories: firstly, demand management, i.e. energy management systems, energy efficiency, and demand response management; second, renewable energy management, i.e. renewable forecast, equipment maintenance, wind and solar efficiency, energy storage; and third, asset performance management, i.e. asset monitoring and diagnostics (M&D); equipment operation and maintenance (O&M), and generation management.

Demand management: All utilities, (regulated and deregulated) have one prime objective: to supply power and/or gas to serve the energy needs of all its customers. Demand management systems play a crucial role in this. The changing nature of power generation resources and unpredictable weather patterns make this task more complicated. Utilities have increasingly used AI/ML to gain a better understanding of consumer demand and manage constraints in the grid. A significant investment has been made in grid modernisation including smart grids, advanced metering infrastructure, synchro-phasers, microgrids and demand response (Table 1), but a lot of further changes are needed to be made demand management more efficient.

The rapid increase in variable renewable energy and natural gas generation is altering grid management needs and the reliance on baseload generation. Nearly 95 per cent of net new electricity capacity added to the US grid in 2018/2019 was renewable, according to data from the US Energy Information Administration.

According to Brattle Group, approximately \$1.5-2.0 trillion will be spent by 2030 to modernise the grid. Interestingly, all generation, transmission and distribution systems are designed for peak demand and with the added challenges of energy efficiency and other factors the systems are mostly under-utilised. The use of AI/ML in demand response management is enabling operators to plan better and optimise the grid infrastructure to better serve customers. The low cost of sensors, edge solutions and faster data transfer have enabled better processing and feedback to operators.

Renewable energy management: Solar and wind are the two largest



Integration of AI/ML (M&D) for asset management & operations management

sustainable and biggest enablers for renewable energy. However, they are also the most unpredictable sources and the lack of large-scale storage presents the biggest challenge to decarbonise energy generation. Not surprisingly, AI/ML have found a wide use in this field with AI being used to improve the reliability of solar and wind power by looking at large amounts of ever changing meteorological data and using the data to make better predictions regarding power production.

With renewable generation, a multitude of microgrids must integrate with larger grid networks to maintain a stable and efficient grid network. AI applications can help balance and manage any microgrid power surges by continuously analysing the various microgrid connections.

Energy storage is a key element of the growth of renewables and is still evolving with respect to cost competitiveness and scalability. AI/ML is being used to provide intelligent energy storage by gathering and providing data to determine the optimum locations for energy storage by analysing storage needs and grid position in real-time. In the USA, approximately 1000 MWh of energy storage capacity is now functional and likely to double in the next few years. According to McKinsey, one of the key drivers for growth in this area will be profitability of energy storage projects, which are highly dependent on AI/ML to predict the suitable size, location, technology and optimise cost.

Asset performance management: Asset performance management solutions are ideally suited for maintaining the reliability and performance of the energy asset stream (generation, transmission, distribution and storage). Owners/operators are constantly looking for innovative and cost-effective ways to improve the flexibility, performance, availability, and reliability of their assets while also reducing their operating and maintenance costs to stay (or become) profitable. Many are now implementing active, real-time M&D solutions to move from a reactive mindset to a more predictive asset management strategy. AI/ML solutions are the foundation of these efforts across North America. The early adopters like Duke Energy, Southern Co and TVA are already using these techniques to improve performance and reliability.

Today, M&D applications have moved beyond simple anomaly detection. With most utility operators facing significant "baby boomer" retirements and smaller O&M teams, the question is often: What to do once the anomaly is detected by the M&D centre? New, advanced M&D applications use more accurate machine learning algorithms for early problem detection (and less false alarms), in combination with AI-based methods for diagnosing the most likely root cause of a problem and determining the remaining time to act when an anomaly case arises.

Most of the subject matter expertise we need is readily available from plant staff, troubleshooting guides and fault trees. The digital transformation task at hand is to bring this expertise online using tools that are available now to do so. These advanced solutions can ingest and leverage the available domain (SME) knowledge for efficient application across the entire fleet.

Digital transformation is no longer just part of the standard vision or strategy statement. It is now a critical part of the business in the utility industry and important for overall success. Many early adopters are already creating value from digital transformation efforts, whereas others are still on the edge looking at initiation plans.

However, there are multiple challenges for any major digital transformation initiative including: lack of executive support and buy-in; lack of well-defined plans; significant disruption or change in business plans; internal cultural obstacles; lack of communication or coordination across multi-functional teams; "pilot purgatory" or no early demonstrated success to build upon.

The bottom-line for any digital transformation effort is to plan better, get a few early wins and make a case for further investment to enhance capabilities. In our experience, the best way forward is to develop a vision on how digitalisation can improve your business (think big), start with a well-defined application in as a pilot (start small) to prove the benefits and then apply these solutions quickly across the organisation to reap the benefits (scale fast).

Deepak Khajouria is Vice President, XMPLR Energy; Scott Affelt is Business Development Executive, Expert Microsystems Inc.

Comparison of grid of now/past with grid of 2030: there has been significant investment in grid modernisation but further changes are needed. (Source: Southern Company)

Now/Past	2030
One-way flow	Bi-directional flow
Scheduled generation	Uncontrolled variable generation
Central dispatch	High-performance infrastructure
Time-based maintenance	Condition-based maintenance
Mostly mechanical	Inverter-based growth
Reactive expansion	Proactive expansion

Biomass: burning issues

Biomass has its challenges but arguably still has a role to play in many markets.

Junior Isles reports.



Giglio says biomass still has a good story today



Janhunen notes BioCCS or BioCCU would enable negative carbon emissions

Some argue that the ethical and environmental concerns surrounding the use of biomass as a fuel for power generation make it a poor solution in countries' efforts to get to net zero by 2050. Yet despite the cons, it still can still play an important role in national energy strategies to tackle carbon emissions and combat climate change.

"Biomass still has a good story today; it's not perfect, 100 per cent, carbon recycling but you can get pretty close," notes Bob Giglio, Senior Vice President at Sumitomo SHI FW (SFW). "Even though the biomass grown absorbs the carbon, you have carbon leakage when you re-admit it through the combustion process. Although the amount you re-admit is equal to the amount you absorb, the extra energy you put into the process, through transport and processing the biomass into a burnable form, is usually provided by non-renewable sources. But depending on how you process and harvest it, you can get to around 95 per cent [carbon recycling]."

With the ability to co-fire or burn biomass in modified coal burning stations, Giglio believes burning biomass is a better carbon reduction option than retrofitting carbon capture and storage to coal plants. "CCS could get you to 90 per cent but you will have to spend a lot of money. And what do you do with the captured carbon? With biomass it's a natural process." He added: "To make biomass plant economic, you need CO₂ to be in the €20-30/t range. For CCS, you're up in the €70-100/t range."

Commenting on the CCS situation, however, Kai Janhunen, Vice President of Energy at Finnish-based Valmet notes that the discussion about BioCCS or BioCCU (biomass based carbon capture and utilisation) has come on to the agenda in the EU and the Nordics. "If CCS or CCU is installed in a biomass-based power plant it would enable negative emission, which is increasingly on the agenda in the European Union."

Unlike renewable alternatives such as solar and wind, however, biomass requires land and water, and it requires processing. But the upside is that it is a dispatchable generating source and can be stored. "Unlike solar and wind, you can turn a biomass plant on and off because the energy is stored in the biomass, whether on site or in the crop itself," said Giglio. "Today, biomass is the only dependable, renewable, sustainable source of energy we have."

Countries with limited options on near- or zero-carbon options in their energy portfolios are recognising this.

A good example is Japan. Having stopped most of its nuclear generation following the Fukushima disaster, the country now has to depend on expensive imported natural gas and oil to

replace base load capacity. Giglio said: "Coal is the obvious low cost baseload replacement for nuclear, and the government is trying to push it despite public opposition, but it's the worst emitting in terms of carbon. So Japan is in a tough spot."

In this situation, biomass is a good option, as it provides dependable baseload power with the value of carbon recycling – a capability that Japan has recognised.

"To ensure energy sufficiency, the Japanese government drew up a feed-in-tariff (FIT) scheme for renewable electricity including biomass. This system allows a higher FIT price for biomass-based electricity production. It has been the biggest driving force behind the bioenergy boom and the building of biomass power plants in Japan," Janhunen said.

Consequently, Japan is one of the most aggressive and progressive in pursuing large-scale, high-efficiency biomass projects. These larger more efficient plants are important in reducing the consumption of biomass and thereby in improving the overall carbon cycle and reducing land use.

SFW has been working with Japan to develop 300+ MW single unit plants that operate under supercritical conditions. Giglio commented: "No one has done this anywhere else in the world. Japan has the structure, the will and the financial capability to do it." He says, the company is working with the government on writing the policy that will then be turned into a bidding programme and then tenders for these larger scale more efficient projects.

Another key market in Asia is South Korea. It is similar to Japan in terms of energy profile and strategy – it is a large importer of fuels and needs to keep electricity costs low. It is therefore, according to Giglio, also a target market for large, supercritical biomass plants.

He noted, however: "Unlike Japan, Korea has greater public opposition to biomass. The authorities have realised that mixing demolition woods and industrial waste material, etc., into the biomass streams, can reduce fuel costs. The public, however, view this as a type of waste-burning plant, which still has a stigma as being bad for the environment. Although a lot of the gas emitted from those plants is considered carbon-neutral, there are a lot of toxins, chlorines, metals, plastics, etc., that get into these fuel streams that make them more affordable but require clean burning technologies, like fluidised bed combustion to ensure they don't get into our atmosphere."

He added: "China is also looking at biomass but is going more towards the traditional trash-based fuel market... as a way to connect their landfill problems with their climate issues."

Valmet has also seen the interest

for different kinds of waste fuelled power plants increase in China. "We have delivered one municipal waste fuelled CFB power plant to China and have several other projects ongoing," Janhunen adds.

The picture in Europe is more mixed. While a number of countries are using biomass-based plants for power and heat, others such as Denmark are using it as part of a strategy to handle waste, become carbon neutral and create a circular economy. Valmet has recently commissioned a 500 MW (thermal) biomass based combined heat and power plant for the city of Copenhagen and another 140 MW (thermal) boiler for Ørsted. Germany sees biomass to energy as a local solution similar to waste-to-energy.

The UK, however, has been far more progressive on promoting and utilising biomass. The Drax 4000 MW power station in North Yorkshire, which was once the UK's largest coal fired station, has been steadily converted to biomass.

Further, Drax's latest Teesside project being undertaken by SFW will be the largest CFB boiler in the world firing only biomass when it starts up in 2021/2022. Japan will use this as a model to build its own supercritical 300 MW biomass projects.

Meanwhile, the Nordics have long been leaders in the use of biomass throughout the value chain – from pulp and paper to power generation and heating. The governments are well aligned with industry on the use of biomass and the business is well established and will continue for the foreseeable future.

Both Finland and Sweden, with their large biomass resources, are the world leaders in the field. Janhunen, says biomass is a very important energy source for district heating in Finland and Sweden, and also for industrial captive power heat and power plants.

"In fact our roots are in the pulp and paper industry, providing technologies that allows customers to turn waste bark, sludge and wood-based residues from their production processes into energy instead of landfilling," he said. "This is well aligned with moves to the circular economy and resource efficiency programmes."

Both SFW and Valmet, however, believe that developers looking to make the large long term investment required for such projects, need to know that their investment will be secure, and this calls for supportive legislation and market mechanisms.

Most countries have moved away from Renewable Energy Certificates to some form of feed-in tariffs to support projects. Europe, however, now seems to be discouraging support for biomass due to concerns over the carbon neutrality of the energy resource.

During a UN press conference in December last year, Frans Timmermans, Executive Vice President of the EU, said: "The issue of biofuels needs to be looked at very carefully. We have to make sure that what we do with biofuels is sustainable and does not do more harm than that it does good."

Giglio noted: "You now have to go through these 'tollgates' to get your biomass certified... and there is a big process to weed-out those projects that are not that carbon neutral. A big new no, no in Europe's latest sustainability plan is that you can't source the biomass outside Europe. That puts a stop-sign in front of a lot of new projects."

According to SFW, this is mostly affecting the growth of projects in Europe that generate electricity only, and to drive new power-only projects into the market, carbon prices in the EU emissions trading scheme will need to be in the €50/t range. Nevertheless, the underlying market for smaller niche, industrial CHP or district heating type plants where there is a local supply of biomass, is expected to remain robust.

If investors are to have confidence in the long-term return on projects, technologies that bring greater fuel flexibility and higher efficiency will be important.

Janhunen noted: "Circulating fluidised bed technology gives users the opportunity to burn various different fuels – biomass, coal or a mixture of both, as well as new types of biomass and waste. We are building more technologies to access a wider range of biomasses, especially in the area of agro-based biomasses."

He added: "The conversion rate needs to be good so that we can generate the most electricity when combusting the biomass." Valmet says steam temperatures in its boilers can now reach 560°C – even with partly agro-based biomass. This enables plant efficiencies of more than 40 per cent in condensing plant.

Giglio also believes efficiency is key to lowering costs, which also comes with scale. "As we build bigger plants, on average they become more efficient because there are bigger pieces that can contain the process better and you have lower heat losses. And we can push the steam conditions higher to supercritical steam conditions. So efficiency and scale both go together."

At the same time boiler companies are trying to advance technology to burn low quality fuels efficiently at these higher temperatures with minimum corrosion inside the boiler.

Ultimately, biomass burning and co-firing with coal may fall globally but it looks likely to remain an important energy source for many countries, especially in Asia, as they move towards greening their economies.

A little heat can go a long way

A new technology that is able to produce electricity from very low-grade heat looks set to help meet the power demands and reduce the carbon footprint of data centres. Applications in the oil and gas, fuel cell, and geothermal sectors are also just around the corner. **Junior Isles reports.**

The carbon emissions produced by data centres as a result of the massive amount of power they consume is increasingly being highlighted as a growing concern in the war on climate change. At the same time, utilities are struggling to keep up with this demand, and data centres often find themselves without adequate power for expansion.

A solution, however, could be just around the corner as a novel technology developed by PwrCor, Inc.

key step in its technology's roll-out with the announcement that it has engaged a New York investment bank as part of a multi-pronged plan to commercialise its proprietary heat-to-power technology.

Commenting on the move, Thomas Telegades, PwrCor's CEO, said: "The bank will be attracting strategic partners that will help us accelerate our commercialisation and, in the process, invest in our company. One of the strategies is to work with those industry leaders in the market verticals that we are focussing on: those who see the benefit of our technology to their business strategy and are looking to accelerate the use of PwrCor's technology in their industry."

"The amount of capital being invested – either by the strategic verticals that will come in, or by an energy fund or private equity – could range anywhere from \$10-20 million," noted Telegades. "It's not a great deal of capital but it's very focussed and purposed capital."

Strategic partners will essentially be those that have large amounts of "wasted low-grade heat that can be converted to power to their benefit". Key markets are therefore data centres, geothermal installations, the oil & gas sector, applications that use fuel cells and even solar-thermal facilities.

"The ability to capture that waste heat is what our technology does," said Telegades. "If you look at a reciprocating combustion engine as an example, a huge amount of heat is wasted in the exhaust and within the radiator (cooling) loop: those engines are running at about less than 50 per cent efficiency. We can harness this low-grade waste heat and convert it back to energy which ultimately improves the return on investment of a given process."

PwrCor's proprietary, international patent-pending technology uses waste heat, typically presented in the form of hot water, to power what Telegades describes as a "piston-driven thermal-hydraulic engine".

According to Telegades, the engine can function economically, depending on electricity prices and on heat at temperatures between 55-120°C (130-250°F).

Telegades claimed: "We are about the only solution able to efficiently convert heat to power at those levels. Organic Rankine Cycle (ORC) engines typically function above 250°F and some of them have been known to function as low as 200°F but none have functioned with any level of notable efficiency or economics below 200°F."

"When we compare the thermodynamic efficiency of our technology to ORC, we can deliver 3-5 times more power at equivalent heat levels. It's a breakthrough in the ultra-low temperature heat-to-power conversion market place."

The technology has been developed over the last seven years or so in collaboration with a world renowned independent research institute based in the US that offered third party R&D expertise as well as applications engineering.

Full-scale testing of PwrCor's first generation engine was carried out at the research institute and subsequently deployed at a geothermal hot spring in California. Power output has since steadily increased in subsequent generations of the engine, while slightly reducing the footprint. The current third generation engine has also been fully tested and has been shown to produce between 30 and 50 per cent of additional power versus that first generation engine.

"With the development of the 3rd generation of the technology, we're now ready to accelerate the commercialisation. The investment banking firm will help us do that," said Telegades.

The first two markets that PwrCor will focus on are data centres and oil & gas fields.

According to industry studies, data centres now consume over 3 per cent of total global electricity production, and consumption is expected to double every four years. Data centre power consumption in the US alone is expected to increase to 140 TWh within a year's time.

The servers within the data centres account for about half of the power consumed and additional electricity is needed to cool the data centre electronics. And with the number and size of data centres growing and the market trending to the use of denser server racks and faster chips to support High Performance Computing, Artificial Intelligence (AI) and the Internet of Things, etc., both power and cooling requirements are increasing.

PwrCor says it is "uniquely positioned" to convert the heat absorbed by state-of-the-art liquid cooling technologies into clean green power, thereby reducing carbon footprint and the demand placed on utilities to provide electricity.

Telegades, noted: "It's not unusual for a data centre to consume 40-50 MW of power, with as much as 98-99 per cent of the power consumed by the servers and its electronics being converted to heat. As servers get denser and hotter, the effective way to cool those electronics

is through liquid cooling that provides us with a stream of fluid that becomes the medium from which we can extract heat and convert it to useful electricity."

The end result is an improvement in the data centre's Power Usage Effectiveness (PUE) – a key data centre efficiency ratio – and significant cost savings that positively impacts a data centre's bottom line.

The power that can be recovered is significant. "For a data centre with electronics that consume 50 MW – if we assume the data centre is entirely liquid-cooled and the liquid-cooled stream is presented to us at between 160-175°F – we can produce approximately 5 MW of power. So, we're running at about a 9-10 per cent efficiency at those temperature levels," explained Telegades.

He added: "Not only can we give them electricity, we are entirely green: there is no combustion in our engine and we use no harmful chemicals. We only produce clean power from heat."

In terms of oil and gas, PwrCor is focussing on production fields. Its research, which has been validated by Southern Methodist University, shows there is a big market opportunity to produce electricity from heat in the geothermal co-produced fluids extracted from the ground during oil and gas production. According to their data, in the US alone there are more than 600 000 operating oil and gas wells with geothermal potential.

"When you extract hydrocarbons from the ground, typically what comes up with the oil or the gas is a lot of hot water known as co-produced fluids. Sometimes there's as much as nine parts co-produced fluids to one part hydrocarbon. The ability to provide electricity at the wellhead or well-site is a market opportunity for PwrCor," noted Telegades.

He says the company is currently working with an oil and gas operators to demonstrate the viability of PwrCor's technology at the wellhead. The gas operators have wells yielding co-produced fluids of between 190-215°F.

Telegades said: "One of the biggest costs of operation in an oil field is the cost of electricity. This will eliminate the need for them to import power from the utility or to run generators to create electricity to extract oil from the ground and/or run pumps."

Although not an immediate target market, PwrCor has also worked with a major fuel cell company on a study of how the engines can be used to provide additional power from fuel cell installations. Fuel cells also produce heat during the process of converting chemical energy to electricity. PwrCor believes that it can use the wasted low-grade heat from the fuel cell to produce 12-14 per cent of additional power.

Telegades summed up: "There's no other technology that operates in the temperature range that we do. So, our technology can bring a tremendous benefit to not only our clients in terms of low-cost power, but to the environment in terms of reduced heat and reduced hydrocarbon emissions."

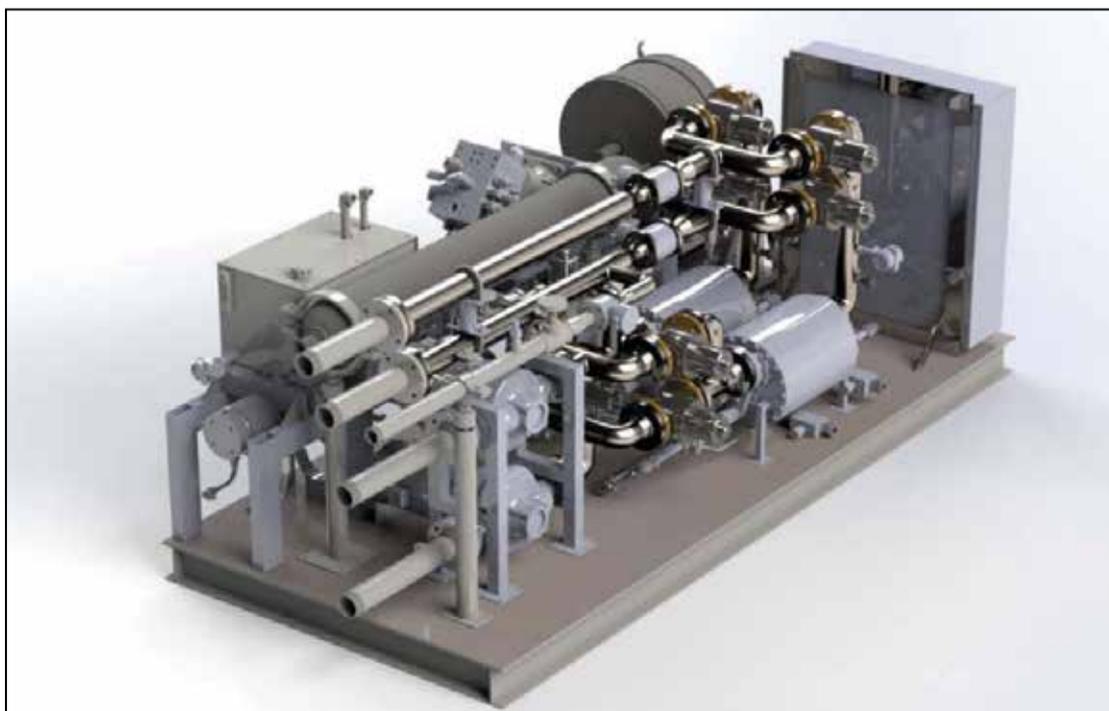


Telegades: "There's no other technology that operates in the temperature range that we do"

Waste heat is typically presented in the form of hot water to power a piston-driven thermal-hydraulic engine

moves closer to deployment. In October of last year PwrCor announced the discovery of an enhanced thermodynamic cycle, validated by an internationally renowned research institute, which makes the economic conversion of ultra-low-grade waste heat to power a reality.

At the start of February the US technology company, which specialises in renewable energy, marked a





Junior Isles

Desperate times need not be dark

These are desperate times. Almost everyone has been affected by the Covid-19 pandemic and for many of us the way we now live and work has changed beyond recognition.

While some industry sectors will be hit harder than others, all will be impacted in some way. The energy sector is no exception.

As lockdowns become widespread, electricity demand has fallen and will no doubt continue to fall for the coming weeks, if not months. On March 25th, one quarter of the world's population was under a coronavirus lockdown. And there is a direct correlation between the demand slump and the virus. According to an *FT* analysis of data from the European Network of Transmission System Operators for Electricity (Entso-e) – which represents 43 electricity transmission system operators in 36 countries across Europe – energy consumption is down in most European economies.

S&P Global Ratings said it expects power demand in Europe to decline by 5-7 per cent this year on 2019 and power prices to be down 20 per cent in 2021 from its previous assumptions.

In Europe, the fall in electricity consumption was first seen in northern Italy, the epicentre of the country's outbreak. Consumption in the region was 15 per cent lower on March 18 compared to the same day of the week in mid-February. In China, where the outbreak started, there has been some recovery from the peak of the crisis but power plant coal consumption is

still down by 30 per cent compared with the start of the year.

Wood Mackenzie said existing generators were having to “navigate crashing demand and margins” and noted that “significant downside risks remain” if containment efforts prompted a global recession. “The primary risk to regional power markets is a prolonged recession. Gas generators must navigate uneven impacts of a simultaneous oil price collapse,” said the global research and consulting firm.

“European lockdowns have become more widespread and established – shifts in power demand, market balance and price will become more marked. Gas remains more economic than coal despite the downward shift in carbon prices but both fuels are seeing lower margins due to depressed demand,” it said.

Wood Mackenzie also observed that the impact on technology supply chains and installations is “coming into view”. The spread of shutdowns into Spain, Italy, Malaysia and parts of the US will impact solar inverters and module production, said the firm.

The wind sector is certainly being hit. A report from the Global Wind Energy Council (GWEC) and Chinese Wind Energy Association (CWEA) said the coronavirus outbreak will impact the supply chain and installation operations in China's wind energy sector, as well as the worldwide wind industry.

It concluded, however, that while the virus will impact supply chain and installation operations, the slowdown

will not be as significant as reported by some industry observers (for example predicting a halving of China's installations in 2020).

Wood Mackenzie forecasts that the crisis will cause global wind additions in 2020 to decline by 4.9 GW compared to its previous projections. Due to the pandemic and other market changes since Wood Mackenzie's Q4 2019 update, total forecast wind additions for 2020 is now expected to be 73 GW.

According to Wood Mackenzie, the potential impact on global installations remains most significant in China and the US, where wind-focused policy deadlines were expected to deliver record volumes.

“The state of the pandemic is evolving on an hourly basis, resulting in a highly reactionary environment. Industry stakeholders are continually adapting business operations to balance worker safety with the needs of their clients, all while complying with dynamic government containment measures,” said Dan Shreve, Wood Mackenzie Head of Global Wind Energy Research.

The rapidly transitioning energy landscape has certainly shown that the sector can be creative and adapt when it needs to.

In India, the Ministry of New and Renewable Energy (MNRE) recently issued an official memorandum, which states that the time extension in scheduled commissioning of renewable projects due to the disruption of supply chains will be treated as a ‘*force majeure*’ event. It is a shame that many

insurance companies and some airlines have not taken the same stance to affected travellers.

The government of India, in its letter dated February 19, 2020, clarified that the disruption of the supply chains due to the spread of Coronavirus in China or any other country should be considered as a case of natural calamity and the Force Majeure Clause (FMC) may be invoked.

Working together during this testing time is important for everyone's survival and it is heartening to see that companies and governments are collaborating to keep businesses afloat and people in jobs. Ultimately businesses depend on people.

Trade unions, EDF and the UK government are all working to ensure jobs are safeguarded as much as possible to keep construction of the Hinkley C nuclear project moving. After the UK government announced its lockdown, the trade union GMB acknowledged that it was almost impossible to maintain full operations but would work to find solutions.

“We are aware that EDF and the companies involved are exploring options to keep workers, including the new government Furlough scheme, and we will work with them to find solutions to the short term issues thrown up by the current crisis.

“GMB are in several discussions a day with EDF to ensure that workers get the best deal in the short term, and that we secure their long term future at the site. We are strongly committed to the safety of our members and the future of the HPC Project.”

Fortunately, with electricity being an essential part of modern life, power providers will survive and ultimately, those supplying equipment to the sector will remain in business.

In light of the corona crisis, E.ON SE CEO Johannes Teyssen stressed: “Energy utilities have a special significance for critical infrastructure in this crisis and thus a special responsibility. We're Europe's biggest operator of energy networks. Their reliability and continuous availability is of paramount importance for healthcare, public order, and people everywhere.”

Addressing the possible implications of the corona crisis to the company, he said: “Overall, the energy industry doubtless won't be as hard hit as other industries. But will still expect the crisis to leave its mark on our bottom line. Industrial and commercial customers are consuming noticeably less energy. This will have a temporary impact on our network and sales businesses.”

Certainly these are desperate times but given the essential service that generators provide, they will be able to withstand Covid-19 better than most. S&P Global Ratings expects the credit quality of European utilities to stay relatively resilient. “We currently expect only a limited number of rating downgrades in the sector given the essential service they provide, the regulated or long-term contracted nature of a portion of their activities, and their relatively better access to capital markets,” said credit analyst Pierre Georges

That is fortunate for all of us. If the power industry fails, these would not be just desperate times but dark times indeed.

