

# THE ENERGY INDUSTRY TIMES

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# Clash over state subsidies stymies EU electricity market reform

German vice-chancellor Robert Habeck called the coal exemption "wrong"

A dispute over subsidies for coal and nuclear plants proved to be a thorn in the side of EU ministers, as they failed to agree on a proposal to reform the electricity market. **Junior Isles**

Negotiations on reforms to the European electricity market stalled at the end of June as EU ministers disagreed over subsidies for backup coal power generation and the lifetime extension of existing nuclear power plants.

The reform, proposed by the European Commission in March, seeks to avoid a repeat of last year's energy crisis when record-high gas prices left consumers with soaring energy bills. It aims to lower consumer bills by relying less on short-term markets and promoting instead long-term contracts with renewable energy producers providing electricity at a lower cost.

Despite hours of negotiation, however, France and Germany remained at odds over whether state-backed contracts that ensure that electricity producers only charge a set price for power and return additional profits, should be applied to existing opera-

tors. Such a move would allow France to subsidise its nuclear fleet more easily.

France wants to extend the lifespan of some existing reactors to at least 50 years if possible, while building new ones, one of the reasons it is arguing for current ones to be covered by the state-backed contracts.

"The aim is to treat a new asset and one whose lifespan might have been extended in the same way," the French official said.

France has continued to push for assurances for nuclear power across several EU laws over the past year, arguing that it is a key source for the energy transition and should be recognised alongside renewable energy.

Germany, along with member states including Austria and Luxembourg, opposed the push saying that allowances for nuclear power risk pulling funding away from wind, solar and

other renewable energy generators.

Smaller member states fear that giving France the ability to provide greater subsidies to its nuclear sector will allow it to guarantee cheaper tariffs for its industry and put it at a competitive advantage.

EU energy ministers also opposed an effort by Poland to grant subsidies for coal power plants.

Sweden, which chairs the EU's rotating presidency, allowed an exemption to the proposed reform that would permit coal power plants to receive state support for providing a steady flow of energy when other forms of energy were not available. This could see Poland, which gets around 70 per cent of its power from coal, prolong its support scheme for coal plants, potentially until 2028.

Robert Habeck, Germany's vice-chancellor and minister for energy, told journalists that the exemption

was "wrong [and] not compatible with the climate protection goals of the European Union".

Claude Turmes, Luxembourg's Energy Minister, described the proposal as "really astonishing" and amounting to a "weakening [of] our climate policy".

Putting a positive spin on the talks, Swedish Deputy Prime Minister and Energy Minister Ebba Busch, who chaired the meeting, described the negotiations as "long and difficult" but added: "We have successfully agreed on two out of three parts of the electricity market design package."

During the negotiations, an agreement was reached on the general approach to the EU's Single Electricity Market Directive and the electricity market supervision regulation. The agreement includes, among other things, the possibility of sharing the

*Continued on Page 2*

## Clean hydrogen market expected to surpass value of LNG trade by 2030

The clean hydrogen market is expected to surpass the value of the liquefied natural (LNG) gas trade by 2030 and continue growing to reach \$1.4 trillion annually by 2050, according to Deloitte's 2023 global green hydrogen outlook.

The majority of this growth is anticipated to be driven by green hydrogen, which is produced by using electricity generated by renewable energy to split hydrogen atoms from water molecules.

Deloitte's 2023 global green hydrogen outlook suggests that clean hydrogen presents a significant opportunity for sustainable development in developing countries, potentially accounting for nearly 70 per cent of the \$1.4 trillion market in 2050 and

supporting up to two million jobs worldwide each year from 2030 to 2050.

The global hydrogen trade is projected to generate over \$280 billion in annual export revenues by 2050, with North Africa expected to benefit the most, reaching \$110 billion per year due to its significant export potential.

The Deloitte outlook indicates that despite the expected growth, based on current project announcements, the global community would only be able to fulfill a quarter of the projected demand for clean hydrogen by 2030.

The report followed news that the European Hydrogen Bank and H2Global agreed to join forces to boost global hydrogen ramp-up.

At the end of May, the European

Commissioner for Energy Kadri Simson, and German Federal Minister for Economic Affairs Robert Habeck agreed to link the new European Hydrogen Bank with Germany's H2Global support scheme, meaning H2Global will be open to all EU Member States interested in running their own hydrogen tenders. The Bank and the German initiative will also jointly develop a European auction targeting international hydrogen imports.

After assigning an €800 million budget for the first pilot auction of the domestic European Hydrogen Bank, to be launched before the end of the year, the agreement sets in motion the Bank's external pillar for the much-needed imports of renewable

hydrogen from outside the EU.

"We definitely need this step forward in order to remain credible with the implementation of the EU Hydrogen Strategy," said Jorgo Chatzimakris, CEO of Hydrogen Europe. "We will need more renewable hydrogen than we can produce inside the EU in the required timeframe, particularly for the hardest to abate sectors. And we also need it at a competitive price."

In mid-June the EU announced that it will invest €2 billion (R\$ 10.5 billion) in the production of green hydrogen in Brazil, as part of the bloc's plans to seek to reduce dependence on and use of fossil fuels, and will make an initial donation of €20 million to the Amazon Fund.

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electricity that households produce directly between individuals, for example by selling electricity produced by solar panels to a neighbour. In addition, it will be possible to install several meters at one place of consumption and buy electricity from multiple sellers simultaneously.

Following the Luxembourg meeting, EU countries' ambassadors agreed to take up the negotiations, and were still aiming for a deal by the end of June, as *TEI Times* went to press.

The targeted reform also aims to end the investment uncertainty caused by uncoordinated government interventions in electricity markets.

In a report published in early June, the European Commission defended its position on the withdrawal of electricity market intervention measures such as the cap on revenues to infra-marginal energies, i.e. nuclear and renewables.

The review found that the application of the revenue cap varies widely from one Member State to another, which has led to "great uncertainty among investors", compounded also by the fact that, in some EU countries, the application of the cap has affected the conclusion of power purchase agreements and other long-term contracts.

Spain and Portugal, notably introduced the Iberian mechanism in June last year in a move to tackle spiralling energy prices.

This tool for controlling electricity prices, which has only been applied in Portugal and Spain due to the low levels of interconnection that make the Iberian Peninsula an 'energy island' within Europe, has also allowed last year's electricity prices in the two countries to be lower than those registered in other European countries.

According to data collected by the Spanish news agency *Efe*, since June 15, 2022 the price of electricity in the Iberian wholesale market (Mibel) has registered an average value of €154.2/MWh, that is 15 per cent below the €182.2/MWh that should have been registered, on average, in these 12 months.

While electricity prices across Europe have fallen in recent months, they still remain high.



**Voigt says it cannot be assumed that prices will soon return to pre-crisis levels**

"For consumers, this is good news," commented Markus W. Voigt, CEO of the aream Group. "However, it cannot be assumed that electricity will soon be as cheap as it was before the crisis."

According to aream, 1 MWh in Germany still cost €128.31 in February. In March, the price dropped to €102.52, in April to €100.74 and in May even to €81.72. There were similar developments in southern Europe: In Italy, the MWh fell in price from €161 to just under €106 between February and April May. In Spain, the price plummeted from €133.47 to €7.21.

# Renewable capacity expected to jump by a third this year

- Renewable capacity additions set to soar by 107 GW
- EU wind and solar generation overtake fossil for first time

Junior Isles

Renewable power is on course to shatter more records as countries around the world speed up deployment, according to a report by the International Energy Agency (IEA).

With the global energy crisis as a catalyst, global additions of renewable power capacity are expected to jump by a third this year as growing policy momentum, higher fossil fuel prices and energy security concerns drive strong deployment of solar PV and wind power.

The IEA's new 'Renewable Energy Market Update' says global renewable capacity additions are set to soar by 107 GW, the largest absolute increase ever, to more than 440 GW in 2023. The rapid growth is set to continue next year with the world's total renewable electricity capacity rising to 4500 GW, equal to the total power output of China and the United States combined.

The dynamic expansion is taking place across the world's major markets. Renewable energy sources are at the forefront of Europe's response to the energy crisis, accelerating their growth there. New policy measures are also helping drive significant increases in the United States and India over the next two years. China, meanwhile, is consolidating its leading position and is set to account for almost 55 per cent of global additions of renewable power capacity in both 2023 and 2024.

"Solar and wind are leading the rapid expansion of the new global energy economy. This year, the world is set to add a record-breaking amount of renewables to electricity systems – more than the total power capacity of Germany and Spain combined," said IEA Executive Director Fatih Birol. "The global energy crisis has shown renewables are critical for making energy supplies not just cleaner but also more secure and affordable

– and governments are responding with efforts to deploy them faster.

"But achieving stronger growth means addressing some key challenges. Policies need to adapt to changing market conditions, and we need to upgrade and expand power grids to ensure we can take full advantage of solar and wind's huge potential."

Solar PV additions will account for two-thirds of this year's increase in renewable power capacity and are expected to keep growing in 2024, according to the new report. Wind power additions are forecast to rebound sharply in 2023 growing by almost 70 per cent year-on-year after a difficult couple of years.

The report also said around 60 GW of solar and wind power capacity is set to be brought online in the EU this year, contributing to achieving some €100 billion (\$106.9 billion) in savings since the beginning of the energy crisis in 2021. The new deployments

will further reduce the bloc's dependence on Russia and boost fossil fuel displacement to almost 20 per cent, said the IEA.

New data released last month by energy think-tank Ember shows that wind and solar produced more EU electricity than fossil fuels in May, for the first full month on record.

Almost a third of the EU's electricity in May was generated from wind and solar (31 per cent, 59 TWh), while fossil fuels generated a record low of 27 per cent (53 TWh). The data shows that from January to May this year, coal and gas generation have fallen by 20 per cent and 15 per cent, respectively, compared to the same period in 2022, whilst solar increases by 10 per cent and wind is up 5 per cent.

■ Last month the European Solar PV Industry Alliance (ESIA) said Europe is on track to exceed the EU's goal of creating 30 GW annual solar manufacturing capacity across the value chain by 2025.

## Denmark, Germany sign first legally binding cooperation on joint offshore renewable energy project

Denmark and Germany have signed an agreement for the Bornholm Energy Island in the Baltic Sea – the first legally binding cooperation agreement in Europe on a joint offshore energy project under the EU Renewable Energy Directive (RED).

The RED, agreed by the member states in March, also includes cross-border projects and in this regard requires each member state to develop a legally binding framework. Denmark and Germany have now met this requirement with the signed intergovernmental agreement.

The agreement regulates sharing of the renewable target quantities from Bornholm Energy Island and counting

the capacity towards the German targets under the country's Renewable Energy Sources Act (EEG) and towards the German and Danish contributions to the EU target under the EU Renewable Energy Directive.

The agreement came as Denmark approved a new Marine Plan, which will abolish the Open Door offshore wind auction scheme and terminate 24 out of the 33 offshore wind projects proposed under the scheme. Denmark suspended the Open Door scheme earlier this year to clarify if the scheme is in line with EU laws.

Under the new Marine Plan, Denmark plans to increase the sea area reserved for developing renewable

energy projects and energy islands from 15 per cent to 30 per cent. An additional 31.7 per cent of the country's sea area will be designated nature and environmental protection zones.

The Marine Plan, however, allocates no new areas for commercial open door applications. This means that only three out of the 27 open door projects will proceed to development.

Commenting on the abolishment of the Open Door scheme, Andreas Karhula Lauridsen, Head of offshore wind at European Energy, said: "We believe that the decision made by the government regarding the Open Door projects is very unfortunate... The Open Door scheme could have ensured

subsidy-free renewable energy for Denmark and green jobs in the local municipalities that were involved in the projects.

"We have obtained full support from all the municipalities where we have applied to establish new coastal offshore wind turbine projects. The local support for the projects in Stevns, Guldborgsund, Frederikshavn, Hjørring, Lolland, and Tønder is something we have worked on for a long time. It has been a requirement from the authorities that local governments should be consulted in this process – and we are puzzled that this local anchoring of renewable energy projects now seems to mean nothing."

## Net Zero Stocktake reveals need for stronger action at all levels

The globally agreed mission to curtail climate change will be impossible unless national and sub-national governments and the largest companies urgently strengthen their targets, according to the Net Zero Tracker (NZT)'s annual Net Zero Stocktake.

The NZT Stocktake shows that in the last 2.5 years a clear consensus to curtail greenhouse gas (GHG) emissions to net zero has been reached, with the bulk of national governments setting commitments. It finds, however, that with net zero now mainstream across countries, the quantity of national targets and their coverage of GHG emissions have plateaued

over the last year. NZT suggests that in the last 12 months many national governments shifted their focus to formalising existing commitments – with a massive shift in targets up the governance curve, from pledges into domestic policy.

The analysis showed a significant share of sub-national and corporate entities, both at the global level and within the G7, still lack any emission reduction targets. The quantity of cities, states and regions committing to net zero is increasing, but only at a gradual rate.

It revealed that: 37 per cent of the world's largest companies have not

set any kind of GHG mitigation target; only 252 large cities have set net zero targets, which together represents 37 per cent of the 2.1 billion people living in large cities; 41 per cent of global states and regions do not have any mitigation targets, compared with the vast majority of states and regions in the G7 (80 per cent), EU (75 per cent) and US (72 per cent) that do; only around a 40-50 per cent share of the national emissions of the high emitting G7 countries and China, is covered by states and regions' net zero targets.

John Lang, Project Lead, the Net Zero Tracker (ECIU), said: "Real-

world realities are not yet being reflected in the robustness of regional, city and company net zero targets. More entities need to sign up to net zero, but those that have pledged to step on board need only to look at the direction of travel.

"The political calculus has changed for sub-national regions and companies in the now 72 nations with net zero targets in law or policy. Ignore the shadow of regulation and choose economic homelessness, or jump on the gravy train that the US Inflation Reduction Act, the EU Net Zero Industry Act and other net zero-supporting pieces of legislation are fuelling."

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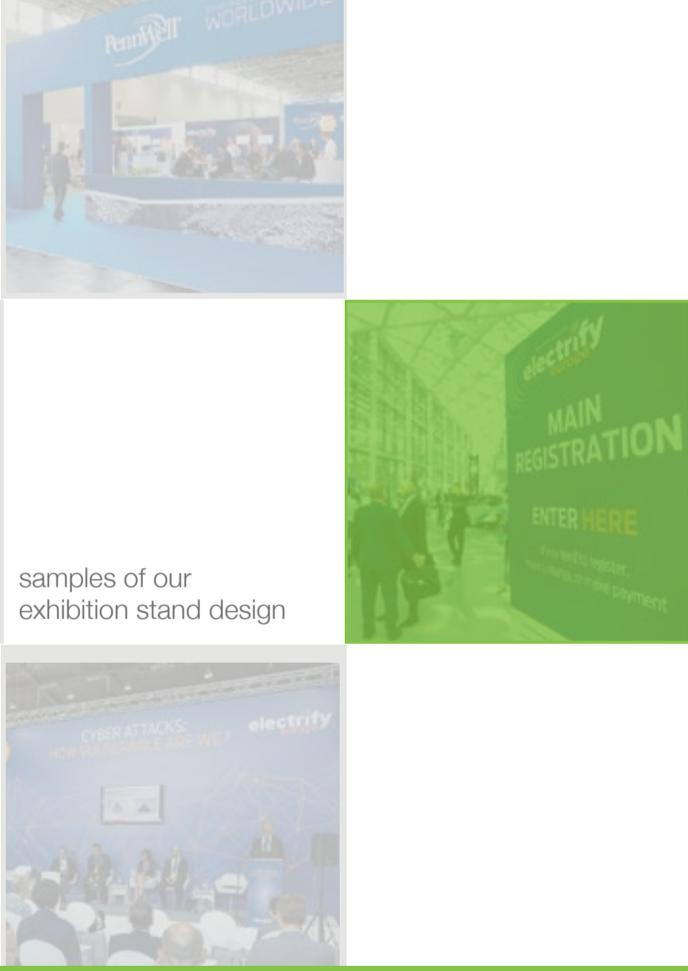
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# California prepares to deliver on renewables ambition

- System operator plans to integrate 25 GW of solar and wind
- State will see record-breaking 2 GW solar and storage plant in operation by 2026

Janet Wood

California is set to see a huge boost in renewable energy and storage capacity after the California Independent System Operator (CAISO) agreed a new \$7.3 billion power transmission plan.

The expansion will allow over 40 GW of renewable and battery storage capacity to be added to the system in the coming decade.

The 2022-2023 plan included 45 transmission system expansion and upgrade projects, most in California

and some in neighbouring Arizona.

CAISO said the transmission plan will enable the integration of 17 GW of solar and 8 GW of wind, of which 4.5 GW will be imported from Idaho, Wyoming and New Mexico. It also includes 1 GW of geothermal capacity. All of these have been identified as cost-effective and needed to meet the state's clean energy goals over the next 10 years.

"With electrification increasing in other sectors of the economy, most notably transportation and the building industry, even more new power will be

required in the years ahead," CAISO said.

CAISO expects next year's transmission plan to allow it to accommodate even more, as additions of new capacity are expected to reach 70 GW by 2033. The total capacity could reach 120 GW by 2045, as California works to meet its goal of having a carbon-free power system and electrify transport and heating.

CAISO's plan will also accommodate increasing amounts of storage, among it the largest permitted solar-plus-storage project in the USA, the

2 GW Bellefield scheme, in Kern County, California. This installation recently moved towards the construction phase as it was acquired by AES Corp. from its developer, Avantus.

The project has two phases, each including 500 MW of solar and up to 500 MW of four-hour duration battery energy storage. They are expected to become operational in 2025 and 2026, respectively.

The first phase has a 15-year power purchase agreement (PPA) to supply hourly, clean power to an existing AES corporate customer, the company said.

It expects to contract the second phase capacity by the end of 2023. AES is ranked by Bloomberg New Energy Finance (BNEF) as the top developer for signing corporate PPAs in 2021 and 2022.

"With the addition of Bellefield phase one, our signed PPA backlog grows to more than 12 GW, which represents growth of more than 80 per cent from our current installed renewable generation fleet," said AES President and Chief Executive Andres Gluski. Most of this is expected to come online over the next two years, he added.

## US northeast power market banks on new gas plant for flexibility

The US northeast can call on 1800 MW of new flexible generation after Caithness Energy started up the new Guernsey power station in Southeastern Ohio, a new plant that can accommodate a high proportion of hydrogen in the gas fuel mix.

The GE-supplied combined cycle equipment will serve the PJM Energy Market, which coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia, including Ohio.

PJM wants to boost grid stability in the region after the closure of coal fired generation.

"In 2022, coal fired plant retirements accounted for approximately 89 per cent of retired capacity in the PJM

region and as more and more coal fired plants are retired, the need for thermal resources and the essential reliable and flexible power they provide is crucial for grid stability and to help meet the increasing demand for power," said Ross D. Ain, President of Caithness Energy.

Dave Ross, Chief of GE Gas Power in the Americas, said: "Gas power plays a crucial role in the energy transition, helping to balance the variable nature of renewables and ensuring system reliability."

He said that its advanced 7HA.02 gas turbines can burn up to 20 per cent hydrogen, and GE has plans to transition to 100 per cent hydrogen over the next decade.

## Small island nations need higher priority for equipment and financing, says Barbados minister

The Caribbean island of Barbados has complained that its attempt to become 100 per cent carbon neutral by 2030 is being hampered by financing, access and supply delays.

In 2019 the small island nation announced plans to install 85 MW of renewable energy—between 12 and 15 per cent of the country's electricity demand. But sourcing the associated battery storage required to ensure the reliability and stability of the grid was problematic, according to recent comments by former Energy Minister, Kerrie Symmonds.

"The reality of our experience has been that there was tremendous disappointment and, indeed, tremendous delay as a result of the fact that there is simply an unavailability due to the

consolidation of production and due to the consolidation and prioritisation of sales efforts in the global north, as opposed to small island developing states predominantly to be found in the south," said Symmonds, adding "... though we would have wanted to be able to access battery storage as a first option, it simply was not available to us in this part of the world."

The former energy minister highlighted the need for direct financing towards a more resilient electricity grid, noting the need to move the island's 1500 km of electricity wires underground. It would cost billions but "for that investment not to take place leaves the country naked and exposed with respect to the visit of another hurricane", he said.

## South American states plan more power trading with new interconnector proposals

- Brazil explores new link with Venezuela
- New link may increase Paraguay's power exports to Argentina

Janet Wood

The Brazilian government wants to strengthen partnerships with neighbours, especially with the bloc of countries that can export or import electricity, according to the Ministry of Mines and Energy (MME). Initially, it is considering resuming power purchases from Venezuela to manage a lack of generation in its most northerly state, Roraima, which is the only Brazilian state that is not part of the national interconnected system.

Brazil said recently that the exchange of electricity between Venezuela and Roraima was "a potential measure to reduce costs and greenhouse gas emissions". But there were questions over the proposal as Venezuela's electricity infrastructure has not received investment for years and generation fell by 19 per cent between 2018 and 2019, according to the International Energy Agency (IEA), due to failures in hydroelectric and

thermal power plants.

Roraima is supplied by five diesel and natural gas thermoelectric plants. "The search for the elimination of the daily burning of diesel oil to supply the energy of the state of Roraima will benefit the environment and consumers throughout the country who today have to subsidise this expensive energy from the diesel thermoelectric plants," said Celso Torino, Vice-President of the Regional Energy Integration Commission. The diesel used in the power plants is subsidised by the Fuel Consumption Account (CCC), a fund financed by a tariff on all consumers.

Meanwhile Argentina and Paraguay may be linked by a new 500 kV interconnector, according to a recent announcement from the Yacyretá Binational Entity (EBY). It said electrical studies for the potential connection between the substations of Villa Hayes (Paraguay) and Formosa (Argentina) have already been made.

EBY has responsibility for the Argentine-Paraguayan Yacyretá power plant and it is analysing whether the connection would allow more opportunity for Paraguay to sell energy to Argentina, it said. The studies evaluated the feasibility of increasing the sale of energy from Paraguay to Misiones in Argentina's northeast.

The project was discussed at a meeting in Buenos Aires, which also considered the possibility of selling electric energy from Paraguay's Acaray hydroelectric power plant (Paraguay) to Argentina, through an existing 220 kV interconnection in the Argentine city of Clorinda.

"This alternative would make it possible to provide greater energy security and expand the supply of Paraguayan electricity to new regional markets, taking into account the growing demand for energy produced by the industrial and tourist development of the north of the province of Misiones," EBY said in a statement.

## South America wins hydrogen investment from EU

Europe is set to boost South America's growing hydrogen industry, after Ursula von der Leyen, President of the European Commission, announced funding initiatives in Chile and Brazil.

Launching a €225 million green hydrogen fund initiative in Chile, she said the EU needs friends that produce green hydrogen, given the growing global demand for hydrogen and the EU's plans to import 10 million tonnes of hydrogen annually, as well as

producing a similar amount.

The investment includes an €8 million technical assistance programme funded by the EU and the German Federal Ministry of Economics and Climate Protection. There will also be a €216.5 million fund for the development of renewable hydrogen production projects. The 'Team Europe Renewable Hydrogen Fund in Chile' includes a €16.5 million grant from the EU's Latin America and Caribbean

Investment Facility and loans of €100 million each from the European Investment Bank (EIB) and German development bank KfW. The fund will be managed by Corporacion de Fomento de la Produccion (CORFO).

Von der Leyen had already committed to €2 billion investment in Brazilian green hydrogen when she met President Luiz Inacio Lula da Silva. Von der Leyen described Brazil as a "renewable energy superpower".

# Financial group pushes coal phase-out in Asia

- Guidance for financial institutions on coal phase-out
- Unclear how Singapore banks can pursue early coal phase-out projects

Syed Ali

The Glasgow Financial Alliance for Net Zero (GFANZ), the world's largest financial sector grouping to support net zero, has proposed the development of voluntary guidance and practical steps for financial institutions to drive the financing of a managed phase-out of coal fired power plants in Asia.

Despite the fact that coal power usage globally likely peaked last year, rising energy demand in Asia will increase coal fired power generation for several more years, the alliance said.

China, the largest consumer of coal

in Asia, continues to build coal fired power capacity. Currently it is building or planning to build some 366 GW in new coal generation capacity, accounting for some 68 per cent of global planned new coal capacity as of 2022.

In May, the G7 leaders failed to set a date for a coal phase-out, although all agreed that coal should be phased out at some point in 2030 or soon after.

Commenting on the guidance proposal, Ravi Menon, Managing Director of the Monetary Authority of Singapore (MAS) and Chair of the GFANZ APAC Advisory Board, said: "The guidance to support the financing of

the early retirement of coal fired power plants in Asia-Pacific seeks to provide financial institutions with practical guidance to accelerate their efforts and help them meet their commitments to an inclusive and just transition to net zero."

The voluntary guidance comes as the MAS said it is considering adding phase-out of coal fired power plants to its planned green finance taxonomy. The Singapore Asia Taxonomy is currently being drafted to help Singapore's financial sector to identify green investments to reach their net zero goals faster.

The proposed taxonomy is being drafted by the Green Finance Industry Taskforce (GFIT), which is an industry-led initiative convened by MAS to speed up the development of green finance in Singapore. The taxonomy will be designed to be aligned with those used in Europe and China.

Although Southeast Asia's financial sector looks set to give the green light for the financing of early coal phase-out projects, the ability of Singapore's three banks to pursue such deals lies in a grey area due to their self-imposed coal policies.

DBS, OCBC and UOB had publicly

committed to cease funding for coal fired power plants in 2019, amid growing international pressure on banks to help curb global warming by cutting financing for fossil fuels. The industry's approach towards coal has softened somewhat since then.

Whether Singapore's banks are able to take advantage of these new opportunities remains to be seen. The responsible financing frameworks of all three local banks make no mention of how they will accommodate such projects. This has created some degree of uncertainty, since coal phase-out is neither expressly allowed nor prohibited.

## India to pause new coal plants

The Indian government will not consider any proposals for new coal plants for the next five years and will instead focus on growing its renewables sector, according to an updated national electricity plan.

In a draft of the plan released in September, the Central Electricity Authority, which is in charge of planning for India's electricity needs, projected that nearly 8000 MW of new coal capacity was required by 2027. But the new strategy proposes the build-out of more than 8600 MW of battery energy storage systems instead.

Updated every five years, the plan serves as a guideline for India's priorities in its electricity sector.

The temporary pause in the growth of coal use was hailed as a positive step for a country that is currently reliant on coal for around 75 per cent of its electricity.

"This plan is a step in the right direction," said Raghav Pachouri, an energy sector expert at Vasudha Foundation, a New Delhi-based think-tank.

The country has been experiencing longer summers and hotter weather, meaning greater electricity demand during the scorching day. This makes it easier to fulfil energy needs with

renewables, said Pachouri. "When you need energy during the day, solar power can provide for it," he said.

India plans to install 500 GW of clean energy by 2030, enough energy to power anywhere from 150 to 500 million homes depending on power use, but is not on course to meet that target, according to Aditya Lolla, an energy analyst at the think-tank Ember.

"We're installing only up to 17 GW a year, this needs to increase to 40 to 45 GW to meet targets," said Lolla.

India is the world's third highest emitter and most populous country. It plans to reach net zero emissions by 2070, which would mean significantly slashing coal use and ramping up renewable energy.

In a recent interview with the *Financial Times*, however, Raj Kumar Singh, India's Minister for Power and Renewable Energy accused developed economies of hypocrisy for advocating the phasing out of coal. He also said measures such as the US Inflation Reduction Act and Europe's green hydrogen auctions, which both offer heavy subsidies to renewable industries, would undermine building clean energy production in emerging economies such as India.



In a move to speed up its transition to green energy, the Philippines Department of Energy (DOE) has issued the policy and administrative framework for the efficient and optimal development of the country's Offshore Wind (OSW) resources applicable to all permitting agencies.

According to the Philippines Offshore Wind Roadmap, launched last year, the country has potential OSW resources of 178 GW.

Under the framework, permitting agencies are mandated to submit a complete list of appropriate permits and clearances, including all requirements, fees, and a detailed process flow diagram.

The framework also provides a 'streamlined, effective, and efficient permitting and consenting activity that will lessen the development cost of OSW resources, ultimately lowering the rates to the electricity consumers.'

Energy Secretary Raphael Lotilla also listed seven 'priority activities' for the efficient rollout of OSW projects. These include: the establishment of the Philippine Offshore Wind Databank (POWD), which will serve as a data repository of all submitted information and documents on OSW projects; a review of the existing DOE guidelines on the award of Offshore Wind Energy Service Contract and its subsequent monitoring and evaluation system; and preparation of the smart and green grid plan by the Network Service Provider.

The news followed a significant announcement by Madrid-based BlueFloat Energy, which said it plans to put up 7.6 GW of offshore wind capacity in the Philippines, with projects ranging between 1.5 and 3.5 GW. BlueFloat Energy CEO Carlos Martin said current investment required for the offshore wind projects is between \$3 million and \$5 million per megawatt.

Last month Lotilla also called for the World Bank to step-up its support for the Philippines' goal to shift to cleaner energy.

"The green transition or the climate transition or securing a clean energy future must be a just and fair transition. That means that transition financing, or climate financing or call it by any other name, such financing should be available to the country," said Lotilla.

The DOE announced at the start of June, that a total of 118 companies consisting of some of the country's major renewable energy developers had qualified to participate in the second round of the green energy auction or GEA-2.

It said 339 out of 378 submissions of registration for different renewable energy technologies from 118 companies were found compliant to join in the bidding process for the 11 600 MW under the GEA-2.

## Indonesia "well positioned" to take advantage of renewable energy boom

Although Southeast Asian nations are struggling to meet their emissions reduction commitments and unlock their green economic potential, a recent study has found that Indonesia may be well positioned to take advantage of a future renewable energy boom.

The 'Southeast Asia's Green Economy 2023 report: Cracking the Code', published on June 6th, noted that, along with Singapore, significant capital is moving into the country and renewables. More than 50 per cent of last

year's green investments in Southeast Asia were in the two countries.

The report calculates the region would require over \$1.5 trillion in cumulative investment by 2030 to meet its emissions reduction targets, as measured by the nationally determined contributions (NDCs) of each country.

As the highest carbon emitter in the region, Indonesia offers the biggest opportunity in the green transition, and is receiving \$20 billion in funding for the managed phase-out of coal.

In mid-June the Ministry of Energy and Mineral Resources and global technology provider Hitachi Energy signed a Letter of Intent (LoI) on the development of clean energy technology to accelerate Indonesia's green transition.

According to Arifin Tasrif Minister of Energy and Mineral Resources, the biggest challenge in the development of renewable energy-based electricity lies in power infrastructure, given Indonesia's archipelagic nature with dif-

ferent energy sources on each island.

Therefore, the government has initiated a national super grid programme to interconnect islands, particularly the larger islands in Indonesia.

Tasrif emphasised the need for collaboration and cooperation with national and international stakeholders, including Hitachi Energy, to expedite the programme's implementation.

He said that Hitachi Energy is one of the companies possessing the technology and digital transformation

capabilities necessary to accelerate the energy transition process.

Hitachi Energy's CEO Claudio Facchin said that the company would support Indonesia in achieving its set targets. He said that the technical collaboration would focus on areas such as renewable energy integration, interconnectors, power quality, grid edge technologies, and digital solutions to address the complexities of supply and demand in the new electricity landscape.

# Storage attracts large-scale investment across Europe

- Major investments planned in Germany and Hungary
- GB report calls for investment to align better with system needs

Janet Wood

Two major tranches of funding have been announced for large-scale energy storage projects across Europe.

Long-duration compressed air energy storage (CAES) provider Corre Energy has announced a 1.3 GW target for projects under construction by 2026, after it completed commercial close for its flagship ZW1 project in the Netherlands and signed an option agreement to develop three near-term projects in Germany.

"We have now completed all aspects of our Dutch commercial close and

have done so within the timeframe set out at the beginning of the year," said Chief Executive Keith McGrane.

The ZW1 project in Zuidwending, Groningen can draw on €4 million funding from FIEE SGR's Italian Energy Efficiency Fund II. Corre Energy said expected revenue from the project will be higher than previously estimated in view of the changes in the energy market since the first forecast was made. "While cost inflationary pressures continue, we believe these will be more than offset by the revenue uplift," the firm said.

A land and cavern option agreement

with Belgian chemical company Solvay in North Rhine-Westphalia could provide 500 MW/80 GWh of multi-day electricity storage.

The company says several offshore wind developers have approached it as they have to include integration solutions in upcoming tender bids in the Netherlands.

Separately, the European Commission (EC) has given State Aid clearance to €1.1 billion scheme by the government of Hungary to support large-scale energy storage projects.

The funding will enable the deployment of at least 800 MW of storage,

the EC said and it will be distributed via a competitive tender as grants and two-way contracts for difference.

As storage options win funding in the EU, concerns have been raised in the UK that its 118 GW storage pipeline may not be best aligned with system needs.

A report from Balance Power found projects are heavily weighted towards 2-hr duration, because that currently gives the best project return on investment. But Balance Power believes that 8-hour duration projects provide the best balance between having sufficient operational flexibility to prevent

excessive grid actions, and minimising cost and time of connection. The Balance Power analysis suggests that the electricity storage marketplace is too orientated on the power of electricity storage projects rather than the growing importance of capacity.

Phil Thompson, Chief Executive of Balance Power said: "With hindsight, the UK should have ensured that the technical needs of operating a net zero grid network and the business models driving the project development cycle are fully aligned, long before the projects developers are trying to connect where we put forward."

## TenneT agrees new funding ahead of potential German sale

Transmission system operator TenneT has signed a €8 billion credit facility to finance new investments in networks to enable the energy transition. The agreement follows plans announced in May for at least ten 525 kV HVDC cable systems to be delivered by 2031 to connect with six German and three Dutch offshore projects.

The new facility is one of the largest single facilities agreed in Europe since 2020 and it is being provided by BNP Paribas, ABN AMRO, BNG, Commerzbank, Deutsche Bank, ING, Rabobank, Santander, SMBC Nikko and UniCredit.

TenneT's Chief Financial Officer Arina Freitag said: "TenneT is one of the largest investors in the energy

transition in Germany and the Netherlands and we welcome the support from our relationship banks to execute our Capex programme."

The credit facility has a tenor of 2.5 years and will cover expansion while the future shape of TenneT is being determined.

TenneT currently owns and manages networks in Germany and the Netherlands, but earlier this year, the company announced plans to explore sale of its German activities to the German government. It believes that the transaction would enable the creation of two strong national players, controlled and funded by their respective governments, and cooperating in driving the energy transition.



## Partnerships form to deliver Ireland's offshore wind targets

Denmark's Ørsted and Irish utility ESB have joined forces to deliver 5 GW of renewable energy and hydrogen projects. They will compete in the next offshore wind auction, ORESS 2.1 - part of Ireland's plan for 7 GW of offshore wind by 2030.

Ørsted Senior Vice-President and UK and Ireland Head Duncan Clark said the partnership "creates an ideal platform for Ørsted to bring its global expertise in the delivery of offshore wind to bear in Ireland".

The partners' plans to explore opportunities to produce renewable hydrogen from offshore wind projects are for the longer term. Ireland's long-awaited national hydrogen strategy currently has no firm date for publication.

Meanwhile EDF Renewables Ireland and Simply Blue Group will jointly develop the 1.35 GW Western Star and 1.3 GW Emerald floating wind projects. The Irish government is targeting 2 GW of floating wind in development by 2030.

Matthieu Hue, CEO of EDF Renewables UK and Ireland, said: "Emerald and Western Star will complement our flagship, fixed-bottom foundation, Codling wind park development off the east coast of Ireland, diversifying our offshore portfolio in Ireland and strengthening our position as a key player in the Irish and UK offshore markets." The 1.3 GW Codling wind farm is a joint venture with Fred Olsen Seawind.

## UK's global place in offshore wind put in doubt by rising costs

- Investors warn promised prices must rise
- Network extensions needed

Janet Wood and Junior Isles

The UK's pipeline of offshore wind projects has reached 98 GW, up from 91 GW a year ago, but RenewableUK says the government will have to double-down on efforts to support the sector.

The pipeline, which includes projects at every stage of development, was second only to China with 157 GW, followed by the USA (82 GW), Sweden (75 GW) and Brazil (63 GW).

The growth of the global pipeline, which is now more than 1.23 TW, has brought complications for an industry that has to grow equally fast, and for host countries. Dan McGrail, RenewableUK Chief Executive said: "Recent developments such as the Inflation Reduction Act in the USA and the EU's Green Industrial Deal have increased competition for investment. We must double-down on our efforts to support and accelerate offshore wind development."

To meet UK government targets to grow offshore wind power capacity from 13.7 GW to 50 GW by 2030 - a 265 per cent increase - global technology firm ABB estimates that a further 24 wind farms with an average 1.5 GW capacity need to enter operation

during the next seven years.

Speaking on the sidelines of the Global Offshore Wind (GOW) 2023 conference, Simon Wynne, Head of ABB Energy Industries UK, commented: "One positive is that we are at around 14 GW in capacity and we [ABB] are working on projects that will bring a further 9 GW; so there's quite a lot in the pipeline. From a UK point of view, the target is a stretch but it's achievable."

There are, however, obstacles. Constraints around vessels and HVDC cables are well-known.

Ørsted Chief Executive Mads Nipper also recently warned that Hornsea 3, the world's largest offshore wind project, could be derailed because the electricity prices the UK government offers are not high enough to absorb surging costs.

He said: "If a project, which is by far the biggest in the world, with all these opportunities, can only become investable after having worked intensively for a year with everything, it's hopefully also a stark reminder to the British government that something must change." The company has cut costs it is expecting to make a final investment decision this year.

"It is inconceivable that others are

not having a difficult time," Nipper warned. He noted that the Irish government recently awarded offshore wind contracts at €86/MWh.

Sven Utermöhlen, Chief Executive of RWE's offshore wind business, told the GOW conference that the costs of developing offshore wind have risen 20-40 per cent since Russia's invasion of Ukraine. He added that he did not expect costs to fall.

UK Energy Minister Graham Stuart said: "While our flagship Contracts for Difference scheme has been immensely successful to date and much repeated around the world, we aren't resting on our laurels... That's why we're looking at ambitious reforms to the CfD to ensure that it continues to provide sustainable prices for future projects, so that developers have the confidence to invest in infrastructure for the long term."

Network connections have also been a barrier to fast deployment of wind power. SSE's Scottish transmission subsidiary recently unveiled a £10 billion investment in two 2 GW high voltage direct current (HVDC) links from Peterhead in Scotland to England, and two subsea links in Scottish waters of 2 GW and 1.8 GW, to accommodate 11 GW of offshore wind.

## Fortum signs two MoUs as it assesses nuclear new-build potential

Fortum has signed a Memorandum of Understanding with US-based nuclear technology firm Westinghouse Electric Company to explore potential new nuclear in Sweden and Finland. That may include small modular reactors (SMRs) - Westinghouse anticipates it will commission its first SMR in 2033.

Fortum has also signed a new MoU with Korea Hydro & Nuclear Power Co. (KHNP), owner and operator of South Korea's nuclear fleet and a nuclear technology supplier. It ex-

tends an earlier MoU, signed in 2018, to a joint exploration of new nuclear.

"Fortum appreciates very much the long-term cooperation with KHNP. We believe the cooperation is beneficial to both parties," said Fortum's President and CEO Markus Rauramo.

"KHNP has world-class capabilities in nuclear new-build projects, while Fortum is one of the largest nuclear companies in northern Europe, and we hope to see both companies become partners that grow together through mutual cooperation," said KHNP's

President and CEO Jooho Whang.

Both MoUs are linked to Fortum's two-year nuclear feasibility assessment, which started in November 2022. It is reviewing technological, commercial, political, social, regulatory and legal conditions for large reactors and SMRs in Sweden and Finland, including new collaborations and business models.

Fortum has also partnered with Rolls-Royce SMR, Kaernfull Next (Sweden), EDF, and Helen and Outokumpu (Finland).

## International News

# Global consensus grows on energy efficiency push

- Near-doubling of progress from 2.2 per cent to 4 per cent is needed
- Energy efficiency can foster economic growth while cutting emissions

Nadia Weekes

Forty-five governments have pledged to double the average global rate of energy efficiency improvements by 2030 to foster sustainable economic growth and support the transition to net zero emissions.

At the International Energy Agency's (IEA's) '8th Global Conference on Energy Efficiency' in Versailles, France, governments from across the world highlighted the critical role of energy efficiency in improving living standards and energy security.

Ramping up annual energy efficiency progress from 2.2 per cent today to over 4 per cent by 2030 would create jobs, expand energy access, reduce energy bills, decrease air pollution and diminish countries' reliance on fossil fuel imports, the conference heard. Invest-

ments would increase from \$600 billion today to over \$1.8 trillion by 2030.

Convening more than 600 participants from 90 countries, the event included 30 ministers and 50 CEOs. Governments with official delegations represented 70 per cent of global energy consumption.

The Versailles Statement on "the crucial decade for energy efficiency" urges all parties and stakeholders taking part in the COP28 Climate Change Conference in Dubai later this year to raise their ambition and strengthen energy efficiency policy implementation in line with the Paris Agreement.

It calls for effective policies that encourage behaviour change among consumers and businesses, with targeted actions to support individuals, especially vulnerable and low-income households.

The IEA has developed and updated

its policy toolkit for governments to support stronger action on efficiency. The toolkit comprises ten strategic principles and a set of sectoral policy packages, including two new policy packages on clean cooking and finance.

Digitalisation, demand-driven solutions and investments in modernising electricity grids were all identified as priorities. Promoting energy efficiency progress in emerging and developing economies will be at the heart of the next IEA Global Conference in Nairobi, Kenya, in 2024.

In a separate joint report with the International Finance Corporation (IFC), the IEA also called for annual clean energy investments in emerging and developing economies to more than triple from \$770 billion in 2022 to as much as \$2.8 trillion by the early 2030s to meet rising energy needs and align with the Paris climate goals.

The report, 'Scaling Up Private Finance for Clean Energy in Emerging and Developing Economies', shows that public investments alone would be insufficient to deliver universal access to energy and tackle climate change. Increased public funding in partnership with private-sector capital will reduce project risks – a concept known as blended finance.

According to the report, two-thirds of the finance for clean energy projects in emerging and developing economies (outside China) will need to come from the private sector. Today's \$135 billion in annual private financing for clean energy in these economies will need to rise to as much as \$1.1 trillion a year within the next decade.

The report urges greater technical, regulatory and financial support to unlock the potential for clean energy in emerging and developing economies

by helping governments overcome obstacles that deter clean energy investments today, including relatively high upfront costs and a high cost of capital.

The report also identifies the importance of concessional financing for projects that involve newer technologies that have yet to scale and are not yet cost-competitive in many markets, such as battery storage, offshore wind, renewable-powered desalination or low-emissions hydrogen.

Another finding highlights the potential for issuing more green, social, sustainable and sustainability-linked bonds through platforms that aggregate and securitise investments to overcome the asymmetry between the relatively small size of energy transition projects in emerging and developing economies and the relatively large minimum investment size that major institutional investors require.

## Global wind industry celebrates one terawatt milestone

The wind industry has reached the landmark figure of 1 TW of global installed capacity and is gearing up to install the second terawatt by 2030, according to data from the Global Wind Energy Council (GWEC), which organised a series of events to mark the achievement.

This capacity milestone pulls into focus the fundamental role wind energy is playing in decarbonising the global power system and helping the world reach its climate and energy goals, GWEC said.

"This is an enormous moment for the wind industry, but it is also a moment to celebrate for the whole world – this landmark achievement shows the path to a clean energy future is here," said CEO Ben Backwell.

"Building to 2 TW by 2030, and eventually to 8 TW by 2050, will require unprecedented collaboration and cooperation across the world, and the creation of a huge and diverse new workforce," he added. "At GWEC we are looking forward to working with governments, companies and communities around the world to make this vision a reality."

Meanwhile, a survey and analysis by

Westwood Global Energy Group has found that recent cost inflation could add roughly \$280 billion in capital expenditure for the offshore wind industry over the next decade.

"Inflation has been one of the key challenges facing the global economy over the past 24 months and offshore wind has been no exception, grappling with both specific and general inflationary factors," said Peter Lloyd-Williams, Senior Commercial Wind Analyst at Westwood.

While OEMs have incurred losses and developers have delayed projects in the face of shrinking margins, precise details on the extent of rising prices and their causes have remained elusive, he explained.

One-third of respondents said they had seen cost inflation of 11–20 per cent since 2021 – up to 30 per cent or more for some. Financing and commodity prices had risen by over 40 per cent, said Westwood.

Financing the expenditure gap could ultimately take the form of higher off-take prices funded directly by consumers or indirectly through additional fiscal and tax incentives, according to Westwood.

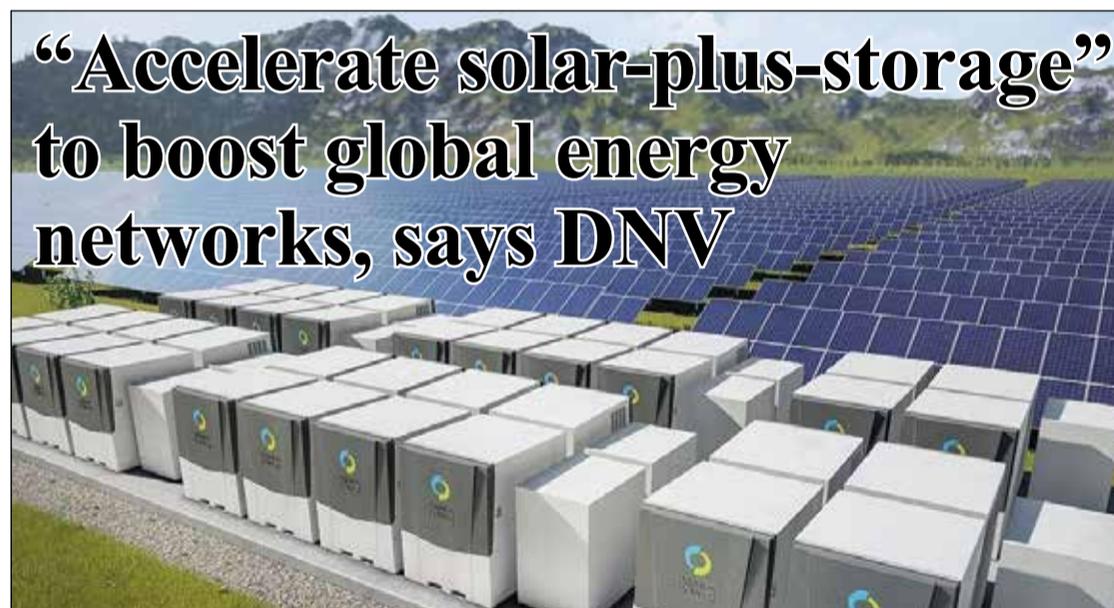
## Angola launches \$106 billion strategy for energy

The Angolan government plans to invest \$106 billion in the electricity sector by 2050 under a new long-term strategy that foresees \$15 billion being invested by 2030 and a total of \$106 billion by 2050.

Investment will flow into renewable energy sources and private initiatives in the energy sector in order to achieve the country's ambition of increasing electrification.

The strategy points to a raft of solutions including system rationalisation, a cut in tariff subsidies and a reduction in commercial losses. It also proposes expanding the on-grid/on-grid system, universalising access to electricity and creating off-grid/off-grid solutions.

When reviewing tariffs, compensatory measures will be applied to vulnerable groups such as low-income families, pensioners and disabled citizens.



**"Accelerate solar-plus-storage" to boost global energy networks, says DNV**

- Solar-and-storage 'power couple' can boost energy resilience
- Half of solar installations to include storage by 2050

Nadia Weekes

Accelerating solar-plus-storage in the next five years would boost the efficiency and resilience of global energy networks making clean energy supply more reliable, according to new research by DNV's Industry Insights.

A survey of global energy industry professionals on the outlook for the year ahead found that the so-called 'power couple' of the energy world – storage combined with solar – could be used to tackle the intermittency of solar power generation.

DNV forecasts solar to grow 20-fold globally by 2050 and installations are increasingly being planned with dedicated storage. Within a decade, about one fifth of all PV installed will be with dedicated storage, and by mid-century, this share will have risen to half.

Despite its current higher costs, solar-plus-storage has an advantage over solar alone on capture price because plants with storage can charge batteries during the day and sell the stored electricity when the price is high. By 2038, the capture price advantage will surpass the cost disadvantage on a globally averaged basis.

Skills shortages and lack of policy support could stand in the way of progress. Nearly two-thirds of respondents from the solar industry said that their own organisation is finding it difficult to attract employees with the right skills.

When it comes to policy support, 47 per cent believe that inadequate public policy represents the biggest risk to their organisation's near-term success.

In a separate piece of research, DNV found that the energy industry is boosting its cyber security spending this

year, as geopolitical tensions trigger growing awareness of emerging threats.

But industry professionals warn that budgets are still too low to safeguard safety-critical systems. Tightening cyber security regulation is expected to be the greatest driver for unlocking new funding.

Cyber security skills shortages and barriers to collaboration emerge as key challenges to greater cyber resilience. Where expertise is in place, cyber security professionals often struggle to communicate and collaborate with operational teams, leading to a 'cyber-perception gap'.

Three-quarters of respondents say their cyber security and engineering teams must learn to collaborate more effectively if the organisation is to strengthen the security of assets and infrastructure.

## 8 | Companies News

# GHG Protocol must unlock higher-impact opportunities for corporates in emerging markets

- Next step is to champion framework in emerging countries, says D-REC
- Corporates and supply chains account for 60 per cent of industrial greenhouse gas emissions

Junior Isles

The Greenhouse Gas (GHG) Protocol's market-based rules have inspired greater accountability of emissions reductions in North America and Europe but under current guidelines there is insufficient provision for emerging markets, according to D-REC (the Distributed Renewable Energy Certificate).

Since it first published its Corporate Standard in 2001, the GHG Protocol has defined global best practice and provided a model for emissions management across many sectors. However, as it invites consultation for revisions to its Standard, D-REC – a not-for-profit initiative that delivers internationally recognised guarantees

of origin for distributed renewable energy – believes that the next crucial step is to champion the framework in emerging markets.

Corporate clean energy buying increases year-on-year, with the 36.7 GW secured in 2022 being another record-breaking high. International corporations are increasingly looking for solutions to reduce their emissions in the areas where they consume energy for their direct operations or via their value chains. Yet, under current guidelines, it is not possible to account for energy attribute certificates (EAC) across markets boundaries or recognise the renewable energy engagement of supply chain partners.

As a result, says D-REC, these areas miss out on critical investment that

would empower their energy transition, and therefore remain dependent on carbon-intensive energy generation for longer.

The organisation claims that in practice, this leads to a scenario where, for example, a company based in Norway that wishes to reduce its emissions might opt to invest in domestic solar energy certificates rather than a solar project in Nigeria, even though the latter would be more efficient in generating renewable energy and would contribute materially to several UN Social Development Goals as a by-product.

“Reporting frameworks like the GHG Protocol can provide a solution for corporations targeting higher-impact clean energy purchases if it

resolves to widen its parameters globally and tailor its legislation to the unique requirements of power systems in emerging markets,” said D-REC Co-lead Gian Autenrieth.

“D-REC is focused on opening up more pathways for private finance to reach distributed, off-grid, renewable energy projects in the emerging market. The GHG Protocol does not currently consider market-based instruments for Scope 3 accounting. If we do not revise this we are only compounding the current limitations of renewable energy certificates, making it more difficult for the private sector to meet their GHG emissions objectives, and depriving those most dependent on fossil fuels of the readily available investment that could drive the

energy transition where it is needed most.”

Recent data from the World Bank and CDP's voluntary disclosure platform found that 157 global companies and their supply chains now account for 60 per cent of the world's industrial greenhouse gas emissions – 10 per cent from companies, 50 per cent from their supply chains.

Global businesses have been calling for a louder voice at the upcoming UN climate change talks. A recent survey of the top 100 revenue-ranked corporates across 14 nations revealed that large businesses are increasingly losing confidence in the world's ability to limit global warming below the Paris Agreement's 1.5°C climate change threshold.

## Jan De Nul Group gains confidence after return to profitability

Jan De Nul, the Belgium-based provider of services relating to the construction and maintenance of maritime infrastructure, says it is looking ahead “with confidence” after reporting strong growth, restored profitability, and a record order book.

Despite continuing market uncertainty, the company said 2022 fulfilled its expectations. “Thanks to our

operational management and supported by a well-stocked order book, we were able to achieve strong results,” it said in a statement.

Turnover increased to €2.5 billion, its highest turnover ever. This enabled the company to restore EBITDA to 18 per cent on turnover, or €440 million. Due to “operational excellence” Jan De Nul Group booked a net profit of

€108 million.

Its order book, which stood at €4.6 billion at the end of 2021, grew to €6.45 billion at the end of 2022, a record increase of 40 per cent. The increased tender activities in the market and increasing number of orders continued unabated in 2023, resulting in a further increase of the order book up to €8.10 billion.

The maritime dredging and offshore sector remains the cornerstone of Jan De Nul Group's activities, accounting for 81 per cent of the total turnover of the Group.

In the offshore renewable energy market, Jan De Nul was actively involved in the construction of several offshore wind farm projects, both in and outside Europe. Highlights in 2022

include the completion of the Formosa 2 Offshore Wind Farm in Taiwan, which entailed the design, supply and installation of 47 wind turbine foundations, four export cables and 47 inter-array cables. Closer to home, in Saint-Nazaire, its jack-up vessel Vole au vent transported and installed 80 wind turbine generators for the first offshore wind farm in France.

## Plug Power reaffirms revenue targets



US-based hydrogen solutions provider Plug Power Inc. has reaffirmed its revenue objectives for both the near- and long-term.

During its Analyst Day at the Rochester Gigafactory in New York, Chief Executive Andy Marsh said that the company expects to generate a revenue of between \$1.2 billion (€1.12 billion) and \$1.4 billion this year and to achieve positive gross margins. About 25 per cent of the 2023 top line will be contributed by activities in Europe, while 60 per cent of the revenue will be associated with non-material handling. The company also reiterated its long-term target of generating annual sales

of \$20 billion by 2030.

By the end of the decade, Plug Power targets deploying 1 GW of stationary power products, shipping 5 GW of electrolyzers annually.

Plug Power also announced a deal to supply 5 MW of containerised proton exchange membrane (PEM) electrolyzers to Avina Clean Hydrogen Inc. The latter will use the system for a green hydrogen plant that will serve the commercial mobility sector in southern California.

Electrolyser deliveries are expected to take place during the second quarter of 2024 and the project is anticipated to be completed in mid-2024.

## Siemens Energy shares plunge on wind turbine woes



Shares in Siemens Energy plummeted last month after the company warned that technical problems at its wind turbine business were worse than previously thought.

The group scrapped its full-year profit target and said it was setting aside more than €1 billion (\$1.1 billion) over the coming years to fix the issues at troubled wind turbine subsidiary Siemens Gamesa.

In a call with reporters, Siemens Gamesa CEO Jochen Eickholt said “the quality problems go well beyond what had been known hitherto”.

“The result of the current review will be much worse than even what I would have thought possible,” he added. At the heart of the latest troubles are faulty components, mainly related to bearings and rotor blades in onshore

turbines, Eickholt said.

In the call with reporters, Siemens Energy CEO Christian Bruch called the developments “bitter” and “a huge setback”. Speaking to analysts on June 23rd he said: “This setback is more severe than I thought possible. He said “too much had been swept under the carpet” and admitted that Siemens Gamesa will make bigger losses this year and will take longer than expected to become profitable.

He added: “I do believe that there is a positive wind business ahead. But we also believe that we need to tackle these problems in a more consequential and a more effective way.”

Siemens Energy issued an ad-hoc statement late on Thursday June 22nd saying that it had ordered a technical review following a “substantial

increase in failure rates of wind turbine components”.

Shares in Siemens Energy plunged by more than 31 per cent shortly after trading opened in Frankfurt on Friday June 23rd.

The company also withdrew its profit guidance for the fiscal year, without giving an updated estimate. Siemens Energy will provide another update on August 7, after releasing its third-quarter results.

■ At the end of June, Siemens AG transferred a 6.8 per cent stake in Siemens Energy AG to Siemens Pension-Trust e.V. As a result, Siemens AG's stake in Siemens Energy AG declines to 25.1 per cent. With this move, Siemens is executing its previously announced plans to reduce its investment in Siemens Energy.

## Tenders, Bids & Contracts

### Americas

#### US nuclear plant to get Framatome ICIs

Framatome has been awarded a contract to manufacture and deliver in-core instrumentations (ICIs) for a US nuclear plant. The contract also establishes consistency of supply for the plant, and cost management for long-lead materials for the instrumentation that is essential for plant operation.

Frédéric Lelièvre, Senior Executive Vice President of Sales, Regional Platforms and Instrumentation and Control at Framatome, said: "Framatome continues to play a strategic role helping US utilities safely extend their plant operations and reach their carbon reduction goals. We are honoured to be chosen to provide yet another campaign of ICIs at this plant and eager to continue delivering solutions to help our US customers prepare for the clean energy future."

Framatome designs and manufactures ICIs at its facility in Lynchburg, Virginia.

#### Vestas wins 139 MW repowering order in USA

Vestas has been awarded a contract to repower a project owned by Vitol in Pennsylvania, USA. The order consists of 68 V110-2.0 MW wind turbines delivered in 2.05 MW operating mode, which will replace the site's current wind turbines.

The order includes supply, delivery, and commissioning of the turbines, as well as a 20-year Active Output Management 5000 (AOM 5000) service agreement.

Turbine delivery begins in Q2 2024 with commissioning scheduled for the Q4 2024.

### Asia-Pacific

#### TKF wins Taiwan offshore wind cable contract

Twentsche KabelFabriek (TKF) of the Netherlands has been awarded a cable supply contract from Ørsted for the 920 MW Greater Changhua 2b and 4 offshore wind farms in Taiwan.

The contract scope includes the supply of nearly 200 km of inter-array cables and other cables including accessories and connectors operating at 66 kV for the two offshore wind farms.

The contract announcement follows Ørsted's final investment decision, taken in March 2023. The wind farms are now under construction and are set to be some of the largest offshore wind projects in Asia Pacific.

The Greater Changhua 2b and 4 offshore wind farms will comprise around 65 wind turbines with an individual capacity of 14 MW, installed some 35-60 km off the Changhua coast.

#### Amplus Solar to build its first Indian wind farm

Amplus Solar has selected GE Vernova to supply and commission 40 units of its 2.7-132 onshore wind turbines for its first wind power project in Tamil Nadu, India.

The project will have a capacity of 108 MW and is scheduled to be commissioned by August 2024.

Sharad Pungalia, CEO for Amplus Solar said: "We are happy to have found an experienced partner in GE Vernova as we take another step in contributing to the country's net zero targets with our first wind power project. We are confident that together, we can create the synergies needed for the successful completion of this project."

Product design will take place primarily at GE's Technology Centre in Bengaluru, the turbines assembled at GE's manufacturing facility in Pune, and blades manufactured at LM Wind Power's plant in Vadodara.

#### Mitsubishi Electric wins Taiwan's first STATCOM

Mitsubishi Electric has announced that its Taipei-based affiliate Shihlin Electric & Engineering has won an order from Taiwan Power Company for Taiwan's first static synchronous compensator (STATCOM). The STATCOM from Mitsubishi Electric will be delivered to the Nanke substation in Tainan and installed in a substation designed to blend in with its surrounding landscape and community.

With a rated capacity of ±200 MVA, Mitsubishi Electric's system will contribute to the stable operation of the Tainan Science Park, where a number of factories produce semiconductors and display monitors. Delivery is scheduled for the first half of 2025 and the system is expected to begin operating in the first half of 2026.

#### LS cables for Korea's largest offshore wind farm

A \$76 million order for submarine communication cables for Hanwha Corporation Engineering and Construction's Shinan Ui offshore wind power project has been awarded to LS Cable & System.

The project, in the southeastern sea near Uido, South Jeolla Province, is scheduled to be completed by 2026. When constructed it will be the country's largest offshore wind farm, capable of producing 400 MW.

It is predicted that the wind farm will produce more than three times the wind energy currently produced by all of Korea's offshore wind power projects.

#### Suzlon to build Karnataka 300 MW wind project

Suzlon has won an order from Torrent Power to develop a 300 MW wind power project in Karnataka, India.

Suzlon will install 100 wind turbines with a hybrid lattice tubular tower, each with a rated capacity of 3 MW.

The wind power project is expected to be commissioned in 2025.

Suzlon said in a statement: "This is the fourth order from the Torrent Group to Suzlon. This is also the sixth and the largest order of the new Suzlon 3 MW series turbine so far."

### Europe

#### North Kyle wind order for Vestas

An order for 49 V136-4.5 MW wind turbines has been awarded to Vestas by North Kyle Wind Farm, part of Brockwell Energy for the North Kyle wind park in East Ayrshire, Scotland. The order includes supply, delivery, and commissioning of the turbines.

Vestas will service the turbines under a 30-year service agreement.

Vestas will begin turbine delivery in Q2 2024 with commissioning scheduled for completion in Q3 2025.

#### Westinghouse signs FEED contract for Kozloduy

Westinghouse Electric Company has signed a Front-End Engineering and Design (FEED) contract with Bulgaria's Kozloduy NPP-Newbuild for a new AP1000 reactor to be located at the Kozloduy nuclear power plant site.

Earlier this year, both entities signed a memorandum of understanding establishing a joint working

group to plan deployment of the AP1000 reactor in Bulgaria.

There are currently two Russian-designed VVER-1000 reactors in operation at the Kozloduy site. Westinghouse signed a 10-year agreement in December 2022 to supply nuclear fuel to one of the units starting in 2024. The fuel will be supplied out of Westinghouse's fabrication site in Västerås, Sweden and is the only fully Western option to Russian supply.

#### Hitachi Energy converters for France-Spain link

Electricity Interconnection France-Spain (Inelfe), the joint venture bringing together operators of the Spanish (Red Eléctrica) and French (RTE) electricity transmission networks, have awarded a contract to Hitachi Energy to supply four high voltage direct current (HVDC) converter stations to interconnect France and Spain via a subsea cable across the Biscay Gulf.

The Biscay Gulf interconnection will consist of two HVDC links, with a converter station at each end of both systems. Combined, the links will efficiently supply a total of 2000 MW at 400 kV over 400 km. Most of the link will be underwater, but a short section of the link cable route will return to land to avoid the deep Capbreton Canyon.

#### Vestas wins two orders in Finland

Vestas has won an EPC order for two wind projects totalling 161 MW to build Neoen's and Prokon's jointly owned Lumivaara and Storbötet wind farms in Finland.

The order for the 105 MW Storbötet project in the municipality of Uusikaarlepyy consists of 17 V162-6.2 MW wind turbines, while the order for the 56 MW Lumivaara project in the municipality of Hyrynsalmi consists of nine V162-6.2 MW wind turbines. Vestas will service the turbines under a 20-year Active Output Management 5000 (AOM 5000) service agreement.

Turbine delivery for both projects will begin in Q3 2024 and both wind farms are scheduled to be fully operational in 2025.

#### ScottishPower awards €250 million cable contract

ScottishPower Renewables (SPR) has awarded Danish-based NKT a €250 million order for the complete 320 kV HVDC export power cable system for the 1400 MW East Anglia Three offshore wind farm in the UK.

Under the terms of the contract, NKT will be responsible for the design, manufacture, and installation of the cable system which includes approximately 2 x 150 km of offshore cable and about 2 x 40 km of onshore cables.

Project completion is scheduled for 2025.

Construction of East Anglia Three started last year with onshore work on the converter station in Suffolk and along the land cable route, while offshore work is scheduled to begin in 2024. The East Anglia Three offshore wind farm will consist of 95 wind turbines located 69 km off the UK coast in the North Sea.

### International

#### Ormat developing 50 MW geothermal plant in NZ

Ormat has won a contract from Eastland Generation Limited (EGL) to build a 50 MW power plant in New Zealand. EGL is a subsidiary of Eastland Group Limited and a regional infrastructure company.

Under the terms of the agreement, Ormat will design, build, commission and own the power plant. EGL will operate and maintain the power plant under a separate services arrangement and also purchase 100 per cent of the plant's generation under a fixed price Power Purchase Agreement (PPA).

As part of the development agreement with EGL, Ormat has granted EGL a contractual option to purchase the power plant at an agreed purchase price, subject to certain conditions.

#### Envision Energy secures Egyptian wind project

AMEA Power has awarded a contract to supply the wind turbines for the Amunet 500 MW wind farm project in Egypt to Envision Energy.

The project has obtained financing from a prominent consortium of banks, including the International Finance Corporation (IFC) and the Japan Bank for International Cooperation (JBIC).

Envision will supply its EN 171-6.5 MW wind turbines. The turbines feature advanced control systems that optimise performance and maximise energy production, while minimising downtime and maintenance costs.

The Amunet project is expected to be commissioned by mid-2025. It will contribute to Egypt's goal of generating 42 per cent of its electricity from renewable sources by 2035.

#### Sungrow to supply 14 MW batteries in Lebanon

Sungrow of China has signed contracts to supply utility-scale micro-grid battery energy storage systems (BESS) with a total capacity of 14 MW/24.9 MWh in Lebanon. The batteries will be delivered for eight micro-grid projects and will be combined with solar photovoltaic systems. Commissioning is scheduled for Q4 2023.

Zaid A-Helo, Country Manager for the Levant and Yemen, said: "Lebanon is a perfect place to install solar projects, as the country has over 300 sunshine days per year. Deployed with Sungrow's solar-plus-storage solutions, an increasing number of local businesses and facilities are enjoying the independence of energy and decarbonising their daily operations."

#### Vestas wins 37 MW

#### EnVentus order in Türkiye

Vestas has been awarded an order for a 37 MW wind project in Türkiye. The contract includes the supply and installation of six V162-6.2 MW wind turbines, as well as a 10-year Active Output Management 4000 (AOM 4000) service agreement.

Turbine delivery is planned for Q4 2023, with commissioning expected in Q2 2024.

#### Trina Solar to deliver Uzbek solar tracker

An order to deliver 510 MW of smart solar trackers for several projects in Uzbekistan has been won by China's Trina Solar.

TrinaTracker, a smart tracker solution supplier unit of Trina Solar, will deliver the contracted volumes of Vanguard 1P trackers. The hardware will be used at the Jizzakh and Samarkand PV projects. Both schemes were proposed by renewables developer Masdar, which achieved financial close in April and aims to complete the projects in 2024.

The solar farms in the Jizzakh and Samarkand regions of Uzbekistan will be able to produce 1.1 TWh per year once operational.



## Hydrogen

# Thumbs up to the US as destination for green energy investment

It is clear there are many ways to produce hydrogen, but how to produce it in a big way is where the world wants to go. Investors are searching and debating about where the best place may be to put their money for big projects, and many agree that the US is promising the most bang for their bucks – thanks to the Inflation Reduction Act and other Biden Administration moves to launch a new energy era.

Gary Lakes

A panel of experts gathered in London for the 'FT Hydrogen Summit' last month agreed that the US is the most studied location for hydrogen investment, due to the passage last year of the Inflation Reduction Act (IRA), which is offering investors millions of dollars in tax breaks for investments in green hydrogen production that will likely make the US a leading hydrogen exporter in the years to come.

Europe has yet to match the incentives that the US is offering despite recent steps taken by the EU to provide support for European projects, which suggests that investors could opt for US-located projects, even though Europe is keen to get its renewable energy industry established.

The panellists at the conference

expressed their support for the actions taken by the US, pointing out that the IRA is simple to understand and makes a plain case for how investors can benefit from what the US is offering. The IRA provides tax credits for hydrogen production that is based on the carbon intensity of the production process. The lower the carbon emissions, the higher the tax credit. The IRA will make hundreds of billions of dollars available for projects that will transform the energy industry.

According to the panel, the EU needs to simplify the conditions set to acknowledge a renewable fuel and provide more financing.

Apart from the IRA, the US has also set aside \$2 billion in grants for the development of hydrogen fuel cells for electric vehicles, and the Infrastructure and Jobs Act provides \$8 billion for

hydrogen projects. Actions taken by the Biden Administration are meant to get the US economy on a firm footing and transition to a clean energy industry that will create jobs for those whose livelihoods are linked in one way or another to the fossil fuel industry and to launch new technology employment based on clean energy innovation.

One of the biggest advocates on the panel for green investing in the US was Andrew Forrest, an Australian mining tycoon who has turned his attention to clean energy investing through his Fortescue Future Industries (FFI), which is planning a number of big projects across the globe. Forrest said his firm would be investing tens of billions of dollars in the US and would concentrate on the US market for the short and medium term.

FFI was set up in 2021 to act as a

developer, financier and operator of a global portfolio of renewable energy resources to produce green energy at "a scale equal to the oil and gas supermajors", Forrest said during an interview published last month with the green energy publication *CleanTechnica*. The company is a member of the UN Race to Zero Coalition and a signatory to the Climate Pledge.

It is involved with developing technology solutions for hard to decarbonise industries, and is building a global portfolio of renewable green hydrogen, green ammonia, battery systems and zero emission energy projects. FFI intends to completely eliminate emissions from its mining operations, Forrest said.

Hydrogen still has its detractors, however, who believe that its potential might be exaggerated. In a recent

article, the *Financial Times* points out that some investments in recent years have proved disappointing and that hydrogen has lost its lustre for some investors. The *FT* reported that inflation is impacting new projects that are under construction and could make hydrogen too expensive to produce.

Yet, some big investors – like Andrew Forrest – remain undeterred. The financial daily newspaper cited US green hydrogen maker Ohmium as an example of a company that has recently invested to expand output, in its case, \$250 million.

A solid hydrogen market will work to reassure investors that hydrogen will take root and spread not only in hard to decarbonise industries, but for everyday necessity. The US is pressing the issue, and other big economies are being encouraged to do the same.

## Gas

# US LNG continues to reassure European markets for long-term supply

The war in Ukraine has brought about a revival in the NATO military alliance between the US and Europe. But it is also serving to establish what will likely become a long-term energy security alliance as well, as business between US LNG suppliers and European LNG marketers make solid agreements that will last into the late 2030s and beyond.

Gary Lakes

US LNG exporters have agreed several deals in recent weeks with European companies that will continue the security of gas supply to European markets. Europe's long-time dependence on Russian natural gas has come to a near end following the invasion of Ukraine in February 2022 and the European Union's subsequent decision to halt pipeline imports from Russia.

EU sanctions put a stop to overland gas shipments from Russia and unknown saboteurs bombed Russia's dual subsea Nord Stream pipelines in the Baltic Sea in September last year, putting a halt to that newly constructed route. For now, only a gas pipeline across Ukraine and Moldova carries Russian gas into Europe, and according to the Ukraine energy minister, it is unlikely that Kyiv will extend a current transport contract with Russia's state-owned gas monopoly Gazprom, causing Russian gas flow

through the pipeline to stop.

In the midst of complications created by the war, European states have moved quickly to install floating storage and regasification units (FSRU) and signed contracts with LNG exporters for supplies. These conditions have served to encourage investment in LNG export projects in the US, where there are huge resources of non-conventional shale gas that are developed by using hydraulic pressure to fracture the rock in which the gas is trapped.

Last month, the German state-owned company SEFE (Securing Energy For Europe) signed a 20-year agreement with US company Venture Global LNG for the supply of 2.25 million tons/year, which amounts to about 5 per cent of Germany's annual gas demand.

This is the second deal that a German company has signed with Venture Global, which has plans for four LNG export terminals along the US Gulf Coast. The German utility company

EnBW, which is largely owned by the state of Baden-Württemberg, has signed a 20-year contract for supplies of 2 million t/y. Those deals together make Venture Global the largest LNG supplier to Germany, which, having relied on Russia gas supplies for decades, only began to import LNG last December. Since then, it has imported 2.4 million tons of LNG and 70 per cent of that has been from US suppliers.

During 2022, when there was a global scramble by European states to secure gas supplies in the midst of huge price rises, the US exported some 40 million tons to Europe. That enabled European countries to replenish their gas stocks and prepare for last winter and the one ahead.

SEFE was created by the German state with the assets acquired when it nationalised Gazprom's German subsidiary. Venture Global is involved with four LNG export facilities in Louisiana and Texas. Promoting LNG as a key transition fuel, US companies

are looking to expand facilities.

Norway's Equinor, the largest supplier of natural gas to Europe by pipeline and tanker, also recently signed a LNG supply agreement with the largest US LNG producer, Cheniere Energy, which also operates on the US Gulf Coast. The new contract covers the supply of 1.75 million tons/year of LNG for 15 years beginning in 2027 from the Sabine Pass export facility. It doubles the amount of LNG that Equinor has contracted for with Cheniere to 3.5 million t/y.

Cheniere is one of the world's largest LNG producers with a current operational capacity to export 45 million t/y, plus a further 10 million t/y under construction.

Another significant development in US LNG is a recent decision by France's TotalEnergies to buy into the NextDecade LNG project, Rio Grande LNG, which will be sited in Brownsville, Texas.

The agreement will see Total acquire

17.5 per cent in NextDecade for \$219 million, which will be paid in three tranches. Total will also take a 16.7 per cent stake in Phase 1 development, which involves the construction of three LNG trains with a combined output of 16.2 million tons. The deal will see Total off-taking 5.4 million t/y for 20 years from Phase 1 when it begins commercial production in 2027.

The French investment will enable NextDecade to make its final investment decision (FID) for Rio Grande Phase 1, which was due to be made by the end of June.

NextDecade has also concluded supply agreement with the European firms Engie and Galp, Shell, ExxonMobile, Japan's Itochu, and China's Guandong Energy, ENN Energy, and China Gas Holding.

TotalEnergies is presently the largest off-taker of US LNG. It has contracted for 13.35 million t/y and the new Rio Grande deal will boost that volume to 15 million t/y by 2030.



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# Europe's climate ambition for 2040? Get the right enablers in place first

Against the backdrop of a geopolitical landscape that has brought energy security to the fore, Eurelectric has released a new study, 'Decarbonisation Speedways', outlining three scenarios for reaching climate neutrality. Eurelectric's **Kristian Ruby**, explains why all scenarios point to direct electrification as the most cost-effective and energy-efficient accelerator of decarbonisation in Europe's economy.

Europe is headed towards yet another summer with extreme weather demonstrating the disastrous effects of climate change. Droughts in Spain, floods in Italy and early heat waves in Belgium and the UK have already reminded us that our climate clock is ticking faster and faster. Adding to the urgency, geopolitical tensions, epitomised by the Russian invasion of Ukraine, have uncovered energy insecurities in Europe that are forcing us to rethink our energy transition under a previously overlooked security dimension.

In the context of new policy developments, technological innovation and changing energy geopolitics, effectively reducing greenhouse gas emissions requires a holistic approach to decarbonisation. In our new study, 'Decarbonisation Speedways', we outline three scenarios for reaching climate neutrality. All scenarios

point to direct electrification as the most cost-effective and energy-efficient accelerator of decarbonisation in Europe's economy including in the transport, buildings and industry sectors.

So what will Europe's future energy system look like? Provided we opt for the most cost-efficient approach, clean and renewable power will account for at least 60 per cent of final energy consumption by 2050 in contrast to 23 per cent in 2020. In buildings, heat pumps and district heating will heat homes and buildings replacing fossil-based solutions such as gas boilers. In transport, electric battery-powered engines will replace internal combustion engines fuelled by petrol and diesel, while electric boilers and industrial heat pumps will replace fossil fuel boilers.

Where direct electrification is not possible, low-carbon hydrogen, as well as biofuels, will play a role in satisfying energy demand in hard-to-abate sectors, such as feedstock for industrial processes or long-distance cargo transport. Being an expensive and less energy-efficient form of energy, however, hydrogen should serve as a complement to electrification.

If the correct balance is found in this changing system, an electrified and decarbonised system will not only provide environmental benefits such as reducing society's carbon footprint and improving biodiversity and ecosystems preservation, but it could also come with broader societal benefits. Over time, direct electrification could account for €40-140 billion in annual savings in health spending and contribute to improved air quality.

Electrifying energy demand will also lead to widespread efficiency gains. The sector with the highest efficiency gains is transport. Thanks to the electric vehicle (EV) revolution already underway in Europe, the sector will be able to reach a 53 per cent reduction in final energy demand by 2050 compared to 2015 levels. In buildings, heat pumps will register similar gains as they are 3-5 times more energy efficient than their fossil fuel alternatives.

These transitions mean that the final electricity demand will increase greatly over the next few decades, despite the fact that the absolute energy demand will decrease. Electricity capacity will have to triple by 2040, together with a massive expansion in wind and solar and a stable basis of firm capacity to match around 4600 TWh of final electricity

demand by 2040.

Wind and solar will account for most electricity generation. Their capacity is expected to increase from 352 GW in 2020 to 2212 GW by 2040. This capacity growth will be dominated by solar photovoltaics (PV), but to achieve our decarbonisation targets, all clean energy technologies will need to be implemented. These technologies include onshore and offshore wind, hydropower, and for countries who decide so, nuclear.

While the discussion on the EU's climate targets for 2040 unfolds, it is crucial for Europe and its industry not to lose track of the near future. Now is the time to build on agreed policies and start delivering concrete action on the ground.

To create a European power system that can deliver clean power anywhere at any time, critical enablers must be ensured to pave Europe's decarbonisation pathways into decarbonisation speedways for 2040 and beyond. These include higher investment in grid expansion and reinforcement, an innovation-friendly investment policy, an improved financial framework, and a holistic market design.

A good example of the need to keep focus on the short-term in order to reach the long-term objectives is in relation to market design. Formulating an electricity market design fit for net zero is crucial to provide a clear direction in terms of investment and to construct an improved financial framework.

Forward markets, power purchasing agreements, and contracts for difference, all have a role to play in de-risking investments while mitigating consumer exposure to extreme short-term price volatility. On the other hand, a botched reform, or a reform that drags out and leaves investors in doubt, could derail the EU's efforts to achieve its long-term goals.

In a green energy future, all technology must be on board to boost flexibility. Because renewables come with variable generation, flexible assets such as storage, demand-side response and firm capacity must be incentivised to ensure reliable supply when the wind does not blow, and the sun does not shine. Altogether, 531-782 TWh of flexibility is needed to properly incorporate the massive amount of renewable generation required by 2050.

Energy storage technologies such as hydropower, batteries and low-carbon thermal assets for flexible electricity generation are some of the

alternatives available today to provide more flexibility. In 2022, battery storage reached only 9 GWh, which represents 0.009 per cent of the 108 TWh needed in 2040. This illustrates how gigantic the leap forward needs to be. In transport, the roll-out of EV smart-charging and vehicle-to-grid solutions (V2G) yields much potential to turn EVs into flexible assets.

These goals are attainable so long as the technology development and infrastructure are supported. To power hundreds of millions of EVs and heat pumps as well as industrial processes with clean and renewable electricity, we need to rely on a secure, agile, and resilient electricity system, 24/7. This requires increased system efficiency through expansion and reinforcement of distribution grid infrastructure and further technology development.

As most renewable integrations will need to happen at the distribution level, investments in distribution at a near-par level with generation are desperately needed. Grid investments will need to increase to at least €38 billion per year until 2030, all the way to €65 billion per year until 2050.

If all these building blocks are put in place, the transition will come with significant economic benefits. Distribution grids alone will account for the creation of 440-620 thousand jobs. We could see a reduction in electricity costs of approximately €28-37 billion per year thanks to lower renewable operating costs in comparison to fossil fuel power generation. Electrifying the system will also save €175 billion annually in fuel imports. On a consumer level, a highly efficient decarbonised system based on massive electrification could reduce average EU household energy consumption by 45 per cent by 2050, lowering energy bills significantly.

The time to act is now. While the initial costs of electrifying our energy system may seem daunting, we need to reflect on the notion of costs. It may, at first sight, seem unaffordable, but on the other hand, can we afford to stay dependent on imports of fossil fuels from unreliable regimes? Can we afford to surpass the trigger levels for dangerous, self-reinforcing climate change? The price of delayed or no action is far more costly. Let the action begin.

*Kristian Ruby is Secretary General at Eurelectric, the association representing Europe's electricity utilities active in power generation, distribution and supply.*

**Ruby: "The initial costs of electrifying our energy system may seem daunting, but can we afford to stay dependent on imports of fossil fuels from unreliable regimes?"**



# Cyber security: a top priority for the power sector

The number of high-profile attacks on power and utility companies in recent years has shone a spotlight on cyber security and where the industry is lacking the tools to ensure resiliency in operational technology. Open Systems International's **Josef Fantik**, discusses the rising threat and what can be done.

**Power companies cannot afford to ignore the threat posed by bad actors if they want to avoid detrimental levels of disruption**

The onward march to decentralisation and digitalisation is making cyber security a growing issue and escalating concern. With expanding intelligence embedded into devices in the field and more connections to the internet and enterprise applications, operational technology (OT) asset owners are facing an increasing attack surface.

According to a report by Fortinet, polling 500 OT security professionals around the world, almost every organisation (93 per cent) surveyed has been on the receiving end of a security intrusion in the past year, and over six-in-ten of those (61 per cent) had a direct impact on OT systems. To reflect the severity of such breaches, 90 per cent of intrusions needed several hours or even longer to restore service. Power and utility companies cannot afford to ignore the threat posed by bad actors if they want to avoid detrimental levels of disruption.

Cyber security has become a major issue for the power sector, and awareness of this is growing among business leaders. Now, more and more space is dedicated to cyber issues on every request for proposal (RFP) document issued across the sector today. The reason? OT is no longer separated from the rest of the business network. It's a connected part of a wider ecosystem of enterprise applications and other devices. This visibility is what caused the energy sector to be on the receiving end of numerous cyber attacks in recent years.

Malware and ransomware have become key tools for cyber hackers, alongside more emerging attack vectors such as social engineering, which have become much more commonplace in the age of the internet. In 2015, the power grid in two stern oblasts of Ukraine was hacked, which resulted in power outages for roughly 230 000 consumers in Ukraine for 1-6 hours, and became a publicly acknowledged successful cyber attack on a power grid. Since then, power and energy organisations have become increasingly worried

about a repeat.

More recently, 25 per cent of utilities in the US were exposed to the 2021 SolarWinds cyber attack, with the Colonial Pipeline attack also taking place in that year. As one of the most comprehensive and critical oil pipelines in the US, it supplies half the fuel needed on the East Coast, from Texas to New Jersey. Employees were forced to shut down the pipeline to prevent ransomware from spreading, which started to affect computer systems, including billing and accounting. To regain control of its systems, the pipeline restarted operations after paying the hackers a ransom for the decryption key to be returned.

In delivering a response to these cyber security threats, power and utility companies face a raft of challenges. Traditionally, a utility or power company would procure, install and control the relevant resources and applications itself. Today, that's all changed – and the picture has become more complex. These companies typically work closely with a range of independent third parties. We are seeing a proliferation in independent power facilities, while at the same time the number of residential prosumers and IoT devices is ramping up. All these can be sources for intrusion and malware.

With more players involved in the process, there is also a growing quantity of information being passed between different stakeholders and project partners in the sector. More than ever, there's real-time data being shared about the status of the grid and in the operational planning phase.

New communication channels are having to be built all the time to facilitate these transfers and diverse communication protocols have to be deployed and kept up with. The proliferation of different parties involved in power and utility projects and programmes, also means that more people need to be factored into the equation, further increasing the complexity of the cyber security picture and the breadth of potential sources from which cyber threats could originate.

Added to this, power and utility companies are increasingly dependent on third-party software, including open software, which can further increase the cyber risk.

At the same time, advancement of this technology to enable quick communication means attackers are becoming more sophisticated and advanced in tandem. The internet has become an absolute pre-requisite for this level of communication. However, for comprehensive networks, it can take around 30 days before relevant data reaches the OT part of the network, meaning that it is essential for it to be protected throughout this period to avoid another attack on the scale of SolarWinds or the Colonial Pipeline.

Even if attackers are unable to take full control of a network or grid to

wreak havoc, the seamless transferring of data between different stakeholders can be distorted. Control centres, which likely rely on IoT technology and field data coming from different areas from all over a large region, then have inaccurate numbers to work from, leading to potential mistakes. Via this method, attackers have a second way of negatively impacting their operations, even where full-scale control isn't possible.

The reality is also that data used by power companies originates from two quite distinct segments of infrastructure. Some comes from the regular IT systems in use across the ecosystem and some from industrial control systems. Functionally, there is need to coordinate more and more between the two areas and pass data back and forth but businesses need to protect the boundary between the two, and encrypt and authenticate data being passed between them.

Maintenance can be an issue too. There is the need to coordinate between IT and OT systems but OT system patch and upgrade procedures are very different from those used in IT and can take days or even weeks to fully implement, adding to the cyber security risk.

Power and utility companies worldwide must take action to increase cyber resilience, in combination with physical security. It's a level of urgency that certainly hasn't escaped the radar of regulators. This year, the network and information security directive was updated by the European Union to cover the cyber security status across the continent. With the free flow of data across countries in the region, the directive is focused on Member States considering new areas of interest such as supply chain, vulnerability management, core internet and cyber hygiene within their wider strategies. This is part of a wider effort to harmonise cyber security practices across organisations in the sector.

As a result, many are increasingly investing large sums of money and a great deal of effort in training, backup systems and robust IT architectures to keep bad actors at bay and ensure a quick recovery from any attack. For example, business leaders are increasingly looking towards training programmes as a matter of course to ensure employees are conscious about any potential threats and take appropriate action to reduce cyber risk. Alongside this, spending on relevant technology is also rising as organisations explore how they can support their people.

Investment in digital software has been a given in recent years to drive global electrification and encourage distributed generation and distribution, microgrids, wind farms, battery technology, industrial site power island optimisation, direct air carbon capture and hydrogen fuel cells. Organisations are also making use of advanced data analytics and AI to respond quickly and effectively

to situations across a diverse system. Outage management systems have become more commonplace to help coordinate field repair work with central teams to resolve problems quickly.

Of equal importance is that this software follows strict rules on cyber security. Best-in-breed solutions will follow standards derived from the most sophisticated US and European directives on cyber security best practice. One prime example of this is the ISO27001 cyber security certificate, which is a key baseline for businesses in both regions. It's vital that any new integrations must be securely deployed and maintained so peace-of-mind is delivered.

Usually, the more protections added to such technology, the harder it is to operate its features. However, the most refined technology platforms from specialist vendors will allow organisations to build the architecture of their system in a way that doesn't prevent them from using it to its full capabilities.

For example, if several control centres are in operation, data from each can be backed up to another centre to enable a full recovery in the event of any breaches. It's essential that tools always meet that key balance between maintaining efficiency and process optimisation on one hand and delivering robust cyber security on the other. Tools must be backed up by expert service and support to ensure that utilities can make the best of them.

The number of high-profile attacks on power and utility companies in recent years has shone a spotlight on cyber security and where the industry is lacking the tools to ensure resiliency in operational technology. High-profile cases have proven that some of the most important infrastructures to support human life can be disrupted. The threat is two-fold when considering that attackers can not only take control of grids to cause catastrophic consequences but can interfere with the data being sent across entities as they share real-time information more freely and new communication channels continue to be established.

To achieve the needed cyber resilience, power and utility companies must invest equally in cyber security training to enhance the knowledge of employees and the supporting tools to ensure optimum protection. Many are already making use of tools that enable them to carve out their competitive advantage and market differentiation. As important is the fact the tools implemented effectively balance robust cyber security with efficient results, while also providing the flexibility for employees to tweak the software based on their organisation's operations. It's this flexibility that will allow businesses in the sector to confidently move forward.

*Josef Fantik is Principal Solutions Engineer at Open Systems International (OSI), an AspenTech company.*



# Advanced consumers can help drive the energy transition

Finland has plans to be net zero by 2035 and believes it can hit that target even sooner. Junior Isles visited the country to hear how, with the help of Siemens Smart Infrastructure, advanced consumers are becoming central to this accelerated energy revolution.

With electricity currently priced at around €2/MWh – a luxury for consumers in the current climate – and having a CO<sub>2</sub> content of 28g/kWh, Finland is in an enviable position. Starting from such an advanced place, it is hardly surprising that the country believes it can meet its 2035 net zero target ahead of schedule.

Much of Finland's base load generation comes from nuclear and according to transmission system operator (TSO), Fingrid, last year the country was ranked fifth globally for investment in onshore wind. The TSO also notes that electricity generated from wind will pass nuclear in 2027, and says that solar also has big potential.

Even when considering the task of decarbonising heat and industry, Finland is in many ways already ahead of the game. It is a highly electrified country – in fact it does not have a gas infrastructure – and since its electricity from the grid can already be categorised as “green”, any hydrogen produced directly from the grid would also be green. Using hydrogen in industries such as steelmaking, chemicals and aviation is seen as key to decarbonising economies.

Commenting on Finland's position during a recent press visit, Fingrid's CEO, Jukka Ruusonen said: “To tackle climate change, in Finland the main thing we should do is electrify everything as far as possible. We have a good starting point because Finland is already highly electrified. Historically we have long used electrical space heating and direct heating. But our heating for industry still uses fossil fuels; as does our transport. We need to have direct electrification where possible and for what we cannot electrify directly, we should use hydrogen.

“The target is no emissions from the electricity sector by 2035; I'm sure it will be even sooner. The regulations and goals are set by the politicians, but it's being driven by companies and private investors – faster than the politicians can imagine. The main

message to politicians is: don't interrupt, we are going there!”

But according to Ruusonen “the biggest revolution” will be on the consumption side, with “advanced customers” at the centre of the energy revolution. He said these advanced consumers are those that want to benefit from clean electricity in terms of both emission reduction and electricity price.

“If they are allowed to be active in all the markets that they need [to be in] and can see the right wholesale price, they can help us balance supply and demand in the system. Our vision is based on flexibility on the consumption side,” he said.

Several of these advanced consumer projects have sprung up in recent years. Journalists had the opportunity to visit some of the projects, which have used energy management systems installed by Siemens Smart Infrastructure to help optimise energy use in the facilities and offer services to the grid.

Sello is Finland's most sustainable shopping centre – the first in Finland, with carbon-neutral operations since 2019 – and one of the largest in Scandinavia. Siemens Smart Infrastructure was selected as technology partner to implement a building automation system in 2003 to improve the visitor experience with services such as building temperature management, and even ‘snow melting as a service’ to keep the outside premises safe during the winter.

With the system in place, Siemens Smart Infrastructure worked with Sello to gather data with the aim of seeing how the energy management system could deliver energy savings and subsequently be used as a virtual power plant (VPP). When considering the shopping centre's air conditioning systems, lighting systems, etc., it was found that there was scope for adjusting their operation – without affecting visitor comfort – in order to free-up power that could be exported to the grid. When combined with the building's backup gensets, which can

provide power during their mandatory monthly tests, the rooftop PV system, and the battery storage system, Sello is able to deliver more than 3.5 MW of power to the grid at short notice.

By using the shopping centre as a VPP, Sello has delivered €2.4 million in savings for its owners since its integration with the energy market in 2019. At the same time, it has provided €549 500 in benefits annually, with €350 000 of that annual total being earned from the flexibility market. Since 2010 energy consumption has been reduced by 40 per cent. Equally importantly, 4157 t of CO<sub>2</sub> has been saved between 2010 and 2021.

The project shows the business case for upgrading buildings over time so they can become more efficient and environmentally friendly to support the drive to net zero.

An installation at the Sinebrychoff brewery in Kerava, greater Helsinki, is another good example of this growing trend in Finland. Sinebrychoff is one of Finland's leading breweries, producing over 300 million litres of beer, cider, soft and energy drinks annually.

The brewery began its journey to becoming carbon neutral in 2015 and over the years has optimised systems and processes including heat recovery, air conditioning and lighting. When its energy partner Keravan Energia stopped using peat in its energy production, the brewery was able to produce its beverages using 100 per cent renewable energy. This meant that in 2021, it became the first brewery in Finland to become carbon neutral.

The brewing process requires significant amounts of heat, provided by a wood chip-fired boiler. Heat pumps have also been added to the facility to recover heat from wastewater to provide additional heat that is used to pre-heat process water and heating parts of the building. In 2022, the brewery consumed 25.9 GWh of heat. Some 8.2 MW of this was gathered and recycled. Carbon dioxide is also

captured and reused for carbonating beverages.

This all calls for a high level of automation, and also requires a significant amount of electricity. In 2020 the owners contracted Siemens to build an intelligent energy management system that would also allow the facility to be used as a virtual power plant.

To support the next level of energy optimisation, Siemens developed a unique business model. At the heart of the solution, implemented at Sinebrychoff's plant, is a VPP that uses the latest software and energy storage technology, to create one of the first examples of power flexibility in an industrial site.

The virtual intelligent energy management system includes a modular electricity storage facility, which consists of numerous 2m x 2m x 2m batteries. This 20 MWh electricity storage system was connected to the grid at the end of October 2021 and to the brewery in March 2022.

The connection to the grid allows for active participation in the energy market, flexibility in consumption and a reduction in the use of carbon-based backup power nationally, which in turn contributes to Finland's goal of becoming carbon neutral by 2035. The installation means Sinebrychoff benefits from lower electricity costs and improved power quality in production facilities. Notably, Siemens Smart executed the project as an ‘energy storage as a service’ contract, meaning that Sinebrychoff could install and benefit from the asset with minimal expense and investment risk.

Constantin Ginet, Head of Energy Performance Services, Siemens Smart Infrastructure commented: “This is a service model in two ways. We finance and manage the assets and sell it as a service; so it's an opex (operational expenditure) model instead of a capex (capital expenditure) [model]. Secondly, we also have the ‘service’ portion of it, which is very important. In our case, we are ensuring we are selling or utilising the asset according to what happens in real-time in the market, as well as looking at the day-ahead, to plan how we manage the asset. And that's a service. Prices are changing all the time, so there are incentives to operate things differently. But it's not only a way of making money, it also helps to operate the grid more efficiently and in a carbon efficient way.”

Through its collaboration with Siemens Smart, Sinebrychoff, like Sello, is demonstrating how industrial and commercial energy users can assist in the journey to net zero in a way that also makes commercial sense.

Ginet concluded: “If you produce exactly what you need for the process, you can save massive amounts of energy. So the very first step is to introduce smart controls. This saves a lot of money and CO<sub>2</sub>. Then along the way you can add to it – EV charging and batteries, and then the flexibility market. And I think the journey is not over... A big part of the evolution of the energy transition is happening at the edge... This is a great example because it's a frontrunner and we're implementing more projects of this nature, with the core being around local optimisation and energy flexibility as a service.”

**The virtual intelligent energy management system at the Sinebrychoff brewery includes a modular electricity storage facility, which consists of numerous 2m x 2m x 2m batteries**



# Taking the clean energy transition underground

With the global focus on renewable energy, Enhanced Geothermal Systems (EGS) can take centre-stage as the ideal solution for base load power, dispatchability and energy storage. RegenBiomass' **Phil Cruver** explains how the synergy between EGS and a technology known as Aquifer Pumped Storage could be the ideal solution for supporting the global energy transition, especially in arid parts of Africa.

Geothermal energy holds immense potential, but its widespread utilisation has been hindered by past technological limitations. However, a transformative shift is occurring with the rapid development of Enhanced Geothermal Systems (EGS). These systems offer a solution for balancing the increasing influx of renewables into the electric grid, providing baseload power, dispatchability, and energy storage.

By employing advanced drilling techniques and reservoir engineering, EGS taps into the abundant heat beneath the Earth's surface, making it a promising contender for meeting future energy demands.

EGS essentially creates artificial reservoirs where hot rock exists but lacks natural permeability or fluid saturation. Through controlled fluid injection into the subsurface, fractures are created, enabling the establishment of permeability. This breakthrough technology allows access to previously untapped geothermal resources, even in regions considered inaccessible. In the transition to electric energy, EGS emerges as a reliable and virtually limitless energy source, setting it apart from solar and wind power due to its constant availability and dependability.

Driving the future innovation and expansion of EGS is the recently passed \$369 billion US Inflation Reduction Act (IRA). This comprehensive legislation introduces a range of incentives designed to encourage investment in zero-emission technologies in the United States. The IRA includes an investment tax credit (ITC) of 30 per cent that went into effect in January 2023. Additionally, there are stackable bonus credits, allowing monetisation of up to 70 per cent of project costs, including a 20

per cent bonus for projects deployed in low-income underserved areas. The significant support provided by this historic legislation, through monumental federal tax incentives, will attract private sector capital for the development and deployment of innovative technologies, accelerating the energy transition.

Energy & Sustainability Expert Mike Matson of the Boston Consulting Group explained: "EGS offers a more favorable Levelised Cost of Energy (LCOE) compared to other conventional and renewable energy sources when the IRA tax credits are included. As shown in the chart created by the Boston Consulting Group, the LCOE for onshore wind, after tax credits, is estimated at \$15, but it would require an additional \$110 for storage, making it more than double the LCOE of EGS for providing reliable electricity."

California, a leading force in renewable energy, exemplifies the increasing urgency for energy storage. As the state's solar and wind power generation grows, there is a critical need for affordable and effective energy storage technologies to balance utility loads. With high electricity rates and a significant portion of energy imports, California may require up to 14 GW of energy storage by 2025 to maintain a reliable grid.

In this context, pumped storage emerges as a clean, scalable, and sustainable solution, outperforming battery storage limitations. While batteries typically provide backup power for only a few hours and have a restricted lifetime due to limited charging cycles, pumped storage offers longer-term storage capabilities. Additionally, the reliance on lithium batteries exacerbates material and mineral shortages and poses challenges for disposal.

Aquifer Pumped Storage (APS), a concept developed by researchers at the University of Colorado-Boulder (UC-B) in 2007, offers a promising energy storage and electricity generation solution.

APS utilises a reciprocal pump-turbine unit located in an aquifer, simultaneously pumping water to the surface reservoir and generating electricity as the released water flows through the turbine. By coupling APS with renewable generation sources such as wind turbines or solar panels, energy can be stored in the form of gravitational potential energy. The ability to generate electricity from stored water provides an effective means of balancing the grid and meeting energy demands. While APS was not commercialised at the time due to limited demand for energy storage, the current landscape, supported by the IRA's funding and tax credits, provides an opportunity for further development and deployment.

Regenbiomass is at the forefront of developing Timber & Carbon Farms in California and Africa. Our mission is to produce regenerative lumber and facilitate decarbonisation through afforestation. In 2022, the company embarked on a pilot project that showcased the potential of our vision. By growing 800 paulownia trees on marginal land in the desert of Southern California, we not only demonstrated the viability of our approach but also received vital funding through a USDA grant.

It was during this project that we stumbled upon the concept of aquifer pumped storage, a remarkable discovery that led us to delve deeper into the emerging EGS industry and its connection to the timely IRA tax benefits.

The alarming statistics surrounding deforestation and electricity deprivation in Africa highlight the urgency of our work. Among the ten countries worldwide with the largest annual net loss of forested area, six are in Africa, which sadly witnesses an average loss of 40 000 km<sup>2</sup> of forests each year. Furthermore, with a population of approximately 1.2 billion, half of Africa's inhabitants are deprived of electricity, hindering progress and development.

However, amidst these challenges lies a glimmer of hope and the nexus with aquifer pumped storage. Many of the poorest African nations are blessed with abundant underground aquifers, which hold vast reserves of freshwater. These aquifers present not only a potential solution for irrigation, afforestation, and access to clean water but also offer an opportunity for generating renewable electric power. By tapping into these hidden treasures, we can transform the lives of communities and contribute to sustainable development.

Africa, with its growing population and abundant natural resources, is poised to shape the global energy transition. By 2050, Africa's population is projected to reach 2.5 billion and its combined business and consumer spending to exceed \$16 trillion. The continent's vast reserves of precious metals and hydrocarbons, coupled with its untapped solar, wind, and hydroelectric potential, position Africa as a key player in driving renewable energy solutions. To unlock its full potential, energy storage becomes crucial.

The Sahel region of Africa, known for its arid climate, also holds vast underground treasures. Massive aquifers beneath the surface provide potential solutions to water scarcity in the region. Moreover, the Sahel region exhibits significant geothermal potential, offering a clean and sustainable energy source. Pilot projects are currently underway to validate the utilisation of geothermal power generation alongside agricultural irrigation from aquifers. Collaboration among geologists, hydrologists, and thermodynamic experts is essential in exploring the potential of harnessing the "heat beneath our feet" to support the global energy transition.

Enhanced Geothermal Systems offer a promising solution to meet the increasing energy needs of the future. With advanced drilling techniques and reservoir engineering, EGS has the potential to tap into previously untapped geothermal resources, providing a reliable and uninterrupted power supply. Supported by the Inflation Reduction Act (IRA) and federal tax incentives, the development and deployment of EGS are expected to accelerate, offering a low cost of energy compared to other conventional and renewable sources.

Additionally, pumped storage, such as Aquifer Pumped Storage, presents a clean and sustainable solution for energy storage, complementing the intermittent nature of renewable energy sources. Africa, with its young and growing population, abundant natural resources, and immense potential for renewable energy, holds the key to shaping the global energy landscape.

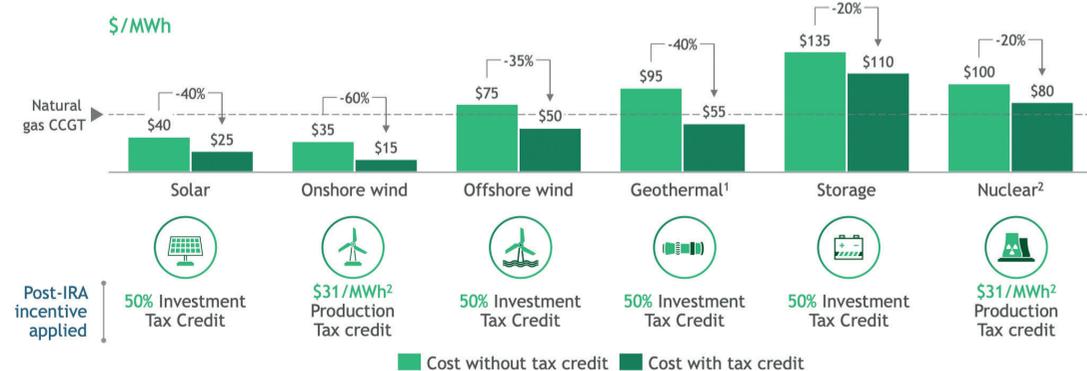
By harnessing geothermal energy and exploring aquifer-based solutions, the continent can drive the transition to a renewable energy future while addressing water scarcity challenges. The synergy between geothermal energy and aquifer utilisation presents a unique opportunity to propel Africa towards sustainable development and position it as a leading player in the global energy transition.

*Phil Cruver is President at California-based company RegenBiomass.*

LCOE for onshore wind, after tax credits, is estimated at \$15, but it would require an additional \$110 for storage, making it more than double the LCOE of EGS for providing reliable electricity

## Funding reduces the cost of clean technologies, in many cases eliminating the green premium and making them cheaper than fossil fuel alternatives

### Levelized Cost of Energy (LCOE) pre- and post-tax credits



1. Geothermal values reflect average of traditional flash and EGS technologies 2. New small modular reactor (SMR); 2. Assumes \$15/MWh incentive, inflation adjusted and with bonuses; Note: All technologies assume base + prevailing wage bonus + domestic production bonus + energy community bonus. All numbers rounded Source: Lazard, IEA, BCG Analysis



Junior Isles

# Back to the future

**K**ristian Ruby, Eurelectric's Secretary General, summed up perfectly the challenges facing the EU energy market against a turbulent global geopolitical backdrop. "How do we get back to the future without repeating mistakes of the past?"

Speaking at this year's Eurelectric Power Summit, organised by the association that represents Europe's electric utilities, Ruby's address came as EU ministers were engaged in negotiations on reaching an agreement on a new electricity market design.

Redesigning a decades-old market,

which no longer reflects an energy mix that now has a significant and growing amount of renewables, has now become urgent – especially since high gas prices, exacerbated by Russia's invasion of Ukraine exposed Europe's dependence on Russian gas and the shortcomings of the intrinsic link between electricity and gas prices.

Citing runaway inflation, the re-opening of coal plants, war returning to Europe, nuclear threats and rising protectionism, Ruby said: "It is like being beamed back in time to the worst parts of the 20th Century... in a world with ideological rivalry, geopolitical

tension, it is critical that we learn from our mistakes. On that note, how did it happen that we got so dependent on Russian gas? How?"

The reasons are several. But in the final analysis, Europe, complacent and distracted by global events, simply took its eye off the ball. The result is a changing economic mantra. As Ruby put it: "For many years, it was 'just in time'; now it seems to be 'just in case'."

Balancing energy security against affordability for citizens, while not forgetting the darkening cloud of climate change is not an easy conundrum to solve. But, as Ruby, said: "Energy independence and climate action are to a large extent complementary. Even though the current turmoil complicates things in the short-term, it clarifies things in the long-term. In the new balance of power, homegrown electricity is industrial power, it's political power. And let's be clear, electricity has to be reliable. That means renewables. But it also means a system in which to integrate renewables – infrastructure, flexible, firm capacity."

EU member states are on the same page here. The European Commission's REPowerEU plan adopted in May last year in response to the hardships and global energy market disruption caused by Russia's invasion of Ukraine is based on three pillars: saving energy and becoming more energy efficient; increasing renewables; and reducing dependence on Russian gas by sourcing alternative gas suppliers whilst growing the hydrogen economy.

Ditte Juul Jørgensen, the Director-General for Energy at the European said at the Power Summit: "One of the lessons we learned is that the [energy] crisis response had to be aligned with the response to the climate crisis. We also learned that our economic security is very much about energy security and climate security. So we need to make sure that our policy objectives work together."

She noted, however, that the lessons learned are not just about the immediate response but are also about looking at the longer term impacts of the crisis. "How do we develop and design our energy markets; what have we learned and what is necessary?" she said.

Accelerating the green transition requires a stable regulatory framework that incentivises investment while protecting consumers. It is one of the main goals of the new electricity market design.

In her keynote address, Jørgensen said: "I hope we all agree that the electricity market design we have has served us very, very, well for decades. It has given energy security – the design of the common electricity market has made sure that the electrons can go where they are needed. We need to protect that and take that with us into the future."

"However, there are elements of the market that could be strengthened – that could be designed in a cleverer way to help facilitate the transition and speed up the deployment of renewable energy, but also protect consumers and create the best possible investment conditions for project developers and for those who operate in the market."

A proposal aimed at achieving this was put forward earlier this year. In short, the objectives are to: separate the bill that consumers pay from the short-term market volatility; accelerate renewables and phase-out gas;

protect electricity consumers from market manipulation; and finally empower consumers with the possibility to choose their energy mix and decide on the type of energy tariffs and contractual arrangements that work for them.

It was hoped that ministers would rubber stamp the proposal last month but reaching agreement between 27 countries with differing economies and needs is always complicated. While the direction is common and the landing zone is essentially agreed, the devil proved to be in the detail.

While ministers at a meeting in Luxembourg agreed on a law to prevent market manipulation and tentatively agreed on some elements of market reform, they left with major outstanding issues over subsidies for backup coal power generation and the lifetime extension of existing nuclear power plants.

After several hours of negotiation, France and Germany remained at odds over whether state-backed contracts that ensure electricity producers only charge a set price for power, with additional profits being returned, should be applied to existing operators. The move would allow France to subsidise its nuclear fleet more easily.

Germany, along with member states including Austria and Luxembourg, argued that that allowances for nuclear power risk pulling funding away from wind, solar and other renewable energy generators.

Further, in a move widely criticised by several ministers, Sweden, which at present chairs the EU's rotating presidency, added an exemption to the market reform proposal. The exemption, pushed by Poland, would permit coal power plants to receive state support for providing a steady flow of energy when other forms of energy were not available. Such a request from Poland should not have come as a surprise; the country relies on coal for about 70 per cent of its energy mix.

Teresa Ribera, Spain's Minister for Ecological Transition, commented that some "comfort" had to be given to Poland but also stressed policymakers should not give "contradictory signals to the market". Robert Habeck, Germany's vice-chancellor and Minister for Energy, told journalists that the exemption was "wrong [and] not compatible with the climate protection goals of the European Union".

"It's not that coal power plants should not run... this counts as well for Germany but to give them an extra subsidy system goes too far," he told other EU ministers at the start of the EU energy council.

Habeck makes a fair and sensible point. Creating a subsidy system for coal seems a huge backward step, especially when considering the myriad reports and evidence that climate change is here and now.

The temptation to hang on to, or revert to the 'tried and tested', especially when things get tough is human nature. But now is not the time to go back to the dark ages. Nor is it the time for silo mentality. The EU's response to the crisis and succeeding in what seemed like the high on impossible task of cutting reliance on Russian gas almost overnight has proven that there is strength in unified resolve.

Now is the time for European ministers to be united in their conviction and follow through in breaking with the past to find a way back to the future.

