Kiel Policy Brief

April 2026

Running into a debacle:

The mismatch between the EU's AI ambition and its energy planning.

No. 208, ISSN 2195-7525

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Overview

- The Global Race for AI is on, and Europe is trying to play its part. However, there is a serious mismatch between data center capacity planning and energy supply planning in the EU.
- Despite ambitious plans, the EU risks falling further behind: China is on track to triple its data center capacity by 2030, and the United States to double, leaving Europe with significantly lower shares of global capacity
- EU data centers' electricity demand is forecast to double over the next five years, from around 80 and 168 TWh; the upper end of this range is equivalent to the entire electricity demand of a country such as Poland in 2024. The share of total EU electricity demand absorbed by data centers will thus rise rapidly from around 2% in 2023 to around 5% in 2030.
- Covering the additional demand by data centers is only possible if the rest of the economy remains largely static. This is, however, unlikely, as the electricity demand in other sectors will increase as well, in particular in the housing market (heat pumps) and in the transportation sector (electric vehicles).
- The uncovered additional electricity demand of data centers by 2030 is substantial and equivalent to the 2024 net electricity consumption of countries like Belgium or Finland. Poor planning may thus leave the European Union in a dangerous trilemma: giving up on growth, net-zero goals, or on the AI race.

Keywords Artificial Intelligence, Digitalisation, Energy

JEL classification O33, Q43

Acknowledgments

The author is grateful to Moritz Schularick, Dirk Dohse, and Johannes Binder for their valuable comments and suggestions on earlier drafts of this work. The author also thanks the Kiel Institute for the World Economy for institutional support.

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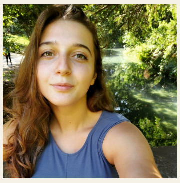

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1 Introduction

The Global Race for AI is on, and Europe is trying to play its part. As AI investments soar worldwide, the European Union has launched an "AI Continent Action Plan", a comprehensive strategy to foster AI innovation on the continent (European Commission, 2025). The goal is to construct brand-new AI Factories and Gigafactories, mobilizing billions of private and public euros. However, one crucial aspect is often overlooked: one cannot separate the AI data center infrastructure from one of its main inputs, electricity. This raises a central question: **are current energy plans sufficient to support the AI ambitions, or is Europe running into a debacle?**

To answer this question, we compare the additional electricity demand from data centers with the total electricity demand forecast in 2030 in the European Union. We show that the current EU energy plans are severely misaligned with its ambitions, leaving the EU in a dangerous trilemma between losing the AI race, threatening economic growth, or abandoning its net-zero goals.

2 EU Data Centers' Electricity Demand

AI-specialized data centers are particularly energy-intensive. As of 2025, there are currently more than 10,500 data centers in the EU, according to the European Data Center Association (EUDCA). Most of them are relatively small in size and, therefore, have lower energy consumption. More than 80% of them have a capacity below 1 MW, which is roughly comparable to the electricity use of about 2,000 households (European Data Centre Association, 2025). In stark contrast, an AI-focused data center can consume as much electricity as 100,000 households (International Energy Agency, 2025a). The scaling of AI development and deployment is substantially increasing the electricity consumption of data centers.

Despite the AI Continent Action Plan, Europe might still fall behind its international competitors. Globally, data centers consumed approximately 415 TWh in 2024, accounting for around 1.5% of global electricity consumption. In the United States, this percentage is around 4% of total demand in the same year (International Energy Agency, 2025a). While the United States and China are expected to increase their share of global data center capacity, reaching respectively shares of around 40% and 30% by 2030, European shares are forecasted to decrease from 22% in 2023 to 12% in 2030 (International

Energy Agency, 2025a).

In 2023, data centers represented between 2.2% and 3.6% of the EU electricity demand. According to estimates from multiple sources, the electricity consumption of data centers in Europe for 2023 ranges from 60 to 96 TWh.[1] Although 2% or 3% may seem modest, it corresponds to a significant share of electricity consumption. The projections for European data centers' electricity demand range from 98.5 to 168 TWh in 2030, with the most recent studies pointing to higher estimates (as illustrated by Figure 1) (Montevecchi et al., 2020; Granskog et al., 2024; International Energy Agency, 2025a; European Data Centre Association, 2025; ICIS, 2024; Kamiya and Bertoldi, 2024; Dodd et al., 2020). Data centers in 2030 might consume as much electricity as the entirety of Poland in 2024 (ENTSO-E, 2025).

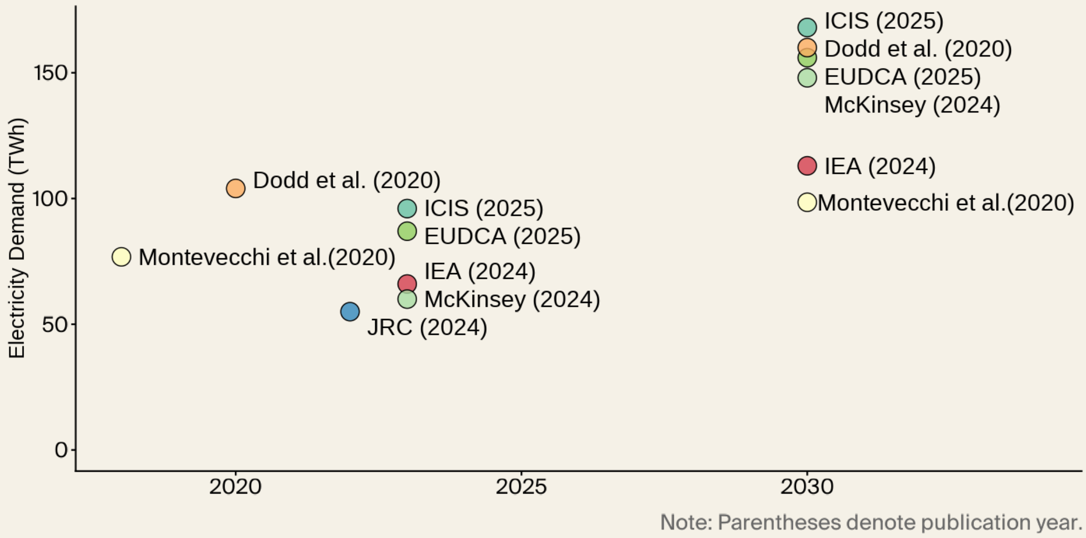

Figure 1: Current AI electricity demand and forecasts for 2030

Data centers' electricity demand is forecast to double in the next five years. If we apply these estimates to the total forecasted demand by the European Network of Transmission System Operators for Electricity (ENTSO-E), data centers will represent 3.2% - 5.5% of total electricity demand in 2030 (ENTSO-E and ENTSOG, 2025). These demand projections are set out in ENTSO-E's Ten-Year Network Development Plan (TYNDP). The forecasts are crucial because they guide future electricity and gas infrastructure investments that are needed over the next decade to ensure a secure and integrated energy system across the EU; if demand is underestimated, the planned supply will be too.

[1] One important caveat is that the IEA estimates include the United Kingdom and Switzerland.

3 Mismatch between planning and ambition

Data centers will shift from representing 2% of the total electricity demand in 2023 to around 5% by 2030. At first glance, the TYNDP and the projected electricity demand from data centers would suggest that sufficient supply is being planned. However, this change in shares implies that data centers alone will be responsible for consuming almost 20% of the additional electricity supply. This is evident in Figure 2, which illustrates the 2023 electricity demand and the 2030 forecast divided by sectors. Based on the TYNDP projections, data centers will represent a large part of the additional electricity demand by 2030 (ENTSO-E and ENTSOG, 2025).

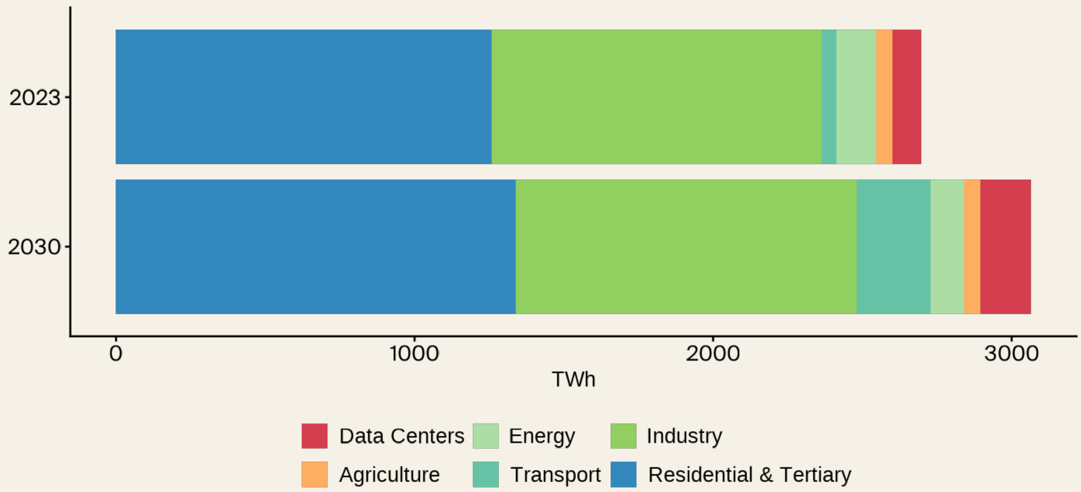

Figure 2: Electricity demand by sectors in 2023 and 2030

Covering the additional demand by data centers is only possible if the rest of the economy remains largely static. The TYNDP serves as the EU's primary planning instrument for electricity infrastructure, directly guiding investment decisions in generation and transmission capacity. Underestimating future demand in this framework directly translates into insufficient supply expansion; a gap that becomes apparent when correcting the TYNDP's 2030 forecast for the additional electricity consumption of data centers. While these figures may not initially seem alarming, they rely on the problematic assumption that all other economic sectors combined would need to increase their annual electricity demand by less than 1%. This gap becomes evident when zooming in on the residential and tertiary sectors (combined in the TYNDP scenario). The EU plans barely cover the electricity demand increase due to heat pump deployment, leaving no space for the data centers' additional consumption (European Climate Foundation and European Heat Pump Association, 2023; Toleikyte et al., 2024; Shehu, 2024). No reduction due to improved efficiencies in any other sector would allow such a gap to be covered.

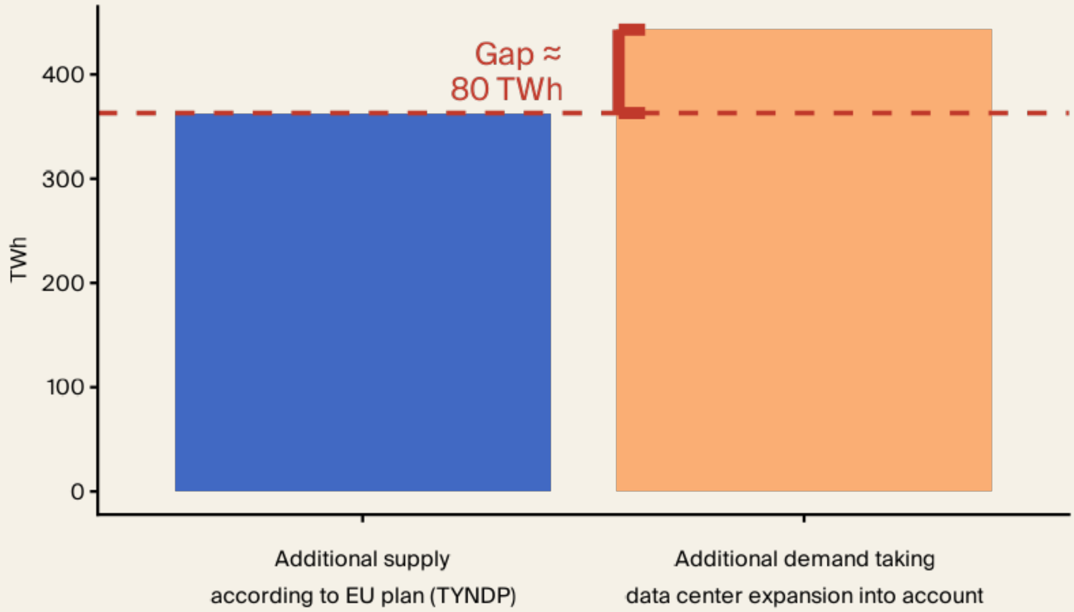

Figure 3: The gap between planned additional supply and additional demand 2030

The uncovered additional demand of data centers by 2030 is equivalent to the 2024 net electricity consumption of Belgium or Finland. Decarbonization-driven demand growth in sectors such as housing and transport leaves no room for data centers, potentially creating an 80 TWh gap by 2030, as shown by Figure 3. To contextualize the scale of the issue, it can help to compare these estimates to the electricity consumption of EU countries. The data center demand increase is equal to the 2024 net electricity consumption of Belgium or Finland. Expressed differently, meeting the growing electricity demand of data centers requires additional generation capacity sufficient to supply an additional Belgium or Finland by 2030 (ENTSO-E, 2025). If this is not accounted for, it would constitute a massive gap in the electricity supply planning.

Poor planning may leave the European Union in a dangerous trilemma: giving up on growth, net-zero goals, or on the AI race. The potential underestimation of demand poses several threats to the sustainability of the EU electricity grid, which would be left with three possible concurrent outcomes. One option is that the increase in electricity demand from data centers will be met with non-renewable energy sources. This means that the European Union would not be able to follow along its decarbonization strategy, which requires the electrification of multiple sectors, such as transport, heating, and manufacturing, to achieve net-zero targets by 2050. Alternatively, data centers, once connected to the local grid, will place such stress on the system to result in increased electricity prices throughout the European Union. The price increase could shrink consumption in other sectors, limiting overall economic growth, and potentially becoming an additional deterrent for AI investment. Lastly, local grids would be under such stress that local authorities would pass regulations to stop data center development. Regulatory and technical constraints around grid interconnection already pose delays and uncertainties, directly affecting the feasibility of data center projects. Dublin was a clear example of this: the local grid operator announced that it would not connect new data centers to the network before 2028 (O'Halloran, 2025). This will likely deter future investments in data center infrastructure within the EU.

This trilemma between giving up on climate goals, AI competitiveness, or general economic growth would represent the debacle of the EU's core strategic interests. The EU energy plans fail to take into account the exponential growth of electricity demand driven by Artificial Intelligence in an alarming misalignment with its own political ambitions. Energy and electricity need to enter these key conversations for the future of Europe. If the EU aspires to be a serious contender in the global AI economy, energy policy must be recalibrated accordingly. AI policy cannot be decoupled from planning for the energy systems that will power it.

4 Conclusion

Current energy plans reveal an alarming reality: the European Union is not planning for an innovation-fostering and prosperous continent, but is running into its own debacle in the global economic competition around Artificial Intelligence. All investments in data center capacity must be systematically coupled with an expansion of the electricity supply. The systematic underestimation of future electricity demand risks imposing costs on other sectors or undermining climate objectives. Electricity supply must therefore increase in parallel with digital infrastructure.

This expansion can take different institutional forms. In some cases, data center providers may directly invest in new generation capacity or enter joint ventures to secure the electricity required for their facilities. A limited number of such arrangements already exists, demonstrating the technical and financial feasibility of linking new demand to new supply.[2] These approaches could be further generalized or mandated through regulatory requirements tied to permitting and grid connection. In other cases, public investment and coordinated infrastructure planning will be necessary. Regardless of the instrument chosen, the principle must remain clear: new demand must be matched by additional supply from low-emitting energy sources. A coherent European AI strategy, therefore, requires that energy planning be embedded in digital policy from the outset. Aligning finance mobilization with clean electricity expansion is the central condition for reconciling competitiveness, growth, and decarbonization objectives of the European Union.

[2] Such arrangements typically take the form of long-term power purchase agreements (PPAs) or joint ventures between data center operators and energy providers; see as examples (Iberdrola, 2025), and (Google LLC, 2026).

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Value Added Tax Identification Number
DE 251899169

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