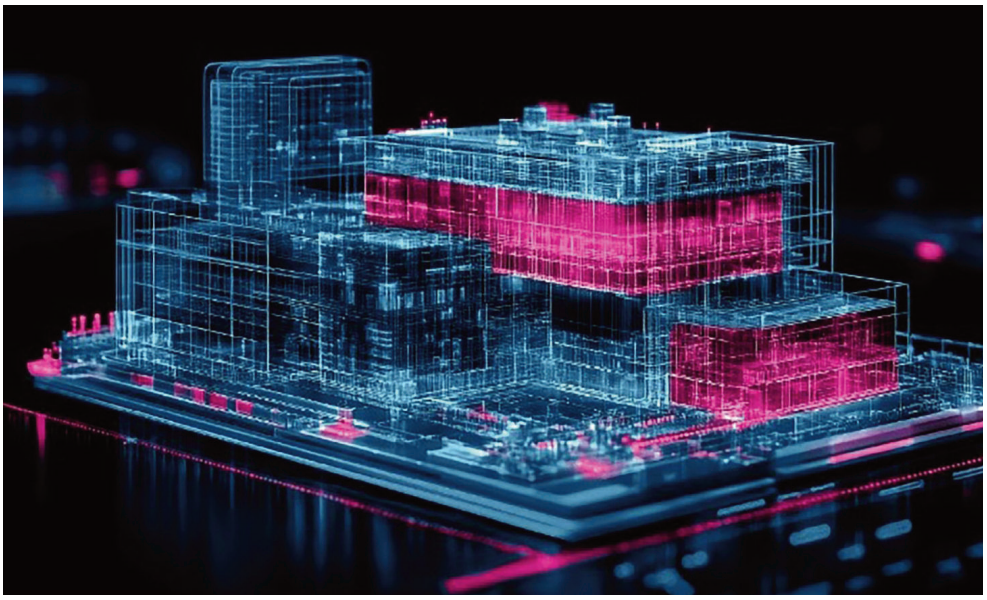
Gas to Power Journal
Peakload Power and Energy Storage

Focus on AI power hunger, energy storage

Weekly News 28 November 2025

Hyperscale analytics – decoding the data behind the build race

Decisions of hyperscalers – such as Google Cloud, Meta, Microsoft and AWS – dictate where electricity flows and how billions in capital are deployed. Responding to grid access constraints, data center developers increasingly shift their focus on markets in Southeast US and Asia Pacific, DC Byte's 2025 Global Data Center Index shows.



In mature hubs like Virginia, Frankfurt, and Singapore, grid shortages and regulatory limits are reshaping delivery timelines. "Vacancy rates in some metropolitan cities have fallen below 1%, underscoring the scale of demand and the mounting challenge of getting capacity online," said Siddharth Muzumdar, DC Byte's research director.

In Northern Virginia, Dominion Energy forecasts that connecting data centre projects exceeding 100 MW could take up to seven years. Investors hence shift their focus on South Virginia, Georgia and North Carolina – US federal states that combine low-cost land, proactive utility partnerships and state-level incentives.

In Asia-Pacific, hyperscale capacity grows at a rate of 32.9%, making it one of the world's fast-growing markets. Emerging hubs in Malaysia, Indonesia and India attract investment thanks to pro-growth policies and available electricity supply.

The FLAP-D markets in Europe – Frankfurt, London, Amsterdam,

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Distributed gas power market to grow 11.7% through 2029

Gas-fuelled distributed power markets have been booming as grids have become more decentralised to integrated a growing share of renewables and energy storage. Distributed gas generation is forecast to grow at a 11.7% rate, with the market size forecast to expand from $36.59 billion this year to $57.01 billion by 2029.

Technological breakthroughs in microgrids, advancements of small-to-medium-scale gas turbines and the rising deployment of hybrid power sources (renewables + gas gensets + energy storage) is underpinning the trend towards decentral power markets.

A shift towards more decentralized gas-fired stations help would meet grid flexibility requirements. Facing a fickle task, TSOs have to compensate the peaks and troughs of wind and solar power supply through active load man-

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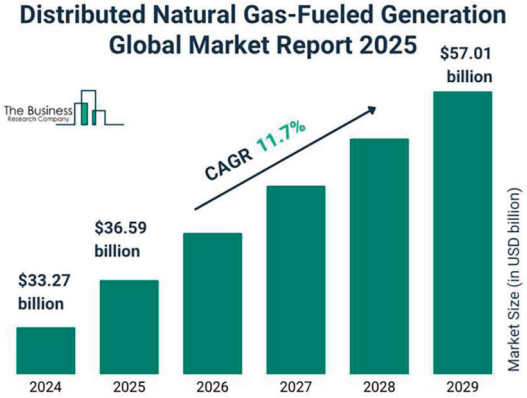

AGENDA

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Paris and Dubin – are getting saturated under power and land constraint. According to DC Byte's finding, this pushes hyperscalers towards Milan, Madrid and Warsaw, as well as into the Nordics, which can offer low-cost hydro power.

Operators of hyperscale data centers respond by securing electricity and land 24 to 36 months before delivery, locking in power gen capacity long before construction begins. Pre-leasing cycles now extend up to two years ahead of completion.

"For operators, success depends less on size than on execution. Investors are redirecting capital toward markets capable of delivering capacity efficiently under constraint," Muzumdar explained. Suppliers are trying to adjust and balance rising electricity demand with ordering critical equipment for generating capacity upgrades longer in advance.

Grid build-out lags behind

Despite the massive rise in AI-related energy demand, investment in electricity grids cannot keep paces and, in fact, stalled at $400 billion this year, held back by slow permitting and tight supply chains for cables and transformers.

The International Energy Agency (IEA) recommends grid spending must rise toward parity with generation spending by the early 2030s to maintain electricity security.

Overall spending on clean technologies — including renewables, nuclear, grids, storage, low-emissions fuels, efficiency, and electrification — is on track to reach a record $2.2 trillion this year, according to IEA figures. Spending on utility-scale and rooftop solar is expected to reach $450 billion in 2025, making it the single largest line item in global energy investment. Battery storage — critical for balancing variable renewable output — is also rising fast, reaching more than $65 billion this year. ■

Iberian region leads EU's data center demand

Ensuring uninterrupted power supply through resilient battery backup systems is paramount as Europe's data center energy storage market is forecast to grow from €585 million last year to €1.2 billion by 2034. Analysts see the Iberian region seizing leadership in this rapidly expanding sector.

The IT and telecommunications sector, uses about 33% of Europe's data center energy storage capacity to avoid downtime and facilitate rapid data traffic. With AI-driven GPU clusters now drawing 30 to 60 kilowatts per rack continuously, Europe's electricity infrastructure must evolve rapidly to meet these unprecedented demands.

Iberian blackout – a wake-up call

The April 2025 Iberian blackout was a wake-up call for Europe's digital infrastructure. The incident, which resulted from voltage surges following the sudden loss of 2.5 gigawatts of generation capacity, underscored the vulnerability of facilities dependent on grid stability without adequate battery backup infrastructure.

Since then, investors have come forward to accelerate battery-based energy storage across Portugal and Spain in an effort to enhance grid resilience. New battery projects reinforce the region's robust framework that includes the EU Battery Regulation and Battery Passport requirements, which create clear standards that promote quality, safety and circularity.

New energy storage technologies will be showcased on 8th and 9th September 2026 in Barcelona, at the trade show Battery & Energy Storage Tech Europe. In focus will be stationary and industrial battery applications, including data centers, ports, rail, microgrids, commercial and industrial facilities, and long-duration energy storage. ■

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agement. Load changes typically occur less than every 60 minutes. In a renewables-dominated grid, load changes for gas turbine driven power plants range from over around 8 MW/min to the maximum permissible rate.

"Loss of rotation mass, or inertia, in the grid increase the sensitivity of frequency changes. This is yet another major burden TSOs as they have to maintain grid stability," explained Dr. Thorsten Krol, Siemens Energy's Vertical Manager Grid Services.

To remedy this, many grid operators have commercial agreements in place with some generators to provide or remove additional capacity which is contracted one day ahead. Oftentimes, a battery starts a small gas engine or an open-cycle gas turbine to re-energize the grid before larger-scale plants can come back onto the market.

Cost-of-service is considered when selecting the dispatch order for black-starts – a method pioneered by the California Independent System Operator (CAISO), the PJM Interconnection and the New York Independent System Operator (NYISO). Plant operators get compensated via a flat rate payment (in $/KWyr) multiplied with by the unit's Monthly Claimed Capability for that month. ■

Green H2 & NH3 industry gains traction in Inner Mongolia

Inner Mongolia is emerging as one of China's fastest-growing clusters of the green hydrogen, ammonia and methanol industry, underpinned by multi billion yuan wind and solar investments. In 2025, the region drew major developers including Goldwind, CGN and Mingyang Smart Energy into integrated "wind to X" projects.

Goldwind just approved plans for a wind hydrogen ammonia methanol complex in Bayannur with 3 GW of wind power capacity and 1.2 GW of electrolysis, backed by an investment of 18.9 billion Chinese Yuan, or US$2.7 billion. The project is designed to produce 600,000 million tons per annum (mtpa) of green methanol and 400,000 mtpa of green ammonia.

A separate CNY 7 billion green hydrogen to ammonia project is moving ahead in two phases in Ulanqab. The venture target 20,000 mtpa of green hydrogen to feed 800,000 mtpa of green ammonia once fully ramped up. The large scheme includes modular 2,000 Nm³ alkaline units and is co-located within a dedicated new materials industrial park to guarantee local downstream investment.

Goldwind's wind hydrogen ammonia methanol complex in Bayannur

Fast-paced build-out

Pure hydrogen projects are also is gaining speed, with at least two large electrolysis plants slated to break ground in Inner Mongolia in 2026. Developers aim for a two to three year build window for green hydrogen infrastructure at scale.

A reference project – the Envision Chifeng zero carbon hydrogen ammonia venture – has entered operation in Inner Mongolia in summer 2025. Together with similar ventures Bayannur and Ulanqab, this creates multiple hubs across the region.

Developers and project sponsors are focussing on hydrogen based fuels for chemicals, fertilisers and potential export grade e-fuels.

State backed CGN and turbine maker Mingyang, for instance, are leveraging their regional wind and solar power installations to co develop wind to hydrogen and hydrogen to ammonia assets – often adjacent to existing grid infrastructure. Their entry alongside Goldwind "adds balance sheet depth and technical experience," analysts commented. ■

Economies in Southeast Asia rely too much on fossil fuels; ADB finds

The Asian Development Bank (ADB) has criticised the high dependence of Southeast Asia on fossil fuels in their energy mix which makes reginal economies exposed to volatile fuel prices and supply disruptions. Singapore is the most dependent, with coal, oil and gas imports far exceeding domestic supply.

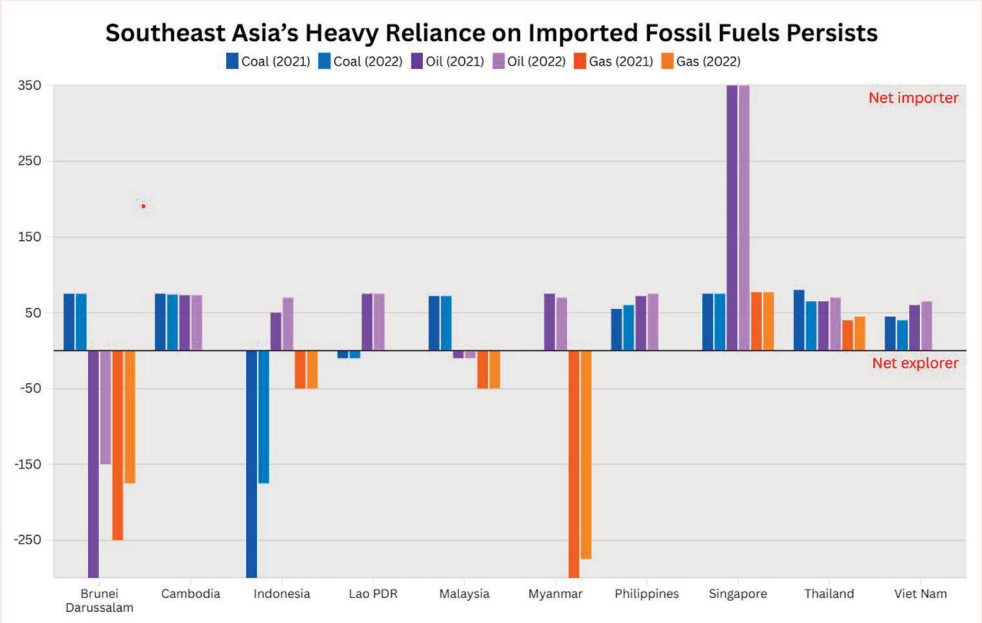
To mitigate the risk of price spikes, the ADB urges regional governments to enhance supply security through regional cooperation, e.g. power interconnectors.

"Improving access to finance, investing in renewable power, and expanding regional cooperation can help countries meet growing energy needs whilst reducing their vulnerability to global shocks," the bank said in a recent report.

However, investors still struggle to finance solar power in many parts of Southeast Asia regardless of the region's favourable geographic and weather conditions. Especially in Myanmar, Vietnam, Indonesia and the Philippines, investors are taken aback given that financing costs roughly double those in Europe or North America.

"Southeast Asia's energy systems remain tied to fossil fuels, but the path to change is open. Shifting toward renewable power will require lower financing costs, stronger policy coordination, and regional cooperation that links national grids and markets," ADB financial sector specialist Kosintr Puongsophol said.

High financing costs make clean energy projects harder to launch even when technology is available. Lowering these costs through clear policies, stronger institutions, and transparent markets could accelerate the region's move toward affordable and sustainable energy. ■



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Caterpillar, Vertiv package power & cooling systems for Big Data

US engine maker Caterpillar and IT infrastructure provider Vertiv have agreed to jointly offer packaged power and cooling systems aimed at shortening deployment times of large data centers. Target customers are AI data center developers that face delays tied to grid constraints, long equipment lead times, and rising power densities.

The collaboration comes as one of Caterpillar's largest associated projects gains momentum: the 4 GW data center campus in Millard County, Utah, led by Joule Capital Partners and supported by CAT dealer Wheeler Machinery.

Under a broader agreement, Caterpillar and its Solar Turbines subsidiary will supply gas turbines and reciprocating engines for on-site generation and combined cooling, heat and power generation. Vertiv will integrate those systems with its power distribution and liquid-cooling equipment in predesigned modular blocks.

The Utah data center will be powered by a large fleet of Caterpillar G3520K generator sets supported by 1.1 GWh of battery storage.The long-term buildout is designed to provide 4 GW of capacity — enough electricity to supply several dozen hyperscale data halls. The systems' liquid-cooling architecture is tailored for thermally intensive AI workloads.

Shift to onsite generation

The new Caterpillar–Vertiv model reflects a broader shift in the data center sectors, as developers increasingly favour on-site generation in the face of rising load on the grid. Several fast-expanding regions in the United States have warned of multi-year waits for new grid connections., prompting operators to rely on gas turbines and large engine plants as bridge solutions while new power transmission capacity is built.

By offering power and cooling as a single packaged block, Caterpillar and Vertiv provide standardized designs for campuses that need predictable schedules and repeatable configurations across multiple sites. Improved operational efficiency will be achieved by coordinating power and cooling decisions from the outset of the design process. The Caterpillar-Vertiv offer includes global service coverage and parts support – a key feature as operators scale fleets of near-identical AI campuses.

The partners formalized their cooperation through a memorandum of understanding, and while neither company has announced commercial deployments yet. ■

IceBrick thermal storage dispatched into CAISO power market

The first thermal energy storage – a Nostromo IceBrick system – is being dispatched in California's CAISO wholesale power market, delivering load reductions over of 200 kW on the grid this summer. Installed at the Beverly Hilton Hotel, this behind-the-meter thermal energy storage sets a precedent as an "grid-interactive efficient buildings."

According to the Department of Energy's (DOE), such grid-interactive buildings could save the U.S. electricity system between $8 and $18 billion annually by 2030. The Hilton project is meant to help advance California's goal of 7 GW of load shift by 2030.

Smarter use of grid, decentralised power, and energy storage are vital for California's clean energy future. Nostromo's IceBrick system at the Beverly Hilton participated in California's Demand Side Grid Support (DSGS) program this summer, delivering event reductions exceeding 200 kW.

Making use of flexible loads

Virtual power plants made of homes, hotels, and businesses equipped with flexible resources like thermal storage can shift load, reduce curtailment, and keep the lights on at lower cost. "I'm encouraged to see projects like the Beverly Hilton demonstrate how customer-sited storage can participate in CAISO markets," said California's Senator Henry Stern.

Nostromo's IceBrick system at the hotel participated in California's Demand Side Grid Support (DSGS) program. By bidding in the CAISO market, the thermal energy storage can run as a dispatchable, market-integrated resource.

"Cooling by commercial buildings' and data centers is the single, largest load on the grid. Making these large loads flexible and operable interactively with the power grid demonstrates how buildings and data centers can help the grid unlock existing capacity to serve new demands," explained Nostromo Energy CEO, Yoram Ashery.

Olivine's ClimateResponse DER platform bridges the gap between complex CAISO requirements and monetization of real-world assets. It coordinates dispatches, valuates performance of the energy storage and ensures that the IceBrick facility can earn revenue from delivering grid services. ■

Render of Nostroma IceBrick system

NEWS NUDGES

Loan agreed for Texan power project

A new Texas Energy Fund loan agreement is in place for a 455 MW plant in northeast Houston. The $617 million power project will add to the Lone Star State's rising share of decentralised, fast-ramp gas power capacity.

Dynamis orders aero-turbines

Dynamis has ordered 25 aeroderivative gas turbines – including LM2500, LM6000 and LM9000 – with 1.3GW capacity combined from Baker Hughes. Ten of these turbines will be packaged in a new offering DT70, totalling 700 MW of gas-fuelled power – delivering the oil & gas industry's highest reported mobile power density (MW per square foot) to date.

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