



KEY DISCUSSION HIGHLIGHTS

# WE CAFÉ: AI, DATA CENTRES AND THE FUTURE OF DEMAND

The World Energy Café session on AI, data centres, and the future of demand explored one of the fastest-emerging challenges facing the global energy sector: how to power the rapid expansion of artificial intelligence infrastructure while maintaining reliable, affordable, and sustainable energy systems.

Co-hosted by the World Energy Council Member Committees in Türkiye, Finland and the UAE, the discussion brought together perspectives from the International Energy Agency (IEA), Electric Power Research Institute (EPRI), Wärtsilä Energy and ADNOC.

AI infrastructure relies on dense GPU clusters operating at near-constant utilization, creating highly concentrated, continuous electricity demand with significantly greater power and cooling intensity than conventional data centres, placing growing pressure on power systems, cooling infrastructure, and grid reliability. As the panel emphasized, the challenge is increasingly local rather than global: many regions may have sufficient generation capacity overall, but lack the grid infrastructure needed to deliver power at the location, scale, and speed required for AI deployment.

PANELISTS



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## AI IS EXPOSING EXISTING GRID CONSTRAINTS

AI is accelerating long-standing structural constraints across energy systems, including:

- underinvestment in transmission infrastructure and aging grid systems,
- slow permitting processes,
- supply-chain bottlenecks,
- inflexible market structures,
- and insufficient planning for electrification at scale.

These challenges are becoming more acute as the **speed** at which AI developers can secure and connect reliable electricity supply becomes a **critical competitive factor** and directly shaping where AI infrastructure will prosper.

This sense of mounting *systemic* strain was also reflected in the audience poll, where 44% believed AI and data centre growth would place simultaneous pressure across all three dimensions of the World Energy Trilemma: energy security, energy equity, and environmental sustainability.

## WHY AI-DRIVEN DEMAND IS DIFFERENT

As noted by the IEA during the discussion, capital expenditure by just five technology companies – much of it directed toward AI and data centre infrastructure – now exceeds global investment in oil and natural gas production, with spending projected to increase by roughly 70% between 2025 and 2026.

Yet despite this rapid capital deployment, data centres accounted for only around 10% of global electricity demand growth in 2025 – comparable to the impact of electric vehicles. What makes AI demand uniquely significant is therefore not simply its scale, but its operational profile.

### AUDIENCE FLASH POLL

As AI and data centre growth accelerate globally, which dimension of the World Energy Trilemma will face the greatest pressure first?

ENERGY SECURITY	33%
ENERGY EQUITY	5%
ENVIRONMENTAL SUSTAINABILITY	18%
ALL THREE SIMULTANEOUSLY	44%

## FLEXIBILITY AS THE DEFINING CHALLENGE – AND OPPORTUNITY

A central theme throughout the discussion was that the future challenge is operating power systems more *flexibly* rather than merely adding generation capacity. Many grid constraints emerge only during limited periods of high demand, while substantial generation capacity remains underutilized under normal operating conditions.

In this context, if planned at a systemic level, AI infrastructure could increasingly support grid balancing through demand response mechanisms such as intelligent workload management and geographically distributed computing.

## MARKET INCENTIVES AND SYSTEM COORDINATION

The panel emphasized that unlocking flexibility at scale will require changes to market incentives and collaboration frameworks. As AI infrastructure expands, there is a growing need for market structures that enable and reward flexibility, including dynamic pricing, faster interconnection processes, and mechanisms that incentivize flexible computing loads. The discussion also highlighted EPRI's "Flex Mosaic" framework, which aims to support the integration of flexible AI loads into power systems and improve coordination between grid operators and large electricity consumers.

More broadly, the panel noted that as AI infrastructure is proving significantly capital-intensive, the future pace of deployment will depend on whether these assets can be efficiently integrated, successfully monetized, and supported by affordable and strategically located power supply.

The audience poll reinforced this shift in thinking. When asked about the top priority for managing AI-driven electricity demand, participants placed the strongest emphasis on better coordination between data centers and energy planners (44%).

### AUDIENCE FLASH POLL

What should be the top priority for managing AI-driven electricity demand?

FASTER GRID & PERMITTING	10%
COORDINATED GRID PLANNING	44%
MORE FLEXIBLE GRIDS & STORAGE	33%
STRONGER AI EFFICIENCY STANDARD	13%

## BEYOND THE DEMAND NARRATIVE

While rapid AI deployment presents significant energy challenges, the panel also noted the potential for positive spillover effects across the broader energy system. Growing investment in data centres may help stimulate demand for new clean energy capacity and could support investment in areas such as battery storage, transmission infrastructure, advanced grid management, smart cooling systems, and potentially new nuclear technologies, including small modular reactors (SMRs).

However, the extent to which these opportunities translate into wider system benefits will depend on planning, policy frameworks, and the ability to align AI-related demand growth with broader energy system objectives.

## KEY QUESTIONS AHEAD

- What will determine whether AI infrastructure becomes commercially viable, systemically resilient, and socially valuable?
- How do we build trust and coordination that can scale as quickly as AI ambition?
- Can institutions, permitting processes, and governance systems evolve quickly enough to keep pace with accelerating demand?
- Will AI become a source of convergence – or a new source of divergence – between energy systems?

## WORLD ENERGY CAFÉ

Our WE Café series is a member-driven dialogue platform that explores pressing energy issues across the World Energy Community, connecting diverse geographies to exchange perspectives and address shared challenges. Please contact your Member Committee if you are interested in joining future WE Cafés.

These discussions will continue at the **World Energy Congress** in Riyadh 26–29 April 2027

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