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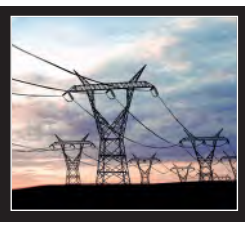

Offshore collaborations

Collaboration is key to solving the issues facing offshore wind expansion. *Page 13*

Final Word

Letting them eat cake is not an option, says Junior Isles. Page 16

News In Brief

Supreme Court sets new limits on action of EPA
The US Supreme Court has limited the Environmental Protection Agency's ability to regulate carbon emissions from existing power plants. *Page 4*

ETS will support Australia's emissions reduction goals
Australia's new Labor government will launch an emissions trading scheme in 2023. *Page 5*

EU taxonomy opposed as Ukraine invasion puts pressure on gas
The EU's attempt to classify energy investments in a so-called 'taxonomy' that makes it clear which are 'climate-friendly' for the purposes of investment is set to face a legal challenge. *Page 7*

'Quick and cheap' renewables key to energy and climate solutions
As the cost of renewables continued to fall last year, solar and wind power additions in 2021 are estimated to save $55 billion from global energy costs in 2022. *Page 8*

EDF to be nationalised as France bets on nuclear for energy security
The French government is to buy-out the remaining shares in EDF that it does not already own for the sum of €9.7 billion in a move to facilitate huge investment in nuclear power. *Page 9*

Nuclear could but won't solve Japan's green energy plight
Japan is looking to nuclear to tackle the energy crisis and at the same time decarbonise its economy. But with public opinion likely to remain sceptical post-Fukushima, it is unlikely that nuclear will solve its problems, says Joseph Jacobelli. *Page 14*

Will the gas crisis plunge the EU into recession?
A full stop to Russian gas could plunge Europe into a full-blown recession, according ING's team of macroeconomists. Therefore, trying to avoid it by jointly coming up with credible demand reduction plans is crucial. *Page 15*

EU moves to tackle looming gas crunch but concerns remain as countries shift back to coal

EU ministers show solidarity in gas crisis

With the real possibility of a complete halt in Russian gas, EU member countries have struck a deal to reduce gas consumption. The agreement, however, comes as individual governments plan a temporary but worrying return to coal and nuclear. **Junior isles**

EU ministers have agreed a deal to reduce gas consumption in the face of a looming energy crisis this winter but there are concerns over several countries reverting to coal fired power generation as the fall-out from Russia's war in Ukraine hits EU energy supplies.

Late last month the EU's 27 ministers compromised on a deal, pledging to reduce gas by 15 per cent on a voluntary basis but with a long list of opt-outs should the target have to be made binding. A week before the deal, the European Commission faced broad backlash after suggesting that it would demand a blanket 15 per cent cut in gas if need be.

Now exemptions are included for island states such as Malta, Cyprus and Ireland that are not directly connected to the European grid, for states that are heavily reliant on gas for electricity and for countries that are exporting gas at 90 per cent of their total capacity to other member states. The amount of gas in storage and demand reductions already achieved should also be taken into account, drafts of the final text said.

The International Energy Agency (IEA) has been warning for many months of what it is calling "the first truly global energy crisis" in history, noting that the situation is especially perilous in Europe.

Fatih Birol, Executive Director of the IEA, recently wrote in an editorial: "The gas crisis in Europe has been building for a while, and Russia's role in it has been clear from the beginning. In September 2021 – five months before Russia's invasion of Ukraine – the IEA pointed out that Russia was preventing a significant amount of gas from reaching Europe. We raised the alarm further in January, highlighting how Russia's large and unjustified reductions in supplies to Europe were creating artificial tightness in markets and driving up prices at exactly the same time as tensions were rising over Ukraine."

Following the invasion on February 24, the IEA released its '10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas', setting out the practical actions Europe could take.

One of the IEA's suggestions is to minimise gas use in the power sector. It said this could be done by temporarily increasing coal and oil fired

Continued on Page 2

High energy prices slow global electricity demand

The world's electricity demand growth is slowing sharply in 2022 from its strong recovery the previous year as economic growth weakens and energy prices soar following Russia's invasion of Ukraine, according to the International Energy Agency's (IEA) latest 'Electricity Market Report'.

Global electricity demand is expected to grow by 2.4 per cent in 2022 after last year's 6 per cent increase, bringing it in line with its average growth rate over the five years prior to the Covid-19 pandemic, the new report says. While electricity demand is currently expected to continue on a similar growth path into 2023, the outlook is clouded by economic turbulence and uncertainty over how fuel prices could impact the generation mix.

Encouragingly, the report noted that renewable power generation is growing faster than overall demand in 2022, leading to a slight decline in global power sector CO_2 emissions despite rising coal use in Europe amid the gas crisis. Strong capacity additions are set to push up global renewable power generation by more than 10 per cent in 2022, displacing some fossil fuel generation.

Despite nuclear's 3 per cent decline, low-carbon generation is set to rise by 7 per cent overall, leading to a 1 per cent drop in total fossil fuel-based generation. As a result, carbon dioxide emissions from the global electricity sector are set to decline this year from the all-time high they reached in 2021, albeit by less than 1 per cent.

In the first half of 2022, average natural gas prices in Europe were four times as high as in the same period in 2021 while coal prices were more than three times as high, resulting in wholesale electricity prices more than tripling in many markets. The IEA's price index for major global electricity wholesale markets reached levels that were twice the first-half average of the 2016-2021 period.

Due to high gas prices and supply constraints, coal is replacing natural gas for power generation in markets with spare coal plant capacity, particularly in European countries seeking to end their reliance on Russian gas imports.

In its latest 'Gas Market Report', the IEA said high gas prices and supply disruptions following the invasion of Ukraine have led to downward revision of forecasts for gas use and casts doubt on the fuel's prospects in energy transitions.

Prospects of a rapid energy transition have been called into question in a recent report. The report from the International Institute for Sustainable Development (IISD), Oil Change International (OCI), and Tearfund warns of two major threats to implementing the COP 26 Statement on International Public Support for the Clean Energy Transition on time.

The report says that some signatories of the COP26 statement, known as the Glasgow Statement, have signalled their intention to allow continued large-scale overseas support to gas, despite their pledge. The report added: "This risk has increased since the war in Ukraine as countries look to replace the Russian fossil fuel supply. Yet, this support is incompatible with the agreed 1.5°C global warming limit, and research shows that clean alternatives are better suited to serve energy security and clean development pathways."

If signatories' development finance institutions, export credit agencies, and government departments fully redirect their $28 billion a year in overseas public finance for oil and gas, they would more than double their international clean energy finance, from $18 billion a year to $46 billion, the report finds.

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Continued from Page 1

generation while accelerating deployment of low-carbon sources, including nuclear power where it is politically acceptable and technically feasible.

It is a move that several countries have made, but one that had initially been met with caution by the Commission. The risk of a total gas supply cut-off by Russia has since, however, led the Commission to draw up a contingency plan recommending that nuclear and coal fired plants be kept in operation.

"We have to make sure that we use this crisis to move forward and not to have a backsliding on the dirty fossil fuels," European Commission chief Ursula von der Leyen said in late June. "It's a fine line and it is not determined whether we are going to take the right turn."

Neil Makaroff, of Climate Action Network, an umbrella organisation for environmental groups, called turning back to coal "a bad choice" with structural consequences.

France, the Netherlands, Austria and Germany have all announced plans to keep coal plants running or re-open previously mothballed plants.

Notably, last month Germany's government passed emergency legislation to keep its 10 000 MW of coal fired power plants operational but says it still aimed to close its coal plants by 2030. The country will also accelerate its so-called Easter package, in which it planned to speed up the installation of renewable energies and self-consumption.

Germany is also reconsidering its position of just a couple months ago when it concluded it was not possible to delay the phase-out of its nuclear plants. It is now preparing a stress test for its electricity system in order to find out whether it will be necessary to resort to the three remaining nuclear power plants it had planned to shut down this autumn.

Similarly, Belgium is also planning to keep its reactors running. In late July, the Belgian federal government and the French group Engie reached an agreement in principle to extend the operation of two nuclear reactors in Belgium for a period of 10 years in order to guarantee energy supply.

De Croo has moved to extend nuclear plant life in Belgium

"A first agreement in principle has been reached between the Belgian state and Engie on the extension of the Doel 4 and Tihange 3 nuclear power plants. The Belgian government assumes its responsibilities so that our country can control its energy supply," Belgian Prime Minister Alexander De Croo announced on his official Twitter account.

- The Ukrainian government announced that it has officially completed its synchronisation with the continental energy grid of the European Union – well ahead of the original 2023 schedule.

Biden mulls declaring climate emergency following EPA court ruling

- Biden announces offshore wind and grid strengthening plans
- Stops short of declaring national emergency as temperatures soar

Junior Isles

US President Joe Biden is said to be close to declaring a climate emergency in an effort to advance his clean energy agenda. The idea comes as the country experiences record temperatures and follows a decision by the US Supreme court that curbs the powers of the Environmental Protection Agency (EPA).

Speaking to *The New York Times* in late July, John Kerry, the US special envoy for climate, said the President was "very close" declaring a national climate emergency and that "it's a matter of timing".

Secretary Kerry said that within the administration, discussions were about when the declaration should be announced, "rather than if it should be done", *The New York Times* reported.

The remarks came while wildfires raged through California, and as Biden announced more climate-related measures including offshore wind development in the Gulf of Mexico and $2.3 billion to help vulnerable communities deal with extreme heat. Texas saw record high temperatures in June and has been experiencing searing temperatures throughout the summer.

The $2.3 billion formula grant programme is designed to strengthen and modernise America's power grid against wildfires, extreme weather, and other natural disasters exacerbated by the climate crisis. Power outages from severe weather have doubled over the past two decades across the US and the frequency and length of time for power failures has reached their highest levels since reliability tracking began in 2013.

Speaking in Somerset, Massachusetts, at the site of a defunct coal fired power plant being transformed into a manufacturing hub for New England's offshore wind industry, Biden promised that more aggressive climate action was coming.

"This is an emergency and I will look at it that way," Biden said but he stopped short of declaring a national emergency. Addressing the question why he stopped short of describing the situation as a climate emergency, Biden said: "Because I'm running into traps on the totality of the authority I have. I will make that decision soon."

A national emergency declaration would give the President power to stop fossil fuel projects at the federal level, and rapidly shift to clean energy in order to carbon emissions without input from Congress. But the move would also likely face a raft of legal challenges from Republican-led states.

At the end of June the US Supreme Court limited the ability of the EPA to limit greenhouse gas emissions from power plants in a landmark ruling that dealt a blow to the Biden administration's fight against climate change. The ruling leaves the Biden administration dependent on passing congressional legislation if it wants to implement sweeping regulations to curb emissions.

More than 1200 environmental and climate groups have reiterated calls for greater action on climate change – noting that none of the plans announced by Biden would do much to cut the fossil fuel use that is largely responsible for global warming.

Energy demand and emissions bounce back, says bp Statistical Review

Energy demand and emissions bounced back to around pre-pandemic levels in 2021, reversing the temporary reduction in 2020 resulting from the Covid-19 pandemic, according to the latest bp 'Statistical Review of World Energy'.

Data from the 71st edition of the Review showed that global primary energy in 2021 increased by almost 6 per cent, more than reversing the sharp fall in energy consumption in 2020 as much of the world locked down. Primary energy use in 2021 is estimated to be more than 1 per cent above its 2019 level.

Commenting on the Review, Spencer Dale, bp's Chief Economist, said: "In many ways, this sharp rebound in energy demand is a sign of global success, driven by a rapid recovery in economic activity as the widespread distribution of effective vaccines allowed for an easing in Covid-19 restrictions in many parts of the world and a return to our everyday lives."

He noted, however that it also highlights that the pronounced dip in carbon emissions in 2020 was only temporary: carbon equivalent emissions from energy (including methane), industrial processes, and flaring increased by 5.7 per cent last year. Smoothing through the impact of the pandemic, it said emissions were broadly unchanged over the past two years.

Encouragingly, the report found renewable energy, led by wind and solar power, continued to grow strongly and now accounts for 13 per cent of total power generation. Renewable generation increased by almost 17 per cent in 2021 and accounted for over half of the increase in global power generation over the past two years.

Solar and wind capacity continued to grow rapidly in 2021, increasing by 226 GW, close to the record increase of 236 GW seen in 2020. China remained the main driver of solar and wind capacity growth last year, accounting for about 36 per cent and 40 per cent of the global capacity additions, respectively.

Meanwhile, hydropower generation decreased by around 1.4 per cent in 2021, the first fall since 2015. In contrast, nuclear generation increased by 4.2 per cent – the strongest increase since 2004 – led by China.

Coal remained the dominant fuel for power generation in 2021, with its share increasing to 36 per cent, up from 35.1 per cent in 2020.

Natural gas in power generation increased by 2.6 per cent in 2021, although its share decreased from 23.7 per cent in 2020 to 22.9 per cent in 2021.

The report also noted that global energy prices increased sharply in 2021, with the most pronounced increase being in the price of natural gas. It said natural gas prices quadrupled in Europe, tripled in Asia, and doubled in the US.

UK eyes biggest market reform in a generation as energy costs bite

The UK's exposure to volatile global gas markets and energy costs for consumers could be radically reduced in the long term, if a recently launched review leads to a transformation of Britain's electricity market design.

In July the government launched the Review of Electricity Market Arrangements (REMA) in a move to tackle higher global energy costs, boost energy security and transition to a cleaner energy system.

With electricity demand set to at least double over the next 13 years, REMA will focus on establishing a fit-for-purpose market design, identifying and implementing the reforms needed to GB electricity markets.

The consultation, which will run until October 10, will fundamentally explore ways of updating the existing pricing system to further reflect the rise in cheaper renewable electricity. This could have a direct impact on reducing energy costs, ensuring consumers reap the full benefits of the UK's abundant wind energy resources.

Some of the changes being consulted on include:

- introducing incentives for consumers to draw energy from the grid at cheaper rates when demand is low or it is particularly sunny and windy, saving households money with cheaper rates
- reforming the capacity market so that it increases the participation of low carbon flexibility technologies, such as electricity storage, that enable a cleaner, lower cost system
- de-coupling costly global fossil fuel prices from electricity produced by cheaper renewables, a step to help ensure consumers are seeing cheaper prices as a result of lower-cost clean energy sources
- varying prices according to location and proximity to power generation assets, such as wind farms.

Through this initial consultation, the UK government will engage extensively with the sector to develop and assess options for reform. Following this consultation, the department will further develop, refine and narrow down options for reform during 2022-2023 before delivering proposed market reforms.

It is understood that some potential changes within the review could be implemented as soon as the middle of next year.

Business and Energy Secretary Kwasi Kwarteng said: "In what could be the biggest electricity market shake up in decades, I am confident that this review will significantly enhance GB's energy security and supply for generations to come."

Deputy Director at Energy UK, Adam Berman, said: "With the cost of energy reaching unprecedented levels, it's right and timely that the government reviews how to provide the most efficient market arrangements to support decarbonisation – so that it reduces bills in the long term."

The current market design, wherein gas sets electricity price has seen energy prices soar due to spiralling global gas prices, and resulted in dozens of energy suppliers going out of business.

Texas users urged to shift demand to avoid rolling blackouts during heatwave

- Crisis highlights lack of interconnection
- Other regions to invest in network, hydro upgrades

Janet Wood

Tesla electric vehicle (EV) owners and bitcoin miners in Texas were among those asked to reduce or shift their power use during a recent heatwave, after the power grid operator warned the state was under the threat of rolling blackouts. Around ten cryptocurrency mining facilities are connected to the grid and demand for cryptocurrency grid connections is expected to grow over the next four years.

The Electric Reliability Council of Texas (Ercot) asked businesses and households to conserve electricity after high demand coincided with gas and coal power plant outages and low wind and solar generation. Other requests from Ercot included asking businesses to reduce operations and requesting that households set their air conditioning to higher temperatures and avoid using large appliances. The crisis came during a recent heatwave that included the hottest four-day period on record in Houston.

Ercot warned of a potential shortage "with no market solution available", and a company spokesperson said: "We have approached all Texans and Texas businesses to conserve energy."

Tesla sent an alert to customers' in-car screens that said: "A heat wave is expected to impact the grid in Texas over the next few days. The grid operator recommends to avoid charging during peak hours between 3pm and 8pm, if possible, to help state-wide efforts to manage demand." This is the second time this year that Tesla has encouraged off-peak charging during a Texas heatwave.

Ercot's system is poorly connected to its neighbours and the inability to import or export power to relieve system stress was highlighted during a winter storm last year that saw customers left without power for several days.

The US government has recently announced plans to invest in upgrading the nation's ageing transmission network. One regional grid operator, Midcontinent Independent System Operator, which covers all or part of Arkansas, Illinois, Indiana, Iowa, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Montana, North Dakota, South Dakota, Texas, and Wisconsin as well as Canada's Manitoba province, recently approved a $10.3 billion expansion of its grid to help move clean energy throughout the Midwest. Up to 18 new high-voltage transmission lines are set to come online from in 2028.

Meanwhile, the DOE has sought input on $600 million of funding to maintain and improve the nation's hydropower plants, which currently supply 6 per cent of all electricity in the USA and 32 per cent of renewables generation. They also represent 93 per cent of all utility-scale energy storage.

Argentina seeks more capacity close to demand

Argentina's federal energy department said it had received bids to install power generation totalling over 8.11 GW, after a call earlier this year for new capacity.

The federal energy department said in a press release over that over 480 energy and energy storage project proposals had been submitted for 20 provinces

Wholesale power market administrator Cammesa is overseeing the process, which also encompasses developing local energy markets. Cammesa was looking for projects sited close to load centres.

Of projects rated at over 100 MW, 34 are solar and wind. Other technologies submitted include biomass, storage, thermal and co-located or hybrid projects. By law, Argentina must generate 20 per cent of electricity from renewables by 2025.

Cammesa will now analyse the proposals and report to the energy department, which will then explore potential regulatory frameworks.

Without local markets, Argentina will have to build new transmission lines to help support continued growth in renewable power generation, tending towards wind in the southeast and PV in the north.

Meanwhile, Argentina's electric power regulator Enre is consulting on proposed grid infrastructure work. Transmission firm Transener has also sought political support for expansion, starting with a 500 kV transformer in Chaco province.

US and Canada move towards formal dispute with Mexico over energy market access

The US and Canada have recently both sought talks with Mexico in a trade dispute over the central American country's energy policies. They both say that the policies have undermined international energy companies and that Mexico has restricted market access and failed to protect investment.

Washington said that Mexico's decision to favour its own Federal Electricity Commission (CFE) was a breach of its obligations under the US-Mexico-Canada Agreement (USMCA).

"Mexico's policies have largely cut off US and other investment in the country's clean energy infrastructure," US trade representative Katherine Tai said in a recent statement.

Canada followed suit, also citing the USMCA breach of obligations. A spokeswoman for Mary Ng, Canada's International Trade Minister, commented: "Canada has consistently raised its concerns regarding Mexico's change in energy policy. We agree with the United States that these policies are inconsistent with Mexico's USMCA obligations."

Mexico's economy ministry said the country wanted to reach a "mutually satisfactory solution" during a 75-day consultation stage. After that period, under USMCA rules, the complainants can request the formation of a dispute settlement panel.

Arturo Sarukhán, a former Mexican ambassador to Washington, said: "There is real concern that Mexico is the odd man out in efforts to truly build a paradigm of North American energy efficiency, security, resilience and independence – on renewables, on hydrocarbons, on the green economy and on climate change."

Supreme Court sets new limits on action of EPA unless directed by Congress

- EPA now requires direct authorisation to limit carbon emissions
- Ruling has implications for other agencies

Janet Wood

The US Supreme Court has limited the Environmental Protection Agency's (EPA's) ability to regulate carbon emissions from existing power plants, in a decision that also threatens actions by other agencies that do not have direct clear congressional authorisation. Following the ruling, the Biden administration must pass congressional legislation if it wants to implement regulations to curb emissions.

In a majority opinion (supported by six of the nine judges) by chief justice John Roberts, the justices ruled that the Environmental Protection Agency, a federal agency, was not specifically authorised by Congress to reduce carbon emissions when it was set up in 1970. The EPA's limits on emissions help to force a nationwide transition away from the use of coal but the Supreme Court said "it is not plausible that Congress gave EPA the authority to adopt on its own such a regulatory scheme" under the law in question.

Roberts said: "A decision of such magnitude and consequence rests with Congress itself, or an agency acting pursuant to a clear delegation from that representative body."

The justices added they doubted Congress intended to delegate the question of "how much coal-based generation there should be over the coming decades, to any administrative agency".

The ruling has implications across government, according to Steve Vladeck, CNN Supreme Court analyst and Professor at the University of Texas School of Law. He said: "For a century, the federal government has functioned on the assumption that Congress can broadly delegate regulatory power to executive branch agencies. Today's ruling opens the door to endless challenges to those delegations."

Justice Neil Gorsuch also said that the opinion would limit the power of agencies, which he considers unaccountable to the public.

Justice Elena Kagan, writing for the dissenters, said that the court's decision "strips" the EPA of the "power Congress gave it to respond to 'the most pressing environmental challenge of our time.'" US Department of Health and Human Services Secretary Xavier Becerra said the ruling is "a public health disaster", saying "a failure to regulate power plant emissions will lead to increases in asthma, lung cancer, and other diseases associated with poor air quality".

A White House official said: "While the Court's decision risks damaging our ability to keep our air clean and combat climate change, President Biden will not relent in using the authorities that he has under law to protect public health and tackle the climate change crisis."

The ruling placed new pressure on negotiations over a package of clean energy tax credits and other emissions-cutting programmes but in late July lawmakers reached a compromise on the package.

Uruguay joins race to become green hydrogen exporter

Uruguay is the latest country to announce plans to produce hydrogen for export after Walter Verri, interim Minister of Industry, Energy and Mining, said his country planned to export hydrogen by 2030.

Verri said the current environment-driven changes in the energy industry were "driven by environmental reasons", and "it implies a radical change".

He said that after a history of using renewable energy, Uruguay is moving towards what it calls "the second energy transition" which would include production of green hydrogen. To achieve that, Uruguay has produced an inter-institutional green hydrogen roadmap, which will allow the generation of green energy for both heavy transport and industry. "Uruguay is positioned on the world map as a pure hydrogen exporter," said Verri.

The roadmap includes a pilot that he said "will allow us to acquire knowledge and develop capacities". In fact, private projects are already being developed, including a methanol production project, Verri said, adding: "We have an adequate country framework to attract investments."

ETS will support Australia's emissions reduction goals

- Emissions trading scheme targets industrial emitters
- Renewables and storage gain momentum in Queensland

Syed Ali

Australia's new Labor government will launch an emissions trading scheme (ETS) in 2023 after the previous conservative administration reversed its first attempt to put a price on carbon nearly 10 years ago.

The new ETS would apply only to industrial emitters such as smelters, miners and manufacturers. It would exclude electricity generators and emissions from buildings, transport and agriculture, and would be a softer policy than those in Europe, Britain and North America.

Energy minister Chris Bowen said last month that the policy, which is much weaker than the previous scheme, would end "10 years of policy dysfunction" on climate change. It will come into force on July 1, 2023 following industry consultation.

The conservative Liberal-National Coalition government, which was in power in Australia from 2013 to 2022, watered down or repealed Labor's climate policies and introduced few stringent measures of its own.

Labor, led by Anthony Albanese, won an election in May promising to end the "climate wars" and, since taking office, has raised Australia's 2030 emissions reduction target under the Paris agreement to 43 per cent, up from 26 to 28 per cent.

Renewables combined with energy storage will play a major role in reaching the target, and several states continue to make progress in building new projects.

In early July, the Queensland government-owned energy generator Stanwell unveiled revealed plans to a build a 1.45 GW/2.9 GWh battery energy storage system (BESS) alongside the coal fired Stanwell power station, near Rockhampton.

According to the planning report, the BESS would be installed on a 12 ha site near the Stanwell plant and would be built in two stages. The first phase would involve the installation of lithium-ion batteries with an output of 150 MW/300 MWh. Stage two could use lithium-ion or flow battery technology with an output of up to 1300 MW/2600 MWh.

The news follows an announcement of another BESS to be erected in southeast Queensland. In late June Queensland's publicly-owned CS Energy and Powerlink said they will build a 200-MW/400 MWh battery probably at Powerlink's Greenbank substation, which is currently the preferred location.

This is one of 13 batteries that will be rolled out across the Australian state with funds from the 2022 Queensland Budget.

The Greenbank battery system will be installed, owned and operated by CS Energy, while Powerlink will provide land and connection services.

"Large-scale batteries like the one planned for Greenbank allow us to capture the energy generated by Queenslanders, and best use it for Queenslanders," said Treasurer Cameron Dick, noting the state's high rate of rooftop solar and adding that the batteries support its 50 per cent renewable energy target by 2030.

Minister for Energy, Renewables and Hydrogen Mick de Brenni said the new commitment will increase the battery storage Queensland's publicly-owned power companies are investing in from 430 MW to more than 720 MW.

Japan signals return to nuclear as winter looms

The Japanese government says it will aim to restart up to nine nuclear reactors to address a looming winter electricity shortage. According to Prime Minister Fumio Kishida, the plan will allow the country to secure about 10 per cent of its electricity needs from nuclear energy.

A likely power shortage crunch and Russia's invasion of Ukraine have renewed hopes that the country will be able to resolve the paralysis in its energy strategy since it closed its nuclear reactors. Before the Fukushima Daiichi nuclear accident in 2011, Japan sourced about a third of its electricity from 54 nuclear reactors. Now, only four of the units are operational and 10 have received restart approvals.

Commenting on the restart plan Kishida, stressed: "Safety will be a prerequisite for taking this forward." Noting that the country lacked natural resources, he added: "We need to have a balanced mix of various energy sources."

Kishida said having nine reactors in operation this winter will ensure enough power sources to cover about 10 per cent of Japan's total energy consumption.

Nuclear is key as South Korea braces for inflation and energy shocks

Korea should fine-tune its export competitiveness and seek a more extensive use of nuclear power in order to combat inflation and energy shocks, the country's top energy policymaker has said.

According to Trade, Industry and Energy Minister Lee Chang-yang, the nation's import-oriented power plan will remain extremely vulnerable to global commodity price volatility, unless policy goals are reoriented to prioritise energy efficiency and better use of nuclear power.

In his first official press conference since taking office, Lee said: "The approach to mitigating the two shocks is two-pronged. One is to increase competitiveness in exports and promote energy efficiency, as underpinned by better and more extensive use of nuclear energy."

He said the ministry's energy policy directives announced last month are reflective of the new priorities – a set of measures that will "fortify" the nation's energy security and limit energy shocks at the same time.

To this end, the Cabinet approved the administration's energy policy direction, which is aimed at raising the share of nuclear energy in total power generation to 30 per cent or more, up from the current level of 27.4 per cent.

The Yoon Suk-yeol administration's energy policy direction invalidates that of the previous Moon Jae-in administration in October 2017, which supported a decade-long project for nuclear power phase-out.

The ministry forecasted "the ratio of dependency upon fossil fuels will decline from 81.8 per cent in 2021 to the 60 per cent range in 2030, if the administration successfully implements the harmonised operation of nuclear energy, renewable energy and hydrogen energy".

For renewable energy, the government decided to revise the optimal ratio of resources such as solar and wind power in total power generation in the fourth quarter of the year.

- Korean Register (KR) has signed a Memorandum of Understanding agreeing to technical cooperation in the development and construction of offshore wind power projects with Korea Electric Power Corporation (Kepco). Kepco plans to build a 2.7 GW offshore wind power plant by 2029, near the Korean southwest coast.

Pivot to renewables strengthening in Asia but coal still dominant

About 66 per cent of Asia's power capacity growth from 2021 to 2031 will come from non-hydropower renewables, according to a press statement from Fitch Solutions Country Risk & Industry Research.

From year end-2021 to 2031, the organisation expects Asia's non-hydropower renewables sector to grow by 1327 GW, as pressure mounts to diversify the power sector away from fossil fuels brought on by rising decarbonisation aims and energy market volatility.

The reports says elevated fossil fuel prices have strained various Asian markets' ability to suppress electricity prices and match power demand during the hot summer period, exposing vulnerabilities for power markets that rely heavily on fossil fuels to meet their electricity demand.

"The pivot to non-hydropower renewables will see more frequent non-hydropower renewable project auctions launched by governments across the region. This will pose further upside to our already constructive forecast for renewables growth over the coming years as the project pipeline strengthens. Within the non-hydropower renewables sector, the solar and wind power sub-sectors will lead the sector's capacity growth, at a total of 727 GW and 497 GW, respectively," it stated.

The statement highlights that while solar power leads non-hydropower renewables capacity additions, wind represents the larger share of the sector's generation additions. This is mainly due to wind power technology's higher energy conversion efficiency compared to solar PV.

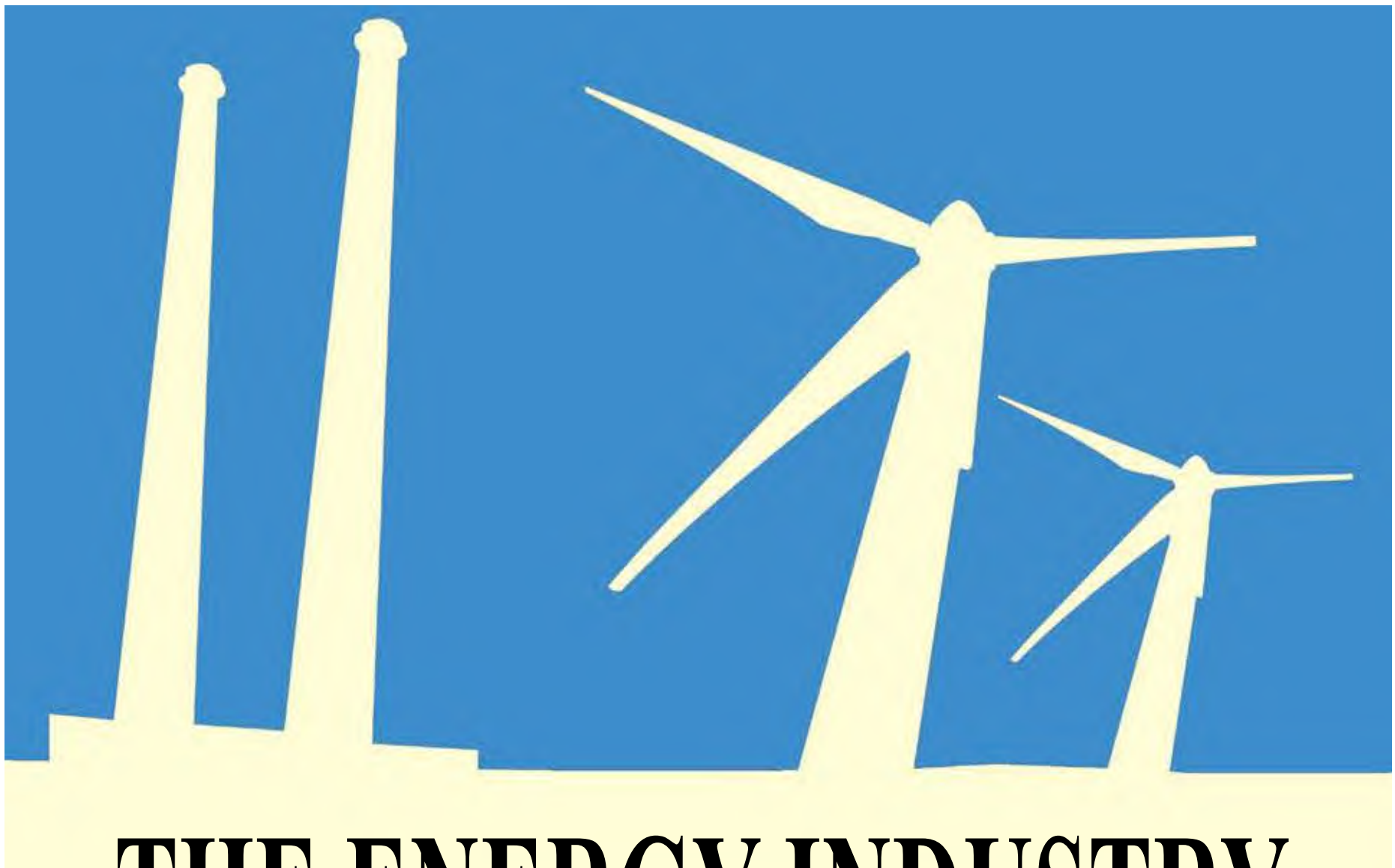
"We expect technological developments in the wind turbine manufacturing industry to benefit Asia's wind power markets as well, further supporting generation growth. This will mainly be experienced in the offshore wind power sector, where turbines have better power generation capacity factors," said the research organisation.

The news, however, came as bp's latest Statistical Review of World Energy stressed that the region's dependence on coal remains significant, representing nearly half of its primary energy consumption.

In 2021, coal consumption grew more than 6 per cent globally to its highest level since 2014, the data shows. China and India accounted for almost three-quarters of the growth in demand.

The data revealed Asia-Pacific's dependency on coal shows little sign of waning. This is partly due to the region's soaring demand for energy, driven by the industrial powerhouse of China, responsible for more than half of the region's consumption.

This came as electricity needs rose again following the recovery in economic activity after the pandemic, and wind and solar also contributed more than 10 per cent of energy sources for the first time.



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UK set to invest in massive new generation capacity

■ Development consent for Sizewell C ■ Contracts for difference for 11 GW of renewables

Janet Wood

The UK government has granted development consent for the Sizewell C 3.2 GW, twin-reactor nuclear power plant on the east coast. Although the Sizewell C plant remains subject to a final investment decision, expected next year, the government itself has taken an option on part-ownership of the plant.

Sizewell C is expected to cost around £20 billion in 2015 prices and would be paid for through a surcharge on customer energy bills as well as £1.7 billion of taxpayers' money.

Tom Greatrex, Chief Executive of the Nuclear Industry Association, said: "This is a huge step forward for Britain's energy security and net zero ambitions." He added: "Sizewell C will be one of the UK's largest ever green energy projects, and this decision significantly strengthens the pipeline of new nuclear capacity in Britain." The Sizewell C plant is a key part of the UK government's ambitious plans to start work on eight nuclear reactors by the end of the decade.

But the project still faces local opposition. "Not only will we be looking closely at appealing this decision, we'll continue to challenge every aspect of Sizewell C because… it remains a bad project and a very bad risk," argued Alison Downes of the Stop Sizewell C campaign.

Meanwhile the government has provided further financial support for nuclear, in the form of a new £75 million fund to support domestic production of nuclear fuel. The Nuclear Fuel Fund will award grants to projects that can increase the UK's domestic nuclear fuel sector.

The decision came as the UK unveiled the results of its latest auction of so-called 'contracts for difference', which offer 11 GW of green energy projects a stable price for 15 years. The contracts included 7 GW of offshore wind, which bid at lower prices (£45/MWh) than solar and onshore wind and ten onshore wind contracts totalling 900 MW.

Ørsted, Vattenfall, and Scottish Power were among the winners of the offshore wind contracts. Kwasi Kwarteng, Business and Energy Secretary, said: "The more cheap, clean power we generated within our own borders, the better protected we will be from volatile gas prices that are pushing up bills."

The contracts for wind and solar projects would save £7 billion on electricity costs under wholesale prices seen during the current gas crisis, equivalent to over £100 per home, analysis by the Energy and Climate Intelligence Unit found. Dr Simon Cran-McGreehin, Head of Analysis at ECIU said: "To keep bills low, these new wind farms can't come online soon enough."

Work set to start on GB-Germany interconnector

Work to build the NeuConnect interconnector will start this year, after a consortium of more than 20 banks and other investors reached financial close on the €2.8 billion investment.

The European Investment Bank (EIB) will contribute up to €400 million for the financing of the European part and will be joined by the UK Infrastructure Bank and the Japan Bank for International Cooperation.

The project will be the first interconnector between Germany and the United Kingdom, facilitating electricity trade between the European Union and the GB markets. It is expected to go into commercial operation in 2028.

The 750 km cable for the high-voltage direct current link will pass through German, Dutch and British waters. It will have a rated capacity of 1400 MW and DC voltage of 525 kV. It will connect to Tennet's electricity network near Fedderwarden and at the Isle of Grain in the United Kingdom. Siemens has been appointed as the contractor for the converter stations, and Prysmian will manufacture and install the cable.

EIB Vice-President Ambroise Fayolle, said: "This project is groundbreaking for the energy transition, as it makes it possible to use offshore wind energy more efficiently."

EU must act to support ocean renewables

The EU has to act now if it is to meet its 100 MW ocean energy deployment target by 2025, according to a new report by Ocean Energy Europe (OEE).

The organisation highlighted new developments being made in ocean energy outside the bloc, such as revenue support in the UK and Canada, a €500 million package in the US, and deployment in China's Five-Year Plan. The UK granted contracts for difference to four tidal stream projects in its auction earlier this year, having 'ring-fenced' a portion of funding for ocean technologies.

OEE said Europe has not matched the pace of other countries and risks losing its competitive advantage. It suggested an action plan focused on improving the funding available to ocean energy, making it easier to access and improving coordination with Member States, as promised in earlier EU strategies.

That included leveraging programmes such as Horizon Europe to get pilot farms in the water and EU requirements for ocean energy projects in new National Energy & Climate Plans.

Remi Gruet, Chief Executive of OEE, said: "Ocean energy targets in the Offshore Strategy are exactly what Europe needs right now – it's clean and home-grown, and can create hundreds of thousands of jobs. But implementation is just as important. If Europe wants to stay out in front, it needs to act now."

'Climate friendly' taxonomy opposed as Ukraine invasion puts pressure on gas

■ Austria plans to lead legal challenge
■ Bloc agrees short and long term measures to reduce gas use

Janet Wood

The EU's attempt to classify energy investments in a so-called 'taxonomy' that makes it clear which are 'climate-friendly' for the purposes of investment are set to face legal challenge.

At issue is the inclusion of gas fired generation and nuclear as 'green' options, which have attracted opposition, for different reasons. The two sources had already been the subject of a year of debate within the EU over their status, until the European Parliament passed the law establishing the taxonomy.

The EU taxonomy does not ban investments in fuels that are not labelled as green, but it incentivises investors to choose projects within the taxonomy, to ensure they would be classified as 'climate friendly' to meet environmental standards.

Now Austria is seeking support from other European Union countries for a legal challenge to the taxonomy. Austrian climate minister Leonore Gewessler said: "We have several other states who've been very critical of, and very vocal also in their criticism, on the delegated act. And so we will also look for further allies in the lawsuit." It has already won backing for the challenge from Luxembourg.

Austria's lawsuit will argue that neither fuel deserves a green label and also question whether Brussels used the correct law-making process.

Including gas in the taxonomy also met opposition over the use of gas supplies from Russia. Sandrine Dixson-Declève, member of the Platform for Sustainable Finance, said: "In light of Russia's invasion of Ukraine, it is ludicrous that the EU continues to legitimise gas as green as planned at the start of the year. No credible institution can sanction the Russian invasion of Ukraine with one hand, and push ahead with plans to incentivise investments which include Russian fossil gas supplies with the other."

EU financial services chief Mairead McGuinness said the law would ensure that investments in gas and nuclear met "strict criteria".

Meanwhile, the EU has tried to speed up a reduction in gas use across the bloc, recently gaining agreement to cut gas use across the bloc by 15 per cent this winter.

The EU Energy Council recently agreed a revised Renewable Energy Directive (RED) and Energy Efficiency Directive which stress the need to accelerate the deployment of home-grown renewables in order to strengthen EU's energy security.

They agreed the expansion of renewables and the linked expansion of on- and offshore grid infrastructure in Europe should be considered a matter of "overarching public interest" and "public safety".

Floating PV for Portugal and the Netherlands

EDP has installed a 5 MW floating solar farm on a reservoir in Alqueva, expected to provide 7.5 GWh annually – the second floating plant built in Portugal, after EDP's pilot project in Alto Rabagão. It has 12 000 PV panels occupying 4 hectares. It will be combined with power from the hydroelectric energy from the Alqueva dam and a planned 1 MW battery.

Furthermore, EDP plans to install up to 70 MW of floating PV.

"Floating solar technology, in which EDP is a global pioneer, is a remarkable leap forward in the expansion of renewables and in accelerating the decarbonisation process. And our hybridisation strategy, by combining water, sun, wind and storage, is clearly a logical path," commented Miguel Stilwell d'Andrade, Chief Executive of EDP.

Meanwhile RWE has commissioned its first floating project, with over 13 000 solar panels totalling 6.1 MW at the Amer power plant in Geertruidenberg, Netherlands on a lake whose waters were once used as cooling water. The power plant already has 0.5 MW of roof-mounted PV and 2 MW of ground-mounted PV.

Roger Miesen, Chief Executive of RWE Generation and Country Chair for the Netherlands said: "With Solar Park Amer we demonstrate that it is possible to turn conventional asset sites into landmark projects that promote innovative solutions for a sustainable electricity system."

‘Quick and cheap’ renewables key to energy and climate solutions

- Solar and wind almost always cheaper than coal
- Global trade needed to unlock green hydrogen potential

Nadia Weekes

As the cost of renewables continued to fall last year, solar and wind power additions in 2021 are estimated to save $55 billion from global energy generation costs in 2022, according to a report by the International Renewable Energy Agency (IRENA).

Despite supply chain challenges and rising commodity prices, most newly installed renewable power in 2021 had lower costs than the world’s cheapest coal fired option in the G20. The cost of electricity from onshore wind fell by 15 per cent, offshore wind by 13 per cent and solar photovoltaic (PV) by 13 per cent in 2021 compared with 2020, the report found.

Thanks to their relatively short project lead times, solar and wind power represent vital planks in countries’ efforts to swiftly reduce and eventually phase-out fossil fuels while providing cost-effective electricity, the report states.

“Renewables are by far the cheapest form of power today,” said Francesco La Camera, Director-General of IRENA. “2022 is a stark example of just how economically viable new renewable power generation has become. Renewable power frees economies from volatile fossil fuel prices and imports, curbs energy costs and enhances market resilience – even more so if today’s energy crunch continues.”

High coal and fossil gas prices in 2021 and 2022 will profoundly deteriorate the competitiveness of fossil fuels and make solar and wind even more attractive, IRENA said. New fossil gas generation in Europe will increasingly become uneconomic over its lifetime, increasing the risk of stranded assets.

Between January and May 2022, the generation of solar and wind power may have saved Europe fossil fuel imports to the tune of at least $50 billion, the report estimates.

In a separate report, IRENA also highlighted the role of green hydrogen trade in diversifying energy imports and improving energy security, allowing countries to decarbonise their economies.

Trade allows countries to tap into affordable hydrogen as the scale of projects progresses and technology matures, the report finds. One-quarter of the global green hydrogen demand could be satisfied with international trade through pipelines and ships, it estimates.

Hydrogen trade is essential to reaping the benefits of the falling cost of renewables and the huge potential of global hydrogen, according to IRENA’s Director-General Francesco La Camera.

“A mix of innovation, policy support and scaling up can bring the necessary cost reduction and create a global hydrogen market. Whether trade potentials can be realised will strongly depend on countries’ policies and investment priorities and the ability to decarbonise their own energy systems,” he said.

IRENA’s World Energy Transitions Outlook sees hydrogen covering 12 per cent of global energy demand and cutting 10 per cent of CO_2 emissions by 2050. Yet, hydrogen can only be a viable climate solution if the power needed to produce it comes in addition to the electrification of the energy system, placing an even greater uptake of renewable power at the heart of the transition.

New trade markets would lead to different roles for energy players. Some of the largest potential exporters of hydrogen by pipeline in 2050 are Chile, North Africa and Spain. Major consumers like China and the US are able to produce most of their hydrogen domestically. Africa, Australia and North America account for three-quarters of global exports, while Japan, South Korea and the EU are expected to satisfy a large share of their hydrogen demand through imports.

In early July, it was reported that the EU was looking to close a green hydrogen deal with Namibia as part of its efforts to wean itself off Russian fuels. A memorandum of understanding (MoU) on hydrogen could be ready for signing at the UN Climate Change Conference that will take place in November in Egypt, according to news reports.

Under the REPowerEU plan, the EU aims to produce 10 million tonnes and import another 10 million tonnes of green hydrogen by 2030. Germany has already unveiled a green hydrogen partnership with Namibia.

Ivory Coast boosts electricity capacity with Azito Phase IV completion

GE and Azito Energie S.A. have started operations at the Azito Phase IV natural gas fired simple cycle power plant in Abidjan, making Azito the largest gas power plant in the Ivory Coast to date.

The plant will add 180 MW of electricity to the country’s national grid, which represents approximately 8 per cent of the country’s installed capacity and is sufficient to power more than 300 000 Ivorian homes.

Located in the Yopougon district of Abidjan, the plant was supplied by GE with a GT13E2 2012 MXL2 gas turbine including power generation equipment, analytics and controls software, as well as a 20-year service agreement to manage all aspects of the project’s life cycle.

“Because of its relevance in providing energy to the people of Ivory Coast, the commissioning of the Azito Phase IV power plant is another milestone in ensuring energy efficiency for generations to come,” said Luc Aye, Managing Director of Azito Energie S.A.

Azito power plant will use big data analytics to monitor and diagnose possible issues, improve capacity planning and drive improved efficiency, availability and flexibility.

“This project supports Ivory Coast’s plans for transition towards lower-carbon power generation through gas and renewables,” said Kenneth Oyakhire, Services Director, GE Gas Power Sub-Saharan Africa. GE has been present in Sub-Saharan Africa for almost 70 years.

Nuclear power can unlock route to 2050 decarbonisation

- Nuclear can support transition to renewables
- Industry needs government support to prosper

Nadia Weekes

Nuclear power has the potential to help countries transition to net zero energy systems dominated by renewable energy sources, but only if it wins government support, adopts new technologies and reduces costs, according to a report by the International Energy Agency (IEA).

Nuclear is today the second largest source of low-emissions power after hydropower, with nuclear power plants in 32 countries. About 63 per cent of today’s nuclear generating capacity comes from plants that are more than 30 years old, however.

“In today’s context of the global energy crisis, skyrocketing fossil fuel prices, energy security challenges and ambitious climate commitments, I believe nuclear power has a unique opportunity to stage a comeback,” said IEA Executive Director Fatih Birol. He said this would only happen if governments put in place robust policies to ensure the long-term safe and sustainable operation of nuclear power plants and to mobilise the necessary investments, including in new technologies.

Birol also said the nuclear industry “must quickly address the issues of cost overruns and project delays” that has led to advanced economies losing market leadership: 27 out of the 31 reactors that started construction since 2017 are Russian or Chinese designs.

Without further efforts, the IEA sees the nuclear fleet operating in advanced economies shrinking by one-third by 2030. While 19 countries currently have reactors under construction, nuclear power faces public and political opposition in some countries. The IEA makes no recommendations to countries that choose not to make use of it in their energy mix.

Global nuclear capacity must double to 812 GW by 2050 in a net zero scenario, according to the IEA. Global annual investment in nuclear power would be $100 billion per year by 2030 under this scenario, while without new construction and life extensions, plant retirements will see nuclear’s share of global electricity fall from 10 per cent today to 3 per cent in 2050.

The IEA foresees small modular reactors (SMRs), which are generally defined as advanced nuclear reactors with a capacity of less than 300 MW – or about one-third of a traditional plant – leading the way in the future.

The lower cost, smaller size and reduced project risks of SMRs may improve social acceptance and attract private investment. They are not yet commercially available, however, and their successful long-term deployment hinges on strong support from policymakers to mobilise investment and streamline regulatory frameworks.

Responding to the report, Sama Bilbao y León, Director General of the World Nuclear Association, said: “The IEA’s report is clear: a low-carbon, sustainable, affordable and secure energy future needs nuclear… Coordinated action is needed now to maintain our existing nuclear plants and to ramp up the deployment of new nuclear capacity worldwide. The nuclear industry is ready to rise to the challenge,” he added.

Meanwhile, Russian state nuclear corporation Rosatom has announced the start of construction at the El-Dabaa nuclear power plant in the Governorate of Matrouh on Egypt’s Mediterranean coast.

The project will be the first nuclear power plant in Egypt and Rosatom’s first major project in Africa. It will comprise four units of 1200 MW each equipped with a Generation III+ VVER-1200 reactor. Construction is expected to cost $30 billion.

Egypt will access an export loan of $25 billion to cover 85 per cent of the construction work. The remainder should be covered by private investors. Egypt is due to start payments on the loan, with an annual interest rate of 3 per cent, in October 2029.

Delivering a stable energy transition

The retirement of large coal, gas and nuclear power plants, combined with the rapid rise of variable renewable energy is making the operation of a stable transmission network increasingly difficult. Siemens Energy describes the solutions that are available to network operators and offers a glimpse of some of the more advanced technologies it is developing. **Junior Isles**

Europe, and indeed many parts of the world, is at a crossroads. As the electricity sector works its way through the energy transition, grid operators are faced with one overarching challenge: how to keep power grids stable as it shifts from a centralised, fossil fuel-based market to one that is increasingly underpinned by variable renewable generation in a more distributed network.

As Europe faces searing temperatures and the crisis in Ukraine deepens, never has it been clearer that there is a need to accelerate the deployment of wind and solar to address the twin threats of climate change and the need for energy independence. Yet without an adequate electricity network to deliver renewable energy to homes, businesses, and EV (electric vehicle) charging stations, the green transition will be ineffective.

Speaking at a conference co-organised by E.DSO and ENTSO-E – the organisations representing Europe's distribution system operators (DSOs) and transmission system operators (TSOs) – Sonya Twohig, ENTSO-E Secretary General, said: "Innovation in power system distribution and transmission and its fast uptake is key to Europe's energy transition. The needs for flexibility will ramp up to ensure the stability and security of a power system with an increasing share of variable renewable energy sources."

It is an area that Siemens Energy also agrees is crucial. The company noted that while grid expansion must be accelerated in order to meet future electricity demand, strengthen resilience and ensure security of supply, the ever-growing amount of decentralised and fluctuating renewables poses new challenges for grid stability. It said that the expansion not only calls for new high voltage direct current (HVDC) lines, but also requires investment in grid stabilisation.

Hauke Jürgensen, Senior Vice President High-Voltage Grids at Siemens Energy, explained: "Looking at it from the transmission side, it's clear that less fossil-based generation, i.e. rotating equipment in the form of turbines on the grid, and more volatile wind and solar leads to grid instability. This means you need solutions to replace the missing rotating equipment that provides inertia and ensures frequency stability."

Volker Hild, Siemens Energy's Vice President Grid Stabilisation, added: "More and more power plants are being retired – coal obviously, as well as nuclear in parts of Europe and maybe gas later on. With all these retired power plants in Europe, as well as North America, this means inertia is missing and therefore short-circuit power is missing. Solar and wind farms can hardly, if at all, provide this inertia and short-circuit power. It's a problem for the overall stability of the network, and this is why we are seeing a big demand for grid stabilising solutions."

Jürgensen: You need solutions to replace the missing rotating equipment that provides inertia and ensures frequency stability

In a rapidly changing energy world, grid operators need a quick solution to respond to fluctuations when power plants are shut down and renewables are added

Grid operators are seeing these instabilities in the form of voltage fluctuations, frequency deviations and situations where they are operating in contingency or emergency modes for much longer periods of time.

To counter these problems, which can manifest at various voltage levels in the network, Siemens Energy recommends a top-down approach in terms of where to target stabilisation. Hild explains that, if the necessary stability and interconnection can be provided at the high voltage level, it will also help stabilise the network at the lower voltage levels.

"If you try to provide stabilisation at the lower voltage level, it will have less of an effect at the higher voltage level. So it is more or less a top-down approach. There are needs on the distribution side but because it can be done easier and with less investment, there is less public focus on it," he said.

Transmission grid stabilisation technologies are essentially split into two main categories: Static Synchronous Compensator (STATCOM) devices and synchronous condensers.

STATCOM devices are essentially based on power electronics, which allow voltage to be adjusted in the network within milliseconds by injecting or absorbing reactive power. The technology is categorised under Flexible AC transmission system (FACTS) devices.

Typical applications are in electric power transmission, electric power distribution, electrical networks of heavy industrial plants, arc furnaces, high-speed railway systems and other electric systems, where voltage stability and power quality are of the utmost importance. STATCOMs have been deployed in hundreds of applications around the world and according to Siemens Energy, demand is increasing every year.

The technology is based on voltage source converters (VSCs) with semiconductor valves in a modular multi-level configuration. The STATCOM design and fast response makes the technology very convenient for maintaining voltage during network faults (as STATCOMs are capable of providing fast fault current injection limited to the rated current), enhancing short-term voltage stability. In addition, STATCOMs can provide power factor correction, reactive power control, damping of low-frequency power oscillations (usually by means of reactive power modulation), active harmonic filtering, flicker mitigation and power quality improvements.

Like STATCOMS, the need for synchronous condensers (sometimes called a rotating phase shifter) has also increased significantly over the

last few years. This piece of equipment is essentially a generator weighing several hundred tonnes, which spins purely to provide a rotating mass and therefore inertia. It does not produce energy but is driven up to the network frequency using a motor, leaving the rotor to spin at the network frequency. This rotating mass essentially provides the inertia that would have come from the turbines of the retired conventional power plants. Again, Siemens Energy says it sees a growing demand for such equipment across Europe, the US and other parts of the world.

Choosing between the two technologies depends on the network's needs. "It always depends on the electrotechnical aspect that is missing," explained Hild. "If it is voltage support or reactive power, then you use STATCOM; if it's missing inertia or short-circuit power due to power plant retirements, then it's most likely a synchronous condenser."

While it is easier to identify things such as voltage deviations through flickering lights, for example, assessing whether inertia or short-circuit power is needed in the grid, is

Siemens Energy's synchronous condenser and flywheel at their arrival at Moneypoint power station in Ireland

something only a grid operator can identify through measurements and calculations. "It's a matter of how easily failures in the network could lead to blackout," noted Hild. "If the network is weak because rotating mass is missing, then short-circuit power is low. This means that even a small variation in voltage or power flow could cause load shedding and potential blackouts in regions. This is why network operators always check the strength of the network in terms of inertia and short-circuit power and how stable voltage and frequency are."

The Moneypoint project, which Siemens Energy is working on in Ireland, is a good example of how grid operators are providing grid inertia using synchronous condensers.

At the end of April last year the company secured a €50 million contract to supply a synchronous condenser system to the Electricity Supply Board (ESB), Ireland's leading energy company. The grid stabilising system will be developed at the Moneypoint power station located in southwest Ireland near Kilrush, County Clare.

ESB recently announced the launch of Green Atlantic @ Moneypoint, an ambitious plan to transform the County Clare site into a green energy hub, where renewable technologies will be deployed over the next decade with the capacity to power 1.6 million homes. The synchronous condenser, a key component of ESB's Green Atlantic @ Moneypoint project, will be the first in the country and incorporate the world's largest flywheel used for grid stability.

The facility will enable an increased integration of wind power into the Irish grid by providing sufficient inertia for frequency support, short-circuit power for system strength and reactive power for voltage control. The project is expected to enter operation this summer.

Commenting on the project, Hild said: "The site has existing coal fired power plants that ESB want to retire in the near future. At the same time, a number of wind farms are being built in the western part of Ireland, which need to be connected to the Irish and then subsequently the European grid. So here we have the dual effect: a lot of wind power is being injected into the network, which we know will soon become much weaker because the large coal fired power plant will retire. This is why ESB identified the need for a large synchronous condenser in the Moneypoint area so that the grid can handle the influx of wind power."

He added: "Since the mass of the generator cannot provide enough inertia, a flywheel, which is simply a rotating mass, is placed on the extension of the rotor shaft. The size of the flywheel is determined by the required electrical features – the amount of inertia, short-circuit power and maybe reactive power. Depending on the requirements, we determine whether a larger generator with a smaller flywheel, or a smaller generator with a larger flywheel, or a large generator without a flywheel is the best and most economic choice."

Just last month, a similar project began operation in the UK with the commissioning of two synchronous condenser units at the Killingholme power station in Lincoln. The project included the re-purposing of two steam turbine generators and installing flywheels at the site. The technology will allow Uniper to deliver essential grid stabilising services to National Grid ESO without the need to generate power.

Siemens Energy was appointed to provide the solution after Uniper was awarded four six-year contracts by National Grid ESO in 2020 to provide inertia services and voltage control to the grid under phase 1 of its Stability Pathfinder at its Killingholme and Grain sites.

Another important more recent technology in the field of grid stabilisation is what Siemens Energy calls a frequency stabiliser. Currently in the finalisation stage, the company has secured its first order for its 'SVC PLUS FS' (Frequency Stabiliser) for a project in Germany.

Essentially, it is a STATCOM that includes a large number of super-capacitors. A super-capacitor is a high-density energy storage device that typically stores 10 to 100 times more energy per unit volume or mass than electrolytic capacitors. It can accept and deliver charge much faster than batteries, and tolerates many more charge and discharge cycles than rechargeable batteries.

The frequency stabiliser will allow operators to absorb or inject reactive power for voltage stabilisation like a STATCOM. In addition, however, if the network frequency is dropping due to high loads or large fluctuations due to a solar or wind farm dropping out, the SVC PLUS FS recognises the frequency deviation. In the case of a frequency drop, it injects the active power stored in the super-capacitors within seconds. Such an injection of active power will have a stabilising effect on the frequency.

Hild added: "The reason we are doing this with super-capacitors and not with batteries is because frequency support needs a high amount of active power in a very short, limited time. Unlike batteries, super-capacitors can charge or discharge within seconds. Batteries are used for storing energy, which is then delivered in minutes or hours. So, if it's an imminent network contingency case where there is a major problem, you need very fast reacting devices. The utility we have sold this to in Germany has a strong need for that frequency support and other TSOs in Germany have already identified a large number of installations that will be needed over the next few years."

Looking further down the line, there are a few other important technologies that are under development. The UPFC (Unified Power Flow Controller) PLUS is one such technology that is already part of the Siemens Energy portfolio. The technology is based on power electronics, which actively adjusts the power flow in an AC network within milliseconds.

It can rapidly bypass overloaded line sections, provide reactive power and dynamic voltage control, and utilise assets to physical limits without the need for safety margins.

"An existing AC network is like a highway where there are multiple lanes. In a high-voltage transmission line there are several circuits that are interconnected and there are different loads on it. Depending on where the generation feeds in and where the demand is, it can lead to an over-utilisation of one line. This means you can exceed the load that one line can safely carry, while another line in the other circuit might be under-utilised."

Hild: We are seeing a big demand for grid stabilising solutions

According to Siemens Energy, there are limited options in the market for managing such scenarios, apart from physically switching lines on and off or switching loads from one circuit to another. This, however, is not fast and requires manual intervention.

"The UPFC PLUS is a fully automated system that will actively adjust the impedance of the transmission line and therefore make the load flow differently, since current always flows in the path of least resistance," said Hild.

When managing a fully loaded network during a fault, the line loading will be at 100 per cent, which will cause a voltage drop. Because of this, reactive power will need to be provided to ensure stability. Also, when managing or changing the load flow during a network fault it is possible that there will be some stability problems in the transmission line or network that will require insertion of active damping. The UPFC PLUS provides active damping by injecting a voltage with a controlled magnitude and angle to ensure that the line and voltage are in phase.

With a UPFC PLUS the load can be balanced across numerous lines in milliseconds. When the network is healthy there is no time pressure to balance the flow, this can often be in the range of several minutes, but when a fault occurs you must act in milliseconds. The first requirement for any active or dynamic load flow management is to perform the load flow management in two time zones, both for slow control and fast control.

This is where UPFC PLUS outperforms other flow management components. In the field of dynamic load flow management, it supplies fast

To provide maximum inertia, synchronous condensers solution can be extended with additional rotating mass from a flywheel

Special Technology Supplement

Recently, Siemens Energy has secured its first order for its 'SVC PLUS FS' (Frequency Stabiliser) for a project in Germany

response in terms of active power management, coordinated reactive power control and can insert active damping to ensure stability. For effective dynamic load flow management, a response time in milliseconds is required to balance the load during the fault condition and manage the network integrity in terms of stability and thermal limits. This is achieved by the voltage source converter, which is one of the main components of the UPFC PLUS system.

According to Siemens Energy, UPFC PLUS can easily be implemented in an existing grid and allows fast reaction times for an efficient load flow management. With this option and the high dynamic control, transmission assets can be operated closer to their physical limits. UPFC PLUS is therefore seen as an innovative solution to meet with the growing requirements of the grid through dynamic load flow management that adapts easily to changing in-feed from renewable sources.

Nevertheless, the choice between the array of technologies that can be used to strengthen grids and provide grid stability and how the various technologies should be deployed is largely down to the planning of the TSO and its network analysis. This gives a clear indication of what is required, where, and when. At the same time STATCOM after STATCOM cannot be indefinitely placed on a network. As a network becomes weaker, small adjustments of reactive power or voltage can lead to quite a significant impact on the network.

Hild explained: "Just think of a branch on a small tree; if it's a very tiny branch, i.e. a weak branch, it doesn't take much force to move it away but if it's a large branch, it would take much more force to move it. It's the same on a network. If a network is weak, a small injection of voltage or reactive power could lead to a significant impact. "This is why you always need a good mixture of power electronics which controls voltage and power regulation fast, and inertia and short-circuit power, which comes from either power plants or synchronous condensers. You cannot ignore one or the other."

Looking further to the future and the need for this mixture, Siemens Energy is now developing a technology that is kind of a combination of both STATCOM and synchronous condenser – capable of meeting many of the requirements at the same time. Known as an Asynchronous Rotating Energy System Stabiliser (ARESS), it consists of a rotating machine similar to a synchronous condenser but is a different type of electrical machine in that it is asynchronous and uses power electronics to adjust the machine's performance.

Hild noted: "With this technology, we are able to provide much stronger support in the network with the regards to inertia and reactive power. It's kind of like a Swiss Army knife of different solutions we have combined in one technical offering."

Siemens Energy is developing the technology with Amprion for the 50 Hz market, as well as with Dominion Energy in the US for the 60 Hz market. "Both utilities have identified the clear advantage of having such a multi-tool solution, and were willing to collaborate closely with us on the development of this technology," said Hild.

Compared to traditional power flow controllers, UPFC PLUS controls power flow in just milliseconds

Currently R&D activities are proceeding "at full speed", with execution of the first project set to begin in 2023 and commissioned in 2025.

Commenting on the project, Hild said: "Since we are doing the project in collaboration with TSOs, we give them certain results and they simulate the performance and give us feedback for us to incorporate back into our design."

Although ARESS can perform the task of STATCOMs and synchronous condensers, Hild does not see it replacing them. "With any multi-use offering, like a Swiss Army knife, it can do quite a lot but it cannot perform specific functions as well as a tool specifically designed for a purpose. Also, if you only have a voltage problem, why go for a solution that has many more features that you don't require? You end up paying for something you don't need.

"The use cases [for ARESS] are in situations where many individual challenges for grid stabilisation come together but none of the challenges are unusual enough to require a uniquely designed solution."

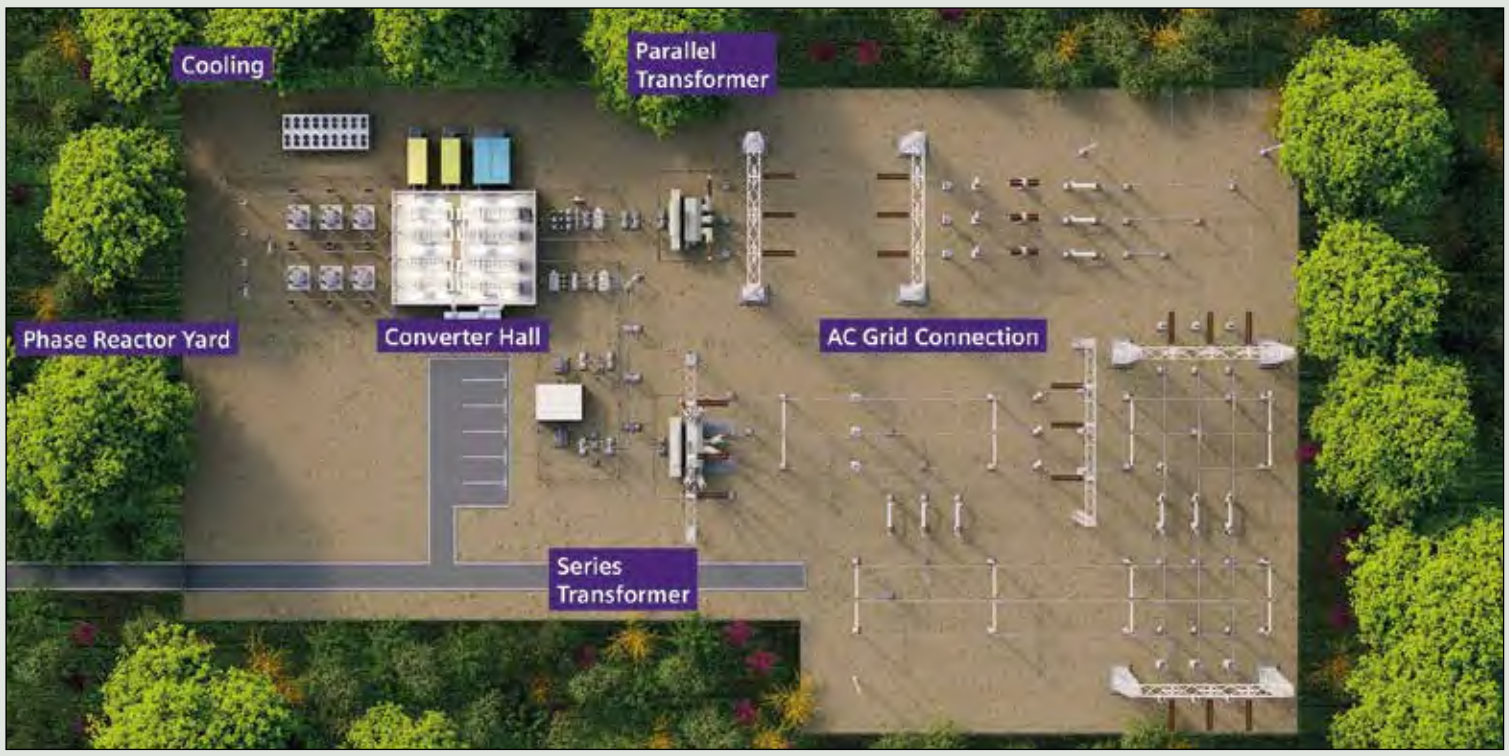
No doubt there will likely be other challenges in the future, as the network topology changes with increasing renewables. For example, Hild believes that while the addition of more battery storage will help the integration of renewables by providing energy when the sun is not shining or the wind is not blowing, it will make regulation of the network more complicated.

"In the future you will be injecting or absorbing energy at many more multiple points in the network, unlike today where there are a smaller number of power plants or large in-feeds to the grid," noted Hild.

Siemens Energy believes that with all of its technologies, it has a powerful portfolio that targets various stabilisation problems in the network and can combine these solutions according to the specific AC network requirements.

But its message is clear. Jürgensen summed up: "TSOs really underestimated the scale of the challenge that closing all of these large power plants would present to the grid. What is actually needed to stabilise the frequency of the grid is quite tremendous. In addition to all the transmission projects that we have, we are seeing a similarly high demand for grid stabilisation; and urgently. We cannot wait 10 years to do it, otherwise you really jeopardise the stability of the grid.

"Grid planners need to plan ahead – carefully consider this effect and plan the investment that is needed."



Aerial view of various components in a typical UPFC PLUS system

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EDF to be nationalised as France bets on nuclear for energy security

- Government to pay nearly €10 billion for remaining shares
- Cash injection will help attract investment for new nuclear fleet

Junior Isles

The French government is to buy-out the remaining shares in EDF that it does not already own for the sum of €9.7 billion ($9.9 billion) in a move to facilitate huge investment in nuclear power to guarantee energy security while cutting CO_2 emissions.

The deal announced by Prime Minister Élisabeth Borne last month envisages taking over the outstanding 16 per cent of shares and 60 per cent of the power company's large debt by means of a compulsory purchase, should this be necessary.

The €12-a-share offer is a premium of 53 per cent to the closing value of €7.84 for EDF shares on July 5, the day before Borne announced the nationalisation plan.

"We must have full control over our electricity production and performance," Borne said as she laid out her government's priorities in her first major speech to France's parliament. "We must ensure our sovereignty in the face of the consequences of the war (in Ukraine) and the colossal challenges to come... That's why I confirm to you the state's intention to own 100 per cent of EDF's capital."

The aim is for the deal to go before the financial supervisors by the start of September after parliament has approved the funding.

It has been more than 20 years since France built its last reactor but earlier this year, President Emannuel Macron said the country would build a new nuclear fleet, to eliminate reliance on Russian gas and achieve carbon neutrality by 2050. In February he said up to 14 reactors would built and announced the construction of at least six new reactors by EDF by 2050, with an option for another eight.

EDF, however, has been facing financial difficulties and has experienced shutdowns at some of its 56 reactors due to technical problems. EDF's nuclear production accounted for 69 per cent of France's electricity supplies in 2021. However, this supply level is expected to fall to the lowest level in more than three decades this year because of a combination of maintenance, refuelling and repairs at 12 reactors.

The plant closures have forced the company to turn to expensive wholesale markets for electricity, forcing the company into further debt. The company already carries a liability of €43 billion.

The programme for EDF to build six new European Pressurised Reactors (EPRs) is expected to cost EDF in the region of €50 billion, which will need to be financed with debt.

In an internal memo to staff in July seen by the *Financial Times*, EDF Chairman and CEO Jean-Bernard Lévy said facing up to future projects as a listed company had become too difficult.

"If the delisting does not solve all of our regulatory, industrial and financial problems, and particularly the scale of our debt, it does allow us to start finding solutions."

In addition to nationalising EDF, French Finance Minister Bruno Le Maire said that Levy, 67, who took EDF's helm in 2014, will step down.

Hitachi Energy extends collaborations

Hitachi Energy is continuing to form strategic alliances that will further decarbonisation in the energy sector.

Last month it signed a Memorandum of Understanding (MoU) with H2 Green Steel to leverage electrification, digitalisation, and hydrogen to support the decarbonisation of the steel industry.

The MoU outlines a collaboration which is built on three pillars: 1) Hitachi Energy's equity investment in H2 Green Steel; 2) products and services from Hitachi Energy that are needed to construct and improve the electrical infrastructure to power steel production and giga-scale electrolyser plants; and 3) green steel to be used in the manufacturing of Hitachi Energy's products, once H2 Green Steel starts production.

Steel production at H2 Green Steel's plant in Boden, Sweden, will use green hydrogen instead of coal in a fully integrated process using end-to-end digitalisation, which reduces up to 95 per cent CO_2 emissions compared to traditional steelmaking.

Over the past decade, expanding steel production has increased total energy demand and CO_2 emissions, which contributes to about eight per cent of the world's global industrial carbon emissions.

The MoU follows an agreement signed in late June between Hitachi Energy and Petrofac, an international service provider to the energy industry. The two companies have entered into a collaboration to provide grid integration and associated infrastructure to support the rapidly growing offshore wind market.

This collaboration builds on the complementary core technologies and expertise of both companies in offshore wind to support the decarbonisation of power systems and deliver clean energy. It covers high-voltage direct current (HVDC), as well as high-voltage alternating current (HVAC) solutions.

According to Hitachi Energy, its HVDC Light and modular HVAC grid technologies and solutions combined with Petrofac's engineering, procurement, construction and installation capabilities for offshore platforms and offshore and onshore civil works, will bring considerable benefits to the efficient implementation of offshore wind projects and help accelerate the energy transition.

UK government struggles to sell Bulb

The British government's planned sale of failed UK energy supplier Bulb has attracted just one bid. The government has been trying to sell Bulb since it collapsed last November but an auction for the company has seen only Octopus Energy make an offer.

The government stepped in to ensure that Bulb's 1.6 million customers would still receive energy and aimed to sell the business by the end of July. It placed the company into 'special administration', a measure designed to protect customers if a large energy supplier becomes insolvent. It enables a business to continue to trade as usual, and if circumstances permit, to be sold at the appropriate time, in full or in part.

London-based Bulb, which caters to 5-6 per cent of the UK energy market, said the massive rise in gas prices meant it was unable to raise the financing it needed from investors to keep on operating.

Bulb was the biggest supplier out of 31 companies that have failed since the middle of last year as a result of poor capitalisation and inadequate hedging that left them unable to manage the sharp rise in gas prices.

Centrica, the largest UK supplier, had been tipped to lodge a bid but pulled out of the competition in June. Abu Dhabi-based Masdar, which had also been in discussions with the government, declined to submit a bid but may provide financing for Octopus, according to a report in the *Financial Times*. A government official confirmed that only one bid had been received.

The government is now in a weakened position as it attempts to agree terms for a sale of Bulb, which is burning through taxpayer money and losing staff. The company is already expected to cost the government at least £2.2 billion, marking the biggest state bailout since Royal Bank of Scotland in 2008.

A ministerial meeting was held last month to discuss options for Bulb, which could still include dividing up its customers between other suppliers or handing incentives to Octopus to take them on.

The cost of transferring customers of a failed business is borne by households through extra charges on customer bills.

The terms of Octopus's offer are not yet clear. Sources told the *FT* that the government could decline Octopus's bid, although it is keen to sell the business as it is losing money as a result of government rules that do not allow it to hedge – or buy in advance the energy it sells.

GE unveils new brand name for future energy business

GE's existing energy portfolio of businesses is to be re-branded under a plan for the future companies it will create through its planned separation into three industry-leading, global, investment-grade public companies focused on the growth sectors of healthcare, energy, and aviation.

The energy portfolio including Renewable Energy, Power, Digital, and Energy Financial Services, will sit together under the new brand name GE Vernova.

Following the spin-off of healthcare in 2023, GE plans to execute the tax-free spin-off of GE Vernova in 2024.

GE said its portfolio of energy businesses, together with its customers, provides one-third of the world's electricity and is focused on accelerating the path to reliable, affordable, and sustainable energy.

The new name is a combination of "ver", derived from "verde" and "verdant" to signal the greens and blues of the Earth, and "nova," from the Latin "novus," or "new," reflecting a new and innovative era of lower carbon energy that GE Vernova will help deliver, said GE.

"With an installed base of more than 7000 gas turbines and 400 GW of renewable energy equipment, GE Vernova's Monogram will serve as a reminder of the company's lasting commitments to deliver quality, partnership, and ingenuity to its customers," it stated.

The news came as GE Renewable Energy decided to withdraw its plan for the construction of an offshore wind blade manufacturing plant in Teesside, UK. LM Wind Power was to operate the facility, which was intended to manufacture 107 m-long blades for the company's Haliade-X offshore wind turbines. The blades from the facility were to go to the Dogger Bank offshore wind farm. Operations were slated to begin in 2023.

Americas

Brazilian transmission line contract for Neonergia

Neonergia, a subsidiary of Iberdrola, has won two contracts in July with a combined value of $1 billion in a tender by Brazil's National Electricity Agency (Aneel) to construct transmission line projects in Brazil.

The first contract is the construction of a 1700 km transmission line between the states of Minas Gerais and São Paulo. This is scheduled to be completed 60 months from the signing of the contract, which is expected to take place at the end of September 2022.

The second contract involves the construction of a 291 km transmission line in the state of Mato Grosso do Sul. Aneel said that it expected this project to be completed in 48 months.

Nordex wins 456 MW Brazil wind turbine order

A joint venture between Macquarie Asset Management's Green Investment Group and Hydro Rein has placed an order with the Nordex Group for the supply and installation of 80 N163/5.X turbines for the Feijão wind farm in Brazil. The order also includes a 20-year service agreement for the turbines.

The 456 MW wind farm will be built in the states of Piauí and Pernambuco in the northeast of Brazil. The Nordex Group will supply and install the 80 N163 turbines from autumn 2023. The wind farm will start operation in spring 2024.

The wind farm is part of the renewable energy project known as Feijão – a combined wind and solar energy project by the Green Investment Group and Hydro Rein with a total capacity of 586 MW.

Vestas wins 266 MW US wind turbine order

Vestas has won an order from Omega Energia for 59 V136-4.5 MW wind turbines for the 266 MW Goodnight I wind project in Texas, USA. The order also includes a 30-year service agreement.

The contract covers supply and commissioning of the turbines. Turbine delivery will start in Q2 2023 with commissioning scheduled for Q4 2023.

Design contract for carbon capture in Canada

A contract for a Front-End Engineering Design (FEED) study of a CO_2 capture plant has been awarded by Capital Power to Mitsubishi Heavy Industries Engineering (MHIENG). This is for natural gas turbines for a repowered combined cycle power plant in Alberta, Canada.

The objective of this FEED study is to implement the CO_2 capture plant at the repowered Genessee Units 1 & 2, owned by Capital Power. MHIENG will use its Advanced KM CDR Process at these units. The company expects to capture approximately 3 million tonnes per year of CO_2. The captured CO_2 will be transported and sequestered underground.

Operation with this system is scheduled in 2023 and 2024 at units 1 and 2, respectively.

Asia-Pacific

Cable protection for Taiwan wind farm

CRP Subsea has secured a contract from Seaway 7 to provide 140 Njord-Guard cable protection systems and bellmouths for Changfang and Xidao (CFXD) offshore wind farms located 11 to 25 km off the west coast of Taiwan. The cable protection systems and bellmouths will protect the inter-array and export power cables for 62 wind turbines with a combined capacity of 589 MW, with horizontal directional drilling (HDD) conduit cables, from fatigue damage due to the significant wave and current forces in the region.

Project engineering works will commence immediately, with project commissioning split into two phases scheduled for completion in 2022 and 2023.

Toshiba wins GIS order from Tepco Power Grid

Tokyo Electric Power Company (Tepco) Power Grid (PG) has placed an order with Toshiba for a gas-insulated switchgear (GIS) that uses natural origin gases. This will be the first GIS for power transmission systems of a transmission system operator (TSO) in Japan to use natural origin gases. Installation is scheduled for completion by the end of 2022.

The order is for a 72 kV GIS, a replacement for equipment at Tepco PG's Fuchu substation. Rather than using SF_6, this uses a mixture of nitrogen and oxygen as its insulating medium.

Hiroshi Kaneta, Director, Vice President of Toshiba ESS's Grid Solutions Division said: "We will continue working to help achieve carbon neutrality by actively developing this and other similar environmentally friendly products."

Hitachi Energy electrical equipment heads offshore

Hitachi Energy will supply WindSTAR transformers, and the high-voltage hybrid switchgear Plug and Switch System (PASS) to China's Tuci offshore wind power project. These will enable the wind farm to operate at 66 kV.

The 280 MW Tuci offshore wind farm is being developed by China General Nuclear Power Corporation (CGN) off the northeast coast of Xingshan in Zhejiang province. The wind farm will have 35 turbines, each with an 8 MW capacity, and transmit power to shore via a 66 kV submarine cable.

Hitachi Energy will install 66 kV WindSTAR power transformers and 72.5 kV high-voltage hybrid switchgears in each turbine, both part of Hitachi Energy's OceaniQ portfolio for offshore applications.

Bladon to supply MTGs to Philippines

An order for 200 micro turbine gensets (MTG) to the Philippines has been won by Bladon Micro Turbine. The order was from connectivity system integrator One Commerce. The first MTG has been installed at an off-grid telecom tower site in northern Luzon.

The Philippines has over 27 000 telecom towers serving three mobile networks. It is difficult to maintain coverage across an archipelago of over 7000 islands. Thousands of sites have relied on traditional diesel generators to provide round the clock power, often on islands that are difficult to reach. Bladon's MTG, with its microturbine technology, eliminates the need for frequent service visits and reduces fuel costs.

Siemens Gamesa order for Gunwi wind farm

SK D&D has ordered 15 wind turbines from Siemens Gamesa for its 75 MW Gunwi wind farm in South Korea, scheduled for commissioning in 2024. Siemens Gamesa will supply 15 units of its SG 5.0-145 wind turbine.

Siemens Gamesa also signed a 20-year long-term service agreement to provide O&M services.

The Gunwi wind farm will be located in Gunwi-gun, Kyongsangbuk-do province.

Europe

Siemens Energy wins largest offshore connection

Siemens Energy has won the largest offshore grid connection order in its history. The DolWin4 and BorWin4 power links will transport up to 1.8 GW from several offshore wind farms in the German North Sea. Amprion Offshore commissioned Siemens Energy to supply the converter stations for the first grid connection projects.

The order value is in the "high three-digit million euro range", making it the largest offshore grid connection order Siemens Energy has yet received.

Siemens Energy's scope of supply consists of two converter platforms at sea and two associated stations on land. The two connections will be installed in parallel and are scheduled to begin operating in 2028.

Siemens Energy will build the land converter stations near Amprion's Hanekenfähr substation in Lingen in southern Emsland. The grid hub currently connects the Emsland nuclear power plant to the transmission grid, which is scheduled to be shut down at the end of 2022. DolWin4 and BorWin4 will replace the generation capacity.

Siemens Energy will also maintain the converter solutions for 10 years.

Polish wind farm order for Nordex

The Swedish wind farm developer OX2 has placed an order with the Nordex Group for the supply of eleven N149/5.X turbines for the Wysoka wind farm in Poland. The order includes a 30-year service agreement for the turbines.

The 63 MW Wysoka wind farm will be built 125 km southeast of Koszalin in the northwest of Poland. The N149/5.X turbines will be supplied on tubular steel towers with 125 m hub heights.

Installation of the turbines is due to begin mid-2023 with commissioning following in 2024. OX2 will then take over technical and operational management of the wind farm for the owner, the Ingka Group.

UK's Hornsea 3 to be connected

Hitachi Energy has won a contract from Ørsted to provide two HVDC systems to transmit electricity from the 2.85 GW Hornsea 3 wind farm, located 120 km off the UK east coast. Hornsea 3 will be the largest offshore wind farm in the world.

Hitachi Energy is supplying four HVDC converter stations. Two of the converter stations will be installed on offshore platforms and two at mainland grid connections.

The overall HVDC system, including the offshore platform, is being delivered in partnership with Aibel. Hitachi Energy will supply HVDC Light converter systems, while Aibel will deliver the HVDC offshore converter platforms. The platform is based on Hitachi Energy's modular HVDC system including its control and protection system, MACH.

Wärtsilä 50SG engines for 75 MW Termoli plant

Wärtsilä has won an order from Italian energy utility Metaenergiaproduzione to supply engines and auxiliaries for a 75 MW power plant being built in Termoli, Italy. FATA is constructing the plant.

The scope of delivery includes four Wärtsilä 50SG engines, plus auxiliaries, control panels, technical advisory services, the operators' interface system, and commissioning.

The engines will operate on natural gas but can also run on sustainable fuels, as well as hydrogen blends. The engines are scheduled for delivery in early 2023, with the plant becoming operational a few months later.

The plant will be on call by Terna, the national transmission system operator, to supply energy on demand to compensate for fluctuations in supply from solar and wind sources.

International

Saudi Aramco awards Jafurah project to Kepco

Saudi Aramco has awarded a contract to a consortium led by Korea Electric Power (Kepco) to develop an independent steam and power producer project in Jafurah, Saudi Arabia. The project will be developed under a public-private partnership model.

Synergy Consulting was responsible for consultancy to the consortium. The cogeneration plant is planned to have a power generation capacity of between 270 MW and 320 MW.

MAN PrimeServ wins O&M extension in Kenya

MAN PrimeServ, the after-sales brand of MAN Energy Solutions, has signed a five-year extension of its O&M contract with Triumph Power Generating, an IPP in Kenya. The contract is for Triumph's 83 MW plant in Kitengala, Kenya, which consists of ten Himsen 18H32/40 engines and one steam turbine.

Additionally, MAN applied a turbocharger upgrade package and implemented the MAN control and protection concept to improve reliability, efficiency and output of the engines.

The original contract with MAN PrimeServ was in December 2016, after MAN had won an international tender for the day-to-day management of third party equipment.

Henning Hansen, Head of MAN PrimeServ O&M Execution, said: "Taking over a power plant already in commercial operation, built and operated by unknown EPC and O&M contractors, was something we had never done before. The project posed many challenges."

Hybrid wind and solar project for Turkey

A hybrid wind and solar project will be developed in Turkey. Sertavul, the plant owner, is expanding an existing 32 MW wind farm commissioned in 2020 with a 30 MW solar plant. GE and Inogen will build the development for Sertavul.

Inogen will perform site activities and deliver the sun tracking systems for the solar modules that will help increase the total energy production of the power plant.

GE will deliver seven of its Flex-Inverter solar power conversion units. This project is the first installation of GE's 4.7 MW solar solution worldwide.

Hydrogen

Hydrogen research stays on track despite concern over hydrocarbons

High crude oil prices brought on by the war in Ukraine has shifted the world's energy focus to securing sufficient oil and natural gas supplies, making it seem that the attention placed on hydrogen at the start of this year has evaporated. But fortunately, it has not. New developments – some of them surprising – continue to be announced every day, along with innovative government and public projects.

Gary Lakes

A Hong Kong-based company named EPRO Advanced Technology, or EAT, has developed what might prove to be a safe and effective solution for transporting hydrogen in bulk. The company has come up with a silicon-based powder it calls Si+ powder. The powder is made using electricity and a metallurgical-grade silicon, which is sand or crushed-up recycled solar panels and electronics. The process of infusing hydrogen into the silicon creates a porous powder that can be easily and safely transported.

Hydrogen can be produced by pouring the Si+ powder into water and giving it a stir. The mixture will begin to produce hydrogen at temperatures between 0 and 80°C. The product is hydrogen gas and silicon dioxide, silica – sand, which can then be used in concrete or for other purposes.

Meanwhile, in Japan, where companies are struggling to secure LNG supplies but have managed to reduce their use of Russian oil, the NTT Anode Energy Corporation is planning a new research and development project jointly with the National Institute of Advanced Industrial Science and Technology (AIST) and Toyota Tsusho that will study safety measures for the mass transportation of hydrogen through existing pipeline infrastructure.

The research involves studying a hydrogen pipeline once it has been placed inside an existing pipeline and measuring leakage, control sequences, performance evaluation and abnormality verification for the purpose of setting technical standards. The study will also determine transportation costs, energy input and the economic efficiency of using existing infrastructure.

Hydrogen is expected to play an important role in decarbonising the country's transport sector. Japanese automaker Toyota recently announced that it will introduce light-duty hydrogen fuel cell electric trucks to the market next year in partnership with Isuzu, Hino Motors and the Commercial Japan Partnership Technologies Corporation. A statement released by Toyota said the vehicles could be used in situations where the small trucks are required to drive long distances over extended hours to perform multiple delivery operations in one day.

"The use of FC (fuel cell) technology, which runs on high energy density hydrogen and has zero CO_2 emissions while driving, is considered effective under such operating conditions," Toyota said in the statement. Toyota began developing fuel cell vehicles in 1992 and produced the Mirai hydrogen fuel sedan in 2014.

Hydrogen-fuelled fuel cells for transport is gaining traction around the world. Industrial gases giant Air Products stated last month (July) that it will put a further $4 billion into its transition to clean energy during the next five years through new investments or modifications in existing assets including low and zero carbon hydrogen as well as carbon capture technologies.

The international corporation, headquartered in the US, said it would increase its use of renewable energy and has already said it will convert its fleet of 2000 trucks to hydrogen fuel cell vehicles. Through its policy of reducing carbon dioxide emissions, the company intends to reach net zero by 2050. The company has already announced investment of some $11 billion in its operations that will lead to zero or low-carbon hydrogen production.

There was also an interesting development in the US power sector last month. In the small town of Hannibal, Ohio, a gas fired power plant successfully tested the use of 15-20 per cent hydrogen. Long Ridge Energy Terminal was supplied with hydrogen gas in mid-July by General Hydrogen's Corporation plant in Proctor, West Virginia, to run the test at its 485 MW plant in Hannibal.

The Long Ridge power plant will eventually switch to 100 per cent hydrogen. Officials from both companies said their partnership was a step towards transitioning to a carbon-free future.

In developments elsewhere, it was announced that Portugal is to be the home of a new joint venture that will build a 'world class' facility for the production on an industrial scale of e-sustainable fuels (e-SAFs) based on green hydrogen and biogenic carbon dioxide. Hamburg-based P2X-Europe and the Navigator Company have formed P2X-Portugal, which will be located in Figuera da Foz. The plant could eventually produce 80 000 tons annually of renewable power-liquid products that would reduce carbon emissions by 28 000 tons per year.

The partners are to make a final investment decision (FID) in mid-2023 for the project, which will require an estimated investment of €550-600 million in capital expenditure. The facility will include a green hydrogen production unit and biogenic carbon dioxide capturing equipment. The initial production capacity of e-SAFs could amount to 40 000 tons and production could begin in mid-2026.

Gas

IEA to EU: Winter is coming

The gas challenge is on in the European Union. In the months ahead the EU will learn just how dependent it is on Russia for supplies of natural gas and whether other suppliers, particularly the US, can meet European demand with cargoes of LNG. Critical action is needed to avoid a difficult winter.

Gary Lakes

On July 18, the Executive Director of the International Energy Agency (IEA) Fatih Birol urged Europe to take serious steps quickly in order to stave off "a very difficult winter." Following a 10-point plan that the IEA released in late February after Russia had invaded Ukraine, the IEA advised the EU to take steps to reduce its reliance on Russian gas. In his latest commentary, Birol listed five coordinated actions that the EU should take immediately in order to diminish the risk of gas shortages in the coming months:

- Encourage industrial users to reduce demand through auctions
- Minimise the use of gas for generating electricity
- Enhance coordination among gas and electricity operators across Europe
- Bring down household electricity demand by setting cooling standards and controls
- Harmonise emergency planning across Europe

Birol reminded his readers that in September last year, the IEA had pointed out that Russia was preventing significant amounts of gas from reaching Europe. Then in January, the IEA further "raised the alarm, flagging that Russia was creating 'artificial tightness in the markets' and driving up prices at exactly the same time as tensions were rising over Ukraine". After that, the IEA issued its 10-point plan to reduce EU demand for Russian gas.

Those recommendations included: maximising gas supplies from other sources; accelerating the deployment of solar and wind; making the most of existing low emissions energy sources, such as renewables and nuclear; ramping up energy efficiency measures in homes and businesses; and taking steps to save energy by turning down the thermostat.

According to Birol, Europe needs to fill its gas storage facilities to 90 per cent capacity by October 1, something that is possible, he said, but which requires immediate action.

"In my conversations with European leaders, including at the G7 Summit in Elmau, Germany, and in a meeting [in mid-July] with European Commission President Ursula von der Leyen and all the EU Commissioners, I have been urging them to do all they can right now to prepare for a long, hard winter. It is encouraging to see the readiness of key European leaders to be proactive on this issue. It will require strong resolve and determination to see it through," Birol said in his commentary.

On July 26, EU energy ministers reached a deal designed to prepare them in case Russian President Vladimir Putin decides to halt gas supplies because of the EU's support for Ukraine. The compromise deal calls for EU members to curb gas consumption by 15 per cent between now and spring 2023. The agreement contains exceptions for those countries that may face difficulty in reducing their gas consumption or meeting energy demand, or those countries such as Poland, Greece and Spain that have adequate stocks at this time. Should the member states agree that an energy supply emergency exists, the measures will become mandatory for all members.

Russia's main supply link to Europe, the Nord Stream 1 pipeline, had been offline for several days during July due to an annual maintenance, but supplies through Nord Stream had only just resumed when Russian state-owned gas monopoly Gazprom announced that it would restrict gas flows through the subsea Baltic pipeline to 20 per cent of capacity because of technical problems at a pumping station. The move threatens Europe's supply of natural gas, just as the continent prepares for winter.

The EU gets about 40 per cent of its gas supplies from Russia, most of it through Nord Stream, which has a capacity of 55 billion m^3/year.

Speaking after the passage of the agreement by EU energy ministers on July 26, EU Commission President Ursula von der Leyen said the EU had taken "a decisive step" to face down the threat of a full gas disruption by Putin. She said the move to cut gas usage by 15 per cent "will help fill our storage ahead of winter".

"The EU has secured the strong foundations for the indispensable solidarity between member states in the face of Putin's energy blackmail," she said.

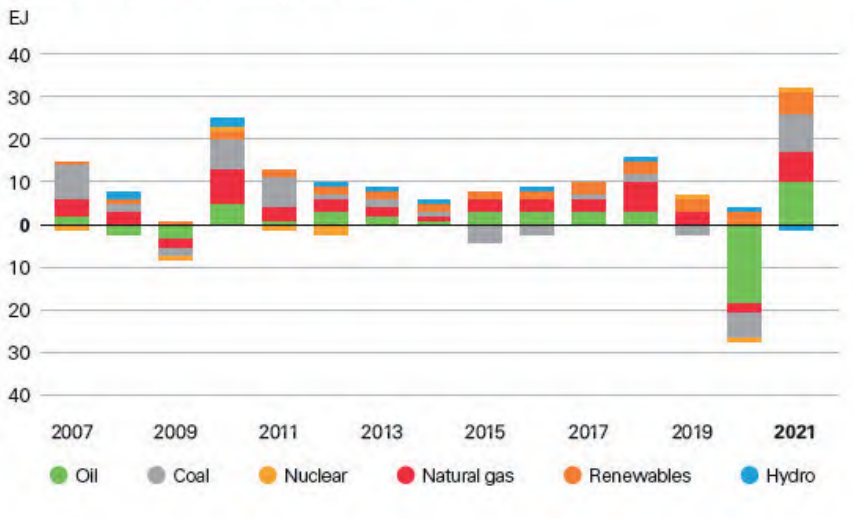
Meanwhile, the US is making gains in its delivery of LNG to Europe. The Energy Information Administration (EIA) in Washington has reported that the US became the world's top LNG exporter during the first half of 2022, citing data from Cedigaz.

US LNG exports rose by 12 per cent to average 11.2 billion ft^3/day (bcf/d) during the first half of the year, compared to the second half of 2021, the agency reported, adding that the boost in exports was due to an increase in LNG export capacity, higher prices and higher demand (particularly in Europe). About 71 per cent, or 8.2 bcf/d, of total US LNG exports went to the EU and the UK during the first five months of this year.

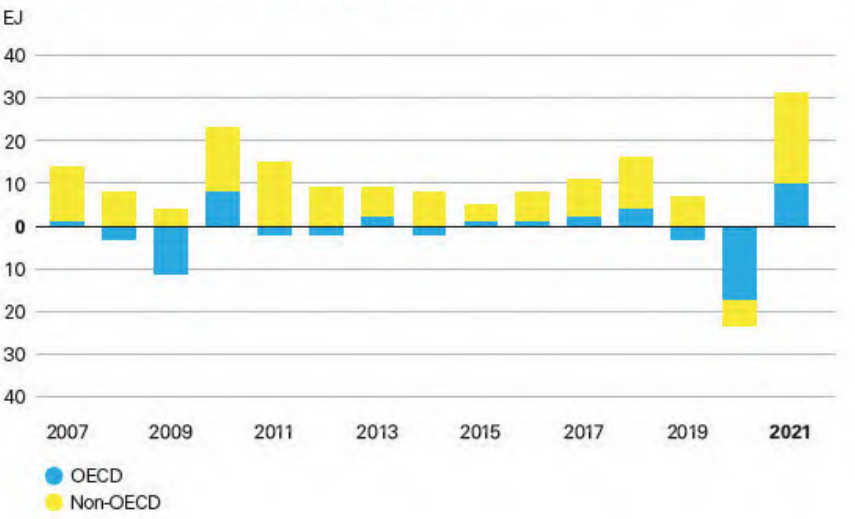
Key charts from the bp Statistical Review of World Energy 2022

Primary energy in 2021 grew by its largest amount in history, with emerging economies accounting for most of the increase

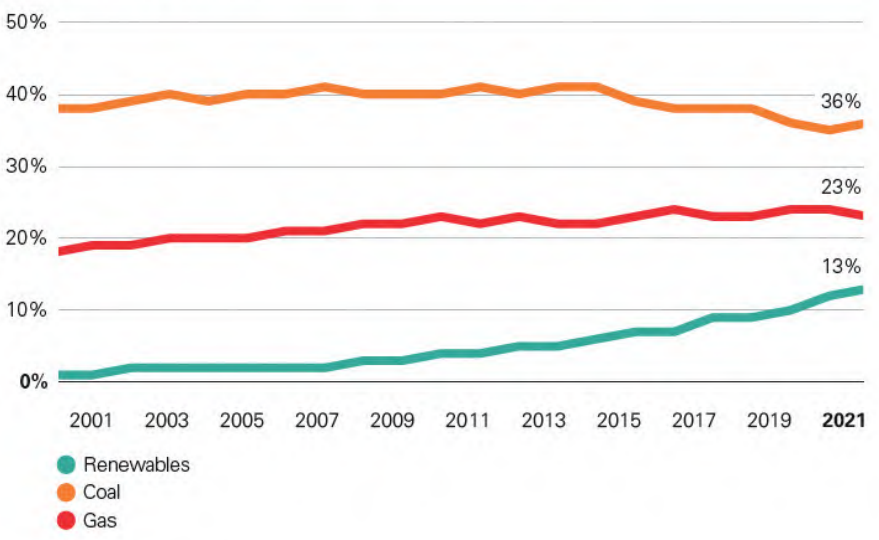
Change in primary energy by fuel



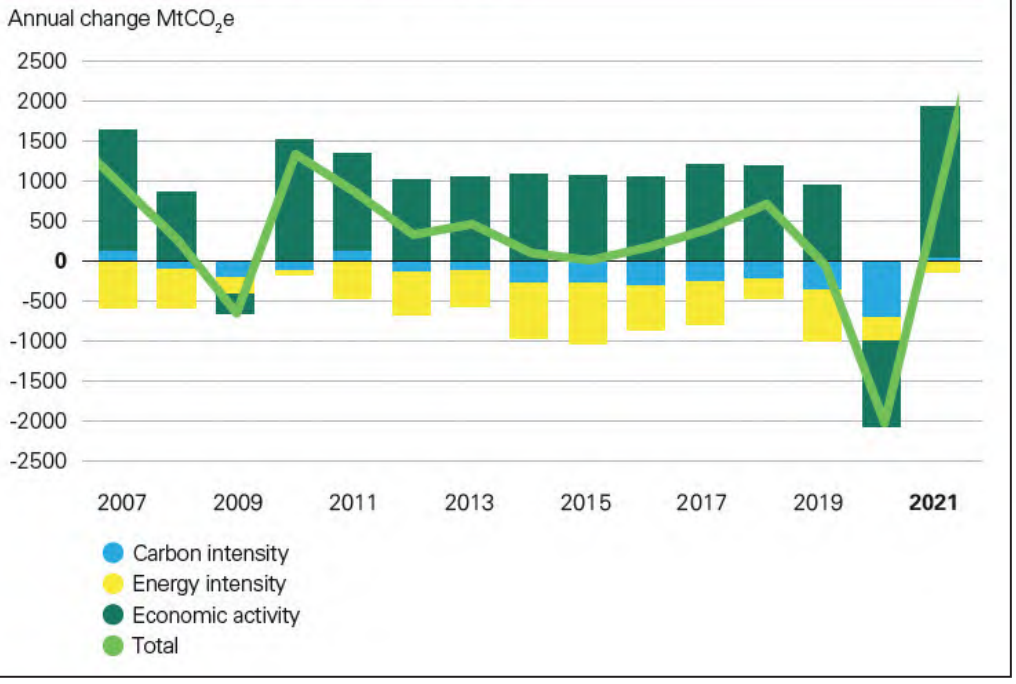
Change in primary energy by geography



The share of renewables in global power generation continued to increase



The increase in carbon emissions in 2021 was driven by the rebound in economic growth



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Offshore collaborations

Expanding offshore wind at the necessary speed to meet climate change goals and stave off the energy security crisis is a huge task in itself. Supply chain issues caused by global events make that task even more challenging. **Junior Isles** hears why ABB Energy Industries believes greater collaboration is key.

The EU's target of 300 GW of offshore wind by 2050 is daunting – it calls for just under 285 GW of new capacity, or roughly 10 GW every year for the next near 30 years. And it is an even taller mountain climb in a world still suffering from the impacts of a global pandemic and geopolitical turmoil on a scale not seen since the Second World War. Yet with the need to combat climate change and rapidly cut its dependency on Russian fossil fuels, the EU offshore wind sector must nevertheless find a way to scale its Everest.

With electrification of the broader society seen by many as one of the best ways to cut carbon emissions and the falling cost of wind power produced from gigawatt scale wind farms out at sea, it is no wonder that offshore wind is central to the EU's strategy.

"Offshore wind is becoming an increasingly attractive power generation source in more and more markets," said Martin Kjäll-Ohlsson, Vice President for Offshore Power, ABB Energy Industries. "Those markets already open to offshore wind are increasing their ambitions and more markets are coming on stream. We are seeing a lot of activity in the Baltic Sea, with countries like Poland for example, coming a long way in just a few years.

"But there are challenges. Where do you find all the components that go into the turbines? All the bumps in the road and rough seas in terms of the geopolitical situations are a challenge for everybody. Generally, we are seeing price appreciation on many commodities and special pieces of kit needed for projects – this might be anything from circuit boards to high steel prices, and everything in between."

Kjäll-Ohlsson: providing an "attractive recipe" in the offshore substation market

Although no company can solve these global problems, there are a few things he says ABB is doing. "The key, he says, "is openness about the environment we are in – with our suppliers and customers."

One example he gives in the offshore oil and gas space, is its long-time collaboration with Aker BP. Instead of working together on a project-by-project basis and pushing the supply chain from one project to the next, ABB has what Kjäll-Ohlsson calls a project alliance with Aker BP.

This means that for certain disciplines or scopes of supply, there are pre-defined partners that are qualified to enter the project alliance for a specific project.

"The aim," he said, "is to nurture a sound culture between those parties inside of the alliance. This means that, from the outset, you execute with trust at not only the company level but at the personal level. Then as you enter a project you mature towards investment decisions together. Time, costs and risks are set in stone, targets are set and then everyone is incentivised to perform better. You are all in the same boat, and much more willing to solve problems together when they come. And since you know each other better, you don't add risk on top of each other's scope."

Kjäll-Ohlsson notes that strong global teams are required for such an approach and may result in developers losing some flexibility in terms of sourcing freely from around the world but says it is still beneficial.

ABB has not yet engaged in any offshore wind projects using this project alliance type of scheme buts says it would welcome them. Kjäll-Ohlsson said: "The evidence is there that it works very well in offshore oil and gas. There is no evidence yet in offshore wind but building projects in the North Sea, in principle it's not all that different."

A second example of collaboration, directly related to the wind sector, is ABB's recent Memorandum of Understanding (MOU) with Ramboll. In April this year ABB and Ramboll signed an MOU to work together in pursuing new prospects for offshore substations.

Under the agreement, ABB will bring its expertise in design and supply of electrical, SCADA (Supervisory Control and Data Acquisition), automation, and telecommunications equipment, including engineering, products, installation, commissioning, and operational maintenance of such equipment.

Ramboll will contribute its expertise in engineering services in development, design and specification, construction, maintenance, and operation, including disciplines of structural, piping, mechanical & layout, process, and technical safety, electrical, SCADA, automation, and telecommunication systems.

The initial agreement is valid up to five years and facilitates collaboration on a case-by-case basis.

Explaining the workings of the MoU, Kjäll-Ohlsson said: "We go to market together with a joint design, with Ramboll being responsible for the structural and mechanical elements and ABB of the electrical system and associated disciplines. It's not excusive but if you are going to make a cake it makes sense to go to guys that have been making cakes for decades; you can be sure that if you follow that recipe, the cake will be great. That's what we are doing in the offshore substation market; provide an attractive recipe."

ABB has a similar strategic partnership in place with Norwegian oil and gas services player Aibel to deliver voltage connections for offshore wind integration. Here ABB is providing its proven high voltage technology, while Aibel is responsible for turnkey engineering, procurement and construction (EPC) responsibility for the design, construction, installation and commissioning of the offshore platforms.

Kjäll-Ohlsson says the partnership is working well. In March it signed a deal for part-electrification of the Oseberg oil and gas field on the Norwegian Continental Shelf. According to ABB, the part-electrification with 105 MW of largely renewable power will enable phasing out gas turbines and installation of two new 10 MW pre-compressors for gas production.

ABB is also cooperating with Aibel in system design and engineering and will deliver the complete power and control systems onshore and offshore. ABB says that the connection is designed for 180 MW high voltage alternating current at 132 kV.

It is also working with Aibel on the massive Dogger Bank offshore wind farm, having secured major contracts for the HVDC link for the third phase of the 3.6 GW project.

Yet meeting the massive amount of offshore wind that is needed will require more than cross-company collaborations. It will also call for cross-sector cooperation in the supply chain.

"It's not possible to build the 100s of GW with the supply chain today," said Kjäll-Ohlsson. "You have to enable more players to grow the supply chain. Specifically, you have to enable the supply chain to offshore oil and gas. There are whole yards around the world that build things, such as steel structures for oil and gas. These fabricators need to be enabled for the green energy sector too; they have the capacity to weld steel but only need guidance from ABB and Ramboll, for example, to understand what to make. This would bring more capacity into the supply chain."

He compared it to the automotive industry, where factories that manufacture internal combustion engine-based cars will be transformed to produce electric vehicles.

Kjäll-Ohlsson believes that as a global leader in telecoms systems integration with extensive experience in oil and gas, it is well placed to succeed in the offshore wind sector. He said: "Offshore wind is much more asset intensive than oil and gas. If you look at Dogger Bank, it will have three huge substations surrounded by 285 wind turbines. Making sure all the assets are online, cyber secure and can be controlled at all times, is not an easy task. But it is one that we can undertake with the experience of doing similar work in very harsh waters over the last three or four decades."

To this end, ABB and Aker Solutions are focusing their attention on seabed solutions for oil and gas in an effort to accelerate technology development for offshore wind power.

"We are seeing whether we build offshore [wind] infrastructure more simply than it is done today," said Kjäll-Ohlsson. At the moment, huge platforms are used for the power transformers and switchgear. These are costly. Our proposition is, as we have done in oil and gas, is to place the transformer and switchgear on the seabed. Nobody has done this in offshore wind but we are ready to do it. I'm 100 per cent sure it will come; it has the potential to save a lot of costs."

An offshore grid on the seabed is an exciting idea, and one that would not only further cut the cost of offshore wind but would enable wind farms to be connected faster. But, as Kjäll-Ohlsson summed up, "it's a case of who dares to be first". He said: "It's never easy. We are talking to some players and our message is clear: we are ready to do it and we welcome a developer to be the first to do it seriously."

Nuclear could, but won't solve Japan's green energy plight

Japan has limited natural resources and is looking to nuclear to tackle the energy crisis and at the same time decarbonise its economy. But with public opinion likely to remain sceptical following the Fukushima meltdown, it is unlikely that nuclear will solve the country's problems, says **Joseph Jacobelli.**

Japan is currently facing an energy crisis; just like many countries around the world. Its challenges, however, are more acute than the average country. With an economy that is almost solely dependent on imported fossil fuels, it wants to achieve net zero emissions (NZE) by 2050 but lacks the resources to do so. The government may want nuclear energy to resolve two massive energy hurdles – the energy crisis and energy decarbonisation – yet this may turn out to be just wishful thinking given the domestic scandal-ridden nuclear power industry.

Japan is one of the many victims of a global energy crisis – a fossil fuel supply and pricing crisis. It is one that experts, including the head of the International Energy Agency (IEA) and the Indian power minister, believe is likely to worsen in the coming months.

The crisis is massive, and the dynamics are highly complex. The reasons lie well beyond underinvestment in fossil fuel resources in recent years, the Covid pandemic affecting demand, and the Ukraine invasion by Russia's President Vladimir Putin affecting supply of oil and gas from the Russian Federation. The prices of thermal coal, oil, and natural gas have hit or are nearing historical highs. Examples include South African coal, whose Index was up to 328 points as of June 1, 2022 using January 1, 2021 as a base (i.e., 100) or US or European natural gas prices up to 473 and 288, respectively, according to the World Bank. This has caused tremendous increases in gasoline or electricity prices in the majority of countries around the world. The outlook for prices for the rest of 2022 and for 2023, unfortunately remains bullish.

Japan is important in the Asian and global energy context. At 17.74 EJ, the country was the fifth largest consumer in the world of primary energy in 2021, and the second largest in Asia, after China. In terms of electric power generation, at a little over 1000 TWh per year, it is also the fifth largest electricity generator in the world. This is predominantly from fossil fuels, albeit the share from coal, gas and oil is declining; 64.7 per cent in 2021 versus 69 per cent in 2020.

A previous commentary (*'Japan is not the land of the rising decarbonisation'*, *The Energy Industry Times, July 2021*) stressed that "the land of the rising sun may find the decarbonisation climb a desperately steep one". It was highlighted that "governmental, institutional, and socio-political impediments are just some of the multi-faceted challenges".

Other hurdles are that while the population may be declining, electric mobility may lead to higher consumption growth in the coming decades, that it has virtually no indigenous energy resources, and that the island nation's onshore solar and wind resource is limited. The only at-scale resources are offshore wind and nuclear energy.

Japan has been affected by the sharp increase in the import prices of liquified natural gas, oil, and thermal coal. Recently this has been exacerbated by the weakening of the Japanese yen against the US dollar – about 15 per cent, to Yen137 to the US dollar in the year to mid-July 2022. The increases resulted in rises in the wholesale electric power market.

The nation's principal exchange facilitating wholesale electricity trades is the Japan Electric Power Exchange or JEPX. The JEPX average day price was less than Yen10 ($0.073)/kWh before February 2021. Transactions of about Yen20 became commonplace by the end of 2021.

Thereafter, the JEPX transacted prices exceeded Yen30-40. Corporates have been paying less than Yen20, while household electricity rate plans are generally Yen20-30.

This has caused significant financial turmoil for Japan's electricity retailers. Just like in Australia, the UK and some other jurisdictions, the energy crisis has forced some retailers to exit the market for the first time since the country's electricity markets were fully liberalised in April 2016; 14 had filed for bankruptcy as at the end of the last Japanese fiscal year, through March 2022.

The energy crisis has resulted in renewed calls to boost domestic energy security including raising the amount of non-fossil fuels for electric power generation.

The cabinet affirmed its commitment to reach NZE by 2050 and also approved the nation's latest renewable energy plan in October 2021, just ahead of COP26 (the 26th United Nations Climate Change conference) in Glasgow in November. The objective is for non-fossil fuel resources to account for 56-60 per cent of power supply. Renewable energy is to account for 36-38 per cent of the total electricity generation, twice as much as 2019 and up from the previous 22-24 per cent target. The breakdown is between 14 and 16 per cent from solar PV, 11 per cent from hydropower, 5 per cent from wind power, 5 per cent from biomass, and 1 per cent from geothermal energy. Authorities still hope for nuclear energy to generate 20-22 per cent of the total.

Between the release of the draft of the plan in July and the Cabinet's approval in October, media reported that the government had received 6400 public submissions which included negative comments around coal and nuclear generation, *Reuters* and other media reported.

Nuclear power generation had contributed to about 25 per cent, or 285 TWh, of the total on average in the 10 years through 2010. The amount was just 6 per cent, or 61 TWh, in 2021, as the majority of the country's nuclear fleet was shut. Just eight reactors, out of the previous 54, were operating when the Cabinet approved the latest renewables plan. The closures occurred following the Fukushima nuclear disaster on March 11, 2011 when an earthquake-caused tsunami triggered the meltdown of the Fukushima Daiichi nuclear power plant, owned, and operated by the nation's largest electric power utility, Tokyo Electric Power (Tepco).

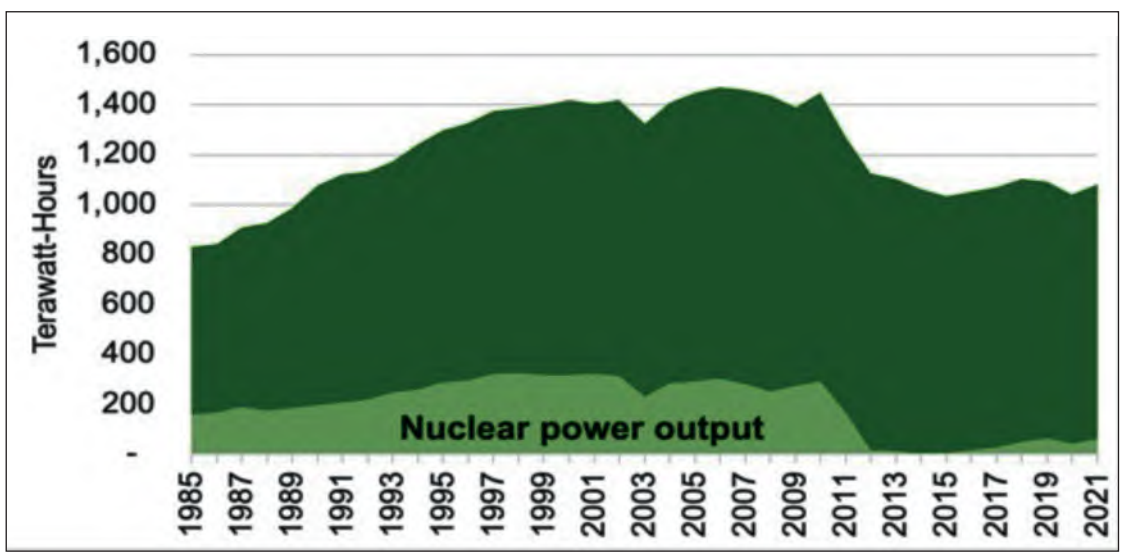
Various reports have indicated that the dreadful tragedy which caused human, environmental, and economic disasters could have been prevented by government, the regulator, and the company. In fact, the scandal has been ongoing since March 2011. For example, Tepco shareholders brought a civil case against Tepco executives, and the Tokyo district court ruled against former executives, ordering them to pay Yen13 trillion ($95 billion) in damages in July 2022.

Prime Minister Fumio Kishida recently asked Koichi Hagiuda, the Minister of Economy, Trade and Industry, this July to ensure that nine reactors will be operating by the year-end. Prime Minister Kishida and the ruling party have proven to be pro-nuclear energy and its recent major wins in the upper house elections gives them a strong base to push forward the restart of reactors. However, public opinion may not be easily swayed. The Tokyo district court judgement is surely not the last time the Fukushima disaster makes the headlines and public opinion should remain broadly sceptical when it comes to restarting the reactors. The public image of the domestic nuclear power industry should remain quite horrendous for many more years, notwithstanding the energy crisis, including higher electricity prices.

Given the country's limited natural resources, including renewable energy sources, and the difficulties and limitations in raising output from nuclear power plants, what can the nation do to reduce its reliance on fossil fuels?

A possible scenario is that ultimately some reactors may restart but the total output is highly likely going to remain well below the 22-24 per cent 2030 objective. A source which could see a gigantic leap is offshore wind. One estimate has put the total potential amount of offshore wind resource at almost 3500 TWh. It would mean over three times the electricity output which averaged at about 1050 TWh in the past 10 years. While it is unlikely that offshore wind power will be responsible for all electric generation in Japan over the next few decades, it is highly likely that it can fill the gap from the missing nuclear power generation. What is absolutely key is for the government to establish processes to fast-track offshore wind energy projects as well as provide some form of financial support, even if it is just partial.

Giuseppe 'Joseph' Jacobelli is Managing Partner, Asia Clean Tech Energy Investments, a single-family office, and a direct clean energy investments advisor. He has over 30 years' experience in Asia energy at leading investment banks and as a senior executive at energy developers. He is author of 'Asia's Energy Revolution' (De Gruyter, 2021) and is host of 'The Asia Climate Capital Podcast'.



Japan Total electric power and nuclear power output 1985-2021. Source: *bp Statistical Review of World Energy June 2022*

Will the gas crisis plunge the EU into recession?

A full stop to Russian gas could plunge Europe into a full-blown recession, according ING's team of macroeconomists. Therefore, trying to avoid it by jointly coming up with credible demand reduction plans is crucial, says **Marieke Blom.**

While Europe cut demand for gas by 15 per cent, Russia also lowered flows through Nord Stream 1. Gas prices are now skyrocketing. Both decisions will result in falling demand for gas. The energy crisis will lead Europe into recession – the question is just how bad will it be?

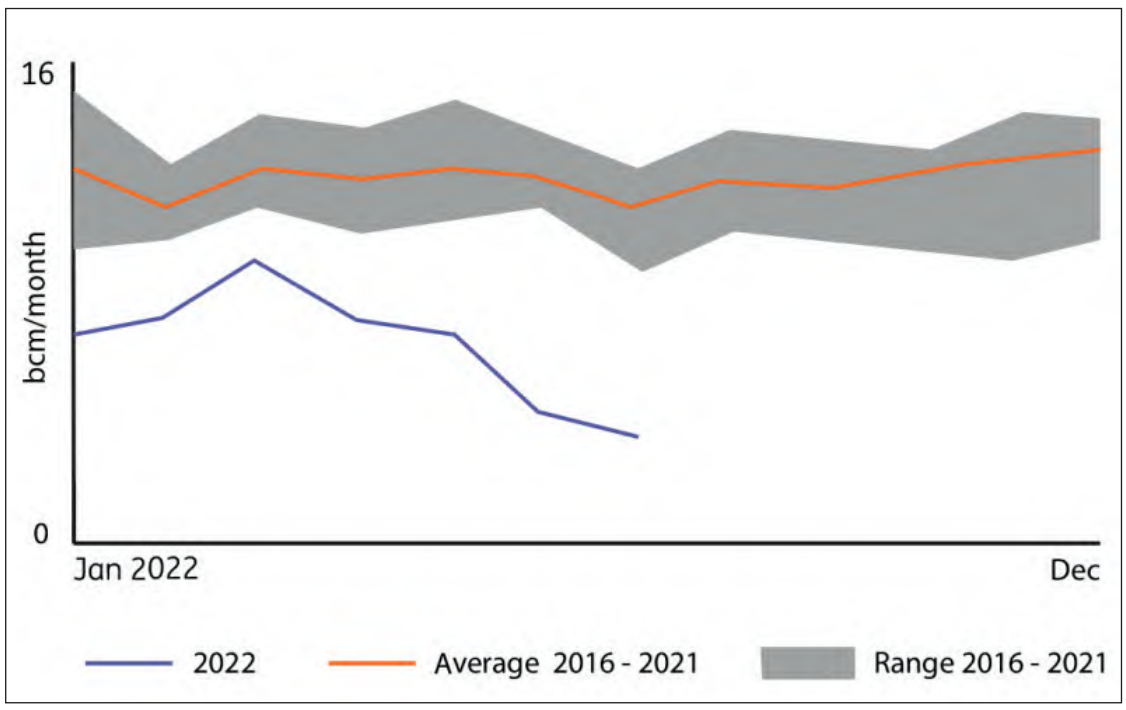
Overall gas demand in Europe has come down substantially this year. During the first quarter, gas demand in Europe fell by about 5 per cent compared to the 2017-21 average, partly due to a mild winter. Prices rose further in the second quarter and fuel switching began, so the decline in the second quarter was stronger. Germany, for example, reports that gas demand is down 10-15 per cent compared to the 10-year average in the second quarter, and the Netherlands stood at -30 per cent compared to the 2019-21 average. It shows that many countries have already come a long way in bringing gas demand down.

The same goes for finding substitutes. The flow of Russian gas to Europe has come down strongly over the first two quarters of this year – on average it has just about halved and recently it stood at as little as a third of normal flows.

The decline in Russian flows is the equivalent of about 15 per cent (quarter one) and about 25 per cent (quarter two) of total gas used in Europe historically, as Russian gas is about 40-45 per cent of total gas used. This shows that alongside lower demand, the Continent has been able to substitute a large share of Russian gas with alternatives. Liquefied natural gas (LNG) has been the most prominent, alternative pipeline flows a second, while fuel switching to coal and oil has also contributed. Renewables play a role when compared to the longer-term historical average use too.

The crucial question is of course how much of the flow can be substituted. The European Commission's estimate is that about 60 per cent of Russian gas can be replaced by other energy sources in one year. This makes sense since substitution has been high already and more LNG terminals are being constructed, and more solar and wind power is being installed.

We have also seen the debate on fuel switching change rapidly over time. The reopening of coal fired power plants is now acceptable, and extending the lifespan of nuclear power plants is no longer taboo in Germany. Reopening the Groningen field is still a no-go in the Netherlands, and the Commission makes no mention of it, but the economic impact of high gas prices for households, and the need to compensate corporates for a lack of gas or automatic stabilisers, which is worsening the government budget, might be offset by the possibility of sky-high returns from Groningen gas for the Dutch state at some point.



Flows of Russian gas in 2022 compared to previous years. *Source: European Commission*

The current voluntary goal of bringing down gas demand by 15 per cent compared to the historical average was chosen for a reason. It would offset the remaining gas required from Russia. The 40-45 per cent dependence and the alternatives amounting to about 60 per cent of that, implies 15 per cent of total gas demand not being met. Ironically, the decision by Russia to cut the gas flow through Nord Stream 1 back to 20 per cent again will help governments reach this goal. It leads to price levels where the market will cut down on demand by itself. So the chance of governments rationing supply may have fallen. Industrial players will decide whether they are still willing to pay the price. As long as they are, they will likely get it. The rest of the world will probably be less willing to pay the same price, as they may have alternatives such as coal at their disposal.

One question is to what extent governments will allow households to be incentivised by prices to lower thermostats and insulate their homes. Winter usage of gas is much higher mostly because of heating demand. Shielding households from higher prices may offset the economic consequences via purchasing power, but will keep up gas demand, which will lead to higher gas prices for all other players, most notably industrial users. This would also negatively impact the cost of living via other energy-intensive products as well as slowing down industrial activity. The price for more expensive gas will have to be paid either way.

The solution may depend on whether socially undesirable effects of costly gas (a high share of spending for lower-income households) can be prevented, while higher-income households would get sufficient incentives to limit their consumption. Remember, higher-income homeowners will often have larger homes, so will use more gas than the average household. Capping energy prices is saving them more money than poorer households.

Hungary has reshaped its utility bill support scheme for gas and electricity so that households that are using more gas on a yearly basis than the average household must pay the extra usage at close to the market price. This is seven-times higher than the price for below-average consumption. This may lower the second-round effects, as the financial impact on higher-income households would be mitigated by lower savings.

The crucial question is of course whether gas flows will continue to be interrupted. One could argue that with credible plans to bring down gas use in Europe, the attractiveness of no longer supplying that gas from a Russian perspective falls. Alternatively, cracks in solidarity between European countries would make attempts to try to divide and rule more attractive. So European solidarity is important either way: it helps mitigate the impact of a further reduction in gas supply, and may prevent it from happening altogether. Also, the longer it takes for a cut in flows to happen, the lower the effect as alternatives will be available and storage will have been filled. All parties involved will be aware of this. We expect to witness a game of poker being played out in front of us.

Many have tried to put a GDP number on the impact of a cut in Russian gas. Depending on the degree of market integration, the IMF computed two scenarios for European countries: for the European Union as a whole the negative shock would be between -0.5 per cent and -2.7 per cent of GDP.

In its Spring Forecast, the European Commission concluded that in a severe scenario, where gas supplies from Russia would be cut and under the assumption of limited substitution, GDP growth would be cut by an additional 1.5 percentage points in 2022 and by around 0.75 percentage points in 2023.

However, the experience of the last two years has painfully shown that standard macro models are not really capable of adequately predicting the numerical economic implications of an unprecedented, once-in-a-lifetime and fully abrupt event with longer-term consequences and many interlinkages across sectors. Therefore, all current estimates have to be taken with a large pinch of salt. It simply remains impossible to put precise numbers on the impact. Having said all of this, and acknowledging that we are also expected to present at least some order of magnitude, we believe that the negative impact of a full embargo on Russian gas on the eurozone economy would be between 1-3 per cent of GDP in the short run from here on.

That means after we have already seen a substantial impact with a significant difference in impact per country, and given that we are already expecting a mild recession, this would be enough to get to a full-blown recession.

It is very clear that a full stop to Russian gas would hurt Europe. Trying to avoid it by jointly coming up with credible demand reduction plans is crucial.

Marieke Blom is Global Head of Research and Chief Economist, ING.

Junior Isles

‘Let them eat cake’ is not an option

The British love a cup of tea, often with a slice of cake as a form of succour in times of shock. On hearing that the average annual UK household energy bill could hit nearly £4000 in January, the temptation to put the kettle on was great –if only the cost of boiling the kettle wasn’t already so high.

Not so long ago, the average annual energy bill was around the £1000 mark; since April it has been capped at a record high of about £1900 and, according to energy-focused management consultancy BFY the price cap is predicted to hit £3420 in October before reaching an eye-watering £3850 in January 2023.

The price cap forecast followed the announcement that Russian gas supplier Gazprom would cut flows through its Nord Stream 1 pipeline to 20 per cent of capacity. While Gazprom says the reduction in capacity is due to necessary technical maintenance, the West says it further demonstrates Russia’s determination to use energy as a weapon in retaliation against the bloc’s support for Ukraine against invading Russian forces. Whatever the reason, no doubt it is a step towards the EU’s nightmare scenario and most likely a precursor to a complete lock-off of gas supplies from Russia this winter.

The deepening crisis has seen experts both in industry and governments question responses to the prospect of zero gas from Russia and the consequential astronomical energy prices.

The risk of a total gas cut-off has led the European Commission to draw-up a contingency plan recommending that nuclear and coal fired plants be kept in operation, as well as a reduction in gas consumption.

Germany is one of the countries for which a gas supply cut would be most damaging. According to an estimate by the Bruegel Institute, the country could run out of gas reserves between January and February 2023 in the event of a supply cut.

The German government recently announced its intention to keep the 10 000 MW of coal fired power plants it has in the country operational in order to increase its security of supply. At the same time it has accelerated its so-called Easter package in which it planned to speed up the installation of renewable energies and self-consumption in the country.

The Greens, who govern with Chancellor Scholz’s Social Democrats and the liberal Free Democratic Party (FDP), had until now pushed for an end to the use of nuclear energy, but the government’s position may have changed following the contingency recommendations from Brussels.

In the face of growing support for nuclear, the German Economy Ministry said it is reconsidering the option. Germany’s three remaining nuclear power plants, which accounted for 6 per cent of electricity production in the first quarter of 2022, are scheduled to be shut down by the end of the year.

An initial review by the German environment and economy ministries in March concluded that extending the life of the plants is not advisable, citing legal, licensing and insurance problems, the need for extensive and possibly costly safety checks, and a lack of fuel rods to keep the plants running. With the drop in gas supply from Nord Stream 1, the German ministry now says the country’s power grid operators have requested a second review of the viability of nuclear power.

Elsewhere, France said it was reserving the option to reactivate the Saint Avold coal fired power plant in the Lorraine region this winter “as a precautionary measure, given the situation in Ukraine”. In June the Netherlands and Austria also said they would lift restrictions on coal fired power stations to reduce natural gas consumption.

The UK has also said that some of its coal fired plants slated for closure this year might need to stay open to ensure electricity supply this winter. Early last month the government announced that it had agreed a deal with Drax to produce power from its remaining coal fired units. The power station, formerly the largest coal fired plant in the country has already converted four of its six units to run on biomass.

The UK must be aware, however, that these are just sticking plaster measures, especially if it is to meet its climate goals. If gas prices are to remain high and volatile going forward, more deep-rooted, lasting change is needed – change that will benefit household pockets and the planet.

Dr Simon Cran-McGreehin, Head of Analysis at the Energy and Climate Intelligence Unit (ECIU) said: “With the gas price so high and volatile, and set to remain so, the question is: where’s the plan? As the IFS [Institute for Fiscal Studies] has already pointed out, a £17 billion winter bailout for bills isn’t sustainable for years to come. The very obvious answer is to help people to use less gas, but the government has had itself in a muddle over energy efficiency.

“The ECO insulation scheme has worked well and is knocking £600 off the bills of fuel-poor households, but government is non-committal on doing more. We have to consider security of supply too, but more UK gas won’t come online anytime soon, won’t bring down bills and for many will have the whiff of ‘let them eat cake’ about it.”

Cran-McGreehin was referring to the French phrase *“Qu’ils mangent de la brioche”*, said to have been spoken in the 17th or 18th century by “a great princess” upon being told that the peasants had no bread.

Whether the UK government has an arbitrary disregard for the struggling working class (and even the middle-class) or is unable to truly grasp the depth of their troubles is debatable. Regardless, the question remains: what is the plan, for the UK and the wider EU?

Energy efficiency will certainly help cut household bills, as will the £400 energy bills discount announced last week, but these will do little to change the market fundamentals that dictate electricity prices in the UK. In response to the crisis and the changing energy landscape, last month the government launched a major review into Britain’s electricity market design.

Described as the biggest electricity market reform in a generation, the Review of Electricity Market Arrangements (REMA) will gather views on a wide range of options to address the combined challenges of responding to higher global energy costs, the need to further boost energy security and move the UK to a cleaner energy system.

Under the current system, gas prices often end up setting the wholesale electricity price but the increasing participation of renewables in the system means over time, cheaper electricity produced by renewable energy sources will determine the price more often.

UK Business and Energy Secretary Kwasi Kwarteng said: “We’ve just seen the price of offshore UK wind power fall to an all-time low and gas is a shrinking portion of our electricity generating mix, so we need to explore ways of ensuring the electricity market is adapting to the times.

“That includes ensuring the cost benefits of our increasing supply of cheaper energy trickle down to consumers, but also that our system is fit for the future – especially with electricity demand set to double by 2035.”

While the government is moving fairly quickly – options on proposed reform will be delivered during 2022/2023 – households would argue there is no time for prices to “trickle down”. Perhaps the goal should be to implement reforms ahead of the anticipated price cap rise in January.

Electricity market reforms must happen and happen quickly, not just in the UK but also across the EU. In these difficult times, doubtless many would be more than happy to ‘eat cake’ – if only they could afford to bake it.

Cartoon: jemsoar.com