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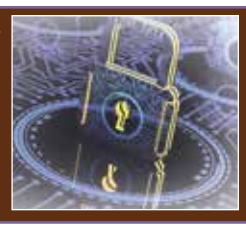

Corporate Decarbonisation

Corporations in the Asia-Pacific region lag behind their European counterparts when it comes to sustainability and climate strategies. But this is changing fast. *Page 14*

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France takes up challenge to speed up renewables deployment

The lower house of the French Parliament has approved a draft bill that would speed up deployment of solar PV and offshore wind, cutting red tape and offering tax incentives.

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Technology Focus: Avoiding stranded assets with thermal energy storage

A new thermal energy storage technology is soon to be delivered to a site in India. The system has the potential to accelerate the move to renewables, while addressing the issue of stranded fossil fuel assets.

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Brussels under "political pressure" to redesign electricity market

In an effort to tackle high electricity prices, the European Commission is under pressure to act quickly on reforming the market. **Junior Isles**

European Commissioner for Energy, Kadri Simson has said the European Commission is under "very strong political pressure" to redesign the electricity market to cut bills for consumers. As the EU faces an energy crisis, largely brought on by a huge rise in gas prices, the Commission is looking to reform the market so that electricity prices are no longer dictated by gas prices.

Simson said the Commission was looking at how to bring the "benefits of a larger share of renewables" to consumers. She told the *Financial Times*: "We will also need gas fired power plants, but we don't want to create a system where they will be in operation 24/7."

With the low cost of renewables and their increasingly significant share in electricity production, the Commission suggests making renewable power more reflective of its "true production costs". Renewables accounted for about 40 per cent of European electricity production in 2020, according to European Commission data, and once the infrastructure is built, power from wind and solar is essentially free.

In a draft document outlining possible reforms, seen by the *FT*, the Commission also proposes extending a windfall tax on renewable power companies, the proceeds of which are passed to consumers and which is due to expire in 2023.

Under the current market model, renewable and nuclear power are dispatched first, followed by gas and coal, with prices being set by the last generator called on to meet demand. This means renewable power prices are often tied to the cost of fossil fuels, mainly gas.

While this has promoted investment in renewables, which have benefited from the higher cost of gas, it means consumers pay high prices for renewable electricity despite its lower production costs.

As countries across the bloc struggle with the high prices, Brussels has come under pressure from, most notably, Spain and France to rapidly reform the market.

Renewables provides almost half of Spain's electricity but prices in the wholesale market soared during 2022. On average, prices were 88.3 per cent more expensive than in 2021 – €209.69/MWh compared to €111.93/MWh the previous year, according to OMIE data. However, a cap on gas price has softened the impact of the energy crisis in the country, as prices remained well below the average of the major European economies.

The government wants to protect itself against large increases in the price of electricity for as long as the energy crisis lasts. And it says the easiest way, until the European Union agrees to reform the current regulation of the wholesale electricity market, is to maintain the current gas cap mechanism applied in the Spanish market for the next few years.

The validity of the so-called 'Iberian exception' – the limit on the price of gas used to produce electricity that applies in Spain and Portugal – expires on May 31, but the Spanish government wants to extend it at least until the end of 2024 and plans to ask the European Commission for permission to extend it.

Brussels has said it will launch a consultation on the possible reforms, and publish a full proposal by the end of March.

In the meantime, the Spanish government has submitted a proposal to the European Commission to serve as

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Energy crisis must be addressed by long-term transition goals, says WEF

The current energy crisis is driving inflation and slowing economic growth, yet short-term backward steps like increasing electricity output from coal and broad-based consumption subsidies are risky, according to a new report from the World Economic Forum (WEF).

The report, titled 'Securing the Energy Transition', proposes a strategic plan to make energy security and resilience the backbone of a transitioning energy system. It suggests aligning current interventions to address the energy crisis with long-term energy transition goals.

"The energy crisis has brought energy security to the forefront of political and corporate agendas and prompted the need to develop responses that are adapted to how the energy system has evolved and to where it needs to transition," said Roberto Bocca, who heads a WEF section on shaping the future of energy and infrastructure.

"What is now a global crisis is a real opportunity to steer a more direct course towards a secure, sustainable, and affordable energy future for everyone," he added.

The report proposes a broad framework for a secure energy system to guide countries and policymakers to plan strategic actions, policies, and regulations.

Solutions include prioritising renewable energy investments, plugging methane leaks, maximising electrification, driving consumption efficiencies, and taking advantage of excess profits made by energy companies in 2022.

One immediate action proposed is to prioritise supply from renewable energy and constrain fossil fuel reinforcements to committed emission reduction targets.

The International Energy Agency recommends $5 of investment in renewables for every $1 spent on new fossil fuel production.

According to the WEF report, the climate benefits of natural gas are no better than coal if more than 3.4 per cent of it escapes before combustion, but some gas fields have fugitive emission rates of 6 per cent or more.

Through a separate report launched at the WEF in Davos, Switzerland, Spanish utility Iberdrola issued a call to action for global policymakers, companies in the energy and industrial sectors and other stakeholders on the steps that need to be taken in 2023 to break the cycle of crises driven by oil and gas, and to shift the balance to delivering green energy security as quickly as possible. Iberdrola is investing a total of €47 billion for the three years to 2025.

In a five-point manifesto titled 'Electric, Together', Iberdrola unpicks the key challenges that remain unsolved in the energy transition, setting out the best ways to move forward at speed.

The five points for action listed by the company are: accelerating planning and ambition for electricity grid infrastructure to deliver the transition to a green economy; turbocharging the deployment of renewable generation projects; scaling up green hydrogen; increasing ambition on innovation to drive climate solutions; and "keeping our eyes on the long-term prize" of decarbonisation.

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basis for reforming an European electricity market that was designed in 1998.

It is proposing a dual market with a short-term market (daily and intraday) "that is very liquid and transparent" like the current marginal market, that would be combined with another long-term market adapted to the particularities of each national market. It would separate the most expensive energy source in Europe's power mix – natural gas – from clean electricity producers, such as renewables, hydro and nuclear energy, and promote forward contracts.

Another option in the proposed reform includes segregating power generators by technology. Renewables, nuclear and hydro would be on one side, paid based on forward contracts for producing electricity. Combined cycle gas plants, energy storage and demand-side management would form the capacity market and be paid for firm capacity and availability, according to the Spanish proposal.

In this scenario, contracts for difference (CFDs) for renewables would incorporate a fixed price for the lifetime of the power plant, while prices for nuclear and hydropower would be regulated under

The Spanish government has submitted a proposal to the European Commission

their CFDs.

The upside of this design is that power generators would not be able to earn windfall profits, while the capacity market would facilitate investments in energy storage, the government said.

Spain believes the new regulation will give states room to adapt their energy mix and that, in the case of Spain, it may allow the remuneration of hydro and nuclear energy to be removed from the daily marginal market in order to reduce the weight of the daily price influenced by volatility and give more room for long-term contracts.

France, meanwhile, is committed to maintaining the existing marginal pricing system and rules out any type of market price intervention, as proposed by the Spanish government for nuclear and hydroelectric energy.

Instead the French government advocates the creation of a fund to serve as a counterpart mechanism. This vehicle could be managed by the system operators to guarantee neutrality in its application.

Eurelectric, the organisation representing Europe's electricity companies has already tabled a proposal that will focus on the implementation of a capacity mechanism. This would allow the development of back-up technologies, with CFDs and long-term PPAs to guarantee the profitability of infra-marginal technologies (renewables and nuclear).

Meanwhile, the EU faces continuing difficulties in 2023. The International Energy Agency has warned that the reduction in pipeline gas from Russia risks leaving the bloc with a shortfall of 30 billion m^3.

World "at the dawn" of new industrial age, says IEA

- Clean-tech manufacturing market worth $650 billion per year
- Geographic concentration presents supply chain risks

Junior Isles

The energy world is at the dawn of a new industrial age – the age of clean energy technology manufacturing – that is creating major new markets and millions of jobs but also raising new risks, prompting countries across the globe to devise industrial strategies to secure their place in the new global energy economy, according to a major new report by the International Energy Agency (IEA).

The Paris-based agency's 'Energy Technology Perspectives 2023' shows that although the global market for key mass-manufactured clean energy technologies will be worth around $650 billion a year by 2030 – more than three times today's level – current supply chains of clean energy technologies present risks in the form of high geographic concentrations of resource mining and processing as well as technology manufacturing.

For technologies like solar panels, wind, EV batteries, electrolysers and heat pumps, the three largest producer countries account for at least 70 per cent of manufacturing capacity for each technology – with China dominant in all of them.

Commenting on whether Europe and the US should be concerned about the dominance of China, IEA Executive Director Fatih Birol, said: "Yes it is true that today China has a dominant role in both the manufacturing of clean energy technologies and processing critical minerals. But you can look at this in two ways. On the one hand it has a huge role and concentration but on the other you can see that as a result of China's learning by doing, it was able to bring the cost of these clean energy technologies down to make them more affordable.

"Now I see that countries like the US, Europe, India and Japan are also coming with their clean energy manufacturing strategies. This will help with diversification, which is always good to reduce risks. But we should not forget that the efforts the Chinese are making is having a positive global impact."

The report notes that major economies are acting to combine their climate, energy security and industrial policies into broader strategies for their economies.

The Inflation Reduction Act in the United States is a clear example of this, but there is also the Fit for 55 package and REPowerEU plan in the European Union, Japan's Green Transformation programme, and the Production Linked Incentive scheme in India that encourages manufacturing of solar PV and batteries – and China is working to meet and even exceed the goals of its latest Five-Year Plan.

Meanwhile, clean energy project developers and investors are watching closely for the policies that can give them a competitive edge. Relatively short lead times of around 1-3 years on average to bring manufacturing facilities online mean that the project pipeline can expand rapidly in an environment that is conducive to investment. Only 25 per cent of the announced manufacturing projects globally for solar PV are under construction or beginning construction imminently, according to the report. The number is around 35 per cent for EV batteries and less than 10 per cent for electrolysers. Government policies and market developments can have a significant effect on where the rest of these projects end up.

Amid the regional ambitions for scaling up manufacturing, ETP-2023 underscores the important role of international trade in clean energy technology supply chains. It shows that nearly 60 per cent of solar PV modules produced worldwide are traded across borders. Trade is also important for EV batteries and wind turbine components, despite their bulkiness, with China being the main net exporter today.

Wind installations advance despite challenges

Offshore wind installations are up, inspite of challenges such as a lack of trained personnel and supply chain issues.

According to WindEurope, the EU installed 15 GW of new wind farms in 2022 – one third more than 2021. The organisation noted that this increase in new installations "is an encouraging result" given the overlapping challenges the industry faced in 2022.

Although it hailed the progress, the organisation noted that the 15 GW still falls significantly short of what Europe needs to build to deliver on its climate and energy security targets. The shortfall is largely due to permitting bottlenecks, it said, noting that 80 GW of wind energy projects across Europe are currently stuck in permitting procedures.

WindEurope CEO Giles Dickson said: "15 GW of new wind in 2022 is not too bad given the challenges faced last year by Europe's wind industry. It's not enough for the EU's energy targets, but governments know the latter can only be achieved if they simplify the permitting rules and procedures – and there are now signs of progress on this. Less encouraging is the slowdown in investments in new wind farms. Confusion about electricity market rules is turning investors away. The EU must make Europe an attractive place for renewables investments again."

A combination of inflation and unhelpful government interventions in electricity markets is undermining investments in new wind farms, said WindEurope. In the first 11 months of 2022 the total new investments in wind farms in the EU covered only 12 GW of new capacity. This is significantly less than the rate of new investments needed to deliver the EU's 2030 climate and energy targets.

The organisation also said the forthcoming reform of electricity markets must give investors greater clarity about what rules apply. "The freedom given to Member States in last year's emergency measures to set their own national rules is turning investors away. They're investing instead in the US, Australia and elsewhere. The EU is not attractive for major renewables investors right now," it said.

Meanwhile, the International Energy Agency said in a report that the lack of trained personnel in the offshore wind energy sector could delay installation in the coming years.

"Installing a wind turbine requires fewer workers per unit of capacity than solar PV, but more material inputs, notably cement and cabling, as well as specialised machinery to transport and position the turbine. In the case of offshore wind farms, specialised vessels are required, which increasingly need to be capable of handling taller and larger wind turbines," the agency said.

At the same time, offshore wind energy projects require more trained workers and more labour per megawatt than land-based projects throughout their life cycle.

"For instance, installing an offshore wind farm takes six or more years. For large-scale solar PV farms, installers can spend 8-14 months on a project, while distributed rooftop PV systems can typically be installed in just a few days," said the report.

■ The UK government has signed an agreement with a group of European partners to develop offshore renewable projects in the North Sea. The projects will link electricity interconnectors and wind farms. Players include Belgium, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, Sweden, Norway and the European Commission.

UK is missing net zero opportunities

The UK needs a five-fold increase in solar power, an earlier ban on new gas boilers by 2033 and curbs on the export of plastic waste by 2027, according to a recent report.

In the 340-page 'Net Zero Review', Chris Skidmore, the Tory MP and former science and universities minister, commissioned to conduct the review, said the transition to a low-carbon economy is "the industrial revolution of our time" with opportunities for companies. He stressed, however, that opportunities are being missed today because of weaknesses in the UK's investment environment.

Grant Shapps, Business and Energy Secretary, commented: "The UK is well placed to ensure that tackling climate change also brings new jobs and investment for businesses and communities. I am grateful to Chris Skidmore for his detailed report, which offers a range of ideas and innovations for us to consider as we work to grasp the opportunities from green growth."

Energy UK welcomed the independent review. Deputy Director of Policy, Charles Wood said: "We welcome the findings of the Net Zero Review which underline in comprehensive fashion, the economic benefits, in addition to the environmental ones, that meeting net zero will bring – as well as making it clear quite how far we have to go." He called the review a "wide-ranging assessment", noting there are 129 specific recommendations and actions that the government should adopt in full.

The report recommends reforms to local and national planning systems to "unleash" cheaper forms of electricity generation – onshore wind and solar – albeit with the caveat "where [such technologies are] locally supported".

The review called for the government to set an official target for solar power for the first time – proposing that the UK develops 70 GW of solar generation by 2035 compared to the current figure of 14 GW.

It also urged the Treasury to give greater "longer-term certainty" to nuclear power stations, hydrogen technology and carbon capture and storage projects.

US turns to wind and solar as gas and nuclear additions barely balance retirements

■ No new coal plant planned ■ More battery storage helps smooth supply

Janet Wood

Some 72.8 GW of new solar will account for nearly two-thirds of 'high probability' additions to utility-scale generating capacity in the US over the next three years, according to new data released by the Federal Energy Regulatory Commission (FERC),

The monthly 'Energy Infrastructure Update' says the growth would nearly double solar's share of the total installed generating capacity of 151.7 GW. It also expects wind capacity to grow by 16.9 GW and hydropower to increase by 819 MW. But the Commission thinks 17.2 GW of 'high probability' new natural gas would be offset by 16.9 GW of retirements and 2.2 GW of new nuclear would be outweighed by 2.3 GW in retirements. FERC foresees coal falling by 17.3 GW with no new capacity.

This would see renewables account for almost one-third (32.5 per cent) of US generating capacity – up from 27.2 per cent today.

"The combined generating capacity of solar and wind is now greater than either coal or nuclear power," noted SUN DAY Campaign's Executive Director Ken Bossong. "Moreover, if the current trajectory persists or accelerates, generating capacity by the mix of all renewables should overtake that of natural gas before 2030 and possibly much sooner."

The FERC statistics do not include storage, which is also seeing major increases in deployment. Recently New York State Governor Kathy Hochul announced a new framework for the State to achieve 6 GW of energy storage by 2030. The roadmap would procure some 4.7 GW of new storage projects, which would be added to the 1.3 GW of existing energy storage already under contract with the State.

"Storing clean, renewable energy and delivering it where and when it is needed is one of the most critical challenges we must overcome to reduce statewide emissions, especially from traditional fossil fuel peaker plants," Governor Hochul said. "This roadmap will serve as a model for other states to follow by maximising the use of renewable energy while enabling a reliable and resilient transformation of the power grid."

Meanwhile, FERC has directed the North American Electric Reliability Corporation (NERC) to develop and submit Reliability Standards on internal network security monitoring. "The nature of cyber security threats to our nation's grid require constant monitoring and vigilance," FERC Chairman Willie L. Phillips said. "One year after we proposed this rule at my first meeting as a Commissioner, we are finalising this rule in my first meeting as Chairman, and taking a major step to better secure the reliability of our nation's bulk power system."

Ecuador brings forward 0.5 GW of renewables

Ecuador could see 511 MW of new renewables capacity if all the projects that came in under the ceiling price in a new tender go ahead.

The international tender for the construction and operation of 500 MW of renewables had price caps of $52.44/MWh for hydropower, $61.12/MWh for wind, $67.79/MWh for solar and $45.59/MWh for biomass, according to the Ministry of Energy and Mining, which ran the tender.

It was offering concessions for 150 MW of small-scale hydro, 200 MW of wind power, 120 MW of solar PV and 30 MW of biogas or biomass. No bids were placed for biomass but other offers add up to a total of 511.31 MW and a possible average power production of 1886 GWh per year.

The projects were all in the 49-60 MW range. The solar PV bids were largely in Imbabura with one in Yanahurco while hydropower projects were in Santo Domingo and Morona Santiago. The sole wind project was in Ñañapura.

The Ministry will make decisions on the projects in 1Q 2023.

Texas considers move away from energy-only basis for power market

Conventional and nuclear power plants in Texas could receive ongoing payments in exchange for ensuring they are online when supply/demand margins are tight, if a proposed capacity mechanism is taken forward.

A consultant for the state government says a so-called Performance Credit Mechanism would cost households and business about $460 million a year, according to a report by an independent consultant hired by the state.

The payouts are an incentive for developers to build new gas fired power plants. If the proposal is adopted generators say they will build 4.5 GW of capacity, according to Texas Competitive Power Advocates, an industry group whose members include some of the state's biggest generators and traders.

The grid reform "must be given strong consideration" by the Public Utility Commission of Texas after an 18-month process to develop and review power market changes, Texas Governor Greg Abbott said in a recent letter to the commission.

"The fact that generators have already publicly committed to build thousands of new megawatts of dispatchable generation resources if the PCM is adopted and implemented by the PUC, further supports this point," he said.

The state currently operates an energy-only market. Some critics argue the new measure would increase consumers' bills without guaranteeing greater reliability because it does not require developers to build new plants. Others note that that the state's existing gas plants have shown poor reliability during recent cold weather events.

Brazil's capacity expansion moving at fast pace

■ Renewables added 6.5 GW in 2022
■ Renationalisation at Eletrobras 'unlikely'

Janet Wood

Brazil gave startup approval for 6.5 GW of wind, solar and biomass power plants in 2022, power sector regulator Aneel announced recently. Wind farms accounted for 2.9 GW, while solar and biomass plants contributed 2.6 GW and 0.9 GW, respectively. Brazil entered 2023 with 188 GW of capacity, of which 83.24 per cent comes from renewable sources.

Among new solar projects, Project Sobral – at 1 GW the largest solar PV project – will now be a co-development by Cubico Sustainable Investments, which has joined forces with ZEG Energias Renováveis.

Francisco Moya, Country Head of Brazil and Rest of Latam at Cubico, said: "This important acquisition consolidates our presence in Latin America and marks the start of our new renewables platform in Brazil after recent strategic divestments in the country. It's also our first investment in solar assets in Brazil and we will be actively looking to grow the portfolio through the acquisition and development of other PV and onshore wind projects."

Among the smaller PV projects, Iberdrola has announced a 0.6 MW solar PV plant – its first floating plant – on the reservoir of the Xaréu dam, providing half the electricity required on the island of Fernando de Noronha, recognised by UNESCO as a Natural World Heritage Site.

The initiative is being carried out together with Companhia Pernambucana de Saneamiento (Compesa), which operates the water and sewage distribution network on the island, and with the support of the Energy Efficiency Program regulated by Brazil's National Electric Energy Agency. The company also intends to promote the use of electric bicycles on the island.

Elsewhere Enel has finalised the sale of its stake in the Brazilian power distribution company CELG Distribuição to a subsidiary of Equatorial Energia for around $1.6 billion. Enel said its strategy was to focus the distribution business on grids located in urban areas, with distributed generation and smart grids.

Meanwhile Eletrobras has played down the possibility of its recent privatisation being reversed by the administration of Luiz Inácio Lula da Silva. The utility is responsible for about 30 per cent of Brazil's power generation, the vast majority of it from hydroelectric dams. It also operates wind and solar assets, thermoelectric plants and transmission lines.

Wilson Ferreira Júnior, Eletrobras's Chief Executive, told the *Financial Times* that he saw no risk of renationalisation thanks to legal protections designed to prevent an unfriendly takeover of the utility. "To renationalise [Eletrobras] would cost three times its value. I believe this is a disincentive. Not even half of those funds exist," he said in an interview.

Renewables tender expected in Argentina after flood of expressions of interest

Argentina is expected to launch a tender for renewable generation and energy storage projects after expressions of interest submitted in 2022 exceeded 14 GW.

Gustavo Gil, President of development consultant Goesgreen, said: "If Argentina wants a greater participation of renewable energies, it will have to incorporate elements in the bidding process that will allow a diversification of the sector not only with multiple non-conventional renewable technologies but also with a variety of actors in the market." He said 2023 would be an opportunity for an improved bidding process, after three years without public calls for tenders to access.

Nicolás Rossi, Chief Executive of Goesgreen, said: "The incorporation of storage will allow a greater integration of renewable energies into the system, occupying a smaller share of electricity distribution and transmission capacity."

Argentina has 5149 MW of renewables capacity, representing 12 per cent of the energy matrix, but that could double during this decade and under an Energy Transition Plan the country plans to increase the share of renewable energies to at least 20 per cent, suggesting at least 8700 MW is needed.

Australia advances low carbon projects

- Azuli and AGIG extend carbon capture agreement
- Enel Green Power secures solar-plus-storage grid connection

Syed Ali

Australia's energy transition effort is continuing to make progress, with the announcement that Azuli International (Azuli) has signed an extension to its Memorandum of Understanding with Australian Gas Infrastructure Group (AGIG), under which the two companies will work together to identify, evaluate and progress carbon capture and storage (CCS) project opportunities in the country. CCS is a core strand of the energy transition to net zero targets, with onshore pipelines being a key component of any project.

Azuli is an independent CCS specialist company based in the UK, with a portfolio of global CCS opportunities, while AGIG is one of Australia's largest gas infrastructure businesses with operations across every mainland state and the Northern Territory.

CEO of Azuli, Hamish Wilson, explained: "This move allows us to put real impetus into a new phase of growth, looking to leverage the range of opportunities on offer in Australia, where the government has set emissions targets and regulations for carbon sequestration either in place or being rapidly developed."

The move will be an important piece of Australia's plan to achieve net zero by 2050. To reach its goal, the Australian government will invest A$20 billion ($14.4 billion) in low emissions technologies over the next decade (under the Technology Investment Roadmap), hoping to unlock A$80 billion of private and public investment on green technologies.

Notably, the state of New South Wales (NSW) is well on the way to the 2050 target, having said in December that it will slash greenhouse emissions by 70 per cent by 2035. It is already on track to meet its current target of halving emissions by 2030, based on 2005 levels. NSW Treasurer Matt Kean said the new 2035 target would also attract more than $39 billion in private investment.

In January Italy's Enel Green Power secured grid-connection approval for a project that is planned to incorporate 96 MW of solar and 20 MW battery storage capacity. It will be the company's "very first" hybrid solar-plus-storage project in the country.

The complex will be installed in the state's Central West and Orana Region, with its construction set to begin in the middle of this year. Enel said the point of connection to the electricity grid will be shared under single Generator Performance Standards (GPS), instead of two separate connection points in close proximity.

S. Korea raises nuclear ambitions in net zero drive

South Korea will raise its dependence on nuclear power generating sources to over 30 per cent, while sharply reducing its reliance on coal by 2036, as it accelerates its push to reach carbon neutrality.

Last month the Ministry of Trade, Industry and Energy said it will raise the share of nuclear energy in the generating mix to 34.6 per cent by 2036 from 23.4 per cent in 2018, while renewable sources will be responsible for 30.6 per cent, up from 6.2 per cent in 2018. At the same time, South Korea will cut its reliance on coal fired power generation to 14.4 per cent by 2036 from 41.9 per cent in 2018.

South Korea's President Yoon Suk Yeol has pledged to reverse the nuclear phase-out policy of the previous administration.

The move comes as South Korea has been pushing to reduce its greenhouse gas emissions by 40 per cent from the 2018 levels by 2030 and reach carbon neutrality by 2050.

"South Korea will actively use renewable energy sources and nuclear power plants and come up with a feasible and balanced energy mix amid the country's efforts to reach carbon neutrality," the ministry said.

South Korea will also reduce the proportion of power generation from liquefied natural gas to 9.3 per cent in 2036 from 26.8 per cent in 2018, the ministry said. A total of 28 aging coal power plants will be converted to LNG power plants by 2036.

In terms of renewable energy, the ministry plans to add more wind generators by 2036 to reduce its heavy reliance on solar power generators.

The statement was followed by news that Danish wind turbine manufacturer Vestas Wind Systems will invest $300 million in South Korea and move its Asia-Pacific headquarters to the country.

The investment will be made toward a large-scale turbine parts plant that will produce key equipment for wind turbines for export to the entire Asia-Pacific region.

Vestas' decision to move its Asia-Pacific headquarters to South Korea shows that multinational companies are recognising the country as an investment hub, the presidential office said.

Philippines power companies ramp up renewables

The Philippines is ramping up its renewable generating capacity as several power companies announce plans for major new additions this year.

Meralco PowerGen Corp. (MGen), the power generating arm of Manila Electric Co., is targeting to commence this year the construction of "hundreds of megawatts" of new renewable energy projects, as two solar plants are set for commissioning this quarter.

MGen President and CEO Jaime Azurin said the company was looking to commission projects this quarter that would add around 150 MW to its renewable energy capacity.

The two projects that will start commercial operations shortly are the 75 MWac solar plant in Baras, Rizal and a 68 MWac solar plant in Ilocos Norte.

The news came as Solar Philippines New Energy Corp. announced its plan to convert land located in Nueva Ecija and Bulacan for solar energy projects in its pipeline.

In a disclosure sent to the Philippine Stock Exchange in early January, Solar Philippines said that over 3000 ha (30 km^2) will be prepped by the first quarter of this year. Conversion of these lands will commence by the final quarter of 2023.

Meanwhile, Aboitiz Power Corp. said it has secured a P20 billion ($1.65 billion) loan from state-run Land Bank of the Philippines to fund the expansion of its renewable energy projects.

The long-term debt financing is set to finance AboitizPower's ongoing expansion and development projects, according to the company's Chief Renewables Officer Jimmy Villaroman. "This loan will allow us to continue providing clean and sustainable energy to help meet the growing demand in the country," he said.

Villaroman said the loan facility is aligned with AboitizPower's 10-year strategy of growing its renewable energy portfolio to 4600 MW, or half of the total 9200 MW capacity, alongside its thermal assets, which the company targets to generate by 2030.

AboitizPower is looking to spend P190 billion this decade for an additional 3700 MW of clean energy. It has over 1000 MW of disclosed and ongoing renewable projects, which include solar, floating solar, hydro, and onshore wind, as of end November 2022.

Indonesia to halt fossil fuel imports by 2045

Indonesia says it will stop importing fossil fuels from 2045, under a programme that aims to cut imports of fossil fuels, increase the use of renewable energy, as well as minimise emissions from the use of fossil fuels.

Coordinating Minister for Maritime Affairs and Investment, Luhut Binsar Pandjaitan, said the increased production of palm oil will be central to the abandonment of fossil fuel imports.

According to Pandjaitan, the transition from fossil fuelled energy to renewable energy would enable net zero emissions by 2060.

Pandjaitan said the development of alternative fuels is one of the five green economic pillars being implemented, the other four being: decarbonisation of the electricity sector; the utilisation of low-carbon transportation; the development of green industry; and the strengthening of carbon sinks.

Speaking at the World Energy Forum which took place in Davos, Switzerland last month, Pandjaitan said: "We are currently researching (the potential of) palm oil because we believe that we will be able to produce around 100 million tons of palm oil by 2045."

At least 30 percent of palm oil production will be used for the food industry, while the remaining 70 per cent will be used to manufacture ethanol, the coordinating minister said.

The Indonesian government will now allow productivity of the plantations to be increased from 2.3 tons per hectare to 8-10 tons per hectare in the next 10-15 years.

Think-tank proposes Black Sea energy island to speed up offshore wind

- Skepticism that Romania could set up governance framework
- Bulgaria focused on retaining coal capacity

Janet Wood

Romania and Bulgaria could see faster deployment of multi-gigawatt offshore wind capacity while avoiding grid connection challenges if they jointly developed an 'energy island' in the Black Sea, according to a new report from the Energy Policy Group (EPG), a Bucharest-based think-tank.

A 2020 study by EPG estimated the total potential capacity for offshore wind in Romania to be 94 GW, of which 22 GW would be fixed-bottom turbines. Other modelling ('Climate Recon 2050: Dialogue on Pathways and Policies for a climate-neutral EU'), suggests 15 GW of offshore wind could be developed in the Black Sea by 2050, and 5 GW built as soon as 2030.

However, to reach large-scale objectives quickly, Romania has to address its grid challenges. The 2020 study expected offshore wind farms would be connected to the grid in Dobrogea, where the grid is congested and demand is limited.

EPG's report 'Offshore wind: the enabler of Romania's decarbonisation', says Romania can join with Bulgaria to overcome grid challenges via an energy island in the Black Sea.

"To address the grid challenges that both Romania and Bulgaria face in deploying their offshore wind potential, a Romanian-Bulgarian (RO-BG) energy island would be an efficient and scalable solution to unlock large-scale offshore wind deployment, as well as bring valuable interconnection capacity with other Black Sea countries (such as Turkey, Georgia, as well as Azerbaijan, further east), drastically improving energy security and contributing to the regional price stability," EPG's report says. A recently announced subsea HVDC link between Romania, Azerbaijan, Georgia, and Hungary would be a 'stepping stone' it said.

Zoltan Nagy-Bege, the Vice-President of the Romania's National Authority for Energy Regulation, expressed scepticism that Romania could install significant capacity in the Black Sea by 2030, saying that an offshore wind Act, a support scheme, and a partnership with Bulgaria all need to happen by the end of this year.

Two developers, Hidroelectrica and Skyborn Renewables, have announced plans for offshore wind development in Romania.

Bulgaria, meanwhile, has been seeking to renegotiate the energy part of an EU-funded post-pandemic recovery plan, to save the country's coal fired power plants from closure.

A Parliamentary vote requires the government to seek guarantees that coal plants can continue operating without restrictions at least until 2038. Nearly half of Bulgaria's electricity is produced by coal fired power plants and 35 per cent from nuclear energy.

Battery owners find benefits in new trading options

RWE has recently completed construction of a 117 MW/128 MWh battery system spread between two sites but virtually connected, at a cost of €50 million. The batteries at RWE's sites in Lingen, Lower Saxony (49 MW) and Werne, North Rhine-Westphalia (79 MW) will be virtually connected to RWE's hydropower plants along the Moselle River, raising the total capacity available for grid stabilisation by up to 15 per cent.

RWE also recently took a final investment decision for another virtually networked 220 MW/235 MWh battery storage system in Neurath and Hamm, North Rhine-Westphalia.

RWE wants to install 3GW of storage capacity globally by 2030.

Meanwhile Statkraft has agreed a battery 'forward trade' on behalf of long-term customer Statera Energy-claimed as an industry first.

To avoid risk from price fluctuations in the frequency response, 'day ahead' market and in the 'intra-day' market, in a trade for Creyke Beck Storage near Hull, UK, it used a customised 'forward trade' product created by Statkraft. In what is believed to be a first, it simultaneously sold the overnight power to charge the battery and bought the evening peak power discharge in volumes appropriate to the assets' technical capabilities, locking in the buy and sell prices at the same time.

Nuclear operators seek out alternatives to Russian-supplied fuel

The UK government has promised £75 million in funding to support development of alternatives to Russian fuel supply and strengthen UK energy security, Energy and Climate Minister Graham Stuart announced recently. G7 leaders agreed to begin concerted action to reduce reliance on civil nuclear goods from Russia.

Stuart said: "Record high global gas prices, caused by Putin's illegal invasion of Ukraine, have highlighted the need for more home-grown renewable power generation, but also UK generated nuclear power – building more plants, and developing domestic fuel capability."

The government hopes the fund will help stimulate a diverse and resilient nuclear fuel market. It will support projects establishing new domestic fuel capabilities for existing and new fuel types for advanced reactors.

Tom Greatrex, Chief Executive of the Nuclear Industry Association, said: "Having the sovereign capability to manufacture next generation nuclear fuels for advanced reactors of the future is vital for energy security and net zero."

Meanwhile Bulgaria has signed a 10-year nuclear fuel supply deal with Framatome of France, to replace shipments from Russia for one of its two nuclear units from 2025. An earlier contract with Westinghouse Electric Sweden covers nuclear fuel for its other operating unit from 2024.

Europe struggles to manage power prices

- National Assembly agrees draft bill to cut red tape
- Faster permitting needed across bloc, EU says

Janet Wood

The National Assembly, the lower house of the French Parliament, recently approved a draft bill that would speed up deployment of solar PV and offshore wind, cutting red tape and offering tax incentives.

For solar the new measures proposed include making available more land for solar power generation and using artificial surfaces such as canopies for outdoor car parks with more than 80 slots.

For offshore wind, the bill calls for priority zones for turbine installation to be created in France's exclusive economic zone.

The bill was passed in the first reading, despite opposition from far-right and far-left parties.

Last year President Emmanuel Macron announced ambitious mid-century renewable energy objectives including 40 GW of offshore wind capacity and more than 100 GW of solar by 2050. But France is the EU's only Member State to have missed its 2020 renewable energy target, reaching 19.1 per cent of consumption in 2020, against a target of 23 per cent.

Removing barriers to renewables, including reducing siting and permitting delays, has recently become a major concern of the EU, which wants to see renewables deployed more rapidly to reduce costs, fossil fuel use and reliance on Russian fuels. Member States broadly agree with the issue but removing barriers has proved more difficult.

"Urgent action is needed to deliver planning and permitting systems that will drive the transition to a net zero economy. Governments, developers and civil society need to work together to remove barriers and focus on reducing development times for vital wind and solar projects," said Adair Turner, Chair, Energy Transitions Commission, which has produced a new analysis that shows simple measures to streamline planning and permitting can reduce project times by more than half for wind and solar projects.

The analysis identifies three major categories of planning and permitting barriers: regulatory, administrative and societal. It proposes several actions such as: setting clear targets and the renewables and grids that will be required to meet this; assigning priority status to renewable energy projects; dedicating sufficient land; setting and enforcing streamlined permitting targets; allowing some permit flexibility; and assigning clear property rights.

The analysis also recommends 'one-stop-shops' for permitting and using digitalised processes.

Developers, local authorities and civil society also have a key role to play in delivering progress. Wind and solar developers should effectively engage with stakeholders during project planning and construction to minimise environmental and social impacts and ensure benefits-sharing with local communities.

Major new wind and nuclear projects proposed in Sweden

Sweden is preparing legislation to enable the construction of new nuclear reactors. Prime Minister Ulf Kristersson said a new law would be proposed to lift current restrictions that limit the number of Swedish nuclear reactors to 10 and to restrict nuclear to three locations across the country. "We should be able to build more reactors in more places than we've been able to do up till now . . . We have an obvious need for more electricity production in Sweden," Kristersson said. Sweden had closed three of its six reactors but Romina Pourmokhtari, Sweden's Environment Minister, said the government was looking into whether two decommissioned reactors could be restarted as well as the potential for building smaller nuclear plants. "We see that other countries are building small reactors instead of a few large ones," she added.

Meanwhile, Sweden is a target for Denmark's Ørsted wind power developer, which recently announced it is seeking permission for four offshore wind projects in Swedish waters with a combined capacity of 15 GW. All could be commissioned, along with 3 GW currently under way, by 2032.

In 2021 more than half of Sweden's energy came from renewable sources relying mainly in a combination of biomass, hydropower, wind, heat pumps and liquid biofuels.

Masdar signs multi-megawatt clean power deals

Agreements in Central Asia and Africa pave the way for global rollout of 100 GW of renewable energy projects by 2030. **Nadia Weekes reports**

United Arab Emirates' Masdar has signed deals for renewable energy projects with a combined generation capacity of 6 GW in Central Asia and 5 GW in Africa.

Masdar agreed to jointly develop with the State Oil Company of the Republic of Azerbaijan (SOCAR) a total capacity of 4 GW of onshore wind and solar projects, and integrated offshore wind and green hydrogen projects.

The UAE company has also signed an agreement to develop a 1 GW pipeline of renewable projects in Kyrgyzstan, starting with a 200 MW solar photovoltaic plant, and another deal for an up to 1 GW wind power plant, its first investment in Kazakhstan.

Under the Etihad 7 initiative, a global development fund launched by the UAE to provide 100 million people across Africa with clean electricity by 2035, Masdar has agreed to develop projects with a combined 5 GW of capacity across Angola, Uganda and Zambia.

Speaking at the Abu Dhabi Sustainability Week (ADSW) 2023 in January, Sheikh Shakhboot Nahyan Al Nahyan, Minister of State in the UAE Ministry of Foreign Affairs and International Cooperation, said that his country and African nations share "a firm belief in the tremendous potential [of clean energy] to unlock economic and climate action progress".

Following a 2 GW agreement last year for renewable energy projects in Tanzania, this year's 5 GW pledge includes agreements with:

- Angola's Ministry of Energy and Water for the development of 2 GW of renewable energy capacity;
- Uganda's Ministry of Energy and Mineral Development for the development of 1 GW of greenfield renewable capacity;
- and Zambia's Ministry of Energy and Zambian national utility ZESCO Limited for the joint development of solar, wind and hydroelectricity projects with a total capacity of 2 GW.

Angola's Minister of Energy and Water, Joao Baptista Borges, said the agreement would boost power generation capacity, create jobs and improve access to electricity for the Angolan people. Victor Benjamin Mapani, ZESCO Managing Director, said his company – and Zambia overall – viewed the development of clean energy as complementary to hydropower and a matter of urgency for energy security.

According to the International Renewable Energy Agency (IRENA), less than half of the sub-Saharan population has access to electricity. Africa generates just 20 per cent of its electricity from renewable sources but has a theoretical potential capacity of approximately 850 TW of solar and wind.

Masdar has already established a considerable presence in Africa, having formed its Infinity Power Holding joint venture with Egypt's Infinity to target opportunities on the continent. In November, Masdar, Infinity Power and Hassan Allam Utilities signed an agreement with the government of Egypt to develop a 10 GW onshore wind project – one of the largest wind farms in the world.

The three companies are also cooperating on the development of green hydrogen projects in Egypt, targeting a combined electrolyser capacity of 4 GW by 2030, and an output of up to 480 000 tonnes of green hydrogen per year.

The deals are part of Masdar's efforts to deliver 100 GW of clean energy worldwide by 2030.

Lebanon opens credit lines to fix electricity grid

Lebanon's caretaker government has approved credit lines totalling $116 million to fix the country's electricity transmission grid. Prime Minister Najib Mikati said an advance of $62 million had been approved, with $54 million being allocated to maintenance works.

Energy Minister Walid Fayad has announced a $600 million, five-month initiative to solve the country's chronic power outages and increase electricity supplies to ten hours a day.

Since 2019, Lebanon has been plagued by a crippling economic crisis. The country's two main power plants have suffered outages and require heavy maintenance.

Türkiye unveils roadmap to 30 GW of wind energy by 2035

- First 5 GW of offshore wind "an important milestone"
- Renewables will be three-quarters of capacity growth

Nadia Weekes

Türkiye has revealed how it plans to achieve 29.6 GW of installed wind capacity by 2035, with 5 GW to be deployed offshore. Under projections included in the country's latest National Energy Plan, which is aligned with Türkiye's goal to achieve net zero emissions in 2053, nearly 100 GW of electricity capacity is to be commissioned in the 2020-2035 period.

Speaking at the launch of the plan, Energy and Natural Resources Minister Fatih Donmez said it will both support economic growth and take the country's green energy transformation to the next level.

The combined share of solar and wind power will increase to 43.5 per cent, while the share of all renewable energy sources is expected to reach 64.7 per cent. To date, Türkiye has installed 11 GW of onshore wind capacity and no offshore wind.

Veli Bilgihan Yaşacan, vice-chair of the board of the Offshore Wind Energy Association (DURED), said the 5 GW target was an important milestone for the sector. Yaşacan also emphasised the role that offshore wind power can play in the production of green hydrogen.

Türkiye's energy consumption was 147.2 million tons of oil equivalent in 2020. It is projected to increase 39.5 per cent to reach 205.3 million tons of oil equivalent in 2035.

The country's installed electricity capacity will reach 190 GW by 2035, up from 96 GW in 2020. Three-quarters of the increase is expected to come from renewable energy sources, primarily solar and wind. In 2035, solar capacity will reach 53 GW, followed by hydro at 35 GW and wind at 30 GW, well ahead of nuclear, geothermal and biomass. Battery storage capacity is to rise to 7.5 GW.

Türkiye's new Hydrogen Technologies Strategy and Roadmap outlines the important role that green hydrogen can play in achieving the country's net zero emissions target. From 2030 to 2053, the share of hydrogen blended into natural gas will be 12 per cent, and synthetic methane 30 per cent. The expected cost of hydrogen production is $2.4/kg in 2035, halving to $1.2/kg by the 2050s.

Under the plan, installed electrolyser capacity will reach 2 GW in 2030, 5 GW in 2035 and 70 GW in 2053.

Solar-powered hydrogen 'viable' in Africa

Africa can harness its strong solar energy resources to produce 50 million tonnes of green hydrogen a year by 2035 to meet local demand and for export, according to a study by the European Investment Bank (EIB).

The study finds that producing green hydrogen from solar power is economically viable at a cost below €2/kg ($2.1), equivalent to an oil price of $60 a barrel.

Unlocking Africa's green hydrogen potential will help decarbonise local heavy industry while creating jobs, securing global energy supplies and improving access to clean water and sustainable energy.

The Africa's Extraordinary Green Hydrogen Potential report focuses on three hubs: Egypt, southern Africa, and Mauritania – Morocco. It estimates that tapping the sun's energy for hydrogen production would require 1230 GWp of new solar energy generation and €1 trillion of investment in green hydrogen production and transmission.

The study outlines three prerequisites to reach the contemplated scale of hydrogen development:

- national planning, regulation and incentive schemes;
- partnerships to cooperate on infrastructure and enable mass-scale offtake;
- and pilot projects.

Meanwhile, a report by the International Renewable Energy Agency (IRENA) finds that nearly 60 per cent of Nigeria's energy demand in 2050 can be met with renewable energy sources, saving 40 per cent of natural gas and 65 per cent of oil use.

'Renewable Energy Roadmap for Nigeria', developed in collaboration with the Energy Commission of Nigeria, finds renewable energy technologies are key to achieving a sustainable energy mix and meeting the country's growing needs. "By using its abundant, untapped renewables," said IRENA's Director-General Francesco La Camera, "Nigeria can provide sustainable energy for all its citizens in a cost-effective manner."

Coordinated policies will be essential for a successful energy transition, said Dr. Adeleke Olorunimbe Mamora, Nigeria's Minister of Science, Technology and Innovation. "A cross-cutting agency or body tasked with doing so would be helpful in building consensus and developing a coherent plan which in turn would allow for the scaling up of renewable energy to meet the needs across the Nigerian energy sector," he added.

The share of primary energy requirements met with renewable energy can reach 47 per cent by 2030 and 57 per cent by 2050, according to IRENA's report. Electrification will play a key role in achieving higher renewable energy shares with electricity in final energy use nearly doubling by 2050.

Businesses prioritising commercial success over sustainability

A corporate survey finds that although almost all IT decision makers rank sustainability as their top priority, 84 per cent still prioritise commercial objectives over sustainability.

Junior Isles

As businesses were called on during the World Economic Forum in Davos, Switzerland, to follow credible net zero pledges or risk greenwashing, a survey has found that 8 in 10 organisations would accept regulatory penalties to avoid taking on sustainability initiatives.

In a survey of 2000 senior IT decision-makers from the US, Canada, UK, Germany and France, Germany-based Software AG found that the majority (84 per cent) of organisations will prioritise commercial objectives over sustainability in the face of economic challenges. This is despite the fact that almost all (95 per cent) leaders agree sustainability is either a top or high priority and a similar number (97 per cent) agree that other firms' sustainability credentials are either essential or important in their own buying decisions.

Despite the difficulties of delivering sustainability initiatives, 87 per cent of companies believe that they will lose investors if they do not have a clear strategy and many lack the technology to deliver one. In almost a third (32 per cent) of cases the necessary technology is simply not in place. And even when it is available, it is poorly implemented or used by almost half (47 per cent) of companies. In particular, 36 per cent say that they are unable to effectively track the progress of sustainability initiatives to determine whether they are effective.

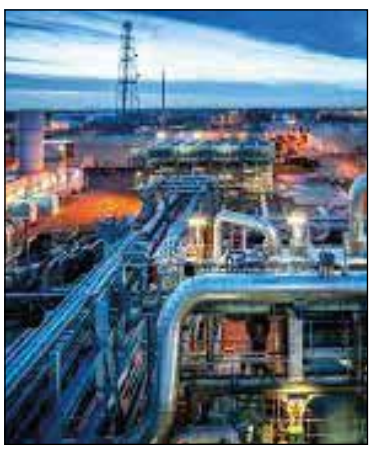
The majority (87 per cent) of organisations tackle sustainability and digital transformation separately. The Reality Check report, which seeks to investigate how technology initiatives can benefit both sustainability and commercial objectives, shows how an integrated approach can address multiple challenges at once.

Sanjay Brahmawar, CEO, Software AG commented: "In the current climate, it's no surprise that commercial objectives are a top priority – they have to be, otherwise organisations cannot continue to operate. We are keen to help organisations to find solutions using the 'Genius of AND', where they don't have to be torn between commercial and sustainability objectives."

Promisingly, a third (33 per cent) of organisations have already integrated sustainability plans into their technology roadmap.

Earlier ENGIE Impact launched its 2023 Net Zero Report, titled 'Six Actions to Accelerate Decarbonisation'. It revealed that nearly two-thirds (62 per cent) of the 500 senior executives surveyed said they have now made some form of public commitment or target to address carbon emissions reduction but only 12 per cent rate their sustainability efforts as "extremely successful".

Energy company profits surge as prices soar



UK energy company Centrica has forecast an almost eight-fold increase in full-year earnings after it benefitted from soaring energy prices. The forecast is in spite of the impact of the windfall taxes on energy companies.

The energy group, which owns British Gas, said that it expected to report adjusted earnings per share of more than 30p when it publishes its 2022 results this month. The update represents a significant upgrade on the company's previous guidance in November when it said earnings would come in at the top end of analysts' expectations, which at the time ranged between 15.1p and 26p per share.

SSE also increased its full-year profit forecast after higher than expected output from its gas fired plants. The company said that output from its gas power plants was 27 per cent higher in the nine months to the end of December compared to the previous year. The power generator said last month that adjusted earnings were expected to rise to more than 150p a share for the 12 months to the end of March, up from its earlier forecast of at least 120p. In November, SSE reported a four-fold increase in profits in the six months to September.

Power companies have benefitted from the high electricity and gas energy prices exacerbated by Russia's war on Ukraine, which has led the UK government to impose windfall taxes on power companies and oil and gas majors.

Alistair Phillips-Davies, SSE's Chief Executive, had warned that the tax could harm investment in the UK. But the company says it remains on track to deliver record investment of more than £2.5 billion this year, "with clear visibility" for further investment opportunities that support the transition to net zero.

Phillips-Davies maintains, however, that Britain is not moving fast enough on green economy and says planning and consent times for renewables development must be improved.

■ The UK government is set to recoup hundreds of millions of pounds from the sale of the collapsed power supplier Bulb to Octopus Energy, as long as wholesale gas prices do not rise again in the coming months. The potential payback from the Octopus deal will raise hopes that the cost to taxpayers and households of Bulb's temporary nationalisation will be well below expectations. The recent drop in energy prices – if it continues – would shave up to £840 million from the eventual losses, government officials have estimated.

Siemens Gamesa takes hit on operating profit

Wind turbine manufacturer Siemens Gamesa Renewable Energy SA has revealed a €472 million ($511.4 million) charge to operating profit in the first quarter ended December, after discovering faulty components in its installed fleet that increased its warranty and maintenance costs.

The charge will lead to approximately a €760 million loss of EBIT before purchase price allocation (PPA) and integration and restructuring (I&R) costs for the first three months, the wind turbine maker said in its preliminary earnings report.

"These charges reflect the outcome of the evaluation of the installed fleet, during which the company detected a negative development of failure rates in specific components resulting in expected higher warranty and service maintenance costs than previously estimated," the company stated.

The news comes as some developers are predicting difficult times for the wind industry.

In January, Denmark's Orsted A/S, one of the world's largest renewable energy developers, said it fears that the energy transition will slow as increased competition and interest rates reduce profitability and challenge the case for investment.

Some argue that the sector is becoming a victim of its own success. Until recently, wind power was increasingly affordable. As turbine sizes increased, costs plummeted. This trajectory was expected to continue and tenders for new projects began to favour applicants who could promise lower power prices. In recent years, however, inflation and rising interest rates have put an end to the downward trend in costs and now threaten continued growth.

Mads Nipper, CEO of Orsted, told Bloomberg Green in a podcast: "If states around the world say energy prices can only go down, it will be a race to the bottom. In the end, capital will dry up."

He added: "There's not much room to absorb higher costs. A typical offshore wind farm generates a return of about 1 per cent above the cost of capital. A really good project can get as much as 3 per cent. Rising interest rates are eroding that return, and if the price of electricity from wind farms doesn't go up, companies won't be able to invest at the rate needed to meet climate targets."

GE and IHI eye ammonia-fired gas turbines by 2030

GE Gas Power has signed of a Memorandum of Understanding (MoU) with Japan's IHI Corporation (IHI) to jointly develop ammonia combustion technologies for heavy duty gas turbines to generate electricity with reduced or near zero CO_2 emissions.

The MoU marks a significant milestone following the announcement in June 2021 of the first MoU between GE and IHI to carry out an economic assessment for the use of ammonia as a carbon-free fuel for both existing and new gas turbines. As part of the MoU, both parties will further define a technology roadmap to develop gas turbine technologies by 2030 that will enable GE's 6F.03, 7F and 9F gas turbines to fire up to 100 per cent ammonia in a safe and commercially competitive manner, with potential implementation across additional gas turbines in the future.

The collaboration aligns with the companies' commitment to support the global transition. GE will bring its extensive experience and expertise in engineering and manufacturing gas turbine combustors and balance of plant systems, while IHI Corporation will bring its experience in developing ammonia combustion technologies and global value chain development.

Scott Strazik, CEO of GE Vernova, said: "We hope that this collaboration will pave the way for power plant operators to pursue the adoption of carbon-free fuels such as ammonia for power generation in their GE gas turbines and significantly contribute towards lowering carbon emissions in the power sector globally."

Looking through the industrial cyber portal

Every power project has different requirements and components that change the prerequisites for cyber security. At the same time, cyber security needs to change over the lifetime of a project, making it tricky to maintain a holistic overview of projects around the world. Siemens Energy has therefore developed an industrial cyber security portal that simplifies the integration of cyber security into each of its projects, with the aim of delivering products and solutions that are inherently cyber secure. **Junior Isles**

Mehlig: "Essentially, one needs enough transparency when it comes to cyber risk to act appropriately."

While digitalisation is seen as a key pillar of the energy transition, the growth of devices connected to the industrial internet poses a real threat. Certainly, it is a major concern for executives. According to PwC's 25th Annual Global CEO Survey, 44 per cent of energy, utilities and resources CEOs ranked cyber threats as a "top three" concern. And of all sectors, energy is among the most targeted.

According to the X-Force Threat Intelligence Index 2022, the energy sector ranked as the fourth most affected sector in 2021, with 8.2 per cent of all observed attacks, behind the manufacturing industry, the financial sector, and the professional services sector. The war in Ukraine has no doubt heightened that threat. In April, for instance, Ukraine's Computer Emergency Response Team announced that it had successfully repelled a series of cyber attacks on the country's power grid.

In the past, hacking energy infrastructure would usually require cyber criminals to have an on-site deployment to successfully hack the operational technology needed to run a network or plant. With increasing digitalisation, and as information technology (IT) and operational technology (OT) converge, this is no longer the case.

Stensletten says the portal is designed to serve as a 'one-stop-shop' to address all cyber security needs of any given project

Today, utilities, factories, etc., typically use IT systems connected to OT networks to operate their digital equipment. This makes it easier than ever for cyber criminals – whether nations (cyber warfare) or individuals – to not only infiltrate the IT of a company, but also the attached OT operated via those IT systems. To keep the critical infrastructure secure, providers of energy technology equipment nowadays have to provide state-of-the-art cybersecurity solutions including secure products that meet all legal requirements.

Commenting on the challenges its customers are facing and what it can do as a company, Bernhard Mehlig, Industrial Cybersecurity Consultant, Siemens Energy, said: "Companies that provide us with electricity, natural gas for heating or oil for transport, operate complex manufacturing and production sites that use digital solutions to make their operations more efficient and profitable. These are at risk from various types of hackers. The companies that we provide solutions to are becoming more and more aware of this. So it is important for us to focus on what we can do to ensure our customers achieve a secure operation of the products and solutions we provide."

Rune Stensletten, Head of Industrial Cybersecurity Office (ICS Office), Siemens Energy, added: "The industrial products and solutions we provide to our customers cannot be protected in the same way as IT infrastructure. Trying to secure these systems is a highly complex task. So what we are doing is trying to collect and define best practice and guidance centrally and provide it to our internal business partners. The purpose of our industrial cyber security team is to support our businesses involved in the execution of customer projects and product development."

Although each business unit of Siemens Energy has its own industrial cyber security community, which oversees cyber security for products and solutions coming out of the specific business unit, the central ICS Office coordinates all the various efforts. This includes cyber resilience of Siemens Energy's various manufacturing and production sites as well as the security of products and solutions provided to its customers.

Such an approach enables each business unit's ICS community to bring their expertise to customer projects, answering all questions and meeting the needs of the customer. But in an environment that is changing quickly there has to be a coordinated way of managing this community of ICS experts and bringing them up to speed with the latest requirements for each product and solution. This is where the central ICS team comes in.

A good example is the differing and evolving cyber legislation in the regions Siemens Energy is operating in. In the EU, the recently introduced Cyber Resilience Act (CRA) requires each project in the energy industry to meet certain criteria. Cyber security therefore is a business enabler and market access requirement in many countries, as technology providers are not able in some parts of the world to conduct business without complying with existing legislation. Further, customers themselves might have specific requirements that can be a deciding factor in selecting an equipment supplier.

Executing projects worldwide is already a complex task; and cyber security adds yet another layer of complexity that has to be addressed. As Mehlig put it: "There are already a lot of moving parts and a lot of resources and deliverables have to be aligned. Cyber security adds to that. And if you look at the specific cyber security task there is a sequence that has to be followed and tasks have to be executed iteratively. You have to have all your ducks in a row.

"This presents challenges for technology companies, from both a central point of view and in a customer project context to keep track of risks originating from cyber security issues, e.g. non-compliance to cyber requirements or security vulnerabilities in products or solutions. Essentially, one needs enough transparency when it comes to cyber risk to act appropriately."

According to Siemens Energy, having the tools to keep track throughout its cyber community is therefore key. Having this ability not only drives horizontal cyber security portfolio definition in alignment with business units' offerings and manufacturing, it also enables understandable and optimised implementation of cyber security in processes, technology and guidelines.

To address these issues, the company recently launched what it calls its Industrial Cybersecurity Portal (ICS Portal).

The portal is designed to simplify security by providing specific function modules within a central repository. Tasks and outcomes are stored centrally so they can be evaluated and documented. This will help provide transparency for the central ICS team and the business units themselves.

Stensletten said: "It is designed to serve as a 'one-stop-shop' for addressing all cyber security needs of any given project. Helping all our Siemens Energy business units working with our portfolio, the ICS portal provides transparency, for example, on relevant security requirements for their assets as well as guidance on related vulnerabilities and their mitigation. Featuring automation capabilities, and the ability to contextualise, visualise, and structure the project data, it has never been easier to integrate and maintain cyber security in the design of our products and solutions."

The types of risks that a project might face could range from a vulnerability in an individual component delivered to a customer, to a solution from a sub-supplier that does not meet the security requirements of the customer.

"To remain a trusted partner for our customers, our portfolio must become secure by design to protect adequately against cyber threats, meeting global regulatory requirements and standards. To achieve this goal broadly and holistically can be a huge challenge. It requires a simplification of security and the ability to integrate cyber security into existing business

Cyber security in industrial projects is a key concern

processes. The ICS portal is a tool that covers the whole lifecycle of cyber security for our customers' projects," said Mehlig.

The portal will have a number of modules to support both Siemens Energy and its customers. With the first release of the ICS Portal it is already possible to:

- Define the 'project context' by adding project information, (security) zone hierarchy; asset definitions; software/hardware components;
- Evaluate standards and requirements by the mapping of requirements between different standards;
- Perform vulnerability monitoring.

In the next iteration, the ICS team plans to introduce other functions like risk assessment to give an indication of the type of cyber security that should be planned for project execution; vulnerability management in assets and components; secure supplier cyber security evaluation; and project security activities guidance.

Stensletten explained: "The vulnerability management module, for example, will contain a full list of all assets and components involved in the project and will allow tracking of tasks and workflow. The supplier module says that when you are buying things from 3rd parties, you want to make sure that these vendors are secure and know how to develop secure products and solutions that meet our customer requirements."

"There are certain activities that should be best practice, depending on the state, or the time in the lifecycle of the project," added Mehlig. "So, we want to create a module for every activity; i.e. specific modules for certain activities that occur during a particular timeframe in the project lifecycle.

"This simplifies security. A person that is focused on a specific activity can feed in the data to the portal, which stores it in the context of the project. This makes it easier for the project team to assess certain outcomes and react accordingly."

Stensletten noted: "Bernhard and I have worked in cyber security in the business units for many years and we've been talking about having this tool for at least five or six years. Now as part of this central team, we finally have the means to be able to do this. By doing this we are not only helping the business unit we came from but the entire company, when it comes to dealing with cyber security."

In developing the portal, the central ICS team has collaborated closely with cyber security communities working on projects. "This is important to build the functionalities that are relevant to them in their business area," said Stensletten. "But we are also thinking long term because we know that if we do all of our cyber security due diligence as part of our project execution, it also makes it possible to use these services for our end customers.

"By doing vulnerability management in-house, we ensure the elimination of all vulnerabilities before handing over to customers, and we are also monitoring solutions during the warranty phase. Further, we can provide this as an end service to customers after the warranty. "

This, he says, not only provides them with information on upcoming vulnerabilities but also gives them access to experts that actually developed the product or solution, who can advise on how to address the issue.

Stensletten added: "Going into the project phase, there are a number of different roles. There are engineers, technical project managers, etc., and we are introducing a role that is responsible for cyber security in projects to ensure that the activities that have been defined are actually being followed – kind of like a quality [control] function. There is also an ICS expert, who will help with the technical implementation and verification of requirements, etc.

"The idea is that the tool will guide you through all the cyber security activities, allow you to customise according to the project's cyber security risks and introduce cyber security activities for different roles in the project."

Siemens Energy also plans to create a dashboard where it can collect key performance indicators (KPIs), generate queries and create reports on, for example, projects that have reached a certain stage.

Mehlig explained: "This is important for us centrally and for the portfolio. We can, for example, look at all projects in a certain area and see how many components have been sold there, what their current status or risk assessment score is, etc. This would allow us to make detailed evaluation reports based on data entered, and try to figure the risks or hotspots in terms of cyber security risks."

"It could also show where the organisation is lagging. For example, we can find out where, say, vulnerability mitigation is taking very long. The portal will allow the organisation to monitor itself in order to learn and improve."

In addition to further developing the tool, the ICS team's next steps will be to reap the rewards of its work by raising awareness of the portal internally and making its use inside the company more widespread. The overall goal is to simplify the integration of projects, ultimately benefiting Siemens Energy customers, who can rely on a unified process that ensures implementation of cyber security before the solution is handed over.

Stensletten summed up: "We have been a small group, currently working on the development of the portal's functionality and verifying that the technology is working. Now we will introduce it to the whole company by implementing the module for the initial risk assessment, and will build the core functionality as we get more people to start using this tool."

Siemens Energy's industrial cyber security experts came together for an on-site event in Berlin during September last year

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Americas

Siemens Gamesa wins Canada wind farm order

Siemens Gamesa Renewable Energy has received an order to supply wind turbines for a 495 MW wind farm located in Canada. The purchaser has not yet been revealed.

The firm order comprises the supply of a combination of SG 5.0-145 and SG 6.6-170 wind turbines, as well as a 10-year service contract, and the project is expected to be commercially operational in 2024.

200 MW wind order in Canada for Nordex

The Nordex Group has received an order to supply 36 N155/5.X turbines for a wind farm, which is expected to reach full commercial operation in 2024.

The wind farm is being built in the Canadian province of Saskatchewan, where the temperature can fall to -30°C in the winter. The turbines will therefore be supplied in the cold climate version.

Vestas to supply 288 MW to Brazil

Vestas and Engie Brasil Energia have signed an agreement for Vestas to supply 288 MW with 64 units of the V150-4.5 MW wind turbine to be installed in Serra Assuruá in Bahia, Brazil. Vestas will also provide a service to optimise output of the facility over the next 25 years. The Serra de Assuruá wind farm, with a total capacity of 846 MW, will be gradually connected during the second half of 2024.

In addition, Vestas won a 216 MW order for the Chevelon Butte wind farm phase 2 in Arizona, USA, for the AES Corporation. Vestas did not reveal financial details of the deal. The order will consist of 48 V150-4.5 MW turbines. This project is the second and final phase of the Chevelon Butte wind farm. Chevelon Butte I is scheduled to be operational in Q2 2023.

The order includes supply, delivery, and commissioning of the turbines, as well as a 10-year service agreement. Turbine delivery will start in Q3 2023, with commissioning scheduled for early 2024.

Grid balancing order from US for Wärtsilä

Wärtsilä has won an order to supply engines for two new US power plants. The order was placed by a major American investor-owned utility in the Upper Midwest. The Wärtsilä engines were selected for their grid balancing capabilities as the utility expands its integration of renewable energy, notably wind and solar.

The two plants will operate with Wärtsilä 34DF dual-fuel engines. The first plant will generate an output of 28 MW from three engines, while the second will provide 47 MW of power from five engines. All eight engines will run on natural gas and will have the capability to use light fuel oil if natural gas is not available.

Asia-Pacific

BTL EPC wins supercritical order in India

BTL EPC has won an order from BHEL to set up an ash handling system for the 5x800 MW Telangana State Power Generation Corporation's (TSPGENCO) supercritical coal fired thermal power plant at Yadadri, Telangana, India.

The order includes installation of a bottom ash handling system, economiser ash handling system, coarse ash removal system, dry fly-ash evacuation system through vacuum, and pressure conveying system including high-concentration slurry disposal system (HCSD). The contract is valued at about $55 million.

Service orders in China for GE

GE and Chinese state-owned power utility Guangdong Energy Group have signed a long-term service agreement for the 2.4 GW Dongguan Ningzhou power plant, which is powered by three GE 9HA.02 gas turbines. GE will provide services to help ensure reliable and stable operation for a total of 10 GE aeroderivative gas turbines, which currently power China Huadian Corporation (CHD)'s Tianjin Beichen, Guangdong Foshan, Jiangsu Jinhu, Shanghai Minhang, and Fujian Xiamen power plants.

GE's agreement with Guangdong Energy Group includes spare parts supply, unit maintenance, technical support, and on-site services for up to 18 years.

Xu Xin, General Manager, GE Gas Power China Services, said: "GE Gas Power has established productive and successful relationships with CHD and Guandong Energy Group that allow our collective organisations to deliver meaningful innovation and energy contributions to China."

First commercial green ammonia plant in China

Topsoe has been chosen by Mintal Hydrogen to provide technology to the first dynamic green ammonia plant in China. The dynamic green ammonia plant is Topsoe's first power-to-X project in China and includes Topsoe's process licensing, engineering design package, proprietary equipment, and catalysts.

The plant will be built in Baotou, Inner Mongolia, and will have an output of 390 000 tons green ammonia annually.

Power from wind turbines will be connected directly to the electrolysis unit making it more cost-effective than if involving hydrogen storage.

Ormat secures financing for Ijen geothermal plant

Ormat Technologies and PT Medco Power Indonesia have signed a financing agreement with PT Sarana Multi Infrastruktur (SMI) for development of Ijen geothermal power plant.

The Ijen power plant will be developed in stages. The first phase is expected to generate 34 MW in 2025. MCG, a joint venture between Medco Power and Ormat Technologies, will develop and operate the first geothermal power plant in East Java. Ormat also signed a contract as a key contractor on OEC supply for this project.

Doron Blachar, CEO of Ormat, said: "This signing is another step to support Indonesia's economy towards clean renewable energy and another step in Ormat's long term plan to increase its presence in the country both as a geothermal power plant owner and as an equipment supplier."

Europe

Repsol orders wind turbines from GE

Repsol has selected GE Renewable Energy to supply 22 units of 6.1 MW wind turbines for six of the wind farms of the Delta II project in Aragón. GE Renewable said that these six wind farms will have a total capacity of 133 MW. The Delta II project is Repsol's largest renewable complex currently under construction, with a total capacity of 860 MW.

The wind turbine blades will be manufactured by GE's wind turbine blade subsidiary LM Wind Power, which operates from Ponferrada (León) and Castellón in Spain. The wind turbine towers will also be produced in Spain, while the nacelles will be produced in Salzbergen, Germany.

Vestas wins 84 MW order in Italy

Camp Eolico Ariano (CEA), a subsidiary of the WEB Group, has placed an order with Vestas for the 84 MW Ariano Irpino wind farm, to be located in the Campania Region, Italy.

The contract includes the supply and installation of 20 V150-4.2 MW wind turbines, as well as a 25-year Active Output Management 5000 service agreement.

Turbine delivery and commissioning are expected for the second half of 2023.

Frank Dumeier, CEO of WEB, said: "Since the Ariano project is WEB's biggest project so far, it marks another important milestone for the growth of WEB. We are also glad to add this project to our long-term partnership with Vestas."

Wind turbines ordered for Ruginoasa project

Vestas has received an order for ten V162-6.2 MW wind turbines in 6.0 MW operating mode at a hub height of 125 m from DTEK Renewable International & Moldova Eolian to power the 60 MW Ruginoasa wind project in Romania.

The order includes supply, installation, and commissioning of the turbines, as well as a 20-year service agreement.

Turbine delivery begins in Q3 2023 with commissioning scheduled in Q4 2023.

Ignalina signs dismantling contract

The Lithuanian state enterprise Ignalina nuclear power plant has signed two contracts for the design services of reactor dismantling technologies with two consortia.

One consortium, led by Westinghouse Electric Spain, consists of Westinghouse Electric Spain, Jacobs Slovakia, and the Lithuanian Energy Institute. The other consortium is led by EdF, and consists of EdF and Graphitec.

The contracts were signed for 4-year periods, with a maximum price for each preliminary contract of €5.5 million.

The physical dismantling of the two RBMK reactors at Ignalina will start in 2028.

Converter platforms for LanWin 1 and 3

A consortium made up of Dragados Offshore – a subsidiary of Cobra IS – and Siemens Energy has been awarded a contract by Amprion Offshore to design, build, and install the LanWin 1 and LanWin 3 offshore wind farm energy converter platforms in the North Sea. The contract is valued $4.3 billion.

The two platforms will each have a transmission capacity of 2 GW. They are scheduled to be commissioned in 2029 and 2030.

The project falls within the German energy transition plan, which seeks to build a major offshore wind farm energy network.

Dragados Offshore is already executing four other offshore converter projects of this nature for German operators commissioning in the North Sea.

International

Qatar 875 MW PV module supply agreement signed

The PV module supply agreement for the Qatar 875 MW PV power plant project has been signed between JA Solar and Samsung C&T.

Under the terms of the supply agreement, JA Solar will provide over 1.6 million DeepBlue 3.0 modules for the project. The project will be built in the Mesaieed Industrial City and the Ras Laffan Industrial City, and is expected to go into operation in 2024.

AMEA Power solar plant for Ivory Coast

AMEA Power has won a contract from the government of Ivory Coast for a 50 MW solar PV project. The deal includes a 25-year power purchase agreement (PPA). The $60 million project is being fully developed by AMEA Power under a BOOT (build, own, operate, transfer) model and will generate 85 GWh annually.

The project will be the first solar independent power producer (IPP) project in Ivory Coast and will be located at the city of Bondoukou in the northeastern region of Gontougo, 420 km northeast of Abidjan.

The offtaker for the project will be Compagnie Ivoirienne d'Electricité, responsible for the electrical network throughout the country.

As part of its strategic plan, the government of Ivory Coast aims to raise the share of renewable energy in the country's electricity generation mix to 42 per cent by 2030.

Converting coal plant to biomass in Reunion

EdF La Réunion has selected Aggreko to supply 24 MV diesel mobile power units to the Bois-Rouge power plant in Reunion Island. This will allow EdF La Réunion to convert the plant from coal to biomass without halting energy production.

The Bois-Rouge cogeneration plant has an installed capacity of 108 MW. Conversion work from coal to biomass began in 2021 and by the end of 2023 the plant is expected to be operating at 100 per cent biomass. The conversion will increase the proportion of renewables in the energy mix on Reunion Island from 35 per cent to 51 per cent.

The delivery of the power generators will begin in January 2023, with all operations planned to be fully converted to biomass by the end of that year.

Saft energy storage system for New Zealand

Saft, a subsidiary of TotalEnergies, has been awarded a major contract by Meridian Energy to construct New Zealand's first large-scale grid-connected battery energy storage system (BESS).

Located at Ruakākā in the country's North Island, the 100 MW BESS will improve the stability of the national grid as intermittent renewable power generation increases in New Zealand. The BESS is the first stage of a project that will include the construction of a co-located 130 MW solar farm by Meridian Energy.

Saft is supplying the battery and power conversion equipment, installation, commissioning and 20 years operational services. Scheduled to enter service in the second half of 2024, the BESS will have storage capacity of 200 MWh to support the local grid demand for around two hours.

Hydrogen

India launches $2.4 billion programme to go big on hydrogen

India's economy and population are growing and the country is forecast to need as much new energy over the next two decades equivalent to what the European Union uses now. Last month the authorities in New Delhi announced the launch of a subsidy programme designed to provide funding for hydrogen innovation and attract investment to the promising sector.

Gary Lakes

Coal and hydrocarbons provide India with the energy it needs to keep its industries and businesses growing and its automobiles moving. But carbon dioxide emissions must be drastically curtailed if the country is serious about reducing its contribution to the damage being done to the global climate as well as its own environment.

India's air pollution problem alone became starkly obvious when during the early days of the Covid-19 global lockdown, before and after photographs were published where the before photo showed the smog-filled skies over New Delhi, while the after photo taken from the same location showed a clear view of the Himalaya Mountains in the distance – the consequence of reduced carbon emissions.

In early January, the Indian authorities announced a $2.4 billion package designed to encourage its industries and businesses to produce, use, and export green hydrogen, as many governments in the developed world are doing already.

An important factor weighing upon India and encouraging an energy transition is the rising cost of hydrocarbon imports.

Cutting the cost of energy will be vital if India is to pull its masses out of poverty. The country's solar and wind resources are sufficient enough to enable India to reach its 2045 goal of being energy independent and reaching net zero emissions by 2070.

While the country has its own well-developed coal, oil and gas industries, it is highly dependent on imports of gas and oil from the Middle East and Russia. But as global energy prices rise, the money flowing out of India to cover energy costs is a big incentive to transition to renewables. India's reliance on hydrocarbon imports is such that despite international sanctions against Russia for invading Ukraine, India has taken Moscow's offer to buy Russian oil at a discount. Along with China, the two countries are the best customers for discounted Russian crude.

Funding under the programme is meant to push India to building the capacity to produce 5 million metric tons of green hydrogen by the end of this decade through the development of electrolysers, which use water and renewable energy to produce green hydrogen. No greenhouse gas molecules are emitted during this process. What hydrogen there is in the world is produced as blue, grey or even black, which uses natural gas or even coal to produce it.

Some major Indian heavy industrial conglomerates are already making the switch to hydrogen in the form of a clean fuel. The Adani Group, partnered with France's TotalEnergies, is planning to invest $50 billion to create what it describes as the "world's largest green hydrogen ecosystem" over the next 10 years. And India's multi-industrial Reliance Industries is planning a $75 billion clean energy restructuring that includes switching from grey hydrogen to green by 2025.

In recent public remarks, Indian Prime Minister Narendra Modi said India would by 2030 develop a further 125 GW of renewable energy sources to be used for green hydrogen production. He said the new green hydrogen programme would support research and development as well as pilot projects that would increase decarbonisation in big energy users such as steel, oil refineries and fertiliser companies.

He said regions of India capable of large-scale production and utilisation of green hydrogen would be identified and developed as green hydrogen hubs.

Under the recently-released National Green Hydrogen Mission, India will establish a green hydrogen ecosystem in which these hubs will be located near existing industrial centres where oil refining and steel plants are located.

The hydrogen mission calls for at least two large scale production and/or utilisation hubs to be established by 2025-26. It calls for pilot projects in emerging applications such as steel manufacture, mobility, port development to be promoted in these hubs, and that these hubs be connected by mobility corridors that include sufficient refuelling infrastructure and hydrogen supply arrangements along the route.

India's green hydrogen mission is, according to the government document, replacing fossil fuels and the hydrogen that is produced by fossil fuels with green hydrogen; produce steel with green hydrogen and produce green hydrogen-derived synthetic fuels such as green ammonia and green methanol. Ultimately, the aim is to make India a leader in technology and manufacturing of electrolysers and other enabling technologies for green hydrogen, the mission document says.

The subsidy funding that the government is making available should kick-start the process and provide further encouragement and investment advantage to the country's entrepreneurs.

Gas

Italy, Eni seek to boost Africa gas exports to Europe with Mattei Plan

Italy's energy giant Eni is looking to increase African gas exports to Europe through new energy projects in Algeria and in Libya as a means to end the continent's reliance on Russian gas imports and establish Italy as an energy hub.

Gary Lakes

Italian Prime Minister Giorgia Meloni visited Algeria in January to express support for Eni's energy plans in North Africa and to promote the Mattei Plan, named after Eni founder Enrico Mattei, who established close relations between the company and Algeria in the 1950s and 60s. Key to the plan is stemming the flow of illegal migrants across North Africa to Italy and other southern European countries. Meloni identifies the primary causes for the flow of migrants as poverty and jihadist unrest. The plan calls for Italy to work together with other countries in Africa and Europe in addressing these problems.

At a news conference in Algiers with Algerian President Abdelmadjid Tebboune, Meloni called the plan "a collaboration on an equal basis, to transform the many crises that we are facing into opportunities."

Eni CEO Claudio Descalzi travelled to Algeria with Meloni and met with the head of Algeria's state-owned oil and gas company Sonatrach, Toufik Hakkar. Long-time partners in a number of hydrocarbon projects, the two companies signed more agreements during the January meetings for projects meant to increase Algeria's production and export capacity.

Algeria already exports gas to Italy through gas pipelines across Tunisia to Sicily and mainland Italy. New efforts will be made to expand infrastructure in order to reduce Italy's once close dependence on Russian gas, and to strengthen Algerian gas shipments into Europe, once reliant on Russia for 40 per cent of its gas supplies, but now keen to find alternative sources in the wake of Russia's invasion of Ukraine.

In early January, Hakkar said Sonatrach is looking to raise hydrocarbon output to 200 million tons of oil equivalent (toe) during 2023. The latest available figures show that production stood at 185 million toe in 2021.

During her press conference with Tebboune, Meloni announced that two agreements had been signed by Eni and Sonatrach, "one to identify activities to reduce greenhouse gas emissions and the other to achieve an increase in energy exports from Algeria to Italy and potentially from Algeria to Europe.

According to Eni, the two companies "will perform research to determine possible measures to improve [Algeria's] energy export capacity to Europe. The purpose is to support energy security and ensure a sustainable energy transition", the company said in a statement. With the other agreement, the two companies will explore opportunities to reduce greenhouse gas and methane emissions, and determine energy efficiency initiatives, renewable energy developments, green hydrogen projects, and carbon capture and storage projects, Eni said. The two countries are also discussing the transmission of Algeria's surplus electricity to Italy through a subsea cable.

Last November, Descalzi and Hakkar inaugurated Solar Lab and laid the first stone for a 10 MW photovoltaic plant in Bir Rebaa North production complex in the Berkine Basin in southeast Algeria. The solar plant is the second such facility linked to BRN's hydrocarbon production. Another PV plant is set to be constructed this year at Menzel Ledjmet East, also in the Berkin Basin.

Solar Lab is where different photovoltaic panels will be tested in the extreme irradiation conditions of southern Algeria. It will collect data and provide analysis that will identify the most efficient technologies.

In early January, Eni and its former energy infrastructure company Snam closed an agreement whereby Snam acquired 49.9 per cent in a joint company called Sea Corridor that will operate two groups of international gas pipelines connecting Algeria to Italy. Eni will hold 50.1 per cent of the new firm, which will also examine the possibility of hydrogen pipelines. Snam paid Eni about €405 million for its place in Sea Corridor.

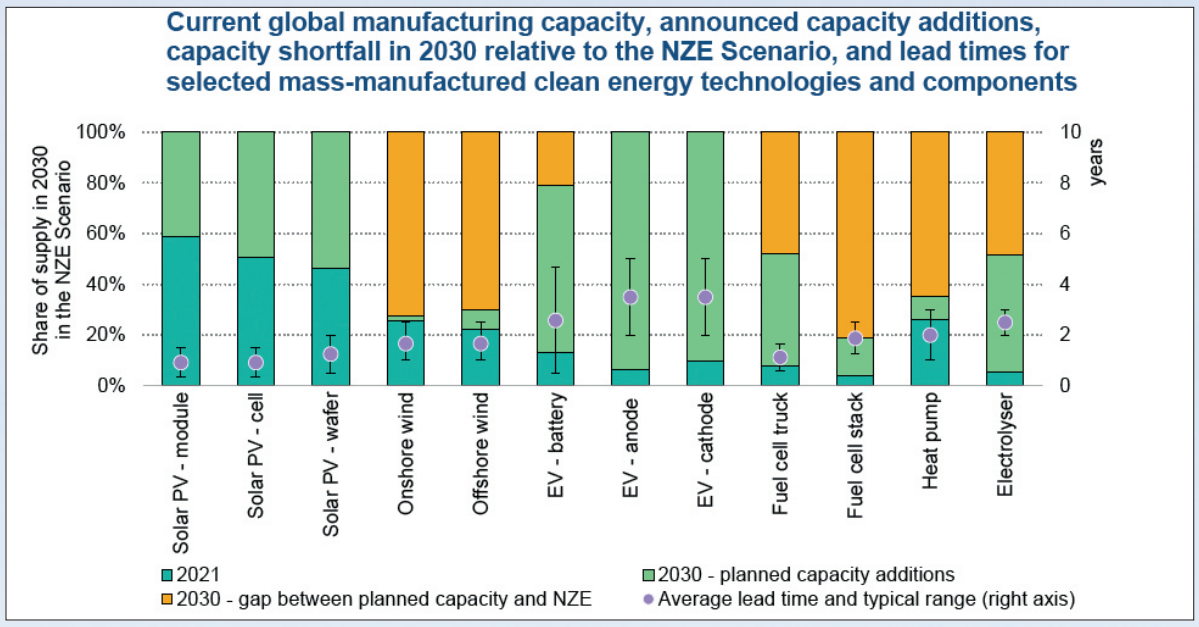
Eni said in a statement "the scope of the transaction includes the onshore gas pipelines running from the Algeria and Tunisia borders to the Tunisian coast (TTPC), and the offshore gas pipelines connecting the Tunisian coast to Italy (TMPC)."

Meanwhile, the head of Libya's National Oil Company (NOC) Farhat Bengdara has said that Eni and NOC are preparing to agree a production deal that will see Eni invest some $8 billion towards bringing two offshore fields on-stream and produce some 850 million cubic feet of gas per day. Eni already produces nearly 200 billion cubic feet (bcf), most it from the offshore Wafa and Bahr Essalam fields operated by a joint venture company between Eni and NOC, Melittah Oil and Gas.

Eni exports gas from Libya to Italy through the 8 bcm/year capacity Green Stream gas pipeline to Sicily.

Eni's Descalzi has called for Europe to look to Africa for its future gas supplies, saying that 'south-north' energy axis would bring gas from Africa to the EU and enable Europe to halt its gas imports from Russia. Italy has set a target date of 2025 for ending its imports of Russian gas.

Energy Technology Perspectives 2023: Technology manufacturing and installation



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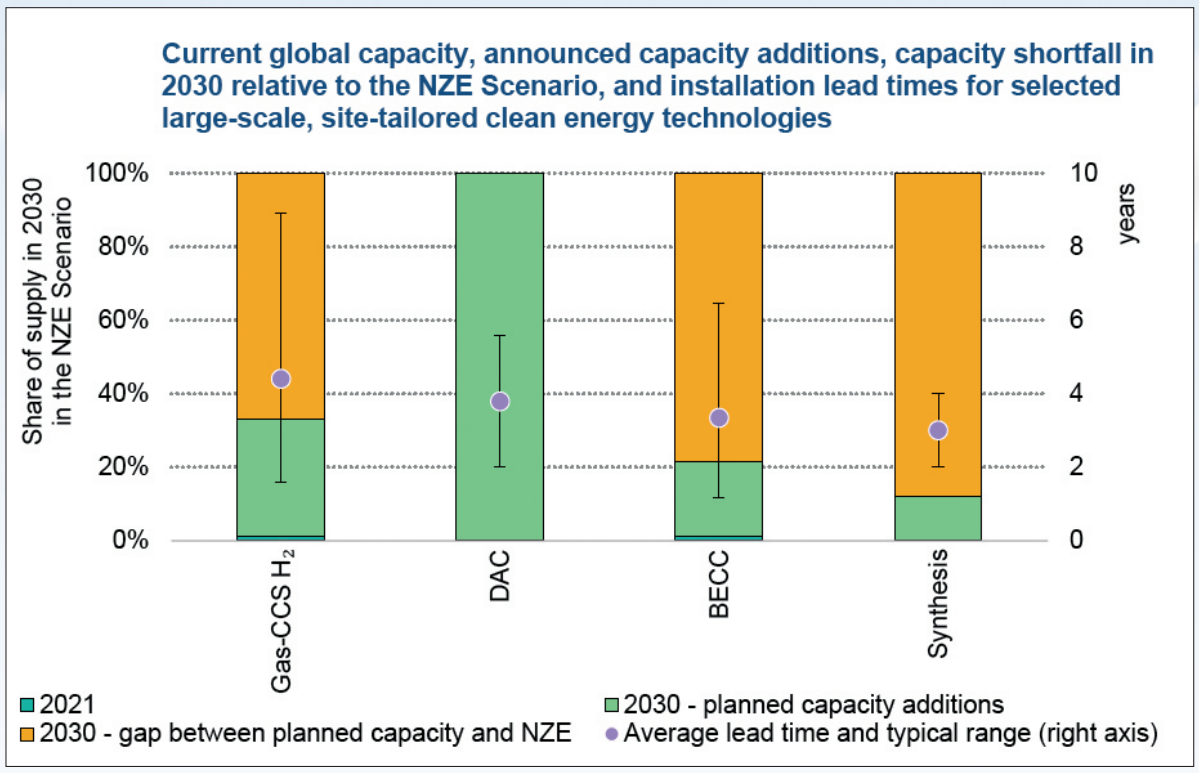

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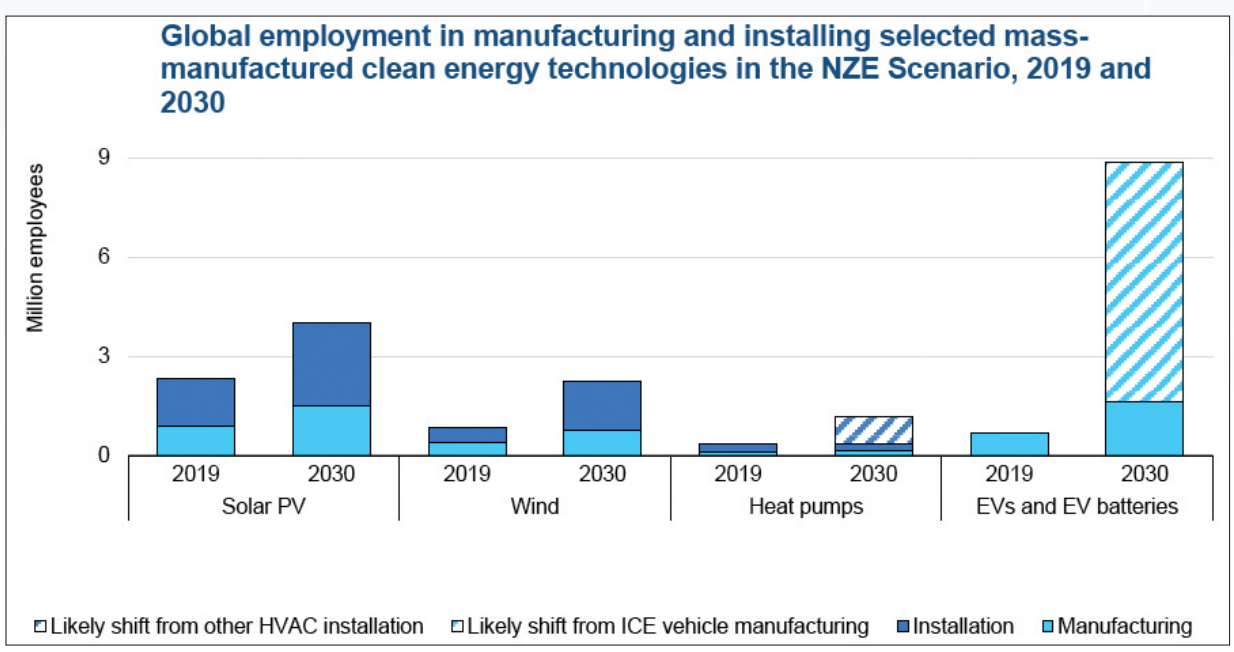

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The business of climate strategy: *opportunities vs. risks*

Corporations in the Asia-Pacific region have lagged behind their European counterparts when it comes to sustainability and climate strategies. But this is changing fast, as the future energy landscape brings new opportunities.
Joseph Jacobelli.

Thousands of people, including hundreds of government and business leaders, descended on Davos, Switzerland, in January for the annual general meeting of the World Economic Forum (WEF). While several hot topics were discussed in the sub-zero temperatures of the alpine ski resort, one of the hottest among them was the climate – not only climate change factors but also the role of businesses in the net zero transformation to slow global warming.

Corporations now face multiple pressures from governments, shareholders, and other stakeholders to adopt sustainability and net zero strategies, particularly those involved in energy. There are pressures on their financing, requirements for financial and other reporting, and demands for short- and long-term corporate strategies.

Typically, energy corporates in Asia-Pacific have lagged behind their European counterparts in terms of sustainability and climate strategies. But the lag can be seen as a positive. It means energy companies in the region have the opportunity to learn from their European and global peers. Also, given the bulk are in growth markets, they have the opportunity to create and innovate and potentially design new net zero strategies.

The capital markets increasingly demand utilities and other corporates address net zero emissions. Commercial banks, multilateral banks, and other financial institutions themselves are being asked by regulators and shareholders to implement green financing measures.

The industry-led Net-Zero Banking Alliance is one example. It was formed in April 2021 to get the member financial institutions to align "their lending and investment portfolios with net zero emissions by 2050", states the United Nations Environment Programme - Finance Initiative. The Alliance has 126 member banks from 41 different countries, representing 41per cent of global banking assets. It "reinforces, accelerates and supports the implementation of decarbonisation strategies" within the institution, which in turn means members must encourage their clients to adopt net zero emission strategies.

Another example is the massive rise of thematic bonds such as green bonds; their issuance proceeds are limited to projects with clear environmental benefits. There are increasingly other types of climate change solutions-linked fixed-income financial instruments; accumulated proceeds reached about $2 trillion in late 2022 in just ten years.

In addition, for those companies listed on stock exchanges, regulators' demands are multiplying. The US Securities and Exchange Commission, for example, wants companies to include climate-related risks and other disclosures in their filings. There are also increasing demands on financial institutions, which in turn affect corporations. Hong Kong's Securities and Futures Commission is now asking fund managers to disclose climate-related risks with their investments, for example. These are some of the developments forcing corporate behaviour changes.

Businesses also have a greater financial reporting burden. They must address Environmental, Social and Governance (ESG) factors as the capital markets look at evaluating and determining future financial performance based on ESG factors. Corporate sustainability reporting is now commonplace. Financial reporting will also be harsher in the coming quarters. The International Sustainability Standards Board – an entity under the International Financial Reporting Standards (IFRS) that sets global sustainability standards and climate-related reporting – will issue standards in June, its chair said in Davos.

There are many other organisations and institutions applying such pressure on companies. The Task Force on Climate-Related Financial Disclosures (TCFD) is another initiative with plenty of muscle. It was formed after a recommendation by the G20 finance ministers and central banks to the Financial Stability Board – an international body that monitors and makes recommendations about the global financial system.

The various pressures now require businesses to set out concrete game plans for their short- and long-term net zero strategies. These comprise commitments and roadmaps to realise net zero emissions by 2050. So, what are corporates supposed to do? One recommendation comes from the CEO of the We Mean Business Coalition, Maria Mendiluce. Her organisation calls for a '4As' approach: ambition, action, advocacy, and accountability. Corporates must have a science-led aim for net zero. They must have an actionable plan embedding climate in their business processes – including tackling supply chains and going beyond the value chain. They must advocate or speak up their science-based climate policies. Lastly, they must be accountable through such actions as publicising their plans, reporting progress, and offering transparent governance.

All of these pressures are highly taxing for corporates trying to run a profitable business. Unfortunately, the train has already left the station. Frameworks, rules, regulations, standards, and other guidance are evolving by the day. Ignoring these forces will ultimately impede the business to function. Plainly put, businesses won't be able to finance their operations, and shareholders as well as stakeholders will ostracize the services or products the business offers. It is difficult for an energy company in Asia-Pacific or in Europe to raise the finance to build a coal fired power plant, for example. Conversely it is easier for such a company to raise finance to build a large wind farm.

European corporations lead net zero emissions disclosure. This can be measured in a variety of ways. One is looking at data from TCFD. It identified in its 2022 Status Report that companies in the Asia-Pacific, Europe, and North America all had sharply raised their levels of climate-related financial information disclosure aligned with the TCFD recommendations. Between 2019 and 2021, the increase was 23 percentage points for European corporates, 12 for North America ones and 11 for Asia-Pacific ones. The highest adoption was in Europe with 60 per cent, followed by Asia-Pacific at 36 per cent and North America at 29 per cent. Capital markets practitioners would generally agree that Europe is ahead, and Asia-Pacific is lagging.

But although Asia-Pacific corporations are behind, this is changing fast due to demands from global and regional capital markets. Investors themselves are setting net zero targets for their portfolio but they will not be able to do so if companies do not embark on the energy transition path. So, where do investors in Asia-Pacific actually stand?

The Asia Investor Group on Climate Change (AIGCC) offers some insights. The group comprises asset owners and managers from 11 markets around the region with over $39 trillion in assets under management in public equities, private debt, private equity, direct property, unlisted infrastructure, and venture capital. In a survey, AIGCC found that "29 per cent of respondents had set a 2050 net zero target for their whole portfolio, and 18 per cent have net zero targets on some asset classes". Also, it established that about 41 per cent who had not yet set net zero interim targets to be achieved by 2025 or 2030, were actively considering doing so.

The net zero ambitions disclosures by corporates in the Asia-Pacific region may lag European peers, but it must not be looked at as a negative.

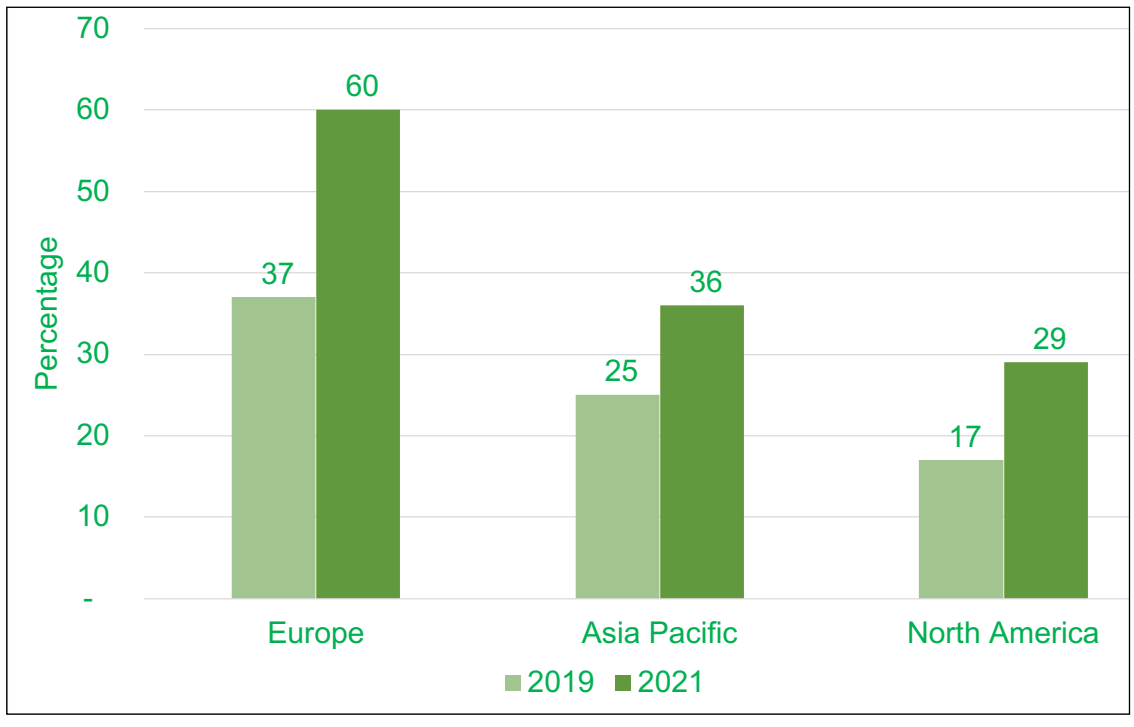
Firstly, disclosure is accelerating and will speed up in the coming years given pressures from governments, shareholders, and stakeholders, especially the capital markets.

Secondly, the formulation of short- and long-term net zero strategies is still evolving for some of the more advanced corporates because the rules, regulations, and guidelines themselves are evolving.

Finally, as detailed in the book 'Asia's Energy Revolution', the majority of countries in the Asia-Pacific region are developing economies, with only about one-tenth of total energy consumption coming from developed Asia. So, while the fossil fuel footprint of these countries is high, given growing consumption new energy supply is needed. Domestic and global pressures in the majority of these developing economies, leads them to prioritise low- to zero-carbon generation. The percentage of fossil fuel generation, especially coal fired, will certainly steadily decline over the next 27 years and creating enormous new business and investments opportunities.

Joseph Jacobelli is Managing Partner at direct investments advisor Asia Clean Energy Investments, and at single-family office Bougie Impact Capital. He is a prominent Asia-Pacific energy markets expert, author of 'Asia's Energy Revolution', and host of 'The Asia Climate Finance Podcast'.

Percentage of companies disclosing TCFD-aligned information
Source: Task Force on Climate-related Financial Disclosures (2022). Task Force on Climate-related Financial Disclosures 2022 Status Report, Page 5. [online] https://www.fsb-tcfd.org/. Available at: https://assets.bbhub.io/company/sites/60/2022/10/2022-TCFD-Status-Report.pdf [Accessed Jan. 22, 2023].



Avoiding stranded assets with thermal energy storage

A new thermal energy storage technology is soon to be piloted at a site in India. The system has the potential to accelerate the move to renewables, while addressing the issue of stranded fossil fuel assets, says E2S Power's **Fabrizio De Candia**.

The shift from fossil fuels to renewables is a global trend that is gathering momentum. In Europe and the US combined, over 160 GW of coal plant is scheduled to be retired by 2030. It is a trend that is also taking hold in Asian countries where coal usage is still significant. The government of India, for example, is aiming to reach 500 GW of renewable capacity by 2030. At the same time, about 50 GW of coal fired capacity will be decommissioned in the coming years. But as coal use for power generation declines, decisions will need to be made very soon about what to do about these potentially stranded assets and how to address security of energy supply.

To address the intermittency of renewable power and to maintain a stable and reliable system, it will be necessary to have a long duration energy storage solution that can be implemented in the near term.

Recognising the need to support renewables such as wind and solar, while at the same time tackling the issue of stranded assets, E2S Power has developed a technology that has been demonstrated as a pilot that will soon be delivered to a site in India.

Under a recent agreement, E2S Power will deliver a 250 kWh pilot thermal energy storage, fully engineered and developed by its team, to India Power Corporation (IPC). The pilot unit, which has been engineered, built, and tested at E2S Power's facility in less than nine months, has already successfully passed Factory Acceptance Tests and will be delivered during the first quarter of 2023. It is a collaboration that will ultimately help to transform the thermal power assets at the site into clean energy storage facilities, contributing significantly to India's energy transition and renewable energy growth while retaining key jobs and providing a pathway for the local economy to clean power and carbon reduction.

E2S Power was formed four years ago in Switzerland to grab the window of opportunity presented by the imminent retirement of fossil fuel power plants and the urgent need for long duration energy storage. A key priority was to develop a flexible "all-in" low-cost solution that would simplify integration with existing plants. E2S tested a demonstration unit at its facility in Belgrade, for over a year, gathering important data used in the optimisation of the design.

Subsequently, a larger, 250 kWh pilot was built and tested, capable of generating steam up to 540°C for a period of over four hours, after being charged the previous day. As part of the collaboration to expand in the Indian market, IPC decided to acquire the pilot to be located in Kolkata, West Bengal. This will represent a showcase for key stakeholders in the Indian market, including government representatives and power companies looking for a long duration energy storage solution and a way to decarbonise existing assets. IPC and E2S Power are already planning an additional unit to be installed in the next year and a utility scale plant in the next few years.

E2S Power is also in advanced discussions with power companies and investors in the US and Europe to scale-up the commercialisation of the unit with power plant applications in the next two years.

So what makes E2S Power solution unique? In simple terms, the technology converts electricity from renewable sources during low demand periods into heat, which is stored using advanced storage materials, and then returns the stored energy in the form of superheated steam to power existing steam turbine generators to provide needed capacity during peak periods when the demand is high.

Known as TWEST (Travelling Wave Energy Storage), it is a proprietary technology to transfer the heat from a higher temperature section to a lower temperature section of the unit, maintaining a constant discharge temperature to the existing plant's steam turbine.

The objective of TWEST is to maximise the use of existing infrastructure without additional equipment. This results in less complexity, faster implementation, and therefore lower capital and operating costs. For utility scale applications, the total installed cost is estimated to be a quarter of lithium-ion batteries energy storage plants.

De Candia: "The objective of TWEST is to maximise the use of existing infrastructure without additional equipment"

In addition, the E2S Power system has superior energy density with significantly less space requirement than competing storage technologies, uses abundant and recyclable material, and has long life and negligible performance degradation during its lifecycle. Since the system utilises existing synchronous generators, it can also provide grid stability support.

TWEST consists of three key components in an insulated enclosure – electric radiant heaters, graphite storage blocks and steam generators.

The electrical heaters are designed for high temperatures and facilitate the heat transfer to the storage blocks during charging. The storage blocks are made of high energy density and thermal conductivity materials, capable of fast charging, and are arranged in blocks similar to building blocks. When generating steam, the heat is transferred directly to pipes made of high temperature alloys mounted in the storage blocks. The storing efficiency, which is defined as conversion of electrical energy into heat, is very high, about 98-99 per cent, thanks to efficient heat transfer and therefore experiences very low losses in this process.

The system is packaged in a standard module that allows stacking, as required to meet the storage requirements and plant footprint for a variety of power plant sizes and configurations. The superior energy density makes it a more compact solution requiring less space.

The TWEST thermal energy storage offers a "plug-in" compact solution that allows easy integration with existing plants with three main interfaces: electric supply for charging the system, feedwater input and steam supply into the existing steam cycle.

The system has several unique aspects and key advantages:

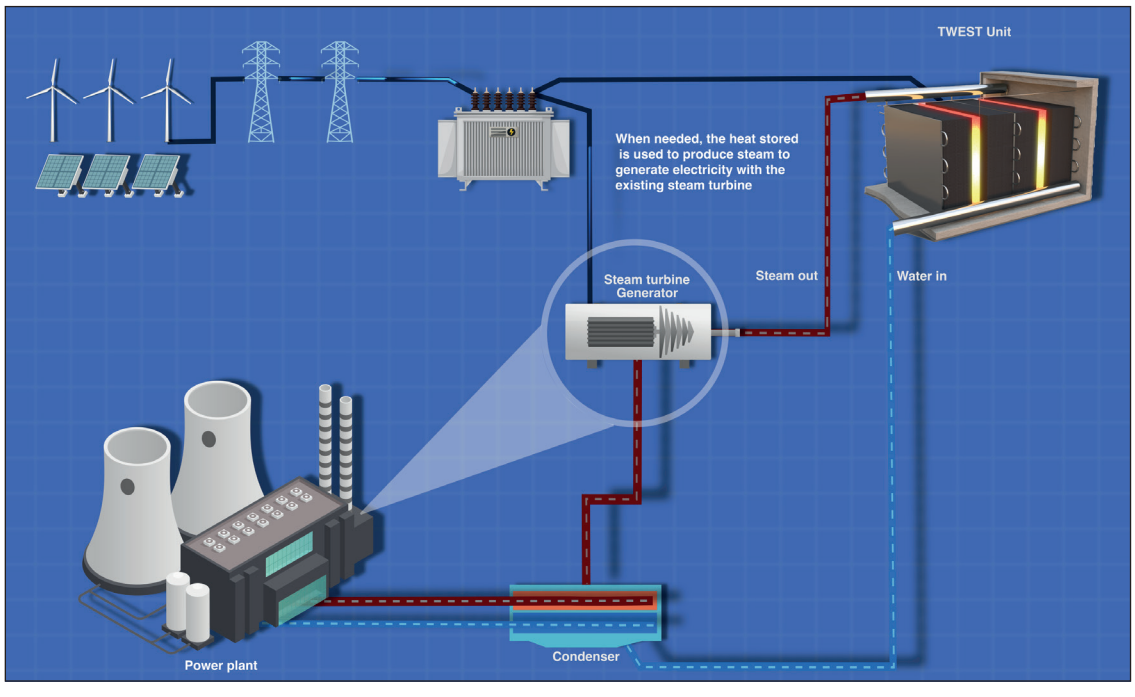
- Compact design with high energy density. This makes it the most suitable utility scale storage with a footprint 2-5 five times smaller compared to all other storage systems;
- It has scalable modular design. It has an all-in modular design without the need for additional external equipment such as heat exchangers and enables easy integration and minimum disruption to existing plant. It can be easily scaled up thanks to the modularisation concept;
- Lower capital cost. The system maximises the use of existing equipment and infrastructure (all but coal-related equipment and mine);
- It is environmentally benign. It is made of abundant, safe, and recyclable materials;
- It is safe. The design is inherently fail-safe and maximum temperature is limited. The process is not chemically active and poses no fire risk;
- It has long life. The system is designed for 30 years. There are no issues related to degradation or depth of charge. Storage material is safe and remains stable throughout their life cycle;
- It supports grid stability. By using synchronous generators, TWEST is better able to provide voltage and frequency support compared to batteries;
- Has socio-economic benefits. By using existing, potentially stranded assets and by retaining jobs, E2S Power's technology can help local economies transition to clean energy;
- Can be implemented fast. Due to the simple, easy to integrate technology, this solution allows faster deployment. A typical time to market (from order to commercial operation) is estimated to be less than 18 months.

The quest toward carbon reduction and the need for energy security presents new challenges and opportunities in the near-term. Solutions ready to be deployed immediately, such as TWEST, are urgently needed.

The TWEST system has generated a huge amount of interest from the world's major energy companies that are looking for long-duration energy storage solutions that can be implemented in the near term, while repurposing their fossil fuel power plants to clean energy. E2S Power has identified a near-30 GWh global project pipeline, equivalent to about $3 billion in storage investment and this is still growing. Over the next two years, the plan is to deploy first commercial units in the US and Europe. This will be followed by full global commercial expansion.

Fabrizio De Candia is Chief Operating Officer, E2S Power

Energy from renewable sources is stored using advanced storage materials and then returned in the form of superheated steam to power existing steam turbine generators



Junior Isles

Dancing through the crisis

Some say a good way to get through a crisis is to let your hair down and dance your troubles away. While the EU cannot be accused of tackling the energy crisis with careless abandon, it has pulled a few moves worthy of the dance floor.

As gas and electricity prices spiralled last year, exacerbated by Russia drastically cutting gas supplies to the region in response to sanctions, it looked like it might be the last Tango in Paris for the bloc. Yet the Tango is about partners moving in perfect harmony with a level of intimacy. As the EU's member states moved to secure alternative gas supplies from global partners and took synchronised steps to reduce gas demand, the harmony may not have been perfect but has been effective nevertheless.

Speaking at a recent press Q&A, Emmanuel Dubois-Pelerin, Senior Director, EMEA Utilities, S&P Global Ratings, noted: "We believe the sector – in 2022 and we expect in 2023 – to be quite resilient, despite facing a multiplicity of external challenges. Despite the stormy waters of 2022... We think the worst may be over because despite the continuation of some headwinds, Europe has done a good job since the first quarter of 2022 to redress its gas balance."

Floating storage and regasification units to bring natural gas into Europe recently commissioned in Germany, Finland and Greece, and more coming in Italy, combined with an impressive reduction in gas demand across the continent since August, has allowed the region to become much less dependent on Russia. The EU has said it expects to be completely independent from Russian gas by 2027; it has already reduced gas demand by more than 20 per cent since August.

"This is a great achievement," said Dubois-Pelerin, "one that we would not have expected so confidently a year ago. The risk of physical gas cuts is now really remote, at least for this winter. The next two winters will be tight but much more manageable – much more than we would have thought last August."

And so as confidence grows, the Tango that has seen the EU navigate the crisis now becomes a ballet. Late last year saw the first pirouette.

"We think December was a positive turning point for European energy utilities and actually in a way for economies, as prices for gas and power reduced significantly," said Dubois-Pelerin.

The challenge is how to not only make this price reduction long lasting but also reduce price volatility going forward.

While gas prices remain about four or five times higher in Europe than in the US, S&P Global sees further reductions in gas and electricity prices this year. Gas price volatility is also expected to remain and this will be reflected in an electricity market where power prices are closely linked to those of gas.

A wave of regulations has been spreading across the continent and the UK since the autumn to break this link and deliver electricity prices that better reflect the growing amount of low cost renewables in the system and therefore reduce consumer prices. The next wave of regulations will continue in the EU in the form of market redesign. The European Commission launched a consultation last month, which closes February 13, with the aim of having proposals around late March.

Kadri Simson, European Commissioner for Energy, said the Commission is under "very strong political pressure" to redesign the market to cut consumer bills, and is working under "extraordinary circumstances" to deliver the reforms faster than usual.

Simson said the Commission was looking at how to bring the "benefits of a larger share of renewables" to consumers. She acknowledged that gas fired power plants will be needed, but does not want to create a system "where they will be in operation 24/7".

The current market design has functioned well for more than two decades but arguably these are circumstances that call for intervention at the EU or national level. A gas price cap in Spain, for example, has reduced electricity prices in the country but has seen gas use increase at a time when the continent is trying to reduce consumption.

"Spain's gas use actually increased by 64 per cent… this aggravates potential tensions in the European energy market. So there is a risk that government interventions, no matter how well intended, will have unintended consequences. Intervening in market functioning is always a delicate balance," said Dubois-Pelerin.

It is believed that one of the focuses of the Commission will be to promote Contracts-for-Difference (CFDs) and Power Purchase Agreements (PPAs) across as many technologies as possible. This, says Dubois-Pelerin, may target those technologies, predominantly renewables and nuclear, which are currently benefitting from CFDs, and anchor prices at levels that will not discourage investment.

With PPAs worth millions of Euros and typically lasting 10-15 years, this is causing concern among investors.

"Talking about reworking the electricity market to sweat out any imagined margins is the wrong thinking at a very critical moment," said Ulrik Stridbæk, Head of Regulatory Affairs at Ørsted, the Danish energy company.

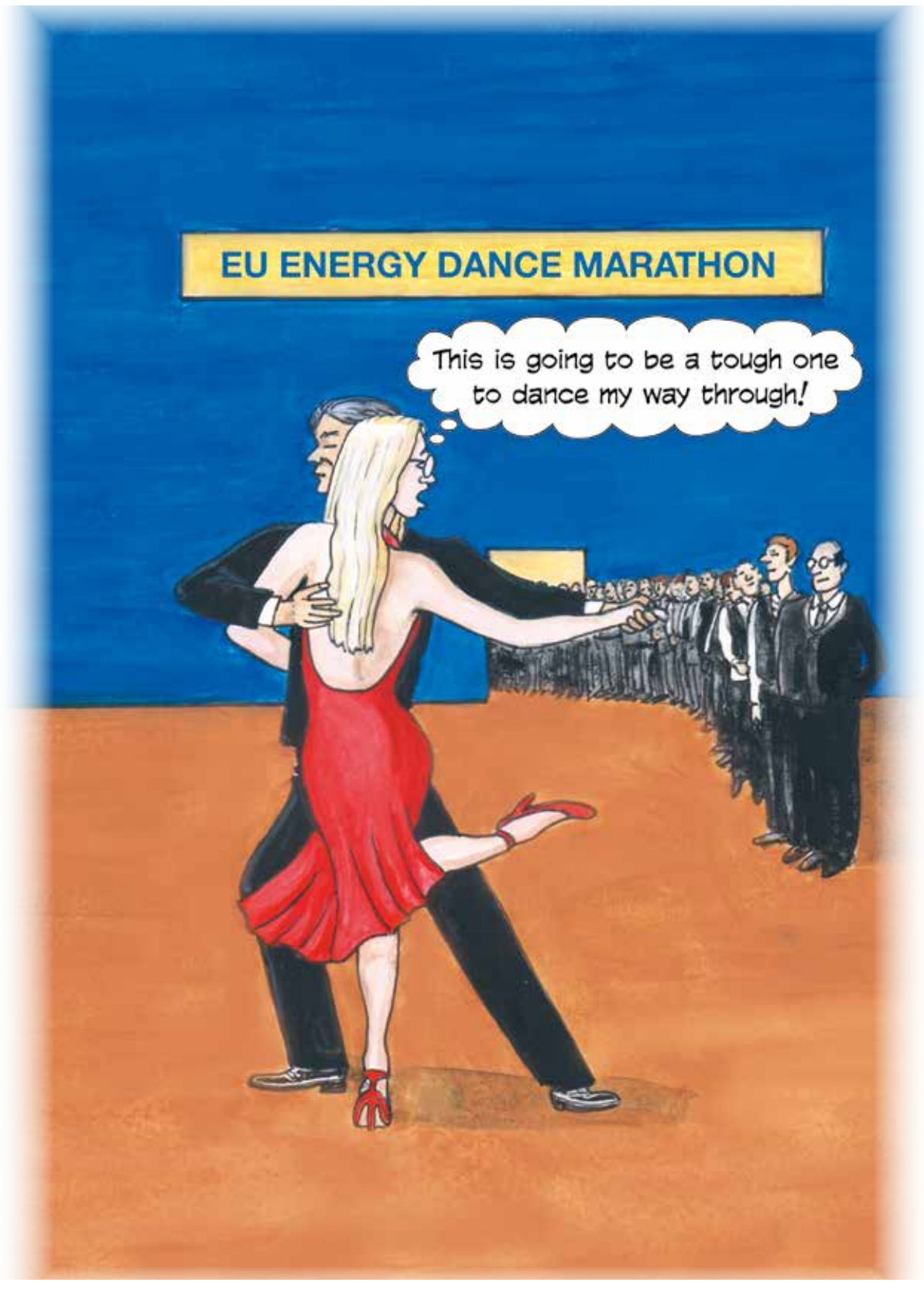
Dubois-Pelerin commented: "What we would wonder, looking at it from the credit side of things, is will it [the mechanism] be by encouragement or mandate? For example, would it be a legal obligation that capacities would have to be under PPAs or CFDs, which is a bit more of a heavy-handed intervention, or an enticement to be on CFDs or PPAs? Once you start regulating what are effectively market prices, because you want them to be low for consumers, the more you discourage investment. It's a fine balance."

He added: "But what the governments can control is how permanent interventions can be. They can exit when they wish. For example, if you say that from now on, all new renewables [projects] should be CFDs or PPAs, this is not something you would do for two years and then interrupt. You need to structure for the long term but having an early exit is a bit more difficult. Also, if any new mechanisms apply to existing capacity, this would be a further degree of intervention in the market functioning."

The next steps the Commission takes will be critical for Europe's economies as well as its net zero ambitions. If any lessons have been learnt over the last 18 months, it is that Gazprom can longer be relied on as a European gas supplier, and diversity of supply is crucial. Diversity of technologies should also remain at the forefront of government thinking – renewables, nuclear, hydrogen, and even gas will all have a role to play – without forgetting the importance of the grid and improvement in energy efficiency. Also, the EU's success thus far in reducing gas demand while securing additional supplies has illustrated the benefit of cooperation and a unified approach.

Risks may have receded for 2023 but challenges such as inflation and high opex and capex are still there. And this will put pressure on renewable deployment and the pace of the energy transition. In all of the market chaos, the urgency of tackling climate change must not be lost.

Moving through the plethora of demands is no easy task for the EU and the UK, and any missteps could be costly. But step we must, and in good time. So let's all keep dancing; it's also a good way to keep warm.



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