

Germany's digital industry needs highly efficient data centers

A successful digital industry and a leading role in AI are only possible with high-performance data centers. The VDE ITG brief "Network Connectivity for AI" explains how this works.

(Frankfurt am Main, April 30, 2026) The expansion of Germany's digital infrastructure is underway, with around 2,000 data centers either already in operation or nearing completion. But that is not enough, according to the authors of the new VDE ITG brief "Grid Connection for AI." Dr. Damian Dudek, co-author and Managing Director of VDE ITG, says: "We need smart solutions and the courage to expand — now."

On the one hand, a look at the U.S. shows where things are headed: The Meta Hyperion data center currently under construction in Louisiana is expected to have a power consumption of 5 GW, which, according to a report in IEEE Spectrum magazine, corresponds to the electricity consumption of over 4 million U.S. households. On the other hand, it is clear that in Germany, with a much higher population density, a European-style distribution grid, and other regulatory requirements, replicating such projects is not possible.

Damian Dudek comments: "Instead of burying our heads in the sand and letting others take the lead, we should rely on our expertise and drive expansion forward." The new VDE ITG brief outlines what this expertise entails and what is necessary for the cost-effective operation of AI data centers.

Designing AI data centers efficiently: Hardware and cooling as key factors

Dudek emphasizes: "As of today, about 60 percent of the primary energy in a data center goes into computing—40 percent is wasted as heat, which drives up electricity consumption due to the necessary cooling." Modern high-performance data centers (HPC DCs) can remedy this on two levels. While hardware optimized for energy efficiency requires more power, it also delivers

computing efficiency that is four times higher, resulting in a significant increase in computing power. If cooling is also AI-controlled, the energy required for it can be reduced by more than 20 percent in some cases. According to the so-called “five nines” concept, the combination of intelligent cooling and a reliable power supply results in 99.999 percent availability, virtually eliminating critical system failures.

“I can simply accept the energy hunger of data centers and, as seen in the U.S., meet the electricity demand entirely through off-grid gas-fired power plants,” notes Christoph Strunck, co-author of the paper and engineer at Goodman Germany. “Or I can work together with policymakers, grid operators, and power plant operators on innovative, economically viable solutions that are sustainable.”

Grid Connection for AI: Expand Data Centers and Infrastructure Now

To avoid falling behind in the race for technological developments in the field of artificial intelligence and the associated business models, the authors believe decisive action is required. In Germany, there are over 1,600 company-owned data centers and around 300 so-called third-party colocation data centers (as of 2025). “The existing and emerging locations show that it’s possible,” says Damian Dudek. “Metropolitan areas like Frankfurt am Main, Munich, or Berlin benefit from the investment and from the fact that not all AI applications run through and are billed via data centers abroad.”

In addition to the efficient design of data centers, the authors therefore believe it is necessary to quickly launch construction projects at suitable locations, even if not all details have been finalized yet. The paper proposes focusing primarily on medium-sized cities and outlines the grid connection requirements for data centers. If the grid is not yet 100 percent available as needed at the start of the project, the expansion can be phased in over the course of the project. Potential gaps could also be closed by intelligently scheduling computationally intensive processes during periods of high electricity availability.

“If we use an energy mix of wind, solar, and biomass, supplemented by highly efficient gas turbines in combined heat and power generation, we create infrastructure with high overall efficiency. At the end of this path lies not only AI made in Germany, but AI that itself becomes a building block for energy efficiency,” emphasizes Dr.-Ing. Panten, co-author of the paper and founder of etalytics (Darmstadt). The use of renewable energies also ensures that operations run largely independently of the availability of fossil fuels. In this context, regulatory frameworks must, where necessary, demonstrate the flexibility required to remain internationally compatible.

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