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Time for action

A study of Great Britain's power sector shows the progress that is needed within the next 1-3 years for the UK to avoid missing its promised 2035 net zero carbon emissions target. *Page 13*

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Renewables to meet all electricity demand growth in next two years

Sadamori is "encouraged by the rising share of renewables"

Although electricity demand has slowed it is predicted to pick up again in 2024, with all the new growth being met by renewables, according to the IEA. **Junior Isles**

The strong deployment of renewables worldwide means they are now on track to meet all the additional growth in global electricity demand over the next two years, according to the latest 'Electricity Market Report' from the International Energy Agency (IEA).

By 2024, renewables' share of global electricity generation will exceed one-third. And depending on weather conditions, 2024 could well become the first year in which more electricity is generated worldwide from renewables than from coal, said the report.

At the same time, electricity generated from fossil fuels is expected to decline over the next two years. Electricity generated from oil is projected to fall significantly, while coal fired generation will slightly decline in 2023 and 2024, after rising 1.7 per cent in 2022.

"The world's need for electricity is set to grow strongly in the years to come. The global increase in demand through 2024 is expected to amount to about three times the current electricity consumption of Germany," said Keisuke Sadamori, the IEA's Director for Energy Markets and Security. "And we're encouraged to see renewables accounting for a rising share of electricity generation, resulting in declines in the use of fossil fuels for power generation. Now is the time for policy makers and the private sector to build on this momentum to ensure emissions from the power sector go into sustained decline."

According to the IEA, overall growth in electricity demand worldwide is expected to ease in 2023 as advanced economies grapple with the ongoing effects of the global energy crisis and an economic slowdown.

The report's July update finds that electricity demand in the US is expected to decline by almost 2 per cent this year while demand in Japan is forecast to fall by 3 per cent. Electricity demand in the European Union is set to drop by 3 per cent, similar to the decrease recorded in 2022. Following these two consecutive declines, which together amount to the EU's largest slump in demand on record, EU electricity consumption is poised to drop to levels last seen in 2002.

As a result, global electricity demand is set to increase by slightly less than 2 per cent this year, down from a rate of 2.3 per cent in 2022. But assuming an improving world economic

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G20 move to reduce fossil fuel use hits roadblock

Several countries led by Saudi Arabia have blocked a move by G20 nations to cut the use of fossil fuels.

A summary document issued after the meeting in Goa, India, said that some member states had emphasised the need to cut back the use of fossil fuels without the capture of emissions "in line with different national circumstances". But others "had different views on the matter".

The EU has been a leading supporter of efforts to shift away from burning fossil fuels, which account for about three-quarters of all greenhouse gas emissions.

The G7 nations have already agreed to accelerate the phasing out of fossil fuels but in the past, Russia and China have opposed such a move.

Speaking at the end of the Goa meeting, RK Singh, India's Minister of Power, acknowledged that the reduction of fossil fuel production was a "sticking point" in the discussions.

Amid a year of ongoing geopolitical tensions with energy and supply chains at the heart, record growth in renewable energy and a marked slowdown of fossil fuel demand growth, the energy ministerial was an important gauge of how the geopolitics of the energy transition are playing out.

Commenting on the meeting, Alden Meyer, Senior Associate at E3G, the independent climate change think-tank, said: "With temperature records being set daily around the world… the world needed to hear a clarion call to action… Instead, what we got was very weak tea indeed."

Energy ministers were also unable to agree on setting a global goal of at least tripling renewable energy capacity to 11 TW by 2030, together with implementation strategies to achieve that goal. They did, however, agree to step up energy efficiency and deployment of distributed renewable energy technologies. They also recognised the need to increase basic energy access and provide low-cost finance for the clean energy transition in developing countries.

As much as 40 per cent of emissions reductions are expected to happen in developing economies, which currently receive less than 20 per cent of clean energy investment. The new initiative to facilitate access to low-cost finance for energy transition is thus a critical step. Multilateral development banks need to respond to this in October at the World Bank annual meetings and the Joint-MDB Statement at COP."

Madhura Joshi, Senior Associate at E3G, said: "The Indian G20 presidency brought a positive agenda to the table – accelerating energy efficiency and renewable energy, phasing out fossil fuels, and increasing finance for the energy transition – some of these discussed for the first time in the G20. But the final text marks out the divisions between countries."

Continued from Page 1

outlook, demand growth is expected to pick up again in 2024, rebounding to 3.3 per cent, according to the IEA's latest projections.

Solar PV will be key in meeting the new demand, with the technology generating a record of nearly 1300 TWh in 2022, up 26 per cent from 2021 and logging the largest absolute generation growth of all renewable technologies in 2022.

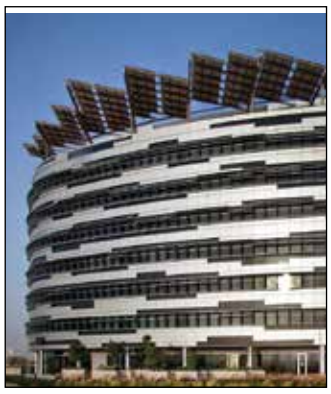
In its recently released 2023 update of 'Tracking Clean Energy Progress' solar PV has been upgraded to "on track", as its progress now aligns with milestones consistent with net zero ambitions.

The update warned, however, that while there has been progress across all of the 50-plus components of the energy system evaluated in Tracking Clean Energy Progress, the majority are not yet on a path consistent with net zero emissions by 2050.

In a separate report, research by Rocky Mountain Institute (RMI), in partnership with Bezos Earth Fund predict that solar and wind will supply over a third of all power by 2030.

Complementary research from Systems Change Lab shows eight countries have already grown solar and wind generation faster than what is needed to limit global warming to 1.5°C.

RMI have forecasted that by 2030, solar and wind is to supply over a third of all global electricity, up from around 12 per cent from early July 2023. Forecasts show this would see solar and wind generate 12 000-14 000 TWh by 2030, 3-4 times higher compared with 2022 levels. It would also surpass recent calls running up to COP28 for a tripling of total renewable energy capacity by 2030.



IRENA says 1000 GW of renewables must be added annually by 2030

In June, the International Renewable Energy Agency (IRENA) said an average of 1000 GW of renewable power capacity must be added annually by 2030, and the direct use of renewables in end-use sectors must be significantly increased.

According to RMI analysis fossil fuel demand for electricity will steeply decline, down as much as 30 per cent from the 2022 peak by 2030, as renewable electricity further outcompetes hydrocarbons on cost.

RMI predicts that what is already the cheapest form of electricity in history will roughly halve in price again by 2030, falling to as low as $20/MWh for solar from over $40MWh currently.

The price of renewable electricity has plummeted over the past 10 years, overcoming a key barrier to widespread deployment. Solar and battery costs have fallen 80 per cent between 2012 and 2022, while offshore wind costs are down 73 per cent and onshore wind costs are 57 per cent down, BNEF data shows.

EU adopts formal position on electricity market reform

The European Parliament has supported a targeted approach to reforming its electricity market in an effort to avoid market fragmentation and prepare for a system that will be largely driven by renewables.

Junior Isles

The European Parliament's Committee on Industry, Research and Energy (ITRE) decision to formally back the European Commission's proposal for a targeted electricity market reform, has been hailed as a strong positive signal for renewable investment and flexibility support schemes.

Last month the Committee voted to maintain the merit order system and to avoid infra-marginal revenue caps, which fragment the internal energy market and undermine investor confidence. Crucially, the agreement allows for different routes to market for renewable electricity: Contracts for Difference, renewable Power Purchase Agreements, and merchant investments.

Following the invasion of Ukraine, the EU is looking to reform its electricity market to promote energy independence and reduce volatility in electricity prices.

Prior to the vote the EU's energy regulator had warned against a repeat of the untargeted measures that governments used to curb soaring prices during last year's energy crisis, saying they could increase fossil fuel use and send the wrong signal to investors.

WindEurope welcomed the European Parliament's ITRE committee vote. "Crucially the ITRE committee voted against enshrining in law revenue caps for infra-marginal generators of electricity. This will help put an end to the patchwork of national market interventions. That's good news to uphold the integrity of the wholesale power markets in Europe. And will help unlock stalling investments in renewables," it said.

The ITRE committee also supported the Transmission Access Guarantees ("TAG") which will help de-risk investments in hybrid offshore wind farms. This will clear the way for hybrid offshore wind farms – that have connections to one or more countries – to become a central building block of Europe's offshore wind expansion. Hybrid offshore wind farms are key to building up a meshed and interconnected offshore wind grid, which allows for more efficient energy flows and more coordinated approaches to grid planning.

The Parliament's position introduces a range of new provisions to support the deployment of flexible technologies, such as energy storage. Member States would now have the powers to set up non-fossil flexibility support schemes, which provide energy storage a solid business case. The Commission will also introduce a Strategy for Energy Storage from 2025, to ensure a harmonised approach across the EU.

Thomas Lewis, Policy Officer at European Association for Storage of Energy (EASE) said: "The introduction of flexibility support schemes will give investors confidence in energy storage technologies to provide the flexibility needed to integrate further renewable energy.

"EASE is pleased to see that this deal ensures in-depth assessments for flexibility at both the national and European level, and crucially introduces a Union Strategy on Demand Response and Energy Storage from 2025 with the possibility of EU-level targets."

With the ITRE Committee's vote, the European Parliament is almost ready to enter negotiations with the Member States and the EU Commission (trilogues) on a final deal.

In parallel the 27 EU Member States have not yet finalised and agreed their negotiating mandate on the EU electricity market design revision. It is expected they will reach agreement as well in autumn so trilogues can begin immediately .

The EU electricity market design reform needs to be finalised by the end of 2023 as mandated by EU Heads of State and Government earlier this year.

Offshore wind turbine demand could outstrip supply

Offshore wind is critical to Europe's energy transition plans but a turbine supply headache could be on the horizon for the industry before the end of the decade, according to Rystad Energy.

Modelling by the research and business intelligence company shows that demand for offshore turbine towers will outstrip manufacturing capacity in 2028.

Rystad Energy's offshore wind capacity outlook shows that wind tower manufacturing capacity will keep pace and exceed demand before 2028. However, that year is the turning point, and in 2029, demand will surpass manufacturing capacity by a significant margin. Steel demand for offshore wind towers will total more than 1.7 million tonnes in 2029, but manufacturing capacity will be a maximum of around 1.3 million tonnes, meaning supply can only meet about 70 per cent of demand.

If Europe is to reverse this trend, it says, manufacturers need to initiate expansion in the next two years, since it takes between two and three years to build new facilities. These forecasts assume no major steel shortage, so manufacturers can work at full capacity. If a shortage materialises, Europe could face a supply issue even earlier than expected.

"Turbine sizes keep growing as the importance of offshore wind to the global power grid accelerates, and tower demand is projected to surge accordingly," said Alexander Flotre, Vice President, Rystad Energy. "This is a golden opportunity for manufacturers to capitalise on increased demand, but new capacity needs to be added imminently if Europe is going to avoid a supply headache.

"Since constructing a tower manufacturing facility can take three years, European producers must initiate more expansions within the next two years, at the latest. They should not find this problematic as wind towers are made of steel, with no particularly complex or specialised machinery required."

While the average turbine capacity fixed in Europe in 2023 is expected to reach almost 10 MW, Rystad Energy estimates that 50 per cent of the total turbines installed between 2029 and 2035 will be bigger than 14 MW, with some projects forecasting to build 20 MW at the beginning of 2030.

The news comes as a new report from Bloomberg Intelligence (BI) forecasts that global wind installations could jump to about 110 GW this year vs. a lull of 87 GW in 2022, and that a double-digit growth pace could be sustained in 2024-26. Nearly half of this year's capacity additions are likely to be in China, according to BI's 'Global Wind Energy Mid-year Outlook'.

Denmark seeks alternatives to "expensive" North Sea Energy Island

The Danish government, the transmission system operator (TSO) Energinet, and other relevant agencies are looking at alternatives to building an artificial North Sea Energy Island after concluding it would be too expensive.

The government said that after "the balance sheet has been settled" for the current concept, it proved to be economically challenging. The Danish Energy Agency (DEA) estimated that the State would have to spend around DKK 50 billion ($7.39 billion) for the entire artificial island project. "In its current form, the costs to the state are too great and the risks too many," said the government in a press release.

Energinet will now help investigate whether the energy island should be established on a foundation made up of several large platforms. Commissioned by the Danish Ministry of Climate, Energy and Utilities, Energinet will be performing analyses over the coming months to investigate whether or not multiple platforms are an economically and technically more sustainable alternative to building an artificial island.

Energinet also said that, in addition to their expected economic benefits, platforms with converter substations and other high-voltage technology equipment are likely to become the future standard for energy islands.

Hanne Storm Edlefsen, Vice President, Energy Islands, Energinet, explained: "The functionality of the electricity transmission part, which is the core of the North Sea Energy Island, remains unchanged whether you choose an island or platform structure.

"Moreover, another great benefit of the platform structure is that several of our European TSO colleagues have chosen this path and have already placed orders in the market. This applies, for example, to the German TSO TenneT, which has signed contracts for converter substations to handle a total of 22 GW of offshore wind power. A large part of this order involves newly developed converter substations on offshore platforms, each of which is able to handle 2 GW."

The artificial island was planned to be constructed 80 km off the peninsula of Jutland.

The first phase would involve the connection of 3 GW of wind power from wind farms. This was subsequently expected to be extended to a capacity of 10 GW of wind power.

The island was also to be prepared with facilities for producing hydrogen using electricity from the wind farms.

News of the change of plan came as some questioned the role of hydrogen in Portugal's National Plan for Energy and Climate 2030.

Zero association recently claimed that the role of hydrogen has been "exaggerated" in the Plan.

"Injecting hydrogen into the natural gas grid is a huge efficiency mistake and prolongs fossil fuel use. The priority in the use of green hydrogen, produced from renewable sources, should be the use in industrial sectors where high temperature combustion is essential and where there is a replacement of the use of fossil fuels by hydrogen in the process," said Zero.

Canada's provinces take different options in low-carbon power generation

- East coast prepares for offshore wind
- Ontario claims leading position on small modular reactors

Janet Wood

Offshore of Nova Scotia, Canada, on the east coast, DP Energy and SBM Offshore have formed a joint venture to pursue floating wind opportunities.

The Nova Scotia government announced last year that it would offer seabed leases for 5 GW of offshore wind energy by 2030. In May this year, Canada's Minister of Natural Resources began legislating on regulations that will enable offshore wind development in Nova Scotia, Newfoundland and Labrador.

"Our 30-year approach to renewable project development puts the environment and local communities front and centre. Floating offshore wind is an exciting new opportunity for Nova Scotia and will bring much needed new investment which can add to coastal economies and communities," said Simon De Pietro, CEO of DP Energy.

Further west, Ontario Power Generation is investing in nuclear, and has announced the start of planning and licensing for three small modular reactors (SMRs) at the Darlington New Nuclear Project site. Four GE Hitachi Nuclear Energy BWRX-300 units are now planned for deployment at the site east of Toronto. OPG recently announced the first commercial contract for a grid-scale SMR in North America at Darlington.

"OPG and the Province of Ontario have staked a leading position in the deployment of new nuclear with a project that will offer significant energy and economic benefits to Ontario and Canada," said Jay Wileman, President & CEO, GEH.

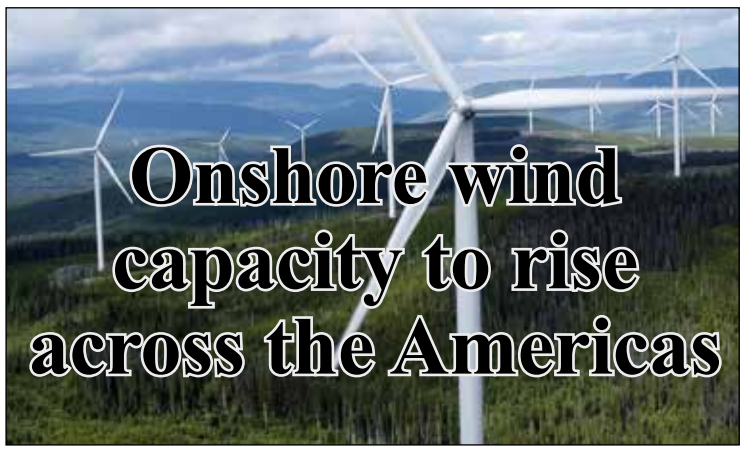
The western province of Alberta announced $160 million in grants for nine solar power projects totalling 163 MW, praising the "immense potential for solar power generation" in the state. The projects also have 48 MW of battery storage in total.

The Honourable Jonathan Wilkinson, Canada's Minister of Natural Resources, commented: "By working with Indigenous partners and industry, the Government of Canada is helping to unlock the economic potential of our clean technologies as we advance toward a prosperous net-zero future."

Meanwhile the Canada Pension Plan Investment Board (CPP Investments) and hydrogen project developer Power2X have announced a long-term investment partnership aimed at advancing Power2X's leading role in the global clean energy transition.

The two companies plan to invest €130 million to support Power2X's mission to become a long-term developer, owner and operator of green hydrogen, methanol and ammonia projects.

Bruce Hogg, Managing Director, Head of Sustainable Energies, CPP Investments, said: "Investing in Power2X is fully aligned with our ambition to play a leading role in the energy transition."



South America's onshore wind capacity will increase by about 41.2 GW, with around half that being built in Brazil, according to a new report from Wood Mackenzie. But the US will see onshore wind boosted even faster – up by 19.8 GW by 2026 – according to the most recent data from the US Federal Energy Regulatory Commission (FERC)

FERC says that in three years, wind will account for 12.4 per cent of US installed capacity. Factoring in FERC's forecasts for solar, hydropower, geothermal and biomass, renewable energy would expand from 28.01 per cent of installed capacity to nearly 34 per cent by May 2026.

Wood Mackenzie says South America will more than double its onshore wind power generation capacity to 75 GW from nearly 34 GW at the start of 2023. Brazil is expected to be 56 per cent of growth and 23 GW of capacity.

Karys Prado, Senior Research Analyst, Power & Renewables with Wood Mackenzie, said: "We will see large off-takers from the commercial and industrial sectors shifting away from auctions and migrating to the unregulated (or so-called free) market to seek favourable power purchase agreements. This will significantly drive buildout in South America moving forward, mostly in Argentina, Brazil, Chile and Peru. However, less mature markets like Colombia and Ecuador will continue to rely on the regulated market."

Chilean organisations tender for new renewables

- Annual auctions expected to bring forward more wind and solar
- First hybrid project for Antofagasta

Janet Wood

The Chilean Energy Commission (CNE) has released bidding rules for its 2023 electricity tender.

The annual tender auctions are not specifically aimed at renewables, but at meeting future demand from households and small business customers, so they are awarded on the basis of energy, not capacity. Domestic and international companies compete to offer electricity to qualified distributors from 2027. In recent years, the auctions have been filled by wind and solar generation, which is also expected to fill this year's total of 5400 GWh.

This year, the tender is designed to incentivise energy storage and non-variable renewables, which will allow hydroelectric projects to participate. Storage projects must have a minimum duration of four hours, CNE said. The term of the power purchase agreements (PPAs) has been increased from 15 to 20 years.

The total volume of electricity is divided into two blocks. Electricity supply for block 1 (1800 GWh) should be supplied between January 1, 2027 and 31 December 2046. Block 2 (3600 GWh), will run one year later.

Interested parties have to submit their proposals on 13 December and the winners will be announced in January.

Chile's Ministry of National Assets has also tendered for new renewables and EDP Renovaveis won the tender. As a result it will develop a 323 MW wind, solar, and storage hybrid project in Chile's northern Antofagasta region. The Taltal Wind Reserve project will be one of the first in Chile to incorporate wind, solar and batteries in a single connection to the grid.

EDPR said the scheme would use around 2850 hectares of land in the commune of Taltal for the development and operation of green energy sources for a period of over 40 years.

Enrique Alvarez-Uria, Country Manager of EDPR in Chile, said: "Our presence in the Antofagasta region presents an opportunity to grow our footprint in the country, bringing along environmental, social, and economic benefits while also addressing the energy needs of the mining sector through decarbonisation."

EDPR now has more than 500 MW of renewable energy projects in various stages of development across Chile.

Meanwhile, Enel Chile has agreed to sell 416 MW of solar farms to Sonnedix Power Holdings Ltd for $550 million.

Arcadia owns four solar farms in the Chilean regions of Atacama and Antofagasta. These are the Diego de Almagro (36 MW), Carrera Pinto (97 MW), Pampa Solar Norte (79 MW) and the Domeyko (204 MW). Together, the plants generate close to 1 TWh of electricity per year.

New Jersey signs off on Ocean Wind offshore wind farm

New Jersey's first offshore wind farm, the 1.1 GW Ocean Wind 1 project, is set to begin construction after it got the green light from federal authorities and state Governor Phil Murphy signed a bill that will ease tax obligations for developer Ørsted.

Joseph L. Fiordaliso, President of the New Jersey Board of Public Utilities (NJBPU), said: "Not only is a thriving offshore wind industry vital for the future of our environment, but it will provide a significant boost to our state's economy including the creation of a supply chain hub in south Jersey and thousands of good paying union jobs."

The bill will enable Ocean Wind 1 to access federal tax credits. But Atlantic Shores Offshore Wind, a joint venture between Shell and EDF Renewables which is also developing offshore wind projects in the state, has called for "an industry-wide solution" on tax obligations in the state.

The New Jersey state governor's goal is 11 GW of offshore wind capacity by 2040. Offshore wind farms in permitting or in planning include the 1148 MW Ocean Wind 2, as well as two projects being developed by Atlantic Shores Renewables rated at 1.5 GW and 1.4 GW.

US northeast states seek federal support to plan power grid expansion

Eight New England states including New York and New Jersey have asked for support from the federal government on interregional transmission planning to accommodate new generation including a planned 80 GW of offshore wind.

A joint letter requesting support to form a Northeast States Collaborative on Interregional Transmission was signed by officials from Massachusetts, Connecticut, Maine, New Hampshire, New Jersey, New York, Rhode Island and Vermont.

Successfully integrating offshore wind into the transmission grid requires substantial upgrades and planning, but there are complex and overlapping jurisdictions.

The proposal would see the US Department of Energy (DOE) leading the states in planning activities for interconnections in the Northeast US and assessing offshore wind infrastructure needs and solutions.

"We're grateful to our neighbouring states and regions for joining together to propose this concept," said Rebecca Tepper, Massachusetts Energy and Environmental Affairs (EEA) Secretary.

Massachusetts shares an energy grid within New England but is also part of a larger electrical network in the eastern USA.

"The US Department of Energy is uniquely positioned to bring states together on interregional transmission planning, and we look forward to exploring opportunities to benefit all of our states through this historic infrastructure partnership," said Jason Marshall, EEA Deputy Secretary for Federal and Regional Energy Affairs.

China urged to take "additional" measures to decarbonise

Recent talks between Washington and Beijing indicate a potential warming in relations between the two countries on tackling climate change.

Syed Ali

US Special Envoy for Climate Affairs John Kerry has urged China to decarbonise its power sector, cut methane emissions and reduce deforestation, as the US looks for closer alignment between the two countries on tackling climate change.

Kerry met with the head of the Foreign Affairs Commission of the Communist Party of China (CPC), Wang Yi, in Beijing last month to discuss cooperation on the climate crisis and stabilise relations between the two countries.

During the talks Kerry outlined the "efforts" that the US is making to comply with the Paris Agreement commitments to keep global temperatures from rising more than 1.5°C above pre-industrial levels, and called on China to take "additional" measures in the same direction to avoid "the worst impacts of the climate crisis".

A statement from the US State Department said both sides recognised the "enormous potential" for cooperation in the field of climate change and the importance of having the understanding and support of their respective citizens.

Wang said China "stands ready to strengthen dialogue, explore mutually beneficial cooperation and jointly address climate change".

Beijing says it hopes to promote a substantive dialogue and focus on the green transition. Although the country continues to build coal fired capacity it is already making a significant effort to ramp up renewables.

According to a recent report from Global Energy Monitor (GEM), a US-based non-profit organisation that tracks fossil and renewable energy projects worldwide, operating offshore wind capacity in China has reached 31.4 GW and accounts for approximately 10 per cent of the country's total wind capacity which has doubled since 2017 and now exceeds 310 GW.

The country, which took over the top position in installed offshore wind capacity from the UK at the end of 2021, is well on its way to reaching the government's 2030 target of 1200 GW five years ahead of schedule, GEM says.

It is also a world-leader in offshore wind turbine size. In July Mingyang Smart Energy announced that it has commissioned its MySE 16-260 offshore wind turbine. The 16 MW turbine, with a rotor diameter of 260 m, is operating at full capacity and the company now overtakes Goldwind in having the biggest installed wind turbine in the world.

The total capacity of operating wind and solar projects in China now stands at 757 GW, of which 31.4 GW is offshore wind capacity, which exceeds the operating offshore capacity of all of Europe, according to the GEM report.

GEM says that a further 750 GW of wind and solar capacity is in the pipeline, with 379 GW of large utility-scale solar and approximately 371 GW of new wind capacity identified across projects that have been announced or are in the pre-construction and construction phases.

The majority of China's additional 750 GW of wind and solar capacity is expected to come online by 2025, according to the GEM.

"China is making strides, but with coal still holding sway as the dominant power source, the country needs bolder advancements in energy storage and green technologies for a secure energy future," said Martin Weil, Researcher at Global Energy Monitor.

Renewables still Australia's cheapest electricity source despite rise in costs

Wind and solar remain Australia's cheapest sources of electricity generation despite a rise in technology costs, according to a new report.

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Australian Energy Market Operator last month published the annual GenCost report for 2022-23, revealing that all technology costs increased over the last 12 months by an average of 20 per cent.

It is the first time since the report was first published in 2018 that all generation sources monitored by the report have gone up in price. Onshore wind technology had the biggest price increase, up 35 per cent from 2021-2022, and rooftop and large-scale solar the smallest at 9 per cent.

Despite the spike, wind power remained one of Australia's cheapest new-build generation sources along with photovoltaic solar.

The report attributed the uniform rise in costs to the accelerating pace of the global energy transition. And the COVID-19 pandemic had resulted in lingering global supply chain constraints, which impacted the prices of raw materials required in technology manufacturing and freight costs.

It projected that technology cost pressures in Australia will revert to normal by 2027.

"During the recovery from these global events, various input costs are showing signs of moderation. However, there is an expected delay due to future price uncertainties and the robust demand associated with the global energy transition," Paul Graham, the CSIRO's Chief Energy Economist and lead author of the report, said in a press release.

"GenCost analysis anticipates that technology costs have mostly peaked and the risk of cost pressures extending beyond 2030 will be mitigated, as the global manufacturing capability established by that time will adequately meet deployment needs."

The rise in costs does not, however, appear to have impacted the country's appetite for renewable energy and green technologies.

Last month Simply Blue Group, offshore services provider Subsea7, and Australia's Spark Renewables unveiled a plan to develop the Sea Fern floating offshore wind project in the Commonwealth's newly declared Hunter wind zone in the Pacific Ocean. The consortium is planning to develop a project using floating wind technology that would have a generating capacity of up to 2 GW.

The development approval would be required by 2030 to start construction, with expected operations running through to the 2060s and beyond, said the companies.

The Hunter region, off the coast of New South Wales (NSW), has the potential to accommodate up to 5 GW of offshore wind capacity.

In late June the Australian government said it would support additional firmed renewables in NSW through its Capacity Investment Scheme (CIS).

The CIS will underwrite investment for up to 550 MW of additional firmed capacity as part of the NSW Energy Roadmap's firming tender, increasing the size of the tender from 380 MW to 930 MW.

India secures financing for transition to low-carbon energy

The World Bank has cleared $1.5 billion financing to accelerate India's low-carbon transition.

In a statement issued at the end of June, the global lender said the funding will incentivise India's transition towards low-carbon energy by scaling up renewable energy, developing green hydrogen and stimulating climate finance for low-carbon energy investments.

"The programme will support the successful implementation of the National Green Hydrogen Mission, which aims to stimulate $100 billion in private sector investment by 2030," said Auguste Tano Kouame, World Bank Country Director for India.

The programme plans to push renewable energy supply by reducing costs and improving power grid integration, while helping India reach its committed 500 GW of renewable energy capacity by 2030.

The World Bank reiterated that it will support India in developing green hydrogen.

Following the news, the Indian government opened a Request for Selection (RfS) to pick manufacturers for 1.5 GW of hydrogen electrolysers and a tender targeting the production of 450 000 tonnes of green hydrogen annually.

The two rounds were launched by the government's agency Solar Energy Corporation of India. Both rounds are part of the first tranche of the national Strategic Interventions for Green Hydrogen Transition (SIGHT) programme under the National Green Hydrogen Mission, tender documents show. Bidding in the production tender will be open until September 7.

S. Korea eyes home-grown SMRs as part of low-carbon shift

South Korea has launched a government-led project worth Won399.2 billion ($305.4 million) to foster research and development of a home-grown small modular reactor (SMR).

Co-led by the Ministry of Science and ICT and the Ministry of Trade, Industry and Energy, the project is aimed at developing a next-generation innovative SMR by 2028, according to the ministry.

State-run energy firms and private companies, including Korea Hydro & Nuclear Power Co., Samsung C&T Corp. and POSCO E&C Co., are also participating in the project.

"In order to develop an innovative SMR and secure competitiveness in a timely manner, government-private cooperation is important," Science Minister Lee Jong-ho said during a kick-off ceremony in the central city of Daejeon. "For the success of the project, the government will give full support."

Nuclear is part of the country's plan to become carbon neutral by 2050. In May it scrapped a previous plan to phase out nuclear energy and pledged to expand it to more than 30 per cent of the energy mix by 2030. Renewables will also be boosted to more than 21 per cent of power output, up from 7.5 per cent according to the Presidential Commission on Carbon Neutrality and Green Growth.

In June those plans received a boost when Copenhagen Infrastructure Partners (CIP) signed an Investment Notification Form under which CIP is committing to invest $ 350 million into offshore wind projects in South Korea.

The investments from CIP's Flagship funds will support the development and construction of gigawatt-scale offshore wind projects in the country.

Rising offshore wind costs check rollout

- Vattenfall suspends work on Norfolk site
- Success for BP and TotalEnergies in German auction

Janet Wood

The UK suffered a shock to its offshore wind rollout ambitions when Vattenfall said it had suspended work on its 1.4 GW Norfolk Boreas site after a 40 per cent rise in the costs of the project. The decision raised concerns about three other UK wind farms in earlier stages of planning by Vattenfall, with a total investment of about £10 billion

"What we see today, it simply doesn't make sense to continue this project," said Vattenfall Chief Executive Anna Borg.

The company blamed increased cost, which it said was "significant pressure on all new offshore wind projects". It said it would "not take an investment decision now" on Norfolk Boreas and would book an impairment charge of $537 million.

The UK wants to have 50 GW of offshore wind capacity by 2030 – up from about 14 GW now. Carbon Trust, an independent net zero consultancy, warned the Vattenfall decision could be the start of a "genuine crisis" for the UK's offshore wind industry, saying "we are at a tipping point; policymakers must take note".

Developers have been warning that projects with fixed electricity prices, locked-in during an auction years ahead of delivery, have become uneconomic because of rising costs. Norfolk Boreas will be paid £37.35/MWh at 2012 prices.

"The industry has been warning for some time that global economic factors driven by recent events are increasing costs for low carbon developers," said Energy UK's Deputy Director, Adam Berman.

The Department of Energy said: "We understand there are supply chain pressures for the sector globally, not just in the UK, and we are listening to companies' concerns."

In Germany, meanwhile, federal network agency Bundesnetzagentur, revealed the outcomes of the offshore wind auctions for non-centrally pre-investigated sites.

Klaus Muller, President of Bundesnetzagentur, said: "The results confirm the attractiveness of investing in offshore wind energy in Germany. Competition in offshore wind power has never been so high. The results are a key step towards achieving the offshore expansion target of 30 GW by 2030."

The four sites with a combined volume of 7 GW are due to become operational by 2030.

BP and partner OFW Management secured two sites, with bids of €1.83 million ($2.01 million) and €1.56 million per MW.

North Sea OFW secured one site with a bid of €1.875 million per MW while Baltic Sea OFW secured the fourth site with a bid of €2.07 million per MW. These are both backed by TotalEnergies.

The winning bidders will now enter planning processes and secure grid connections.

Malta to power island with offshore wind and solar

Malta is planning to invest in offshore wind and solar in the surrounding Mediterranean Sea to meet its growing need for clean power.

The Prime Minister of Malta, Dr Robert Abela, confirmed the island state is planning to develop offshore windfarms to meet its growing clean energy needs. Malta's Ministry of Environment confirmed in late 2022 that studies were under way to identify windfarm zones.

The Ministry also noted offshore wind "can provide significant socio-economic opportunities including the creation of green jobs and improved local value chains," and said it was working to develop an enabling framework for floating offshore renewable energy.

Parliament is due to hold a debate shortly to identify areas in which floating windfarms could be developed, after which a call for the generation of renewable energy from the zones will be issued.

The Prime Minister said interconnectors would also be developed with nearby countries.

At an event on July 7, 2023, the Prime Minister said his government was also intending to develop floating solar power.

The Times of Malta said the country's Finance Minister Clyde Caruana had described its huge continental shelf as "a massive opportunity for offshore windfarms."

European Investment Bank boosts RePowerEU funding by 50 per cent

The European Investment Bank (EIB) has increased its REPowerEU investment package by 50 per cent and extended it to finance manufacturing in strategic net zero technologies

The additional funding will be deployed by 2027 and is expected to mobilise more than €150 billion in investment.

The funding was agreed at EIB's July meeting in Luxembourg when the EIB's Board of Directors decided to raise the additional funds earmarked for projects aligned with REPowerEU – the plan designed to end Europe's dependence on fossil-fuel imports – to €45 billion. The original €30 billion package was announced in October 2022.

The EIB Board decided to add manufacturing in state-of-the-art strategic net zero technologies and the extraction, processing, and recycling of critical raw materials to its investment sectors. Sectors expected to benefit from EIB support include solar photovoltaic and solar thermal technologies, onshore and offshore wind, battery and storage, heat pumps and geothermal technologies, electrolysers and fuel cells, sustainable biogas, carbon capture and storage, and grid technologies.

"We are deploying the full range of our available financial firepower to support Europe's industrial competitiveness, manufacturing, and the roll-out of critical technologies that will lead us to a swift and just transition to net zero," said EIB President Werner Hoyer.

Nuclear build programme moves forward

- Agreements in Poland, Slovakia
- UK launches new delivery body

Janet Wood

Belgium's two nuclear power reactors are now expected to produce energy until at least 2035, the Belgian government and the operator have agreed.

Belgium has seven nuclear reactors, of which two have been closed and three others will shut down in 2025. But the Belgian government agreed to extend the lifetime of the country's two youngest reactors by 10 years.

Other countries are looking at a longer-term investment in nuclear.

In Slovakia, state-owned nuclear company JAVYS has signed a Memorandum of Understanding with Westinghouse Electric Company around the potential deployment of the company's AP1000 and AP300 reactors.

"Slovakia is a country that understands well the benefits of nuclear energy and we are very excited to be working with the JAVYS team to secure their energy future with our advanced, proven AP1000 and AP300 reactor technologies," said David Durham, Westinghouse President for Energy Systems.

In Poland a government 'decision in principle' confirmed that two planned nuclear projects are in line with Poland's public interest. Poland's nuclear power programme assumes construction of six large nuclear units that will start up by 2043.

The decision keeps Poland on track to start construction of a nuclear plant in 2026 and commission the first 1-1.6 GW unit in 2033. In May, PEJ – the Polish organisation tasked with the project – signed an agreement with Westinghouse and Bechtel on establishing a designing and engineering consortium for construction of the first nuclear plant.

A second 'decision in principle' set in motion a plan by Polish copper and silver producer KGHM Polska Miedź to construct NuScale Power's small modular reactor (SMR).

A third company, Orlen Synthos Green Energy, has also applied for a decision-in-principle to build GE Hitachi Nuclear Energy's BWRX-300 at six locations.

The UK is planning large and small reactors and the government has now launched Great British Nuclear to deliver the new units.

"From today, companies can register their interest with GBN to participate in a competition to secure funding support to develop their products," the government said at the launch.

Sam Richards, founder and campaign director for Britain Remade, said: "Small modular reactors could be game-changing… But to achieve this, the government needs to make sure the new reactors don't get caught in the same red tape as their bigger cousins." He added: "… ministers need to release a siting strategy now. This should include all existing nuclear power locations and former industrial sites."

Interconnectors set to send North Sea renewable energy south and east

GB is adding three new offshore links that will aid power transfers within and into the market.

The NeuConnect interconnection between England and Germany has entered the construction phase. The £2.4 billion ($3.08 billion) link is due to become operational by 2028 with a capacity to transfer up to 1.4 GW of electricity in either direction. As the main contractors, Prysmian Group and Siemens Energy have commenced operations in the UK, while preparatory works have already started in Germany, where construction is scheduled to begin early next year.

Within the UK Scottish and Southern Electricity Networks (SSEN) said it has signed a joint venture agreement with National Grid Electricity Transmission (NGET) to build a 2 GW subsea cable linking northern Scotland to England. The so-called Eastern Green Link 2 will see a 525 kV, 2 GW high voltage direct current subsea transmission cable installed between Peterhead in Scotland and Drax in England.

Cross-border links between Scotland and England have previously been very low capacity and the huge investment in wind power in Scotland and the North Sea has meant energy had to be discarded because there was insufficient network capacity.

Meanwhile energy regulator Ofgem has granted final approval for a 220 MW high-voltage subsea transmission line to connect the Orkney Islands with the Scottish mainland.

CIP reaches first close on €12 billion renewable energy fund

- CI V fund on track to target size of €12 billion
- 20 GW of new clean energy capacity will be added to the grid

Nadia Weekes

Copenhagen Infrastructure Partners (CIP) has reached first close on its fifth flagship fund Copenhagen Infrastructure V (CI V) at €5.6 billion ($6.2 billion) in capital commitments received.

This puts the fund on track to reach its target size of €12 billion and become the world's largest dedicated greenfield renewable energy fund.

A group of institutional investors across continental Europe, the Nordics, the UK, North America and the Asia-Pacific region participated in the first close of CI V.

"We're delighted by the continued trust in CIP from our existing investors, and are pleased to welcome the many new investors to our renewable energy platform," said Jakob Baruël Poulsen, Managing Partner at CIP.

In line with its predecessor funds, CI V applied the industrial value-creation approach of entering projects early, de-risking and optimising them before construction to capture the greenfield premium.

The fund will focus on greenfield investments within large-scale renewable energy infrastructure. It has a global reach and intends to diversify investments across technologies such as contracted offshore wind, energy storage, onshore wind and solar in low-risk OECD countries.

According to Baruël Poulsen, the market timing is favourable for investment in CI V, given the "strong and accelerating demand" for new renewable infrastructure to achieve climate targets and energy independence.

At first close, CI V has ownership of more than 40 renewable energy infrastructure projects with a total potential commitment of approximately €20 billion. Based on the current portfolio, CI V is targeting to add an estimated 20 GW of new clean energy capacity to the grid.

International banks line up support for Uzbeki power system

The European Bank for Reconstruction and Development (EBRD) plans to provide a loan of €250 million ($276 million) to the state electric power company of Uzbekistan, Thermal Power Plants JSC, to finance its working capital and operational liquidity requirements following the COVID-19 crisis.

This will enable the company to maintain its operations without interruptions in the short-term while pursuing long-term objectives such as promoting decarbonisation and implementing tariff reforms.

Meanwhile, the Asian Development Bank (ADB) has approved a $125 million loan to help enhance Uzbekistan's power transmission grid, improving energy efficiency and enabling the integration of more renewable energy.

The 'Digitize to Decarbonize – Power Transmission Grid Enhancement Project' will rehabilitate 12 transmission lines in seven regions: Bukhara, Fergana, Kashkadarya, Samarkand, Surkhandarya, Navoi and Tashkent, for a total length of 359 km.

The project will also finance the reconstruction and modernisation of four 220 kV substations in Faizabad, Obi-Khet, Zafar and Zarafshan, to increase their capacity to meet current and projected energy demand.

The project will digitalise the transmission grid by replacing old technology with modern high-voltage lines and substations ready to be connected to a supervisory control and data acquisition (Scada) system. This will enable the National Electric Grid of Uzbekistan to better manage power supply and increase renewable energy generation capacity in the grid.

"Moving away from a manual system, which is unable to effectively manage the intermittency of renewable energy supply, is vital for the energy transition through increased renewable energy generation," said ADB Energy Specialist Nana Gurgenidze. "Digitalising the grid and incorporating climate-resilient technology will also help decrease the number of unscheduled outages and increase the grid's efficiency."

Bahrain to boost renewable energy generation by 2025

Bahrain is to step up efforts to increase the share of renewable energy to 5 per cent of total electricity generation by 2025, in line with the aims of its National Energy Transition Plan.

Kamal bin Ahmed Mohammed, President of the country's Electricity and Water Authority (EWA), said the move was part of a strategy to diversify the state's energy resources and achieve a renewable resource share of 20 per cent by 2035.

EWA says it has already simplified its connection procedures in order to facilitate the process of integrating renewable energy resources to the authority's electricity network, Mohammed explained.

"Bahrain is dedicated to its transition to sustainable energy and its commitments in COP26 by investing in renewable energy resources and ultimately reducing carbon emissions to net zero by 2060," he said.

Currently, there are 54 contractors and 93 consultants accredited for distributing renewable energy resources in Bahrain. Additionally, the authority has adopted internationally recognised technical standards.

Moreover, EWA has partnered with Bahrain's Information and eGovernment Authority to digitise all the stages of renewable energy applications through a unified portal for the issuance of building permits.

So far, a total of 303 applications have been submitted for the installation of renewable energy in the residential, commercial and industrial sectors. More than 180 have been successfully commissioned and connected to the authority's electricity distribution network, with a total connected capacity exceeding 38 MW, Mohammed noted.

By 2026, more than 150 MW is expected to be further installed in EWA's electricity distribution network, he added.

DRC's solar metrogrid player secures equity funding

- First $40 million secured, another $28 million to follow
- Funds will kickstart construction of 13.7 MWp of projects

Nadia Weekes

Renewable energy-powered metrogrid company Nuru has announced the close of more than $40 million in Series B equity funding and anticipates the close of an additional $28 million in project finance this summer.

The funds will enable Nuru to commence construction on 13.7 MWp of projects, which will significantly expand its existing operating assets in the Democratic Republic of the Congo (DRC) and help bridge the enormous energy gap in the country.

The company's utility-scale solar metrogrids, integrated with cutting-edge technology and services, are designed to provide 24/7 renewable energy to DRC's urban communities. Less than 20 per cent of the country's population has access to energy at present.

The $40 million comes from equity investors including the International Finance Corporation (IFC), the Global Energy Alliance for People and Planet (GEAPP), the Renewable Energy Performance Platform (REPP), Proparco, E3 Capital, Voltalia, the Schmidt Family Foundation, GAIA Impact Fund and the Joseph Family Foundation.

Jonathan Shaw, co-founder and CEO of Nuru, said: "We are thrilled to partner with such a dynamic group of investors who are keen to drive our vision of expanding energy access and transforming five million lives in the DRC."

He said that closing the Series B was a significant milestone in Nuru's journey, demonstrating the viability of the metrogrid model in the distributed energy sector in Africa.

Nuru said work would begin immediately on three projects in Goma, Kindu and Bunia for a combined capacity of 13.7 MWp. The Bunia site will become the largest off-grid solar hybrid metrogrid in sub-Saharan Africa.

Nuru's Series A, led by E3 Capital in 2018 together with EDFI ElectriFI, was catalytic in building Nuru's current operating metrogrid portfolio in the cities of Goma, Beni, Tadu and Faradje.

Initial investments in March from REPP, Proparco and E3 Capital bridged a financing gap to bolster the Series B equity fundraise. REPP, funded by the UK's Foreign, Commonwealth and Development Office (FCDO), Proparco, the private-sector financing arm of Agence Française de Développement Group and E3 Capital each committed $500 000 in a convertible note round earlier this year.

ACWA Power signs agreement for 10 GW wind energy project in Egypt

Egypt's Ministry of Electricity, represented by the New and Renewable Energy Authority, has allocated land to Saudi-based ACWA Power for the initiation of studies and measurements for a 10 GW wind energy project in the West Sohag region.

The project is expected to generate approximately 50 000 GWh of renewable energy, reducing annual CO_2 emissions by 2.4 million tonnes and supplying electricity to around 11 million residential units.

Once completed, it will save Egypt approximately $6.5 billion in annual natural gas costs. The project is expected to create 120 000 jobs during the construction phase plus 2500 long-term jobs for the operation and maintenance of the asset.

Minister of Electricity, Mohamed Shaker, said Egypt aimed to advance the electricity sector with a focus on maximising the use of renewable energy resources and achieving a 42 per cent share of renewable energy sources in the energy mix by 2030.

Shaker highlighted Egypt's ability to make available the necessary land for producing a significant amount of electricity from renewable sources, as well as its favourable geographical location enabling the export of green energy.

ACWA Power has been present in Egypt since 2015. This wind energy project is the company's fourth in the renewable energy sector, following the Benban solar project with a capacity of 120 MW, the Kom Ombo solar project with a capacity of 200 MW and a wind farm in the Gulf of Suez and Jabal Al-Zeit with a capacity of 1.1 GW.

European businesses struggle with Scope 3 emissions

- Majority of carbon emissions disclosed in 2022 were Scope 3
- Only 37 per cent of Scope 3 emissions covered by decarbonisation measures

Junior Isles

Despite a significant increase in carbon emissions disclosures to CDP, European businesses are struggling to set impactful actions for important emissions hotspots, with just 37 per cent of Scope 3 emissions currently being covered by decarbonisation measures.

A new joint research study from Capgemini Invent, and non-profit CDP released last month – 'From Stroll to Sprint: A race against time for corporate decarbonization' – shows that there has been a 56 per cent increase in emissions disclosures to CDP over the past three years but a persistent gap remains between transparency and action.

The study, examining strategies in Europe across 17 sectors and how they have evolved between 2019 and 2022, shows the overwhelming majority (92 per cent) of emissions disclosed by European companies in 2022 were Scope 3, with the use of sold products (57 per cent) and purchased goods and services (17 per cent) cited as companies' key hotspots.

The study finds that 47 per cent of companies reported having absolute emissions reduction targets approved by the Science Based Targets initiative (SBTi), compared to just 14 per cent in 2019. However, SBTi-approved absolute targets cover only 13 per cent of the total greenhouse gas emissions disclosed by companies to CDP in 2022. This reinforces the urgent need for the companies with the highest emissions impact to set robust reduction targets aligned with 1.5°C pathways, said the report.

"Our analysis reveals that although some fast progress has been made by leading companies, particularly on science-based target setting, the majority need to take more decisive action to address their Scope 3 emissions quite promptly," said Maxfield Weiss, CDP Europe Executive Director. "With the urgent need to align corporate decarbonisation with the 1.5°C limit, companies need to set out clear climate transition plans now that will deliver the reduction we need to keep our economy and society safe."

Credible net zero targets are still in their infancy despite rapid uptake, with only 8 per cent of companies reported having set net zero targets approved by the SBTi, and a further 14 per cent with their targets pending validation. Although the number of companies disclosing to CDP has grown significantly, 23 per cent of companies still lacked any emissions reduction targets in 2022.

Roshan Gya, CEO of Capgemini Invent and Member of the Group Executive Committee, commented: "As companies seek to achieve their net zero goals, it's imperative for them to set both short- and long-term targets to monitor their decarbonisation journeys.

"New technologies such as low carbon hydrogen and process electrification will need to be implemented at a massive scale. This requires a shift in the regulatory policies and an innovative approach in order to enable the dual transition towards a sustainable and digital economy."

Azelio bankrupt after failing to secure financing

Azelio, the Sweden-based company specialising in energy storage with electricity and heat production, has been declared bankrupt after failing to secure sufficient financing to complete an agreement with a strategic partner.

According to Azelio, the unnamed strategic partner – an international, major company in the renewable energy sector – shared a common ambition to establish a long-term collaboration, which included a significant commercial order as well as commercial and industrial cooperation.

Since announcing a revised approach to reaching the partnership in May, Azelio has been actively and diligently working on multiple, parallel tracks, such as discussions with potential investors, financial institutions, and other stakeholders, to ensure liquidity and funding until reaching a final agreement with the strategic partner.

Commenting on the bankruptcy filing, Chairman of the Board Bo Dankis, said: "The Board and management have been working hard for a long time with the goal of establishing the strategic partnership previously announced. Despite a great interest in our technology, we have not been able to secure the company's financing. The Board will therefore apply for bankruptcy of Azelio at the Gothenburg District Court." The bankruptcy petition has been accepted by the Court.

Azelio's energy storage and heat production technology is deemed revolutionary in that renewable energy becomes dispatchable, making clean energy available around-the-clock. The energy is stored in recycled aluminium and converted into electricity and heat with a total efficiency of up to 90 per cent.

Profits surge at British Gas as regulator cracks down on suppliers

Centrica has reported a 900 per cent increase in first-half profits at British Gas, the UK's largest household energy supplier.

The nearly 10-fold increase is the result of higher gas and electricity prices, which sky-rocketed after Russia reduced gas supplies to Europe following its invasion of Ukraine.

Adjusted operating profits at British Gas surged to £969 million ($1245 million) in the first six months of this year, up from £98 million in the first half of 2022. Overall, Centrica, which owns British Gas, reported an adjusted operating profit of £2.1 billion in the half, up from £1.3 billion in 2022.

Profits at British Gas were also boosted by around £500 million after Ofgem, the UK energy regulator, allowed energy companies to recover losses incurred when the price cap set by the energy regulator was too low to fully account for costs faced by gas and electricity suppliers.

Thirty suppliers collapsed in late 2021 and early 2022 following the surge in wholesale energy prices in the run-up to the invasion. It led to criticism of the regulator for having allowed companies without sufficient financial backing into the market, as it tried to boost competition.

In a move to improve the financial resilience of companies, last month Ofgem announced it would introduce new capital requirements to ensure retailers could withstand market shocks such as surges in energy prices from March 2025. The rules will require energy suppliers to hold a minimum capital buffer of £115 per domestic customer.

Ofgem said it wanted "all energy suppliers to be financially secure to ensure consumers benefit from a stable energy market".

It also announced it would be able to order suppliers to ringfence advance payments from consumers, rather than using them for working capital, if there were any concerns about any retailer's viability.

Following its first-half profits, British Gas said it intends to pay an interim dividend of 1.33 pence per share, up 33 per cent from the same period last year. It will also extend its share buyback programme by a further £450 million.

Earlier Ofgem said it expects energy suppliers' profits to strengthen as the market continues to stabilise but warned them not to start paying dividends until they were financially stable.

Centrica's Chief Executive Chris O'Shea said the company would also spend an extra £50 million on helping vulnerable customers, taking its total on the programme to £100 million since the start of 2022.

Iberdrola seeks wind power investors in US and UK

Iberdrola is seeking major shareholders for wind power assets in the US and UK. The global energy company with its headquarters in Spain announced last month that it is looking for a majority shareholder for a portfolio of 700 MW of wind power assets to be built between this year and 2025 in the US.

The move is part of a plan to increase its presence in the growing US wind market. The energy company is also looking to establish strategic partnerships in the country to take advantage of subsidies allocated under its Inflation Reduction Act.

According to a report in *El Economista*, Iberdrola plans to sell about 60 per cent of the portfolio, retaining the remaining 40 per cent through Avangrid, the Spanish company's subsidiary in the North American market. The majority stake is valued at €700 million ($772 million).

Meanwhile, in the UK Iberdrola last month hired Goldman Sachs to advise on the sale of a stake in its largest offshore wind farm. The Spanish utility is looking for a partner to acquire up to 49 per cent of its East Anglia Three power plant off the coast of Scotland. The market expects the transaction to start after the summer.

Construction of East Anglia Three, valued at around €2 billion, began last year and is expected to last until 2026.

The sale is part of Iberdrola's asset rotation process set out in its strategic plan. The aim is to divest minority stakes in assets in exchange for a capital injection to finance its renewable energy investment plans. This strategy is already being played out in other markets, such as the sale of 49 per cent of the Wikinger wind farm in the Baltic Sea for €700 million.

Americas

Wärtsilä renews Brazilian O&M agreement

Brazilian energy producer Geradora de Energia do Amazonas (Gera Amazonas) has renewed its O&M agreement with Wärtsilä. The agreement covers the UTE Ponta Negra power plant in Manaus and has been in place since 2006 when the plant was commissioned. The two-year renewal ensures that Gera Amazonas can meet its power purchase obligations with Eletronorte.

Originally the plant operated on heavy fuel oil, but in 2013 it was converted to operate with gas/diesel technology. Wärtsilä subsequently carried out a full gas conversion in 2020 with five Wärtsilä 50SG gas-fuelled engines installed. The plant now operates in 24/7 baseload mode delivering 60 MW to the electricity system.

Parts and service for all planned overhauls are included in the broad scope of the agreement.

Mitsubishi Power supplies H_2-ready GTs to Utah

Mitsubishi Power Americas has delivered two hydrogen-ready gas turbines to the Intermountain Power Project (IPP) Renewed in Delta, Utah, USA, to decarbonise utility-scale power generation.

IPP Renewed and Intermountain Power Agency (IPA) plans to use the two M501JAC turbines with a 30 per cent hydrogen fuel blend at start-up in 2025 with plans to achieve 100 per cent hydrogen in 2045. It is hoped that the initial blend of natural gas and hydrogen will reduce carbon emissions by over 75 per cent when compared to IPP's current operations.

The turbines will have a combined capacity of 840 MW. Mitsubishi Power will provide service and maintenance under a 20-year long-term service agreement.

Hydrogen for the turbines will be supplied from Mitsubishi Power and Magnum Development's planned Advanced Clean Energy Storage project (ACES Delta Hub), located adjacent to IPP. Renewable energy will power electrolysers to produce green hydrogen at the ACES Delta Hub, where it will be stored in two underground salt caverns to hold up to the equivalent of 150 GWh.

AFRY to act as owner's engineer for Huon Hoa 1

Ontario Power Generation of Canada has announced that it will begin planning and licensing for the deployment of three additional GE Hitachi Nuclear Energy (GEH) BWRX-300 small modular reactors (SNRs) at the Darlington New Nuclear Project site.

Asia-Pacific

Mitsubishi Power to build 1950 MW CCGT in Japan

Mitsubishi Power, a power solutions brand of Mitsubishi Heavy Industries, Ltd. (MHI), has won a full turnkey contract to construct three 650 MW CCGT (combined cycle gas turbine) units in Sodegaura City, Chiba Prefecture, Japan.

The cost of constructing the units is estimated at $1.7 billion. They are scheduled to start commercial operation in stages during fiscal 2029.

The project is a joint venture between MHI and Mitsubishi Electric Corporation, covering EPC. MHI will provide the gas turbines, steam turbines, HRSGs and flue gas desulphurisation systems, while Mitsubishi Electric will supply generators and electrical products.

The project will take future decarbonisation into consideration. The gas turbines will be capable of co-firing with hydrogen, and the plant's design will allow for easy conversion to 100 per cent hydrogen firing with minimal modifications, says Mitsubishi Power.

Malaysian orders 65 MW MAN dual-fuel engines

Kibing Solar is currently building a factory in Borneo to produce solar glass for use in photovoltaic modules, and has ordered four MAN Energy Solutions dual-fuel engines to ensure reliable and flexible energy supply. The factory will be in the Malaysian state of Sabah, on the island of Borneo.

MAN Energy Solutions' scope of supply includes three 18V51/60DF and one 8L51/60DF engine, which will provide a total of 65 MW of generation capacity.

The four engines will mainly run on low-emission natural gas in the form of compressed natural gas (CNG). CNG consists largely of methane and is compressed to less than 1 per cent of the volume that natural gas occupies at normal atmospheric pressure.

DORIS wins Gray Whale 3 FEED contract

DORIS has won a Front-end Engineering Design (FEED) contract for the Gray Whale 3 floating offshore wind farm in South Korea. The scope of the FEED includes the project's full electrical and communications system to the grid connection, array and export cabling, and all aspects of the fixed offshore substation foundation and topsides structures.

Gray Whale 3 is being developed by BadaEnergy, a joint venture between Corio Generation, TotalEnergies and SK ecoplant. It will have a total capacity of 504 MW, making it one of the world's largest floating offshore wind power developments. Situated approximately 60-70 km from the port of Ulsan, the project is part of a three-phase development expected to reach a total capacity of 1.5 GW.

Suzlon wind turbines for Velliyanani Phase II

Everrenew Energy has awarded a contract to Suzlon Group for the development of a 100.8 MW wind power project. Suzlon will install 48 wind turbine units of its S120 - 2.1 MW with a Hybrid Lattice Tubular tower at Velliyanani Phase II in Karur district and Vengaimandalam in Trichy in Tamil Nadu. The project is scheduled to be commissioned in March 2024.

Suzlon will supply the wind turbines and supervise the execution and commissioning of the project.

Vestas secures 55 MW order in Japan

Vestas has won a 55 MW order from Renova for the Reihoku Amakusa onshore wind project in Kumamoto prefecture, Japan. Vestas will supply 13 Vestas V117-4.2 MW wind turbines to the project. The turbines will be installed with a high-tower solution with 112 m hub heights in order to unlock new wind resources at higher and more consistent wind speeds.

The order also includes a 20-year Active Output Management 5000 (AOM 5000) service agreement. Turbine delivery will begin in the fourth quarter of 2024, with commissioning scheduled for completion in 2026.

Europe

Nexans wins EuroAsia Interconnector contract

Nexans has secured a turnkey contract worth €1.43 billion to supply and install cables for a portion of the EuroAsia Interconnector.

Nexans said that the contract was for engineering construction, and installation of HVDC cable systems connecting Greece and Cyprus. The link is part of a huge interconnector that will create an energy bridge between Cyprus, Greece and Israel via a 1208 km 1000 MW DC undersea cable route, with the possibility of expanding the capacity to 2000 MW. The networks of Cyprus and Greece will be connected through 898 km of subsea cables.

The 525 kV HVDC cable will be the longest and deepest interconnector globally, running across the Mediterranean Sea floor at depths of over 3000 m. The first section of the route is expected to be completed in 2028, followed by the other one in 2029.

Subsea cables will be made at Nexans' facilities in Halden in Norway and Futtsu in Japan, the French company said.

German onshore wind contracts for PNE

PNE has secured two wind power projects with a combined capacity of 69 MW in Germany's latest onshore wind tender.

The first wind farm will be located in the Heidmoor municipality in the state of Schleswig-Holstein and will consist of six turbines with a total estimated capacity of 36 MW. The second project, in the municipality of Bebensee in the same state, will consist of five turbines with a total capacity of 33 MW.

Both wind farms have already been granted permits and are scheduled to become operational in 2024.

Markus Lesser, CEO of PNE, said: "We are very pleased that we have again succeeded in winning contracts for all the projects we put out to tender. The additional megawatts, totalling 69 MW, will be transferred to our own operations."

EDF orders six 6 EPR2 control systems

EDF has awarded contracts to supply the Level 1 standard control systems for its six planned nuclear power plants to Eviden (Atos Group), through its Worldgrid business, and Schneider Electric.

EDF has announced that construction will start on the first two EPR2 units at Penly, Normandy in mid-2024.

Under the contract, Worldgrid will be responsible for integrating and programming the PLCs (programmable logic controller), as well as producing all the software needed to automate the translation of control function diagrams into PLC programmes. Schneider Electric will be responsible for supplying the hardware infrastructure built around the M580 PLCs, which will be produced at its French plants.

Nordex wins 363 MW orders in Mediterranean

Nordex has won orders for several wind farms in the Mediterranean region.

Nordex will supply turbines with a total capacity of 149 MW for two wind farms in Spain. Installation is scheduled to start in the spring and summer of 2024.

It has also received an order for a 95 MW wind farm in Serbia. Installation of the Delta4000 series turbines is scheduled to begin in 2024.

Meanwhile the company has also received orders with a total capacity of 119 MW from France, Italy, and Portugal.

Commercial order for vertical axis wind turbine

SeaTwirl, based in Sweden, has announced that it received its first commercial order for a new wind turbine application in the North Sea to electrify asset operations offshore.

SeaTwirl's S1.5 incorporates a floating vertical axis wind turbine (VAWTT) with a tower placed on an underwater structure, which consists of a buoyancy component and a keel at its lowest point.

The turbine has a height of 55 m above the water surface, with 80 m of the platform being below the sea surface.

Sungrow to equip UK battery storage project

China's battery storage maker Sungrow has been selected to provide the equipment for a 100 MW/260 MWh battery energy storage system (BESS) project in the UK.

The project is being developed by British renewables and energy storage company Penso Power and investment firm BW Energy Storage Systems (BW ESS).

Under the contract, Sungrow will deliver its PowerTitan 2.0 liquid-cooled energy storage system, in which the power conversion system and battery are integrated into one 20ft container.

The site, based in Bramley, Hampshire, is scheduled to be commissioned in 2024. It will be connected to the local grid to provide balancing and ancillary services.

International

Türkiye 56 MW order for Nordex Group

VRES Enerji of Türkiye has commissioned the Nordex Group to supply eight units of its N163/6.X turbine for the 56 MW extension of the Kartal wind farm in the Eskişehir Province in the northwest of the country. Installation is scheduled for mid-2024. The order also includes a Premium Service contract for a period of ten years.

Ender Ozatay, Vice President Region Türkiye & Middle East for the Nordex Group, said: "We are grateful for our customers' continued trust in our technology and our experienced team. The Turkish Energy Market Regulatory Authority (EMRA) has recently announced 25 GW pre-license capacity for the next 10-year-period for renewable projects with storage, and we aim to build on our strong position in Türkiye."

Sumitomo wins Australia flow battery order

Sumitomo Electric has received an order from Vecco Group for an integrated mining business in Australia, for a vanadium redox flow battery system with a capacity of 250 kW/750kWh.

This is Sumitomo Electric's first order for a vanadium redox flow battery system installation in Australia. The system will be used as a trial project for Energex, part of Energy Queensland Limited (EQL), the Queensland Government-owned Corporation. The trial will assess the medium-duration storage system for deployment in its power distribution network.

Hydrogen

Oman pushes into green hydrogen sector, plans operations for 2030

Oman is keen to develop a green hydrogen sector by the end of this decade and reach net zero by 2050. In recent months it has launched Hydrogen Oman (Hydrom) and signed a number of deals with international firms that will see gigawatts of energy produced through renewable systems and generate millions of tons of green hydrogen for export and domestic use.

Gary Lakes

India's ACME Group last month secured a loan of $487.9 million from REC Limited for Phase 1 development of its green hydrogen and ammonia project within Oman's Special Economic Zone at Duqm in the Indian Ocean.

"The securing of debt for the green hydrogen and ammonia project in Oman is an important milestone," said Shashi Shekhar, Vice-Chairman of ACME Group. "We will start the construction activities soon and build one of the most advanced technologies and create a state-of-the-art facility."

Phase 1 of the project calls for the production of 100 000 tons annually of green hydrogen. Eventually this will be expanded to 1.2 million tons per year with a capacity to 3.5 GW of electrolysis drawing from a solar farm capable of producing 5.5 GW.

In June this year, the International Energy Agency (IEA) produced a report on Oman's green hydrogen potential. It said Oman's high-quality renewable energy resources and large tracts of available land make it well placed to produce large quantities of low-emissions hydrogen and a viable exporter by 2030.

"Oman aims to produce at least 1 million tons of renewable hydrogen a year by 2030, up to 3.75 million tons by 2040 – and up to 8.5 million tons by 2050, which would be greater than total hydrogen demand in Europe today," the IEA report states. "The 2040 hydrogen target would represent 80 per cent of Oman's current LNG exports in energy-equivalent terms, while achieving the 2050 target would almost double them," it adds.

In 2022, the government of Oman established Hydrogen Oman (Hydrom) for the purpose to structure and push the development of a green hydrogen sector in Oman. Hydrom is under the ownership of Energy Development Oman (EDO) and regulated by the Ministry of Energy and Minerals. It is mandated to design a master plan for the sector, delineate government-owned land areas for the projects, structure associated large-scale projects, manage the process of allocation to developers and oversee them, and facilitate the development of common infrastructure, connected ecosystems and hubs.

Oman has launched a two-phased bidding round for green hydrogen projects that will include awards of large tracts of land during 2023 and 2024. Two initial blocks will be awarded in the Duqm area and three more in the Dhofar region. The winning developers are to deliver integrated projects that cover the full green hydrogen value chain.

Oman wants to see a proposed mix of wind and solar that ensures a levelised cost of hydrogen (LCOH). The mix of technology can evolve over time. Developers are free to propose hydrogen electrolyser technology of their choice. They are also free to choose the end-product (hydrogen, ammonia, methanol). The developers are also expected to secure the off-take of their projects. They are also expected to bid as consortia and partner with a government-owned entity after the project award is made.

Hydrom has already made 1500 km^2 available for projects it expects to see in operation by 2030. Up to 40 times more land is available for future long-term projects. So far six projects have been allocated land for renewable hydrogen as a result of Oman's first auction process.

Agreements for those six projects were signed last March with a combined value of $20 billion with companies from the UK, Belgium, Germany, the Netherlands, India, Japan, Kuwait, Singapore and the UAE. Together they have a production capacity of 15GW. The agreements cover a 47-year period – seven years for development and 40 years of operation.

BP Alternative Energy Investments have signed up for two projects that will generate 3.3 GW of electricity and 150 000 t of hydrogen. They are located in Duqm and Dhofar. Other projects include Green Energy Oman and SalalaH2. The Hyport Duqm project will produce 2 GW of power and 70 000 tons of hydrogen. The Green Hydrogen and Chemicals SPC will produce 1 GW and 38 000 t of hydrogen.

Oman intends to be producing hydrogen by the end of this decade. It is also examining the conversion of its extensive pipelines and ports infrastructure to accommodate the shipment of hydrogen to future domestic users and for exports. To further promote its hydrogen sector, Hydrom is sponsoring the third Green Hydrogen Summit Oman (GHSO) in December of this year.

Gas

Rio Grande LNG partners take FID for new major LNG facility on US Gulf Coast

France's TotalEnergies and Houston-based NextDecade Corporation and their partners have taken the final investment decision (FID) to start construction for the Rio Grande LNG project near Brownsville Station, Texas. The 17.8 million tons/year Phase 1 facility will be the first in the US to include carbon capture and storage as part of its operations.

Gary Lakes

International LNG leader TotalEnergies along with NextDecade of the US, Global Infrastructure Partners (GIP), the UAE's Mubadala, and Singapore's GIC have taken the decision to move ahead with Phase 1 of the Rio Grande LNG (RGLNG) project, the latest such project to take shape along the US Gulf Coast.

NextDecade, which is working to develop carbon reduction and storage technology, is leading the RGLNG project with plans to be the first US LNG facility to capture and store underground carbon dioxide produced during Phase 1 development.

On its website, NextDecade states that it is taking action to reduce the greenhouse gas intensity from its LNG by applying carbon capture and storage (CCS) to the process. The company has promised to use responsibly sourced gas and net zero electricity in its activities to advance the energy transition.

With $18.4 billion in financing for Phase 1, RGLNG will be the largest privately funded infrastructure project in Texas. NextDecade said the project "is the largest greenfield energy project financing in US history." The plant will have three liquefaction trains designed to produce 17.5 million tons of LNG annually.

Major international players like Bechtel, Air Products, Enbridge and Baker Hughes will participate in the project, which is planned to come into operation in November 2028. The facility will be financed with equity contributions from the partners and with a loan from a consortium of international banks.

TotalEnergies will take a 16.67 per cent share in Phase 1 of the project and provide $1.1 billion in equity. It will also acquire a 17.5 per cent stake in NextDecade for $219 million paid over three tranches. TotalEnergies is ranked as the third-largest supplier of LNG globally with a market share of around 12 per cent, accounting for around 50 million tons annually. It plans to increase its share of natural gas in its global energy mix by about 50 per cent by 2030. NextDecade will hold a 20.8 per cent share in the project and the remaining equity partners will hold 62.5 per cent.

RGLNG will enable TotalEnergies to boost its LNG off-take from the US to over 15 million tons/year by 2030. The company will take 5.4 million tons/year from the facility for a 20-year period. Phase 1 of the facility has long-term and binding off-take agreements for 16.2 million tons/year with TotalEnergies and Shell NA LNG, ENN LNG, Engie, ExxonMobil LNG Asia Pacific, Guangdong Energy Group, China Gas Hongda Energy Trading, Galp Trading and Itochu Corporation.

In a statement announcing the FID, TotalEnergies Chairman and CEO Patrick Pouyanne said its off-take from RGLNG will enable the company to increase its "ability to contribute to European gas security and to provide customers in Asia with alternative forms of energy that is half as emissive as coal".

NextDecade has given Bechtel Energy the go-ahead to begin construction of the facility. Bechtel was awarded the engineering, procurement and construction contract for Phase 1, which is worth $12 billion. Phase 1 will consist of the construction of three LNG trains and two LNG storage tanks. Phase 2 is planned to consist of two more storage tanks that will enable the facility to produce 27 million tons/year of LNG.

The project includes the $2.4 billion, 135-mile Rio Bravo pipeline, which will be built by Enbridge. The pipeline will deliver 4.5 billion cubic feet per day (bcf) of Permian gas to the LNG facility.

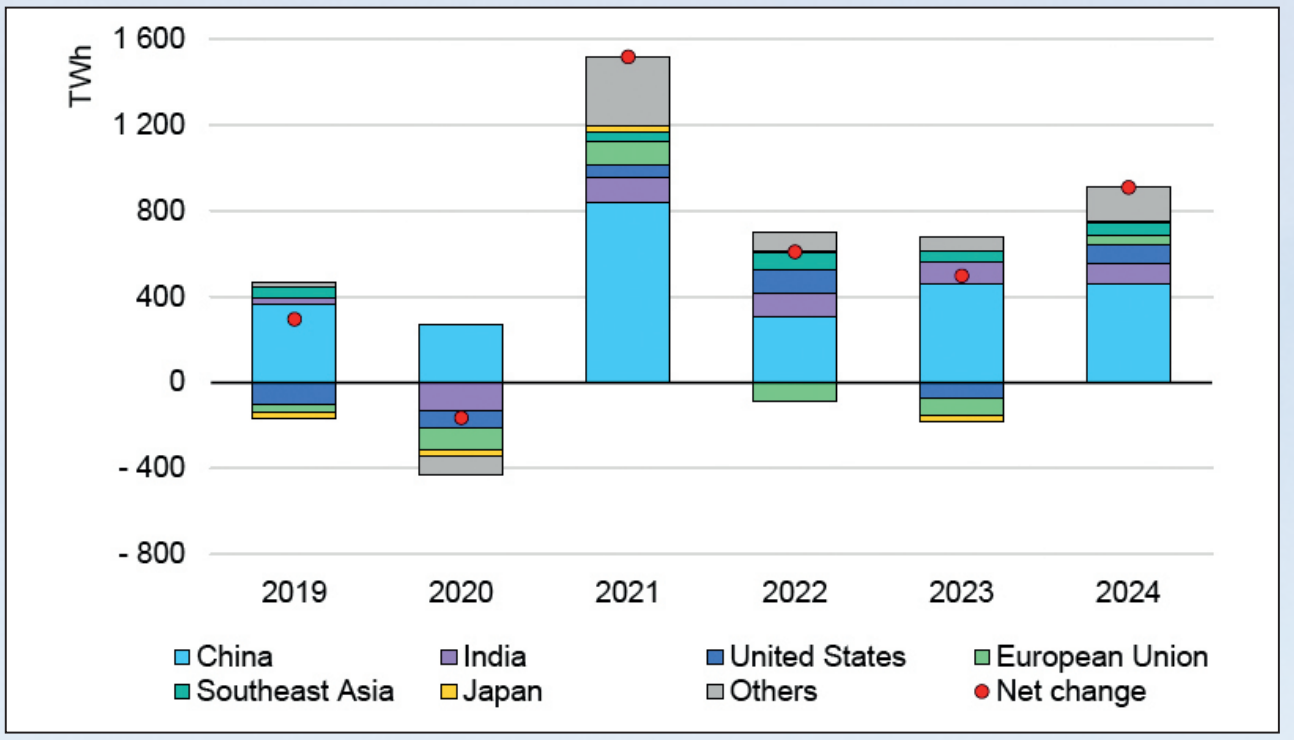
The partners in the project have had to face a number of legal suits filed by opponents of the facility, which will be built in an area described as the last deepwater port in Texas without a major fossil fuel project. But despite objections to the project, the US appeals court and the Federal Energy Regulatory Commission (FERC) have given permission for the project to proceed.

The facility will be built on 750 acres (3 km^2) of undeveloped (greenfield) property, 182 acres of which will be wetlands, along a 984 acre waterfront tract in the Port of Brownsville. NextDecade has set aside some 4000 acres for wetland mitigation and habitat protection.

The US has seen seven LNG export terminals built along US coastlines during the last seven years, most of them located in Texas or Louisiana. Three facilities are under construction and another 11 have been approved by FERC.

Meanwhile, Great Lakes Dredge & Dock (GLDD) Corporation has been given the go-ahead by NextDecade to make improvements to the Brownsville Ship Channel. GLDD said it was the largest project undertaken by the company in its 133-year history.

Year-on-year change in electricity demand in selected regions, 2019-2024



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For more information, please contact:

IEA Publications
International Energy Agency

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Contact information:
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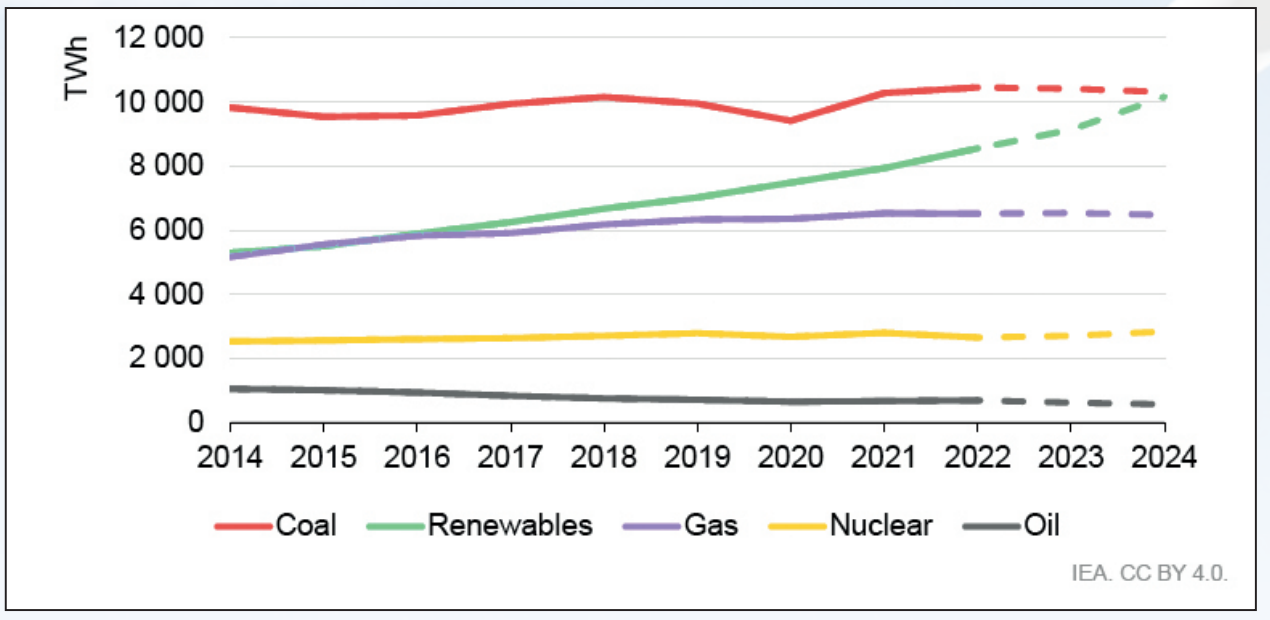
Global electricity generation by source, 2014-2024



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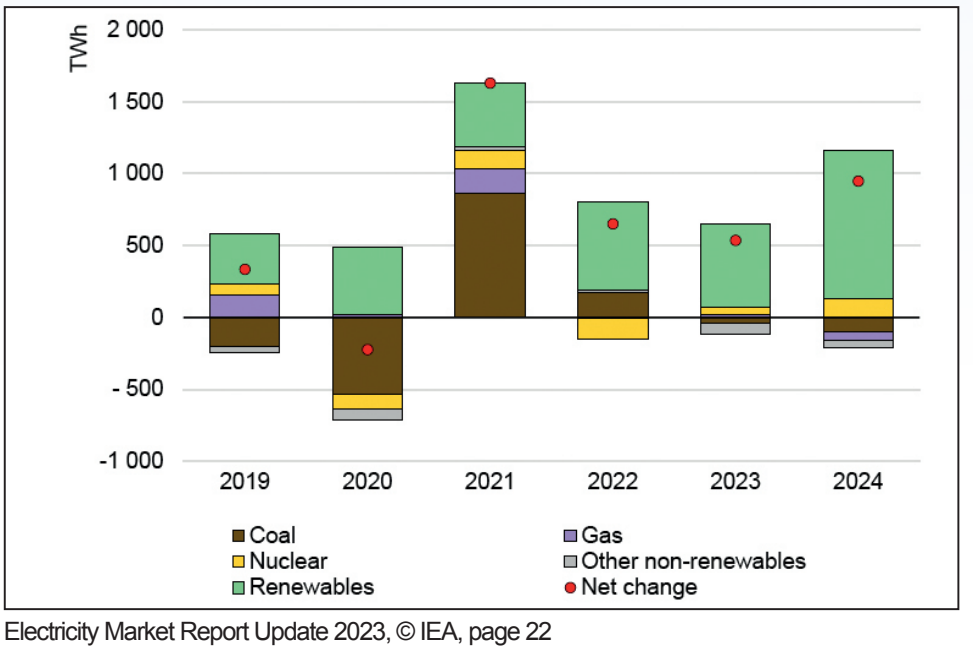
Year-on-year global change in electricity generation by source, 2019-2024



Electricity Market Report Update 2023, © IEA, page 22

Net zero targets: the time to act is now

A number of countries around the world have committed to fully decarbonising electricity production in a little over a decade. GE Vernova recently published a study of Great Britain's power sector that shows the tangible progress that is needed within the next 1-3 years for the UK to avoid missing its promised 2035 net zero carbon emissions target.

Junior Isles

Like a number of developed countries across the globe, the UK has set a target to eliminate carbon emissions from its power sector by 2035. With little over a decade to get there, it is clear that urgent action is needed now.

Early last month GE Vernova Consulting Services launched a new study, 'Reaching Net Zero Carbon in Great Britain', that analyses generation and transmission investment pathways for the economic build-out of the renewables, nuclear, storage and lower carbon thermal generation that would be needed for the UK to achieve its target.

Commenting on the rationale for focusing on the UK and the need for the study now, Martin O'Neill, Vice President, Strategy, at GE Vernova's Gas Power business, said: "The UK is the most catalytic region in geographical Europe in the energy transition… [but] what differentiates it from many of its continental and European peers is a belief system that is quite anchored in common sense. That is: in the energy transition, there's no silver bullet – there isn't one technology that solves [all] for a net zero future. You need to embrace nuclear, as much as you do existing gas turbine plants, as much as you wish to grow wind and solar assets.

"The study aims to bring some real hard facts to the table about what it will actually take in a world where a new power plant can take, in the case of wind, several years to get the permit application approved and several years to bid, construct and commission new gigawatts of power. For new gas power plants it can take six or seven years from inception to commissioning. And for nuclear it's even longer. Investment in transmission and grid infrastructure often takes six to eight years to be sited and permitted, and then the actual upgrade programmes can last several years.

"So if we're talking about zero carbon generation in 2035, it's time we move away from a very high level narrative where we talk about large handfuls of things that we would like to see happen, to a more anchored discussion about: where we need to invest in the UK in the grid and in power generation assets; what size of investments are necessary; and what is the market design that will actually support the flow of capital that will allow financiers and banking institutions to stand behind these projects. If it takes, 5, 10, 15 years for projects, we need real solutions on the table now."

The study looks at several different pathways to net zero. It started by examining a very detailed depiction, or digital twin, of the power grid.

Beth Larose, Energy Transformation Leader, GE Vernova, commented: "We studied the physical constraints of the grid and how they play into the power system as it evolves to net zero."

The model covers 17 different grid zones in GB, keeping transmission constraints in mind to help depict the flow of power across GB. Inputs to the model come from publicly available data, such as the Centre for Climate Change. One of those inputs assumes that GB electricity demand will double from about 300 TWh in 2025 to 660 TWh in 2050, mainly driven by electrification of transport, industry and heating.

It assumes new generation to meet this demand will be sited in very specific areas. "Offshore wind, for example, is highly sited towards the northern part of GB, Scotland, and some in the Midlands as well; whereas solar is much more towards the southwest and southeast. That leaves the very big load centre of London needing a lot of support from more conventional generation such as combined cycle, nuclear and open cycle power plants," noted Larose.

The study shows that an additional 244-282 GW of renewable and decarbonised generation, approximately 2.5-3 times that of the existing capacity, will need to be added to the power system by 2050 across Great Britain. About two-thirds of the new capacity is expected to be wind and solar, with nuclear, abated gas and battery storage all playing an important role to accommodate for the intermittency of renewables and grid congestion.

Capacity build projections are split into three main scenarios: a 'Base Case' scenario with 244 GW based on the least cost economic build-out; a 'High Nuclear Small Modular Reactor (SMR)' scenario; and a 'High Wind' scenario.

"These scenarios do result in meeting a net zero plan by 2035, or very close to net zero, based on the Centre for Climate Change's targets," noted Larose.

The study shows 70-100 GW of offshore wind is expected, along with: 70 GW of solar; 60 GW of battery storage; up to 27 GW of CCGTs with carbon capture and storage and 23 GW of hydrogen-capable open cycle gas turbines; 10-30 GW of onshore wind in addition to repowering of existing sites; and 10-18 GW of new nuclear.

It is a significant amount of new capacity in a relatively short time.

"To add a 1 GW gas turbine plant takes about five years… When someone puts a chart in front of me that says we need 244+ GW, as an industry expert, I panic," said O'Neill. "That's a huge number. We are talking about multiplying the existing UK grid by more than by 2.5 times."

According to Larose, "the big key takeaway is that "we can achieve the climate goals with a very aggressive, and forward-leaning plan towards net zero generation sources".

GE Vernova was keen to examine the physical constraints of the grid to gain information around siting new generation and how that in turn impacts wholesale electricity prices. It observes that in general, wholesale electricity prices are expected to increase post-2040 due to the greater need to balance variable renewable energy sources with flexible hydrogen-based generation.

The study finds that zones with high levels of wind and solar will have the lowest price, while London will observe the highest prices due to its demand and limitation on siting new capacity.

Notably, GE Vernova warns that zones with significant wind generation and lower demand could experience up to 50 per cent curtailment.

Certainly the geographic distribution of certain types of generation, combined with the need to support variable renewables, will result in an urgent need for grid investment over and above that already outlined out to 2040 by National Grid.

In total, around 22 GW of additional transmission line capacity across the Scottish boundaries and 57 GW in the English boundaries is required to alleviate congestion and avoid curtailment of renewable electricity, to save system costs of around £80 billion by 2050.

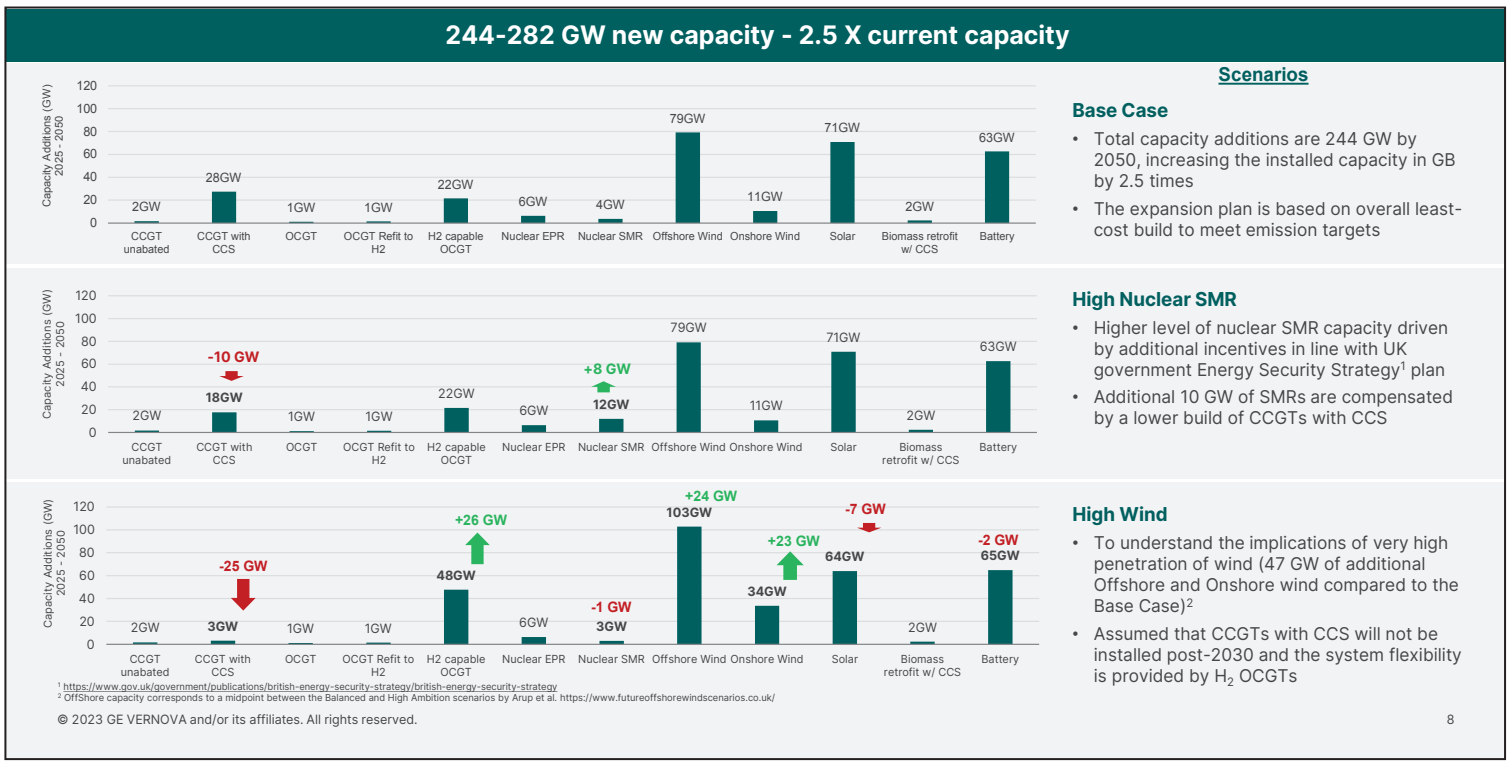
GE Vernova stresses that a combination of various electricity generation, transmission and system control/management technologies with underlying supportive policy and regulatory measures coupled with reformed markets will be essential. Its key recommendations are therefore to:

- Enable and accelerate investments at the required scale and pace in all lower carbon generation technologies (renewables, nuclear, carbon capture and storage and hydrogen) and grid solutions with enhanced digitalisation of the energy system including facilitation of active participation by consumers. The study estimates that over £50 billion of investment is required in generation and storage capacity alone by 2030 in order to meet the 2035 target
- Expedite the implementation of market reforms that are technology agnostic, remunerate all system services (energy, capacity, flexibility and stability) and provide adequate signals for investment in generation and grid assets "when and where" needed
- Adapt energy policy and regulation that bring clarity to the uptake of lower carbon generation (in particular for SMR, CCS and hydrogen) as well as grid technologies. These should ensure:
  - Rapid permitting and deployment of required flexible resource (circ. 10 GW of storage and gas with hydrogen readiness) necessary to integrate over 30 GW of new wind and solar capacity by 2030 to ensure system security.
  - Build-out and commitment of over 100 GW of new generation capacity by 2030
  - Step up of the required grid reinforcement (transmission lines and operational solutions) that is compulsory for the delivery of lower carbon energy to consumers.

Overall, GE Vernova warns that it is essential the UK makes tangible progress within the next 1-3 years regarding the stated recommendations to mitigate the risk of falling short of achieving a net zero 2035 power system and the 2050 net zero target.

"The general conclusion of this piece of work is the net zero trajectory in the UK is achievable through physics and technology but the economic stimulus and sense of urgency is lacking entirely… the energy market design reform has to be implemented and it needs to be sharper," said O'Neill. "If we're still having this conversation in 2026, whatever the stated objective is in 2035 is not going to be achieved."

Capacity build projections



China-US climate talks may be positive for investors

Despite a complex and fractious rapport, it is imperative that the two largest economies and largest polluters in the world drive global decarbonisation together. A recent senior US official visit to Beijing has increased that likelihood, giving a boost to both the financing and business of decarbonisation. **Joseph Jacobelli** explains.

China and the US are key to global decarbonisation and the energy transition. The two nations account for 44 per cent of global GDP and are responsible for 46 per cent of global greenhouse gases (GHGs). Their emissions reduction paths are therefore fundamental to the world achieving a net zero balance by 2050. Today, however, they are far from having similar or coordinated strategies. Quite the opposite. Sadly, their relationship is highly complex and hugely fractious.

The list of disagreements is long. They have serious economic disputes, including over investments, technology, and trade, as well as confrontational divergences, including over global health, domestic human rights, and regional security. The two have not had meaningful talks for over two years. No less than three senior US officials visited Beijing in the hope to restart regular communications between mid-June and mid-July 2023. After US Secretary of State Antony Blinken, came US Treasury Secretary Janet Yellen, and then US Climate Envoy John Kerry.

Expectations for Kerry's were low. Yet, he had a positive message after talks with senior Chinese officials, including with Premier Li Qiang. The two sides decided that representatives would continue to meet frequently ahead of COP28 – the 28th United Nations Climate Change conference to be held in Dubai from 30 November 2023 – not a gamechanger but a positive step, nonetheless.

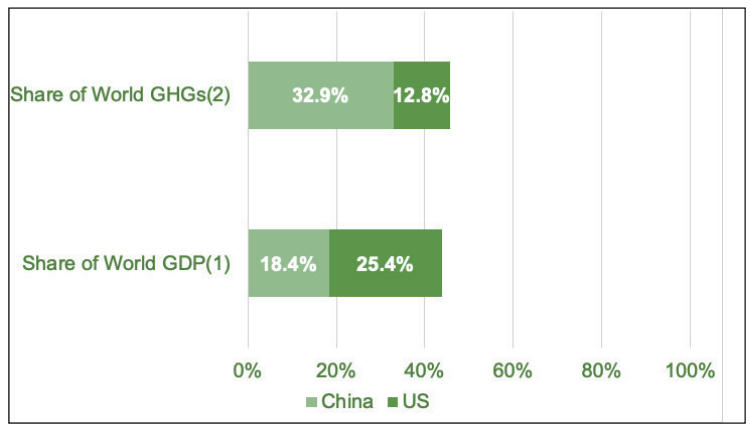
Although a strong, positive, fruitful, and effective climate action relationship is unlikely in the short-term given the countries' various disputes and divergences, it is realistic to believe that the two will find some areas of mutual agreement. An improved relationship would benefit both the finance and the business aspects of decarbonisation and thus the energy transition globally.

Firstly, one can evaluate the implications of how China and the US could benefit from each other's net zero initiatives in the financial arena. Specifically in the public equities, private equity, credit markets, commercial lending, and direct investments. Secondly, we should examine the benefits of a better China-US climate-related relationship for businesses – specifically, direct investments in clean energy facilities and tech exports.

The first area in finance is the public equity market. This is a global market and is less likely driven by societal and political tensions. US-based and China-based investors can freely purchase shares of clean energy companies in each other's market, albeit non-China-based investors face some hurdles in buying China-listed stocks. So energy transformation-related Chinese companies may find it more difficult to raise global capital unless they list outside China. This used to be a trend but of late has become less straightforward.

One of the many benchmarks to assess this is the Chinese stocks' share of leading exchange-traded funds (ETF) – a kind of pool of listed securities, which, broadly speaking, operates similarly to mutual funds. The largest eight clean energy related ETFs have a net asset value of about $11.4 billion. Of the eight, only four track clean energy related companies globally. The other four only track North American-related firms. Even with the four more global ETFs, Chinese equities represent a small percentage of the total. In the case of the largest ETF, with an invested amount of over $4 billion, they only represent about 10 per cent of the total. US listed ones account for over 46 per cent. A China-US climate rapprochement could lead to more investor interest in Chinese listed clean energy companies and help these companies raise more funds globally.

The world's four largest private equity firms (Apollo, Blackstone, KKR and TPG) actively invest in clean energy companies and projects globally. It is hard to get their exact investment breakdowns by region and sector but broadly speaking, only a very small percentage of the total assets under management are in China – three per cent or less, based on data from these firms. China's largest private equity firms have little or no investments in North America in general and in the region's clean energy companies or projects in particular. A closer China-US climate relationship could de-risk the investment environment and help increase investments in both directions.



China and US share of global GDP and GHGs
(1) 2023, current prices. *Source: IMF;*
(2) 2022, gigatons. *Source: IEA*

The credit markets are global and relatively open, like the public equities markets. Investors from the two nations can easily purchase fixed income instruments issued by each other's government, state-owned institutions, and corporations. Unlike the public equities markets, China is more active in climate-related bond issuance, including green bonds, impact bonds, or sustainability-linked bonds. It had the largest issuance of climate bonds – $85.4 billion – from its onshore and offshore issuers in 2022, while the US was the second largest with $64.4 billion, according to a report by Climate Bonds Initiative and other institutions. Cumulatively, it was $380 billion from the US and $286.9 billion from China. A rapprochement would help boost these numbers.

On the lending front, there are at least four types of financial institutions: government-related ones; domestic commercial banks; international institutions and multilateral organisations. A closer China-US climate relationship may not raise lending volumes for the first two types of institutions. It could enhance, however, lending by global banks, especially to Chinese companies and projects. It could also motivate some of the key multilateral financial institutions to become more active in lending to clean energy companies and projects, especially those early-stage ones that need to be de-risked. For now, the multilaterals remain quite conservative in their lending, preferring to join syndicates so as to lower their portfolio risk.

In terms of the implication for businesses, the benefits of a rapprochement would also be great, Officially, Chinese and US corporations are allowed to invest in each other's clean energy markets, including renewable energy generation. Unfortunately, the complex relationship between the two has meant that only a trickle of capital has been seen so far. This is an area which could benefit enormously from a better relationship between the two especially if they create investment incentives.

The export of Chinese and US clean energy technologies to each other's markets has in recent years become more cumbersome, particularly given US tariff barriers and export restrictions over certain types of technologies. So far, a relatively bright spot has been solar exports from China. China solar module manufacturing costs was about $0.24 per watt in 2022, calculates Wood Mackenzie. This was eight per cent lower than southeast Asian manufacturers, 27 per cent lower than India's, 54 per cent lower than the EU's, and 57 per cent lower than the US', estimates the consultancy. Regrettably, most of these regions decided that they want to be less reliant on imports and are trying to build up their domestic manufacturing capability and capacity. A relief in tensions, would surely mean a significantly higher volume of clean energy technologies exports.

There are solid grounds to be optimistic over a five-year view and beyond. China and the US are the world's two largest powers and will continue to compete for the foreseeable future.

One scenario is higher barriers and little collaboration in the style of the US and Soviet Union relationship. Another is that the US and China agree that the world is a big place and that working together in some areas is highly economically advantageous to both. Given the worsening climate crisis the latter scenario is more likely.

In the short term, The US IRA (The US Inflation Reduction Act of August 2022) which includes policies to encourage clean energy investments domestically, may give US companies a domestic clean energy focus. Over the longer term, both will find that a closer collaboration and cooperation in some clean energy areas is the most sensible approach for them both as well as for the rest of the world.

Joseph Jacobelli is Managing Partner at direct investments advisor Asia Clean Energy Investments, and at single-family office Bougie Impact Capital. He is an Asia-Pacific energy markets expert with over 30 years' experience. He is author of 'Asia's Energy Revolution', and host of 'The Asia Climate Finance Podcast'.

World's largest clean energy-related ETFs
Data as of 20 July 2023 (EST);
Source: etf.com

ETF	US	China	$,Billion	Tracking
IShares Global Clean Energy ETF (ICLN)	46.5%	10.0%	4.27	S&P Global Clean Energy
Invesco Solar ETF (TAN)	52.9%	18.4%	2.13	MAC Global Solar Energy
First Trust NASDAQ Clean Edge Green Energy Index Fund (QCLN)	94.6%	n.a.	1.73	NASDAQ Clean Edge Green Energy Index
First Trust NASDAQ Clean Edge Smart Grid Infrastructure Index Fund (GRID)	51.8%	n.a.	1.17	NASDAQ OMX Clean Edge Smart Grid Infrastructure Index
Invesco WilderHill Clean Energy ETF (PBW)	88.2%	3.6%	0.76	WilderHill Clean Energy Index [US]
ALPS Clean Energy ETF (ACES)	82.8%	n.a.	0.52	CIBC Atlas Clean Energy Index [North America]
BlackRock World ex U.S. Carbon Transition Readiness ETF (LCTD)	2.9%	n.a.	0.50	No Underlying Index
SPDR S&P Kensho Clean Power ETF (CNRG)	82.9%	4.5%	0.35	S&P Kensho Clean Power Index

Gaining a better insight into the low-voltage grid

In what is claimed to be an industry first, Siemens Grid Software has introduced software that enables distribution system operators to better manage the low-voltage grid and most importantly, significantly increase the capacity of existing grids quickly. **Junior Isles**

According to a McKinsey report published last year, electricity demand is expected to triple by 2050 as electrification and living standards – driven mainly by the growing use of electricity to decarbonise heating, transport and industry. In its 'Global Energy Perspective 2022', the role of electricity in the final consumption mix is projected to grow from around 20 per cent today to 40 per cent by 2050.

At the same time, the power grid is facing tremendous challenges, especially on the low-voltage network. On the consumer (demand) side, the number of electrical vehicles will increase 13-fold, and in Europe alone, 40 to 50 million additional heat pumps are expected to be installed by 2030. On the generation (supply) side, annual grid connection requests are forecast to increase by a factor of 5-8 in the next few years. With most of these changes happening at the distribution grid level, the challenge for distribution system operators (DSOs) is to provide the necessary capacity and connections quickly while dealing with limited resources to keep the grid stable.

To address the challenge, Siemens Grid Software recently introduced its LV Insights X software. The new software, which is part of the Siemens Xcelerator portfolio, has been specifically developed for low-voltage grids. According to Siemens, it enables DSOs to tackle their most pressing challenge: the need to significantly increase grid capacity while grids are already pushed to their limits by the fast increase of decentralised renewable energy in-feed and additional consumers such as EV chargers or heat pumps.

Certainly there is growing concern that power grids are becoming the bottleneck of the energy transition, and many now stress that utilities urgently need to increase their grid capacity and actively manage the low-voltage grid.

Commenting on the situation and the need for the software, Sabine Erlinghagen, CEO of Siemens Grid Software, said: "The low-voltage grid is at the centre of the energy transition because much of the transition is about adding decentralised energy sources to the grid – that's [solar] PV, heat pumps, EVs, etc. This is putting particular stress on the distribution grids, and especially the low-voltage grid.

"At the same time, the LV grid is the least managed part of the grid. With no visibility, there is no capability to manage it. The new [software] product will provide insights that will help to measure and manage the LV grid."

Due to this lack of visibility, utilities typically build-in a large amount of reserve capacity in the grid. Siemens believes that with greater visibility and knowledge of what is happening in the grid, it is possible to have more active management and therefore reduce the amount of reserve grid capacity. According to Erlinghagen, this makes it possible to reduce this reserve from about 50-60 per cent to nearer 30 per cent.

"If you think about the electrification of everything and how much [distribution grid] capacity is needed, there is a case in Norway where they need to double the grid capacity within the next seven years. This means creating the amount of capacity that has been created in the last 100 years, in the next seven. Grid operators tell us it's impossible to build that physically; so you need to squeeze more out of the existing infrastructure."

The use of software is an effective and fast way of doing this. In terms of grid operation, LV Insights X takes advantage of geographical information systems (GIS) data. It uses data from assets on the network to build an electrical model. This data is then "enriched" with "dynamic" data from smart metering and scada (supervisory control and data acquisition) systems to create a near-real-time view of what is happening in the low-voltage grid. For grid planning, the software uses historical data to examine existing stress levels on the grid and determine what is called an impact score.

Erlinghagen explained: "This informs operators of how many grid violations have occurred and how critical they are to the grid. It lets you know how near you are to an outage and how urgent it is to make an investment."

She added: "It is one single application that, based on the same data and the same grid model, provides a planning perspective, an operations perspective and a customer support perspective. Everyone within the DSO shares the same view of the situation, works with the same grid model and can therefore optimise the grid together in a much more efficient way."

According to Siemens, when implementing the LV Insights X software, grid operators will benefit from significant time savings, detailed insights as well as more efficient outage management and optimised workflows. Power utilities can break down data silos across departments, stakeholders, and systems. This reduces data handling efforts by up to 80 per cent and the time required for grid model maintenance by 50 per cent.

A digital twin of a low-voltage grid can be created easily by integrating data from various sources, e.g., GIS, meter data management (MDM) systems, and advanced distribution management systems (ADMS). The complete grid topology and all information on the near-real-time grid status become visible and can be monitored at any time via a modern, browser-based user-centric graphical interface – even via mobile devices outside of the control room. For example, with outage zones being visualised on a map, grid operations engineers can identify outages much faster, while an integrated ping function allows them to quickly check the impact of faults.

In addition, utilities can significantly improve their planning accuracy, optimise their entire planning activities, and increase the effectiveness of their investments.

Uptake of the new software is already gaining traction – in the first instance with DSOs that worked with Siemens to develop it under a "co-innovation" model.

"It is currently being implemented for the city of Oslo, as well as in a couple of other European cities for DSOs that we worked with to develop it," said Erlinghagen. "The DSOs gave us their time and feedback on a very, very frequent basis. And we worked with several of them in parallel in order to ensure we were not building a bespoke solution; we wanted to make sure it met the needs of many."

With some of the benefits already being realised in Oslo, the DSO is now in the process of going live with more functions of the software.

Erlinghagen added: "The functions that go live first differ according to your starting point. DSOs start from different places and have different pain points. While one utility for example, might have more of a pain point with connection requests and the planning side, another might be more interested in looking at outage cases and managing them better. The DSO might want to resolve those outages faster to provide better customer service.

"This is the case in Norway, where it's more about the operational side – managing the outages and delivering a good customer experience. Others we work with come more from the planning and connection request side. They are looking at ways of finding where in the network the grid is most stressed and where investments should be prioritised."

Siemens Grid Software says it is continuously adding new functionality to the software as it works with the DSOs and therefore provides LV Insights X using the Software as a Service (SaaS) concept. SaaS guarantees the fastest possible time to operation and significantly lowers entry costs and risks, combined with high scalability and cyber security standards.

"It is a cloud-native application," said Erlinghagen. The benefit of that is that you constantly add new functionality or improve usability, etc. This is better than an on-premises application where you don't have this advantage."

She concluded: "Our strategy, by-and-large, is to help grid operators to manage their digitalisation transformation. It's about making it as fast, as easy and as scalable as possible. This is important because only with a really nimble, digital system can you get that grid capacity and manage your grid in a holistic way. That means you have to take an integrated perspective on IT and OT, and you need to look at planning, operation and maintenance of grids in an integrated way as well. LV Insights exemplifies that because it can be deployed in just a few weeks."

Erlinghagen: the LV grid is the least managed part of the grid. With no visibility, there is no capability to manage it

Junior Isles

Anyone for weak tea?

I'm not a tea-drinker, unless it's herbal. But I cannot imagine there would be a clamour for "weak tea" in any boardroom or ministerial meeting. Yet that is what was served up at a recent G20 meeting of energy ministers.

At a meeting in Goa, India, last month, energy ministers failed to acknowledge the necessity of phasing down the production and use of fossil fuels. Ministers did not even reiterate last year's recognition of the need to accelerate the phase-down of unabated coal fired power generation. Against a backdrop of record temperatures in cities like Pheonix, USA, and raging wild fires in Rhodes and Corfu, Greece, such a stance appears somewhat incredible.

Commenting on the meeting, Alden Meyer, Senior Associate at E3G, the independent climate change think-tank, said: "With temperature records being set daily around the world and the impacts of climate change spiralling out of control, the world needed to hear a clarion call to action from the G20 energy ministers meeting that just wrapped up in Goa.

"Instead, what we got was very weak tea indeed, with the failure to set strong goals and implementation plans for at least tripling deployed renewable energy capacity worldwide by 2030 and sharp divisions on display around the need for a fair, fast, and equitable transition away from fossil fuels."

Several countries led by Saudi Arabia blocked the move to reduce fossil fuel use. A summary document released several days after the discussions said that some member states had emphasised the need to cut back the use of fossil fuels without the capture of emissions "in line with different national circumstances". But others "had different views on the matter".

Those countries instead want to focus on the development of technology to capture greenhouse gas emissions.

While such a view is not entirely misplaced, it is blinkered. In the face of evident climate change, all of the above are needed, including carbon capture.

The recent annual update of the International Energy Agency's (IEA) online resource tool 'Tracking Clean Energy Progress' reveals remarkable gains in the past year. However, it also stresses that rapid innovation is still needed to bring to market clean technologies for parts of the energy system where emissions are harder to tackle, such as heavy industry and long-distance transport.

"The clean energy economy is rapidly taking shape, but even faster progress is needed in most areas to meet international energy and climate goals," said IEA Executive Director Fatih Birol.

While progress can be observed across all of the 50-plus components of the energy system evaluated in 'Tracking Clean Energy Progress', the majority are not yet on a path consistent with net zero emissions by 2050. Stronger policy support and greater investment are needed across a wide range of different technologies, in all regions of the world, to enable a broader and faster shift towards clean energy to keep net zero emissions by 2050 within reach, said the IEA.

On a positive note, Birol noted: "This update of Tracking Clean Energy Progress highlights some very promising developments, underlining both the need and the potential for greater action globally. The extraordinary growth of key technologies like solar and electric cars shows what is possible."

In another sign the energy transition is taking hold, the IEA now sees electricity generated from fossil fuels falling in four out of the six years between 2019 and 2024. In the past, annual declines in fossil-fired generation were rare and occurred primarily after global energy and financial shocks, when global electricity demand was suppressed. But in recent years, electricity generated from fossil fuels has lagged or fallen even when electricity demand expanded.

That indicates the world is rapidly moving towards a tipping point in which global electricity generation from fossil fuels will increasingly be replaced by electricity from clean energy sources, says the IEA.

In the Tracking Clean Energy Progress update, solar PV has been upgraded to "on track", as its progress now aligns with milestones consistent with net zero ambitions. Solar PV generated a record of nearly 1300 TWh in 2022, up 26 per cent from 2021 and logging the largest absolute generation growth of all renewable technologies in 2022.

Certainly solar and wind are the bright spots. Separate research by the Rocky Mountain Institute (RMI), in partnership with Bezos Earth Fund predict that solar and wind will supply over a third of all power by 2030, helping to limit global warming.

Complementary research from Systems Change Lab, also published last month, shows eight countries have already grown solar and wind generation faster than what is needed to limit global warming to 1.5°C, proving that a rapid transition to renewable energy is possible.

In its World Energy Transitions Outlook published in late June the International Renewable Energy Agency (Irena) called for annual renewable power additions of 1000 GW by 2030, as well as a significant increase in the direct use of renewables in end-use sectors, to keep the 1.5°C climate target within reach. According to the latest edition, some progress has been made, mainly in the power sector with record additions in global renewable capacity of 300 GW in 2022. However, the gap between what has been achieved and what is required continues to grow.

Despite such reports and the best efforts of the Indian presidency, G20 ministers were still unable to make the progress needed on setting an unambiguous global goal of at least tripling renewable energy capacity to 11 TW by 2030, together with implementation strategies to achieve that goal.

Lisa Fischer, Programme Lead at E3G, said: "Wind and solar are mature technologies that will, notwithstanding national pathway choices, shoulder the bulk of energy sector decarbonisation and demand growth globally. A clear commitment to tripling renewable energy capacity installed to 11 TW by 2030 would thus have been an important market signal by the G20. Yet, an unambiguous signal was sacrificed to a quarrel over net zero compliant technologies."

Energy ministers at least made progress on stepping up energy efficiency and deployment of distributed renewable energy technologies, and recognised the need to increase basic energy access and provide low-cost finance for the clean energy transition in developing countries.

Annisa Sekaringtias, Senior Researcher at E3G, said: "For the first time, the G20 energy ministers agree on actions to reach the goal of doubling efforts in energy efficiency, the first fuel in the energy transition. At this point, it remains largely voluntary, putting responsibility on Brazil's presidency next year to encourage countries to collaborate to translate the "Roadmap for Energy Efficiency" into reality.

It is progress but in light of the climate emergency, it is a very small step. Ministers and leaders must intensify discussions in the coming months.

As COP28 approaches, the world now has an even clearer sense of the fault lines that might prevent major countries reaching the transformational outcome it needs at the Dubai climate summit in December.

With G20 leaders preparing to meet again in a few weeks, it is time for a consensus on a timeline for fossil fuel phase-out to be front and centre of the agenda.

As Meyer stressed: "The Indian presidency must not accept this outcome as the final answer. Instead, it should push G20 leaders to put the interests of their people ahead of those of the fossil fuel industry when they meet in September for their summit in Delhi."

India has the opportunity to make its mark in the climate change battle; a chance to flavour what is served up in Delhi. Surely most would prefer a cup of spiced chai over more weak tea.

Cartoon: jemsoar.com