# THE ENERGY INDUSTRY TIMES

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# US exit from climate agreement will have global ramifications

US President Donald Trump puts global climate targets under threat

US President Donald Trump's decision to pull his country out of the Paris Climate will have a huge impact of climate change efforts and will test the commitment of other countries.

**Junior Isles**

Several global leaders and experts have stressed that the US withdrawal from the Paris climate accord will have a significant impact on efforts to halt climate change.

Following Donald's Trump's Executive Order to pull the country out of the agreement, André Corrêa do Lago the incoming head of the UN COP30 climate summit said President Trump's move has a "huge impact", stressing that the US pivot "is going to make it much more difficult" to limit global warming and would "have an immense impact on efforts to keep temperature rises below 1.5°C".

As promised, on his first day in office Trump once again pulled the US out of what he described as an "unfair, one-sided Paris climate accord ripoff". The US was the first country to withdraw during his first term as president in 2017, a move reversed by former President Joe Biden in 2021.

"The countries of the global south have made immense efforts in their own nations to contain climate change," said Corrêa do Lago, Brazil's recently appointed climate negotiator. "Take the case of China. China is constantly bringing forward its objectives, for example, this year it will sell more electric cars than internal combustion ones." He also told the *Financial Times* that the exit of the US could allow nations such as China, India and Brazil to take a bigger role in the world's most important climate talks.

There are already signs that with the US out of the Paris Agreement, other countries are beginning to question their own position. The *FT* reported last month that Argentina's President Javier Milei, among the few world leaders invited to President Trump's inauguration, was also considering an exit from the Paris Agreement.

At the end of January Indonesia's climate and energy envoy said targets to cut greenhouse gas emissions for countries such as Indonesia were unfair when the US, as the world's largest historical polluter, were reversing on climate commitments.

*Continued on Page 2*

# EU will triple renewables capacity but still miss climate goals, says new report

European renewables capacity will see a more than three-fold increase by 2050, yet fall short of climate goals, according to a new report from Aurora Energy Research. The global provider of power market analytics warns, however, that this growth will still fall short of meeting climate goals, with risk factors such as negative prices, market saturation, and grid congestion hindering progress.

Aurora's inaugural European Renewables Market Overview Report (ResMOR) finds that Over the past decade, Europe's renewable energy capacity has increased to over 528 GW, driven by rising power demand, supportive policies, higher commodity prices, the phase-out of thermal power plants, and supply chain improvements.

This growth aligns with the EU's updated Renewable Energy Directive, which raises the 2030 renewable energy target from 32 per cent to 42.5 per cent. To meet this target, EU countries aim to add over 600 GW of renewable capacity by 2030, compared to 2024 levels.

Non-shielded renewables assets face increasing risk from negative prices with Central Europe seeing the lowest negative prices and the Nordics leading in frequency, according to Aurora's ResMOR. Although some countries previously offered protection against negative price hours in subsidy schemes, most now provide little or no protection.

Aurora further highlights market saturation as a challenge for renewables, emphasising the need for more energy storage and flexibility, which are not yet deployed to substantially mitigate price cannibalisation. Greece, Romania, and Great Britain are most at risk of renewables market saturation impacting the merchant business case.

Aurora anticipates that grid congestion is another major bottleneck for renewable energy expansion. In 2023, Europe saw 57.28 TWh of remedial actions for both renewable and non-renewable assets, a 14.45 per cent increase from 2022. Germany, Poland, Great Britain, and Ireland curtailed the most energy, with remedial actions as the share of electricity demand exceeded 4 per cent in these markets, reaching about 9.5 per cent in Ireland according to the analysis.

Compensation for grid curtailment varies across Europe and depends on factors such as the asset set-up, action type, and government support available. Markets like Great Britain, the Ireland I-SEM, France, and Poland compensate firm grid connections for congestion-based curtailment, but new connections are mostly non-firm, increasing risk. In some cases, like Spain, not all actions are compensated.

Despite these challenges, significant opportunities are available for developers to mitigate risks and unlock value. Key strategies include battery energy storage system co-location, portfolio diversification, and accessing additional revenues through capacity, ancillary, and balancing markets.

Rebecca McManus, Renewables Lead, Pan-European Research at Aurora Energy Research, commented: "Negative prices and grid constraints are significant risks for renewable assets in the market today, which will be further exacerbated with more renewables deployment. It's vital for developers to explore opportunities to de-risk projects such as portfolio diversification to mitigate impacts."

The report follows an earlier analysis published by Montel Analytics, which shows that power prices could jump by 50 per cent across Europe if countries fail to meet their stated goals for decarbonisation. This highlights just how crucial the expansion of renewable energy is for the affordability of power in the coming decades.

The latest update to Montel Analytics' 'EU Energy Outlook' shows that average European power prices could reach approximately €100/MWh by 2060 if the expansion of renewable energy is delayed and the use of coal and gas power plants is prolonged.

This represents a significant increase on the €65/MWh price level suggested by the analysis should all green transition targets be met. These developments strongly emphasise the need to implement strategies to integrate price signals into electricity demand.

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"If the US, which is currently the second-biggest polluter after China, refuses to comply with the international agreement, why should countries like Indonesia comply?" said Hashim Djojohadikusumo Special Envoy and brother to the President of Indonesia.

Speaking at a sustainability forum in Jakarta, he said: "This is a matter of justice. Indonesia three tons, America 13 tons…Where is the justice in that?" said Hashim, referring to carbon dioxide emissions per capita figures.

Indonesia, the world's sixth-largest polluter, is due to submit new national targets to cut greenhouse gas emissions this month under the Paris agreement. Many countries, including some in the EU bloc, are expected to miss the deadline.

Many scientists already say the world is way off track to meet the Paris accord goals of limiting the global average temperature rise to well below 2°C and preferably no more than 1.5°C from pre-industrial times. The UN has predicted that the temperature rise will reach 2.9°C this century.

Lord Adair Turner, a British businessman and academic and current chair of the UK Energy Transitions Committee, said in a recent podcast: "Let me be absolutely clear, the moment Trump was elected, and even more so what he's now said, whatever was my estimate of what's the best we could limit global warming to by the end of this century…

"Maybe before he was elected, I thought with a lot of good policy, we might limit it to 1.6 degrees or 1.7. "I've added .2 or .3 to my estimate of what we can do, simply because Donald Trump has been elected.

"If you think that it doesn't make a difference to switch from Biden supporting clear action on climate change, to Donald Trump saying "this is a 'liberal hoax' and "I'm going to drill, baby, drill", you really are living in delusion-land if you don't think that matters."

In early December, the World Bank said it had met a target to raise $100 billion in finance for the world's poorest countries in the next three years, despite the strong US dollar and fiscal pressures hitting developed countries. However, a Trump presidency threatens future fundraising from its largest shareholder.

The International Development Association (IDA) arm of the bank, the world's biggest lender to poor countries and its biggest source of concessional climate finance, unveiled the largest fundraising in its history in December even as aid budgets around the globe are stagnating.

Donor governments agreed to contribute $23.7 billion at a pledge meeting in South Korea, only a slight increase on the $23.5 billion that they pledged the last time the IDA raised money, in 2021.

The bank will be able to leverage this further to $100 billion, compared to $93 billion in 2021, by borrowing more from markets, getting money back from recipients, and squeezing more headroom from its top-tier credit rating.

The US remained the biggest donor as the outgoing Biden administration pledged $4 billion, up from $3.5 billion last time, and $3 billion under Donald Trump's first presidency.

But the US contribution needs legislative approval, setting up a potential battle in the new Congress this year over the funding.

# Trump reverses Biden's clean energy initiatives

- Federal disbursements to manufacturers and infrastructure developers halted
- Offshore wind leases put on hold

Junior isles

Within hours of his inauguration last month, Trump signed dozens of executive orders quashing former President Joe Biden's policies, including one that threatens the previous administration's climate agenda.

One of the Orders halts federal disbursements to manufacturers and infrastructure developers, putting put more than $300 billion of potential federal infrastructure funding at risk.

The funds affected were provided under two of Biden's signature legislative achievements – the Inflation Reduction Act and bipartisan infrastructure law – and include almost $50 billion in Department of Energy (DoE) loans already agreed and another $280 billion worth of loan requests under review, according to *Financial Times* analysis of the DoE's loan portfolio.

"All agencies shall immediately pause the disbursement of funds appropriated" through the acts, the Trump administration said in an executive order titled 'Unleash American Energy'.

Among the disbursements immediately under threat are a $9 billion conditional loan to Michigan-based utility DTE Energy and another of $3.5 billion to Oregon-based utility PacifiCorp.

Trump's move to halt the funding has shaken the clean energy sector and signalled his intent to undermine Biden's industrial policy, particularly his programmes to speed up the energy transition.

"The executive orders indicate that federal funding for EV and battery manufacturing will be harder to access, increasing the risk of stranded capital for manufacturing projects already under way," said Shay Natarajan at Mobility Impact Partners, a private equity fund based in New York.

Trump also wants to stop construction of wind farms on federal lands and waters. Under another Executive Order he paused offshore wind leasing on the US Outer Continental Shelf (OCS) and mandated a review of the federal government's leasing and permitting practices for wind projects. The Order also stops all relevant agencies from issuing approvals, either new or renewed, for both onshore and offshore wind projects until the review is completed.

According to Rystad Energy nearly 25 GW of offshore wind projects, 65 per cent of the US projects in development, are unlikely to progress under the Trump administration.

Ben Standing, Partner specialising in environment at UK and Ireland law firm Browne Jacobson, said: "President Trump's list of climate-related executive orders – including to withdraw the US from the Paris climate agreement, remove oil and gas drilling restrictions both offshore and on federal land, ban new wind energy projects, and revoke electric vehicle targets – blurs the future path for policymakers and legislators across the world.

"On the international front, he is far from alone in wanting to push back on green targets. Reform campaigned at the last election on their removal, and the Conservatives have recently indicated it considers these targets aren't properly thought through.

"It is a stark reminder that even targets and obligations enshrined into law can be relatively easily reversed. This highlights the importance of democracy in bringing about change – if the public does not buy into the measures to reduce climate change, then these are unlikely to be effective, especially when it comes to making difficult economic and lifestyle decisions."

# Global gas supplies in the balance

Global natural gas markets are set to remain tight in 2025 as demand continues to rise and supply expands more slowly than before the pandemic and energy crisis, according to the International Energy Agency's (IEA) latest quarterly 'Gas Market Report'.

Driven by fast-growing markets in Asia, global gas demand rose by 2.8 per cent, or 115 billion cubic metres (bcm), in 2024 – well above the 2 per cent average growth rate between 2010 and 2020. At the same time, below-average growth in liquefied natural gas (LNG) output kept supply tight, while extreme weather events added to market strains.

According to the report, similar dynamics are expected to persist in 2025 before the arrival of a wave of new LNG export capacity, led by the US and Qatar, that is set to come online over the course of the second half of this decade.

The report, which provides a thorough review of market developments in 2024 and an outlook for 2025, finds that markets moved towards a gradual rebalancing last year after the supply shock that followed Russia's full-scale invasion of Ukraine in February 2022. Still, the global gas balance has remained fragile, highlighting the need for greater international cooperation to enhance gas supply security.

Geopolitical tensions have continued to fuel price volatility in gas markets and look set to continue doing so after Russian gas flows through Ukraine stopped on January 1st following the expiration of a transit deal between the two countries in the wake of Moscow's full-scale invasion.

The pipeline was one of the last two routes still carrying Russian gas to Europe nearly three years into the full-scale war. EU countries will lose about 5 per cent of gas imports in the middle of winter.

While traders had long expected flows to stop, the end of the pipeline route through Ukraine will affect Europe's gas balance at a time when demand for heating is high. Slovakia is the country most affected.

Though the halt of Russian gas via Ukraine does not pose an imminent supply security risk for the European Union, the IEA report says it could increase European LNG import requirements and further tighten global market fundamentals in 2025.

It warns that the vulnerability of Moldova is significantly greater than that of the EU, requiring close coordination between Moldova and its regional and international partners to ensure energy supply security through the winter.

In late December Ukraine received its first shipment of liquefied natural gas from the US, as the war-torn country joins broader European efforts to fully wean themselves off Russian fossil fuels. Europe sources about 40 per cent of its LNG imports from the US, but none have ever been directly purchased by Ukraine before.

"Cargoes like this are not only providing the region with a flexible and secure source of power but are further eroding Russia's influence over our energy system," said Maxim Timchenko, Chief Executive of DTEK.

# Grid modernisation not keeping up with new energy demands

Investments in energy grid modernisation and digitalisation have not kept pace with energy demands and requirements over the past years, according to a new report from global technology intelligence firm ABI Research.

Given rapid electrification and the ongoing energy transition toward net zero, spending on grid digital transformation needs to accelerate. The report estimates that aggregated worldwide investments in grid digitalisation will grow from $81 billion in 2024 to $152 billion in 2030.

"The benefits of the digital transformation of energy grids are huge and wide-ranging," explains Dominique Bonte, VP End Markets and Verticals at ABI Research. "Most importantly, it enables the real-time management, orchestration, and continuous reconfiguration of increasingly complex and distributed energy networks and assets while unlocking much-needed additional generation and transmission capacity. It also reduces costs in terms of both grid expansion and operational management, improves grid resilience in terms of reduced downtime and faster fault recovery, and enhances overall energy quality and efficiency."

Examples of key grid digitalisation technologies include: energy grid management software digital; digital twins; virtual energy substations; connectivity and cloud and the use of AI.

However, grid digitalisation faces multiple barriers and inhibiting factors ranging from a lack of financing, rigid regulation, conservative and protectionist attitudes, aging workforces lacking "digital" expertise, limited competition, long infrastructure lifecycles, and cyber security concerns.

Bonte said: "Going forward, it will be critical for energy utilities and technology providers to develop agile design and deployment practices, tap into innovative funding mechanisms, leverage open platforms and ecosystem cooperation, and address the human factor of embedding technology into company processes and culture. There is no room for failure. Others will be ready to invest in and take control of energy assets if needed."

# Brazil passes offshore wind enabling legislation

- Over 100 projects in development
- Solar represents largest tranche of new capacity in 2024

Janet Wood

Brazil's Federal Senate has passed an offshore wind bill that paves the way for the offshore wind sector to establish itself in the country.

Ben Backwell, Chief Executive of the Global Wind Energy Council, said: "The passing of the Offshore Wind Bill marks the birth of a new industry, with wind getting ready to be a key enabler for an era of green industrialisation in the country.

"There are already around 100 applications for offshore wind projects in Brazil, which represents more than 230 GW of new, clean renewable power. Those projects demonstrate the scale of this bill for Brazil – it unlocks new jobs, rejuvenated industry and a renewed economy."

Roberta Cox, Policy Director – Brazil, Global Wind Energy Council, added: "While waiting for this bill to process, the public and private sectors have been engaged in productive discussions to ensure we build on the momentum this bill delivers. The industry has published standards, agreements and partnerships have been signed and research work has been carried out…

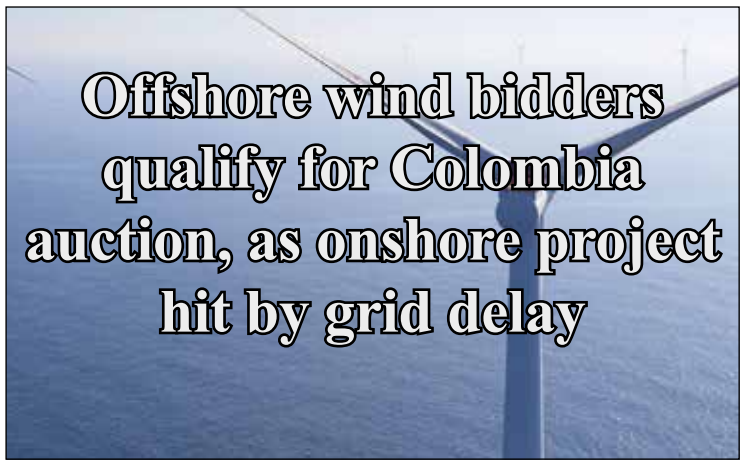
"Now the bill is passed, we need to define area auctions to maintain auction interest in Brazil and attract the offshore wind supply chain to the country.

Brazil's Institute for the Environment and Natural Resources (IBAMA) list of environmental investigation applications filed shows there are more than 100 projects currently undergoing permitting, accounting for nearly 250 GW in potential installed capacity. It is worth noting that a number of the proposed projects' sites overlap.

Among the first tranche could be five projects totalling over 10 GW planned by EDF Renewables. The developer has applied for environmental investigations for the five projects and the proposed offshore wind farms are in the states of Ceará and Piauí, with three in Rio Grande do Sul. EDF Renewables expects to use 21 MW turbines in all the projects.

It plans another 2 GW project in partnership with the Brazilian company Internacional Energias Renováveis, which would be in Rio Grande do Norte. The project began environmental investigations in 2021. In 2023 the two companies signed a Memorandum of Understanding (MoU) with the Government of Rio Grande do Norte on mutual cooperation to develop offshore wind projects and green hydrogen production.

Last year Brazil passed its annual target of 10 106 MW of new capacity. It installed 9947 MW of solar, wind and hydropower capacity in the year. Solar's 147 new facilities accounted for 5629.69 MW of the new capacity, while wind and hydropower plants added 4260.57 MW and 56.40 MW, respectively. Some 906 MW came from 22 thermal power plants.



# Offshore wind bidders qualify for Colombia auction, as onshore project hit by grid delay

ANH, Colombia's hydrocarbons agency, says all companies that submitted applications to participate in the country's first tender for offshore wind leases have been pre-qualified.

The bidders include global energy giants from Belgium, the UK, Spain, China and Denmark, alongside Colombia's Ecopetrol and Celsia. The companies will be bidding for part of 1 GW to 3 GW of offshore wind capacity on offer in this tendering round.

"This is a decisive moment for the energy transformation of Colombia. The participation of these world-class companies demonstrates the confidence in our country and the extraordinary potential of our offshore wind resources," said ANH President Orlando Velandia Sepulveda.

Meanwhile, EDP Renováveis (EDPR) recently announced it has decided not to go ahead with planned investments in onshore wind projects in Colombia, taking an estimated loss of up to €700 million.

"EDPR has decided not to proceed with investments in its 0.5 GW wind projects in the La Guajira region of Colombia," the company said in a statement sent to the Portuguese Securities Market Commission (CMVM).

EDPR won licences for two projects in 2019, but the licensing process for an 81 km transmission line to connect the wind farms is delayed. After a change of government in 2022, licence changes were requested, "creating a material delay".

# Solar expected to be fastest growing power generation source in USA

"High probability" net additions of solar PV between October 2024 and September 2027 are now 93 803 MW, more than four times the forecast "high probability" additions for wind (23 261 MW), according to regular Federal Energy Regulatory Commission (FERC) figures.

FERC also foresees growth for hydropower (1316 MW), biomass (164 MW), and geothermal (90 MW) in the period.

In contrast fossil fuel capacities are set to decrease in the period: coal will contract by 19 863 MW, oil by 2244 MW and natural gas by 90 MW. There is no new nuclear capacity in the three-year forecast.

Solar lobby group SUN DAY said that if FERC's projections are correct and materialise, by October 1, 2027, solar will account for almost one-sixth (15.5 per cent) of US installed utility-scale generating capacity – greater than coal (13.0 per cent) or wind (12.6 per cent) and substantially more than either nuclear power (7.4 per cent) or hydropower (7.3 per cent).

The mix of all renewables would account for 36.7 per cent of total available installed utility-scale generating capacity. The pressure group said the combined capacities of all renewables, including small-scale solar such as that on domestic rooftops, "seem likely to exceed natural gas within three years".

# Canada invests in low-carbon generation and prepares for net zero

- New wind farms and SMRs planned
- Regulations finalised to reach net zero target

Janet Wood

British Columbia has given the green light to nine wind energy projects.

BC Hydro, the province's Crown utility, selected the projects following a strong response to its call for new renewable generation operations.

BC Premier David Eby said: "We need more electricity to meet growing demand," adding, "we also want companies to switch away from polluting fuels that can add to climate change."

The nine projects will increase BC Hydro's power supply by eight per cent, Eby said. They are due for completion by 2031. Eby said the New Democrat government will focus on faster project completions through shorter permit times.

Meanwhile the Canadian government has announced more than $705.9 million in investments to support the expansion of clean electricity in New Brunswick province, including the development of up to 695 MW of new wind energy projects. New Brunswick utility NB Power will also receive funds for predevelopment work on up to 600 MW of new small modular reactors at the Point Lepreau nuclear station.

"Canadians are leaders in generating clean electricity that powers our communities and beyond," said Jonathan Wilkinson, Minister of Energy and Natural Resources.

The new investments come as the government of Canada released a final version of Clean Electricity Regulations (CERs) designed to achieve a net zero electricity grid by 2035 and contribute to economy-wide net zero emissions by 2050. The finalised CER replaces draft regulations released in 2023.

The draft CER proposed emissions limits that were criticised as being overly stringent and not technically achievable for most fossil fuel generating units. The finalised version introduces alternative mechanisms for achieving compliance, such as compliance credit systems, emissions trading, and revised emissions thresholds.

Now, generating units may trade compliance and offset credits to meet emissions intensity limits. Transferable credits allow units to bank credits for their own use or transfer them to other eligible units reporting to the same electricity system operator, generally within the same province.

The CER will apply to most generating units from January 1, 2035, and from January 1, 2050 for certain planned unit. Units converted from coal to gas boilers have a later applicability date.

# World record solar and battery project set to start up in Chile

Grenergy is celebrating construction of Phase 1 of Oasis de Atacama, claimed to be the largest battery project in the world, with the arrival of 105 batteries from the Chinese manufacturer BYD.

The batteries, now arrived in the Chilean port of Iquique, will complete the Quillagua I plant. They are part of a strategic agreement signed with BYD for the supply of 1.1 GWh of storage in 2136 Blade modules.

The project will eventually total 11 GWh of storage and 2 GW of solar photovoltaic generation. It is structured in seven phases and the batteries corresponding to phase 3 are expected to arrive on site during the first half of 2025. A strategic agreement with CATL will provide batteries for phase 4 of the project (1.25 GWh).

Grenergy also announced long-term power purchase agreements (PPAs) under which it will sell the energy from the first four phases. PPAs for the remainder are said to be "at an advanced stage of negotiation".

Meanwhile, Argentina's Eoliasur has begun the environmental permitting process for a 200 MW/888 MWh battery at a site in Cabrero in the Biobio region, according to local reports. Investment in the Charruana project would be $135 million. If the project wins approval from the Biobio authorities, construction will start in July 2026.

# China's streamlined energy law facilitates energy transition

- Law sets tone for future energy developments
- Renewables development prioritised

Junior Isles

China's first Energy Law entered into force on January 1, 2025, marking a milestone in the nation's energy legislation. After decades of fragmented energy management policies, the new law aims to set the tone for China's future energy developments while aligning with President Xi Jinping's ambitious carbon emissions targets.

The new Energy Law comprises nine sections that cover a wide array of topics including energy planning, development and utilisation, the energy market system, energy reserves and emergency response, energy science and technology innovation, supervision and management, and legal liabilities.

Central to the law is the prioritisation of renewable energy development, including a focus on expanding hydropower and renewables (wind and solar) as well as biomass, geothermal and hydrogen.

The law also includes provisions for the dual control of total $CO_2$ emissions and $CO_2$ intensity, in line with the government's targets of $CO_2$ emissions peaking by 2030 and achieving carbon neutrality by 2060 at the latest, as set out by President Xi Jinping at the 75th Session of the United Nations General Assembly in 2020.

In addition, the new law promotes electricity grid interconnectivity and pushes for a market-based pricing system. It also encourages the development of distributed energy, in which generators are placed closer to areas where energy will be used, as well as local development and utilisation. A green electricity certification system encourages users to prioritise the use of renewable energy, and supports the development of new technologies, business models and innovations such as advanced energy storage and smart microgrids.

For the first time, hydrogen is included in China's national legislation, clearly defining its role as an energy source.

The drafting of the Energy Law began in 2006, with multiple drafts released for public comment and three major revisions made before final approval by the National People's Congress on 8 November 2024.

China has previously enacted several individual energy laws and regulations focused on electricity, coal, energy conservation, renewables and urban gas management. However, the new Energy Law provides a comprehensive framework that integrates these disparate policies into a cohesive strategy. Its success will depend on subsequent policies, regulations and implementation details that will gradually supplement and improve its framework.

The drafting of the new law will see a move from a system that primarily controlled total energy consumption and intensity to one that focuses on carbon emissions. The law passed as a November report from the Centre for Research on Energy and Clean Air (Crea) found that that since February 2024, emissions had "stabilised" but were not in structural decline. Chinese President Xi Jinping in 2020 set dual targets for China: to hit peak carbon emissions by 2030 and achieve carbon neutrality, or net zero, by 2060.

The Energy Law's emphasis on energy security means that coal will continue to play a role in China's energy mix, albeit in a 'cleaner and more efficient' manner.

According to the 'Energy Institute's Statistical Review of World Energy', coal dominated China's energy mix in 2023, generating 61 per cent (5753.9 TWh) of the nation's electricity. Hydropower accounted for 13 per cent (1226 TWh) and renewables 18 per cent (1668.1 TWh). Nuclear generated 5 per cent (434.7 TWh) and gas 3 per cent (297.8 TWh).

■ GE Vernova Inc. and Harbin Electric announced that Chinese state-owned power utility Shenzhen Energy Group Corporation Co. Ltd.'s Guangming power plant has achieved the start of operation in Shenzhen Guangming, a district of Guangdong province in China. Powered by three GE Vernova 9HA.01 advancedc gas turbines, Guangming plant is expected to deliver up to 2 GW of electricity to the most populous province in the country, with a population of approximately 127 million.

## Philippines taps Masdar as it continues renewables drive

Renewables developer Masdar has signed agreements with the Philippine government to develop up to 1 GW of solar, wind and battery energy storage projects by 2030.

The UAE-based company signed an implementation agreement with the Department of Energy (DoE) and a memorandum of understanding (MoU) with the Board of Investments of the Republic of the Philippines during the Abu Dhabi Sustainability Week (ADSW) in January. According to a statement by the Philippine Energy Department, the aim will be to scale up to 10 GW within a decade, with an estimated total investment of $15 billion (€14.6 billion).

The pact, which follows a November 2024 MoU on energy transition cooperation between the Philippines and the UAE, will support the Philippines' goal of 35 per cent renewable energy in power generation by 2030 and 50 per cent by 2040.

The DoE said that under the agreement it will help Masdar with pre-development activities, technical studies, securing the necessary rights, and obtaining approvals and permits. The DoE will also aid Masdar in applying for investment incentives and tax exemptions.

Meanwhile, in December the Department of Energy of the Republic of the Philippines (DOE) revealed that the fifth round of the Green Energy Auction (GEA-5), exclusively dedicated to offshore wind projects, will commence in the third quarter of 2025.

According to DOE, the GEA-5 will provide offshore wind developers with secure market access, ensuring long-term demand for their generation capacities. DOE said it will also serve as a timeline guide for all stakeholders.

## Thailand may revise power plan

Thailand's 2024 Power Development Plan (PDP) may undergo significant revisions to enhance the management of its long-term energy supply and bolster efforts against global warming. This was suggested by Energy Ministry Permanent Secretary Prasert Sinsukprasertas after he highlighted the need for adaptation in response to evolving energy concerns.

The Energy Policy and Planning Office is currently evaluating the PDP. Once the review is completed, the plan will be forwarded for approval to the National Energy Policy Council, which is chaired by Prime Minister Paetongtarn Shinawatra.

Prasert noted that Energy Minister Pirapan Salirathavibhaga has yet to give a decisive response to the proposed plan but confirmed that Pirapan would officially announce any potential adjustments to the PDP some time this year.

The potential for adjustments stems from differences of opinion among energy experts, despite the plan having already been subjected to a public hearing.

Under the current PDP, Thailand's power demand is projected to reach 112 391 MW by 2037, a substantial increase from the present 51 000 MW.

Critics argue that such a high-demand projection could impose significant investment burdens on the government. These critics also point out that while the PDP aims to increase the use of renewable energy, the proposed share is not enough to align with the government's global warming mitigation strategies.

The PDP outlines an increase in renewable energy usage to 51 per cent of total fuel consumption by 2037, up from 20 per cent at the end of last year. Conversely, the use of coal and gas is expected to decrease to 48 per cent, compared to nearly 80 per cent at the beginning of this year. The remaining 1 per cent is attributed to nuclear energy and innovative solutions designed to curb fossil fuel reliance and enhance energy efficiency.

# India will need $10 trillion in green investments

- Green investments expected to increase five-fold by 2030
- Renewables to attract lion's share

India will need to invest $10 trillion in green technologies and energy efficiency initiatives by 2070, according to a new report by Crisil. The report notes that this investment is critical for the country to meet its decarbonisation goals and work towards achieving net zero emissions by 2070.

India has set ambitious targets for 2030 and aims to reduce its carbon intensity by 45 per cent and increase the share of non-fossil-fuel energy in its total installed capacity to 50 per cent.

To meet these targets, India anticipates a significant rise in green investments, which are expected to increase five-fold by 2030. This surge in investments presents an opportunity of nearly Rs 31 lakh crore ($360 billion), said Crisil.

The country's emissions surged by 6.1 per cent last year, contributing to 7.8 per cent of global emissions. With energy demand expected to rise in the coming decades, India faces the dual challenge of balancing rapid economic growth with the need for sustainable energy solutions.

Of the projected investments, the renewable energy sector is set to receive the largest share, with Rs18.8 lakh crore earmarked for clean energy initiatives.

"We expect green investments to surge five-fold through 2030, creating a transformative opportunity valued at nearly Rs31 lakh crore. Of this, renewable energy is set to have a lion's share of Rs 18.8 lakh crore, transport and automotive Rs 4.1 lakh crore and oil and gas Rs 3.3 lakh crore," stated the report.

According to JMK Research, India added approximately 24.5 GW of solar capacity and 3.4 GW of wind capacity in 2024 (January to December). This represents a more than two-fold increase in solar installations and a 21 per cent rise in wind installations compared to 2023. Notably, the solar capacity added in 2024 is the highest recorded in any single year so far.

With these additions, India's total installed renewable energy (RE) capacity reached 209.44 GW as of December 2024. Solar energy accounts for 47 per cent of the total RE capacity, making it the largest contributor among renewable sources.

India also expects to attract investment in new nuclear capacity as it works toward satisfying growing demand while keeping a lid on carbon emissions.

In early January the US government said it was finalising steps to remove restrictions on Indian nuclear entities, enhancing a 20-year nuclear deal.

US National Security Advisor Jake Sullivan said: "The US is now finalising the necessary steps to remove long-standing regulations that have prevented civil nuclear cooperation between India's leading nuclear entities and US companies."

Since the mid-2000s, the US and India have been in discussions regarding the supply of US nuclear reactors to meet India's growing energy demands.

A pivotal agreement signed in 2007 by then-President George W Bush enabled the US to sell civilian nuclear technology to India. However, aligning Indian liability laws with international standards has been a persistent challenge. These laws stipulate that the operator, not the manufacturer, of a nuclear power plant should bear the cost of any accidents.

India's stringent nuclear compensation laws have previously impeded deals with international power plant manufacturers, causing the country to postpone its goal of adding 20 GW of nuclear power capacity from 2020 to 2030.

In 2019, an agreement was reached between India and the US to construct six US nuclear power plants in India.

According to the Department of Atomic Energy (DAE), India's nuclear power generation capacity has nearly doubled in the past decade from 4780 MW in 2014 to 8 081 MW in 2024.

Last month Union Minister for the DAE, Jitendra Singh said nuclear generating capacity. is projected to triple to 22 480 MW by 2031-32. He said that nine nuclear power projects are currently under construction, with several others in the pre-project stage, demonstrating India's dedication to expanding nuclear energy.

- The Indian business of China's Envision Energy has secured a 1 GW wind turbine order along with 320 MWh battery order from Indian renewable energy company Juniper Green Energy,

# Polish government agrees funding for nuclear plant

- Italy also set to agree legal framework
- UK's plant sees further cost increase

Janet Wood

Poland has taken a significant step towards establishing its first nuclear power plant by approving funding of up to $14.7 billion. The State Treasury is involved in the construction of the power plant as a direct investor and as a liability underwriter for other lenders.

"The assumed model envisages that the investment is to be financed with 30 per cent from equity and 70 per cent from external capital. External financing will be raised after the equity contribution has been made," the Treasury said.

Poland aims to complete the nuclear power plant by 2036, intending to replace ageing coal fired plants. The state-owned utility company PEJ will be responsible for constructing the 3.75 GW reactors on the Baltic coast.

Elsewhere the Italian government has announced plans to establish a legal framework by the end of 2027 to bring forward new nuclear.

"Italy is ready to return to nuclear energy. This is an important decision that will not replace renewable energies, but rather complement them in order to ensure a balanced and sustainable energy mix," Energy Minister Gilberto Pichetto Fratin told Italian daily *Il Sole 24 Ore*. Italy ceased its nuclear energy operations following the Chernobyl disaster, with the last nuclear power plants shut down after a 1990 referendum.

Sweden is also re-examining nuclear permitting in view of plans for new-build. A new study suggests the approval process for building new nuclear power plants could be shortened by three years, while total permit fees could be cut by half. Pernilla Sandgren, the investigator, says it currently takes around 13 years from the time the application is received until the facility is built and put into operation. The lead times could be shortened by allowing construction to start as soon as all permits are in place, through a new law on principle decisions.

Expected costs continue to rise at the UK's planned Sizewell C, which is now projected to have a final price tag of almost $48.7 billon. This nearly doubles the estimate first provided by developer EDF and the UK government, reflecting rising construction costs and the impact of delays and cost overruns at the sister site, Hinkley Point C. The UK Treasury will decide whether to proceed with Sizewell C during 2025's multi-year spending review.

France's state auditor has said French state-owned nuclear company EDF should not make a final investment decision in Sizewell C until it has reduced its exposure to Hinkley Point C. The Cour des Comptes also said EDF must ensure that any international projects are profitable, and must not delay the programme of new nuclear projects in France.

## Interconnectors under scrutiny over price effects

Sweden would go ahead with the 700 MW Hansa PowerBridge between Germany and southern Sweden, now on hold, if Berlin reforms Germany's electricity market, according to Swedish Energy Minister Ebba Busch.

She told the told the *Financial Times* that "the Swedish government would be prepared to move" on the project if Germany split its internal electricity market into bidding zones. The reform would avoid costs being pushed up for Swedish consumers.

The comment reflects attempts to manage volatile prices across the EU, which are driven by weather-dependent renewables. Busch said that price variability "makes for a very difficult business case" for investment.

The EU's energy regulator Acer warned recently that electricity network costs could double by 2050, "endangering the overall affordability of electricity bills" as more strain was placed on existing grids.

Sweden's own energy system suffers from regional price discrepancies as there are poor transmission links from the north, where most of Sweden's hydropower plants are located.

Norwegian politicians also said they wanted to review interconnectors between Norway and Denmark, Germany and the UK after Norway saw prices spike, although prices later reached record lows. The right-wing Progress party wants to scrap the connection with Denmark and to reform deals with the UK and Germany to reduce "price infection" to Norway from the continent.

## GB cuts reliance on gas as renewables grow

Wind generation provided more of Great Britain's electricity than gas in 2024 for the first time, according to recent figures.

A new study by Montel Analytics showed that GB gas fired output totalled 72.6TWh in 2024 – down on the 86.8TWh recorded the previous year. The decrease in demand for gas was attributed to a rise in renewables output, which totalled 118.1TWh. Renewables contributed 45 per cent to the overall GB power generation mix.

Wind generation was the major contributor to renewable output with a 70 per cent share.

It reached a record high of 9.43 GW, and its contribution would have been even higher if wind generation had not needed to be curtailed due to constraints in the capacity of the transmission system, the report said.

"This long-awaited milestone is a testament to how much progress the UK has made. It's time to seize the moment, to cut reliance on expensive gas with new renewables, storage, and grid upgrades. With the phase-out of coal power completed this year, reducing gas use is the next big opportunity for the country," said Ember analyst Frankie Mayo.

Expanding the grid was named as a key aim of energy secretary Ed Miliband when he set out a 'Clean Power 2030 Action Plan' recently.

# Danish offshore wind auction fails, other programmes continue

- Estonia wins state aid clearance for support
- GB 2030 target needs offshore wind boost

Janet Wood

A 3 GW offshore wind auction in Denmark recently ended without any bids and commentators say the Danish Government must now quickly retender with a new auction design.

The deadline for the first 3 GW of Denmark's 6 GW offshore wind tender expired with no bids and the second deadline is set for April. The Danish auction system does not have any form of state support or revenue stabilisation and offshore wind developers are asked to pay for the right to build a wind farm.

In addition, Denmark does not pay for the grid connection to the offshore wind farms. The market for electricity is uncertain as the country's electricity demand is frequently all supplied by renewables.

"The failed Danish offshore wind auction was disappointing but sadly not surprising. Uncapped negative bidding is not a good system. It raises costs and risk. And it's even harder when the bidders don't know who's going to be buying the energy they produce and how it'll get to them," said Giles Dickson, WindEurope's Chief Executive. "The Danish government have got to change their auction design."

Lithuania's energy ministry also recently announced plans to temporarily suspend an offshore wind tender and review its terms.

Europe installed just 2.3 GW of offshore wind last year, according to WindEurope, but targets require the speed of deployment to be increased. Dickson said that most governments are not applying good permitting rules; grid connections are facing delays; and Europe is not accelerating the electrification of its economy fast enough.

"The EU must urgently tackle all three problems. More wind means cheaper power which means increased competitiveness," he said.

However offshore wind programmes continue to progress. The European Commission has approved a €2.6 billion Estonian scheme to support renewable offshore wind. Poland plans to auction 12 GW of capacity for offshore wind energy for the 2025-2031 period.

The UK wants a big jump in offshore wind to meet its 2030 clean power target. In order for the 2030 target to be met, Britain's offshore wind capacity would have to jump from 15 GW to 43-50 GW by 2030. Ministers are discussing holding the biggest offshore wind auction yet in 2025 to hit the target.

"When you think about the long lead times for a project like an offshore wind farm it makes sense to get going with the CFDs now and throw the book at this with a huge auction round as soon as possible, probably next year," said one government figure.

## Batteries attract government and investor funding

A Bulgarian tender for the construction of at least 3000 MWh of energy storage attracted 151 proposals worth €2.56 billion, the country's energy ministry said recently.

The projects are competing for grant funding under the "National infrastructure for storage of renewable energy" (RESTORE) process. The call was launched in August and the state aid for it was recently approved by the European Commission. The storage facilities have to be commissioned by March 2026.

"The successful implementation of battery projects will significantly contribute to the security of the energy system in Bulgaria and the region," commented Energy Minister Vladimir Malinov.

Battery storage is also expected to grow in Germany after Green Flexibility, a German battery developer and operator, secured investment from Swiss private equity firm Partners Group. Partners Group will initially make an equity investment of up to €400 million ($422 million), while debt funding will bring the total financing to over €1 billion.

Green Flexibility aims to execute a 10 GW pipeline of battery systems and monetise storage capacity through long-term contracts.

Chief Executive Christoph Ostermann, said: "With Partners Group, we have the ideal partner to scale our company and realise our vision of a sustainable and, above all, reliable energy future."

# Nuclear power set to reach a new record in 2025, says IEA report

Renewed momentum has the potential to open a new era for nuclear energy as electricity demand soars. **Nadia Weekes** reports.

There is fresh impetus behind nuclear energy in the form of new policies, projects, investments and technological advances, according to a report by the International Energy Agency (IEA).

The 'Path to a New Era for Nuclear Energy' report provides a comprehensive assessment of the current situation, including insights on how to finance new nuclear projects while ensuring reliable and diversified supply chains for building and fuelling them.

"It's clear today that the strong comeback for nuclear energy that the IEA predicted several years ago is well underway, with nuclear set to generate a record level of electricity in 2025," said IEA Executive Director Fatih Birol.

Birol added that over 70 GW of new nuclear capacity is under construction globally, one of the highest levels in the last 30 years. More than 40 countries have plans to expand the role of nuclear power in their energy systems.

"Small modular reactors (SMRs) in particular offer exciting growth potential. However, governments and industry must still overcome some significant hurdles on the path to a new era for nuclear energy, starting with delivering new projects on time and on budget – but also in terms of financing and supply chains," he noted.

Nuclear power today produces just under 10 per cent of global electricity supply. The increasing use of electricity is accelerating the growth in power demand, which is set to rise six times as fast as overall energy consumption in the coming decades. New generation capacity from a range of technologies will be needed to keep pace with the rapid demand growth, including nuclear power.

Most of the existing nuclear power fleet today is in advanced economies, but many of those plants were built decades ago. The majority of projects under construction are located in China, which is on course to overtake both the United States and Europe in installed nuclear capacity by 2030.

Russia is also a major player in the nuclear technology landscape. Of the 52 reactors that have started construction worldwide since 2017, 25 are of Chinese design and 23 are of Russian design.

Similarly, the report shows that the production and enrichment of uranium, the fuel that goes into nuclear reactors, are highly concentrated.

"Today, more than 99 per cent of the enrichment capacity takes place in four supplier countries, with Russia accounting for 40 per cent of global capacity, the single largest share," Birol said, noting that this concentration represents a risk factor for the future.

In Europe, nuclear energy produces less than one-quarter of total electricity, compared to one-third in the 1990s, and is expected to fall to less than 15 per cent in ten years. A similar trend is predicted for the US. In these countries, projects are on average seven years behind schedule and costs are 2.5 times higher than originally anticipated.

The report highlights how the introduction of SMRs – a type of smaller nuclear power plants that are quicker to build with greater scope for cost reductions – could lead to lower financing costs. With the right support, SMR installations could reach 80 GW by 2040. However, the success of the technology and speed of adoption will hinge on the industry's ability to bring costs down, by 2040, to a level similar to large-scale hydropower and offshore wind projects.

The agency proposes three scenarios for the evolution of the sector by 2050, all of them predicting a sharp increase in global nuclear power installations – of more than 50 per cent in the most cautious scenario.

In a rapid growth scenario for nuclear, annual investment would need to double to $120 billion by 2030. The report highlights that the private sector is increasingly viewing nuclear energy as an investable energy source. Notably, big names in the technology sector are signing power purchase agreements with developers to provide electricity for data centres and artificial intelligence.

# Solar in Africa lagging behind despite record growth for third year in a row

- South Africa and Egypt dominate installations
- Battery storage growing at pace

Nadia Weekes

Solar power installations in Africa have reached 19.2 GW after 2.5 GW of capacity was added in 2024, following record additions in 2022 and 2023, according to the 'Africa Solar Outlook 2025' report.

But solar in Africa is lagging behind the global solar market, as it still represents less than 1 per cent of solar capacity worldwide. Globally, by the end of 2024, solar capacity reached 503 GW – a 44 per cent increase from 2023.

The best African performers for new installed generating capacity in 2024 were South Africa with an estimated 1235 MW and Egypt with 707 MW. Far behind follow Zambia (74.8 MW), Nigeria (63.5 MW) and Angola (53.8 MW).

All these figures exclude residential installations as these are currently not tracked by the Africa Solar Industry Association (AFSIA). It is estimated that these installations could represent as much as 10-20 per cent of additional capacity.

In the context of overall national power generation, the Central African Republic leads the ranking with solar contributing more than 40 per cent of all grid electricity consumed in the country. Another four African countries saw solar contribute more than 10 per cent of their power consumption, namely Mauritania (20.7 per cent), Namibia (13.4), Somalia (11.6) and Malawi (11.4).

Energy storage is becoming a key element of the African solar ecosystem. From 2017 to 2022, storage in Africa represented around 50 MWh per year. In 2023 capacity grew to more than 150 MWh, and in 2024 to more than 1600 MWh.

This exponential growth is due to sharply decreasing prices for lithium-ion storage solutions. Bloomberg NEF estimates that the cost of battery storage decreased by 20 per cent in 2024, following a 13 per cent decrease in 2023.

A number of large-scale storage projects have been announced or started construction in Africa, including the second phase of Gambia's 100 MW/130 MWh Soma Project, the Lolda Solar Farm in Senegal comprising 60 MW of PV and 72 MWh of storage, and the 900 MW PV with 720 MWh of storage developed by Masdar and Infinity Power in Egypt.

# Middle East welcomes first grid-connected wave energy array

Israel has inaugurated the first grid-connected wave energy array in the Middle East, developed by Eco Wave Power Global and EDF Renewables.

The Israeli National Electric Company is the purchaser of all the energy produced by the project, which Israel's Minister for Energy and Infrastructure, Eli Cohen, hailed as a testament to the country's efforts to reduce air pollution and improve energy security.

"This is a unique opportunity for Israel to demonstrate how green technology utilising the waves can be implemented and truly make a difference," said Idit Silman, Minister of Environmental Protection.

The innovative Eco Wave Power floaters move up and down with the waves creating pressure that drives the hydro-motor and generator. A smart automation system controls the power station's storm-protection mechanism and stable transmission of clean electricity to the grid.

In the coming months Eco Wave Power plans to launch its next three projects: at AltaSea's premises in the Port of Los Angeles, in collaboration with Shell; on the East Coast of Taiwan, in collaboration with Lian Tat Company and I-Ke International Ocean Energy Co.; and its first MW-scale project in Porto, Portugal.

# Iran announces $5 billion in 'easy' loans to renewable energy developers

The Iranian government has announced $5 billion in loans to developers of renewable power assets amid efforts to offset electricity production issues caused by fuel shortages in the country's thermal power plants.

The Central Bank of Iran (CBI) confirmed that the banking system will offer up to $5 billion worth of loans in the next four years, using finances made available by Iran's sovereign wealth fund. The Iranian Energy Ministry's Department of Renewables (SATBA) will be responsible for vetting applications.

The loans will be exempt from strict CBI regulations governing large loans, with banks able to accept land and equipment of the proposed power plants as collateral.

The CBI said Iranian state companies that export commodities to other countries can use their export proceeds to import renewable power plant equipment to build electricity stations in their factories.

The announcement came just hours after Iranian President Masoud Pezeshkian chaired a meeting of high-profile government officials to streamline processes related to the expansion of Iran's renewable energy sector.

Pezeshkian said that Iran is committed to increasing its renewables capacity to 30 GW in the next four years, from a current figure of nearly 2 GW. He added that several solar power plants should be built immediately to help the country cope with next summer's peak demand.

He also ordered the formation of a consortium of companies controlled by SATBA to buy a large consignment of solar panels.

# Trump election sends wind sector stocks tumbling

Danish offshore wind project developer Ørsted, along with several European companies with businesses in the US, have witnessed significant declines in market value following US President Donald Trump's attack on the wind power sector. **Junior Isles**

Wind project developers and turbine manufacturers look set for a tough time in the US, as stocks tumbled last month following the election of Donald Trump.

Ørsted, the world's largest offshore wind developer, announced fresh write-downs on its US business, causing shares to fall more than 17 per cent as the market opened following President Trump's inauguration, and his immediate suspension of new offshore wind leasing.

Mads Nipper, Chief Executive of Ørsted, said the company was reviewing Trump's suspension order, but did not comment further.

Announcing the impairments, Nipper said they were "very disappointing", but the company remained "committed to the US market for the long term". He added: "We continue to navigate the complexities and uncertainties we face in a nascent offshore industry in the new US market."

Ørsted also blamed the write-down on rising interest rates and supply chain challenges but Trump's approach is weighing heavily on the sector. Shares in Vestas, a Danish-listed wind turbine maker, fell more than 4 per cent.

Just ahead of the inauguration European renewables across the board, but particularly wind power, fell. Alongside Ørsted and Vestas, Siemens Energy, owner of Gamesa, the Spanish-German wind power giant, fell by 6.11 per cent. EDP Renováveis (EDPR) also fell sharply, dropping as much as 3.66 per cent. Acciona, meanwhile, fell by 2.94 per cent. Germany's RWE and Nordex also saw declines.

Notably, EDP has fallen more than 30 per cent in the space of a year, with EDPR sinking 43 per cent in the same period. Prior to the election, EDP had been downplaying Donald Trump's threat, pointing out that support for renewable energy has been made at the state level, including Texas, a Republican stronghold.

The falls came after the then President-elect Trump said: "We are going to try to ensure that the US has a policy in which windmills are not built." Speaking at a press conference in Florida, he added: "It's the most expensive energy there is. It's much, much more expensive than clean natural gas, so we're going to try a policy where there are no wind power plants being built."

The US, until Trump's rise, held the biggest promise for wind development globally. According to Mordor Intelligence the wind market until 2027 was set to grow by 5.87 per cent annualized thanks to the giga wind farm projects that the Biden administration was putting in place.

# Constellation Energy to buy Calpine as AI drives power demand

US utility Constellation Energy is to buy rival Calpine in a nearly $27 billion deal, combining two of the country's largest electricity generators, as electricity demand to power the rise of artificial intelligence (AI) is projected to surge.

According to a statement released by the two companies, the deal, one of the largest in the US power sector, will create an industry giant with a customer base of about 2.5 million.

Constellation will pay $16.4 billion for Calpine's equity through a combination of $4.5 billion in cash and 50 million of its own shares, and will also assume the target's $12.7 billion debt, for an enterprise value of $26.6 billion. Shares in Constellation closed more than 25 per cent higher following the deal's announcement, giving the group a market capitalisation of about $95 billion.

The US electricity system is grappling with a historic rise in power demand after two decades of negligible growth, partly due to the rapid growth of data centres that power everything from AI tools to e-commerce sites. Consulting firm ICF expects the country's power consumption to grow nearly 20 per cent by 2033.

The tie-up would broaden Constellation's portfolio as companies like Microsoft, Google and Amazon scramble to secure energy for data centres used to run AI and other services. Electricity demand is also increasing because of the building of new factories in the US and greater use of electric vehicles and heat pumps.

Calpine, which is based in Houston and is a privately held company, operates a large fleet of natural gas power plants in several states as well as the Geysers geothermal energy complex in California.

Constellation, which is based in Baltimore, said in a statement that it expected Calpine's natural gas assets to help ensure the reliability of the electric grid. The combination would also broaden the company's presence in Texas, where power demand is growing quickly, and add more renewable energy to its portfolio.

"We believe that natural gas and geothermal, along with nuclear, will be critically important for the nation," Joseph Dominguez, the CEO of Constellation, said on a call with investors and analysts.

He added that it was important to ensure that energy resources were not only sustainable, but reliable as well. "We believe that natural gas and clean energy, blended together, will be very attractive to customers," Dominguez said.

# Lhyfe and Masdar eye co-development of green hydrogen

Lhyfe, a producer and supplier of green and renewable hydrogen for mobility and industry, and Abu Dhabi Future Energy Company PJSC – Masdar, the UAE's clean energy developer, have signed a Memorandum of Understanding (MoU) to explore potential co-development opportunities in large-scale green hydrogen production projects in Europe.

The MoU is part of the strategy announced in 2024 by Lhyfe to co-develop projects with financial, industrial investors and experienced partners seeking to invest in green hydrogen production projects.

Through this strategic partnership, the two companies plan to explore collaboration and investment opportunities across the green hydrogen value chain, with a focus on co-developing large projects. This collaboration will leverage their complementary abilities and support their ambitions to drive and develop the sector.

Lhyfe is one of the pioneers in the green hydrogen sector and is one of the fastest-growing players. Established in 2019, Lhyfe already has four installed green hydrogen production sites in Europe, and several other sites under construction. Lhyfe has demonstrated its industrial capacity to build and operate production sites of increased capacity. Its pipeline of projects represents a total installed capacity of 9.5 GW and includes several large-scale projects at advanced stages and ready to accelerate.

Masdar is aiming for a renewable energy portfolio capacity of 100 GW by 2030, supporting the target set in the UAE Consensus to triple global renewables capacity by the end of this decade, and aims to be a leading producer of green hydrogen in the same timeframe. It is targeting 1 million tonnes per annum of green hydrogen or equivalent derivatives in the UAE and globally within a decade.

# Uniper attracts early interest from potential buyers


The German government's majority stake in power company Uniper has garnered attention from potential buyers, including Abu Dhabi's Taqa and Norway's Equinor.

As Germany explores options to reduce its holding, the value of Uniper could surpass €10 billion ($10.3 billion), reported *Bloomberg News*.

The German government, which owns 99 per cent of the company, is seeking to exit its holding, potentially through a single buyer or a stock offering.

The market value of Uniper on the Frankfurt stock exchange is almost €18 billion, but any deal is expected at a discount due to limited liquidity.

Other interested parties may consider offers or partnerships to divide Uniper's assets, which span gas, coal, hydroelectric and nuclear power plants in various European countries.

A spokesperson for the German finance ministry confirmed that the government is exploring options to comply with the European Commission's requirement but has not finalised the timing or form of any potential transaction.

# ABB to acquire power electronics business of Gamesa Electric

ABB has signed an agreement to acquire the power electronics business of Gamesa Electric in Spain from Siemens Gamesa. The acquisition will strengthen ABB's position in the growing market for high-powered renewable power conversion technology.

The transaction is subject to regulatory approvals and customary closing conditions and is expected to close in the second half of 2025. Financial terms were not disclosed.

The agreement includes the transfer of around 400 employees, two manufacturing plants located in Spain, as well as additional assets in the US, China, India and Australia.

As part of the transaction, both companies have entered into a long-term collaboration agreement through which ABB will provide power electronics to Siemens Gamesa turbines, both onshore and offshore.

The power electronics business of Gamesa Electric reported revenues of around €170 million euros for the fiscal year that ended on September 30th, 2024.

"This targeted acquisition is in line with our commitments to grow our portfolio for high power renewable applications and support productivity in a low-carbon world. It will expand our engineering depth for power conversion and grid connection, and will add significant opportunity to service a large installed base," said Chris Poynter, President of ABB's System Drives division.

Vinod Philip, Executive Vice President for Wind Power at Siemens Energy, owner of Gamesa, said: "Our primary goal for Siemens Gamesa is to achieve profitability, which requires a dedicated focus on our core business. The make-or-buy decision is a constant consideration for us and in this case Gamesa Electric will be better positioned to thrive under ABB's umbrella."

## Americas

### JDR to install Virginia inter-array cables

JDR Cable Systems has won a contract from DEME Offshore for cable installation and commissioning work on the Coastal Virginia Offshore Wind (CVOW) project. The 2.6 GW CVOW, developed by Dominion Energy and located 27 miles off the coast of Virginia, is the largest offshore wind farm under construction in the US.

Under the contract, JDR will carry out pull-in, termination, testing, and commissioning of all the 66 kV subsea inter-array cables for the offshore wind farm which will comprise 176 wind turbines and three offshore substations.

The inter-array cables for the 2.6 GW project are being supplied by Prysmian and Hellenic Cables.

JDR Cable Systems will start its part of the work in 2025 and continue into 2026.

### GE Hitachi awards contract for BWRX-300 RPV

GE Hitachi Nuclear Energy (GEH) has awarded a contract to BWX Technologies (BWXT) to manufacture the reactor pressure vessel (RPV) for the first BWRX-300 SMR to be constructed at Ontario Power Generation's Darling New Nuclear Project site.

The RPV is the largest component within the BWRX-300. GEH previously awarded a contract to BWXT for RPV-related engineering analysis, design support and manufacturing and procurement preparations.

Early site preparation work at Darlington has been completed with construction of the first unit expected to start later in 2025, pending regulatory approval, and commercial operations expected to commence by the end of 2029. A total of four units are planned for the site.

### Wärtsilä secures US service agreements

Xcel Energy has awarded a ten-year Long-Term Optimised Maintenance Agreement to Wärtsilä. The agreement covers Xcel's two new power plants located in Minnesota and Wisconsin, USA.

The Blue Lake plant, once in operation, will run on three Wärtsilä 34DF dual-fuel engines delivering an output of 29 MW. The Wheaton plant features five Wärtsilä 34DF engines having a total power output of 48 MW. The fast-starting engines provide effective grid-balancing power to compensate for fluctuations in the supply of energy from renewable energy sources.

The scope of the agreement includes remote support from Wärtsilä's Expertise Centres, as well as all spare parts for the engines and advisory services during overhauls. Furthermore, for the first two years the company will have engineers on site at the two plants.

### Nordex to supply 247 MW Canadian wind turbines

Nordex won orders for 36 N163/6.X turbines for projects in Nova Scotia, Canada. Nordex will deliver the turbines, each with a nominal output of 7 MW mounted on 118 m tubular steel towers, in Spring 2026.

To ensure high availability during Nova Scotia's cold winter, the turbines will be delivered as cold climate variants, and some will be equipped with the Nordex Advanced Anti-Icing System for rotor blades.

## Asia-Pacific

### Eurus Energy to receive 59 MW wind turbines

Japanese wind power company Eurus Energy has placed an order with GE Vernova for 58.8 MW of turbines for wind farm projects in Aomori prefecture, Japan.

The order is for 14 GE Vernova onshore wind turbines, each with an individual capacity of 4.2 MW, which will be installed at the Iwaya and Shitsukari wind farms. Iwaya and Shitsukari are scheduled to be commissioned by 2028.

GE Vernova said that the contract will help Japan achieve its goal of increasing the share of renewable energy in the national electricity mix to 36-38 per cent by 2030.

### Japan orders 15 MW offshore wind turbines

Vestas has received an order to supply 21 V236-15.0 MW wind turbines for the 315 MW Oga Katagami Akita offshore wind project in Akita Prefecture, Japan. The order also includes a long-term service agreement.

The Oga Katagami Akita project is being developed by Oga Katagami Akita Offshore Green Energy, a consortium consisting of JERA, Electric Power Development (J-POWER), Tohoku Electric Power (Tohoku EPCO), and ITOCHU.

This is Vestas' first firm order for this turbine in the Asia-Pacific region, as well as the company's first firm order for a project to be developed under the Japanese government's offshore wind auctions based on the Renewable Energy Sea Area Utilisation Act.

### Singapore invests in $H_2$-compatible power plant

PacificLight Power will start construction of a 600 MW hydrogen-compatible natural gas fired CCGT on Jurong Island, Singapore. The plant is scheduled to start commercial operation in 2029.

The facility will cost $1 billion, and PacificLight Power said that it will be the largest single and most efficient combined cycle gas turbine facility in the country. Once operational, the plant will use a blend of 30 per cent hydrogen, 70 per cent natural gas. It is expected that this will be modified to 100 per cent hydrogen as the technology is proven.

## Europe

### Uniper awards Connah's Quay FEED contracts

Uniper has announced the award of Front-End Engineering Design (FEED) competition contracts for Connah's Quay in north Wales to two companies, Technip Energies and Worley.

The two contractors will design and submit development plans and compete to be selected as final contractor for an EPC contract to build the plant. The FEED competition is the next step in the potential development of a low-carbon combined cycle gas turbine (CCGT) power station at Uniper's Connah's Quay site. The new power station would be fitted with carbon capture technology to capture $CO_2$ emissions.

The proposed power station would connect into nearby $CO_2$ transport and storage infrastructure as part of the HyNet industrial cluster, enabling the captured $CO_2$ to be transported to permanent offshore storage facilities in repurposed depleted offshore gas fields.

The project is at an early stage and final capacity will be determined following completion of the FEED. Uniper is working towards a potential capacity of around 1.1 GW and up to a maximum of 1.38 GW low-carbon power, developed in two phases. Phase one could potentially be operational by 2030.

### AFRY to design Estonian offshore wind farm

AFRY has been selected by Enefit Green to deliver front-end engineering design (FEED) services for the 1 GW Liivi Bay offshore wind farm in the Gulf of Riga, Estonia.

The scope of the assignment includes detailed site assessment studies, site layout optimisation, foundation selection and design, transport and installation engineering and planning, and the full electrical design including the offshore substation.

The Liivi Bay offshore wind farm will be built in the Gulf of Riga, 11 km from Kihnu Island and 16 km from Häädemeeste. Enefit expects the construction period of the offshore wind farm to take place between 2028 and 2030. It will consist of up to 84 turbines and have a total generation capacity of 1000 MW, with an annual electricity production of up to 4 TWh. Besides feeding electricity into the Estonian grid, the project is also planned to be interconnected with the Latvian national grid.

### Hitachi Energy wins €2 billion Amprion order

Hitachi Energy has been awarded contracts worth €2 billion from German transmission system operator (TSO) Amprion to deliver four converter stations for two HVDC links.

Hitachi Energy will supply, install, and commission two HVDC Light converter systems capable of transmitting 2 GW. The converters will operate at 525 kV. The converter stations are scheduled to start operation in early 2030.

The HVDC links, known as V48 and V49, form Korridor B, which comprises two new underground cable connections, each with two converter stations, which transport electricity from the North Sea coast in Schleswig-Holstein and Lower Saxony to the Ruhr region. Each underground cable system will transmit 2 GW. If needed, the transmission capacity can be increased by another 4 GW via additionally laid empty lines.

### Vestas wins 224 MW Swedish order

Vestas has won a 224 MW order from Vinliden Vindkraft for the 70 MW Vinliden and the 154 MW Fjällberg wind power projects in Sweden.

Vestas will supply 35 V162-6.4 MW wind turbines, with 24 units for Fjällberg and 11 for Vinliden. All units will feature an anti-icing solution. The order includes delivery, installation, and commissioning, with Vestas providing long-term service. Turbine delivery is planned for Q2 2026, and commissioning will be completed by Q4 2026. The projects will be located in Västerbotten County, Northern Sweden.

These projects are a collaboration between funds managed by Prime Capital and Polhem Infra.

### Valmet to modernise Czech heating plant

Valmet is to modernise ŠKO-ENERGO's heating plant in Mladá Boleslav, Czech Republic. The project includes converting the two existing circulating fluidised bed (CFB) boilers from coal to biomass and delivering a new bubbling fluidised bed (BFB) boiler. The order also includes a flue gas cleaning system for the new boiler and modifications to the flue gas cleaning systems of the upgraded boilers.

In addition to converting two existing CFB boilers, a new BFB boiler will be delivered to compensate for the reduced capacity from the converted CFB boilers. The new boiler will work alongside the retrofitted ones, which will handle a biomass mix of wood chips and agro-biomass pellets.

The modernisation of the Mladá Boleslav plant, which supplies energy to Škoda Auto's manufacturing facilities and provides heating for the town, represents a significant milestone in ŠKO-ENERGO's transition to decarbonisation.

The project is expected to be completed by the end of 2027.

## International

### Rolls-Royce wins Turkish battery storage order

Rolls-Royce has won a contract from Polat Enerji to supply a large-scale battery energy storage system with a capacity of 132 MWh. The mtu QG EnergyPack will be integrated into the Göktepe Wind Power Plant near Yalova in northwestern Türkiye and will ensure that electricity from renewable sources can be fed into the grid without interruption.

The plant will help to increase the stability of the Turkish power grid and, thanks to the integration of renewable energies, to reduce $CO_2$ emissions.

### EPC contract for 1.1 GW Suez wind project

PowerChina has won the EPC contract for the 1.1 GW Suez Gulf wind power project in Egypt. The project achieved financial close in early January 2025.

PowerChina will handle the design, procurement, construction, commissioning, handover and warranty services for the entire wind power complex. The wind farm will be built near Ras Ghareb and Ras Shokeir in Egypt's Red Sea Governorate. The project will use wind turbines from the Chinese manufacturer Envision.

### Türkiye orders 638 MW of wind turbines

Türkiye has placed an order for 97 wind turbines with Nordex. The orders totalling 638 MW also include Service contracts for the turbines over a period of several years.

With these orders Nordex reached more than 1 GW of new orders in Türkiye in 2024.

Türkiye recently set a goal of quadrupling the expansion of wind and solar energy to 120 000 MW by 2035, due to the expected increase in electricity demand in the coming years.

### Wärtsilä to power 120 MW Kazakhstan plant

Wärtsilä will supply fast-start engines for a new 120 MW power plant under construction in Kazakhstan. The order covers six Wärtsilä 46TS-SG gas engines to compensate for the fluctuation of electricity from renewable sources, as well as mechanical and electrical auxiliary equipment.

Kazakhstan Caspian Offshore Industries (KCOI) is the main contractor for the hybrid power project in the Mangystau region, which in addition to the engine power plant, will comprise a 77 MW wind power plant and a 50 MW solar power plant.

Hydrogen

# China launches first integrated solar-hydrogen farm, pushing hydrogen forward

China has put a new innovative energy project into operation, combining solar and hydrogen, and hitting a milestone in its move towards practical use of renewable energy.

Gary Lakes

The Bundesnetzagentur (the Federal China's Guohua Energy Investment Company, a subsidiary of CHN Energy Investment Group, announced in January that it had opened an integrated solar and hydrogen energy storage centre, the largest of its kind in China.

"This marks the launch of China's first comprehensive energy utilisation and coastal ecological management project, integrating photovoltaic power generation, hydrogen production, hydrogen refueling and energy storage," CHN Energy said in a statement.

The Rudong offshore photovoltaic-hydrogen energy storage project is located in the Yudong Reclamation Area in Rudong County, Jiangsu Province in eastern China. The facility, which covers an area of 287 ha, was put into operation and connected to the grid at the end of December, the company said.

China is already a major investor in solar energy and is making strides in hydrogen production. While Rudong is the first of its kind, more similar projects are expected to follow.

The innovative project integrates the unique coastal tidal flat resources into utilising advanced photovoltaic technology and intelligent control systems to optimise energy conversion and storage efficiency, according to the company.

Rudong has a total installed capacity of 400 MW. It includes a new 220 kV onshore booster station, a 60 MW/120 MWh energy storage facility and a hydrogen production and refuelling station with a production capacity of 1500 standard $m^3/h$ and hydrogen refueling capacity of 500 kg/day, the company reported.

The facility will become fully operational this year and is expected to generate some 468 million kWh of electricity annually, the Chinese news agency *Xinhua* reported. The volume of electricity will replace the equivalent of 151 000 tonnes of coal, it said.

CHN Energy said using the power produced at Rudong will lead to a substantial reduction in emissions, including some 309 400 t of carbon dioxide, 562.6 t of sulphur dioxide, and 1125.3 t of nitrogen dioxide.

"These reductions not only make a significant contribution to environmental protection but also mark a key milestone in advancing the transition to a more sustainable energy structure," CHN Energy said.

By integrating hydrogen production through water electrolysis, the overall energy utilisation efficiency is further enhanced, it added. This innovative approach not only bolsters the peak-sharing capacity of the regional power grid but also significantly improves the stability of the electricity supply, the company said.

The introduction of the Rudong project is a significant step for China towards moving its power sector into renewables, particularly hydrogen, which authorities frequently state will be a major component for the country's clean energy transition. China is a major global emitter of carbon emissions and it views hydrogen as an important part of the efforts to cut emissions in the transportation and heavy industry sectors.

The government is supporting the development of hydrogen fuel cells, hydrogen production technologies, and hydrogen infrastructure. This includes building hydrogen refuelling stations and promoting the use of hydrogen in various industries.

China's Ministry of Industry and Information Technology (MIIT) announced a new policy directive in mid-January, *Hydrogen Fuel News* reported. According to the report, the policy makes China poised to transform its energy landscape as the aim of the directive is aimed to bolster the development of low-carbon (blue/grey) hydrogen. The ministry is pushing the increased use of hydrogen across the industrial sectors this year, the report said.

The directive "marks a pivotal step in the nation's broader decarbonisation agenda as China positions itself as a leader in clean energy innovation," the online magazine reported a Chinese analyst as saying.

"We think the potential of hydrogen in the industrial sector has been confirmed," Wu Jiaxiong, an analyst at BOCI Securities, was quoted by *Hydrogen Fuel News* as saying. Wu added that with the new policy framework, hydrogen-related projects are likely to find greater financial backing, streamlined approvals, and operational support.

China is already making significant strides in the development and use of photovoltaics and is now giving more impetus to hydrogen development through a number of big development projects. The country has established itself as a global leader in solar energy deployment. For example, in 2022, China installed as much solar capacity as the rest of the world combined. The government has been promoting both utility-scale solar projects and distributed solar systems, such as rooftop installations. Additionally, China is investing in concentrated solar power (CSP) technology, which uses mirrors to focus sunlight to generate heat and produce electricity.

China has set a number of targets through hydrogen policy initiatives designed to see the country produce 20 million t of hydrogen by 2025 and 100 million t by 2050. Considerable emphasis is being given to green hydrogen, which is essential for progressing its clean energy strategy. China has set a target of reaching carbon neutrality by 2060. And it intends to have a capacity of 1200 GW of renewable energy available by 2030.

Gas

# Moves to harness Iraqi gas, ending flaring and supplying domestic power

France's TotalEnergies has started a project in Iraq designed to harness the billions of cubic metres of associated gas flared every year in the country, and provide Iraq with its own gas to meet domestic power needs.

Gary Lakes

The French oil major TotalEnergies began in January a project that should eventually lead to a major turn-around for the Iraqi energy sector. Work has begun on a huge multi-energy project that aims to gather natural associated gas and process it for distribution to power stations for electricity supply to large parts of southern Iraq. The domestic gas supply will enable Iraq to greatly reduce its dependence on neighbouring Iran for gas and electricity imports.

The ArtawiGas25 project will require an investment of $250 million and will process 50 million cubic feet (mcf) of associated gas daily gathered from Iraqi oil fields. Associated gas is that which is produced at the same time with oil. But if the infrastructure does not exist to gather and process the gas for further energy production, the gas is flared, contributing to the pollution of the Earth's atmosphere and subsequently climate change.

Iraq has been one of the major gas flaring countries in the world and the practice is reported to have caused major health problems among the population of southern Iraq, many of whom live very near flares.

TotalEnergies is partnered in the project with Basra Oil Company and QatarEnergy. TotalEnergies is operating the project with a 45 per cent ownership share. Iraqi-owned Basra Oil Company holds 30 per cent, and QatarEnergy 25 per cent.

Once ArtawiGas25 is operating, it will supply local power plants with enough gas to serve 200 000 households in the Basra region, TotalEnergies said in a statement. The project will also create jobs during its construction and future operation. It is scheduled to come into operation before the end of this year. It is hoped that the success of ArtawiGas25 will lead to similar projects being initiated for Iraq's many other oil fields.

The processing plant is a key part of the Gas Growth Integrated Project (GGIP), a $10 billion investment project designed to revolutionise Iraq's domestic energy situation, which has historically been based on Iraqi oil exports. The GGIP includes a large-scale gas processing plant with a first phase capacity of 300 mcf/day that will recover gas being flared on three oil fields and supply gas to 1.5 GW of power generation capacity. It will also include the redevelopment of the Ratawi oil field.

The country has been lacking in foreign investment for decades and it is hoped that the ArtawiGas25 project will help to change that. The Iran-Iraq War, Operation Desert Storm, and the US invasion of Iraq in 2003 left the country's industry and infrastructure wrecked. International sanctions prevented foreign companies from investing. Since the wind-down of the US military occupation, continuing instability in the country has made investors wary.

TotalEnergies has also further agreed to invest billions of dollars more in Iraq in the future with the intent of expanding gas recovery and utilising flared gas, boosting oil output, constructing a seawater treatment plant that will serve well injection and other procedures, and build a 1 GW solar park.

Julien Pouget, Senior Vice-President for TotalEnergies Exploration & Production for the Middle East & North Africa, expressed his company's pleasure with having launched ArtawiGas25. "It will give the Iraqi people a tangible insight into the benefits of the GGIP, which will provide more energy with less emissions," he said in a statement announcing the start of the project.

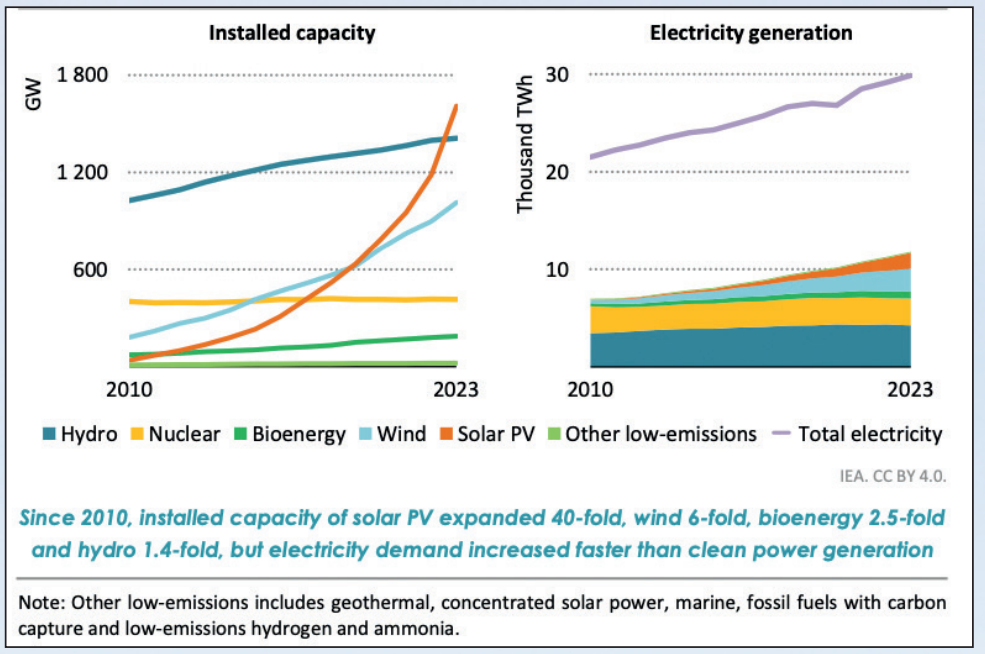
Through ArtawiGas25, he added: "TotalEnergies is demonstrating its capacity to deliver valuable and fast-track solutions in accordance with the government's expectations and the country's electricity needs. We look forward to the next GGIP milestones in the coming weeks with the start of construction of the 1 GW solar project."

International environmental monitoring groups estimate that Iraq is currently flaring more than 18 billion cubic metres (bcm) of gas annually. This is more than what some countries use for power and industrial needs in a year. As many as 1400 flares are deployed throughout the country because it lacks the infrastructure to capture and process the gas produced during oil operations. As Iraqi oil production has increased in recent years, flaring has increased with it. According to the World Bank, Iraq is the second-largest source of flared gas after Russia.

As the world and the gas industry looks for new ways to use gas and make it a friendly component of the energy transition, Iraq's flaring poses a serious threat to the global environment. Gas flaring in Iraq is haphazard at best. According to the Enabling Peace in Iraq Center (EPIC), gas flaring never burns all the natural gas that is released during oil extraction.

"That is almost never the case," a report by EPIC says, flaring is "causing dangerous levels of 'fugitive methane' to escape into the atmosphere," the report states. "This happens due to venting, leaks, incomplete combustion during flaring, and accidents associated with the country's poor energy infrastructure. In August 2021, satellites detected a huge plume of methane gas over southern Iraq that was likely the result of a pipeline leak that was spewing an estimated 130 tons of methane per hour – equivalent to the amount of greenhouse gases emitted by 6500 cars running for a year."

## Global installed clean power capacity and electricity generation, 2010-2023




*Since 2010, installed capacity of solar PV expanded 40-fold, wind 6-fold, bioenergy 2.5-fold and hydro 1.4-fold, but electricity demand increased faster than clean power generation*

Note: Other low-emissions includes geothermal, concentrated solar power, marine, fossil fuels with carbon capture and low-emissions hydrogen and ammonia.

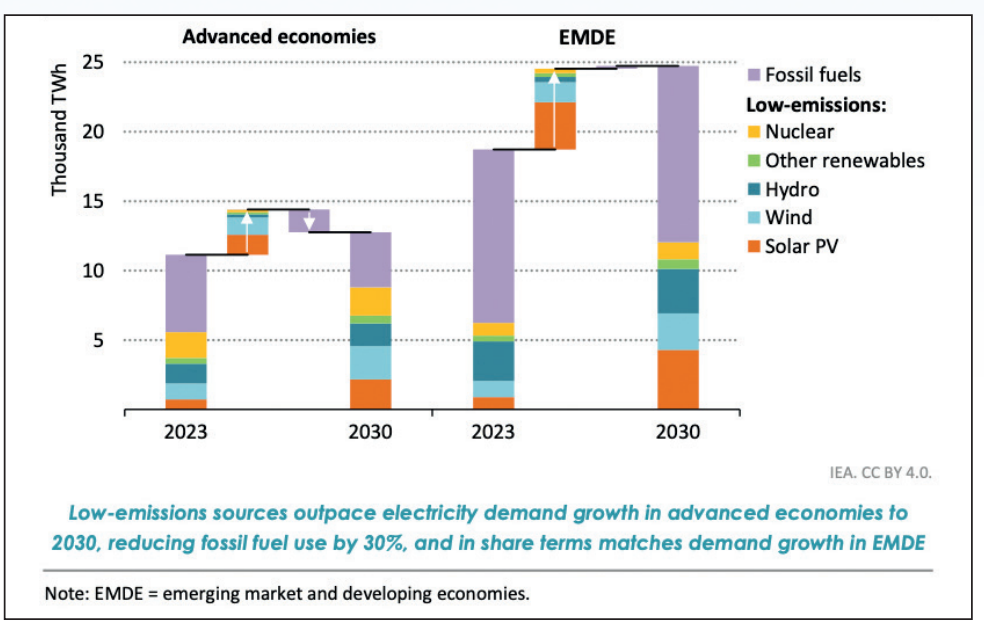
World Energy Outlook 2024, © IEA/OECD, page 46, Figure 1.14

## Change in electricity generation by source and power sector $CO_2$ emissions in selected regions, 2018-2023


*Over the past five years, low-emissions sources outpaced any electricity demand growth in many regions, driving down unabated fossil fuels and cutting power sector emissions*

World Energy Outlook 2024, © IEA/OECD, page 47, Figure 1.15

## Electricity generation by source in advanced economies and EMDE in the STEPS, 2023-2030




*Low-emissions sources outpace electricity demand growth in advanced economies to 2030, reducing fossil fuel use by 30%, and in share terms matches demand growth in EMDE*

Note: EMDE = emerging market and developing economies.

World Energy Outlook 2024, © IEA/OECD, page 48, Figure 1.16

For more information, please contact:

**IEA Publications**
**International Energy Agency**

**Website: www.iea.org**

**Contact information:**
**www.iea.org/contact**

**Source:** *IEA World Energy Outlook 2024, https://www.iea.org/reports/world-energy-outlook-2024, CC BY 4.0*

# Hydrogen in the steel Industry: a pathway to decarbonisation

Innovations in low-carbon steelmaking are critical for the industry's decarbonisation. ***TEI Times*** looks at how Swiss Steel Group is already decarbonising and employing hydrogen where sufficient green energy is available.

The global steel industry is responsible for approximately 7-9 per cent of human-induced greenhouse gas emissions and 11 per cent of $CO_2$ emissions, making it a major contributor to global warming.

The iron and steel industry, however, is widely regarded as one of the hardest sectors to decarbonise due to its high heat demand, reliance on carbon as a process input, low profit margins, capital-intensive nature, long plant lifespans, and global trade challenges.

Producing the large amounts of heat required for many steel processes without emitting $CO_2$ remains a major hurdle, as coal is typically used both as a heat source and within the production process itself. Furthermore, the decades-long operational lifespan of steel plants, the absence of clear financial incentives for decarbonisation, and price volatility create significant barriers to adopting carbon-reducing technologies.

In 2011, the Council of the European Union outlined a roadmap to achieve a competitive low-carbon economy in Europe by 2050. The roadmap mandates the European industry to reduce its $CO_2$ emissions by 80-95 per cent compared to 1990 levels by mid-century. In line with the Paris Climate Agreement, the steel industry is actively working to reduce $CO_2$ emissions by developing alternative process technologies.

A key focus is replacing carbon as a reducing agent and energy source with hydrogen derived from renewable electricity (green hydrogen). However, the availability of the vast amounts of hydrogen required is not yet sufficient and is unlikely to be in the short-term. Nevertheless, green hydrogen represents a promising energy carrier for decarbonisation, contributing to a diversified and sustainable energy supply critical not only from an ecological but also from an energy security perspective.

Innovations in low-carbon steelmaking are critical for the industry's decarbonisation. Among the most promising advancements is hydrogen-based direct reduction, where iron ore is reduced to iron using hydrogen gas ($H_2$). Unlike traditional methods, this approach releases only water vapour instead of $CO_2$.

Hydrogen can be extracted from hydrogen-bearing fuels, such as natural gas and biogas, and from water using electrolysis. The primary source of hydrogen production is currently natural gas, accounting for around three quarters of the annual global dedicated hydrogen production of around 70 million tonnes. According to the World Steel Association this accounts for about 6 per cent of global natural gas use. The International Energy Association (IEA) notes that hydrogen production reached 97 Mt in 2023, of which less than 1 per cent (less than 1 Mtpa) was low-emissions. Low emissions hydrogen relies mostly on production from fossil fuels with carbon capture. Hydrogen from electrolysis makes up a very small share of this total remaining below 100 kt in 2023.

This is set to grow going forward but numbers remain relatively small. According to the IEA's 'Global Hydrogen Review (GHR) 2024' annual production of low-emissions hydrogen could reach 49 Mtpa by 2030, an increase of more than a quarter on the 38 Mtpa by 2030 reported in its 2023 publication. If projects at the very early stages of development (such as those where only a co-operation agreement among stakeholders has been announced) are excluded, annual production of low-emissions hydrogen could exceed 26 Mtpa by 2030. More than 45 per cent of the projects in terms of potential production volume are undergoing feasibility studies, and a similar share (38 per cent) are at early stages. Committed projects – i.e. those that have taken FID or are under construction – account for only 7 per cent (3.4 Mtpa) of the new low-emissions hydrogen production announced by 2030, of which 55 per cent is from electrolysis and almost 45 per cent from fossil fuels with CCUS projects. Nevertheless, this is a notable increase from the 4 per cent (1.7 Mtpa) reported in the GHR 2023.

The review notes that approximately two-thirds of low-emissions hydrogen production in 2030 could come from electrolysis, and this could rise to almost 75 per cent if projects at the early stage of development are also included.

The Swiss Steel Group is already employing hydrogen where sufficient green energy is available. However, downstream processes such as hot forming and heat treatment in steel production still rely heavily on natural gas, leading to significant $CO_2$ emissions.

To remain globally competitive and meet climate targets, substantial investments are required in the electric arc furnace (EAF) route. $CO_2$ reductions are not only mandated by legislation but increasingly demanded by end consumers.

The scale of this transformation is immense. Europe's largest steelworks currently consumes 4.3 TWh of electricity annually. Transitioning from coal based production to hydrogen-based methods will require approximately 46 TWh – 4.5 times the electricity consumption of Hamburg. Only 8.5 TWh of this will power the plant directly, with the remaining 37 TWh needed for hydrogen production.

Through its EAF-based steelmaking process, the Swiss Steel Group is at the forefront of sustainable steel production. By leveraging green electricity from renewable sources such as hydro, wind, and solar power, the company significantly reduces its carbon footprint.

"Hydrogen represents a transformative opportunity for the steel industry to decarbonise at scale," said Frank Koch, CEO of the Swiss Steel Group. "By embracing innovative technologies and investing in green hydrogen, we are shaping a more sustainable future for our industry and the planet."

## Steel production today

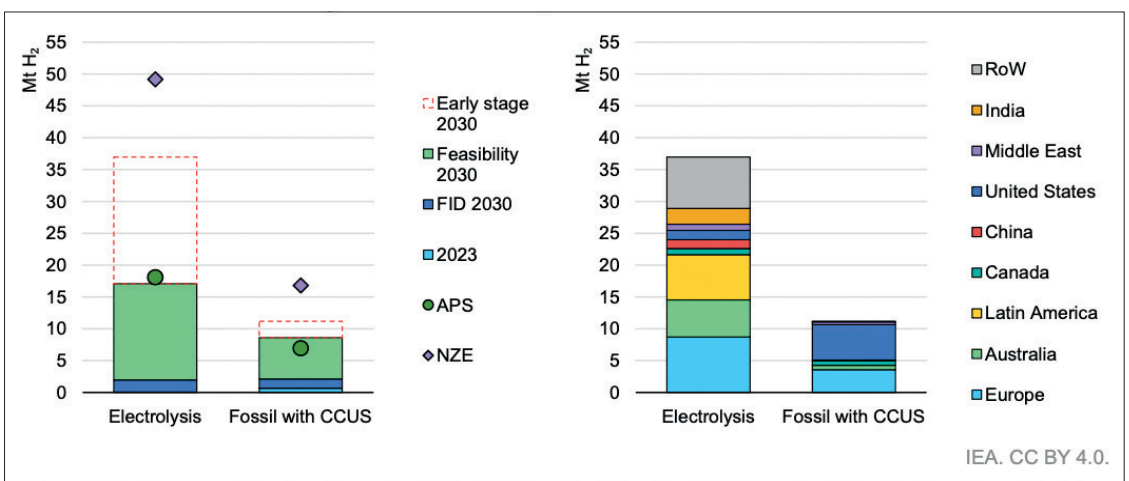
Steel production is defined by two main routes: the iron ore-based route and the scrap-based route.

1. Iron ore-based blast furnace route: Iron ore is combined with additives, coke, and reducing agents such as coal, oil, or gas to produce liquid pig iron, which is then converted into crude steel in basic oxygen converters. This method results in approximately 55 million tonnes of $CO_2$ emissions annually in Germany alone, accounting for around 28 per cent of the nation's total industrial emissions. A significant portion of these emissions arises from the process-related combustion of coal and coke.

2. Direct Reduction: Direct reduction plants eliminate the need for coking coal. Current facilities primarily use natural gas, halving $CO_2$ emissions compared to traditional blast furnaces. Future plans involve increasing the share of hydrogen as a reducing agent, which would further decrease $CO_2$ emissions and increase water vapour output. The sponge iron (Direct Reduced Iron – DRI, or Hot Briquetted Iron – HBI) produced in DRI plants is processed into crude steel in electric arc furnaces (EAF).

3. Scrap-based secondary steelmaking: EAFs recycle carefully pre-sorted steel scrap without the need for iron ore. This secondary production method is significantly more energy-efficient and emits much less $CO_2$ compared to primary blast furnace production. Recycling steel scrap can save approximately 1.67 tonnes of $CO_2$ per tonne of steel produced while conserving natural resources.

**Low-emissions hydrogen production by technology, status and region based on announced projects and in the Announced Pledges and Net Zero Emissions by 2050 Scenarios, 2030.** *Source: IEA, Global Hydrogen Review 2024*




Notes: APS = Announced Pledges Scenario: NZE = Net Zero Emissions by 2050 Scenario; FID = final investment decision; RoW = rest of world. The '2023' label refers to operational projects, and the label FID 2030 includes projects that are under construction and projects that have reached FID. "Feasibility" includes projects undergoing a feasibility study; "Early stage" includes projects at early stages of development, such as those in which only a co-operation agreement among stakeholders has been announced. The right-hand side figure includes operational projects and projects that have taken FID, at advanced planning and at early stages.

Source: IEA Hydrogen Production Projects Database (October 2024).

# A new nuclear wave: small is beautiful

Small modular reactors (SMRs) are gaining global momentum thanks to their flexibility, enhanced safety, and ease of installation. Currently, there is a significant wave of projects under design or construction, as the technology gears up to play a crucial role in decarbonisation – particularly in powering data centres and the maritime industry. **Joseph Jacobelli** explores.

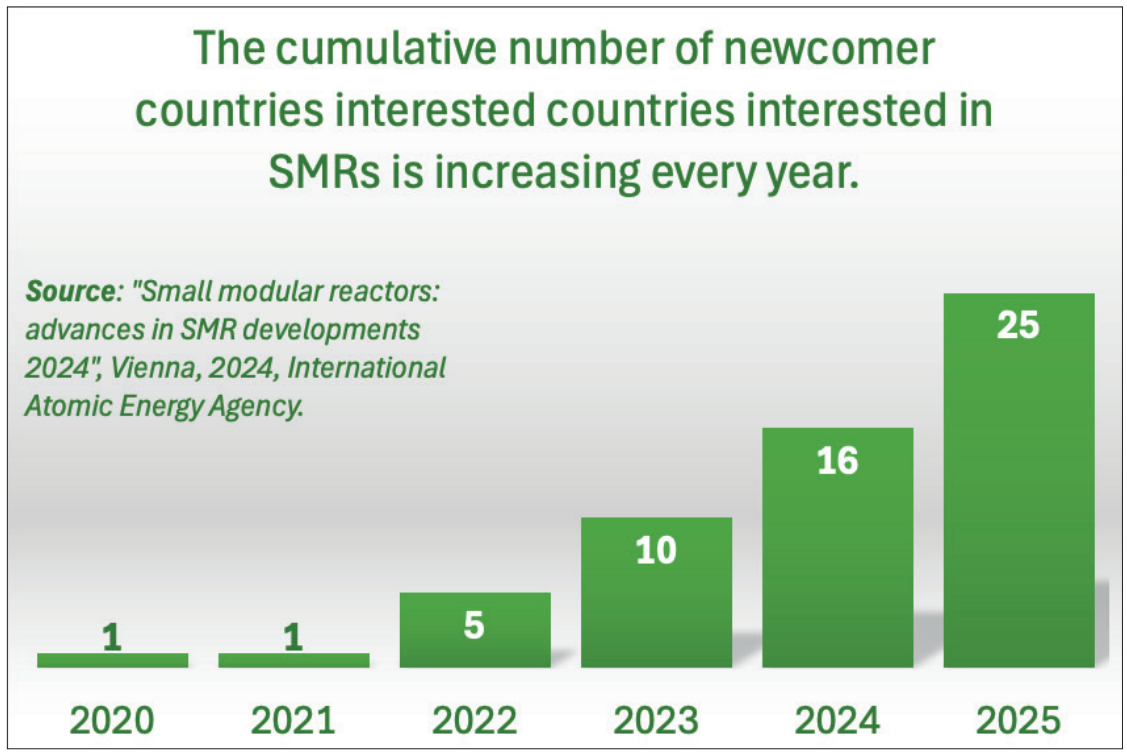
What are Small modular reactors (SMRs)? In nuclear power, reactors are broadly classified by capacity: 700 MW or more for large conventional reactors, up to 300 MW for SMRs, and up to 10 MW for modular micro reactors (MMRs), according to the International Atomic Energy Agency (IAEA). Advantages of SMRs over larger plants include that they can be assembled in a factory, the installation is simpler, they have increased safety features, their fuel requirements are reduced and their deployment is more flexible, including off-grid and remote areas, highlights the IAEA. The agency notes that the global decarbonisation momentum positions SMRs uniquely due to their smaller size and lower upfront costs.

Widespread innovation across numerous countries has led to nearly 70 SMR designs at various stages of development and deployment. These SMRs range in several key technological buckets, including land-based water-cooled (14), marine-based water-cooled (6), gas-cooled (14), MMRs (13), molten salt (11), and liquid-metal fast-neutron (10) . These technologies are detailed in the IAEA's report: 'Small modular reactors: advances in SMR developments 2024'.

Recent years have seen a global surge in interest and development of SMRs, as highlighted by the IAEA report. In Canada, construction of the GE Hitachi BWRX-300 reactor is scheduled to start in 2025, with grid connection anticipated by late 2028, marking North America's first commercial SMR project. France is pushing SMR advancements through its France Relance 2030 funds, backing projects such as EDF-NUWARD and nine other designs. Japan is discussing six SMR designs and intends to use its operational High Temperature Engineering Test Reactor for hydrogen production. South Korea has approved the SMART technology and is developing the innovative i-SMR, with a new partnership with Canada for potential deployment. In the UK, Rolls-Royce is working on a 470 MW Pressurized Water Reactor. The US has multiple SMR designs underway, including those by NuScale, Westinghouse, and Holtec, alongside microreactors and Generation IV technologies that emphasise sustainability, economic viability, safety, and reliability.

Additionally, several countries are exploring marine-based SMRs for floating nuclear power plants, with notable projects from Seaborg Technologies (Denmark), KEPCO (South Korea), Russia, and China.

**Jacobelli: While the investment momentum in SMR technologies is undeniable, several significant challenges remain**




Numerous recent developments underscore this momentum. France's EDF announced a cooperation agreement with Italy's ENEA. In the US, Constellation Energy is seeking federal funding for SMRs at its Nine Mile Point plant, and NANO Nuclear Inc recently acquired Ultra Safe Nuclear Corp's MMR technology. The UK is also considering the BWRX-300 SMR from GE-Hitachi Nuclear Energy , which has completed the first phase of the UK design assessment process and advanced to the next phase.

Two notable applications are driving the recent surge in SMR development: data centres and artificial intelligence (AI), and maritime shipping.

The world is experiencing a significant surge in data centre investments, driven by digitalisation and AI. Data centres impact electricity systems in two main ways: they require substantial generation capacity and strain grid networks. The sharp rise in demand from data centre investments must be met with additional generation, predominantly from clean energy sources. In the US, data centre power demand rose from 58 TWh in 2014 to 176 TWh in 2023 and could reach 580 TWh by 2028, a 229.6 per cent increase, according to the Lawrence Berkeley National Laboratory. Data centres are often built away from major load centres, putting pressure on grids, typically due to land price considerations. SMRs are an ideal solution for powering data centres, which typically require 10 to 100 MW, according to the International Energy Agency.

Several projects are underway to harness SMRs for powering data centres. In the US, Energy Northwest is exploring an SMR project with Amazon and X-energy, aiming to build four advanced SMRs generating around 320 MW, with the potential to expand to 12 reactors. Additionally, Google said in late 2024 a deal to procure up to 500 MW from SMRs, to be deployed by Kairos Power between 2030 and 2035.

In the UK, Prime Minister Keir Starmer announced the establishment of 'AI Growth Zones' to support AI data centres, beginning in Culham, Oxfordshire. These zones will collaborate with the private sector to explore renewable energy solutions, including SMRs, to sustainably power AI development.

The global marine shipping sector is highly carbon-intensive and accounts for about 3 per cent of global $CO_2$ emissions, making it particularly challenging to decarbonise. Numerous solutions are being explored by hundreds of companies and stakeholders, including renewable energy, hybrid systems, fuel cells, larger batteries, ammonia, biogas, biofuels, green hydrogen, green methanol, and SMRs.

The concept of nuclear propulsion is not new; it is widely used by the navies of various countries. A report by Lloyd's Register suggests that SMRs could revolutionise the maritime industry by providing safer, more reliable, and emissions-free shipping solutions. However, the report acknowledges that widespread adoption faces hurdles such as regulatory uncertainty and the need for strong social acceptance. International standards and goal-based regulations are currently being developed to facilitate broader implementation. One notable example is Norway's programme to utilise Generation IV SMRs.

The Norwegian NuProShip project, spearheaded by shipbuilder VARD and backed by various maritime organisations, has concluded its first phase of assessing nuclear power for commercial shipping, evaluating 99 different reactor technologies. Following this initial review, three promising SMR designs have been chosen for further development in the second phase. These include Kairos Power's (US) fluoride high-temperature molten salt reactor using tri-structural isotropic (TRISO) fuel particles, Ultra Safe Nuclear Corp's (US) helium-cooled gas reactor also employing TRISO fuel particles, and Blykalla's (Sweden) lead-cooled reactor concept utilising uranium oxide as fuel. The initiative aims to create a commercially viable, zero-emission technology for deep-sea ships that meets the needs of all stakeholders and requires no subsidies post-development.

While the investment momentum in SMR technologies is undeniable, several significant challenges remain. Achieving a competitive cost per MWh is crucial for economic viability. Regulatory barriers pose another major obstacle, as existing nuclear rules often cater to larger, traditional reactors, necessitating substantial adjustments for SMRs. Public resistance, driven by safety concerns, waste disposal issues, and fears of accidents, can also impede project progress. Environmental considerations extend beyond safe waste disposal to include potential impacts on local ecosystems during construction and operation. Additionally, technological hurdles such as ensuring reliability, efficiency, and cost-effective production must be overcome.

However, as the industry grows and matures, and proven technologies are deployed, the prospects for SMRs appear promising.

*Joseph Jacobelli, head of single-family office Bougie Impact Capital Ltd., has over 30 years' experience in energy markets. He promotes climate finance awareness through his 'Asia Climate Finance Podcast' and publications, including his forthcoming book, 'Empowering Clean Energy's Succession'. This commentary draws from that book.*

# Estonia advances grid digitalisation

Following a successful pilot project, Elektrilevi, Estonia's main network operator, is now rolling out a Distributed Energy Resource Management System to manage the growing amount of wind, solar and distributed energy resources on its network.

**Junior Isles** reports.

Climate change leaders have stressed the world must triple renewable power generation capacity by 2030 if the world is to have any chance of limiting global carbon emissions to the levels needed to meet climate change targets under the Paris Agreement. But while progress in deploying renewables, especially wind and solar, has been staggering in recent years, power grids around the world present a serious stumbling block. Not only is significant additional transmission capacity needed, but there is also a need for extensive grid modernisation at the distribution level, as the electricity generation landscape transforms.

The growing amount of wind and solar, an increasing amount of distributed energy resources (DERs) such as electric vehicles, and the need to transmit power to and from consumers, all mean grids are becoming more complex and difficult to manage. It's a huge challenge. With approximately 40 per cent of the grid being over 40 years old, innovation is necessary to ensure that energy systems can integrate new technologies and meet future demands effectively.

Philippe Arsonneau, Infrastructure Segment President at Schneider Electric, noted: "The grid was built 100 years ago. It was designed to send power in one direction and was very siloed. Now we have a grid that is bidirectional with a lot of incoming data – whether it is data coming from charging cars or data centres. So, in addition to the challenges of managing intermittent renewable energy resources, grid operators are also having to become data operators as well as grid operators. While having to operate a grid that must be flexible and reliable, they also need to be able to manage data in a more defined and succinct manner so they can use that data."

He added: "Transitioning to digitally equipped grids is therefore crucial to facilitate the integration of renewable energy sources while managing emerging energy demands with greater efficiency and reliability."

In response to grid operators' challenge, Schneider Electric showcased several products and solutions at the Enlit conference and exhibition in October last year – one of which is the advanced deployment of its Distributed Energy Resource Management System (DERMS). Utilities around the world, including PG&E and Elektrilevi, are working with Schneider Electric, deploying its EcoStruxure DERMS to help manage the increasing complexity of grid constraints driven by the rapid growth of distributed renewable assets.

Notably, Elektrilevi has started with a proof-of-concept project and validated its own acceptance criteria. The company is now in the process of rolling out a full project using Schneider Electric's Stepwise approach.

As Estonia's largest network operator, Elektrilevi is responsible for 95 per cent of the country's grid, bringing electricity to 533 000 electricity network services customers. To ensure electricity supply, the company must maintain and upgrade 63 000 km of power lines and 25 300 substations throughout the country.

The current legislation requires that the network operator develops the distribution network in its service area in a way that ensures the possibility to provide consistent network services to market participants connected to the network, according to the legislation and requirements of the licence, taking into account the reasonable needs of those participants. For the distribution network to develop in the right direction and at the right speed, feedback from market participants is essential.

Following this input, Elektrilevi has drawn up a distribution network development plan until 2035, which provides an overview of both the current network service and development perspectives, together with prerequisites for their realisation.

The amount of DERs on the company's network has grown dramatically over the last five years. DER capacity has increased 20-fold in the past five years, much faster than forecasted. This is largely due to a solar boom that has seen solar generation reaching 800 MW during the summer months. The expansion of DERs has created a large gap between generation and consumption in summer days (the duck-curve effect) therefore creating a need to increase monitoring and control over these new connections.

The challenge, however, is that most of those connections are non-controllable and not monitored (3:1). Connections under 500 kW are non-controllable and not monitored, whereas connections over 500 kW are controllable and monitored through SCADA (Supervisory Control and Data Acquisition) systems. Non-controllable (less than 500 kW) installed power increased from 200 MW in 2020 to around 600 MW in 2023. Meanwhile, controllable producers (greater than 500 kW) grew from 60 MW to 200 MW in the same timeframe.

Having entered into an agreement with a virtual power plant (VPP) company to expand its flexibility procurement options, Elektrilevi then needed a system in the control centre to standardise DER control and merge it into day-to-day operations using an Advanced Distribution Management System (ADMS).

It kicked off a pilot project with Schneider Electric between 2022 and 2023 in two regional substations. After testing all features in the pilot project substations, Elektrilevi signed a contract with Schneider Electric for a full rollout of DERMS and also expand the network size to the LV network.

The full rollout phase began last year and will continue with the full rollout this year. The plan is to expand the system to one regional substation at a time to ultimately cover 95 per cent of the Estonian grid.

Schneider Electric's involvement in the project began in 2019 when Elektrilevi initially defined the project as a Distributed Storage Resource (DSR) – later renamed Dynamic Connection Management (DCM). Following a market study, Schneider Electric was chosen as the solution provider that best aligned with Elektrilevi's needs.

The project started with Schneider Electric leading the first design sessions, which included defining three key use cases. Simultaneously, it developed a whitepaper outlining the requirements for integrating the project with a third-party market.

The project was implemented in 2022, starting with a training phase. After the training, Elektrilevi was given nine months to trial the software and test all its features.

The pilot project was completed in November 2023, during which additional use cases were identified. These findings expanded the project's scope, paving the way for the larger-scale rollout of the full DERMS system.

The project has several main goals. One is to control the majority of the low-voltage (LV) capacity that is currently not monitored by the system. This involves investigating the most cost-efficient method to integrate rooftop solar installations into the ADMS using a VPP platform, which connects directly to inverters via Modbus. Another aim is to harmonise the control of installations more than 500 kW in a much more standardised way.

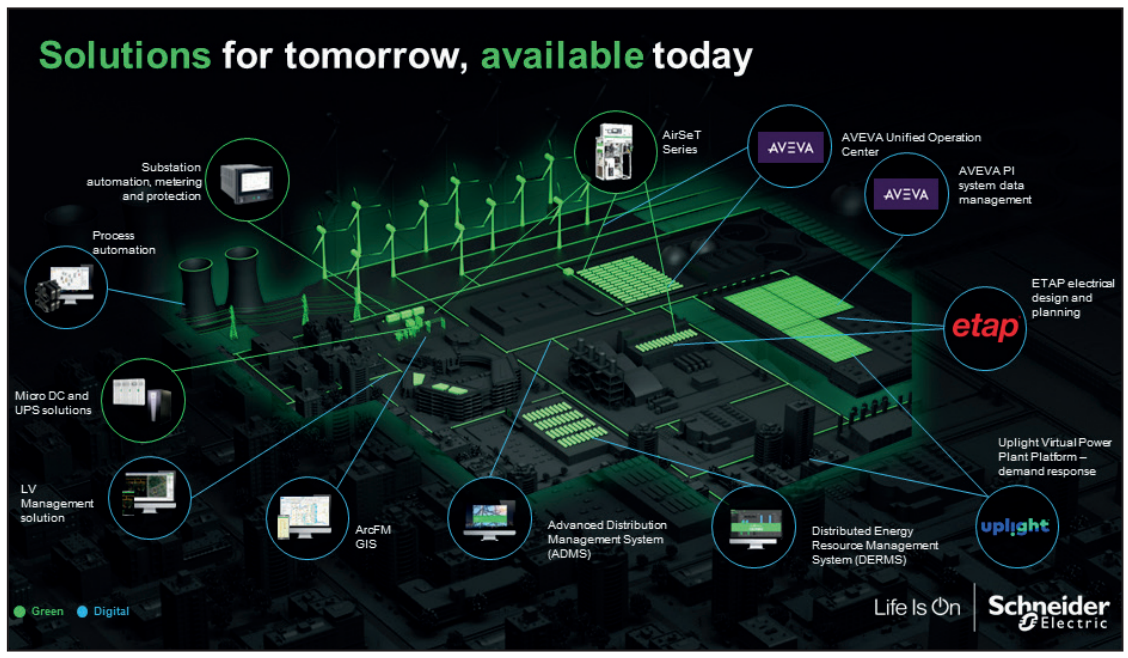
To achieve this Schneider Electric has installed its EcoStruxure DERMS license, along with full implementation. It notes that DERMS projects require in-depth technical analysis of specific use cases to manage the boom of distributed generation.

"The first step is to detect the critical problems and map the current processes that need adjustment to adapt to network changes," explained Arsonneau. "Elektrilevi focused on three critical scenarios: emergency situations, planned maintenance, and structural constraint management.

"To ensure success, Elektrilevi adopted a process-driven approach, defining acceptance criteria for the Proof-of-Concept (POC) and the future DERMS features for each of the defined use cases. A key success factor was implementing a POC project to validate that requirements were met while also training key employees on using DERMS software modules."

He added that this "hands-on experience" ensured that control room operators could continue performing their tasks with familiar processes, but now supported by more efficient tools.

Arsonneau concluded: "We're really proud that Elektrilevi described Schneider DERMS as a 'well-functioning, out-of-the-box software' and is using the results to showcase how DERMS can support regulators in developing new, flexible contract regulations and legislation to accommodate the evolving energy landscape."




**Arsonneau: Now we have a grid that is bi-directional with a lot of incoming data**

Junior Isles

# Dreaming of liquid gold

Love him or loathe him, US President Donald Trump, unlike many political leaders, is proving true to his manifesto. He has wasted no time in acting on his campaign promises, regardless of how shortsighted those actions may seem. Following through on his presidential campaign to stop offshore wind farms from being built in the US and to withdraw from the Paris Climate Agreement "on day one", Trump has left no doubt that it is America first, climate second.

While the global green energy transition will continue apace, there is no doubt that US energy policy under the Trump Administration will be a significant drag on progress in slowing the global temperature rise.

Rachel Cleetus, Policy Director at the Union of Concerned Scientists, said the US withdrawal was "a travesty" and "in clear defiance of scientific realities".

Meanwhile, André Corrêa do Lago, the Brazilian diplomat and climate negotiator, told the *Financial Times* that the US withdrawal from the Paris climate accord for a second time under President Donald Trump will have a "huge impact" on efforts to curb global warming.

Corrêa do Lago , who is the incoming head of the UN COP30 climate summit due to be held in Belém, Brazil, said the US U-turn "is going to make it much more difficult" to limit global warming and would "have an immense impact on efforts to keep temperature rises below 1.5°C".

Although he added that developing nations could step-up to fill the gap, others are not convinced.

Lord Adair Turner told the Institute of Environmental Management and Assessment's (IEMA) podcast 'Sustainable Matters': "Let me be absolutely clear, the moment Trump was elected – and even more so what he's now said – whatever was my estimate of what's the best we could limit global warming to by the end of this century… Maybe before he was elected, I thought with a lot of good policy, we might limit it to 1.6 degrees or 1.7. [Now] I've added .2 or .3 to my estimate of what we can do, simply because Donald Trump has been elected."

Regardless, Trump remains at best skeptical of the climate change argument or at worst, does not really care. The new US President announced a "national energy emergency" to reverse many of the Biden-era environmental regulations, and a commitment to "drill, baby, drill" in his inaugural address, signalling a move to a renewed interest in oil and gas exploration in the US.

"We will be a rich nation again, and it is that liquid gold under our feet that will help to do it," Trump told the audience.

But what happens when that "liquid gold" becomes a weakened and ultimately obsolete currency? While there will no doubt be a continued need for oil for some time to come, all evidence points towards a diminishing role for oil in the energy sector.

In its latest World Energy Outlook the International Energy Agency's detailed analysis of market balances and supply chains brings an overhang of oil and LNG supply into view during the second half of the 2020s, alongside a large surplus of manufacturing capacity for some key clean energy technologies, notably for solar PV and batteries. This implies downward pressure on prices and a period of increased competition among suppliers – hardly a scenario on which to bet a country's future economic prosperity.

At the same time the rapid rise in clean energy deployment has seen the cost of wind and solar continue to fall, while offering countries, especially in the EU, energy security and protection against volatile fossil fuel prices.

The Middle East has certainly seen the writing on the wall and is modifying its canvas to suit the new energy landscape.

Last month, UAE state-owned renewable energy firm Masdar revealed plans to build a $6 billion, 5 GW solar plant backed by more than 19 GWh of battery storage. It is the largest such storage project ever announced.

Speaking at the opening of Abu Dhabi Sustainability Week, Chairman Sultan Al Jaber, who also serves as Chief Executive of energy giant Abu Dhabi National Oil Co (ADNOC) and is the UAE Minister of Industry and Advanced Technology, said: "This will, for the first time ever, transform renewable energy into baseload energy. It is a first step that could become a giant leap," Al Jaber said.

"How can we power a world that never sleeps with energy sources that do? How can we transform renewable resources into reliable power? Today... we have an answer," Al Jaber said before announcing the project.

According to the International Renewable Energy Agency (Irena), the Middle East has less than 1 per cent of the world's renewable capacity. But from a low base, it is also the fastest-growing region outside China, in terms of adding capacity.

"The perfect recipe [for renewable energy] exists here," said Mazin Khan, Masdar's Chief Financial Officer, adding that the cost of the new solar and battery plant would be, for the first time, "comparable, if not cheaper, than conventional gas".

"We have abundant solar resources. We have relationships with manufacturers that we can leverage to get the best price possible. The regulatory market here in the UAE is very competitive and we have a line of commercial banks queueing up to be part of the project."

So what do the Middle East and the rest of the world see, that President Trump does not?

While the UAE seeks to "power a world that never sleeps" using intermittent but clean energy sources, Trump appears to be asleep to the future reality.

Although investing in fossil fuels is detrimental to climate change, it is arguable that for regions like the Middle East and big oil and gas producers, it makes economic sense in terms of production for export. However, Trump's war on wind turbines, while favouring a return to domestic fossil fired generation, makes no sense environmentally nor economically.

There is also the very real prospect that Trump's stance will see the US losing ground in the global clean tech space. As the UAE was revealing its new solar project, Saudi Aramco, the world's largest oil company, announced a joint venture that would start producing lithium, a key ingredient for batteries, as early as 2027. Clearly it sees the opportunity that renewables present.

While Trump continues to focus on threatening China with higher import tariffs on goods such as solar panels, his stance on renewables will only serve to strengthen China's leadership in clean tech.

Some experts have said Trump's moves to reverse Biden's "green" policies would give an advantage to China, which is the world's largest manufacturer of electric vehicles, solar panels and batteries.

"China will be happy to wave in the rear-view mirror of one of its world-leading EVs, as US manufacturers hobble on," said Tim Sahay, Co-Director of the net zero industrial policy lab of Johns Hopkins University.

If Trump cares for little else, he is excited by investment opportunities and being seen as global leader. Simon Stiell, Head of the UN climate change arm, which oversees the Paris agreement, noted that global clean energy investment last year stood at $2 trillion – a big enough pie to attract even the staunchest of green energy critics.

And the thought of the US losing out to China may rankle Trump even more. He called the launch of the Chinese artificial intelligence platform DeepSeek, a "wake-up call" for US tech firms. "The release of DeepSeek, AI from a Chinese company, should be a wake-up call for our industries that we need to be laser-focused on competing to win," he warned.

After dubbing previous adversary Joe Biden as "Sleepy Joe," President Trump might do well to issue a wake-up call to himself when it comes to renewable energy and rouse himself from dreams of liquid gold.


*Cartoon by Jem Soar*