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Negotiators compromise at COP25 but key issues delayed

UN Secretary-General António Guterres expressed disappointment at outcome of conference

Climate negotiators agreed what is seen as a weak deal at COP25 in Madrid but delayed agreement on carbon markets to COP26 in Glasgow. **Junior Isles**

Delegates at the UN's 25th Conference of Parties 2019 (COP25) on tackling climate change reached a compromise deal in December, approving the need to curb carbon emissions globally. However, key issues under Article 6 of the Paris Agreement remain unresolved.

By the end of the talks, held in Madrid, negotiators agreed that all countries will need to put new improved climate pledges on the table by the time of the next major conference in Glasgow in November. All parties will need to address the gap between what the science says is necessary to avoid dangerous climate change.

The UN Environment Programme's (UNEP) own emissions gap report, released just prior to the COP, showed the 1.5°C extended goal of the Paris Agreement is "slipping out of reach". Even if existing climate pledges – countries' Nationally Determined Contributions (NDCs) – are met, emissions in 2030 will be 38 per cent higher than required to meet that target, said the report.

A push led by the European Union and small island states at the meeting for greater climate ambition was opposed by a several countries, including the US, Brazil, India and China. However a compromise was agreed with the richer nations having to show that they have kept their promises on climate change in the years before 2020.

Despite the deal, however, the lack of progress in Article 6 was widely seen as a failure for COP25. Article 6 under the Paris Agreement is designed to allow developing countries to sell their unused pollution allowance, in the form of carbon credits, to heavy polluting developed countries that exceed targets. Those that exceed pollution levels would be financially penalised.

The emissions credits issued under the 1997 Kyoto protocol, however, are now almost worthless. The countries that still hold the old credits, including China, India and Brazil are arguing to have the right to carry them over into the new system that should have been agreed in Madrid. Australia, meanwhile has lobbied to carry over a second type of credit, which would allow it to apply the credits it received for over-achieving on prior climate goals towards its future targets in 2030.

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WB announces global partnership for implementing carbon markets

The World Bank (WB) has moved to help the rollout of carbon markets. On the sidelines of the UN's COP25 meeting in Madrid in December, the bank, together with country partners including Canada, Chile, Germany, Japan, Norway, Spain, and the United Kingdom, announced the 'Global Partnership for Implementing Carbon Markets (PMI)' to help countries embarking on carbon pricing move from readiness to rollout.

The Partnership, which will get underway in July 2020, will provide technical assistance to countries to design, pilot and implement carbon pricing and market instruments. It will support the direct implementation of carbon pricing in at least 10 developing countries and help a further 20 countries get ready to do so.

"Well-designed carbon pricing instruments can be a transformative part of the climate action toolkit. Over half of countries worldwide are thinking about how carbon pricing can help them meet their climate targets," said Laura Tuck, Vice President of Sustainable Development, World Bank. "This Partnership can help countries wanting to encourage climate action through strong carbon markets to get this right, building on what we know works, sharing experiences and best practices, and helping them ensure their citizens are on board with new policies."

The PMI is a response to increased demand for carbon pricing implementation support and knowledge exchange. WB says it builds on the success of its long-standing programme, the 'Partnership for Market Readiness (PMR)', that has provided targeted technical assistance on carbon pricing to over 20 emerging economies and developing countries, collectively accounting for over 40 per cent of global greenhouse gas emissions.

The PMI is expected to begin operations in July 2020 when it anticipates having reached $100 million in capitalisation and, over its 10-year programme, will have a total capitalisation target of $250 million.

Germany's Minister for the Environment, Svenja Schulze said: "The PMI is well-positioned to step-up the climate action agenda to the next level of ambition for reaching the goals of the Paris Agreement. Thus, I am pleased to announce for Germany a pledge of €10 million ($11 million} to the programme."

The Partnership aims to:

- Support countries and jurisdictions in the development and implementation of carbon pricing instruments;
- Assist countries to cooperate with each other, via the operation of Article 6 of the Paris Agreement;
- Help countries identify and implement best practices and, where relevant, achieve compatibility with other countries' carbon pricing and markets;
- Inform national and international policy discussions on carbon pricing, including by providing a platform for collective innovation on instruments and;
- Develop a comprehensive knowledge base and facilitate information exchange on carbon pricing instruments and proven market mechanisms.

Juan Carlos Jobet, Minister of Energy, Chile, commented: "The PMR has been key in building capacities on carbon pricing in our country, including the mechanisms to track greenhouse gas emissions and mitigation outcomes… New programmes such as the PMI come at a very good moment for Chile and other implementing countries, since sustained efforts are essential for our climate policy where carbon pricing is a core element."

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Analysis of the Kyoto Protocol and Article 6 by Climate Analytics revealed that if Brazil, Australia and China used their existing credits to meet the Paris Agreement targets, "global ambition" would reduce by 25 per cent.

Costa Rica's Minister for Energy and Environment, Carlos Manuel Rodríguez, blamed Brazil, the US and Australia for the lack of progress in Article 6, claiming the countries insisted on language unacceptable to most countries.

Nat Keohane, Senior Vice President at Environmental Defense Fund and an observer to the talks, said: "After negotiators failed a second year in a row to agree on guidance for markets, it's time to move on." He called for countries to set up their own rules given the lack of any UN guidance.

Keohane says countries should set up own rules on carbon markets

UN Secretary-General António Guterres expressed disappointment at the outcome of the conference. "I am disappointed with the results of COP25," he said. "The international community lost an important opportunity to show increased ambition on mitigation, adaptation and finance to tackle the climate crisis. But we must not give up, and I will not give up.

"I am more determined than ever to work for 2020 to be the year in which all countries commit to do what science tells us is necessary to reach carbon neutrality in 2050 and a no more than 1.5 degree temperature rise."

With parties falling short of reaching a deal, it was agreed that outstanding issue will be taken up again at an inter-sessional meeting in June and agreed at COP26.

Although COP25 was generally seen as a poor response to the climate crisis, 80 countries have already stated their intentions to enhance their climate pledges in 2020 and more than 175 companies committed to set science based targets. Similarly, a number of private sector companies, cities and regions have signed the World Green Building Council's Net Zero Carbon Buildings Commitment.

Denmark was one of the few countries that stood out amongst the disappointing climate summit. The Danish parliament agreed on a Climate Law, which included a target of reducing greenhouse gas emissions by 70 per cent by 2030. The law is binding for the current of future governments and is in line with the Paris Agreement target of limiting warming to 1.5°C.

Research published during the COP25 negotiations stated that since the Paris Agreement was signed, greenhouse gas emissions have risen 4 per cent. If countries act on scientific advice and keep warming below 2°C, they will need to cut carbon emissions by more than 7 per cent a year in the next decade.

Europe aims to lead climate battle with Green Deal

Europe has laid out the roadmap to be carbon neutral by 2050 but winning the full support of countries still heavily dependent on coal could be a stumbling block.

Junior Isles

The European Commission has set out its plan to make Europe the first climate-neutral continent by 2050. On December 11th, the Commission published its European Green Deal – a roadmap with actions to boost the efficient use of resources by moving to a clean, circular economy and stop climate change, reverse biodiversity loss and cut pollution. It outlines investments needed and financing tools available, and explains how to ensure a just and inclusive transition.

The European Green Deal covers all sectors of the economy, notably transport, energy, agriculture, buildings, and industries such as steel, cement, ICT, textiles and chemicals.

To set into legislation the political ambition of being the world's first climate neutral continent by 2050, the Commission will present within 100 days the first "European Climate Law". Work will immediately start for raising Europe's 2030 emissions targets, setting a realistic path to the 2050 goal.

The law would legally commit all European Union nations to cut emissions from 1990s levels by at least 50 per cent by 2030, up from the current goal of 40 per cent.

The commission is expected to present draft laws in January for approval, although debate and input from the national governments of the member states could water down the current proposal. Most of the policies are unlikely to take effect before 2021.

At the heart of the commission's proposals is a mechanism to pay out billions of euros to nations that rely on coal – especially the Czech Republic, Hungary and Poland, which had blocked the European Union from committing to a goal of net-zero greenhouse gas emissions by 2050.

Poland, which relies on coal for about 80 per cent of its electricity, is looking for more precise and generous commitments of EU funds to move away from fossil fuels before it agrees to implement the target. The Polish Prime Minister, Mateusz Morawiecki, told journalists he had secured an exemption for Poland on the 2050 target. EU leaders, however, expect Poland to sign up to implementing the target in June.

According to EU officials, the goal was to put down a relatively limited amount of cash €5-8 billion ($6-9 billion) and use financial instruments to augment the fund. The Commission has promised to publish details of a €100 billion "just transition fund" in January to help European economies make the green transition, in addition to €1 trillion the European Investment Bank has said it plans to generate from public and (mostly) private sources.

The Green Deal is the first major undertaking of the new EU President, Ursula von der Leyen, who said: 'The European Green Deal is our new growth strategy – for a growth that gives back more than it takes away. It shows how to transform our way of living and working, of producing and consuming... By showing the rest of the world how to be sustainable and competitive, we can convince other countries to move with us."

Executive Vice-President Frans Timmermans added: "We are in a climate and environmental emergency. The European Green Deal is an opportunity to improve the health and well-being of our people by transforming our economic model.

Meeting the objectives of the European Green Deal will require significant investment. Achieving the current 2030 climate and energy targets is estimated to require €260 billion of additional annual investment, representing about 1.5 per cent of 2018 GDP. This investment will need the mobilisation of the public and private sectors.

The Commission will present in early 2020 a Sustainable Europe Investment Plan to help meet investment needs. At least 25 per cent of the EU's long-term budget should be dedicated to climate action, and the European Investment Bank, Europe's climate bank, will provide further support. For the private sector to contribute to financing the green transition, the Commission will present a Green Financing Strategy in 2020.

In March 2020, the Commission will launch a 'Climate Pact' to give citizens a voice and role in designing new actions, sharing information, launching grassroots activities and showcasing solutions that others can follow.

Coal sees largest ever decline but may not be "lasting trend"

Decline in global coal power generation in 2019 will probably be the largest ever, but it is too early to call it the start of a new trend, says the International Energy Agency (IEA).

According to the Paris-based agency's latest market analysis and forecasts, although global coal demand is expected to decline, it remains broadly stable over the next five years, supported by robust growth in major Asian markets.

The weakness in coal demand, says the IEA, results mainly from less coal fired electricity generation, which is set to experience its largest ever decline – over 250 TWh, or more than 2.5 per cent. This drop is led by double-digit falls in the United States and Europe, according to 'Coal 2019', which was released in December and contains forecasts through 2024.

The IEA forecasts that renewable sources will supply a major portion of the increase in global electricity demand over the next five years. Electricity generation from coal will rise only marginally over that period, at less than 1 per cent per year – and its share will decline from 38 per cent in 2018 to 35 per cent in 2024. This means coal remains by far the single largest source of power supply worldwide.

It noted, however, that it is too soon to say whether the expected global decrease in coal power generation will continue.

Keisuke Sadamori, the IEA's Director of Energy Markets and Security, said: "This is not the end of coal, since demand continues to expand in Asia. The region's share of global coal power generation has climbed from just over 20 per cent in 1990 to almost 80 per cent in 2019, meaning coal's fate is increasingly tied to decisions made in Asian capitals."

In a separate report that surveyed 104 emerging markets, research firm BloombergNEF (BNEF) said the volume of power derived from coal surged to a new high in 2018. BNEF's Climatescope report suggested that developing nations are moving toward cleaner power but not nearly fast enough to limit global CO_2 emissions or the consequences of climate change.

It said the majority of new power generating capacity added in developing nations in 2018 came from wind and solar but the majority of power to be produced from the overall fleet of power plants added in 2018 will come from fossil sources and emit CO_2.

In early December a report by environmental groups BankTrack, Urgewald, IDMA and 350.org urged global banks to stop financing the construction of new coal fired plants. In their CoalExit report published just ahead the COP25 climate meeting in Madrid, the groups said financial institutions have channelled $745 billion over the past three years into companies planning new coal fired power plants.

The top three lenders listed in the report are the Japanese banks Mizuho, Mitsubishi UFJ Financial Group and the Sumitomo Mitsui Banking Corporation. These are followed by the US' Citigroup and France's BNP Paribas.

Battery prices continue to fall as flexibility becomes key

Battery prices, which were above $1100/kWh in 2010, have fallen 87 per cent in real terms to $156/kWh in 2019. By 2023, average prices will be close to $100/kWh, according to the latest forecast from research company BloombergNEF (BNEF).

Cost reductions in 2019 are thanks to increasing order size, growth in battery electric vehicle sales and the continued penetration of high energy density cathodes. The introduction of new pack designs and falling manufacturing costs will drive prices down in the near term.

The plummeting cost of batteries will be key to providing system flexibility with the ongoing integration of renewables. Twin reports published last month by BNEF in partnership with Acciona, the Madrid-based global renewable energy and infrastructure group, found that maximising the role of solar and wind power in the electricity systems of Spain and Chile between now and 2050 will hinge on the extent to which 'flexibility assets' such as batteries and dynamic electric vehicle chargers are deployed and used.

Rafael Mateo, Energy CEO at Acciona, said: "These reports show that wind and solar are the most cost-effective forms of generation for both countries and will dominate the electricity mix over coming decades. Using energy storage, smart-charging electric vehicles and other clean sources of flexibility will give Spain and Chile the opportunity to push down both emissions and costs."

Chile taps renewables to fill coal gap

Chile has accelerated its coal plant closure programme and continues its investment in renewables.

Siân Crampsie

Chile has used the COP25 climate talks in Madrid to outline its plans to retire coal fired power generation capacity early.

The country's government said it would retire four large coal fired power plants ahead of schedule and replace the capacity with renewables.

According to a government statement, Engie's Mejillones CTM1 and CTM2 coal fired plants, accounting for 334 MW in capacity, will close by the end of 2024, earlier than the originally planned date of 2040.

Meanwhile AES Gener's 334 MW of capacity at its two Ventanas units will be phased out in 2022, two years ahead of schedule.

Chile is aiming to become carbon neutral by 2050 and closing coal fired capacity is key to its plan. The country is also encouraging renewable energy investments and investing in the grid network to assist the transition.

Coal accounts for around 40 per cent of electricity generation in Chile, which also says it has already hit a target set for 2025 of 25 per cent renewable energy share.

According to the energy ministry, Chile currently has a pipeline of 602 km of transmission lines and 3562 MW of power plants, 97 per cent of which are renewable energy projects.

Engie is planning construction of 1 GW of renewables capacity in Chile to replace its shuttered coal capacity.

Its projects include the under-construction Capricorn solar park and Calama wind farm. a third project, Tamaya solar park, will begin construction in the first quarter of 2020.

Engie has also signed a letter of intent with the Inter-American Development Bank (IDB) to structure a long-term loan for up to $125m to finance investments in renewables.

IDB has developed an instrument to lower the financial cost of renewable energy projects for companies that own coal fired power plants, monetising the reduction in emissions.

In 2019 Engie closed two coal units in Tocopilla totalling 170 MW. It plans to close 270 MW at two more sites in 2021, and will also close 135 MW in Peru in the same year.

■ Vestas has secured a turbine order for the 185MW Cerro Tigre wind project in Chile from Mainstream Renewable Power. It will supply and install 44 of its V117-4.2 MW machines and service the wind farm for 20 years.

Fusion firm raises $65 million

General Fusion will formally launch a project to demonstrate its nuclear fusion technology after closing a $65 million funding round.

The Canada-based company says that the equity finance was led by Singapore's Temasek and includes investments from Development Bank of Canada, the DLF Group, Gimv, I2BF Global Ventures, and Disruptive Technology Advisers.

General Fusion has also raised C$50 million ($38.26 million) in additional investment from Canada's Strategic Innovation Fund, enabling it to launch its programme to design, construct, and subsequently operate its Fusion demonstration plant.

The demonstration plant is designed to confirm the performance of General Fusion's magnetized target fusion technology in a power plant relevant environment. "Pursuit of this next important step toward commercially viable fusion energy reflects the growing global collaboration between public and private stakeholders in this transformative technology," the company said.

"The world is pivoting toward fusion as the necessary complement to other technologies which, collectively, will enable the carbon-free energy future we all need," said Chief Executive Officer Christofer Mowry. "The success of our financing is further evidence that the global stakeholders in this endeavour are leaning into this challenge with action.

General Fusion has attracted more than $200 million in funding to develop its fusion technology. Existing backers include Amazon founder Jeff Bezos, Khazanah Nasional Berhad, Braemar Energy Ventures, Entrepreneurs Fund, and SET Ventures.

Vermont hosts Highview

Highview Power Storage says that a planned long duration energy storage facility in northern Vermont, USA, will help to resolve transmission system issues in the region.

The company has announced plans to develop a 50 MW+ liquid air energy storage system with Encore Renewable Energy.

The facility will be able to provide 400 MWh of storage and will be the first storage plant of its kind in the USA.

The project is the first of many utility-scale, liquid air energy storage projects that Highview Power plans to develop in the USA to help scale up renewable energy deployment. The Vermont facility will contribute to resolving the long-standing energy transmission challenges surrounding the state's Sheffield-Highgate Export Interface (SHEI) and enable the efficient transport of excess power from renewable energy sources, such as solar and wind power to help integrate them on the power grid.

Salvatore Minopoli, Vice President of Highview Power USA, said the company has strategically sought partners in the US that are renewable energy market leaders with experience in developing large-scale projects. "With their expertise in community-scale solar PV systems, traditional battery storage applications and solutions for the redevelopment of under-utilised properties, Encore Renewable Energy is a perfect partner for us as we continue expanding our technology in the United States," Minopoli said.

With Highview Power's liquid air energy storage solution, excess or off-peak electricity is used to clean and compress air which is then stored in liquid form in insulated tanks at temperatures approaching -196°C. When electricity is in high demand and more valuable, the pressurised gas is allowed to warm, turning a turbine as it expands and thus generating energy that can be used at peak times when the sun is not shining and the wind is not blowing.

US loses out in solar tariff war

US policy on solar energy equipment imports has cost the country around 10.5 GW of new capacity, according to the Solar Energy Industries Association (SEIA).

A market impact analysis carried out by the SEIA says that tariffs imposed on imported solar cells and modules have "devastated" the sector with the loss of more than 62 000 jobs and $19 billion of investment since 2017.

In addition to its economic impact, tariffs on solar have caused 10.5 GW of solar installations to be cancelled, SEIA said in a statement.

The analysis comes as the mid-term review process for the tariffs begins at the US International Trade Commission on December 5th, and covers tariff impacts from the beginning of the 2017 trade complaint by Suniva through the end of the tariff lifecycle in 2021.

"Solar was the first industry to be hit with this administration's tariff policy, and now we're feeling the impacts that we warned against two years ago," said Abigail Ross Hopper, President and CEO of the Solar Energy Industries Association. "This stark data should be the predicate for removing harmful tariffs and allowing solar to fairly compete and continue creating jobs for Americans."

The US administration imposed Section 201 tariffs on solar goods in early 2018, with a 30 per cent tariff on solar cells and modules.

The policy has helped solar companies with manufacturing facilities in the USA such as Suniva, which brought the original complaint to the International Trade Commission.

According to SEIA's analysis, each new job created by the tariff results in 31 additional jobs lost, 5.3 MW of solar deployment lost and nearly $9.5 million of lost investment.

According to the report, uncertainty caused the market to lose out on 3 GW of installations as rumours and actual tariffs disrupted contracts in 2017 and 2018. The actual tariffs then reduced the market for new projects by 7.5 GW from 2019 - 2021.

The reduced solar deployment figures will also impact the USA's emissions, it added, because higher prices for solar energy push economics in favour of substitutes, including gas-fired power plants.

Tariffs on solar are most harshly affecting nascent solar markets including Alabama, Nebraska, Kansas, and the Dakotas. These markets "won't be able to get off the ground" because tariffs make solar uncompetitive, SEIA said in a statement.

The Section 201 solar tariffs began at 30 per cent in 2018, and ramped down to 25 per cent in 2019, 20 per cent in 2020 and 15 per cent in 2021.

NJ doubles offshore wind goal

The US state of New Jersey has doubled its offshore wind energy goal as part of plans to produce 100 per cent of its electricity needs from renewables by 2050.

NJ Governor Phil Murphy has signed an executive order setting the state's goal for offshore wind at 7.5 GW of 2035, up from the previous goal of 3.5 GW.

The state this year issued a solicitation and selected Danish energy giant Ørsted as a preferred bidder for Ocean Wind, the first offshore wind project in the state with 1.1 GW of capacity. It is also planning to issue further solicitations for 1200 MW of offshore wind generation in 2020 and 2022.

Governor Murphy said: "There is no other renewable energy resource that provides us with either the electric-generation or economic growth potential of offshore wind.

"When we reach our goal of 7500 MW, New Jersey's offshore wind infrastructure will generate electricity to power more than 3.2 million homes and meet 50 per cent of our state's electric power need. We have an immense opportunity to maximise our potential and make this region and, specifically New Jersey the nexus of the global offshore wind industry."

Stranded coal fired asset risk deepens as renewables gain

■ Stranded assets in Indian thermal sector underestimated ■ Solar crosses 35 GW target

Syed Ali

A new report released by the Institute for Energy Economics and Financial Analysis (IEEFA) finds India's Parliamentary Standing Committee on Energy's 2018 list of stranded assets in the thermal power sector could have underestimated the true number of stranded assets in India.

Tim Buckley, lead author of the report and Director of Energy Finance studies with IEEFA, says stranded assets in the Indian thermal sector are not limited to the 34 projects highlighted by the Standing Committee on NPAs. "The issue is deeper, and the future pipeline faces similar risks," he said.

IEEFA reviewed 12 non-performing or stranded assets in India's thermal coal fired generation sector.

"Each of the 12 non-performing assets we reviewed had questionable economics behind their investment proposals, particularly as lower cost renewable alternatives can be built in a third of the time and at 30 per cent or lower cost to Indian electricity consumers," said Buckley.

According to the report – 'Seriously Stressed and Stranded: The Burden of Non-Performing Assets in India's Thermal Power Sector' – the $40-60 billion of non-performing or stranded Indian thermal power assets is placing stress on a troubled banking sector and is undermining the flow of capital critical to sustain strong Indian economic growth and a renewable energy future.

"Stranded assets in the thermal power sector are accumulating unfunded interest expenses that are unlikely to ever be paid," said Buckley. "Significantly, they're also hampering the bank's ability to invest in clean new renewable energy projects to meet both India's electricity demand needs and the country's ambitious world-leading renewable energy targets."

The Indian government recently clarified that the target date for achieving its 175 GW renewable energy generating capacity target is now December 31, 2022. Some 100 GW of this is planned to come from solar but in December Mercom's India Solar Project Tracker reported that the country has achieved only 35 per cent of the set target.

Mercom also lowered its 2019 forecast for capacity additions in view of the delayed commissioning of over 1 GW of projects, and the weakness in the rooftop solar market. The market research firm now expects 7.3 GW of solar capacity additions in India this year, down from 8 GW in its previous guidance.

It said solar had crossed the 35 GW mark, out of which about 31 GW of a target 60 GW of large-scale solar projects were in operation as of November 2019. Rooftop solar installations, however, are well off track, with only 4.1 GW of a target 40 GW recorded as of September 2019.

Greater adoption of clean energy by commercial and industrial (C&I) consumers is seen as critical for meeting national renewable energy and climate change commitments. In a report released by WWF-India at a recent conference, C&I consumers account for 51 per cent of the total electricity consumption in India, which is equivalent to 1130 TWh per annum.

Speaking at the conference, Vinay Rustagi, Managing Director at Bridge to India, noted that India needs tariff reforms to boost consumption of renewables by these consumers.

"Concerted government action is required to grow penetration of renewable power for these consumers. There are two broad areas of action required. First, we need tariff reform to reduce financial dependence of discoms on C&I consumers. Second, new procurement models need to be enabled."

Ravi Singh, Secretary General and CEO, WWF-India said: "Consumption of renewable power cannot only make C&I consumers cost competitive and spur macro-economic growth, but also play a significant role in reducing India's carbon emissions."

China's wind repowering market to boom from 2023

According to a new report by Wood Mackenzie, China's wind repowering market is expected to take off from 2023. More than 21 GW (cumulative capacity) of China's wind turbine fleet is expected to be repowered over the next 10 years (2019-2028).

Repowering refers to complete dismantling and replacement of old wind turbines at the original wind site. Wind farms older than 15 years are generally ideal candidates for repowering as the operation and maintenance (O&M) cost is 50 per cent higher than that of wind farms younger than five years.

While China's near-term repowering activity is limited, repowering demand should accelerate post 2023, resulting in a compound annual growth rate of 83 per cent. This is mainly driven by aging of installed base as the country's wind market experienced tremendous growth during the 2007-2010 timeframe.

Wood Mackenzie consultant Kevin Han said: "There is an early mover opportunity for forward thinking OEMs and service providers able to develop repowering solutions for at-risk turbines prior to this rapid acceleration in demand.

"Despite the potential, the market is likely to pay little attention to the repowering market in the near term due to the limited capacity of aged wind turbine fleet, lack of supporting policies and near-term focus on fulfilment due to expiring FITs."A second driver of the repowering market boom is declining availability of good wind resources for new wind projects. Most new projects after 2023 will be in regions with wind speeds below 6.5 m/s and have an internal rate of return (IRR) of no more than 10 per cent. Repowering at 9-10 m/s sites could provide an IRR of over 15 per cent. As subsidy cuts take effect and the new-build market slows, developers will increasingly focus on the repowering market for new investments.

In a separate report, Wood Mackenzie said up to 19 GW of new offshore wind capacity is expected to be added in APAC excluding China (APeC) over the next 10 years. It said, however, that the success of future offshore wind in APeC will depend on costs coming down.

Currently, the average offshore wind levelised cost of electricity (LCOE) in APeC is still 70 per cent higher than other renewables but the trend of auctions, technology changes and development of regional offshore supply is anticipated to lead to lower costs.

S. Korea has big wind, solar plans as coal comes under pressure

The Saemangeum Investment Agency of Korea (SDIA) and three local players have formed a joint venture to develop an up to 2.7 GW floating solar complex and 300 MW of offshore wind. The complex is to be built behind the Saemangeum dyke in South Korea, one of the world's largest seawalls.

SDIA's partners in the project are Amsterdam Capital Partners BV (AMSCAP), G8 Subsea Pte Ltd and Saemangeum Offshore Wind Power Ltd (SOWP). AMSCAP says it will work together with G8 alongside SOWP on the offshore wind portion, taking care of the financial and technical elements of the project.

Such projects will ultimately help South Korea reduce its dependence on fossil fired generation and thus cut emissions.

Just last month the country began suspension of up to a quarter of its coal fired power plants in a move to address growing public concern over airborne particles and pollutants.

The country has some 60 coal plants and between 8 and 15 will have operations suspended from December until February 29, the Ministry of Trade, Industry and Energy said in a statement. The remaining plants will reduce output to 80 per cent of capacity over the period, it said, adding the measures would reduce the sector's fine dust production by up to 44 per cent.

Australia must stop burning coal and reconsider nuclear

A new international report has warned that Australia must stop burning coal before the end of 2030 if it wants to meet its commitment to the Paris Agreement.

With coal making up approximately 60 per cent of Australia's electricity generation, the report found that if current power plants were to operate until the end of their technical lifetimes, as current policies foresee, they would emit a further 194 per cent of the carbon budget needed to stay in line with the nation's obligation.

"Australia would be well advised to fully decarbonise its electricity generation quickly, as it is a fundamental step in cutting emissions in all other sectors, where electrification plays an important role," said Paola Yanguas Parra, who leads the work on decarbonisation strategies at Climate Analytics.

Meanwhile, a separate report published by a parliamentary committee said the government should consider a partial lifting of the current moratorium on nuclear energy to allow the deployment of new and emerging technologies.

"If we're serious about reducing greenhouse gas emissions, we can't simply ignore this zero-emissions baseload technology. But we also need to be humble enough to learn lessons from other countries who have gone down this path. It's as much about getting the technology right as it is about maintaining a social licence based on trust and transparency," said committee chairman Ted O'Brien, Member of Parliament for Fairfax in Queensland.

Australia has the world's largest known uranium resources and is the world's third-ranking producer of the metal, behind Kazakhstan and Canada, but it uses no nuclear power, generating most of its electricity from coal.

Agneta Rising Director General, World Nuclear Association, said: "I am pleased to see that the Committee's report recommends an economic assessment of nuclear energy alongside other energy sources that would include full system costs and the impact of carbon emissions. Only when the full costs and benefits of different forms of electricity generation are considered can a fair comparison be made."

Ireland approves RESS scheme

Ireland's long-awaited RESS scheme will help numerous shovel-ready renewable energy projects get over the line.

Siân Crampsie

Ireland will hold its first renewable energy auction under a new support scheme early this year.

The government has given its approval for the long-awaited Renewable Electricity Support Scheme (RESS), paving the way for the first auction to take place and get large quantities of shovel-ready projects off the ground.

The RESS is a competitive auction-based funding mechanism for renewable energy schemes designed to help Ireland achieve a 70 per cent renewables share by 2030. The first auction will target 1-3 TWh of energy for delivery by end-2022, subject to state aid approval by the European Commission.

In a statement, Ireland's Ministry of Communications, Climate Action and Environment said that at least four auctions will be held between 2020 and 2027, and that the frequency of the auctions would be determined by the project pipeline.

The approved RESS rules allows for all renewable energy technologies to compete in the auctions. There will be a solar category accounting for ten per cent of the total auctioned volume, as well as a community-led category for up to 30 GWh of power.

Community benefit funds of €2 ($2.2) per MWh annually will be obligatory for participants, while RESS will also mandate Irish citizens that have access to invest in renewable energy projects located in their area.

According to analysts Cornwall Insight, projects successful in the first auction that can start commercial operation ahead of the end-2022 deadline will be able to earn additional support.

"As a rule, wind projects take 12 months to finance and a further 18 months for construction making the December 2022 deadline a sensible cut-off if the auction is to take place in June 2020," said Catherine Edwards, Research Analyst at Cornwall Insight Ireland. "If a project developer is confident that they can deliver in time for July 2021, it is possible that this may impact their bidding strategy. If the project could be delivered ahead of schedule, it would receive an additional 18 months of support if the bid was accepted. This bonus could incentivise developers to bid in lower prices.

"Ultimately, lower bid prices could negatively impact other projects which could be 'outbid' (undercut) by some of these faster build projects, including solar who are betting on an early delivery date.

"There could be a potential danger for any projects bidding at a low price on the assumption of an extra 1.5 years of support, only to then be unable to deliver their project before the deadline due to circumstances beyond their control."

Ireland's 70 per cent renewable electricity target is part of its Climate Action Plan. Environment Minister Richard Bruton said: "Ireland is currently 86 per cent reliant on fossil fuel. We must radically reduce this dependence and make the transition to cleaner, more renewable energy.

"We are exiting from peat and coal to generate electricity and moving to clean, renewable sources of power, like wind and solar.

"The Renewable Energy Support Scheme is a flagship government policy designed to deliver on our commitments to decarbonise our electricity grid, harness our natural resources and bring renewable energy into the heart of our communities."

Bruton said that installed wind capacity has grown by 50 per cent since 2015.

The auction could see capacity grow by 30 per cent in the next three years, with solar and community participation, Bruton added.

EIB deal highlights hydrogen goal

- S&P launches H_2 price index
- OGA reports on greening oil and gas

The potential role that hydrogen (H_2) could play in the fight against climate change has been highlighted by a landmark agreement between the European Investment Bank (EIB) and the Hydrogen Council.

The two organisations have pledged to collaborate on the development of innovative schemes to finance hydrogen projects, with the EIB providing strategic financial advice and support to companies preparing to deploy large-scale hydrogen projects.

The partnership will help scale-up hydrogen technologies that could play a major role in the energy transition, EIB said. It added in a statement: "The hydrogen economy will require annual investments of $20-25 billion until 2030. Though a significant investment, the amount is a fraction of what the world invests in oil and gas and renewable electricity per year. The EIB and the Hydrogen Council's cooperation will help to accelerate and facilitate access to funding for a number of hydrogen projects which will benefit from the EIB's InnovFin Advisory support."

In a recent report, The Future of Hydrogen, the IEA made clear that hydrogen is experiencing unprecedented momentum around the world due to its potential to tackle various critical energy challenges. Similarly, the Hydrogen Council has found that hydrogen can address 18 per cent of global energy demand and abate one fifth of emissions.

Pierre-Etienne Franc, Hydrogen Council Co-Secretary and Vice President of the Hydrogen Energy World Business Line at Air Liquide commented: "This collaboration agreement signals to the market that a major shift is about to take place. As confidence in hydrogen continues to grow, investors are coming to the table to back innovations and turn them into a reality. Hydrogen Council members recognise the strong business case for hydrogen and, as we work alongside the EIB, our goal is to find new and innovative ways to fund these solutions. Only when we scale deployment will we help realise the full potential of hydrogen to drastically decrease energy-related CO_2 emissions."

Last month, S&P Global Platts published a first-to-market suite of hydrogen price assessments.

According to S&P, hydrogen is increasingly attracting interest from investors, policymakers and energy market participants. Simon Thorne, Global Director of Generating Fuels of S&P Global Platts, said: "The current market for hydrogen is relatively opaque but full of potential. We recognise the importance that hydrogen will play in a clean energy future, and the transformative role the fuel will play in global energy markets.

"In the interest of providing the transparency that is so critical to market development, the new S&P Global Platts hydrogen price assessments will provide an independent, impartial evaluation of hydrogen as a fuel."

Current global demand for hydrogen is roughly 70 million metric tons per year, according to the IEA. S&P analysis suggests that achieving a ten per cent blend in natural gas pipelines would add 60 million tonnes per year to that demand and contribute towards the 'greening' of the world's oil and gas industry.

Last month the UK's Oil and Gas Authority (OGA) highlighted the importance of integrating offshore renewables with oil and gas to help reduce carbon emissions.

The OGA's UK Continental Shelf (UKCS) Energy Integration: Interim Findings study cites technologies, such as carbon capture and storage (CCS), as well as green hydrogen production and storage, as critical in supporting decarbonisation.

OGA's report finds that multiple offshore integration concepts are technically feasible and would be viable options for helping to lower the oil and gas industry's carbon footprint and decarbonising the UK economy.

It notes that H_2 has feasible production avenues through both blue hydrogen (produced by natural gas reforming) and green hydrogen (electrolysis produced by renewables) routes, enabling decarbonisation of power, heat and transport.

The offshore energy sector offers significant production, storage and transport potential, for example through the re-purposing of offshore oil and gas infrastructure and offshore electrolysis, with transportation in re-used pipelines.

Offshore energy hubs can meanwhile help scaling up net-zero energy solutions, for example, by allowing hydrogen to be generated offshore using wind farms and stored in reservoirs to be transported to shore using oil and gas infrastructure, according to the study.

Endesa proposes Spanish mega-project

Plans for significant new quantities of new renewable energy capacity have been put forward in Spain in the wake of the COP25 climate talks in Madrid.

Last month Endesa announced a roadmap to replace its major thermal power plant in Teruel province with a renewable energy mega-project, with the European Investment Bank (EIB) pledged financial support for nine solar power plants.

José Bogas, CEO of Endesa, said the company planned to build a 1.7 GW green energy complex in Andorra to plug the gap left by the closure of a 1100 MW thermal power plant in the region.

The complex would be predominantly solar photovoltaic (PV) capacity, with around 140 MW of wind energy and 160 MW of energy storage. It will be built at a cost of around €1.5 billion.

At the COP25 talks, EIB said it would lend Natixis €66 million to co-finance construction of 436 MW of solar PV capacity, spread across two large-scale complexes.

In Extremadura, Aragón and Castilla y León, Natixis will build eight PV plants with a combined capacity of 245 MW, using up to €25 million of the EIB funds.

The second solar power complex supported by the EIB will be in Alcalá de Guadaira, Seville, with the EU bank providing €41 million to Natixis to finance construction of 182 MW of capacity.

State Grid targets Oman

China's State Grid has continued its overseas utility sector expansion with the purchase of a 49 per cent stake in Oman's Electricity Transmission Company (OETC).

The purchase contract – signed in Muscat in mid-December – represents the largest single investment by a Chinese company in Oman and the first major investment by State Grid in the Arabian Peninsula.

State Grid has paid around $1 billion for the stake in the state-owned group, part of Nama Holding. The move will broaden State Grid's geographic portfolio and follows a major spending spree in 2016, when it spent around $8.4 billion on utility assets in Brazil and Greece.

State Grid also operates networks in Italy, Portugal and Australia. It said in a statement that the purchase of Nama is also part of China's Belt and Road initiative, a $1 trillion plan to build and invest in infrastructure across the Eurasian landmass.

Over the past 10 years, Chinese companies have invested only $50 million in Oman, according to data from global provider of financial markets data and infrastructure, Refinitiv.

Nama said in a statement that the agreement signed with SGCC aims at introducing the most advanced technology and management experience to ensure the steady economic development of Oman.

The deal is part of Oman's wider privatisation programme, which aims to attract foreign direct investment into the country's economy. Nama invited eligible international companies to submit bids for OETC and received 11 expressions of interest from a total of 16 international investors.

Nama Holding launched the privatisation process in late 2018, offering up to 49 per cent of OETC as well as 70 per cent stakes in distribution and supply companies.

Acwa sets solar milestones

- Sakaka on-line by end-2019
- Risha achieves COD

Acwa Power has said that Saudi Arabia's first utility scale renewable energy project would start commercial operations by the end of 2019.

The 300 MW Sakaka solar photovoltaic (PV) independent power project (IPP) has been connected to the grid and started an initial pilot operations phase in late November 2019, Acwa has reported.

The SAR1.2 billion ($310 million) project was awarded to an Acwa Power-led consortium at a world record tariff of 8.781 halalas/kWh (2.34 cents/kWh) under Saudi Arabia's King Salman Renewable Energy Initiative in early 2017.

In January 2019, Saudi's Renewable Energy Project Development Office (REPDO) launched a tender for the development and construction of seven new solar projects with a combined generation capacity of 1515 MW. That procurement exercise has so far attracted interest from more than 250 companies.

In December Acwa Power also announced the completion of the Risha PV IPP project in Jordan's Mafraq Governorate.

It said that the $68 million, 50 MW project started commercial operations on schedule after completing all the required commissioning and start-up tests.

The power purchase agreement for Risha PV was initially signed by Acwa Power and NEPCO in 2017, setting the lowest tariff for renewable energy in Jordan at the time, JD0.042 /kWh ($0.056/kWh). The Risha PV IPP was developed in line with the ambitions of the government of Jordan to attract investment and ensure a 20 per cent contribution of renewable energy in the total energy mix of the country by 2020.

The Risha PV IPP was financed by a number of international and regional financial entities including the European Bank for Reconstruction and Development (EBRD), Deutsche Investitions- Und Entwicklungsgesellschaft Mbh (DEG) and Arab Bank.

Amea wins Egyptian PPAs

Amea Power is to build 700 MW of renewable energy capacity in Egypt but has cancelled plans for a coal fired power plant in the country.

The UAE-based developer has signed two power purchase agreements (PPAs) with the Egyptian Electricity Transmission Company (EETC) covering an onshore wind farm and a solar power plant.

However a planned supercritical coal fired power plant at Ayoun Moussa – backed by Amea's parent company, Al Nowais – has been cancelled because of concerns over the cost of the project, local media has reported.

Amea Power will invest around $750 million in two new renewable power plants – a 500 MW wind farm in Jabal Al-Zayt, in the town of Ras Ghareb in the Gulf of Suez, and a 200 MW solar photovoltaic (PV) power plant in Kom Ombo, in Upper Egypt.

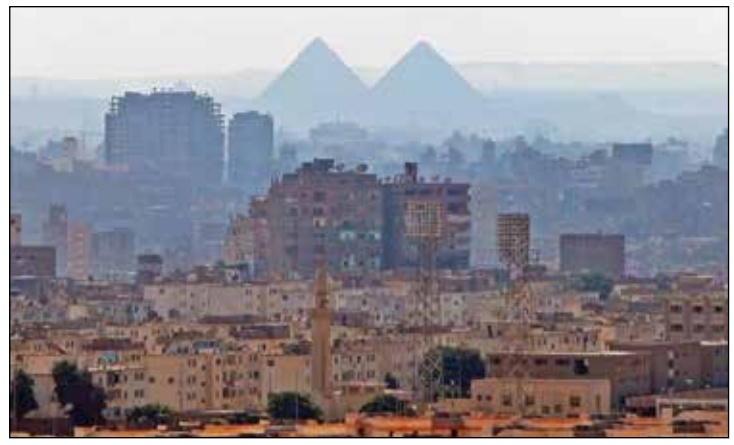
The $550 million wind farm will be developed by Amunet Wind Power Company (AWPC) and the $200 million solar farm by Abyodos Solar Power, both subsidiaries of Amea Power. EETC will pay ¢19/kWh for energy from the wind farm, and ¢15/kWh for the solar energy, according to reports.

The projects will be commissioned in 2023 and 2021, respectively.

In November, AMEA Power signed a PPA with the Electric Power Company of Togo (CEET) for a 50 MW solar PV farm, currently under construction. The firm also has a 60 MW PPA with Chad's Ministry of Energy and over 100 MW of renewable energy projects under construction in Jordan.

In Ayoun Moussa, in Egypt's Suez area, Al Nowais had planned construction of a 4 x 660 MW ultra supercritical coal fired power plant and coal handling jetty. The Egyptian government allocated the company land for the project in 2017 and started talks over power off-take. Power purchase contracts were scheduled to be signed in early 2019 but the Egyptian government delayed the process due to concerns over surplus energy and the costs of the technology.

According to *Daily News Egypt*, the Ministry of Electricity has terminated an agreement with Al Nowais for the plant.



Stage six alert shakes South Africa

South African utility Eskom has issued an apology after implementing the largest rolling power blackouts in its history last month as it continued to battle technical and structural issues in its fleet.

The company implemented stage six load-shedding in early December, meaning that it was forced to remove 6000 MW of demand from the grid to balance the system.

The stage six alert was in place for several hours on the evening of December 9th before the utility reverted to stage four.

"Eskom unreservedly apologises to all South Africans for the inconvenience during this difficult period," Eskom said in a statement. It added that it was "grateful" to large power users on the system for their assistance in helping Eskom to manage demand.

According to Eskom, the shortage in generating capacity was caused by several issues, including the loss of several units at the Medupi coal fired power plant due to coal handling issues, and flooding at the Kriel mine and power plant.

Eskom's system was operating normally later in December, with no load shedding reported. However the continued problems have once again highlighted the need to solve Eskom's financial position and boost investment in the country's crumbling electricity network.

Eskom is currently unable to repay its $30 billion of debt and is reliant on state bailouts. Its ageing fleet of electricity plants require maintenance and repair, while new generating units such as Kusile and Medupi have suffered delays, technical problems and cost overruns.

There are also thought to be problems with corruption in the state-owned group, which President Cyril Ramaphosa has pledged to stamp out.

Ramaphosa has also pledged to split the utility into three government-owned companies to improve its operations.

Business groups and analysts have warned that continued power supply problems will harm South Africa's economy. The South African Chamber of Commerce and Industry, the country's largest business group, has said the effect of the outages were devastating.

"We have received many complaints from businesses in the retail and other manufacturing sectors not being able to fulfil production schedules on sales orders during this critical period," the chamber said.

"The government's promised plans in revitalising the economy by building infrastructure and driving policies for industrialisation will now come into question as energy is the biggest enabler for any of these plans to come to fruition."

In November, S&P Global Ratings said that the proposed three-year timeline for breaking Eskom up into three separate entities was "optimistic".

A government paper released in October set out a vision for a restructured electricity supply industry, where Eskom could relinquish its near-monopoly and compete with independent power producers to generate electricity at least cost.

The government plans to set up a transmission unit within Eskom by the end of March 2020 and complete the legal separation of all three units in 2022.

Mitsubishi wins in Eneco sell-off

Mitsubishi is looking to expand its European footprint and capitalise on Eneco's clean energy expertise through a €4.1 billion deal.

Siân Crampsie

Japan's Mitsubishi has expanded its European footprint with a successful bid for Eneco, one of the largest suppliers of electricity and gas in the Netherlands.

Together with consortium partner Chubu Electric Power Company, Mitsubishi made a €4.1 billion all-cash offer for 100 per cent of Eneco shares. Its bid beat rival offers from Shell, Dutch pension fund PGGM and Rabobank.

The deal will require final approval by Eneco's 44 municipal shareholders. It will give Mitsubishi an 80 per cent share in Eneco, and Chubu Electric the remaining 20 per cent.

Mitsubishi said that the deal would enable it to expand its European operations as well as enhance its footprint and expertise in clean energy. Eneco operates around 1.7 GW of onshore wind capacity – mostly in the Netherlands – and also has assets in offshore wind, solar and biomass technologies.

Eneco is also active in a range of home energy services, including smart meters and electric vehicle charging. Mitsubishi will give Eneco a €1 billion loan, which it can draw upon at its discretion to fund long-term investments.

"Eneco fits in perfectly with our current energy activities and provides us with a platform to further grow in the European market in which we intend to have a leading position in the energy transition," said Takehiko Kakiuchi, Chief Executive of Mitsubishi.

Mitsubishi said that it would look to expand Eneco internationally and make the firm the base for its European activities. It will transfer 400 MW of its offshore wind portfolio to Eneco, it added.

Eneco will continue to operate as an integrated and independent Dutch energy company. Its CEO, Ruud Sondag, will resign once the deal is complete and become a senior advisor, while Eneco Chief Customer Officer Hans Peter and someone from Mitsubishi will be added to the Eneco board.

In 2013, Mitsubishi acquired a 50 per cent stake in the 129 MW Eneco Luchterduinen offshore wind farm in the Dutch North Sea from Eneco.

Eneco and Mitsubishi are also partners in the development of the 370 MW Norther wind farm located off the Belgian coast. The two companies jointly own a 50 per cent stake in the project.

Engie grows European portfolio

- Renvico adds onshore wind capacity
- EDP sells hydro assets

Engie has added to its asset base in Europe with two deals to buy an onshore wind portfolio from Macquarie and six large hydropower plants in Portugal from Energias do Portugal (EDP).

The French energy giant has announced plans to buy Renvico from Macquarie Infrastructure and Real Assets (MIRA) and KKR, giving it 329 MW of operating wind farms in France and Italy.

In a separate deal, Engie will buy 1689 MW of hydropower capacity from EDP in consortium with Crédit Agricole Assurances and Mirova-Nataxis.

The acquisitions will contribute to Engie's growth ambitions of adding 9 GW worldwide by 2021, including 3 GW in Europe, the company said. Gwenaelle Avice-Huet, Engie's Executive Vice President in charge of Renewable Energy said that the Renvico acquisition will enable the company to "strengthen its onshore wind leadership, with a 2.1 GW installed capacity at the end of 2018". Avice-Huet added: "In Italy, Engie will double its onshore wind installed capacity, to reach more than 300 MW."

Renvico also owns a 300 MW greenfield onshore wind project pipeline, Engie said.

In Portugal, Engie owns a 40 per cent stake in the consortium that will take over three run-of-river hydropower plants and three pumped storage plants from EDP.

The Portuguese utility said that it was selling the assets in a bid to optimise its portfolio and reduce its exposure to hydro volatility. It will remain the largest hydropower generator in Portugal after the transaction, with 5.1 GW operating.

EDP expects the transaction to close in mid-2020. Engie said it would help it to accelerate its renewable energy development plans.

The six hydropower plants are located on the Douro river area in northern Portugal and contributed €154 million to EDP's 2018 earnings.

Macquarie powers up Savion

Macquarie's Green Investment Group (GIG) has officially launched operations at Savion following completion of the unit's purchase from US renewable energy developer Tradewind Energy Inc.

Savion's assets include over 8 GW of utility-scale solar energy and energy storage assets in operation, under construction or in development across 25 US states.

It says it "will focus on the development of utility-scale solar and energy storage projects in partnership with utilities, municipalities, corporate customers, and landowners across the United States".

It will be led by Rob Freeman and Geoff Coventry, who founded together Tradewind Energy in 2003.

"We are extremely excited about this next chapter and for our team to have the opportunity to continue its project development focus in the rapidly growing solar sector and the emerging energy storage technology market," said Freeman, Chief Executive Officer of Savion. "The backing from Macquarie's Green Investment Group provides a strong financial footing to ensure successful projects, enabling our team to pursue the mission of electricity grid diversification."

GIG acquired Savion from Enel-owned Tradewind Energy in August 2019 and closed the deal in November. It says that Savion will continue to operate as a standalone business, and that the acquisition has put it at the heart of the fast-growing US renewable energy market.

In a statement, GIG said: "The acquisition of Savion, combined with other key partnerships, has helped GIG form a solar and storage strategy in which it will provide US-based corporates with reliable and cost competitive renewable power from newly developed solar projects through power purchase agreements."

"The combination of Savion with Macquarie's Green Investment Group brings together a leading US renewables developer and project pipeline with the capabilities of the wider Macquarie Group across investment, capital raising, and energy trading," said Chris Archer, Head of Americas at the Green Investment Group.

"We are excited to work with this experienced team to find new solutions to deliver clean, renewable, low-cost energy solutions to our clients including large corporations, municipalities, and residential communities," he noted.

Energy storage facilities are critical to building resiliency on the US electrical grid. According to Wood Mackenzie Power & Renewables, the US storage market is poised to experience substantial growth due to supportive policy structures and new opportunities for battery storage to provide wholesale market services.

Worley partners Plug and Play

Worley will support high potential startup companies across the energy supply chain as part of a new partnership with Silicon Valley startup innovation platform, Plug and Play Energy & Sustainability.

The companies aim to bring innovation to the sector as the industry shifts to digitally-focused operations as well as address challenges and opportunities in new energy, construction, safety, automation, sustainability and the digitalisation of the value chain.

As part of the work, Worley will have a remote office space in Silicon Valley that provides access to the startup ecosystem, which includes over 300 corporate partners and 200 venture capitalists. It will also sit on the Energy and Sustainability board to highlight industry challenges, engage with start-up companies, and run pilot programmes to validate the value of new technologies and their potential impact on the wider energy industry.

"Our partnership with Plug and Play gives us insight into emerging technologies and trends that we otherwise would not have access to," said Roy Brown, Director of Emerging Technology at Worley. "Through this partnership, we can come together with the start-up community to highlight our industry challenges and bring new technology solutions to market. We can also connect with our peers and customers to share our challenges and lessons learned around sourcing, piloting and scaling technologies, and most importantly, share our success stories."

Climeon collaborates with Geo40 on geothermal

Climeon and GEO40 will work together on a solution to combine geothermal energy with mineral extraction. The two companies have signed a collaboration agreement to combine Geo40's mineral extraction technology with Climeon's geothermal energy offering, and create a mineral extraction and power production plant in 2020.

The deal will strengthen Climeon's offering and help it expand into waste heat recovery at existing geothermal sites. Thomas Öström, CEO of Climeon, said|: "We're happy to announce this strategic collaboration with Geo40. By combining our Heat Power modules with Geo40's technology for extraction of silica and valuable minerals we can strengthen our geothermal offering and open up a new part of the geothermal market," said.

Geo40 has developed a technology to extract silica and other minerals from geothermal brine, the hot wastewater that remains after high temperature geothermal power production. The silica in the brine causes scaling in geothermal pipes and wells and limits the heat that can be extracted and utilised for power generation.

By extracting and removing the silica and other valuable minerals like lithium, Geo40's technology reduces operating costs for geothermal power stations, while producing sustainably sourced minerals.

"We believe that our patented technology for silica removal combined with Climeon's technology for waste heat recovery is an exciting development for the geothermal industry and will be exploring the possibilities of a first common project," said John Worth, CEO of Geo40.

Americas

GE equips Rio project

GE has signed a contract to deliver, install and commission the wind turbines for a 150 MW wind farm in Brazil.

The company will supply 30 Cypress wind turbines for the Serra da Babilonia wind farm in Bahia state, with installation due to be completed in late 2020. Its contract also includes a ten-year operation and maintenance (O&M) services deal for all equipment supplied by the company, with an option to extend to 20 years.

The contract is GE's first in Brazil for its Cypress platform, its most powerful onshore wind turbine.

Nordex extends service contracts

The Nordex Group has extended three service contracts covering a total of 61 turbines in Uruguay and the US.

In Uruguay, Nordex will maintain 21 N117/2400 wind turbines at the Florida wind farm, near the city of Florida, about 110 km north of Montevideo, as well as 20 N100/2500 turbines at the 50 MW Cerro Largo wind farm in northeast Uruguay.

The extended service contracts are for a further five and six years, respectively.

In a third contract, Nordex will provide Premium service for a 50 MW wind farm in Maryland, USA. The project is comprised of 20 N90/2500 wind turbines.

The Nordex Group has been providing O&M services to the project since operations commenced in 2011. This extension renews the service agreement for 10 years.

Vestas secures Chilean deal

Vestas will deliver and install 44 of its V117-4.2MW wind turbines at Mainstream Renewable Power's Cerro Tigre windfarm in Chile's Antofagasta region.

Vestas will deliver the turbines by the third quarter of 2020. It will also provide operation and maintenance services for the windfarm for 20 years under active output management 5000 (AOM 5000) service agreement.

The wind farm is due to start operating in 2021, Mainstream said. The project is part of the company's 1.3 GW wind and solar platform in the South American country.

Prysmian reels in Empire deal

Equinor has signed up Prysmian Group to supply the inter-array cables for the 816 MW Empire offshore wind project in the USA.

Under the deal, Prysmian will supply 150 km of high-voltage 66 kV lines for the wind farm. The cable system will be manufactured at Prysmian's centres of excellence in Montereau, France, and Nordenham, Germany.

Cable installation is slated for 2023 or 2024.

Asia-Pacific

Senvion wins Tithwa bid

Engie has awarded the engineering, procurement and construction (EPC) contract for the 30 MW Tithwa wind farm in India to Senvion.

Senvion will supply 13 of its 2.3 MW wind turbines for the project, located in Morbi district, Gujurat state. It will also operate and maintain the wind farm for ten years.

The project was awarded to Engie on a Build, Own, Operate (BOO) model in December 2017 by Gujarat Urja Vikas Nigam Limited (GUVNL), the state's distribution company, under a 25-year PPA at a tariff of Rs2.44/KW/h ($0.034/kW/h).

Vestas secures order from BayWa r.e.

Vestas has secured a 21 MW order from global renewable energy developer, BayWa r.e., for the Diapur and Ferguson wind farms in the western region of Victoria, Australia.

The Diapur wind farm will feature two V150-4.2 MW turbines, while the Ferguson project will comprise three V136-4.2 MW turbines.

In addition to the supply and installation of the turbines, the order also features a 25-year AOM 4000 service agreement.

Turbine delivery is scheduled to begin in the third quarter of 2020.

SNC bags CNNP win

SNC Lavalin-owned Candu Energy Inc has been awarded a contract by China National Nuclear Power Co. Ltd. (CNNP) for pre-project work on the Advanced Heavy Water Reactor (AHWR).

CNNP is developing two AHWRs in China, with construction slated to begin in 2021. Candu Energy's pre-project activities will include planning and licensing work, including production of the top-level licensing basis document (LBD) to outline the licensing process along with the regulatory and safety requirements applicable to the design, analysis, construction, commissioning and operation of the AHWR.

SNC-Lavalin will also prepare Safety Design Guides (SDG) and a description and assessment of the agreed safety-related design changes. It will also review SDGs prepared by partner agencies.

The AHWR is a 700 MW generation III reactor that builds on legacy CANDU plant design.

Europe

Sif bags Saint-Nazaire deal

Dutch steel tubulars manufacturer Sif Holding NV has won a monopiles and transition pieces supply order for the 480 MW Saint-Nazaire offshore wind farm in France.

Eiffage Metal SAS has awarded Sif a contract to manufacture and deliver 80 monopiles and the primary steel for 80 transition pieces for the project, with delivery scheduled for 2020-2021.

Eolien Maritime France (EMF), a joint venture between the renewables arm of French power utility EDF and Canadian energy company Enbridge, is developing the Saint-Nazaire project about 12-20 km off the coast of France in water depths of 12 to 25 m. Commissioning is planned to take place by the end of 2022.

Northwester 2 gets off the mark

The first turbine has been installed at Northwester 2 in Belgium, the world's first offshore wind park to feature MHI Vestas' V164-9.5 MW turbine.

The 219 MW wind farm will use 23 of the MHI Vestas machines installed 50 km off the coast of Ostend. It is the fourth collaboration between Parkwind and MHI Vestas in Belgian waters.

Siemens debuts in Denmark

Siemens Gamesa will install its new SG5.0-132 wind turbine model in Denmark for the first time.

The company has signed a contract with Torp Vind I/S to install three SG5.0-132 wind turbines at the Torp Vindmoellepark wind farm on the island of Thyholm, close to the Limfjorden fjord.

The 15 MW wind farm will be the second in Denmark to operate without subsidies. The wind turbines will replace three old 1 MW Bonus wind turbines installed at the site, with installation starting in late summer 2020.

MHPS delivers HRSG

The municipal utility in Flensburg, Germany, has awarded Mitsubishi Hitachi Power Systems Europe (MHPS Europe) a contract to supply a heat recovery steam generator (HRSG) for a new combined cycle plant.

The Kessel 13 plant will use natural gas and is due to start operating in 2022, modernising an existing coal fired combined heat and power station.

The municipal utility, Stadtwerke Flensburg, is investing a total of €70 million in the new plant, with a portion of this amount being used to pay for the new HRSG. The generator will use the waste heat from the gas turbine exhaust gases to generate additional electricity and hot water for district heating.

The horizontal-HRSG with natural gas supplementary firing system, developed by MHPS Europe, has a steam rate of 150 t/h at a steam pressure of 90 bar and a steam temperature of 5350°C.

JFMS wins EA1 contract

ScottishPower Renewables has awarded James Fisher Marine Services (JFMS) a contract to provide scheduled maintenance at the East Anglia One offshore wind project.

Under the £5.6 million contract, JFMS will provide scheduled and corrective maintenance to the wind farm, with work including statutory inspections, equipment maintenance and structural integrity checks for components.

The three-year Above Water Balance of Plant contract will see the company working both onshore and offshore servicing the project.

Prysmian upgrades Italian grid

Prysmian Group has secured two power transmission cable project contracts from Terna to upgrade the Italian power grid.

Under the first contract, worth €50 million, Prysmian will be responsible for the development of an HVAC 150 kV power cable link between the Zuel and Somprade electrical substations in the province of Belluno. Installation is scheduled to be complete by 2020 in view of the 2021 Alpine World Ski Championships in Cortina.

The second award is for the development of an HVAC 150 kV cable system, aimed to improve the performance and increase the reliability of the power transmission system in Southern Italy. The frame agreement is worth €26 million, with an option for an additional €26 million.

International

Wärtsilä solution for Malian gold mine

Mobile power specialist Aggreko has placed an order with Wärtsilä for equipment for a new power plant at a gold mine in Mali.

The order is Wärtsilä's first for its new, innovative Modular Block solution, which targets the rental and mobile power sector with pre-fabricated, modular power units.

In Mali, Wärtsilä will supply four Modular Block enclosures with one medium-speed Wärtsilä 32 engine in each, providing a total of 40 MW of energy to Resolute Mining's Syama off-grid mine. The power units will replace the existing diesel generators currently powering the mine, but will provide fuel cost savings as well as fast-start and load following capabilities.

The power blocks will be installed in 2020 and 2022. The contract includes an option for installation of a fifth unit at a later date.

Nordex equips Mersinli

Nordex is to equip the Mersinli wind farm in Turkey with its N133/4.8 wind turbines. The company will supply 13 units for the 62.4 MW wind farm and will also provide premium service under a ten-year contract.

The order is the first in Turkey for the N133/4.8 turbine, the strong-wind variant of the Delta4000 series. Nordex will deliver the units in mid-2020, with commissioning scheduled for the end of that year.

Siemens supplies Belarus peakers

Siemens will deliver the power generation equipment for two new peaking power plants in the Republic of Belarus.

State-owned utility RUE Vitebskenergo has placed an order with Siemens for industrial gas turbines for the open cycle power plant, which will operate in conjunction with the existing Lukomlskaya and Novopolotskaya power plants in the Vitebsk region in northern Belarus to ensure the reliability and flexibility of the country's power grid.

Siemens will provide five SGT-800 gas turbines, generators, gas receiving stations, booster compressors, high-, medium-, and low-voltage equipment and the PCS7 control system for the new 150-MW peaking power station at the Lukomlskaya plant and a 100 MW peaking power station at the Novopolotskaya plant.

The plants are expected to go into operation in the end of 2021.

Rosatom signs up Orano

Orano has signed a €40 million contract with Rosatom to build a depleted uranium facility on the Zelenogorsk site in Russia.

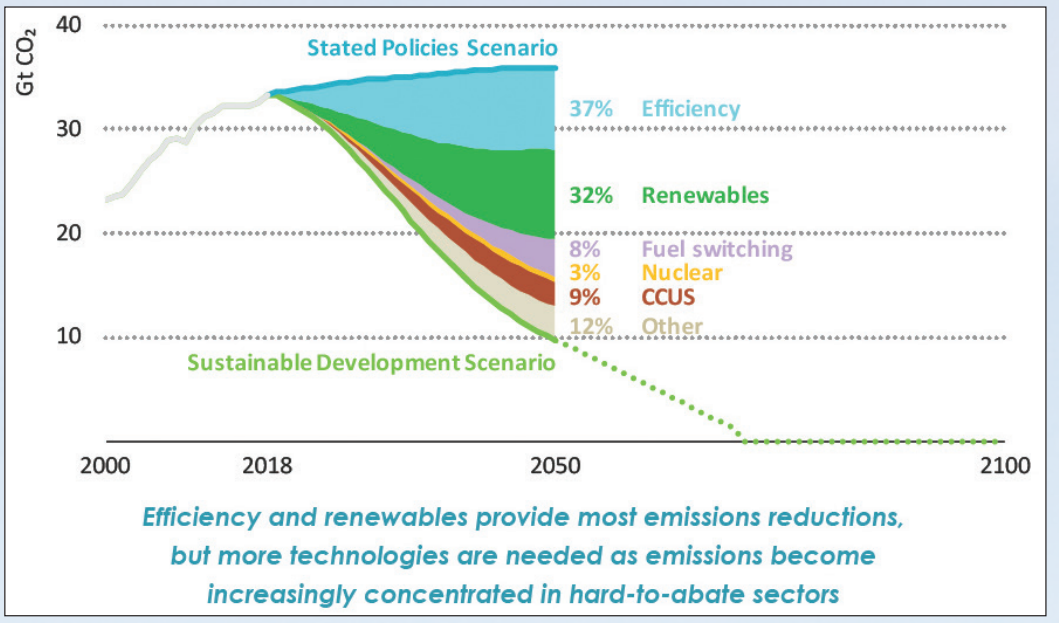
Orano will supply equipment for the construction of a depleted uranium defluorination facility. The group will also provide technical assistance services for the installation of the equipment and startup of the facility. Defluorination allows the hydrofluoric acid to be separated from the depleted uranium resulting from the enrichment process with a view to it being conditioned in a solid and stable form.

Elsewedy picked for Sudan solar plus storage project

Egypt's Elsewedy Electric will install a 20 MWp solar park with 35 MWh of battery storage capacity to be located near Nesitu County, Sudan.

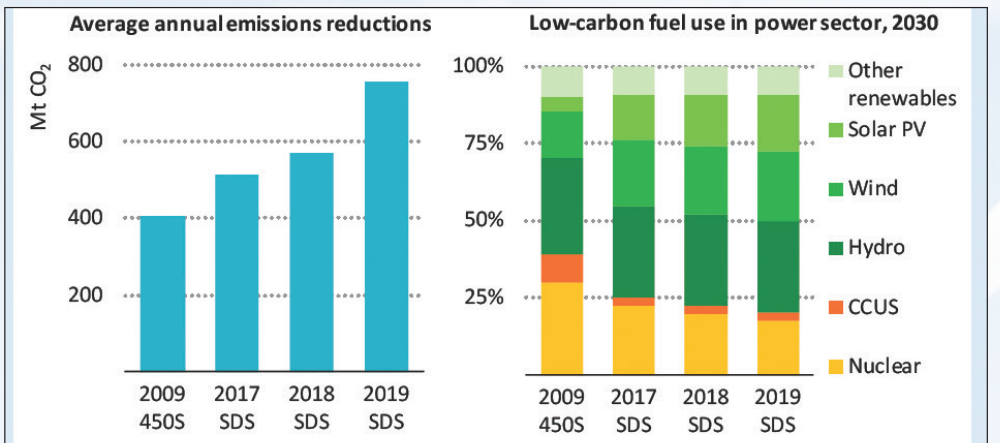
Elsewedy signed a €40.6 million contract with Sudan's Ministry of Electricity, Dams, Irrigation and Water Resources for all engineering, procurement and installation activities. The project will start operating by the end of 2020.

Energy-related CO_2 emissions and reductions by source in the Sustainable Development Scenario



World Energy Outlook 2019, © IEA/OECD, Figure 2.1 , page 79

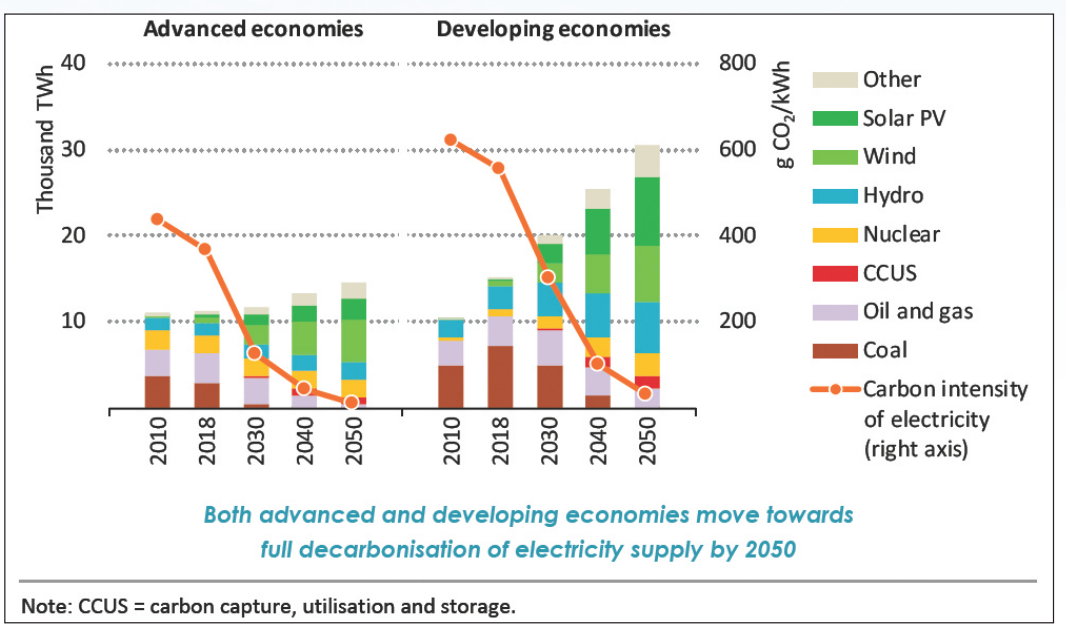
Average annual post-peak CO_2 emissions reductions and power sector mix in various WEO scenarios



Note: 450S = 450 Scenario in *WEO-2009*; SDS = Sustainable Development Scenario in *WEO* editions 2017-2019; CCUS = carbon capture, utilisation and storage.

World Energy Outlook 2019, © IEA/OECD, Figure 2.2, page 84

Electricity generation by source and carbon intensity of electricity in the Sustainable Development Scenario



Note: CCUS = carbon capture, utilisation and storage.

World Energy Outlook 2019, © IEA/OECD,, Figure 2.2, page 84

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China feels Power of Siberia as Russian pipeline starts operation

China has started receiving Russian gas via pipeline for the first time, helping the country in its effort to reduce its reliance on coal fired power generation.

Gary Lakes

China is about to feel the 'power of Siberia' as Russian gas makes its way into the northern provinces for the purpose of replacing coal as a source of electricity generation supply and reducing China's dangerous levels of air pollution. Russian gas will not alone enable China to significantly turn away from coal use, it is still building coal fired power stations, but the Power of Siberia pipeline will make natural gas available in the northern remote regions of China where gas delivered in the form of LNG doesn't usually reach.

The 3000 km pipeline started transporting gas to northern China on December 2 at an initial rate of 4.6 billion cubic metres (bcm) in 2020. It is the first time Russian gas has been delivered to China via pipeline. In 2021 gas delivery will rise to 10 bcm and by the time the pipeline reaches full capacity in 2025, it will be shipping 38 bcm annually.

Chinese President Xi Jinping, Russian President Vladimir Putin, and the heads of Gazprom and China National Petroleum Corporation (CNPC), Alexey Miller and Wang Yilin, respectively, attended a ceremony through a video conference call marking the start of operations at the Atamanskaya compressor station in the Amur region of Russia. From the new station, Russian gas crosses beneath the Amur River through two pipelines from Blagoveshchensk into China and joins the Heihe-Shanghai pipeline.

According to Gazprom, this is the most ambitious investment project ever undertaken by the global gas industry. Beginning at the Chayandinskoya field in Yakutia, where the gas resource is 1.2 trillion cubic metres (tcm), the pipeline crosses mountains, frozen tundra and swamps. Gazprom has built a new gas production centre at Chanyandinskoya that will hit a production peak of 25 bcm/year in 2024.

By the end of 2022, Power of Siberia will begin to ship gas from the Kovyktinskoya gas field in Irkutsk, the biggest producer in eastern Russia, also with a capacity to produce 25 bcm/year. The field holds 2.7 tcm of gas reserves and feeds the Irkutsk gas production centre. An 800 km pipeline is to be constructed from Kovyktinskoya to Chanandinskoya and feed gas into the Power of Siberia.

The opening of Power of Siberia, estimated to cost $55 billion to construct, is the start of a new strategic relationship between Russia and China. With 20 per cent of the world's gas resources, Russia is keen to develop them and market gas on the global market. China, where demand for gas is expected to grow for many years to come, is working to develop its own resources, which include shale, but will also be a major gas importer for the foreseeable future. The value of the agreement between the two countries is expected to reach $400 billion over the period of the 30-year contract, which was signed in 2014.

The project will work to the mutual benefit of both nations by delivering gas to remote regions and by creating jobs. It has already created nearly 2000 permanent jobs in Russia.

During the launch ceremony, President Putin said: "This step takes Russian-Chinese strategic energy cooperation to a new level." China's Xi Jinping called the pipeline an "important result" and "the start of a new era in our bilateral ties".

Indeed, this could be just the start of a gas purchase and supply relationship. The Power of Siberia pipeline, referred to as the 'Eastern Route', now enables Russia and its state-owned gas company to diversify gas exports. Gazprom's biggest market is Europe, but up to 14 per cent of Gazprom's exports are expected to travel through the pipeline by 2025. This could expand. Russia and China are reported to be discussing two more pipeline possibilities, Power of Siberia 2, a 'Western Route', and a third project that would entail construction of an extended pipeline from Sakhalin Island, site of a LNG plant, that would cross to Khabarovsk and run to Vladivostock, from where it would reach the Chinese border.

Power of Siberia 2 has been on the table for some time but it was set aside while Power of Siberia 1 was completed. Gazprom CEO Miller is reported to have said recently that all that is left regarding the start of work on the project is an agreement on price with the Chinese. Gas sold to China through the first pipeline is linked to the price of oil.

For several decades, Russia has relied on the European market for its gas sales. During 2018, Gazprom sold 201.9 bcm of gas to Europe and held a 36.8 per cent share of the European market, the highest ever. But changing energy market circumstances in Europe and sanctions imposed on Russia for annexing Ukraine's Crimea Peninsula have prompted Moscow to direct its attention to Asia for future gas exports. The Power of Siberia pipeline and the development of LNG export centres in the Far North and Far East will make it a big supplier to the Asian market as well as a competitor for new US LNG exporters, who have set their sights on China in particular as a target market.

The switch to cleaner energy is driving China's gas demand. China's burgeoning economy has been the primary driver for energy demand growth, but there have been consequences, particularly the high level of pollution created by burning coal. While the economy may be slowing currently, China's continuing development will continue the country's demand for energy, as will the need to clean up China's skies, where air pollution from burning coal is some of the worst in the world. A pre-trade war with the US economy kept demand for oil and gas moving upward as well as prices for LNG.

Once in China, the Russia gas will flow through a 3400 km Chinese pipeline system divided into north, central and south sections, passing through nine provinces and connecting with the Northeast pipeline network, the Shaanxi-Beijing network and the East-West pipeline network. The system will terminate in Shanghai and supply China's industrial heartland along the way.

In early December 2019, China announced the creation of a new national oil and gas pipeline company with the intention of boosting competition. The new company will separate oil and gas transportation, production and sales, and open transportation to third-party entities, China's *Xinhua* news service reported. The new company will manage most of China's pipeline infrastructure currently owned by CNPC, Sinopec and CNOOC. The ownership of the new company will go to the state-owned Assets Supervision and Administration Commission (40 per cent), while CNPC will hold 30 per cent, Sinopec 20 per cent and CNOOC 10 per cent.

Gas consumption in China is seen as rising to 320 bcm during 2020, according to research carried out by state-run CNPC, but the rate in the growth in demand will slip from the previous year. Demand during 2019 is expected to exceed 300 bcm, a rise of 9 per cent over 2018. Domestic gas production is forecast to reach 170 bcm during 2019, up 9 per cent, while gas imports will likely rise by 8 per cent for 2019 to 133 bcm, down from the 2018 increase of 31.9 per cent, according to the CNPC data.

China's two largest gas suppliers are Turkmenistan and Australia. Turkmenistan supplies gas through the Trans-Asia Gas Pipeline, which delivers more than 30 bcm/year. Australia delivers the equivalent of around 30 bcm in the form of LNG.

The Power of Siberia pipeline, referred to as the 'Eastern Route', now enables Russia and its state-owned gas company to diversify gas exports

Beyond cables

In a move to address the challenges facing distribution system operators (DSOs), Nexans is building on its cable expertise with the launch of an electrical asset management platform that will help DSOs save on both opex and capex. **Junior Isles**

Utilities face a number of challenges in today's changing energy market. The energy transition is causing uncertainty over the need for grid reinforcements, while an aging infrastructure brings uncertainty about quality and safety. At the same time, stakeholder expectations will require new business models.

At a recent media roundtable, French cable supplier and solutions provider, Nexans, outlined what it sees as the main challenges facing utilities in the changing market and the role it believes it can play in helping them meet those challenges.

Nexans says that as we make the transition to a clean, renewables-based, more interconnected world, it is undergoing a "massive transformation" itself where asset management will be a key part of its offering. Frank Blonbou, Service Manager, Electrical Engineering, Nexans, noted: "According to the IEA, by 2040 electricity demand is expected to increase by 60 per cent and 60 per cent of our energy will come from renewables compared to 30 per cent today. At the same time, the global population will reach 9 billion – 60 per cent of which will live in megacities. IoT-connected devices will reach 75 billion by 2025."

All of this, he says will put a huge demand on infrastructure and assets – the management of which, will be crucial. It is a change that Nexans is preparing for. "Asset management is the key to ensuring the transformation can be supported by consistent, reliable and scalable infrastructure… This is all part of the Nexans innovation strategy where we connect our key competencies as a cable manufacturer and the key skills we have acquired over years in asset management."

Expanding on this, Bram Alkema, Nexans' Business Developer for Asset Management said: "Implementing a proper asset management system is key. It is the way to organise and structure your work when designing grids for future needs and to ensure the performance of the grid."

He pointed to a study of 134 companies (across various industries) by Aberdeen Group, which showed the 'best-in-class' for asset management recorded an unscheduled asset downtime of only 1.5 per cent compared with 16.3 per cent for the 'laggards'. The best-in-class group also enjoyed a +20 per cent return on assets compared with -13 per cent (vs the plan) for the laggards.

"This clearly shows that if you structure your processes and make your decision-making consistent and rational, you pay attention and improve what you are doing; and will then create value for your stakeholders and your shareholders. Asset management does not equal managing assets; it is about doing structured activities to derive value from your assets."

Nexans says it has been capable of operational asset management for some time, now it says it plans to use its knowledge of cable design and the aging of cables to not only improve the opex of cables but also to help optimise the overall management of assets, including investment planning. About six months ago, in partnership with start-up Cosmo Tech, Nexans launched what it calls 'Asset Electrical', a strategic asset management solution for Distribution System Operators (DSOs).

At the time of the announcement, Jérôme Fournier, Nexans' Chief Technology Officer, said: "Asset Electrical is a great example of our 'new Nexans strategy' that will help the company to go beyond cables and grow in the value chain. With this digital solution that builds on our rich expertise in electrical assets' ageing profile and behaviour, we aim to help asset managers optimise their maintenance and renewal strategies in light of the many pressures on the industry we foresee going forward."

Blonbou explained further: "Cable services are everything that we can do in the build phase in our customer's infrastructure, up to the point where we commission. That means optimising the way we build, optimising the way we deliver our products and optimising the way they maintain our products. So cable services is not only related to the supply [of cables], it's also related to the electrical system construction and maintenance."

He noted that cables services could take the form of pre-emptive analysis of faulty cables by integrating communications technology inside of the cable to continually communicate its health status to identify early signs of failure – something that is largely lacking in such an important part of the electricity delivery chain.

"Maintaining the performance level of a cable is something that is currently not really seen. Active components are widely monitored but passive components are not. And yet they hold more than 50 per cent of the value of optimisation," he said.

Blonbou used New York City's power system as an example of how cable performance can vary over time – especially with the growth in renewables and greater decentralisation, which causes power fluctuations that can in turn impact the lifespan of cables. "In 2018, there was a massive outage in the city due to the aging of the infrastructure and insufficient planning of maintenance of the key components. This raised a lot of questions about cabling system aging and how to ensure the cabling system could be maintained for the task of delivering renewable energy.

"We are not sure that cable installed 40 or 50 years can sustain the same level of performance and can deliver the extra power to meet the new energy needs of New York. We know how the insulation, etc. of a cable changes but what can vary are the conditions under which it is used, especially with the massive influx of renewable energy. This creates a lot more uncertainty in the power level and the speed of aging in cables."

This all makes the DSO's job much harder when it comes to planning, maintaining and extracting value from network assets.

Asset Electrical is a platform designed especially for the complexity that DSO executives must cope with daily. The platform combines Nexans' knowledge of electrical assets' behaviour and understanding of DSO challenges with Cosmo Tech's skills in developing software solutions that simulate complex scenarios.

The solution allows them to find the balance between network performance, capital or operating expenditures and risk factors (including financial, regulatory, security and environmental aspects).

According to Nexans, there are currently four types of asset management solution based around ISO 55000: Asset Information Management (AIM); Asset Performance Management (APM); Asset Investment Planning (AIP) and Enterprise Asset Management (EAM). It says that 'Asset Electrical' sits in the AIP space.

A key feature of the software is that it makes it possible to centralise and organise data regarding the assets base, complete with Nexans' electrical asset ageing models. Asset Electrical has been launched to mitigate "the investment wall" associated with massive electrical components maintenance or renewal. The purpose of the platform is to optimise maintenance and renewal policy planning while taking into account all constraints usually handled in silos by different departments.

"It bridges the gap between silos within each organisation. It's not just a simulation within one silo or analysis of a cable's behaviour; it's a combined analysis of all the stakeholders within the organisation that targets one strategic plan," said Blonbou.

Through the platform, the user can build a digital twin of a network, accurately reflecting the entire network and the processes used to manage it (such as related inspections and existing repair and renewal strategies). Test scenarios can then be created on the digital twin baseline to measure the correlation between distribution grid performance indicators and capital expenditures and maintenance costs. The digital twin can also be used to analyse risks across all silos historically focused on their individual objectives.

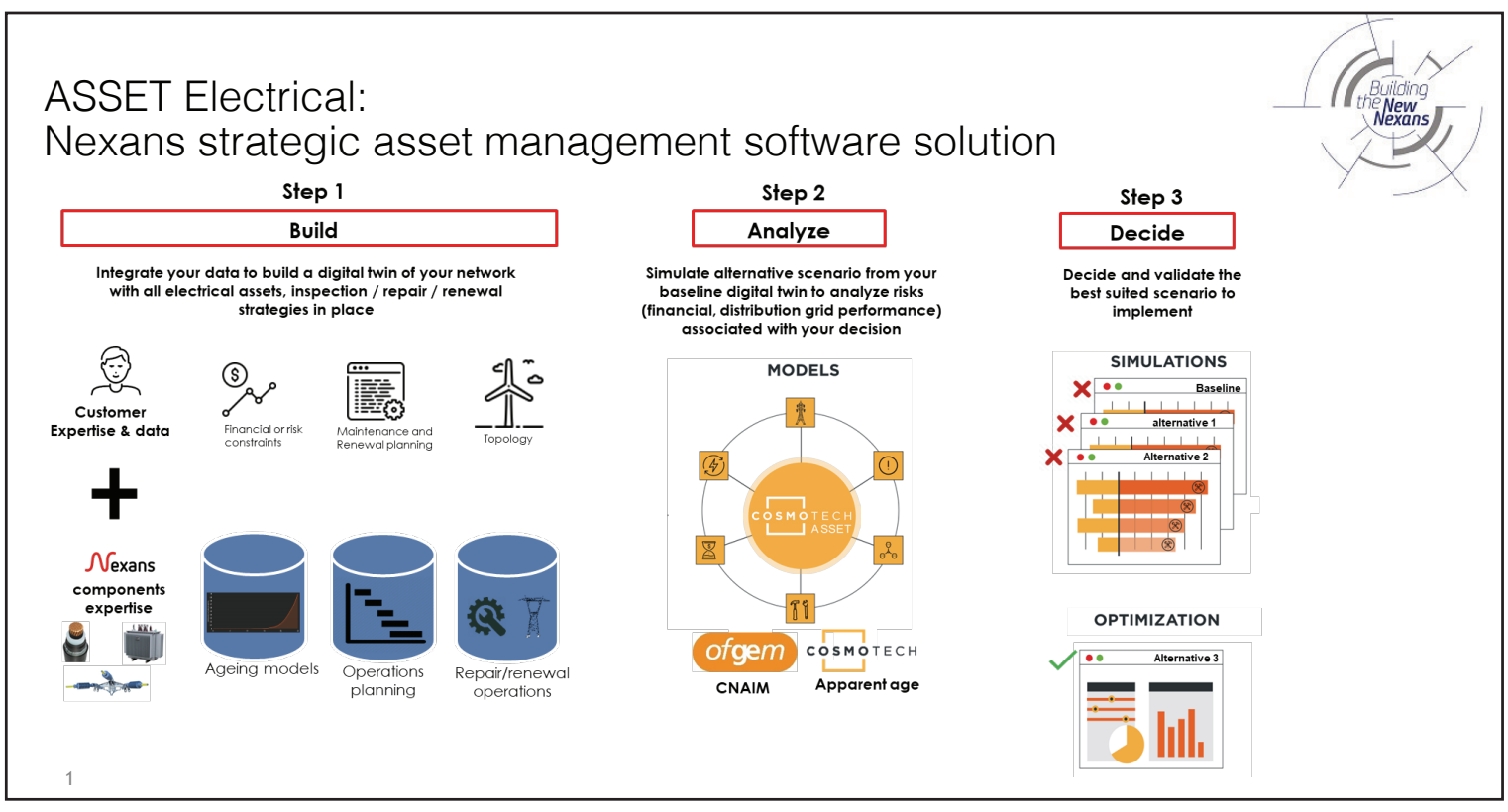
After this they can use the outcomes to decide and validate the most relevant scenario to implement in line with global objectives.

According to Nexans, Asset Electrical enables opex reduction through maintenance savings, with negligible impact on grid performance. It also delays or reduces capex by safely rescheduling investments. In total it can deliver totex (capex + opex) savings of up to 10-15 per cent on mid- and long-term strategies (10 years and more).

"We have actually achieved totex savings of more than 12 per cent for a customer in France," noted Blonbou. "This largely came from planning the maintenance differently." This is significant. Blonbou notes that transmission and distribution companies in France alone spend about €50 billion each year on totex.

Nexans believes it is ahead of the game with this platform and this early success could be an indication that the distribution sector is poised to leverage digitalisation and data analytics to achieve returns on investment in much the same way that power producers have in recent years.

Test scenarios can be created on the digital twin baseline to measure the correlation between distribution grid performance indicators and capital expenditures and maintenance costs



Preparing for a greener future

As pressure increases to achieve net zero carbon emissions, utilities are repositioning themselves to take a bigger focus on renewables, storage and networks. **Junior Isles** reports.

Although subsidies are playing less of a role in driving investment in renewables, 2020-2021 will see Europe's utilities continue to gear investments toward renewable energy, according to Moody's. And one consequence of this will be a continuation in the repositioning of business models, with a greater focus on networks and storage.

At its 'European Utilities' conference held in November in London, the ratings agency said the outlook for unregulated utilities over the next 12-18 months remains positive and that power prices would remain around the same level, as demand remains flat.

In a separate research note published around the time of the conference, S&P Global Ratings had said it sees "stable and credit-supportive power prices over 2020-2022", which eases downside risk. It noted: "European utilities we rate, have significantly reduced their merchant power exposure by selling part of their generation fleet and investing heavily in long-term contracted or subsidised renewable energy projects, thereby protecting themselves from power price volatility."

In its own research note issued alongside its conference, which addressed the theme 'Going Green: Delivering the energy transition', Moody's said environmental policies will continue to be one of the main drivers of growth of renewables' share in the energy mix. It said that development of renewables slowed in certain countries, such as Spain and Italy, during the middle of the decade, when subsidies were reduced. However, it expects that renewables' share of output will continue to rise rapidly in Germany and Great Britain, adding, "… and we expect growth in southern European countries to pick up as the cost of solar photovoltaic falls". The agency said that utilities would commission about 15 GW of solar and wind capacity in 2020.

According to Moody's, the ongoing build-out of utility-scale renewables will therefore continue to displace conventional generation. In parallel, the rise in the carbon price under the EU Emissions Trading Scheme (which has more than tripled since early 2018 following the reform of the market stability reserve mechanism) and declining gas prices are increasingly pushing coal fired generation out of the merit order.

As a result of these market conditions, it noted that Endesa SA announced in September 2019 the suspension of its mainland coal fired power generation in Spain, while SSE plc confirmed in November 2019 the closure of its last remaining coal units at Fiddler's Ferry by 31 March 2020. The agency added: "Conversely, we expect gas fired plants to benefit from the shift in the merit order, at least in the next two to three years."

Speaking at the conference Paul Marty, Senior Vice President/Manager, EMEA Infrastructure Finance, at Moody's, said: "We expect that coal will continue to come down and that will be offset by an increase in renewables. As coal comes off the system in the coming years, it will be partially replaced by flexible technology such as gas, and we see gas coming back to the levels that we saw at the start of the decade."

In a scenario where power prices remain largely stable, while the fuel mix changes, Marty says utilities have repositioned their business models.

"It is fair to say the sector has continued to successfully transition its business model, moving away from too many exposed activities, such as merchant generation, to more low risk contracted generation and networks." He showed how the EBITDA splits for the 20 largest utilities had changed over the last decade. The share of regulated networks and storage, along with regulated/contracted generation, had risen from about 45 per cent in 2011 to around 65 per cent.

Moody's expects investment in regulated networks, renewable generation and energy supply and services to represent more than 70 per cent of total capital expenditure in the 2019-21 period.

Following the outlook from Marty, John Feddersen, Co-Founder and CEO of Aurora Energy Research, offered his view on the implications of very deep decarbonisation for utilities and investors.

Looking at the UK, as the first major economy to commit to net zero decarbonisation by 2050, Feddersen noted that it would require an average of £4-9 billion of capital investment in renewables per year through to 2050. He said: "… regardless of what route you take, we are going to need a lot of renewables; they are the cheapest form of decarbonisation."

He stressed, however that the UK will not get to net zero with market arrangements as they currently are. "There won't be enough value in the energy market to deploy the renewables or anything else that we need. The government could continue to support the build-out of assets through CfDs (Contracts for Differences) and ROC (Renewable Obligation Certificates). Another way is to put up carbon price substantially, which would increase the price of electricity and we could deploy more renewables at a given cost…"

Feddersen described renewables as "the dog" and flexibility as therefore "the tail of the dog". He noted that a high-renewables system increases the need for flexibility and reliability, which creates opportunities for flexible generation and particularly storage.

"The problem with the dog is that renewables are unpredictable, we don't know how much output we are going to get in the next hour or two or next day; it's variable, in that its output goes up and down; and it's undispatchable, we can't turn it up or down. This brings a lot of opportunities in the flexibility space."

According to Aurora, this opportunity is quite large. The amount of daily storage in Great Britain on a winter's day in 2040 was estimated at only about 240 GWh, which is about 24 GW of daily storage capacity. At the moment, he says Britain has about 5 GW. Feddersen commented: "A material increase is needed in the daily system but it's not huge." However, beyond daily storage he says there is "a massive opportunity" which might come in the shape of shifting demand patterns or sector coupling.

Mark Lewis, Head Climate Change Investment at BNP Paribas, said "the debate is moving quite quickly" and the method of providing flexibility will be location dependent. "Gas will certainly be needed for the next decade but storage is the next obvious thing. Ultimately, that will be the key technology over the next decade or two. If we are really going to decarbonise global power systems, that is essentially the first step to achieving the Paris Agreement targets."

Anna Borg, Chief Financial Officer, Vattenfall, described the impacts of the changing energy landscape, and what it takes to become a fossil-free utility. One of the utility's core beliefs about how utilities will adapt, is that digitalisation is necessary throughout the entire value chain.

"It has already hit in the customer interface many years ago. We can now see that it is being deployed in the actual businesses of the companies and their whole operation to bring efficiencies and utilise the data that we have in the right way, etc."

She says the next step will be B2B business models around opportunities at the core capabilities of digitalisation. "The difference between that and just using digitalisation in new business models is like using it to widen a road that goes across a mountain or using it to dig a tunnel through the mountain. These are two very different business models – it doesn't matter how good you are at widening a road over a mountain if someone builds a tunnel. That step still remains [to come] within the energy industry."

Borg believes it is possible to achieve "fossil-free living within one generation" and outlined Vattenfall's path to getting there. She stressed: "It's not our sustainability strategy; it's our core business strategy."

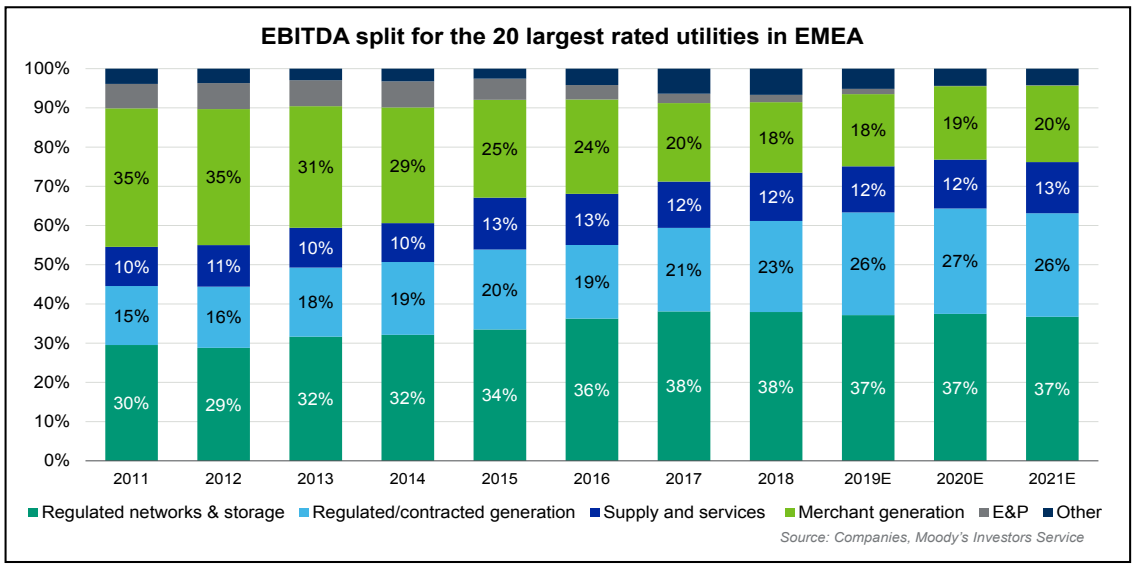
She said the company's operations in the Netherlands would be coal-free from 2020, following the closure of the last of its coal plant in 2019. By 2023 it will have 10 GW of third party renewables capacity under management and 600 MW of flexible hydro capacity to enable more renewable generation.

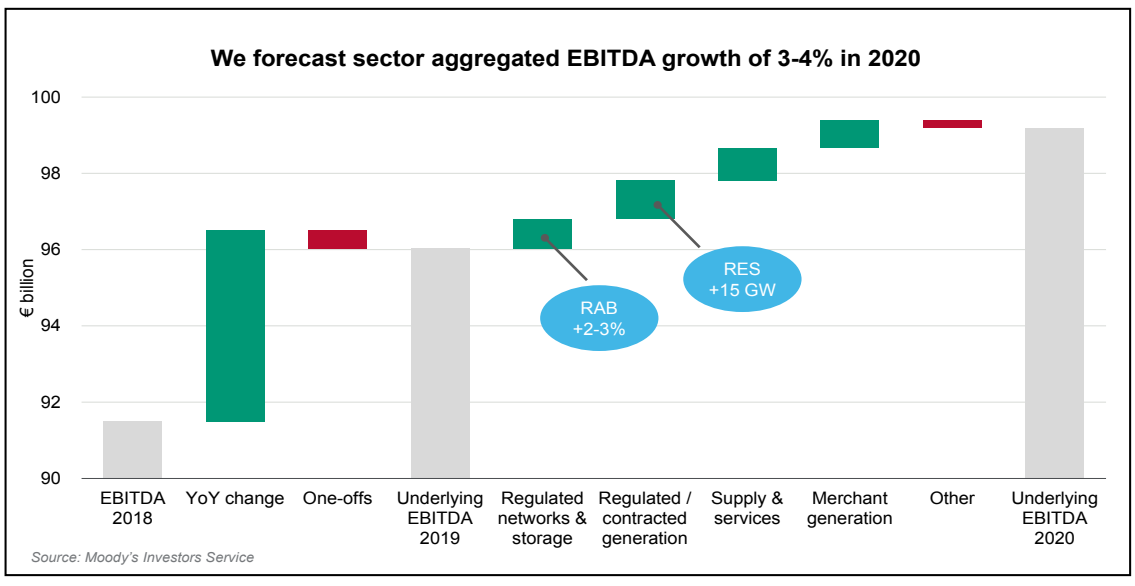
This means that by 2025, it will generate enough fossil-free energy to power 30 million homes. Also, by 2025 its entire Nordic production fleet will be free from fossil fuels. It plans to phase-out fossil fuels in heat production, which is mainly in Germany, by 2030.

Like many of Europe's big utilities, Vattenfall is restructuring and dramatically changing its investments to focus mainly on renewables. At the same time, it is forming partnerships in areas such as battery storage and electric vehicles.

As Borg pointed out, there are many pieces of the puzzle that need to fit together as utilities adapt to the new market. And there will be pieces that utilities are not yet aware of in areas that may also present opportunities. They will need to make investments in interconnectors and transmission grids, as well as distribution grids, she added. But, as Borg summarised: "Vattenfall, will be profitable, not despite doing this but *because* we're doing this."

It is a key message for energy companies around the world as the transition continues to take shape.





Earnings growth to be driven by all segments. EBITDA of 13 out of the 20 largest European utilities will grow by at least 5 per cent. *Source: Moody's Investors Service*

Utilities have repositioned their business models. Networks and contracted generation to settle at 60-65 per cent of EBITDA. *Source: Companies, Moody's Investors Service*

Unlocking value through digitalisation

Landis+Gyr has introduced its Gridstream Connect solution for European utilities. The IoT platform uses intelligence at the grid edge and across distribution systems to help utilities master the challenge of providing grid flexibility, resilience and security. **Junior Isles**.

Stefanidou says Gridstream Connect gives the DSO "eyes" at every connection point on the grid

Distribution system operators (DSOs), i.e., operators of the low and medium voltage grid are facing the challenge of having to handle an influx of variable production from renewables injected into the grid. But unlike in the high voltage transmission network, a lack of transparency in the distribution grid means operators do not have a clear picture of how voltage levels are varying in the grid. It is the major reason for the need for greater digitalisation at the distribution level.

"This is the first step in having greater insight into every connection to the grid," said Ifigeneia Stefanidou, Head of Product Management Grid Edge at Landis+Gyr. "The next step is how to use the data from smart meter devices and systems to benefit the whole utility – not just the metering and billing departments but also the grid department. It's about how utilities can use this data to better understand if their capacity in the system is enough; if they are cost-efficient; if all the changes on the low voltage side, such as batteries, EVs, etc., are having a negative impact on the grid."

At the recent European Utility Week in Paris, Landis+Gyr gave a demonstration of this "next step" with the introduction of its Gridstream Connect solution for European utilities.

Gridstream Connect is an open, secure and scalable Internet of Things (IoT) platform designed to unlock added value and maximise efficiencies from advanced metering infrastructures (AMI) by bringing together intelligent endpoints, communications, software and applications. As a connectivity platform for utilities of all sizes, Landis+Gyr says "it extends beyond AMI into new, data-driven use cases", providing utilities with a basis for "a multitude of new services and business models".

It leverages intelligence at the grid edge and across distribution systems for more efficient management of energy capacity, the integration of renewables, and enhanced consumer engagement.

Gridstream Connect bundles Landis+Gyr's entire IoT portfolio. The capabilities of the platform were strengthened in November by the launch of new Landis+Gyr intelligent endpoints, an extension of the company's communications portfolio, as well as evolving software and applications.

"The intelligent end points, are intelligent devices in the field that can also make decisions," said Stefanidou. "It supports different communications technologies, depending on the application. We decide on the technology, together with the utility, according to their needs. At the application level, it also enables third-party applications to make use of the measurements and data collected centrally. The question is what is needed: do we need local intelligence on the device or from the big application? Or is the optimal somewhere between? We can do both grid-edge intelligence and central intelligence; we just work with the customer to find out what is the optimal solution."

She noted that there are local issues such as voltage regulation, while "global" issues that can be addressed centrally might include energy balancing.

Stefanidou believes the ability to gather and analyse data calls for a much-needed review of existing tariff models. "Today's grid tariff models are based on the old scenario of energy flowing from the top down. This has changed, as have the grid users. So this data should be used to allow utilities to better understand how they can adjust their tariff models."

She says there are already examples of this happening, mainly with utilities that have decentralised generation, perhaps with batteries. "There are a lot of pilot projects in Europe, where utilities are trying to better understand what the future will look like, and which tariff models will give the right incentives for end consumers to become energy efficient. These pilot projects will also help grid departments to plan the system more efficiently for the future – to build capacity where it's necessary."

Gridstream Connect gives the DSO "eyes" at every connection point on the grid. Measurements taken by the smart meter, which is used for billing, can be imported as an input. At the same time the system topology can be imported from a Geographic Information System (GIS). These can then be mapped together to calculate exactly how the energy flows throughout the distribution system. This gives DSOs a view of how every component in a system is loaded throughout the day, year, etc., and enables them to assess which equipment is more critical and likely to fail and thus prioritise investments.

"By understanding how the system is used, DSOs can prepare the system for the future, so that it is reliable, and cost-efficient," said Stefanidou. "And with limited budgets, this helps them decide which projects to prioritise. For example, you could compare two similar transformers that might be the same age but one is loaded quite low, with no overloading, while the other is also healthy but is regularly overloaded. So it helps identify the bottlenecks and identify which might need replacing, thus preventing outages"

According to Landis+Gyr, utilities are now seeing that the smart meter rollout is offering added value for other departments. "Today, we see interest in smart metering systems from people in the grid departments of utilities because they see the value of smart meters for their grid operations," said Stefanidou.

In September last year utility E.On Sweden became the first Gridstream Connect customer in EMEA. Landis+Gyr's solution for E.On's smart metering rollout will include one million smart electricity meters – including both residential and industrial meters – with NB-IoT/M1 communication technology and a Head End System on a Gridstream Connect platform.

The work to replace the existing smart metering infrastructure began in July last year. With this technology, E.On will be able to increase transparency and control in its distribution grid and improve its customers' experience through reliable and precise data.

Sweden is among Europe's frontrunners in the use of advanced energy technology, with its first nationwide installation of smart meters dating back to 2009. Now, the country is taking another key step – replacing all 5.4 million metering points with the latest technology. This modernisation will further empower end consumers to improve efficiency of energy usage and is critical for enhancing smart grids to manage large-scale integration of renewable energy and the use of e-vehicles.

The possibilities with smart metering and greater digitalisation at the grid edge seem endless. Landis+Gyr also demonstrated its latest technology to drive how a utility engages with the customer.

Jesper Nielsen, Head of Technical Solution Sales EMEA, Landis+Gyr said the company was looking to enable this in different ways, one of which is by creating opportunities for smart home use cases that can run on say, mobile apps. It is now doing this through the use of real-time data.

"We measure current and voltage as fast as we possibly can with the meter and then generate some trends. The first trend or pattern we do is called the power DNA. By analysing the current and voltage patterns, we can actually tell you what [electrical appliance] is on: whether it is a dishwasher, fridge, air-conditioner, etc. Not only could we tell you whether it is a dishwasher, we could also tell you what brand it is."

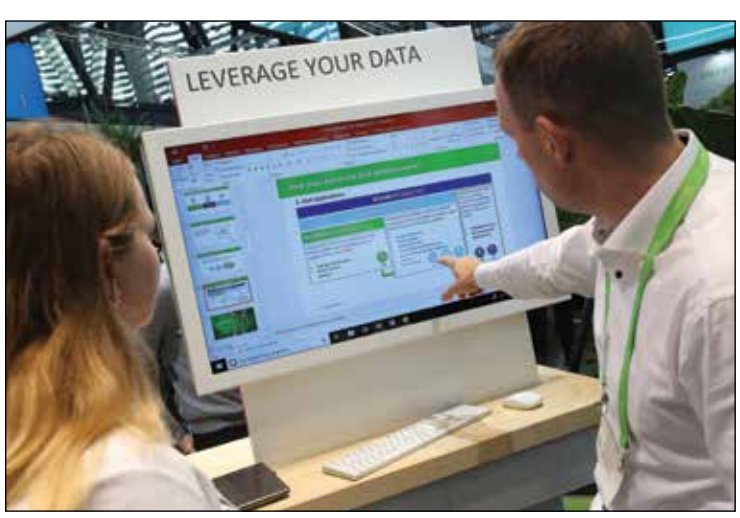
Nielsen says the new system will not only enable users to remotely set alarms and have a view of the state of appliances, etc., but will also help them compare their energy use and environmental performance to other houses in the area or city.

"It's another way for utilities to better engage with their customers… and this is where it gets really interesting because it gives them an advantage over the next utility. By correlating how much energy it is producing from green sources, a utility could then recommend to customers when they should turn on an appliance or turn off the heating, for example, and thereby tell them by how much they could improve their carbon footprint."

While these functions/applications are not here yet, Nielsen says they are coming.

Presenting customers with the possibility of saving money while tackling the climate crisis is a tremendous opportunity for utilities, and greater digitalisation at the grid edge could be the key.

Nielsen demonstrates new possibilities to engage end customers



Junior Isles

Scrooged?

Where was the Christmas spirit during the recent COP25 conference in Madrid? There was little to be merry about at the most recent instalment of UN climate meetings aimed at tackling impending climate change. Indeed it was more a case of negotiations being thwarted by the Ghost of Christmas past.

COP meetings almost always run to the eleventh hour before anything is agreed. The Madrid meeting, however, was the longest on record, running over by some 44 hours. And despite the overrun, negotiators failed to reach the hoped-for outcome.

More than 25 000 delegates arrived in the Spanish capital in early December with the expectation of finalising the 'Rulebook' drawn up at COP24 in Katowice, Poland in December 2018.

The Rulebook contains the rules and guidelines detailing how the Paris Agreement will operate in practice but there were two key issues that countries were unable to agree on in Katowice.

The first was rules detailing how countries can voluntarily work together across borders to reduce emissions through approaches like international market mechanisms. One of the main tasks of COP25 was therefore to agree rules for a new global carbon market under 'Article 6' – the sixth article of the Paris climate accord. Article 6 creates a system that would allow countries to pay each other for projects that reduce emissions. It must also ensure these reductions are not counted twice.

The second unresolved issue in the Rulebook following COP24 was that the Paris Agreement asked countries to consider whether they should standardise the time periods covered by countries' Nationally Determined Contributions (NDCs). At the moment, some NDCs extend to 2025 while others extend to 2030. In Katowice, countries agreed they should use a common time period for future NDCs but could not agree on specific years.

At the conclusion of the Poland meeting, the plan was that rules not finalised in Katowice would be reviewed and refined in Bonn, Germany, the following June and then adopted at COP25. With negotiators leaving Bonn with an unagreed text, it was hardly surprising that, despite increasing public pressure, countries left Madrid without a consensus on Article 6.

At the heart of the discord was the argument by some countries that they should be allowed to carry over Certified Emission Reduction units (CERs) created under the 1997 Kyoto protocol. Most of those credits, which were conceived as a way for rich countries to pay poorer nations for emissions reduction projects, are almost worthless on the open market, valued at around $0.2 per tonne of CO_2.

The EU and vulnerable countries, as well as environmental groups, were firmly against the carrying over of CERs. Japan, not a signatory to the principles, told the final plenary meeting that it also opposed the use of Kyoto-era credits. They all argued the CERs would undermine already insufficient ambition by allowing targets to be met with "emissions reductions" that have already happened, in place of additional cuts being made in the future.

However the countries that still hold the old credits – mainly China, India and Brazil – argued for the right to transition them over into any new system. Around 4.3 billon credits are available under the Kyoto protocol's Clean Development Mechanism, according to Berlin-based think-tank NewClimate Institute. This is more than the annual emissions of the EU. China holds about 60 per cent of these, India 10 per cent, and Brazil 5 per cent.

A supply in the billions of tonnes of CERs far exceeds demand, meaning prices under Article 6 would also be low. Carbon Brief noted that this would reduce the incentive for additional private-sector investment in the scheme, cutting off potential financial flows to the very countries that wanted to benefit from participation in the first place.

Assigned Amount Units (AAUs) are an additional source of Kyoto units given to developed countries with targets under the protocol that effectively permits them to emit a certain amount of CO_2. For some countries, weak targets or economic collapse has led to a large surplus of AAUs, often despite a lack of deliberate action to cut emissions.

Australia lobbied to carry over its AAUs. Using the credits would reduce what Australia needs to do to meet its 2030 target of a minimum 26 per cent cut in emissions below 2005 levels by more than half. Analysts said there was no legal basis for Australia using the credits as the Kyoto and Paris agreements were separate treaties, and noted officials had acknowledged Australia was the only country planning to still count them.

An analysis published by think-tank Climate Analytics during COP25, said if China and Brazil use their CERs domestically to meet their domestic NDCs, and if Australia uses its surplus AAUs towards its NDC, this would "reduce global ambition" by 25 per cent.

In a scathing attack, Laurence Tubiana, an architect of the Paris accord, said: "If you want this carry-over it is just cheating." Speaking to the *Financial Times*, he added: "Australia was willing in a way to destroy the whole system, because that is the way to destroy the whole Paris agreement."

"It is a ghost from the past in some way," said David Waskow, Director of the World Resource Institute's (WRI) climate initiative, and an observer at the talks. "When you look at the final text, you can see that the Kyoto carry-over question was where the nub of the final issue lay – that was where things really did not get resolved," he told the *FT*.

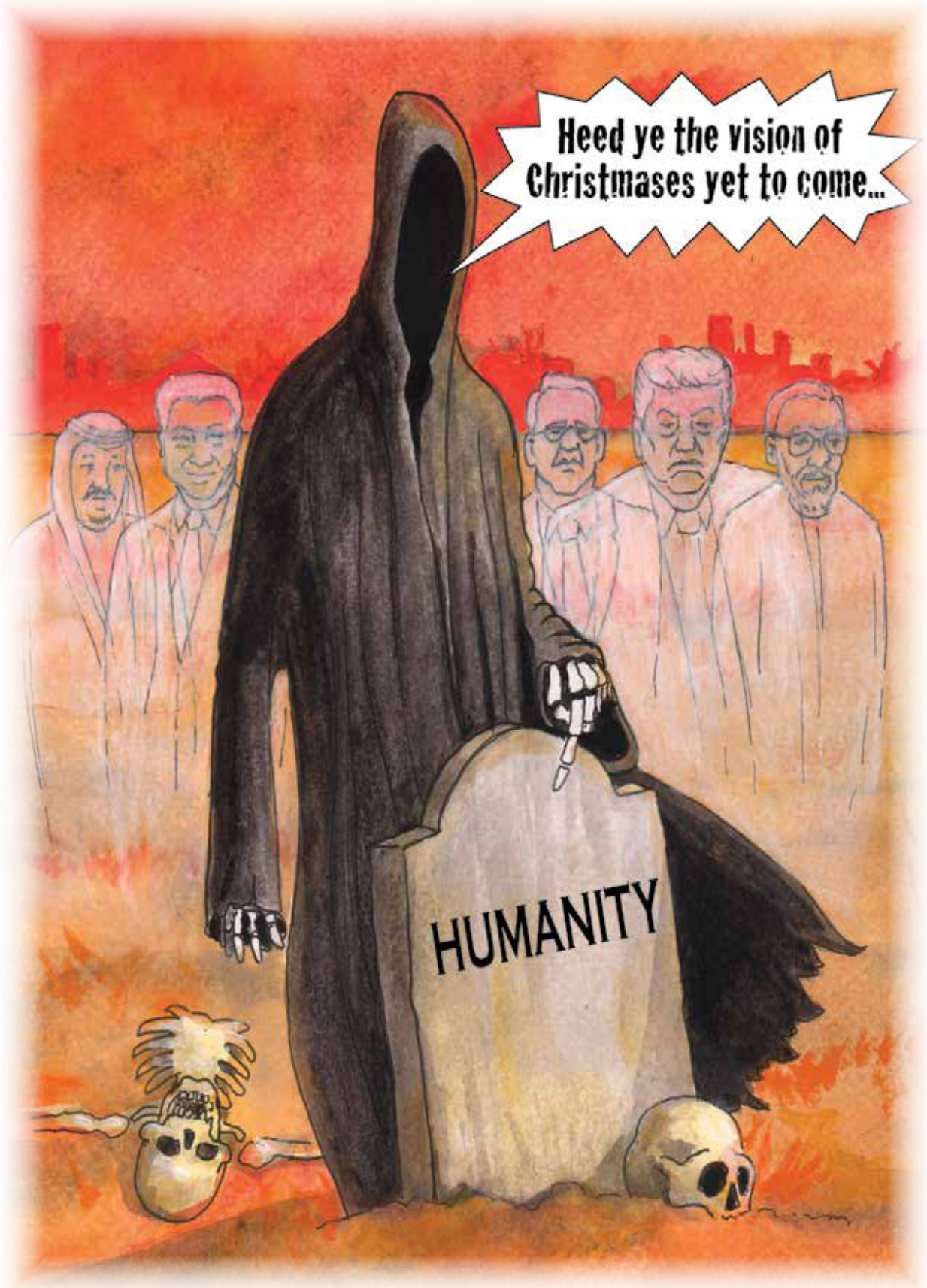
Still, there was some reason for seasonal good cheer. At the conference, the EU was praised for devising the strongest new plan, where nations agreed a bloc-wide goal of reaching net-zero carbon by 2050. The African Development Bank, which attended the conference to lend strategic support to its regional member countries in the negotiations, pointed out that Africa is committed to climate action: 51 of the 54 African countries have already ratified their NDCs.

Most notably, COP25 delivered a deal that will see new, improved carbon reduction plans on the table by the time of COP26 in Glasgow at the end of this year. During the Madrid negotiations the EU and small island states had pushed for increased ambition but met opposition from a range of countries including the US, Brazil, India and China. However, a compromise was agreed with the richer nations having to show that they have kept their promises on climate change in the years before 2020.

As we move into 2020, most would agree that this is a pivotal year for climate action, and the scale of the task ahead cannot be understated. Vice President for climate and economics at WRI, Helen Mountford, said: "There is no sugar-coating it, the negotiations fell far short of what was expected. Instead of leading the charge for more ambition, most of the large emitters were missing in action or obstructive. This reflects how disconnected many national leaders are from the urgency of the science and the demands of their citizens. They need to wake up in 2020."

As talks came to a close at COP25 in Madrid, Christian Aid's Global Climate Lead, Dr Katherine Kramer, said: "The UK now has a gargantuan task of overseeing a successful climate summit in Glasgow. That meeting is supposed to be the moment the world responds to the climate crisis by strengthening the pledges made in the Paris Agreement."

If 2019 was haunted by the ghost of the Christmas past, let's hope that 2020 and COP26 does not doom us to Scrooge's Ghost of Christmas Yet to Come.



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