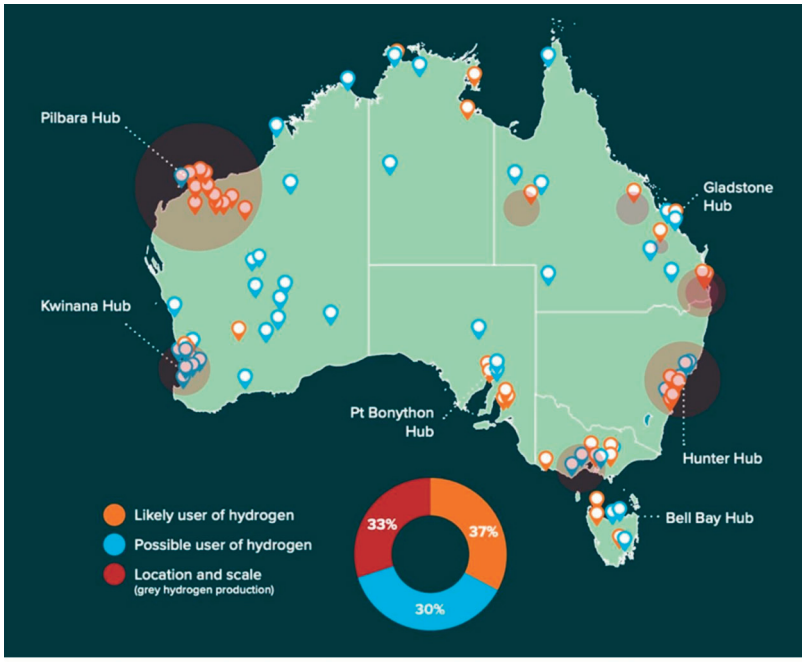
Gas to Power Journal
Peakload Power and Energy Storage

Focus on grid build-out, batteries and balancing energy

Weekly News 21 February 2025

Australia incentivises green H2 and critical minerals

Following months of bickering, tax credits for renewable hydrogen production and critical minerals processing have passed the Australian Parliament. A dedicated 'H2 Production Tax Incentive', valid from the start of July 2027 through June 2040, will offer eligible firms a refundable tax offset of A$2 per kilogram of renewable hydrogen.



Source: Australia Department of Climate Change, Energy, the Environment and Water

Qualifying projects can benefit from this scheme for up to 10 years, provided they take FID by 2030. A carrot for attracting private investors; though it is worth noting that unlike grants or loans, which tend to be paid upfront, tax credits are only refundable after the actual project is implemented.

Adopting H2 as transport fuel

According to the Australian taxation office, the measure is expected to lower production costs, make renewable hydrogen more competitive and foster its adoption and use not only for generating electricity but also for transport and manufacturing.

The initial 2019 Hydrogen Strategy already made substantial investments forthcoming: Over $321 million has been poured into five different hydrogen hubs and an additional $1.3 billion into a competitive hydrogen production program, named 'Hydrogen Headstart'. Thanks to abundant solar and wind resources, a report by 'Renewables Now' expects Australia to have some of the lowest levelized costs for producing green hydrogen by 2050.

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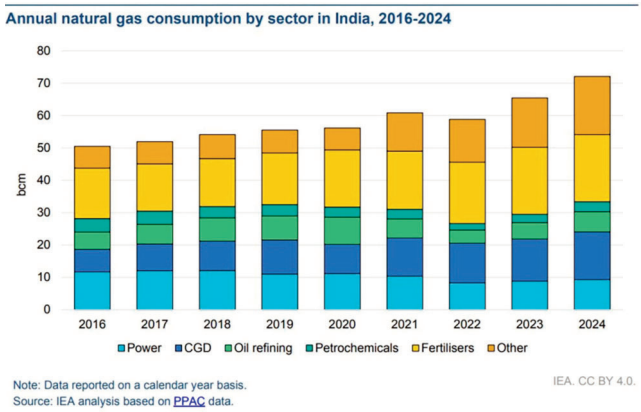
India: Supportive policies boost gas-burn, accelerate LNG imports

Greater utilisation of India's fleet of gas-fired power plants could accelerate LNG imports to bridge the gap left by marginal domestic gas production increases, the International Energy Agency (IEA) finds. Supportive policies by the Indian government could tilt the national power gen mix more towards cleaner-burning natural gas and hydrogen in the coming years.



Note: Data reported on a calendar year basis.
Source: IEA analysis based on PPAC data.

Robust growth in city gas distribution, industrial demand and power generation is set to boost India's overall gas consumption by nearly 60% by 2030 – adding further bullish momentum to a growing market. Since 2000, India's natural gas consumption more than doubled, exceeding 65 bcm/year by 2023. Should gas consumption grow by nearly two-thirds and reach 103 bcm/y by the end of 2030, it would bring India roughly on par with the current gas consumption of Saudi Arabia.

Though the city gas distribution sector is expected to lead this growth, IEA analysts anticipate gas-burn in the power sector will reach nearly 15 bcm/y by 2030. Rapid expansion of gas use as

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AGENDA

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Lowering dependency on China

As for critical minerals, the legislation introduces a 10% refundable tax offset on processing and refining expenditures for 31 designated critical minerals that are vital for advanced technologies. This incentive is available from the start of July 2027 through to the end of June 2040. By producing and processing critical minerals at home, Australia seeks to become a key exporter of materials essential for electric vehicles and wind turbines – and reduce reliance on supply chains dominated by China.

Both the hydrogen and critical minerals tax incentives are fundamental to Australia's strategy to reach net-zero emissions by 2050. Madeleine King, Australia's minister for resources pointed out in Parliament these measures would not only promote job creation but also diversify global supply chains and help reduce dependency on critical mineral imports from China. ■

Queue for battery connection double UK grid's requirement for 2030

The queue for battery energy storage seeking grid connections in the UK by 2030 has soared to more than double the grid's required capacity, while the queue for 2035 quadruples target capacity. Ofgem's latest decision on reforms by the National Energy System Operator (NESO) promises some respite through a more streamlined, fast-track approach to grid connections.

As more intermittent renewable energy sources join the grid, batteries are vital to stabilise the grid. But viable battery storage projects are stuck in limbo, and speculative projects clog up the queue – investors are holding off.

"Ofgem's minded-to decision on approving NESO's connection reform plan gives clarity on the process used to determine which projects move forward and which do not. However, (…) it could well be that more than 100 GW of BESS that wants to connect to the network will not get the option to until at least 2035 or even much later," said, Cornwall Insight analyst, James Lomax.

Given the sheer number of battery projects awaiting connection, many projects may still face delays – regardless of the streamlined process – with connections unlikely before 2035 or beyond.

"If an asset can't connect to the grid, it simply can't contribute. While NESO and Ofgem have set out some clarity on which projects will be protected and given a place in the connection queue, the challenge will now be building the infrastructure to allow them to connect," Lomax said, warning: "In order to meet the Clean Power 2030 capacity targets, we would need to connect assets to the network on average 2.5x quicker than we have over the past five years."

Target capacity ranges for specific technologies have been set out by the Government's Clean Power 2030 Action Plan: In Phase 1, stretching to 2030, the required BESS capacity will be 27 GW split across grid and transmission levels. Phase 2 provides a 10-year view out to 2035, with an upper capacity of 29 GW, though the uplift targets exclusively the electricity distribution level. Further out, the connections queue for BESS in the years to 2030 is 61 GW – more than double the respective target capacity range, while the queue out to 2035 is 129 GW – more than quadruple what has been intended by then.

Irrespective of connection date, altogether, there is 221 GW of BESS capacity in the full connections queue. Targets capacity beyond 2035 will be set out later next year, though analysts doubt that much more additional capacity will be allowed for inclusion be 2050 – the latest Future Energy Scenarios 2024 Report currently sets the BESS capacity by 2050 at 29-36 GW, depending on the pathway. ■

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a fuel in captive power stations is driving growth, as is "a recovery in large gas-fired power plants" thanks to competitive fuel prices.

Targeted policy intervention could push up India's natural gas consumption beyond the forecasted trajectory to around 120 bcm/y by 2030, IEA analysts find. This level would be close to the current gas consumption of the entire continent of South America.

Further growth in this accelerated demand trajectory could come from higher utilisation of India's stranded gas-fired power plants, faster adoption of LNG as a fuel for heavy-duty transport, combined with the replacement of liquid petroleum gas (LPG) through less carbon-intensive LNG. In total, this accelerated uptake of natural gas across the residential, commercial, transport and electricity sectors could add another 15 bcm/y of gas demand by 2030.

Supportive policies, so far, focus on expanding the natural gas infrastructure. Market reforms, meanwhile, have taken cautious steps towards greater gas market competition and market-based pricing, trying to strike a balance between incentivising greater domestic production and ensuring affordable gas supply to India's price-sensitive consumers.

Electric utilities in India keep relying heavily on coal due to its lower cost and established supply chains. Their behaviour is cemented "uneven and generally higher taxation on natural gas relative to competing fuels," IEA analysts criticised. ■

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US tariff on Canadian gas may force producers to lower prices

US President Trump's action to levy a 10% tariff on Canadian gas drives up prices and could force Canadian producers to lower prices in an effort to stay competitive, analysts warn. If tariffs rise, smaller producers get hurt which could lead to production cuts and delay investment.

Trump trade and sanctions policies have the potential to deeply impact gas and LNG markets, analysts at Rystad Energy warn:

"His opening salvo in a US-China trade war has been fired, with 10% tariffs on Chinese goods and retaliatory 15% tariffs on US LNG, while his stance on Russia remains unclear."

Analysts anticipate Trump to "stay put on Russian LNG sanctions" while China's imports could reach a record high of over 80 million tons of LNG.

Chinese LNG imports on track for another record-high

China's LNG imports rose more than 20% year-on-year during the first four months of 2024 on the back of low spot prices while a sluggish demand recovery, substantial inventories and rising spot prices slowed subsequent growth.

2025 started under different circumstances – high spot prices and tank-top inventories – but Chinese LNG imports are still on track for another record-high – propelled up by demand recovery in the industrial sector. The government's stimulus measures are likely to support domestic demand and help the property market recover.

China's manufacturing Purchasing Managers' Index (PMI) has rebounded to the expansion territory in recent months, which could signal that the industrial sector has seen more recovery. "However, the success of domestic economic stimulus measures could be offset by a potential trade war with the new Trump administration in the US," analysts cautioned, specifying "China's manufacturing activity was hit noticeably in 2019 with the onset of the first trade war, also brought on by Trump's during his first term in the White House."

Rystad Energy's base case scenario forecasts China's LNG imports to reach more than 83 million tons in 2025 – greater than the previous record-high in 2021. ■

EU member states urged to stop importing Russian spot LNG cargoes

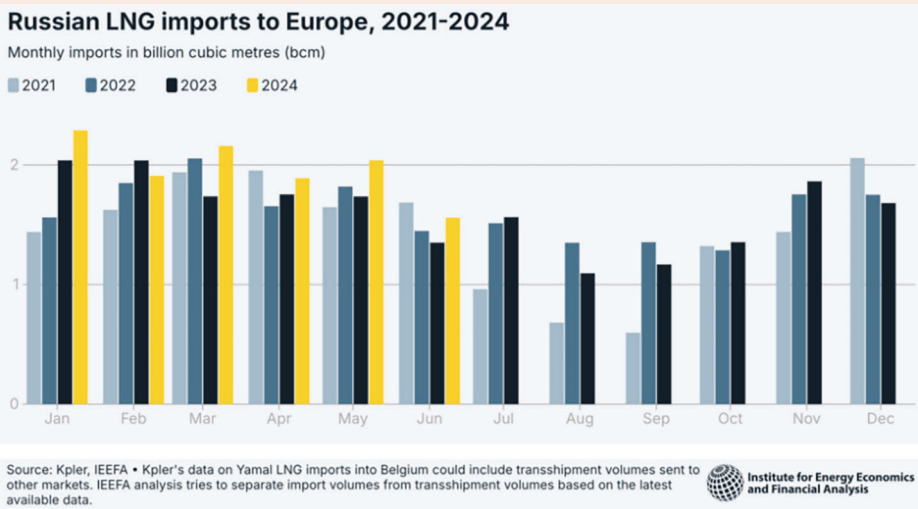
Imports of Russian LNG into the EU have soared – regardless of sanctions – with most shipments headed to France, Spain and Belgium and a third of cargoes imported as spot trades. Analysts urge EU members states to prioritise on phasing out these flows.

Contrary to the European Commission's aim of ending its reliance on Russian fossil fuels by 2027, EU countries spent €6.3 billion on Russian LNG between January and November last year. IEEFA lead analyst Ana Maria Jaller-Makarewicz has called on EU state leaders and utilities to not only scale back on pipeline gas deliveries from Gazprom but also on Russian LNG shipments.

In fact, overall LNG shipments to Europe fell by about 32 billion cubic metres in 2024 – more than twice the volume of Russian gas that transited via Ukraine last year (about 15 bcm). Considering this pipeline supply via Ukraine needs to be replaced, and that gas storage needs to be filled prior to next winter, analysts forecast European LNG demand to rise this year – though with a lower momentum than during 2022 and 2023 peak LNG consumption periods.

The IEEFA's updated European LNG tracker reveals that the continent's LNG demand dropped to its lowest level since 2021. Countries whose LNG imports fell the most were the UK, down 47% year-on-year, Belgium by 29% and Spain by 28%.

Efforts to lower Europe's gas consumption have been crucial for maintaining the continents' security of supply, Jaller-Makarewicz said. However, considering EU gas demand was flat last year, "more work is needed," in her view, "to diversify energy supplies and reduce Europe's exposure to LNG market volatility."



Risk of underutilized assets

Europe's falling LNG demand contrasts will the build-out of new import and regas infrastructure. Current plans will see Europe's LNG import capacity grow by 60% between 2021 and 2030, even though demand is forecast to fall further and IEEFA forecasts Europe's 2030 regasification capacity could just have a 30% average utilisation rate.

Half of the EU's LNG import terminals already were less than 40% utilised and analysts warn: "doubling down on new LNG terminals without taking into account demand trends raises the risk of overinvestment and infrastructure being underutilised as the energy transition accelerates." ■

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AI can optimise build-out of power grids; IEA finds

Artificial intelligence (AI) deployments revolutionises the energy sector by optimising how electricity grids are built and managed, helping to develop cheaper and more efficient batteries or catalysts for hydrogen production, the International Energy Agency (IEA) finds. At the same time, AI is energy hungry – and data centre's soaring electricity demand puts grid stability at risk.

Though today's electricity demand from data centres is small in the context of the global energy system, it has increased in recent years and is expected to keep growing. In regions where data centres are concentrated, utilities and TSO are already struggling to balance the system.

Large tech companies, on the other hand, are large and lucrative customers for utilities – and Big Data firms increasingly become significant offtakers of clean, sustainable electricity which spurs investment in small modular reactors (SMRs) and long-duration energy storage.

Data centres in 2022 collectively accounted for about 1% of global electricity demand, excluding data networks and cryptocurrency mining. In large economies – like China, the EU, the UK and the US – data centres are estimated to account for 2-4% of electricity demand.

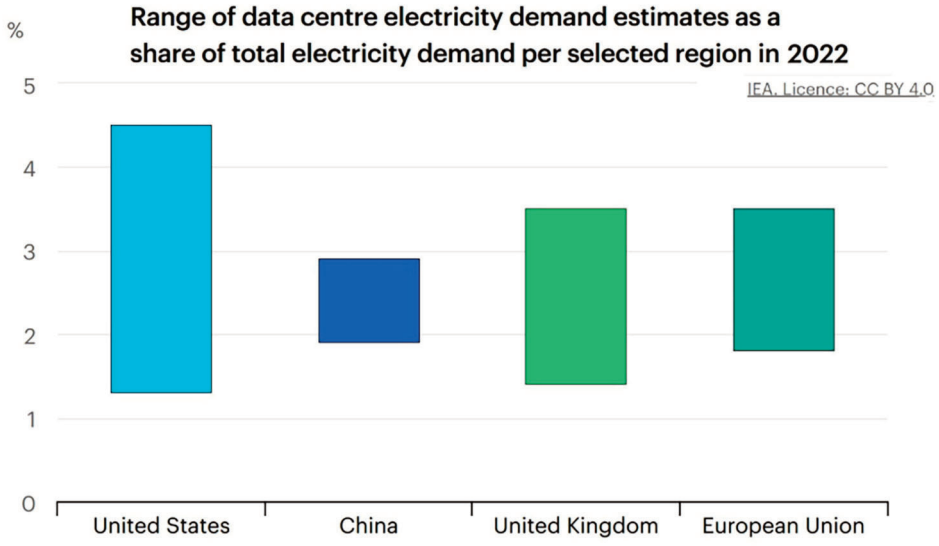
"These aggregate numbers, however, hide local challenges as data centres tend to cluster together," IEA analysts stressed. In at least five states in the United States, data centres already consume more than 10% of total electricity supply. In Ireland, the share is over 20%.

Considering the scale and speed of data centre development, there will be "considerable strain on local grids," analysts warned. Meeting this incremental demand with fossil-fuelled power generators could throw regional energy transition targets off track.

To pre-empt this concern, companies with large data centre operations have been active in procuring low-emissions sources of electricity from renewables and investing in technologies to produce nuclear and geothermal power.

To explore the opportunities and challenges ahead, the IEA has launched a major new initiative: Energy for AI, and AI for Energy. A conference in December 2024 on this topic provided a platform for dialogue among governments, the energy industry, the tech sector, researchers and civil society. ■

> "These aggregate numbers, however, hide local challenges as data centres tend to cluster together ..... [puting] considerable strain on local grids"
>
> *– IEA analysts*



BDY signed world's largest grid-scale battery projects

BDY SEC project kick-off meeting

Chinese manufacturer BYD and Saudi Electricity Company (SEC) have signed the world's largest grid-scale energy storage project contracts with a capacity of 12.5 GWh at the time. Combined with the previously delivered 2.6 GWh project, the partners now have 15.1 GWh of projects – in line with Saudi Arabia's Vision 2030 initiative.

State-owned SEC has been steadfastly committed in reshaping Saudi Arabia's energy mix by spearheading wind and solar PV built-out – driven Kingdom's ambition generating 50% of its electricity from renewables by 2030. Battery energy storage systems (BESS) are vital in storing excess wind and solar power to help balance the grid.

The BESS equipment in the projects will be installed at five sites across Saudi Arabia. To that end, BYD will supply new-generation MC Cube-T ESS that adopt its pioneering CTS (Cell-to-System) technology, with a Vcts (proportion of cell volume to system volume) index exceeding 33%.

These installations will integrate into Saudi Arabia's power transmission network, helping to balance the rising number of wind and solar power installations, ensuring stable power supply, and meeting peak energy demands.

17 years ago, Shenzhen-headquarterd BYD launched the first pilot BESS system to gauge the value of integrating lithium iron phosphate (LFP)-based battery storage in electricity network system. Today, BYD Energy Storage has delivered over 75 GWh of BESS equipment to 350 projects spanning more than 110 countries and regions worldwide. ■

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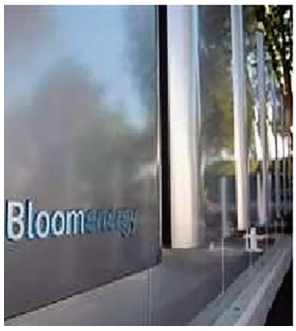
Bloom Energy and Chart strike carbon capture partnership

Bloom Energy and Chart Industries are working on a path to decarbonisation using gas-based fuel cells and carbon sequestration. KR Sridhar, Bloom Energy CEO said the aim is "to demonstrate that cost-effective, onsite baseload power from natural gas with carbon capture is feasible at scale."

The carbon utilisation market serves as a 'near-term bridge' to carbon sequestration in locations, where sequestration infrastructure is not available or permitted.

According to Morgan Stanley, more than 500 mtpa of carbon storage capacity will come online within the next five years. As sequestration capabilities grow in the United States, and globally, CO2 utilization provides a pathway to repurpose captured carbon.



The efficiency of carbon capture, however, hinges on the purity of CO_2 in the exhaust stream which varies widely across power gen technologies. Combusting natural gas – through turbines and reciprocating engines – produces exhaust streams with approximately 5% CO_2. Capturing such low-concentration emissions remains technically complex and costly.

In contrast, Bloom's high-temperature fuel cells converts natural gas without combustion, yielding a CO_2-rich stream that has 15 times lower mass flow and ten times the CO2 concentration. This makes the capture process more efficient and less costly.

"Bloom fuel cells generate electricity without combustion, producing a concentrated CO_2 stream that lowers extraction costs, making carbon capture more affordable and efficient. For energy-intensive industries like data centers and large manufacturers, this will provide a path to reliable, scalable and near zero-carbon power," Sidhar explained.

Chart is a leading carbon capture solution provider, while Bloom's platform is capable of not just producing reliable power but also a concentrated CO2 stream. "Working with a market leader in solid oxide fuel cells, we see exciting opportunities for our partnership in both sequestration and utilization markets," Chart Industries CEO Jill Evanko commented.

Future projects are already in the making, where the captured CO2 will be utilized in the food and beverage industry. ■

GE gets first LM6000VELOX package in operation at Bushy Park

Dominion Energy's Bushy Park combustion turbine has started up, powered by GE Vernova's first LM6000VELOX* package in commercial operation globally. The 52 MW package includes an LM6000 aeroderivative gas turbine and a generator, factory-assembled to facilitate fast and easy installation and commissioning.

The LM6000VELOX package, launched in 2023, reduces the installation and commissioning schedule of LM6000 aeroderivative gas turbines by up to 40%, thereby saving installation time and costs.

At Bushy Park, the new LM6000VELOX replaced older peaking generation units which help the company meet demands during peak energy usage. Two other units ordered for Dominion Energy's Parr facility in Fairfield County, South Carolina, are currently under construction.

Apart from supporting peak power demand, the dispatchable gas power units complement solar power generation on days when sunshine is limited or intermittent throughout the day. Bush Part and future Parr units hence cater for 'operational flexibility' e.g. dual-fuel capabilities, fast-starting, synchronous condensing, and black start.

GE Vernova's scope of supply included selective catalytic reduction and oxidation catalyst systems, which coupled with dry low exhaust combustion, enable best-in-class air emissions performance without the need for water injection.

Besides the two LM6000VELOX packages installed at Dominion Energy's Parr facility, there are ten such packages being installed at Tennessee Valley Authority's Johnsonville aeroderivative power plant in the Middle of Tennessee with an expected start of operation in 2025. The first 100% hydrogen-fuelled LM6000VELOX solution is expected to start up at the Whyalla power plant in Australia in 2026. ■

Dominion's Bushy Park CT facility

NEWS NUDGES

AES secures 1 GW of fuel cells

American Electric Power (AEP) has entered a contract with Bloom Energy to offtake up to 1 Gigawatt (GW) of electricity from the latter's solid oxide fuel cells (SOFC). The flexibly available power will be sold onwards to data centers and other large energy users. Advantages of SOFCs include high efficiency at a lower heating value (60%) compared to rival technologies, fuel flexibility as well as cogeneration and hybrid/gas turbine cycle capabilities.

MAN's methanol orders advance

MAN Energy Solutions has received several orders for MAN B&W G95ME-LGIM Mk 10.5 methanol engines to power a series of VLCVs. The order brings the cumulative number of such methanol engine orders to 95, sold to various yards in South Korea, China and Japan. Similar methanol-based engines are also on available in MAN's offering for stationary power generation.

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