THE ENERGY INDUSTRY TIMES

May 2023 • Volume 16 • No 3 • Published monthly • ISSN 1757-7365 www.teitimes.com

Green grids

Ideally situated between Europe and Asia, the Gulf region could act as a bridge linking a global network of green grids. *Page 13*

Building the next terawatt

Despite the current challenging conditions, the wind power sector will add as much capacity in the next decade as it has over the last 40 years. *Page 14*

Final Word

The G7 will need to be a bit more magnificent in the climate change battle, says Junior Isles. *Page 16*

News In Brief

TenneT deal is boost for global offshore wind ambition

The signing of a contract between TenneT and four cooperation partners to develop the North Sea as a hub for sustainable and independent European energy production will go a significant way to the EU realising its ambition for offshore wind. *Page 2*

Brazil prepares for inaugural offshore wind auction

Brazil is expected to launch its first offshore wind auction this year with the aim of bringing winning projects into operation in 2027. *Page 4*

Green shift will be tall order for India

Making the transition from coal to clean energy will be a tall order for India, with the scale of transition being described as "massive" by a US-based think tank. *Page 5*

Offshore wind investor interest moving to floating wind farms

Europe invested just €17 billion in new offshore wind farms in 2022, down from €41 billion in 2021 and the lowest since 2009, according to WindEurope's Annual Financing and Investment Trends report. *Page 8*

Analysts fear clean energy U-turn following Enel shake-up

Analysts are concerned over a potential change in Enel's clean energy transition strategy following upcoming changes to the state-owned Italian energy giant's management board. *Page 9*

Technology Focus: Modelling weather impact for renewable energy

The Institute for Environmental Analytics describes how data-driven energy modelling helps with planning effective financial and operational strategies for renewable power production. *Page 15*

Emissions may have peaked but coal phase-out still too slow

G7 ministers are still grappling with coal phase-out timelines

Although emissions from the power sector appear to be officially in decline due to the increasing deployment of renewables, more needs to be done to accelerate the phase-out of coal. Yet it is an area in which the G7 remains unable to reach a consensus. **Junior Isles**

Carbon emissions from global electricity generation may have peaked in 2022, but the use of coal for power generation is not decreasing fast enough to avoid the Paris Agreement's target of a maximum of 2°C of warming, according to new research from Chalmers University of Technology and Lund University, Sweden.

In a study by the research programme Mistra Electrification, a group of researchers analysed 72 countries' pledged commitments to phase out their coal use by 2022–2050. It found that the Paris Agreement's target of a maximum of 2°C of warming appears to be missed, and the world is moving towards a temperature increase of 2.5–3°C.

In the best-case scenario, the researchers show that it is possible that the temperature increase will stay at 2°C. But that assumes, among other things, that both China and India begin phasing out their coal use within five years. Furthermore, their phase-out needs to be as rapid as it has been in the UK, which is the fastest to ever happen in a large country, and faster than Germany has promised. This may create inequities, which will need to be addressed by international policies.

The study came just ahead of a G7 climate, energy and environment meeting in Japan where ministers from Canada, Germany, Italy, Japan, UK and the US pledged to accelerate a gradual phase-out of fossil fuels and the shift towards renewable energy but failed to set a firm timeline for phasing out coal fired power plants amid continuing opposition from Japan.

A 36-page document issued at the meeting's conclusion reaffirmed the G7's commitment "to achieving a fully or predominantly decarbonised power sector by 2035", but the phrasing leaves open the possibility for continued use of fossil fuel-fired power. Last year, the G7 added a loophole to a previous pledge to end investments in overseas fossil fuel projects by the end of this year and said investment in liquefied natural gas was a "necessary response to the current crisis".

At last month's meeting in Sapporo, ministers instead directed there efforts towards growing renewables as a way of tackling both climate change and the energy crisis fuelled by Russia's war on Ukraine.

In their communiqué, the members pledged to collectively increase offshore wind capacity by 150 GW by 2030 and solar capacity to more than 1 TW.

"The solar and wind commitments are huge statements to the importance

Continued on Page 2

US and EU move to reduce dependency on Russia for nuclear materials

The United States and the European Union have outlined a programme to reduce their dependency on Russia for nuclear materials and to diversify nuclear fuel supplies.

The EU-US Energy Council said it intended "to intensify cooperation to reduce dependency on Russia for nuclear materials and fuel cycle services" and that it supported efforts by EU member states to diversify their nuclear fuel supplies.

There have been calls for EU sanctions on the Russian nuclear industry, but these could not be implemented on account of the dependency of countries like Hungary, Bulgaria, Slovakia and the Czech Republic on Russian fuel elements.

The news followed an announcement by the Czech Republic that it would cease sourcing fuel elements for its nuclear power stations from Russia from next year. In mid-April, Westinghouse, a US-based nuclear fuel supplier, said it will replace Russia's TVEL as the supplier for CEZ's Dukovany nuclear power plant beginning in 2024.

Explaining the switch, CEZ's Chief Executive, Daniel Benes, said: "Securing a western supplier of fuel assemblies for Dukovany is an important step not only for the Czech energy industry, but also for the entire Czech Republic. There is a further significant strengthening of energy safety."

The first assemblies for Dukovany with fuel supplies are set to arrive next year. The Czech Republic's two nuclear power stations will fully switch from Russian to US fuel as of 2024, covering about one-third of the country's total power production.

Last year, CEZ selected Westinghouse and French company Framatome as its suppliers of nuclear fuel assemblies at its second nuclear power station, Temelin. This decision came as part of CEZ's efforts to diversify suppliers and increase security after the Ukrainian crisis.

At a meeting of G7 energy, climate and environment ministers last month, the member states – Canada, France, Germany, Italy, Japan, UK and the US – reached an agreement aimed at "pushing" Russian President Vladimir Putin out of the nuclear fuel market "as quickly as possible".

The G7 said it would collaborate on exploring "strategic opportunities in uranium extraction, conversion, enrichment and fabrication".

"This multilateral co-operation would enable us to strengthen our domestic sectors and establish a level playing field to compete more effectively against predatory suppliers," it added in a statement.

Russia is one of the world's largest suppliers of enriched uranium for civilian nuclear programmes, with more than 40 per cent of enrichment capacity globally.

Several former Soviet bloc countries in Europe remain reliant on Russian nuclear fuel and have resisted pressure to ban it from the EU until they have an alternative, with many working with US company Westinghouse to convert to its fuel.

Reducing dependence on Russia is crucial in countering the Kremlin's ongoing use of energy as a weapon against the west.

Last month the EU reported that it is storing record levels of natural gas after a milder than anticipated winter, bolstering hopes that the bloc can wean itself off imports from Russia.

The bloc's storage totalled 55.7 per cent of capacity at the start of April according to the industry body Gas Infrastructure Europe – the highest level for early April since at least 2011.

Moody's says, however, the EU will probably still face a supply-demand gap of around 12 per cent of its gas storage capacity by March 2024, based on its current estimates.

THE ENERGY INDUSTRY TIMES is published by Man in Black Media • www.mibmedia.com • Editor-in-Chief: Junior Isles • For all enquiries email: enquiries@teitimes.com

Continued from Page 1

that they will rely on the energy superpowers of solar and wind in order to phase-out fossil fuels," said Dave Jones, head of data insights at energy think-tank Ember.

In a study issued just ahead of the G7 meeting, the think-tank said the power sector could have reached a tipping point in its transition to clean power. It said electricity emissions grew by 1.3 per cent last year to hit a record high, fuelled by a small increase in coal use to meet growing electricity demand after the end of the Covid-19 lockdowns, but 2022 will probably be the last year the global power sector will see growth in greenhouse gas emissions.

Green power met 80 per cent of the increase in electricity demand as economies opened up after the lockdowns, with coal generation increasing by just 1.1 per cent during 2022.

In a new report that draws on 2022 data from 78 countries covering 93 per cent of global electricity demand, Ember says record deployments of renewable power last year pushed wind and solar to a new high of 12 per cent of electricity generation, up from 10 per cent in 2021.

Ember's 'Global Electricity Review 2023' suggests that clean sources of energy, which include hydro, nuclear and bioenergy as well as wind and solar, now account for nearly 40 per cent of the world's electricity supply.

The report also noted that the EU increased its solar power generation by 24 per cent in 2022 in line with the global average, whereas EU wind power generation grew 9 per cent year-on-year, just over half the average global growth of 17 per cent.

The pace of growth in clean power will accelerate in 2023 and beyond, according to the Ember report, as developers take advantage of falling technology costs and favourable government policies to roll-out more cheap green electricity generation.

But despite the accelerating growth the global energy transition remains off-track. At the end of March, IRENA's 'World Energy Transitions Outlook 2023 Preview' called for a "fundamental course correction" in the energy transition.

To keep 1.5°C alive, it said deployment levels must grow from some 3000 GW today to over 10 000 GW in 2030, an average of 1000 GW annually. Deployment is also limited to certain parts of the world. China, the EU and the US accounted for two-thirds of all additions last year, leaving developing nations further behind.

La Camera says "the stakes could not be higher"

IRENA's Director-General Francesco La Camera said, "The stakes could not be higher. A profound and systemic transformation of the global energy system must occur in under 30 years, underscoring the need for a new approach to accelerate the energy transition. Pursuing fossil fuel and sectoral mitigation measures is necessary but insufficient to shift to an energy system fit for the dominance of renewables."

TenneT deal is boost for global offshore wind ambition

- Deals signed worth €30 billion
- Global offshore wind to increase seven-fold

Junior Isles

The signing of a contract between TenneT and four cooperation partners to develop the North Sea as a hub for sustainable and independent European energy production will go a significant way to the EU realising its ambition for offshore wind and bring the world closer to reaching increased targets.

In April, top representatives of the transmission system operator TenneT, the Hitachi Energy/Petrofac cooperation and the three consortium partnerships GE/Sembcorp (SMOP), GE/McDermott and Siemens Energy/Dragados officially signed the contracts in Berlin to seal Europe's largest-ever tender award for energy transition infrastructure.

The total volume of the contracts for the components of the 14 systems amounts to around €30 billion. The result will be a transmission capacity of offshore wind energy in the German and Dutch North Sea that will generate as much electricity as 28 large-scale power plants.

With the signing, TenneT has now completed the process of awarding contracts for the sea- and land-based converter stations for a total of 14 offshore grid connection systems, which was launched in August 2022. TenneT had already awarded 11 of these systems at the end of March, eight of them in the Netherlands and three in Germany. Three more systems in Germany were added last month. These 14 systems are to be realised by 2031.

Their "core components", i.e. the innovative 2 GW HVDC technology for converting alternating current into direct current and back, will be manufactured exclusively at European production sites of the consortiums' members in all projects.

The company stated in a press release: "With a contract of this magnitude, Europe will be taking a global lead – in terms of both technology and production – in a key sector of tomorrow's energy supply."

Tim Meyerjürgens, COO of TenneT, said: "As the leading offshore transmission system operator in the EU, we have the know-how needed to make Europe's goal of securing an independent supply of renewable energies a reality. To achieve this, the North Sea must be developed as Europe's green powerhouse and quickly connected to the electricity grids on land. We are acting and investing accordingly. Our 2 GW Program will help make green wind energy from the North Sea scalable and more cost-efficient – while continuing to minimise any impacts on the environment."

All agreements apply to both the offshore and onshore converter stations and the associated HVDC technology. The contracted suppliers will start the preparatory work for the projects immediately.

The deal was signed as Amprion GmbH, one of the four transmission system operators (TSOs) in Germany said it intends to spend about €22 billion ($24.23 billion) in the next five years to expand and upgrade the country's power grid with the aim to enable the integration of more renewable energy.

The focus of the investment strategy is on the expansion of the north-south direct current corridors on land, which will allow the distribution of wind energy from Germany's north to the south and the construction of four offshore grid connections that will transport power from offshore wind farms to the mainland.

Germany, along with the UK, is among the leaders in the global charge to accelerate offshore wind. According to the latest market outlook from Wood Mackenzie, the next ten years will see an intensified focus on offshore wind as the sector matures and technology innovation and supply chain development help make offshore development more accessible in different regions.

The company's ten-year outlook forecasts a seven-fold increase in global offshore wind capacity in 30 countries, with European countries and China accounting for 81 per cent of capacity additions.

EU electricity market reform should accelerate renewables investment, says S&P Global Ratings

According to S&P Global Ratings, the European Commission's proposals to reform Europe's power market should accelerate investment in renewable energy by supporting the extension of contracts for difference (CfD) schemes and market-based power purchase agreements (PPAs).

Indeed, S&P now expects that the majority (50 -55 per cent, or 63 per cent including hydro) of Western Europe's electricity will stem from wind and solar generation in 2030, up from about 26 per cent this year and 20 per cent in 2019.

The ratings agency said the extension of two-sided CfD schemes to the entire EU strengthens price visibility for developers. These offtake agreements take away both the uncertainty of long-term market prices and, in the case of renewables, the risk of intraday price fluctuations.

It also noted that the Commission's proposal for PPAs requires EU members to ensure availability of counter-party risk guarantees. Such a guarantee-mechanism, it said, could allow more corporates to enter into PPAs and extend their tenors, as well as support more stable remuneration for renewable energy source (RES) project assets.

Power market reform will be central to the EU achieving its increased renewables ambition.

In late March, the European Union countries and negotiators from the EU's parliament reached a provisional deal to raise the share of renewables in the bloc's energy mix.

The European Council, which represents the 27 member nations, said the agreement reached after all-night negotiations would raise the renewable energy target to 42.5 per cent of total consumption by 2030. The current goal is 32 per cent.

To meet the EU's goal of becoming climate neutral by 2050, the EU's executive commission supported a target of 45 per cent. The council and the European Parliament left a door open for such an increase, agreeing on "an additional 2.5 per cent indicative top up" that would allow it to reach 45 per cent.

European Commission President Ursula von der Leyen said the agreement would allow "for more ambition and faster roll-out" of renewables. "This will help us progress towards climate neutrality, strengthen our energy security and boost our competitiveness, all at once," von der Leyen said.

The Commission has since proposed to revise elements of the Clean Energy Package to support development of offshore wind. A Proposal for a Regulation would amend the Internal Market in Electricity Regulation ((EU/2019/943) and Directive ((EU) 2019/944).

Recitals state that to reduce investment risk for offshore project developers and ensure projects have full access to surrounding markets, TSOs should guarantee access of the offshore project to the capacity of any hybrid interconnectors for all market time units.

Under the IME Regulation, when allocating congestion income, priority currently is given to guaranteeing availability of the allocated capacity and to maintaining or increasing cross-zonal capacity.

A third priority would be added: compensating offshore generators if access to interconnected markets has been reduced in such a way that one or more TSOs have not made enough capacity available on the interconnector or the critical network elements affecting the capacity of the interconnector, resulting in the offshore plant operator not being able to export its generation capability to the market.

Investment in grid infrastructure and an economically efficient risk allocation as between project developers and TSOs is critical to delivering offshore renewable energy at scale.

The Commission invites feedback until 23 May 2023.

Heavy industries to leverage low-carbon hydrogen to achieve sustainability targets

Low-carbon hydrogen – electrolysis hydrogen emitting no or marginal carbon – is emerging as one of the most promising routes to accelerating the decarbonisation of high-emission sectors and a crucial facilitator in achieving a greener future, says a new report from the Capgemini Research Institute.

The report: 'Low-Carbon Hydrogen – A Path to a Greener Future' finds that 62 per cent of heavy industry companies across sectors are looking at low-carbon hydrogen to replace carbon-intensive systems. On average, Energy and Utilities (E&U) companies expect low-carbon hydrogen to meet 18 per cent of total energy consumption by 2050. They are unlocking investment across the hydrogen value chain, notably to develop hydrogen infrastructure, cost-effective electrolysers and fuel cells.

The report finds that most organisations believe low-carbon hydrogen (3.38 kg CO_2-equivalent per kg of hydrogen) will be a long-term contributor to achieving emissions and sustainability goals. Some 63 per cent of E&U organisations view low-carbon hydrogen as critical for decarbonising economies, and 62 per cent believe it can help nations reduce dependence on fossil fuels and promote energy independence.

According to those surveyed, low-carbon hydrogen could meet up to 55 per cent of hydrogen mix totals by 2050. On average, 0.4 per cent of total annual revenue is earmarked for low-carbon hydrogen by E&U organisations by 2030, in particular for hydrogen energy transport and distribution (53 per cent), production (52 per cent) and R&D (45 per cent).

- RES and Octopus Energy Generation's green hydrogen joint venture HYRO has signed a deal to develop electrolysers that will be used to produce green hydrogen for use in place of gas at two Kimberly-Clark UK manufacturing facilities.


THE BIG ZERO SHOW
NET ZERO IN ACTION SESSIONS FROM LLOYD'S BANKING GROUP, HILTON FOODS, KING'S COLLEGE LONDON, COVENTRY BUILDING SOCIETY, MOTT MACDONALD
MAYOR ANDY STREET - THE WEST MIDLANDS MAYOR DISCUSSES WHAT NET ZERO MEANS FOR THE REGION
JULIET DAVENPORT - WHY BUILDING A GREEN BUSINESS IS A GOOD BUSINESS
JUNE 20TH, 2023
9:00AM - 5:00PM
REGISTER NOW
bigzeroshow.com


EMPOWER
EUROPE
JUNE
14 – 16
2023
MESSE MÜNCHEN
The International Exhibition for Energy Management and Integrated Energy Solutions
www.EM-Power.eu
Part of
THE smarter
EUROPE


EMC
EASTERN MEDITERRANEAN CONFERENCE & EXHIBITION
Under the patronage of
MINISTRY OF ENERGY COMMERCE AND INDUSTRY OF CYPRUS
Driving Clean, Reliable Solutions to European Energy Demand
28-30 November 2023
Nicosia - Cyprus
www.emc-cyprus.com
BOOK YOUR STAND
For information:
exhibition@emc-cyprus.com
+39 30803030
+39 340 3377803
National Host
CHC
Organised by:
IES Events


EU PVSEC
EU PVSEC 2023
40th European Photovoltaic Solar Energy Conference and Exhibition
18 — 22 September 2023
Lisbon
Portugal
CCL
Lisbon Congress Centre
Programme Outline Available
PROGRAMME OUTLINE AVAILABLE
The EU PVSEC 2023 offers a carefully crafted programme of top-level international presentations giving participants in-depth insights into the latest research in the PV solar energy sector.
The detailed conference programme will soon be published on the website.
Stay tuned and get ready for your visit to EU PVSEC 2023 in Lisbon!
EUPVSEC.ORG

State to buy 80 per cent of Iberdrola's Mexican capacity

■ $6 billion deal transfers 8.5 GW of mostly gas capacity ■ President celebrates 'new nationalisation'

Janet Wood

Iberdrola is selling 8539 MW of installed capacity in Mexico – most of its assets in the country – to a state-owned fund for $6 billion. Iberdrola Mexico and Mexico Infrastructure Partners (MIP) recently signed a memorandum of understanding under which a trust led and managed by MIP will acquire 8436 MW of combined cycle gas plant (12 units) and one 103 MW wind farm. The assets sold represent 77 per cent of Iberdrola's installed capacity in Mexico.

The acquisition follows pressure on Iberdrola from President Andrés Manuel López Obrador, who has been hostile towards Spanish corporate investment because of the country's colonial history. López Obrador called the acquisition "new nationalisation".

José Sainz Armada, Iberdrola's Chief Financial Officer, said the company would channel the proceeds of the sale into new investments in "A-rated geographies", adding "the US is probably the country that brings more opportunities for the medium and long term". Iberdrola's shares following the announcement. The Spanish company said the transaction matched its goal of reducing its ownership of fossil fuel burning facilities. It said it would cut the proportion of natural gas in its global power mix from 30 per cent to about 15 per cent.

The deal will increase state power company CFE's market share from less than 40 per cent to 55.5 per cent.

López Obrador has attacked Iberdrola in his morning news conferences. But the company successfully appealed a ruling from Mexico's regulator last year after it fined the company $466 million for allegedly selling power to partner companies.

The operation has the financial support of the National Infrastructure Fund of Mexico (Fonadin) and other public financial entities associated with the Government of Mexico. Treasury Secretary Rogelio Ramírez said the deal could be completed in five months and would involve selling bonds to raise the cash to pay for the plants.

Some analysts questioned the wisdom the deal, which meant state funds were used to buy existing plants rather than for building new capacity or expanding transmission. "The Mexican electricity system is already very stressed," commented Rosanety Barrios, a former energy official. "It's another political victory for the president that hurts public finances, hurts development."

Iberdrola will continue to own some assets in Mexico and expects to earn $400 million in revenue a year from them. They include a gas plant and renewable facilities.

The transaction is subject to the agreement and the signing of definitive contracts by the parties, as well as obtaining the necessary regulatory approvals.

Brazil prepares for inaugural offshore wind auction

Brazil is expected to launch its first offshore wind auction this year with the aim of bringing winning projects into operation in 2027.

Among likely bidders are Equinor and Petrobras, which recently signed a letter of intent to expand their cooperation and evaluate seven offshore wind generation projects off the Brazilian coast with the potential to generate up to 14.5 GW.

"Equinor and Petrobras have a long history of successful partnerships... Together we are actively engaging to contribute to the realisation of offshore wind and Brazil's energy transition, by creating the necessary initial conditions for renewables energy to develop in a sustainable way," said Anders Opedal, Equinor Chief Executive.

Attaurrahman Ojindaram Saibasan, Power Analyst at GlobalData, warned of a decline in awarded capacity in offshore wind, "due to reduced interest from industry participants because of rising costs and reduction in ceiling prices set by the government". The company advised that Brazil should look for ways to make its auction scheme more attractive, such as floating price schemes or Contracts-for-Difference .

Brazil already has plans to add onshore wind capacity of around 17.8 GW between 2023 and 2035 to its existing onshore capacity of 23.71 GW. Wind power accounted for over 40 per cent of new capacity brought forward via auctions between 2015 and 2022.

Puerto Rico plans to be majority renewables-powered by 2040

Measures to address the high cost and unreliability of power in Puerto Rico, more than five years after a hurricane hit the territory, were at the centre of the annual state of the territory address by Governor Pedro Pierluisi .

Pierluisi's administration oversaw privatisation of the island's generation, transmission and distribution of power. In the speech Pierluisi said that Puerto Rico will increase renewable energy provision from 3 per cent now to 40 per cent by 2025 and 60 per cent by 2040.

He announced $100 million in US federal funds for a new voucher programme to finance up to a third of the costs of installing battery-backed domestic solar systems and said the US Federal Emergency Management Agency had approved microgrid projects to supply all the power to the islands of Vieques and Culebra, important tourist destinations.

The speech was seen as a first initiative in plans for the governor to seek a second term in elections, which are due next year. "It's obvious that the campaigning began," explained Rafael Hernández, speaker of Puerto Rico's House and a member of the main opposition Popular Democratic Party. "But there's still a lot of work to be done."

The speech was powered by generators to avoid interruptions.

US nuclear and coal generation beaten by gas and renewables in 2022

■ Growth in wind and solar to be boosted by IRA
■ Texas lawmakers threaten expansion

Janet Wood

Wind and solar contributed 14 per cent of the electricity produced domestically in the US 2022 while hydropower contributed 6 per cent, and biomass and geothermal sources generated 1 per cent. Together they passed coal-fired generation, which provided 20 per cent of electricity in 2022, down from 23 per cent in 2021. It was the first time electricity generated from coal was overtaken by electricity from renewables in 2022, according to the new figures from the US Energy Information Administration, which said renewables also out-generated nuclear power for the second year running.

Natural gas was the largest source of electricity in the US in 2022, generating 39 per cent last year compared to 37 per cent in 2021.

"When you look at the data, natural gas has been a major driver for lowering greenhouse gas emissions from electricity because it's been largely replacing coal fired power plants," said Melissa Lott, Director of Research for the Center on Global Energy Policy at Columbia University.

The EIC figures come as the Department of Energy released a new Wind Energy Strategy, outlining goals of deploying 30 GW of offshore wind by 2030, while reducing costs from $73 per MWh to $51 per MWh by 2030 and developing a domestic supply chain for the industry. The strategy also plans for 15 GW of floating offshore wind deployed by 2035 and 110 GW total deployed by 2050.

"With over 4200 GW of technical resource potential, offshore wind could meet today's US electricity demands by more than three times," DOE said in the report.

Texas saw the most wind generation in the US in 2022 – 26 per cent of the total – and is on track this year to surpass California with the largest solar capacity in the US. But expansion in the state could be under threat at the state legislature, as lawmakers take up new bills that would hobble wind and solar projects with new environmental permits not required for other types of power plants. "We have invested heavily in renewables, but now it's time to focus on dispatchable," said Texas lieutenant-governor Dan Patrick.

The backlash could stop Texas from accessing subsidies now available under Biden's Inflation Reduction Act (IRA), which is expected to have a "tremendous" impact on accelerating clean energy projects.

"Texas stands to be a major winner under [the IRA], but a lot of our political leaders just seem dead set on cutting off our nose to spite our face," said Doug Lewin, President of consultancy Stoic Energy.

Canada's clean energy industry welcomes budget measures

Canada has made "critical investments" in its 2023 federal budget that will support the expansion of Canada's electricity system to meet the needs of reaching net zero while addressing affordability for electricity customers and preserving reliability, according to Electricity Canada.

Transformative investments include a 30 per cent tax credit refund on the capital costs of wind, solar and energy storage, for all project spending from March 2023 through to 2034. For hydrogen, the plan is for a 40 per cent investment tax credit.

A tax credit of 15 per cent will be available to back investments made by non-taxable entities such as indigenous communities and municipally-owned utilities under the Clean In addition, the budget also includes C$20 billion ($14.8 billion) in support for clean electricity investments, to be distributed in two even portions for projects within designated clean power and green infrastructure priority areas.

The government's plan was strongly welcomed by the Canadian Renewable Energy Association and the industry.

Electricity Canada also noted the budget will advance the elements of a Canadian Electricity Strategy, which should coordinate new and existing programmes, help provide regulatory clarity and offer a clear path for getting projects built faster. It said: "We need this game changer and the work the government has committed to doing will advance that."

Green shift will be tall order for India

- Just transition will cost around $900 billion
- Renewables companies will struggle to keep pace with new annual auctions

Syed Ali

Making the transition from coal to clean energy will be a tall order for India, with the scale of transition being described as "massive" by a US-based think-tank.

According to a recent report from independent non-profit environmental research and innovation organisation International Forum for Environment, Sustainability & Technology (iFOREST), quitting coal over the next 30 years – without jeopardising the livelihoods of millions who still are employed in coal mines and thermal power plants – would cost around $900 billion.

The biggest single investment to enable a just transition will be the cost of setting up clean energy infrastructure, which iFOREST estimates could be up to $472 billion by 2050. Providing workers with clean energy jobs will cost less than 10 per cent of the total amount required for a just transition, or about $9 billion.

It said $600 billion would come as investments in new industries and infrastructure, with an additional $300 billion as grants and subsidies to support coal industry workers and affected communities.

Commenting on the report, Sandeep Pai, a senior associate at the Center for Strategic and International Studies, a Washington D.C.-based think-tank, said: "The scale of transition is massive. If formal and informal sector workers are included, we are talking about an industry that is the lifeline for 15-20 million people." He added: "Reports like this are extremely important since the just transition conversation is beginning only now in India... we need much more of the same."

India has committed to achieving net zero emissions by 2070 but the country is a long way from quitting coal.

Earlier last month, the Indian government issued emergency orders stipulating that coal plants are run at full capacity through this summer to avoid any power outages. The country's coal use is expected to peak between 2035 and 2040, according to government figures.

Also, last month NTPC, India's largest electricity producer, announced plans to build more coal plants to meet India's growing energy needs. The power utility company expects to award construction orders for about 4.5 GW of coal fired capacity during the current financial year.

This continuing dependence on coal will make the transition more difficult.

"The energy transition has to start with coal," said Jayant Sinha, who represents the coal-rich Hazaribagh constituency in the central Indian state of Jharkhand, adding that the switch to clean energy needs both funds and institutions to ramp it up. "Both of these must happen together for a successful transition," he said.

India has set ambitious renewables targets. The country plans to reach 500 GW of non-fossil fuel capacity by 2030 but is likely to struggle to realise its goal. It has already fallen short of a plan to install 175 GW by last year

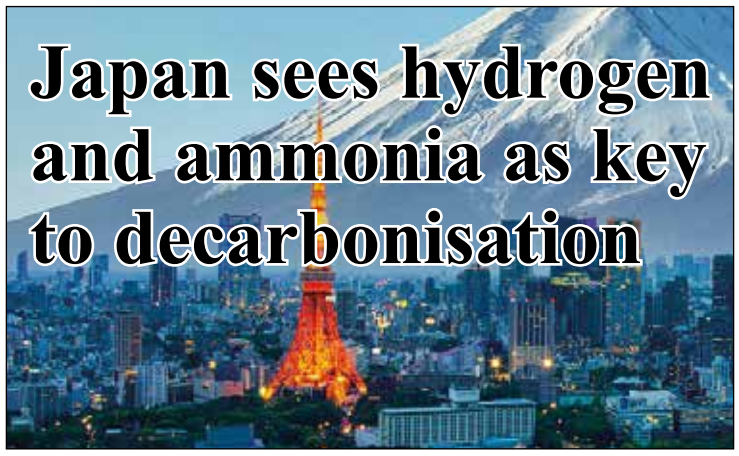
In an effort to regain lost ground, in April the government decided to start auctioning 50 GW of renewable energy capacity annually for the next five years, (2023 to 2028), more than doubling the current pace.

But Sumant Sinha, Chief Executive of ReNew, one of the largest clean energy providers, said the capacity auctions will put "a lot of pressure" on the industry to scale-up quickly, noting that renewable companies were already stretched trying to keep up with existing work.

"This is step one in terms of trying to make the seriousness of their 500 GW target more credible and more real," Sinha told the *Financial Times* in an interview. "It can be done but we'll need a little time to ramp-up.

"More bidding will put a lot of pressure on people like us because we need to raise capital, we need to have equipment, we need to be able to execute on the ground, we need to hire people. All of that is not easy."

■ The government of India is planning to give green hydrogen fuel producers incentives worth at least 10 per cent of their costs under a $2 billion scheme. According to a *Reuters* report, a top government official confirmed that the scheme will begin before the end of June. The incentives will be awarded through a competitive bidding process, and the incentive amount will taper down annually.



Japan sees hydrogen and ammonia as key to decarbonisation

Japan is preparing to use hydrogen and ammonia as part of its plan to decarbonise its power sector, as discussions intensified with potential international partners around the role of the fuels in cutting carbon emissions.

At the recent G7 Ministers' Meeting on Climate, Energy and Environment held in Sapporo, Japan's government pushed for the use of hydrogen and its derivatives (ammonia, etc.) as a way of reducing emissions from coal fired power plants.

Although the G7 did not endorse co-firing with coal in the final communiqué, US Secretary of Energy Jennifer Granholm said that Washington could export hydrogen to Japan as part of larger bilateral energy cooperation.

The US is expected to select nationwide hydrogen hubs by this fall, and exporting it to Japan is "possible", and among the proposals being evaluated, the secretary said.

Japan plans to increase its supply of hydrogen six-fold from the current level to around 12 million tons by 2040. According to a recent report in *Kyodo News*, the Japanese government will aim to generate $113 billion in investment from both the public and private sectors over the next 15 years to achieve the goal.

Prime Minister Fumio Kishida said the government aims to accelerate building international supply chains to provide more hydrogen in collaboration with Australia, as well as Middle Eastern and other Asian countries. The government has also vowed to realise the commercialisation of hydrogen power generation by 2030.

Japan's Ministry of Economy, Trade and Industry also plans to increasingly harness ammonia as a fuel for power generation and for ship propulsion, as part of the country's 2050 decarbonisation goals.

In April, a first shipment of independently-certified low-carbon ammonia arrived from Saudi Arabia for use as fuel in power generation.

The news came as Kyushu Electric Power said it will conduct its first ammonia co-firing test at the 700 MW Unit 1 of its Reihoku coal fired power station. The company is examining the technology for co-firing of 1 per cent hydrogen and 20 per cent ammonia with coal by 2030.

Australia accelerates renewables under Albanese government

The speed of approval for clean energy projects in Australia has more than doubled since the government led by Anthony Albanese came to power, according to Environment Minister Tanya Plibersek.

The government has approved 11 projects in the 10 months since taking over, versus five in the comparison period under the previous government, she said.

Plibersek attributed the increased rate of approvals to streamlining and increased resources in the Department of Environment, as well as creating certainty for investors with the target for 82 per cent renewable energy in the grid by 2030.

Plibersek added that wind farms will also be fast-tracked in the six offshore renewable energy zones.

The rapid ramp up of renewables has seen a subsequent increase in the number of energy storage projects.

At the end of March Macquarie Asset Management's Green Investment Group (GIG) joined hands with Shell Energy Operations to work on a 200 MW/400 MWh battery energy storage project in Victoria, Australia. The partners have already achieved financial close on the project and expect to finalise it late next year.

More recently, Eku Energy, the UK-based battery storage platform of GIG was selected by the government of the Australian Capital Territory (ACT) to build the 250 MW/500 MWh Big Canberra battery.

Last month also saw the final investment decision on the first stage of a large-scale battery being developed by Origin Energy at the Eraring Power Station. Agreements have been executed for the supply and construction of the battery, with works to commence shortly.

Stage one involves construction of a 460 MW battery storage system with a dispatch duration of two hours. The system, which uses Wärtsilä equipment, is anticipated to come online in the final quarter of the 2025 calendar year.

Origin has the option to increase the battery to 700 MW and four hours dispatch duration in the future.

Oil and gas companies sign MoU to explore green hydrogen in Pakistan

Pakistan's leading oil and gas exploration and production companies have signed an agreement to explore and pursue green hydrogen prospects within and outside the country, according the Petroleum Division of the Ministry of Energy.

Five companies, namely Oil & Gas Development Company Limited, Pak-Arab Refinery Limited, Pakistan Petroleum Limited, Mari Petroleum Company Limited, and Government Holdings (Private) Limited, signed a memorandum of understanding (MoU) for joint ventures in the future.

The MoU will be initially effective for two years from the date of signing and it will engage consultants and advisors to explore the opportunities. The companies will also establish a joint fund to raise equity for joint ventures and green energy initiatives.

Secretary of the Petroleum Division Muhammad Mahmood said: "This collaboration is a significant step towards building a more sustainable future for Pakistan and beyond."

There is growing potential for producing hydrogen in Pakistan as it increases its renewables ambition. Speaking at a webinar, titled: 'Accelerating Chinese Renewable Energy Investment in Pakistan', last month, Alternative Energy Development Board (AEDB) CEO Shah Jahan Mirza said Pakistan held immense potential for producing renewable energy. "Pakistan has an ambitious goal of adding 14 000 MW of wind and solar energy to the grid in the next 10 years."

EU sees cross-border projects start to take flight

- Interconnector links GB and Netherlands with offshore wind
- UK and EU discussing carbon border tax

Janet Wood

The EU is struggling to bring its Member States to agreement on measures to ensure the bloc can compete for renewables investment against new US subsidies. But the bloc's members and its neighbours have signed agreements on joint projects that will improve efficient use of renewables.

The UK and the Netherlands recently announced plans for the first so-called 'multi-purpose interconnector' or 'hybrid interconnector' that will allow offshore wind farms to land power in either country, as well as transmit power directly between the two markets. The so-called "Lion Link" is expected to go into operation in the early 2030s onwards and will carry 1.8 GW of energy. "This new connection further boosts energy security and energy independence in Europe," said Dutch Energy Minister Rob Jetten. GB regulator Ofgem has been consulting on business models for this type of multi-purpose connection.

Elsewhere, IberBlue Wind is developing a joint offshore wind project between Spain and Portugal. The projects will be located on the border between Spain and Portugal, and thus, are the first such cross-border offshore wind projects in the area. The Juan Sebastián Elcano and Creoula wind farms will total 1.96 GW and it is estimated that the cost of developing them jointly could be 32 per cent lower than if they were promoted separately. This opportunity would allow synergies to be exploited both during the construction phase, benefitting from economies of scale and the shared use of resources, and once the two wind farms are operational. The two floating wind farms are anticipated to help both Spain and Portugal by driving down energy costs in the two countries, which collaborate on the Iberian electricity market.

"We are very pleased to work on cross-border floating offshore wind projects and to collaborate with the governments on both sides of the border on this opportunity, which we believe will be very positive for both Spain and Portugal," said Adrián de Andrés, Vice President of IberBlue Wind,

Meanwhile, UK Prime Minister Rishi Sunak said recently that Britain and the EU could co-ordinate moves on a new carbon border tax that would place a levy on imported carbon-intensive goods arriving in Europe. Grant Shapps, UK energy secretary, said the consultation would address the risk of future "carbon leakage", where businesses move production to a country with weaker climate regulations to avoid paying a carbon levy.

Discussions between London and Brussels on climate-related issues are the latest signal of improving EU-UK relations.

New condensers provide inertia for GB grid

Four new synchronous condenser units have gone into operation to help stabilise the GB grid as it replaces coal and gas plant, which helped stabilise network frequency and voltage, with wind and solar power.

Two condensers were installed by ABB for Statkraft at the Lister Drive Greener Grid Park in Liverpool. At Lister Drive they are coupled with a 40 tonne flywheel, multiplying the instantaneously available inertia.

Heikki Vepsäläinen, Division President of ABB Large Motors and Generators, said: "Decarbonisation of power generation is a vital element in the world's journey to net zero. Our challenge is to achieve this ambition while maintaining stable and reliable power networks. This is where synchronous condensers are set to play a key role."

Uniper also recently installed two Siemens synchronous condensers and flywheels at the Grain power station site in Kent. Uniper was awarded four six-year contracts by National Grid ESO in 2020 to provide inertia and voltage control and it started up two synchronous condensers at its Killingholme power station site a year ago.

Mike Lockett, Uniper UK Country Chairman, said: "Uniper is now delivering all of the vital stability services it has been contracted to supply to National Grid ESO under phase 1 of its Stability Pathfinder to 2026, putting us at the forefront of this market."

EU to set out new energy market frameworks and extend network rules to hydrogen

The EU has proposed to extend the principles of EU legislation that cover gas networks to hydrogen networks, with consumer protection rules that allow consumers to switch suppliers easily and choose low-carbon gases.

The directive would have provisions on transmission and distribution system unbundling, third-party access to infrastructure, integrated network planning and independent regulatory authorities.

It would set new definitions for 'low-carbon' and create new provisions on the sustainability and certification of renewable and low-carbon gases.

Ebba Busch, Swedish Minister for energy, business and industry said: "I'm glad we have found a balanced agreement on the gas package. Europe is on a journey to shift away from natural gas to renewable and low-carbon gases and we have to create the right market conditions for that to happen, in a way that promotes competitiveness, protects consumers and advances our climate-neutrality objective for 2050."

The Directive was discussed during a Council meeting of EU energy ministers, which also addressed the new European Commission proposal for a new electricity market design and gas demand reduction.

Miriam Dalli, Malta's Minister for Environment, Energy and Enterprise reiterated the need to change market structures in which the electricity price is linked to gas prices, because marginal generators are usually gas power plants.

Offshore wind investor interest moving to floating wind farms

- No final investment decisions for fixed wind farms in 2022
- New technologies announced for floating versions

Janet Wood

Europe invested just €17 billion in new offshore wind farms in 2022, down from €41 billion in 2021 and the lowest since 2009, according to WindEurope's 'Annual Financing and Investment Trends' report.

"The EU needs to build 31 GW of new wind turbines every year to reach its 2030 targets. But the numbers speak a different language. Last year's investments in new wind farms only add up to 10 GW," said WindEurope Chief Executive Giles Dickson. WindEurope said the EU must urgently restore investor confidence and channel money into its wind energy supply chain.

Returns for fixed offshore wind have been driven down by fierce competition in recent tenders. No single commercial scale offshore wind farm reached final investment decision (FID) in 2022.

However, interest remains high in floating wind farms, which are mostly at an earlier stage than fixed bottom wind farms with technological developments and large-scale deployment set to reduce costs.

Portugal has an ambitious target of 10 GW of offshore wind by 2030. Gazelle Wind Power, developer of a modular floating offshore wind platform, has teamed up with renewable energy developer WAM Horizon (WAM). Gazelle's lightweight, modular, and scalable solution not only reduces costs, but can also utilise existing port infrastructure to develop commercial projects in Portugal in the future.

In France, Ocean Winds is progressing the Gulf of Lion floating pilot farm, while in OItlay Italy renewable energy developer GreenIT has signed an agreement with Copenhagen Infrastructure Partners (CIP) to develop three floating offshore wind projects in Latium and Sardinia totalling 2 GW, with commercial operation expected in 2028-2031. GreenIT is a joint venture between Plenitude (Eni) and CDP Equity (CDP Group).

The UK's Crown Estate will launch its first Celtic Sea leasing tender this year, which could deliver 4 GW of floating offshore wind between 2030 and 2035. RWE has already said it is looking to deploy a pipeline of gigawatt-scale floating wind projects in the Celtic Sea and it has been preparing for the opportunity by forming partnerships with Tata Steel UK, ABP Port Talbot, the Port of Milford Haven and Marine Power Systems of Swansea.

"The Celtic Sea region is pivotal to RWE's 'Growing Green' strategy in the UK, where we expect to invest £15 billion in clean energy infrastructure by 2030," said Tom Glover, UK Country Chair at RWE. The UK has launched a £160 million fund to support port infrastructure projects for floating offshore wind.

Europe accommodates diverging nuclear futures

Germany has closed its last nuclear units. But in Finland, TVO's 1.6 GW Olkiluoto nuclear plant has entered into commercial operation. TVO said. "From now on, about 30 per cent of Finnish electricity is produced in Olkiluoto," as the site already houses two reactors.

That divergence on nuclear's future has been a block on targets for renewable energy and low-carbon hydrogen in the EU but the bloc has now reached a compromise. France had wanted nuclear energy to be included in countries' targets, while other states including Germany and Austria argued against it.

The new agreement provides separate targets for hydrogen generated from nuclear electricity and French Energy Minister Agnès Pannier-Runacher said the agreement was an "important advance", adding, "this is about recognising that the development of renewable energy in Europe is aimed at eliminating fossil fuels and should not lead to the replacement of nuclear reactors," she told reporters.

The agreement should be a boost for Polish plans to invest in nuclear. Recently Polish Prime Minister Mateusz Morawiecki announced the location of seven small modular reactors, using Hitachi's BWRX-300, and said up to 13 other sites could be named this year. He said: "Today will go down in history, because Poland needs a permanent, clean and cheap source of energy."

Renewables 'will help beat climate and energy crises' – REN21

- Benefits include greater supply security and lower costs
- Fossil fuel subsidies hinder further renewables expansion

Nadia Weekes

Growing use of renewables globally as reliable and affordable energy sources in buildings, industry, transport and agriculture will help overcome the threats of costly energy and climate breakdown, a new report has said.

The latest annual Renewables Global Status Report (GSR) by the REN21 network – which includes actors from science, academia, governments, non-governmental organisations and industry across all renewable energy sectors – explored trends and opportunities for renewable energy deployment in buildings, industry, transport and agriculture across the world.

It found that soaring fossil fuel prices and the risks of energy shortages combined with stronger climate commitments, targeted policy frameworks and technological developments to drive increased use of renewables, especially wind and solar energy, in the four sectors.

"It's a typical story of challenges turned into opportunities," said Rana Adib, REN21 Executive Director. "The polycrisis made policymakers and the leaders of key energy-consuming sectors realise the benefits of renewables as a local energy source that can guarantee security of supply and stable costs."

It is unfortunate that it took a crisis pushing families into poverty and forcing factories to cut production "for the world to finally turn to renewables to operate industries, buildings, transport and agriculture", she added.

Several key policy packages boosted the demand for renewables in end-use sectors during 2022, including the United States' $500 billion Inflation Reduction Act providing new spending, tax credits and incentives for energy demand sectors, the European Commission's REPowerEU plan and India´s renewable hydrogen plans, which directly target heavy industry and transport.

In the buildings sector, high energy prices and the search for fossil-free energy supply pushed people to switch from natural gas boilers to electric heat pumps, producing record 10 per cent year-on-year growth in 2022 for heat pump installations.

The economic benefits of rooftop solar panels also became more visible to end-users as the price of energy rose and heatwaves in Europe, India and China brought attention to the growing role of cooling in driving electricity demand.

Energy-intensive industries were hit hard by the polycrisis and responded by buying power from renewable energy suppliers through fixed-price, long-term power purchase agreements (PPAs). Renewables-based industrial parks also became more attractive.

"If there is any positive outcome of the energy crisis on the industrial sector, it's the fact that sector leaders were able to concretely discern the benefits of renewables in cutting production costs, strengthening resilience and maximising profits," noted Tareq Emtairah, Director of the Energy Department at the United Nations Industrial Development Organisation.

In road and rail transport, electrification emerged as a growing trend and opportunity to accelerate the uptake of renewables. Electric vehicles and associated charging infrastructure saw investments grow 54 per cent year-on-year in 2022, with India doubling its electric vehicle spending.

Despite being the fastest growing sector for energy consumption, transport had the lowest overall use of renewables, with a modest 4 per cent share – indicating that the sector will require more than simply ongoing electrification to become more sustainable and efficient.

Electrification was a key trend in agriculture as well, alongside growth in energy independence and the use of geothermal and bioenergy sources. The sector also witnessed an uptake of decentralised renewables – especially in Africa, Asia and the Caribbean – as farmers prioritised energy access, reductions in fuel costs and energy efficiency.

"Renewables in agriculture offer the least-cost option for farmers, especially in rural areas where productive use of energy in the agricultural value chain drives a cycle of development by increasing income for farmers, improving financial stability for the electricity provider and enhancing food security for the country," said Mohammed Jibril, an officer at Nigeria's Rural Electrification Agency.

REN21 warned that renewables are still facing barriers, however, as they struggle to compete with heavily subsidised fossil fuels. By continuing to subsidise fossil fuels, policymakers are failing to adequately tackle the crises we are facing, said Arthouros Zervos, REN21 President.

"Fossil fuel subsidies do not enable an even playing field for renewables to compete, and they unfortunately concentrate profits and benefits in the hands of a select few, instead of supporting greater equity for all," Zervos added, hailing the report as "a wake-up call" for policymakers to shift away from "harmful and obsolete energy systems".

A recent report by the International Renewable Energy Agency (IRENA) revealed that global renewable generation capacity amounted to 3372 GW by the end of 2022, representing a growth of 9.6 per cent year-on-year. An impressive 83 per cent of all power capacity added last year was renewables, says the report.

"This continued record growth shows the resilience of renewable energy amidst the lingering energy crisis," said IRENA's Director-General Francesco La Camera on the release of the Renewable Capacity Statistics 2023 report. But he warned that annual additions of renewable power capacity must triple by 2030 if we are to limit global warming to 1.5°C.

A World Bank roadmap for the energy transition in developing countries, 'Scaling Up to Phase Down', has flagged up the financing challenges involved in producing the unprecedented transformation of the power sector infrastructure that is needed. This will involve scaling up energy efficiency and renewable energy as well as phasing down coal fired power generation.

Without the means to fund the energy transition and new network infrastructure, developing countries often pay more for electricity, cannot access energy efficiency or renewable energy, and are locked into fossil fuel projects with high and volatile costs. In essence, they face a triple penalty that becomes a poverty trap.

The World Bank estimates that low- and middle-income countries host 89 per cent of the approximately $1 trillion in global coal fired power generation at risk of being stranded. Funding a just power transition will require much higher capital flows than are being mobilised today.

The roadmap distils the energy transition into a 'virtuous cycle' of six steps needed to overcome barriers to renewable energy: government leadership; a supportive regulatory environment, capable institutions; instruments to minimise risks; transparent and competitive project allocation; and the delivery of renewable energy that serves urgent needs.

"Widespread energy transformation in developing countries requires continuous, strategic engagement and far more coordination among governments, investors and partners than exists presently," said Guangzhe Chen, World Bank Vice President for Infrastructure.

World Bank lines up $200 million to repair Ukraine's energy infrastructure

The World Bank will allocate $200 million to repair Ukraine's energy infrastructure, following damage to more than half of it as a result of the Russian invasion.

The funds will be delivered by the Ukraine Relief, Recovery, Reconstruction and Reform Trust Fund (URTF) with the aim of providing up to an additional $300 million from partners "as the project increases in scope", the bank said.

The main focus will be emergency repairs to electricity and heating infrastructure. The World Bank, the United Nations, the European Commission and Ukraine estimated in a recent study that the country will need about $411 billion for recovery and reconstruction. This sum will probably continue to increase as long as the conflict continues.

Uzbekistan attracts international support for solar PV expansion

The European Investment Bank (EIB), Asian Development Bank, Asian Infrastructure Investment Bank and European Bank for Reconstruction and Development will provide a collective $396.4 million to finance the construction and operation in Uzbekistan of three solar photovoltaic (PV) plants with a total output of 897 MWac.

EIB Vice-President Teresa Czerwińska said the project aligned with the bank's priorities on renewable energy, climate action and environmental sustainability. "It will help to reach Uzbekistan's target of using 25 per cent renewable sources for electricity generation by 2030," she said. "At the same time, it will improve the quality of life for people in Uzbekistan by reducing carbon emissions and air pollution."

The loan is to fund three separate projects, all fully owned by Abu Dhabi's Masdar. Two of the solar PV plants, located in Samarkand and Jizzakh, will have a capacity of 220 MWac each. The third plant, in Sherabad, will have a capacity of 457 MWac. Once operational, the projects will cut annual greenhouse gas emissions by the equivalent of more than one million tonnes of CO_2.

Developing these projects will increase Uzbekistan's electricity supply and shift its energy mix away from carbon emissions. Construction will begin immediately, with commissioning expected in 2024. The country plans to install 7 GW of solar and 5 GW of wind capacity by 2030.

Meanwhile, the OPEC Fund for International Development has entered into two separate loan agreements worth $20 million each with ACWA Power to support the construction and operation of two wind farms: the 500 MW Dzhankeldy and the 500 MW Bash, both located in Bukhara.

In a separate deal, Uzbekistan's energy ministry signed a memorandum of understanding with Chinese companies China Huadian Overseas Investments, China National Electric Engineering Company (CNEEC) and SANY Renewable Energy for the construction of wind farms with a capacity of 1000 MW in Jizzakh.

Analysts fear clean energy U-turn following Enel shake-up

- Concern over change in strategy sees share price fall
- Flavio Cattaneo nominated to replace Francesco Starace as CEO

Junior Isles

Analysts are concerned over a potential change in Enel's clean energy transition strategy following upcoming changes to the state-owned Italian energy giant's management board.

In April Prime Minister Giorgia Meloni's rightwing coalition made a series of proposals to change the make-up of the boards of state-controlled companies. Shareholders will have to approve these appointments at the companies' upcoming annual meetings. Enel shareholders will meet on May 10.

Outgoing Enel CEO Francesco Starace has clashed with Italy's new government, which has been in power since October, over the company's strategy. According to analysts, fears of a U-turn on the company's current energy transition strategy were responsible for Enel's shares falling by 4 per cent in April after the proposed appointments were announced.

Zach Mecelis, Chief Executive of Covalis Capital, a Mayfair-based firm that specialises in energy investments, told the *Financial Times* that the proposals were the result of a political compromise.

"Shareholders should get to choose. It's a matter of governance and transparency," said Mecelis, who has been an investor in Enel since 2004. Covalis Capital currently owns less than 3 per cent of the €58 billion utility. "I want this toxic [management appointment] process to end."

"Enel's stock will go up 30 to 40 per cent if this process is run differently," Mecelis said. According to Mecelis, Enel trades at a discount compared to Spain's Iberdrola and France's EDF mainly because political demands outweigh shareholders' interests and company strategy.

The government owns a 23 per cent stake in Enel through the finance ministry. Minority shareholders do not usually challenge the government's proposals and get three out of nine board seats, with directors usually chosen from a list proposed by a group of domestic investors.

Flavio Cattaneo, currently a board member at insurer Generali and the former chief of state-controlled electricity infrastructure group Terna is the government's nomination to replace Starace as CEO. Paolo Scaroni, chair of football club AC Milan and a former Chief Executive of Eni, is proposed as Enel chair.

Enel is one of the world's biggest renewable energy players, with almost 60 GW of installed capacity. Expertise in renewables and an international focus are what investors want to see from the new head of the company, according to reports.

"I would recommend (the new CEO) not to try to shake up everything," said Jean-Hugues de Lamaze, Managing Director at alternative energy investment firm Ecofin, which has $2.2 billion of assets under management and has held a small stake in Enel for the last six years.

"Starace announced a major programme to restructure the group to go back to a growth path... I would like to see it confirmed," he added.

But although Starace has been praised for his commitment to green energy, there is growing concern over a debt pile that has grown to $65.40 billion in 2022, up from €45.5 billion in 2020, when Starace was reappointed for a third term.

In November Enel unveiled its updated strategy to 2025, pledging to cut net debt by €21 billion via asset disposals, while at the same time investing €37 billion and increasing installed renewable capacity by 21 GW.

It plans to focus on six core markets – Italy, Spain, the United States, Brazil, Chile and Colombia.

Vincent McEntegart, multi-asset investment manager at Aegon Asset Management, an Enel shareholder with assets under management worth $311 billion, noted that US President Joe Biden's green energy subsidy package under the Inflation Reduction Act (IRA) could mean double-digit returns for Enel in North America, compared with single-digit in Europe.

Nordex moves into green hydrogen market

The Nordex Group is taking its first steps into the green hydrogen market in a move to complement its core wind turbine business.

The Group recently entered into two strategic joint ventures: one for the manufacturing of electrolysers, a key component in the production of green hydrogen; and the other to develop green hydrogen projects in areas with abundant onshore wind resources.

José Luis Blanco, CEO of the Nordex Group, explained the rationale behind the company's hydrogen activities: "With two joint ventures, the Nordex Group is establishing a presence in the hydrogen value chain, while, in parallel, continuing the company's strategy of focusing on a low risk profile."

In a joint venture with Sodena, Nordex Electrolysers aims to develop, manufacture and market electrolysers using proprietary technology. Both the Nordex Group and Sodena, a public company of the Government of Navarra, will allocate €15 million to this initiative over the next five years to promote the development of a commercial prototype and its first industrial deployment. Experts expect demand for electrolysers to grow from a very marginal capacity base today to 400 GW by 2030.

Under a joint venture with Acciona, Nordex H2 S.L, will develop green hydrogen projects in areas with abundant onshore wind resources. These resources are located in areas that are not connected to conventional power grids, and where green hydrogen can also be produced at a competitive cost.

Bolstered by the company's previous project development expertise in wind, the Nordex Group has built a pipeline of green hydrogen projects throughout regions such as the US and Latin America.

Acciona has bought a 50 per cent stake in this new Nordex Group venture for €68 million – equally shared between Acciona S.A. and Acciona Energía – to fund the further development and expansion of the business.

With a target renewable energy development pipeline of 50 GW, the joint venture's goal is to develop projects that will produce 0.5 million tons of green hydrogen annually within the next ten years. The first projects would be ready-to-build by 2027.

Each of the projects, whose minimum size will be 1 GW of installed renewable power, will be deployed through strategic agreements with other public and private companies and institutions interested in the production or mass consumption of green hydrogen.

Ørsted-Acciona partnership aims to cut cost of floating offshore wind

Ørsted has signed a memorandum of understanding (MoU) with the infrastructure division of Acciona to explore options for floating offshore wind foundations.

The collaboration will combine Ørsted's expertise in offshore wind with Acciona's experience in large-scale construction projects and focus on carbon reduction through the use of carbon-neutral materials.

As part of the Ørsted-Acciona MoU, the companies will work together to reduce floating wind levelised cost of electricity (LCoE) and environmental footprint, industrialise the fabrication of concrete foundations, and establish a European supply chain to support Ørsted's European project pipeline for floating wind.

Gabriel Davies, Head of the Floating Wind Programme at Ørsted, said: "With floating wind, we can deliver renewable electricity, energy independence, and clear pathways to net zero to many more markets around the world. Working with Acciona will help us take the next step to realise the potential of floating wind at scale here in Europe – to innovate, invest in the supply chain, and bring costs down, all while reducing carbon emissions. Ørsted has done just that with seabed-fixed offshore wind, and we're going to do it all over again with floating wind."

With more than 20 per cent of new offshore wind farms estimated to be floating by the mid-2030s, Ørsted is one of a number of companies taking steps to commercialise floating wind technology.

In late April Gazelle Wind Power (Gazelle), the developer of a modular floating offshore wind platform, unveiled what it is calling its third generation floating offshore wind platform technology.

As a third-generation technology, Gazelle says the platform delivers enhanced mooring innovation that enables serial production.

The company said in a press release: "The platform makes first generation technology – which was primarily designed to float and survive harsh ocean conditions – obsolete and improves on second generation designs that are focused on industrialisation. Instead, Gazelle's platform moves away from archaic models that are stationary, heavy, bulky, and difficult to assemble and transport while reducing costs by 30 per cent compared to conventional semi-submersible designs," said.

Gazelle CTO Jason Wormald, added: "On top of lowering costs and taking advantage of pre-existing infrastructure, every aspect of Gazelle's floating offshore wind platform is designed to minimise environmental impact by using less steel and materials that protect the biodiversity of marine ecosystems, eliminating seabed scouring, and reducing installation impact."

More UK companies need "credible" net zero plans

Analysis by EY has revealed that only a small fraction of FTSE 100 companies have so far disclosed transition plans that would be deemed "credible" or sufficiently detailed under draft UK government guidance.

About 18 months ago, the government pledged that UK listed businesses would be mandated to publish decarbonisation plans by 2023. EY's research shows that only 5 per cent of FTSE 100 companies have disclosed transition plans to meet this government guidance.

EY analysed net zero transition plan information published publicly by FTSE 100 businesses, as of 31 January 2023, and assessed them against the Transition Plan Taskforce's (TPT) Draft Disclosure Framework. The Framework, which is set to be finalised this year following industry consultation, outlines guidance for companies to create decarbonisation plans that can be deemed "credible, useful, and consistent".

Further, the analysis finds that while 78 per cent of FTSE 100 companies have disclosed partially-developed plans that include public targets to achieve net zero emissions by 2050, they have not yet adequately outlined how they will reach these targets, therefore missing key current TPT Framework requirements around strategy and execution. FTSE 100 firms scored best on the initial 'Foundation' stage, requiring companies to publish transition objectives and priorities, as well as implications for business modelling.

Americas

ENEVA orders GE 7HA equipment for Azulão

GE has secured a second order for its H-Class gas turbine technology from Eneva, the largest private natural gas operator in Brazil. This will expand the Azulão II Reserve Power Plant to deliver up to 590 MW to support grid stability.

The new power plant will consist of a 7HA.02 gas turbine, an STF-A650 steam turbine, an H65 and an H53 generator, and an HRSG. It is expected to start commercial operation in 2027.

AFRY to supervise Acaray hydro plant rehabilitation

Paraguay's state-owned power utility Administración Nacional de Electricidad (ANDE) has awarded AFRY, in consortium with Latinoconsult, a contract for the planning and supervision of the rehabilitation and modernisation of the 200 MW Acaray hydropower plant. The renovation project is financed by the Inter-American Development Bank (IDB).

The project aims to extend the plant's lifecycle, improve its availability and reliability and increase the electrical generation capacity.

The first phase of the project will last approximately 20 months. The second phase of the contract will take place in the following 40 months.

Green energy for California wines

ESS Tech will deliver three Energy Warehouse systems to Coldwell Solar. The systems will be installed in a solar + storage microgrid at Roederer Estate, Scharffenberger Cellars and Domaine Anderson, wineries in Mendocino County, California, USA. The microgrid is scheduled to be operational in late 2023.

A spokesman for ESS Tech said: "Our technology uses earth-abundant iron, salt and water to deliver environmentally safe solutions capable of providing up to 12 hours of flexible energy capacity for commercial and utility-scale energy storage applications."

Vestas wins 370 MW order from Xcel Energy

Vestas has won 370 MW of orders from Xcel Energy for two repowering projects in the USA. The order for the 213 MW Pleasant Valley project in Minnesota consists of 97 V110-2.0 MW wind turbines delivered in 2.2 MW operating mode. The 156 MW Border Winds project, located in North Dakota, consists of 71 V110-2.0 MW wind turbines delivered in 2.2 MW operating, which will update the current V100-2.0 MW technology at both sites.

Both projects include supply, delivery, and commissioning of the turbines, and Vestas will service the turbines and provide an energy-based availability guarantee, designed to ensure optimised performance of the asset.

Turbine delivery for both projects will begin in Q2 2025, with commissioning scheduled for completion in Q4 2025.

Asia-Pacific

Vibrant Energy places 130 MW order with Vestas

Vibrant Energy and Vestas have signed a deal for two wind power projects in India. Vestas will supply 36 units of V155-3.6 MW turbines for the 130 MW wind farm in the state of Hyderabad.

Deliveries of the turbines to Vibrant Energy are expected to begin in Q4 2023, while commissioning of all turbines is expected to be completed by Q2 2024.

Srini Viswanathan, CEO of Vibrant Energy, said: "Vestas has been our key partner in delivering our wind projects, and we are glad to announce the second order for V155-3.6 MW turbines."

In addition, Vestas said that it has signed a preferred supplier agreement for a 495 MW floating offshore wind project in South Korea. If the project materialises, the firm will supply and install 33 units of the V236-15.0 MW turbine for the project. The company has not disclosed the name of the buyer.

Suzlon wins 50.4 MW wind order for India

Suzlon has won an order to develop a 50.4 MW wind power project for Green Infra Wind Energy. Suzlon will install 24 wind turbines with a hybrid lattice tubular tower, each with a rated capacity of 2.1 MW. The project is located in Karnataka and is expected to be commissioned in 2024.

Suzlon will supply the wind turbines and execute the project, including erection and commissioning. Suzlon will also provide O&M services after commissioning.

First Japanese offshore wind deal for Mingyang

Nyuzen-machi Offshore Wind Farm is the first Japanese offshore wind power project to use turbines made in China, ordering equipment from Ming Yang Smart Energy Group.

The Nyuzen-machi Offshore Wind Farm is located in the Shimoniikawa district of Toyama prefecture and is designed to supply power to 3600 local families. Offshore construction will start in May and the project is expected to start operating in the second half of 2023.

Ming Yang also said it has gained certificates issued by Japan's economy and industry ministry and ClassNK, and it is the only Chinese company among the four certified offshore wind power equipment makers.

Millennium Challenge project progresses

The Millennium Challenge Account Nepal Development Committee (MCA Nepal) issued a public notice and invited bids for the construction of three substations of 400 kV capacity under the US-funded Millennium Challenge Corporation project.

MCA Nepal has invited tenders for substations to be constructed at Ratmate, New Damauli and New Butwal. It has invited tenders to build on a design, supply, delivery, installation, testing, commissioning model.

Europe

Ørsted contracts Havfram for Hornsea Three

Ørsted has selected Havfram Wind for the installation of wind turbines at its Hornsea Three offshore wind farm in the UK. Havfram will use one of its newly built jack-ups for the work, scheduled to start in autumn 2026.

The 2852 MW Hornsea Three will be built 120 km off the north Norfolk coast in the UK. The offshore wind farm will comprise up to 231 wind turbines, of a type yet to be announced. Contracts for the supply of the project's XXL monopiles and their installation were awarded last year to Haizea Wind Group and Cadeler, respectively.

Havfram said it would deploy one of its newly built NG20000X jack-up wind turbine installation vessels (WTIVs) with a 3250 tonne crane to install the wind turbines.

Nordex wind turbines for Lower Saxony projects

Nordex has won an order from RWE to supply and install eleven turbines from the Delta4000 series for two projects in Lower Saxony, Germany, totalling 61.8 MW.

Nordex will supply seven N149/5.X turbines and one N133/4800 unit for the 44.7 MW Lesse wind farm in the district of Peine in lower Saxony; the 17.1 MW Barbecke wind farm also in lower Saxony will be fitted with three N149/5.X turbines.

Both wind farms are repowering projects in which a total of 17 older turbine models will be replaced by 11 more powerful machines. This will double the output from 30.6 MW to 61.8 MW while reducing the number of turbines.

Vestas wins 140 MW order for Spanish wind parks

Vestas has received a 140 MW order for the Cerrato, Atalayas and San Cebrián wind parks, to be located in Castilla y León, Spain. The contract includes the supply and installation of 20 V163-4.5 MW wind turbines and 11 V150-4.5 MW wind turbines, as well as a 10-year 4000 Active Output Management service agreement.

The order was placed by Estudios y Proyectos Pradamap y Cerrato Eólica.

The San Cebrián and Cerrato wind parks will feature the first V163-4.5 MW wind turbines in Europe. The V163-4.5 MW has a large rotor-size-to-rating ratio resulting in a high capacity factor, which in turn enables higher Annual Energy Production and more stable power output at park level.

Turbine delivery and commissioning are expected by 2024.

Siemens Energy converters for Tyrrhenian Link

A €1 billion contract from the Italian transmission system operator to supply four converter stations for the Tyrrhenian Link project has been awarded to a consortium of Siemens Energy and Fata, part of the Danieli Group.

The project is to enable transmission of electricity between the islands of Sicily and Sardinia and the Italian mainland through a 970 km underwater HV double cable. Siemens Energy will provide the HVDC technology for the power link, with a 1 GW capacity for each interconnection.

The Tyrrhenian Link will be Siemens Energy's first HVDC project in Italy. The contract scope includes building four converter stations at the end points of the two sections of the link. The East Section will connect Campania on the Italian mainland with Sicily, while the West Section will connect Sicily and Sardinia

North Sea €13 billion offshore wind agreement

TenneT has selected Hitachi Energy and Petrofac to supply multiple offshore and onshore HVDC converter stations and associated infrastructure under a €13 billion agreement to accelerate the integration of bulk renewables into European power grids.

Hitachi Energy and Petrofac were awarded the multi-year framework agreement as part of Tennet's offshore wind 2 GW Programme based on HVDC technology. The agreement is to deploy six renewable integration systems, five of which will connect offshore wind farms to the Dutch grid and the sixth to the German grid. Each connection will have a 2 GW capacity at 525 kV.

Hitachi Energy will supply its HVDC Light converter stations. Petrofac will undertake the engineering, procurement, construction and installation (EPCI) of the offshore platforms and elements of the onshore converter stations.

The first contract under the framework, for the Ijmuiden Ver Alpha project, was awarded with immediate effect. The second, Nederwiek 1, is expected to be awarded later in the year. The framework also includes projects Doordewind 1, Doordewind 2, Nederwiek 3 and LanWin5, expected to be awarded over a 2024-2026 timeframe.

International

Strengthening Namibian power supply

Hitachi Energy is delivering high-voltage equipment to Sinohydro Corporation Limited to enhance NamPower's Kunene and Omatando substations in northern Namibia.

NamPower, Namibia's bulk electricity supplier, is implementing the two substations as part of the utility's Transmission Master Plan. The project will strengthen and expand the country's transmission network and ensure reliable power supply throughout Namibia.

For this project, Hitachi Energy collaborated with Sinohydro to supply of a range of reliable high-voltage products including circuit breakers, instrument transformers, surge arresters and disconnectors to NamPower.

GE to build solar project in Turkey

Ecogreen Energy has awarded a contract to GE to supply its FlexInverter Solar Power Station technology for the 130 MW Nigde Bor Solar power plant to be built in Nigde, Turkey. The scope of work includes design, engineering, procurement, and commissioning of the plant.

This project adds up to the 1.3 GW of solar projects GE is delivering in Turkey.

The Nigde Bor solar power plant is part of YEKA- GES4 launched in 2022 by the Ministry of Energy. It will enable the energy transition in the country and beyond, by helping Turkey continue the expansion of renewable energy resources and commission 10 GW of solar capacity between 2017-27.

500 MW solar power plant for Oman

An order to build a 500 MW solar power plant in Oman has been awarded to Korea Western Power.

Oman Power and Water Procurement Company is having two solar power facilities with a total capacity of 1000 MW built in Manah, 170 km southwest of Muscat. The project will be carried out in two 500 MW phases: Manah I and Manah II.

Korea Western Power is investing Won600 billion ($459.6 million) in the land equivalent to 2.6 times larger than the size of Yeouido in Seoul to build the Manah I project. Construction is starting in H2 2023, and is scheduled for completion in March 2025. Korea Western Power will be responsible for operation and maintenance services.

Hydrogen

Japan set to revise hydrogen strategy

Japan launched its 'Basic Hydrogen Strategy' in 2017, the first country to do so. But the road has been bumpy and the country is not where it thought it would be by this time. Later this month, Japan intends to correct its course and relaunch its hydrogen strategy, targeting the use of 12 million tons/year by 2040.

Gary Lakes

The March 2011 earthquake and tsunami off the northern coast of Japan left the country's energy sector in disarray, with an urgent scramble for oil and LNG supplies. Then Covid-19 in early 2020 and the war in Ukraine in February 2022, exacerbated Japan's energy supply dilemmas.

Aware of its vulnerabilities, Japan in the middle of the last decade conceived a plan that would shift the country's energy reliance to hydrogen, but while efforts were made to transition to the use of hydrogen in houses, cars, and industry, Japan has failed to meet the targets it set for itself.

But it hasn't lost faith. Japan has continued to seek ways to get hydrogen into the economy through the use of fuel cells and low-carbon fuels. Numerous steps have been taken, all meant to bring hydrogen to the fore, like setting up the Japan Hydrogen Association in 2020.

Aware that its programme needs to be revamped, Japanese Prime Minister Fumio Kishida and other government officials have announced that the country will in late May relaunch its national hydrogen strategy, which will expand its hydrogen use target from 3 million tons/year by 2030 to a target of 12 million tons annually by 2040 and 20 million tons by 2050, all part of an overall effort to reach carbon neutrality by that time.

Japan is looking not only to government ideas, but it is also urging participation by the private sector so that it might not only meet its own future hydrogen development, but also those throughout the region. It plans also to establish reliable hydrogen and ammonia supply chains.

In early April, Saudi Aramco announced that it had delivered its first cargo of certified low-carbon ammonia, a way to transport hydrogen in liquid form, to the Sodegaura refinery in Japan where it will be used in co-fired power generation. The delivery follows a trial run of an ammonia delivery by Aramco in 2020.

In March, a combination of Japanese and Australian ministries and companies established through the Green Innovation Fund Project a large-scale hydrogen supply chain group that will conduct feasibility studies on the practicality and costs of setting up a hydrogen export site at the Port of Hastings in Victoria, Australia, and a receiving terminal at the Kawasaki Coastal Area, in Kanagawa Prefecture, Japan.

"The project will collaborate with potential customers [and] industrial partners who will conduct hydrogen power generation demonstration projects, and local governments, and contribute to the establishment of a commercial scale international liquefied hydrogen supply chain," a statement released by the group said, adding that the goal was carbon neutrality for Japan by 2050.

Last month, Japan hosted the G7 meeting of climate, energy and environmental ministers in Sapporo City. During the meeting, Japan sought support from other G7 members for its Green Transformation (GX) plan, a programme designed to finance the energy transition. The plan relies on hydrogen, nuclear and so-called clean, (or low-carbon) hydrogen and ammonia, which will be produced by burning coal and gas. Japanese climate experts are critical of the continued use of low-carbon fuels and urge the government to focus more on renewables, which the government has said it will do.

Japan's GX policy is an investment roadmap for Yen150 trillion (over $1.1 trillion) of public-private financing over the next 10 years to transform 22 industrial sectors to meet carbon neutrality and contribute to the energy transition in Asia. The aim of the initiative is to drive economic growth and development through emissions mitigation. The GX policy will not take Japan's focus off energy security but will likely accelerate companies' pursuit of more flexible and shorter LNG contracts.

The GX Implementation Council was established in July 2022 to promote the implementation of major reforms in the energy sector, all industries, as well as the transformation of Japan's economy and society with the intention of reaching carbon neutrality by 2050.

The revised national hydrogen strategy is likely to approach the production of hydrogen and its applications differently following the release of a recent report critical of how the original plan has been carried out. Less emphasis is expected to be placed on low-carbon fuels and fuel cells and more given to the generation of electricity through renewables.

This will be done through the increased use of electrolysis. The GX policy is looking to increase hydrogen production through the use of electrolysers, which produce green hydrogen. Local electrolyser manufacturers are expected to see more investment as Japan continues to pursue the goal of becoming a major global hydrogen producer.

Gas

Latvia scraps Skulte LNG project as Europe warned of excess import capacity

The Baltic state of Latvia has concluded that there is sufficient gas supply infrastructure within its region of Europe and has cancelled a planned LNG terminal. Once dependent on Russia for energy supplies, the Baltic region has expanded its interconnections to ensure energy security. While future demand for LNG is uncertain, it might be wise to Europe to look at its LNG projects and ask if they really will be needed.

Gary Lakes

The Latvian government last month cancelled a project to build an LNG regasification terminal at Skulte, citing analysis by the Ministry of Climate and Energy that there is now sufficient LNG import capacity and gas transport in the Baltic region, concluding that the new facility would be unnecessary.

Skulte LNG was first proposed as a way to reduce EU-member Latvia's imports of Russian gas following the start of the war in Ukraine. As EU members turned away from Russian pipeline imports, the Baltic states have taken strides to reduce gas consumption overall and especially cut their use of Russian gas.

Eurostat data shows that gas consumption across the EU declined by 19 per cent during 2022, but it fell by almost 50 per cent in Lithuania, 36 per cent in Latvia, and 32 per cent in Estonia. Gas consumption in the nearby states of Finland and Sweden, both of which applied to join NATO after Russia invaded Ukraine in February 2022, fell by 57 per cent and 40 per cent respectively.

Pre-war, Russia accounted for about 40 per cent of Europe's gas supply, and the EU was aware that its dependence on Russian gas was something of a Sword of Damocles hanging over its head. Over the last decade the EU has been supporting efforts in East Europe and the Baltic States for new LNG gas terminals and interconnector pipelines. That policy is now beginning to pay off as more terminals come online and more pipelines are crossing national borders.

The Skilte LNG project had once been deemed an object of national interest, but information gathered by the Ministry of Climate and Energy concluded "it is not possible to build a commercially self-sufficient liquefied petroleum gas [LNG] terminal". Such circumstances will probably also impact a planned LNG terminal at the Estonian port of Paldiski.

The Latvian government decision was welcomed by Green Energy advocates in the region that had argued that another LNG terminal in the Baltic would cement the region's dependence on LNG imports. Latvian NGO Green Liberty said "it is clear that with sufficient LNG capacity in the region, another fossil gas terminal would create overcapacity and strengthen the fossil gas market for decades to come".

Lithuania opened its Klaipeda LNG terminal in 2014 and Finland has recently opened a new floating LNG terminal at Inkoo, which received its first LNG delivery – from the US – in early April. Meanwhile, the Balticconnector gas pipeline, which has a capacity of 7.2 million m^3/day, links Finland to Estonia's port at Paldiski. The Baltic-connector also links Estonia, Latvia and Lithuania gas transport systems.

There is also a gas interconnection between Poland and Lithuania that within the next five years will have a capacity to transport 2 bcm/year to Lithuania. Furthermore, there is the Baltic Pipe that links Norway and Poland. The pipeline transports natural gas from the Norwegian shelf via Denmark and through the Baltic Sea to Poland. It is the centrepiece of a Polish strategy to diversify away from Russian gas. Poland also has its own LNG import terminal at Świnoujście on the northwest coast. Plans are underway to install an FSRU near Gdansk with enough capacity to ship gas to the Czech Republic, Slovakia and Ukraine. There has also been mention of a pipeline project to connect Poland with LNG ports in Croatia on the Adriatic Sea.

The war in Ukraine has upturned Europe's energy policies. It has brought a new interest in LNG, which has in the last year resulted in high demand and high prices, as well as plans to build new LNG terminals to import gas from the US, Qatar, Australia and elsewhere.

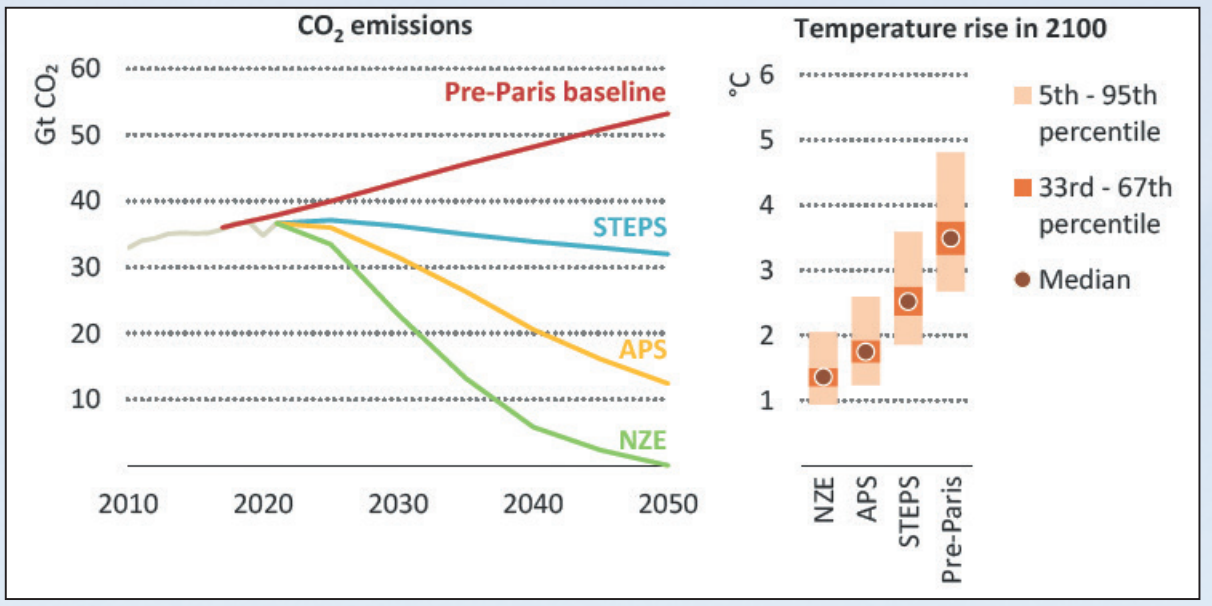
Europe's quest to build new LNG terminals risks over investment and over capacity, the Institute for Energy Economics and Financial Analysis (IEEFA) is suggesting, in a report by Politico. IEEFA analysis shows that if current infrastructure plans are carried out, LNG terminal capacity could exceed 400 bcm by 2030, while demand by that time might drop to 150 bcm/year, according to the report.

As of January this year, there are 29 LNG terminals in Europe and 33 being planned or under construction, according to Statista.

Politico said the Ohio-based IEEFA projected that LNG demand would continue to rise in 2023, but would start to decline in 2024 due to gas demand cuts in the EU, renewables taking a greater share of the energy mix, and governments increasing their focus on energy efficiency.

The possibility of an LNG capacity glut has drawn criticism from climate change protesters who say that the situation could lock the energy industry into continued use of natural gas as a way of justifying the investment and preventing the switch to renewables.

Energy-related and process CO_2 emissions, 2010-2050 and temperature rise in 2100 by scenario



World Energy Outlook 2022, © IEA/OECD, Figure 1.19, page 64

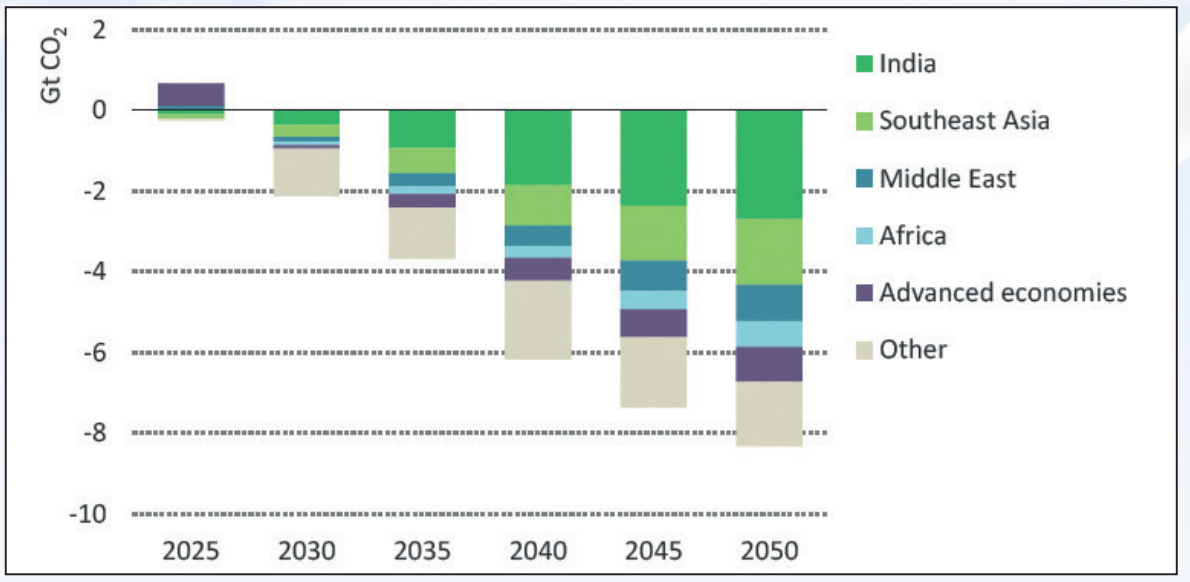
For more information, please contact:

IEA Publications
International Energy Agency

Website: www.iea.org

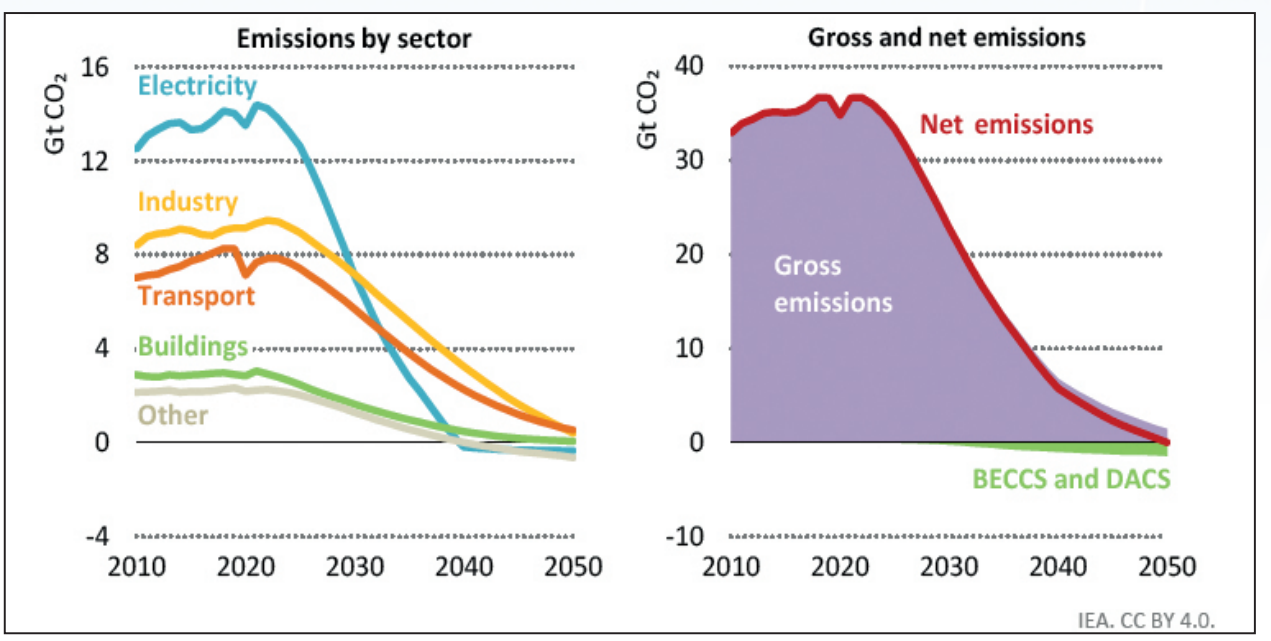
Contact information:
www.iea.org/contact

Change in CO_2 emissions in the 2022 APS relative to the WEO-2021 APS, 2025-2050



World Energy Outlook 2022, © IEA/OECD, Figure 1.20, page 65

Energy-related CO_2 emissions by sector and gross and net emissions in the NZE Scenario, 2010-2050



World Energy Outlook 2022, © IEA/OECD, Figure 3.1, page 126

Green grids, global warming and the Gulf: a hot solution to a hot issue

Green grids offer a viable way to drastically reduce carbon emissions. Ideally situated between Europe and Asia, the Gulf region could act as a bridge linking a global network of green grids – desert solar could be delivered to Europe by day, with European and North African wind energy transmitted eastwards during the night. The Climate Parliament's **Nicholas Dunlop** and **Dr. Sergio Missana**, explain.

The 1.5°C limit is achievable. But it will take a quantum leap in climate action," said UN secretary-general Antonio Guterres, in response to the latest report published by the UN Intergovernmental Panel on Climate Change (IPCC). The report, signed-off by governments worldwide, found that the risks of global warming were greater than was thought at the time of the last assessment in 2014, with some regions already having reached the limit of what they can adapt to.

To avoid climate catastrophe, humanity must stay within a safe carbon budget. However, between the slow pace of government action, a lack of funding, and an unwillingness to divest from fossil fuels at the pace required, current climate change initiatives are caught between a rock and a hard place, with millions of ordinary people paying the price.

As it stands, fossil fuels – coal, oil, and natural gas – supply around 80 per cent of the world's energy, propelling the world quickly towards what are described as irreversible climate 'tipping points', the points at which various changes to the climate would become permanent (or at the very least, long-term). In order to avoid this reality, greenhouse gas emissions would need to peak before 2025 and fall by 60 per cent by 2035. However, governments' national emissions reduction plans are already falling short, and at our current rate we are on track for warming of about 2.8°C by 2100. To avoid global disaster, governments need to make drastic changes in favour of reducing our global carbon output.

Challenges to what has been the global *modus operandi* for the past 150 years will undoubtedly be disruptive. However, solutions do exist.

Harnessing the huge potential of renewable energy sources in order to meet global needs will require both significant political will and resources to build the necessary large-scale infrastructure. Practically, there needs to be a collective adoption of renewable power globally, from small-scale projects such as rooftop solar and mini-grids for rural communities, to a massive expansion of large-scale solar and wind power projects in prime locations.

The best locations for huge solar power stations are, obviously, deserts, where strong sunshine is combined with cheap land, and where covering large areas with solar panels or mirrors does not displace food production. Alongside this, the best locations for wind infrastructure are often equally remote, such as Patagonia, the south coast of Morocco, or indeed offshore.

However, solar and wind production in a single location is variable. Wind comes and goes. The sun rises and sets.

For renewable energy to provide a reliable source of affordable energy 365 days a year, energy-rich locations need to be linked to populations, cities, and industry by grids in order to combine different energy sources in different time zones into a reliable 24/7 supply of clean energy for all.

Whilst energy storage and other energy sources will have a key role to play in this, large-scale continental 'green grids' will be essential for this transition.

A key geographical area that could benefit from this infrastructure is the Gulf region.

As it stands, the Gulf region includes five of the top ten oil-producing countries and is responsible for 27 per cent of world production. However, what if instead of centring their economic output on fossil fuels, these countries reinvested their resources in clean energy? The Gulf region, with its vast deserts and year-round sunshine, is a prime location for the extensive solar farms necessary for humanity's growing energy needs.

Ideally situated between Europe and Asia, the region could act as a bridge linking the global network of green grids; desert solar could be delivered to Europe by day, with European and North African wind energy transmitted eastwards during the night. This mutually beneficial exchange of energy could be replicated around the world. Namibian coastal wind and desert solar could be delivered to the big cities of Southern Africa, Australian desert solar transported to Southeast Asia, and Patagonian wind brought to South America's metropolitan hubs.

Deserts, such as those found in the Gulf, are home to almost infinite solar resources that have remained relatively untapped. The world's largest single site solar farm is already located in Abu Dhabi, but this is still a largely domestic facility which can be replicated at real transformative scale.

All the energy humanity uses in a year is equal to the energy that reaches the earth from the sun in a single hour. We can tap into this energy cost effectively. Solar and wind power are already the cheapest energy sources in the world, and as technology improves, prices will decrease further. But despite the enormous potential lying dormant in solar, we are yet to see any meaningful action towards fully realising its potential. To do so, we will need to establish the grids and technology that would make this resource available to all.

In order to achieve this, we need new transmission lines crossing frontiers and connecting different time zones, creating a global ecosystem of interconnected renewables and a new energy market built to operationalise, and seize the opportunity in, a net zero future. This must be combined with expanded and modernised national and regional grids and complemented with the rapid scale-up of mini-grids and off-grid solar solutions.

The open secret is this technology does exist and is already widely used. High voltage direct current (HVDC) transmission lines can transport energy over long distances – overhead, underground, or underwater – with little energy loss. Clean energy highways can be built rapidly using undersea cables to help avoid delays and the public opposition that overhead lines often encounter.

Fundamentally, the grids of tomorrow will also have to be designed to handle a significant increase in the electrification of an energy system powered by renewables, and will therefore need to be 'smart', decentralised, and digital. Integrating billions of rooftop solar panels, wind turbines and storage systems into the grid will require cutting edge technology and techniques, the likes of which will only be deployed with appropriate political and financial backing.

Organisations like the Climate Parliament are fighting to make this a reality. At COP26 in 2021, the Prime Ministers of India, Samoa and the United Kingdom, and Ministers from Australia, France, Nigeria, and the United States launched the Green Grids Initiative – One Sun One World One Grid. The Green Grids Initiative was first conceived by the Climate Parliament as a global coalition seeking to accelerate the establishment of renewable grids.

As an international network of legislators, the Climate Parliament works to enact a functioning solution to the world's dependence on fossil fuels, centred on rapidly increasing political support for, and the development and use of, renewable energy sources such as solar and wind.

Despite positive steps being taken in this space, the pace at which work is being carried out is not as fast as it could, or should, be to avoid a climate catastrophe. If these projects are to succeed, there will need to be a lot more dynamism on the part of governments to really champion the cause.

As a result, the Climate Parliament has now established a series of green grids 'accelerators' focused on fostering close collaboration between business leaders, investors, governments, and legislators to create 'project pipelines' of green grid construction projects which can move rapidly from concept to completion.

These groups function to (literally) accelerate particular clean energy projects. They will open channels for governments, investors, industry leaders, legislators, and NGOs to become involved in green grid building, increasing the speed at which they can be built by enabling dynamic collaboration.

Furthermore, as an international network, the Climate Parliament is also working to increase cooperation with non-state actors such as universities and research institutions, who will be key players in the success of the establishment of these grids, as their ability to act independently endows them with a dynamism that national governments can often lack.

Combining the resources and stability of state actors with the speed and technical expertise of research bodies and private sector operators, who bring both skills, capital and existing adaptive infrastructure, will be key to making the energy transition a reality.

Climate change is a global problem, and as such, will require global solutions. Green grids present us with a viable way to drastically reduce our carbon emissions, increase global interconnectivity, and create a thriving green economy. It is now up to us, and our governments, to be bold, decisive and make it a reality.

Nicholas Dunlop and Dr. Sergio Missana are, respectively, Secretary General and Executive Director, of the Climate Parliament.

Wind power: building the next terawatt

The Global Wind Energy Council's recent 'Global Wind Report 2023' revealed that new capacity additions last year were the lowest for three years. But despite the challenging conditions, the sector will add as much capacity in the next decade as it has over the last 40 years. ***TEI Times*** presents a summary of the report.

Nearly 78 GW of wind power capacity was added worldwide last year, the lowest level in the past three years but still the third highest year in history, according to the Global Wind Energy Council's (GWEC) latest report on the sector. This was achieved despite a challenging economic environment and a disrupted global supply chain, compounded by global health and energy crises.

Commenting on the latest instalment of the annual report, titled 'Global Wind Report 2023', Ben Backwell, GWEC's CEO said: "The coming years will mark a crucial transition period for the global wind industry. Later this year, wind energy will reach the historic milestone of 1 TW of installed capacity. It has taken us around 40 years to get here. However, the next TW will take less than a decade."

Globally, 77.6 GW of new wind power capacity was connected to power grids in 2022, bringing total installed wind generating capacity to 906 GW, a year-on-year (YoY) growth of 9 per cent.

The onshore wind market added 68.8 GW worldwide last year, with China contributing 52 per cent. Additions were 5 per cent lower than the previous year. The slowdown in Latin America, Africa & the Middle East is partly responsible for the decline, but the primary reason, says GWEC, was falling installations in the US.

Despite finishing the year with a strong final quarter, the US wind industry commissioned only 8.6 GW of onshore wind capacity in 2022, due in part to supply chain constraints and grid interconnection issues.

Thanks to record installations in Sweden, Finland and Poland – and recovering installations in Germany – Europe performed well in a volatile 2022, said the report. The bloc added a record 16.7 GW of onshore wind capacity, bringing its market share up to 24 per cent. Onshore wind additions in North America last year fell by 28 per cent while new additions in Asia-Pacific (APAC) remained constant, but the three regions combined still made up 92 per cent of global onshore wind installations in 2022.

GWEC noted that 8.8 GW of new offshore wind was fed into the grid last year, bringing total global offshore wind capacity to 64.3 GW by the end of 2022. New additions were 58 per cent lower than the "bumper" year of 2021 but still made 2022 the second highest year in history for offshore wind installations.

China continued to lead global offshore wind development, although its new installations dropped to 5 GW from 21 GW in 2021 – a record year driven by the end of the feed-in tariff (FiT). Two other markets reported new offshore wind installations in APAC last year: Taiwan (1175 MW) and Japan (84 MW). No intertidal (nearshore) wind projects achieved commercial operation in Vietnam in 2022, due to the ceiling price to be used by Vietnam Electricity (EVN) to negotiate power purchase agreements (PPAs) with investors for their renewable projects missing until January 2023.

Europe connected the remaining 2.5 GW of capacity in 2022, with France and Italy each commissioning their first commercial offshore wind projects. Despite the rate of installations last year being the lowest since 2016, Europe's total offshore wind capacity reached 30 GW, 46 per cent of which is from the UK.

With its total installed offshore wind capacity reaching 34 GW in APAC, in 2022 Europe lost its top position as the world's largest offshore wind market but continues to lead the way with floating wind. Norway commissioned 60 MW of floating wind capacity last year, bringing the region's total installations to 171 MW, equal to 91 per cent of global installations.

Looking forward, GWEC Market Intelligence expects that total new onshore and offshore wind power installations will exceed 100 GW in 2023 and that 680 GW of new capacity will be added in the next five years under current policies. This equals more than 136 GW of new installations per year until 2027. This represents a compound annual growth rate (CAGR) for the next five years of 15 per cent.

The GWEC lists five pillars that will underpin this level of growth in the next five years:

- Europe's renewed urgency to replace fossil fuels with renewables to achieve energy security in the aftermath of the Russian invasion of Ukraine;
- A strong uplift for renewable energy in the US over the next ten years, primarily driven by the Inflation Reduction Act (IRA)
- China's commitment to further expanding the role of renewables in its energy mix, aiming for renewable energy to contribute more than 80 per cent of total new electricity consumption by the end of the 14th Five-Year Period (2021–2025);
- Governments fully waking up to the opportunities that offshore wind can provide, making offshore wind truly global and increasing ambition in mature and developing markets;
- Strong growth in large emerging markets both onshore and offshore from the middle of this decade.

In terms of the global onshore outlook, the CAGR for onshore wind in the next five years is 12 per cent. Expected average annual installations are 110 GW, with a total of 550 GW likely to be built in 2023–2027.

Growth in China, Europe and the US will be the backbone of global onshore wind development in the next five years. Altogether they are expected to make up more than 80 per cent of total additional capacity in 2023–2027. GWEC Market Intelligence believes that China will be the engine of near-term growth, accounting for 62 per cent of new installations in 2023.

But installations will accelerate in Europe, the US and emerging markets in Southeast Asia and Africa & ME from 2025. Global onshore wind markets will become more diversified by 2027 with half of the annual growth coming from markets outside of China.

Assessing the global offshore outlook. GWEC finds that after a Y-o-Y fall of 58 per cent in 2022, annual offshore wind installations are expected to bounce back reaching 18 GW in 2023. The CAGR for offshore wind in the next five years is 32 per cent. With such a promising growth rate, new installations are likely to double by 2027 from 2023 levels.

China and Europe will continue to be the two key contributors to near-term growth, making up more than 80 per cent of new additions in 2023 and 2024.

The US and emerging markets in APAC will start gaining sizeable market share from 2025 with 7-8 GW of new offshore wind expected to be added every year over the rest of the forecast period.

In total, 130 GW of offshore wind is expected to be added worldwide in 2023–2027, with expected average annual installations of nearly 26 GW.

Beyond 2027, GWEC expects the growth momentum to continue. Global commitments to net zero, coupled with growing energy security concerns, have already brought the urgency of deploying renewables to the top of the political agenda.

"The energy and climate policies now being pursued by the world's largest economies in both the 'West' and the 'Global South' point to a whole new level of ambition and support for wind energy and renewables, said Backwell. "These policies are likely to take us to 2 TW of installed wind energy by the end of 2030."

He added: "These policies are the consequence of growing urgency in the fight against dangerous global heating; prolonged high fossil fuel prices and the impact of fossil fuel dependence on security; and the success of our industry in scaling up and establishing wind as one of the most cost-competitive and reliable power sources in the world."

While the industry pushed through the new level of 100 GW of annual installations in 2021, the last few years have not been without their challenges. Many of the manufacturers at the heart of the industry have seen mounting financial losses caused by 'race to the bottom' pricing, as a result of what GWEC describes as "misguided government policies" around procurement and off-take arrangements, exacerbated by higher inflation and logistics costs.

Meanwhile, wind projects have been delayed or stalled by inadequate and inefficient permitting and licensing rules, from Denmark to India to Japan and beyond.

"This," said GWEC, "has created the bizarre paradox of energy markets rewarding fossil fuel companies with record profits, while renewable energy companies have struggled to break-even.

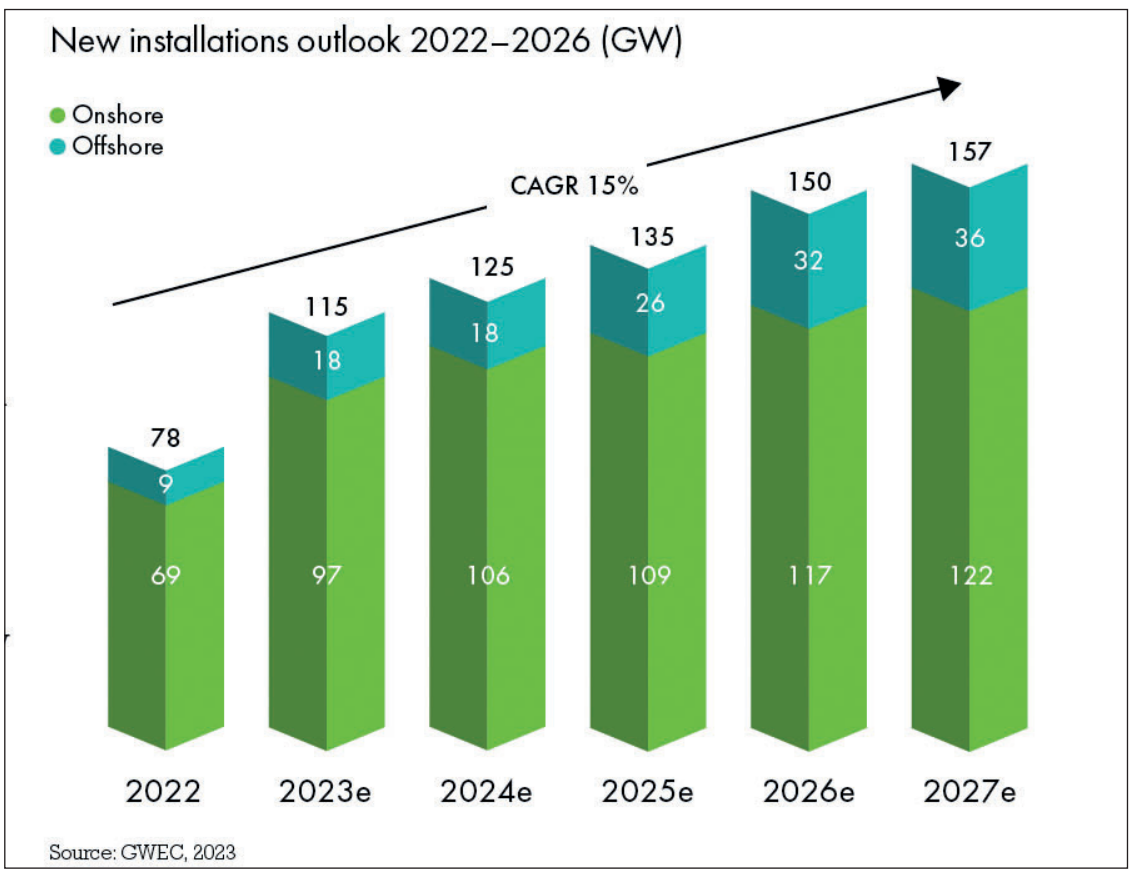
"As this report shows, while companies have regrouped to adapt to the new inflationary pressures, the market has stalled, and the industry installed only 77.6 GW in 2022," it stated.

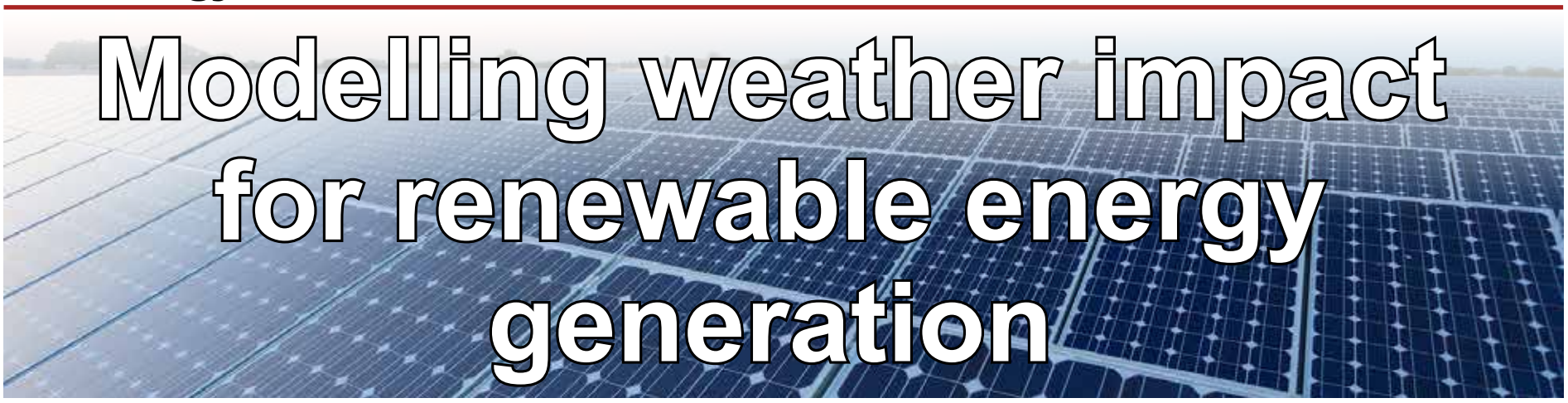
All this has come at a time when policymakers are racing to address the energy and climate crises by dramatically increasing their targets for wind energy across the world.

Backwell believes, however that the situation is about to change and 2023 will mark the start of a decisive turnaround. He noted that governments of all the major industrialised nations have enacted policies that will result in a significant acceleration of deployment.

Nevertheless, he says much more is needed, and fast. He concluded: "The wind industry will need to forge new partnerships with governments, cities, communities, investors and customers in order to enable the next era of growth. Working together, we can put into place the right policies, which will allow trillions of dollars in investments to flow and the creation of millions of jobs."

New installations outlook 2022-2026 (GW).
Source: GWEC, 2023





Modelling weather impact for renewable energy generation

Assessing the financial and operational viability of renewable energy developments calls for data-driven decisions that are based on robust, reliable modelling. The Institute for Environmental Analytics' **Alan Yates** describes how data-driven energy modelling helps with planning effective strategies for renewable power production.

Progress towards the complete decarbonisation of our energy systems – the ultimate goal of the energy transition – has seen a whole new infrastructure to generate renewable energy gradually spread out across the globe, with developments faster in some places than others.

A fundamental principle for electricity systems is that generation must balance with demand across all time periods, from micro-seconds to hours and throughout seasons. This doesn't change when renewable energy sources are integrated, but increasing the proportion of variable renewable energy (VRE) in the mix introduces some major new challenges.

As the proportion of renewables in the energy mix increases, the implications for energy systems become more acute. Their intermittent nature increases the need for additional power system flexibility to avoid blackouts, brownouts and other power quality issues as more VRE is introduced. Understanding how the weather might behave, and how this impacts generation potential is a key part of almost all decisions about renewable energy. Modelling these impacts is not easy and becomes more significant when you factor in climate change. It follows that the need to de-risk energy supply and climate investments, and incentivise funding requires informed, persuasive, scenario-based and data-driven modelling and insights.

As energy systems evolve, the primary challenge lies in managing the differences between load and residual load, i.e., the difference between forecasted load and the expected electricity production from variable renewable generation assets. In its Status of Power System Transformation report the International Energy Agency describes the various levels of VRE penetration within the energy transition, and the key challenges associated with each.

In Phase 1, the percentage of VRE is typically less than three per cent of grid capacity. At such a low level, the availability, or unavailability, of power generated from wind or solar has no noticeable impact on the system.

As the proportion of VRE in the energy mix increases, the system operator needs to react to changing variability on multiple levels.

In Phase 2, where VRE typically accounts for between three per cent and 13 per cent of grid capacity and has a minor to moderate impact on system operation, challenges begin to emerge as differences between load and residual load become noticeable at certain times. The operating patterns of legacy, fossil-fuelled generators start to be affected by the input of VRE. The introduction of short-term forecasting (1-3 days ahead) for VRE generation may be considered and transmission system congestion constraints may be encountered.

By Phase 3, the balance has shifted and VRE now determines the operational patterns of the overall power system. Typically, this is expected when the proportion of VRE reaches between 13 per cent and 25 per cent of total production. Dispatchable generators must now be deployed more dynamically, and system operators have to manage new power flow patterns. There may be a need to implement sub-minute responses and increase forecasting capabilities from daily to hourly, or even 10-minute intervals, to maintain balance between demand and supply and prevent outages or power quality issues.

Given the intermittent nature of renewables, a common concern is ensuring sufficient backup generation to meet demand when weather conditions are unfavourable. But by Phase 3, and beyond, the opposite challenge emerges when more power is produced than is required at certain times. This also needs to be managed, and so additional levers such as curtailment, demand response and energy storage must be considered.

By Phase 4, VRE provides the majority of electricity generation during sustained periods. This typically requires advanced technical solutions to ensure system stability. Other changes will also be required in operational and regulatory approaches e.g., to allow VRE to provide system services.

By Phase 5 there are sustained periods of excess generation from VRE. Excess output will need to be curtailed, stored or used in areas that are not currently electrified such as transport or heating.

Once an energy system reaches Phase 6, seasonal imbalances can occur that will exceed the scale of response available from demand side and electricity storage measures. Phase 6 is therefore likely to require measures such as the conversion of electricity into chemical form, such as hydrogen.

While the principles for operating coal or diesel fired generation plants are pretty much the same all over the globe, the availability and characteristics of VRE resources vary widely, as will the energy systems that rely on them. The need to properly account for weather variability and seasonality is crucial for planning, whether that's for an individual site, a portfolio of installations or a complete system. This calls for suitable datasets, models and tools.

The Institute for Environmental Analytics, for example, has developed customised methods to merge numerical weather models with satellite observations that make it possible to downscale wind, temperature and irradiance estimates to a 1km spatial resolution and 10-minute time-step.

Once the expected resource has been quantified, power yields and levelised costs can be estimated. This can be done at varying levels of detail, using standard formulae and manufacturers' specifications. As a renewable energy project progresses from pre-feasibility into feasibility and eventually to detailed design, increasingly specific details are required to reduce uncertainties, prove viability and make the financial case. Again, this needs the appropriate data, modelling techniques and technology to accomplish successfully.

Increasing the proportion of VRE in the energy mix makes accurately forecasting expected production even more important. Current best practice involves running a combination of forecasting techniques up to the event. For example, if you are forecasting power production at 10:00 am on a given day, numerical weather prediction models provide sufficient forecasting skill up to 24 hours ahead.

From 24 hours up to one hour before the event, the best forecasting skill for solar comes from using satellite observations to predict the movement of cloud using a technique known as Cloud Motion Vectors.

From one hour before, and up to the event, the best forecasting skill comes from statistical models combining forecasting methods with on-site observations from sky cameras, anemometers, and on-site power production.

Combining these prediction methods can give valuable data to the system operator and help the site owner schedule planned maintenance at times of low- or no-generation, to minimise costs, optimise revenues and maximise CO_2 emission reduction.

As with all VRE estimates, the accuracy of the forecast is likely to be localised, dependent on weather regimes, and potentially variable. In stable conditions forecasting accuracy could be very close to 100 per cent, but in intermittent conditions accuracy can drop significantly.

Modelling future mixes of energy generation across a range of timescales helps produce effective generation profiles. This level of modelling involves navigating through large, high-resolution time-series data to find typical and extreme conditions and calls for significant modelling power.

Understanding variability across multiple timescales provides the key to understanding likely weather behaviour and the potential for, and impact on, renewable energy generation. Variability between years and months is important for feasibility analysis, planning and design activities. Understanding variation on a daily, hourly, minute or even second-by-second basis is crucial for making operational decisions to manage the grid.

For a solar plant, overcast conditions will maximise the need for dispatchable generation to compensate for the lack of VRE. Highly intermittent generation must be balanced either by storage or flexible dispatchable generation. Clear sky conditions will minimise the need for dispatchable generation.

At times of excess generation from wind or solar, the system operator may need to curtail energy production, store energy in batteries, increase demand – for example, encourage EV charging or industrial consumption – or convert it into a fuel such as hydrogen.

A tool that enables generation profiles to be visualised with increasing granularity shows how significant short-term variability can be on any given day. At an individual site, up to 80 per cent of solar generation can be lost in as little as 30 seconds as clouds obscure the sun. Managing the power system at all levels is critical.

Robust weather behaviour modelling shows the impact on power generation of different weather conditions – both typical and extreme. It is this modelling that informs the strategies that governments, operators, generators and investors will need to adopt to ensure a stable, efficient and economically sound renewable energy system.

It is important to appreciate that every case is different. From scenario analysis to project design through to operational energy generation, models must be customised to the relevant specifics to highlight and quantify the uncertainty and limitations.

Effective decision-making around renewable energy production calls for a tool that enables quick evaluation of multiple different generation scenarios to plan effectively for a successful energy transition.

The Institute for Environmental Analytics has developed EnergyMetric, a web-based application to enable efficient development of modelled scenarios to inform decision-making for prospecting, pre-feasibility and feasibility analyses. The application is designed to help planners and investors create and explore potential future VRE generation scenarios as power systems evolve through transition phases.

Alan Yates is Head of Energy Applications at the Institute for Environmental Analytics.

Yates: Robust weather behaviour modelling shows the impact on power generation of different weather conditions – both typical and extreme

Junior Isles

The not so Magnificent Seven?

With the condemnation of Russia's "illegal, unjustifiable, and unprovoked war of aggression against Ukraine" out of the way, it was time for the G7 Ministers of Climate, Energy and the Environment to get down to the business of tackling the unprecedented twin challenge of climate change and energy security. Yet after two days of difficult talks in Japan last month, which led to some significant agreements, questions remain as to whether the Group of Seven wealthy nations achieved the level of consensus needed to address the task at hand.

In its communiqué issued after the meeting in Sapporo, the G7 (consisting of Canada, France, Germany, Italy, Japan, the UK and the US) set big new collective targets for solar power and offshore wind capacity. The members pledged to collectively increase offshore wind capacity by 150 GW by 2030, based on each country's existing targets, and solar capacity to more than 1 TW.

The G7 ministers also committed to promoting improvement in innovative technologies such as floating wind and stated that the G7 would ask the International Renewable Energy Agency (IRENA) to prepare an analysis on innovation and sustainability of floating offshore wind.

"We will accelerate the deployment of renewable energies such as solar, onshore/offshore wind, hydropower, geothermal, sustainable biomass, biomethane, tidal using modern technologies, as well as investing in the development and deployment of next-generation technologies and developing secure, sustainable and resilient supply chains," the communiqué stated.

US Secretary of Energy Jennifer M. Granholm, who served as the Head of Delegation for the Energy Track of the meeting, said it delivered "a strong message that the G7 remains in lock step" on the most pressing global energy and climate challenges.

"This document sends an important signal to the rest of the world – from other governments, to industry, to civil society – that G7 nations are mobilising to accelerate the decarbonisation and diversification of our energy sources."

The hope is that the agreements will pave the way for similar commitments from other major economies in forums like the G20 and the UNFCC's COP28 Climate Change summit, and form a basis for agreements on environment and energy at the upcoming G7 Leaders' Summit to be held in Hiroshima from May 19-21.

Yet paving the way will be difficult when there is already disagreement within the ranks on how to get to the final destination. As the host country, Japan was expected to lead in the discussion on accelerating climate change measures, yet was reluctant to specify a date for the phase-out of coal fired power generation.

In addition to speeding up renewable energy development, the G7 also pledged to move toward a quicker phase-out of fossil fuels, committing "to accelerate the phase-out of unabated fossil fuels in order to achieve net zero in energy systems by 2050".

However, it stopped short of endorsing a 2030 deadline for phasing out coal, which Canada and other members had pushed for, and left the door open for continued investment in gas, saying that sector could help address potential energy shortfalls.

Canada was clear that unabated coal fired power should be phased out by 2030, and other members, including the UK and France committed to that date, Canada's minister of natural resources, Jonathan Wilkinson, told *Reuters*.

"Others are still trying to figure out how they could get there within their relevant timeframe," Wilkinson said. "We are trying to find ways (for) some who are more coal-dependent than others to find technical pathways how to do that," he said.

Japanese Industry Minister Yasutoshi Nishimura told a news conference: "In the midst of an unprecedented energy crisis, it's important to come up with measures to tackle climate change and promote energy security at the same time.

"While acknowledging that there are diverse pathways to achieve carbon neutral, we agreed on the importance of aiming for a common goal toward 2050."

Japan's pushback on fossil fuels is understandable, even if its desired path forward is questionable. The country depends on fossil fuel imports for nearly all its energy needs.

Having experienced oil crises in the 1970s, it reduced its dependency on fossil fuels to a certain extent but since the Great East Japan Earthquake in 2011, thermal power generation has increased, with dependency on fossil fuels in FY2019 being 84.8 per cent, according to METI (Ministry of Economy, Trade and Industry). International Energy Agency (IEA) figures show that in 2019, fossil fuels accounted for 88 per cent of total primary energy supply – the sixth highest share among IEA countries.

The country is therefore looking at ways to keep its coal fired plants running by co-firing hydrogen and ammonia for power generation – a strategy not endorsed by the G7 in the agreement, as it has little impact on emission reductions and is not consistent with a 1.5°C pathway. The government also wants to keep liquefied natural gas (LNG) as a transition fuel for at least 10 to 15 years.

With the recent IPCC report reiterating the critical climate situation, environmental groups were understandably less than impressed with Japan's stance.

Climate Action Network Japan (CAN-Japan) said: "As the host country, Japan should not be focusing on building consensus around reliance on new technologies to prolong the life of fossil fuels. We expect Japan to lead the discussion on what should be done in this critically important decade to achieve the 1.5°C target of the Paris Agreement, and to provide a concrete roadmap for a phase-out of fossil fuels and a just transition to renewable energy, including setting a date for the phase-out of coal fired power generation in line with the Paris 1.5°C target."

Masayoshi Iyoda, Interim Team Lead, 350.org Japan, added: "The G7 Sapporo Ministerial Meeting agreement on numerical targets for the introduction of solar and wind power as a means to achieve the Paris 1.5°C goal, is a step forward. However, it is not a sufficient response to the urgency of the climate crisis. The list of unsettled technologies such as greenwashed ammonia/hydrogen co-firing with fossil fuels, CCS (carbon capture and storage)/CCUS (carbon capture, utilisation and storage)/DACCS (Direct Air Capture with Carbon Storage), as well as risky nuclear power, obscure the top priority for maximising energy efficiency and a just transition to 100 per cent renewable energy solutions."

These are valid criticisms and hopefully will help stimulate Japan's fledgling offshore wind programme. Despite having 34 000 km of coastline and being among the first markets in Asia to examine the sector's potential, the country's first offshore wind project only began operating in January. According to Wood Mackenzie, its second offshore wind tender is expected to close in June.

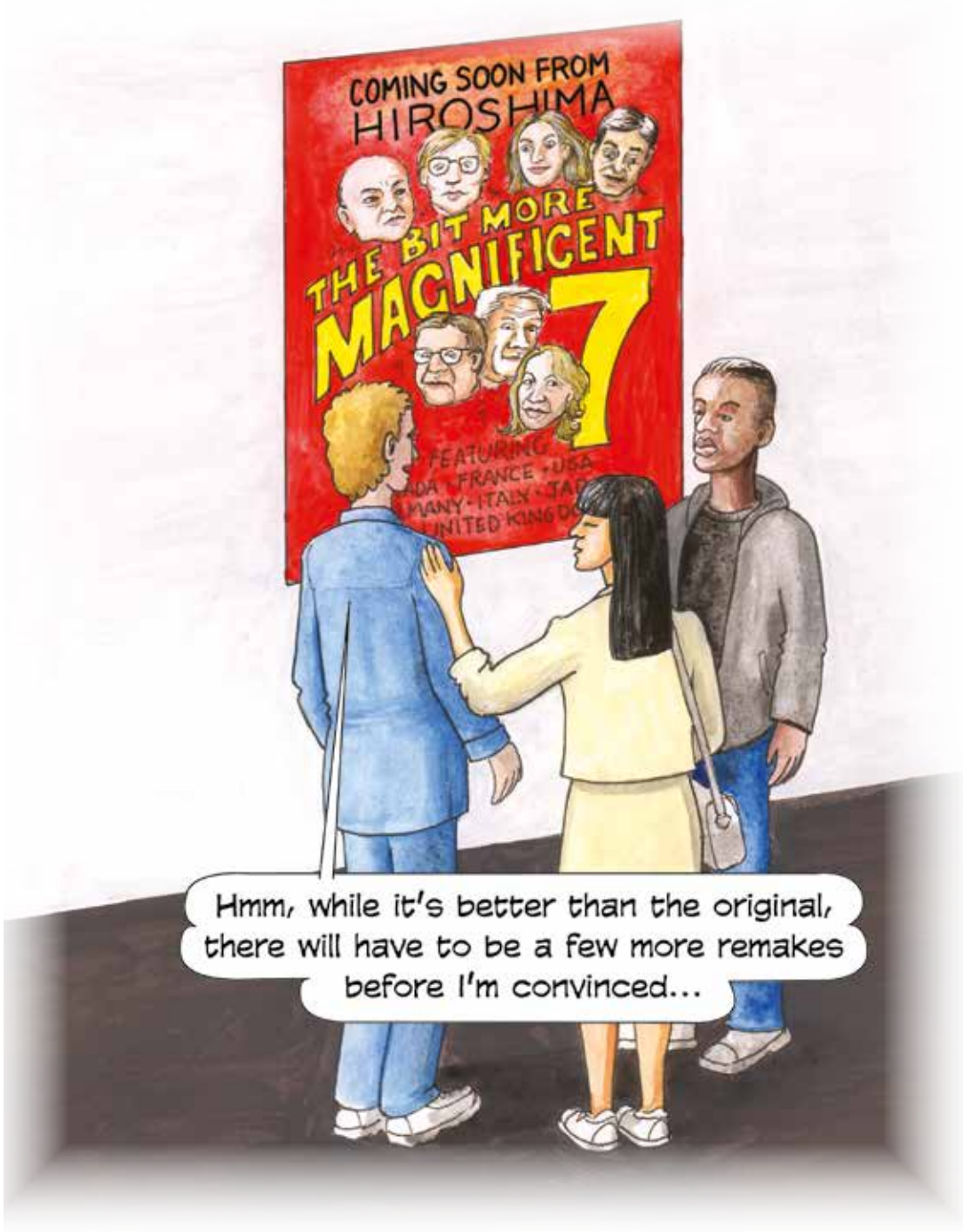
Commenting on the communiqué, Dave Jones, head of data insights at energy think-tank Ember, said: "Hopefully this will provide a challenge to Japan, for which offshore wind is the missing part of the jigsaw that could see its power sector decarbonise much quicker than it thought possible."

So perhaps one of the most important outcomes of the meeting is that there is clear consensus that climate change and energy security go hand-in-hand.

"Initially people thought that climate action and action on energy security potentially were in conflict. But discussions which we had and which are reflected in the communiqué are that they actually work together," said Wilkinson

Stressing this message is key, as Japan and other G7 members respond to criticism that they are backtracking on climate targets following the Ukraine crisis.

At the upcoming G7 Hiroshima Summit, a more ambitious agreement is required for the G7 to lead the global effort to achieve the 1.5°C target of the Paris Agreement. But to have any chance of instilling confidence in that small 'Mexican village' called planet Earth that they can lead the fight on climate change, the G7 will have to be a bit more magnificent.



Cartoon: jemsoar.com