AI Sustainability

Is AI Consuming or Saving Energy?

Jari Arkko

Internet and AI technology researcher

Why talk about this?

Boom or bubble? Inside the $3tn AI datacentre spending spree

Investment in these vast warehouses is huge but some worry the debt-fuelled exuberance will backfire

The Global Switch Docklands data centre campus in east London. There are few signs of a bubble waiting to burst. Photograph: Bloomberg/Getty

OpenAI commits to $1.4 trillion in infrastructure deals

NEWSLETTERS

...e of the most ambitious financial undertakings in tech history, ...vealing the company has committed to over $1.4 trillion in ... chases the goal of artificial general intelligence (AGI). Speaking ...ssured stakeholders that despite the massive expansion, OpenAI ...ent bailouts and anticipates ending 2025 with an annualized ...$20 billion—a figure expected to scale into the hundreds of

Published Nov 6, 2025

cnbc
Sam Altman says OpenAI will top...

techbuzz.ai
OpenAI targets $20B revenue run rate amid $1.4T...

+19 sources

npr

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BUSINESS

AI brings soaring emissions for Google and Microsoft, a major contributor to climate change

JULY 12, 2024 · 5:13 AM ET

By Dara Kerr

3-Minute Listen

Sam Altman: OpenAI wants to get to $1 trillion a year in infrastructure spend

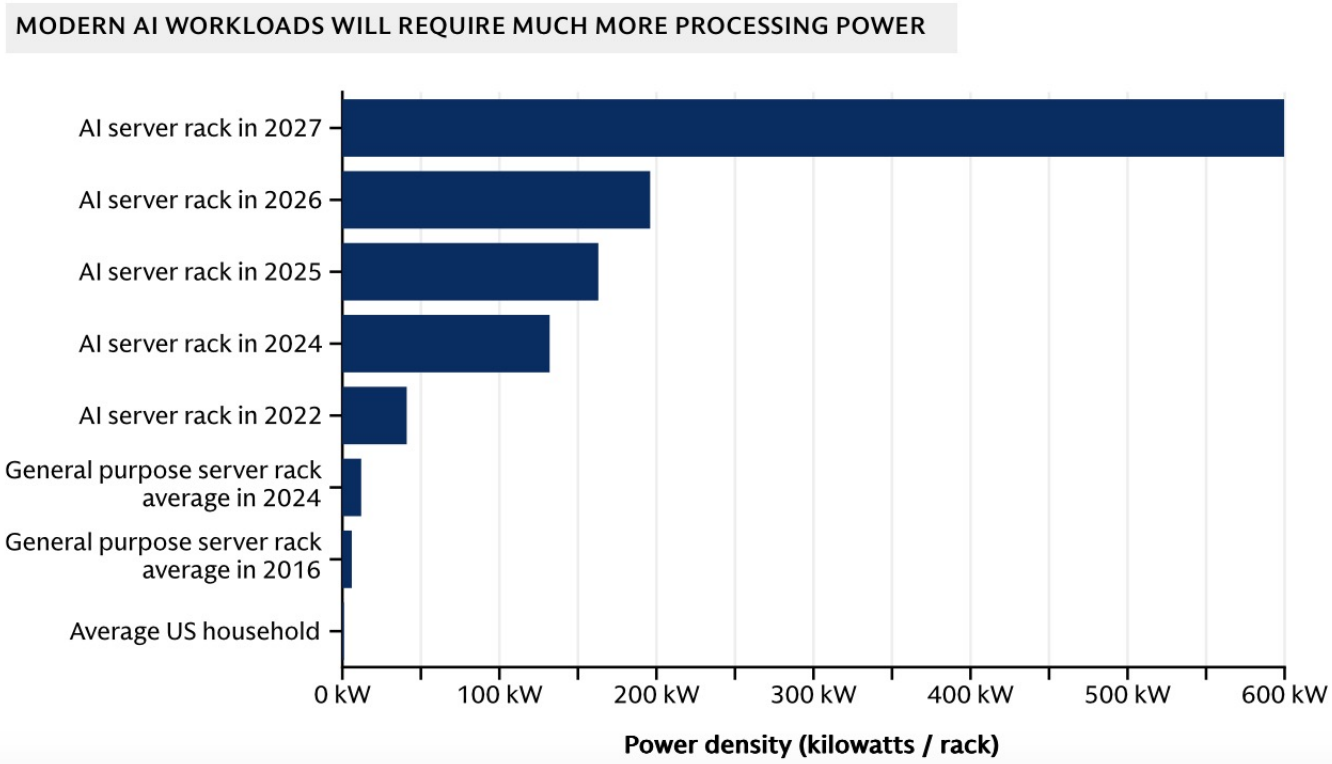
Ina Fried

News clip credits: The Guardian, NPR, Perplexity.AI, Axios

AI requires a new kind of data center

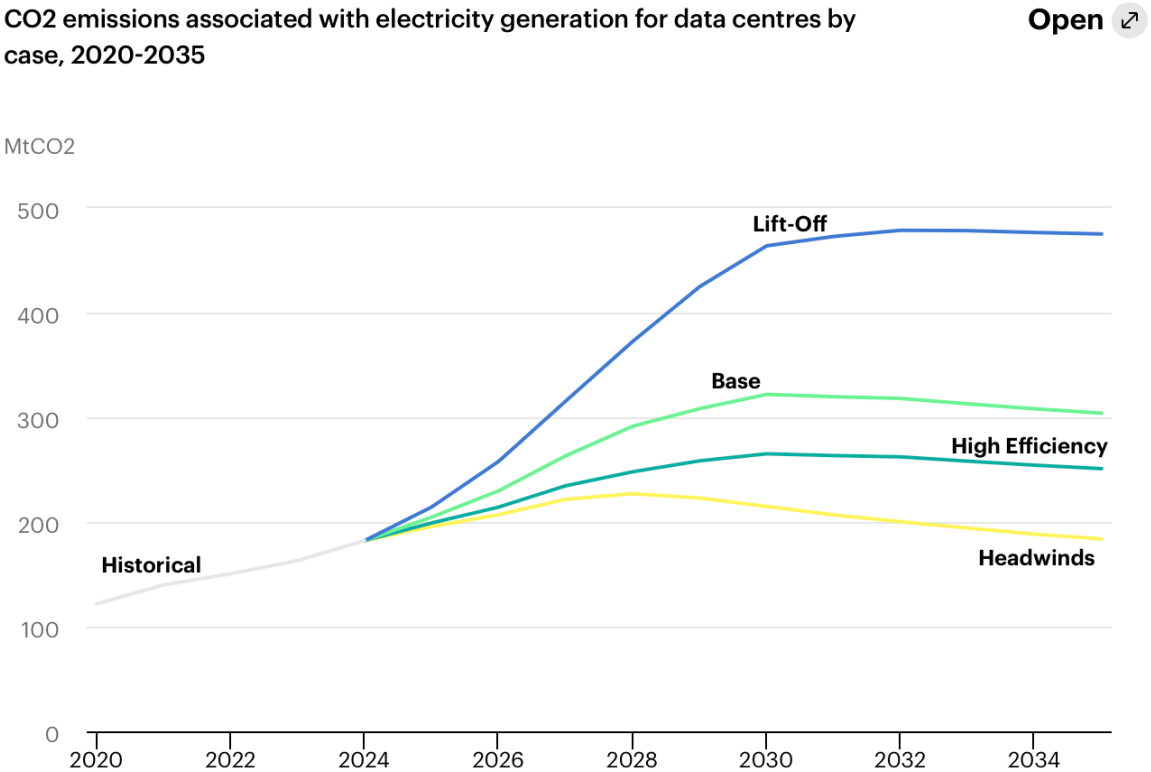
"Retrofitting existing facilities to support these massive jumps in power density is becoming complex and compromised. We will need new, purpose-built AI infrastructure to power the next generation."

Frank Long
Goldman Sachs Global Institute



Report credit: Goldman Sachs

- **The computational power required for sustaining AI's rise is doubling roughly every 100 days.**



Report credits: WEF, IEA

Ripple effects

ECONOMICS, POLICY & REGULATION

Microsoft Taps Nuclear Power To Fuel Growing AI Demand

OCTOBER 9, 2024

CLIMATE

Trump DOE gives Microsoft partner $1B loan to restart Three Mile Island reactor

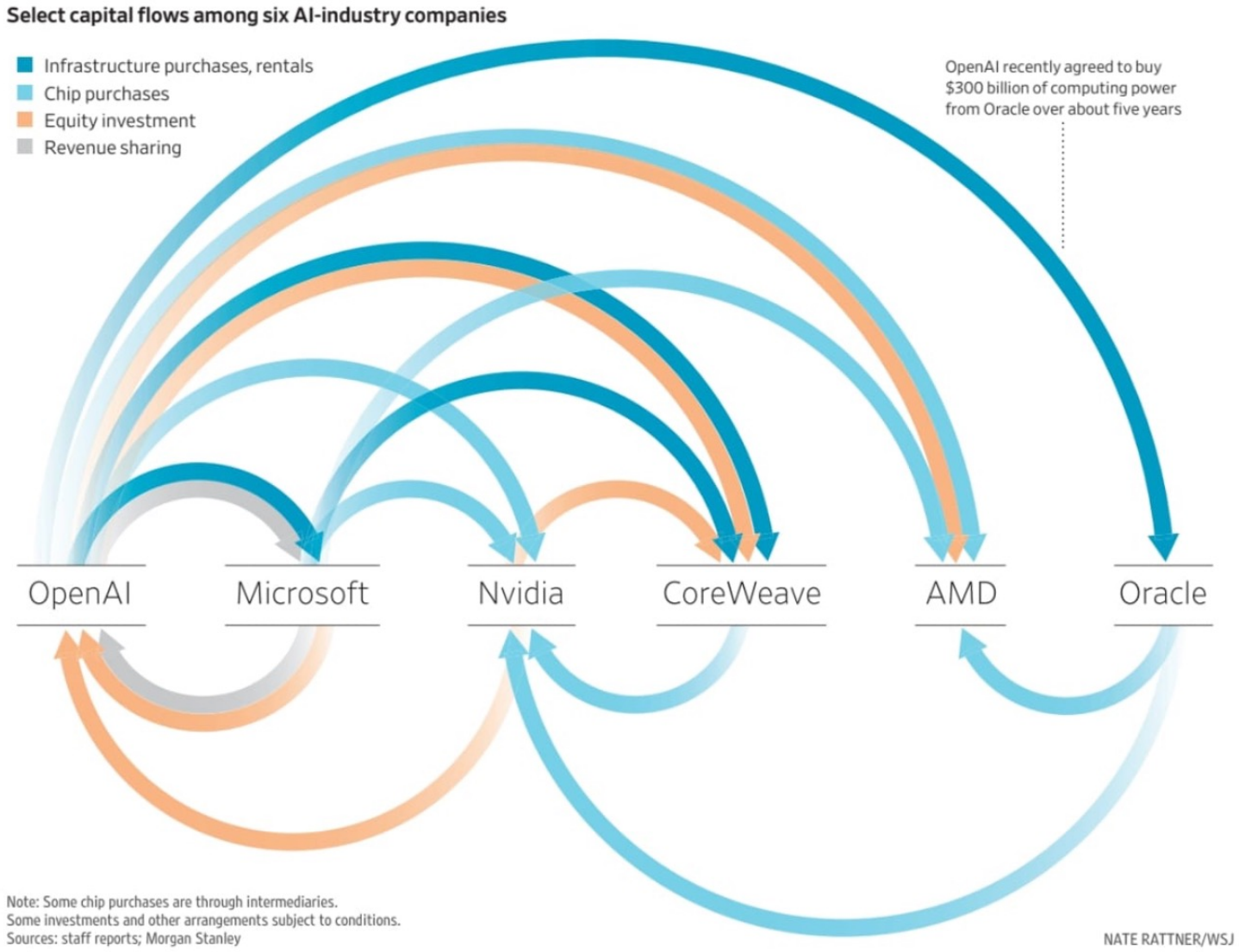
Reuters World Business Markets Sustainability Legal Commentary Techno

Helion Energy starts construction on nuclear fusion plant to power Microsoft data centers

By **Stephen Nellis**

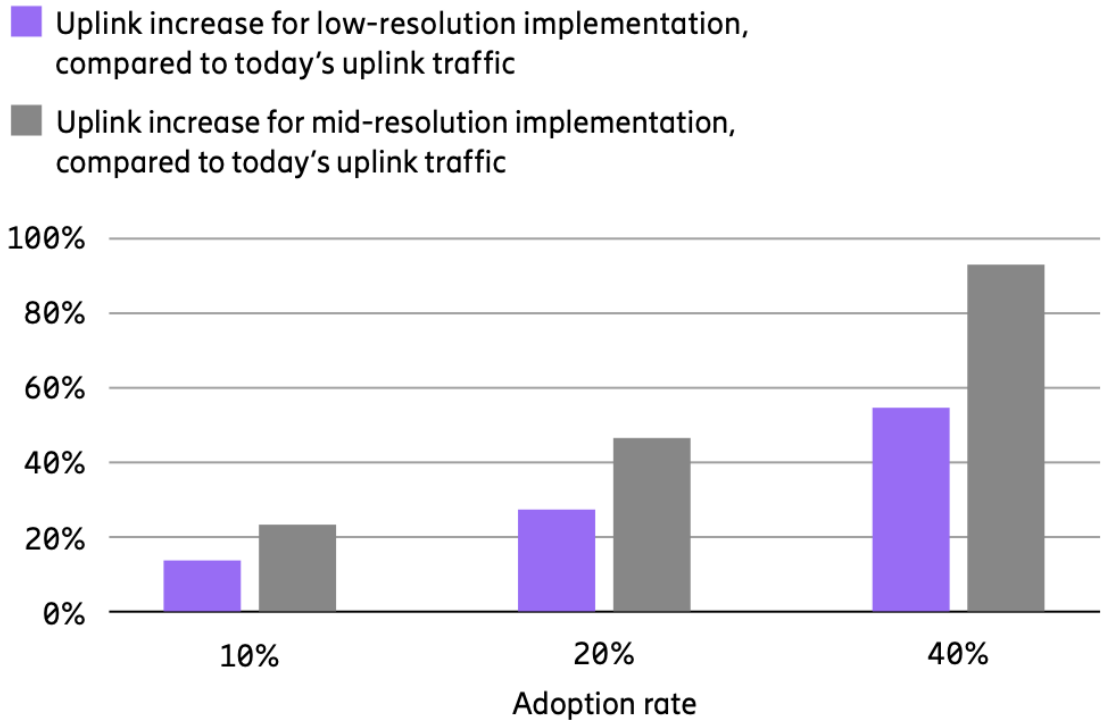
July 30, 2025 7:20 PM GMT+3 · Updated July 30, 2025

News clip credits: Global Finance, Tech Crunch, Reuters



News clip credit: WSJ

Traffic impact of personalized AI assistants in smart glasses and AR devices

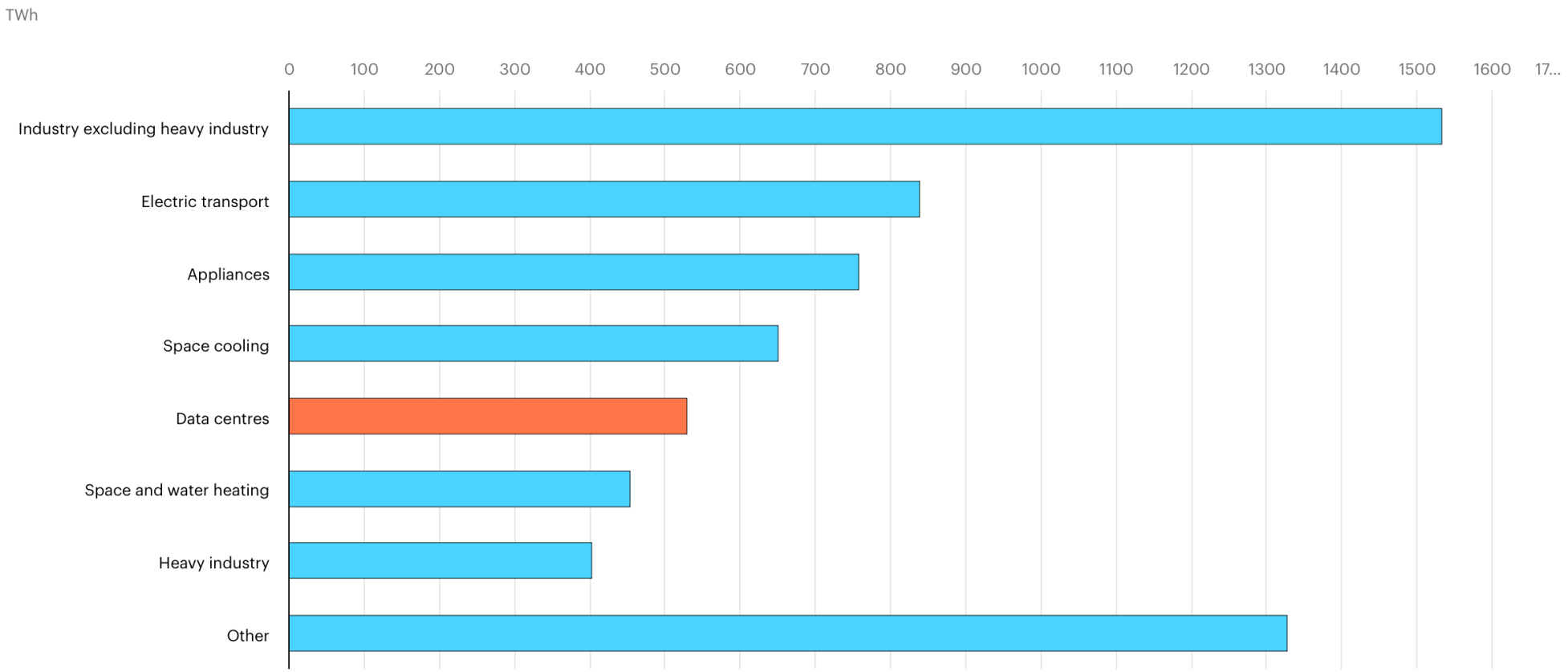


Increases may be partially offset by in-device AI and AI-based improvements in compression

Report credit: Ericsson

Perspective

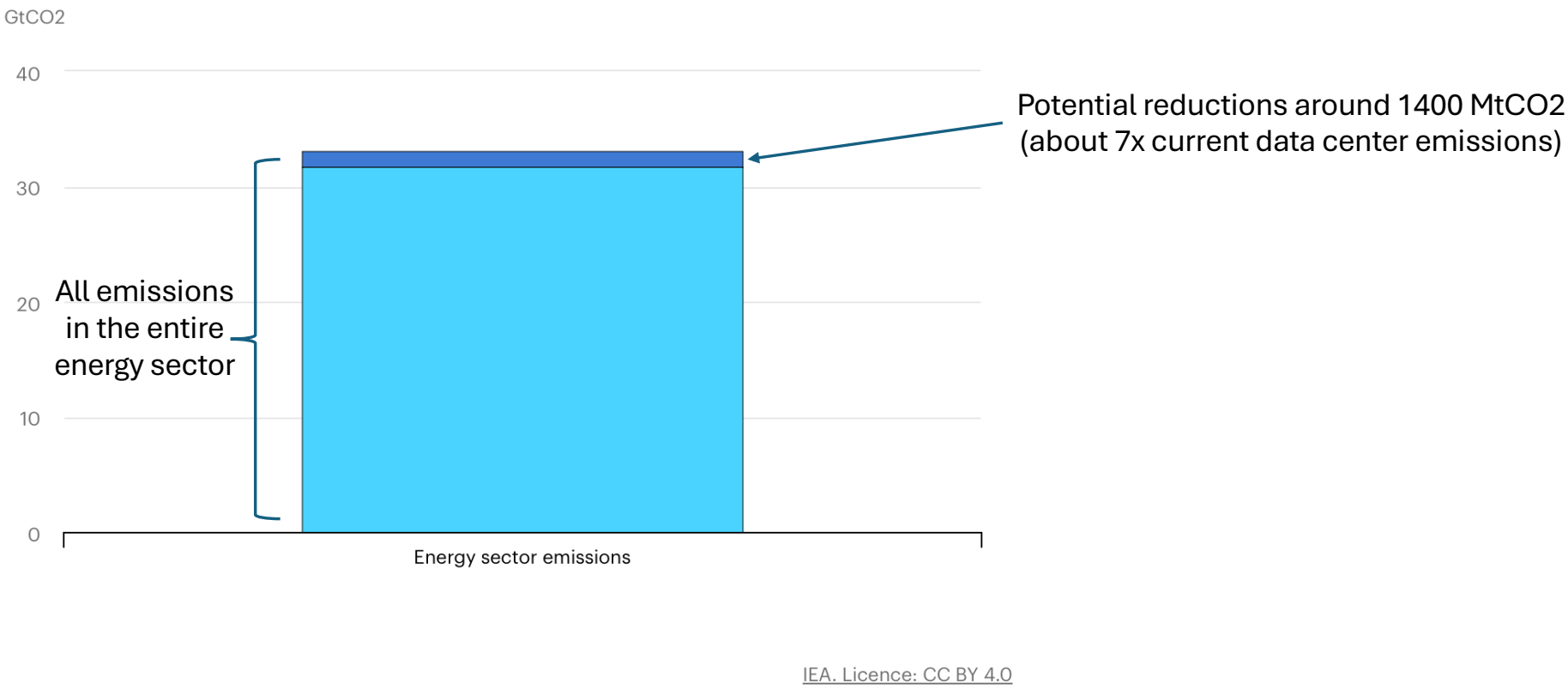
Increase in electricity demand by sector, Base Case, 2024-2030



Report credit: IEA

Direct and indirect emissions reductions contextualised with total emissions, Widespread Adoption Case, 2035

Open



Total **Reductions: Widespread Adoption Case**

Report credit: IEA

Conclusion:

AI can create tremendous benefits and be worth its cost

But it needs to work well, and each use needs to justify its existence

“AI’s handprint in improvements needs to overweigh its carbon footprint”

There are obvious uncertainties in this: e.g., how far microelectronics improvements can be taken, level of improvements achievable via the compute scaling approach, availability of additional training material, of appearance or need for fundamental advances, how successful will AI applications be really

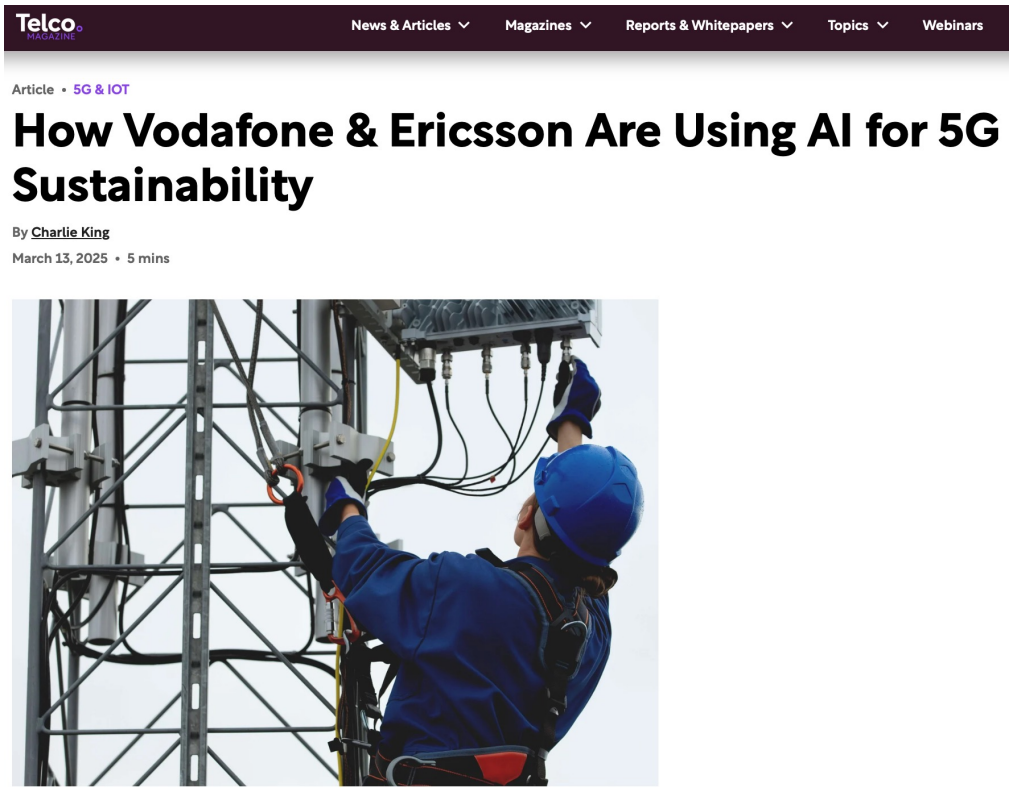
An Example

AI as an optimizer

Problem: high energy consumption for networking, 87% of this is in the radio part

Solution: (1) Equipment with deep- and microsleep modes (2) AI that predicts traffic patterns, directing when/which components to put to sleep

Why this works well: relatively simple AI optimization problem, can use small models, etc. => cost of AI is much smaller than the benefits gained



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Article • 5G & IOT

How Vodafone & Ericsson Are Using AI for 5G Sustainability

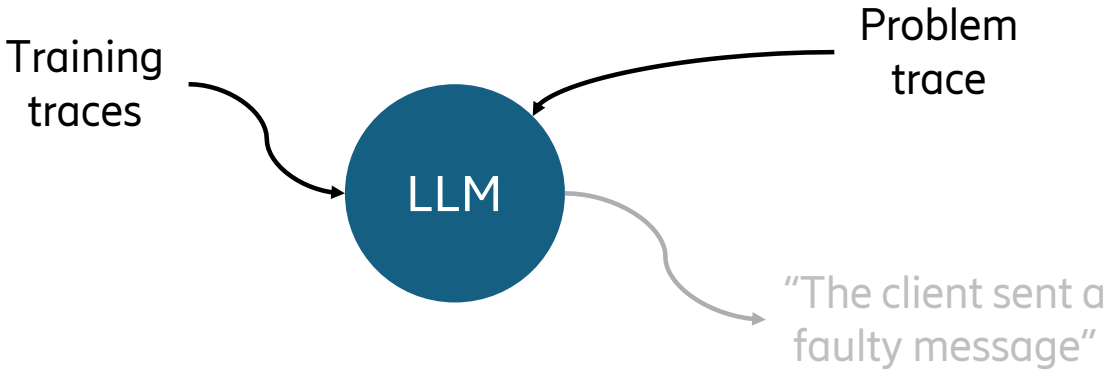
By Charlie King

March 13, 2025 • 5 mins

News clip credit: Telco Magazine

AI in diagnosing system problems

Case Protocol LLMs: Training LLMs to speak not just English but the protocols that machines speak to each other (HTTP, DNS, TLS, BGP, etc.)



Can you diagnose

- A short message exchange? ✅ 0.01€ 0.34 Wh
- A 10 gigabyte log file? ❌ 2M€ 40 MWh

Article credit: ACM

Final conclusion

AI can be beneficial for sustainability
– if done right
– and used for the right task

There are a lot of industry cases with potential sustainability wins

But the devil is in the details

Pick the right tool for the task (this isn’t always AI)

Thank you