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Powering modern data centers: Why megawatts and insulation matter

Remember the Wendy's fast-food commercial from the 80's — "Where's the beef?" Well, now the new mantra is: "Where's the power?" Walk into any conversation about data centers today and you'll hear the same three words: power, power, power. The industry has shifted from worrying about square footage to worrying about megawatts. As the industry races toward gigawatt-scale campuses, one quiet, overlooked technology has a surprisingly large role to play: insulation.

Power availability has become the defining constraint on data-center growth. To understand the scale, consider that 1 MW of electricity powers about 750 single-family homes. The U.S. built 1,957,000 new single-family homes in 2023 and 2024. Combined, those two years of homebuilding represent the equivalent power demand of approximately 2,609 MW. For context, Oracle and OpenAI's Project Jupiter under construction in New Mexico will be powered by a 2,450-MW fuel-cell microgrid from Bloom Energy. This one AI campus will consume nearly as much electricity as all the

new single-family homes built in the U.S. in 2023 and 2024 combined.

Why so much energy? A typical Large Language Model (LLM) inquiry to ChatGPT, Claude or Gemini requires 10 to 30 times the energy of a Google search, while image generation consumes 10 to 50 times more than text. Every LLM inquiry is a burst of GPU power using billions of mathematical parameters. Every image generation is a bigger burst. Every video is bigger still.

Data centers are scaled up to "hyper-scale" sites of 600 MW to 1,000+ MW — about the output of a coal-fired power plant unit consisting of a boiler, turbine and generator. The fastest-growing data center segment is the 300-600 MW class. The industry is shifting from "grid-dependent" power sources to self-powered, using natural-gas turbines, fuel cells and nuclear microreactors to secure reliable, fast, scalable power. The shift is accelerating because the grid simply can't keep up with AI-driven load growth or the long lead times required for new transmission. A great example: Microsoft and Constellation

Energy are restarting Three-Mile Island Unit 1 with Microsoft buying all of its output.

Every watt saved matters

There's a quieter part of the story, one that rarely makes headlines. As data centers scale into the hundreds of megawatts, every watt saved matters and one of the simplest ways to cut load is also one of the most overlooked: mechanical insulation.

Mechanical insulation reduces heat loss in chilled-water loops, condenser systems, mechanical rooms and rooftop equipment. Better insulation means lower cooling demand, and lower cooling demand means fewer megawatts pulled from the grid or generated on-site.

Industrial turbines used in data centers rely on multilayer, high-temperature insulation systems tailored to each zone of the turbine. Thermal insulation reduces heat loss and keeps external surface temperatures below 140°F for personnel protection. Insulation assists in reducing vibration of the equipment. Acoustic insulation reduces noise

to 85 dBA at 3 feet, the OSHA target.

Insulation directly improves Power Usage Effectiveness, PUE, the industry's core efficiency metric. Even a small improvement, say from 1.25 to 1.20, can save 2–5 MW at a 100-MW campus. At 300 MW, the savings multiply. That's the equivalent of eliminating an entire turbine engine, shrinking a fuel-cell block or reducing the size of a battery system.

Insulation reduces operating cost, carbon footprint, and the scale of on-site generation required to keep AI running. As the industry pushes toward larger and more power-hungry campuses, the smartest operators will focus not only on how to generate megawatts but how to avoid them. Insulation is one of the fastest, cheapest, and most reliable ways to do that.

Remember, the cheapest form of energy is the energy you don't use in the first place. Insulate.

For more information, visit
insulationappraisers.com,
insulationinspectors.com
 or insulation.org. •



UPSTREAM

Sector Editor: CARLOS MALESPIN

USGS discovers over 340 tcf of recoverable gas in Bossier formation

WASHINGTON — USGS outlined that, in a recent assessment of undiscovered gas and oil in the Bossier Formation along the Gulf Coast, there are recoverable resources of 343.5tcf of gas and 3mb of oil in the region.

The gas resources are enough to supply the U.S. for more than 10 years at the current rate of consumption, according to the release, which highlighted that since production began, the Bossier Formation has produced 3.8tcf of gas, equal to nearly six weeks of U.S. consumption at the record-high 2025 level.

In its release, the USGS noted that, since its last assessment of undiscovered oil and gas resources in the Bossier, exploration drilling by the industry had revealed deep, highly over-pressured shale formations, a development the USGS outlined warranting their new assessment.

For more information, visit

Devon Energy enhances Permian Basin inventory with \$2.6B land purchase

HOUSTON — Devon Energy Corporation announced the successful acquisition of 16,300 net undeveloped acres in the core of the Delaware Basin in Lea and Eddy Counties, New Mexico, for approximately \$2.6 billion, or approximately \$161,500 per net acre, through a sale facilitated by the BLM.

The acreage is directly adjacent to Devon's existing Delaware Basin position, providing the ability to leverage existing facilities and infrastructure. Devon's top-tier drilling and completion cost performance across its Delaware Basin operations provides a significant underwriting advantage in developing these assets.

"This BLM lease sale presented a rare and compelling opportunity to add high-quality, contiguous federal acreage at scale in the core of the Delaware Basin," said Devon's President and CEO Clay Gaspar.

For more information, visit

U.S. House passes bill to extend federal O&G permitting fund

WASHINGTON — The U.S. House of Representatives passed legislation to extend a key federal program that supports oil and natural gas permitting on public lands. Industry groups including the Independent Petroleum Association of America and Western Energy Alliance welcomed the House vote, noting that the program has received bipartisan support through previous reauthorization. The Permit Processing Improvement Fund supports BLM offices responsible for processing oil and gas permits, rights-of-way, environmental reviews, surface use plans and other approvals tied to development on federal lands. The program is funded through fees paid by operators seeking drilling permits.

The program was originally established under the Energy Policy Act of 2005 and funds are used to support staffing, training and interagency coordination at high-volume BLM offices in key producing states.

For more information, visit

Shell, INEOS agree to joint investment in GoA

LONDON — INEOS Energy and Shell Offshore Inc., a subsidiary of Shell, have agreed to jointly invest in exploration and development opportunities, strengthening their collaboration and supporting long-term energy security, from areas in tieback distance to the Appomattox platform in the GoA. INEOS is acquiring a 21% working interest for an undisclosed amount, consistent with its ownership in Appomattox, Rydberg, the recent Nashville discovery and the Mattox pipeline.

INEOS Energy, along with Shell, aim to unlock additional value from the Appomattox host platform. The agreement focuses on prospects within tieback distance of existing infrastructure, including Shell's pre-FID Fort Sumter discovery, the planned Sisco exploration well and an additional exploration target expected by the end of the decade. INEOS' strategy centers on leveraging established infrastructure to accelerate development timelines, control costs and deliver higher-margin production.

For more information, visit