AI and Sustainability

Josh Parker, Head of Sustainability | ITU AI for Good – July 2025

AI Infrastructure

Pioneering Accelerated Computing

Modern computing started sixty years ago with the IBM System/360. For the last decade—as the performance scaling of general-purpose processing has slowed while computing demand has continued—an exponentially growing performance-to-demand deficit has built up. NVIDIA accelerated computing has created a path forward at just the right time.

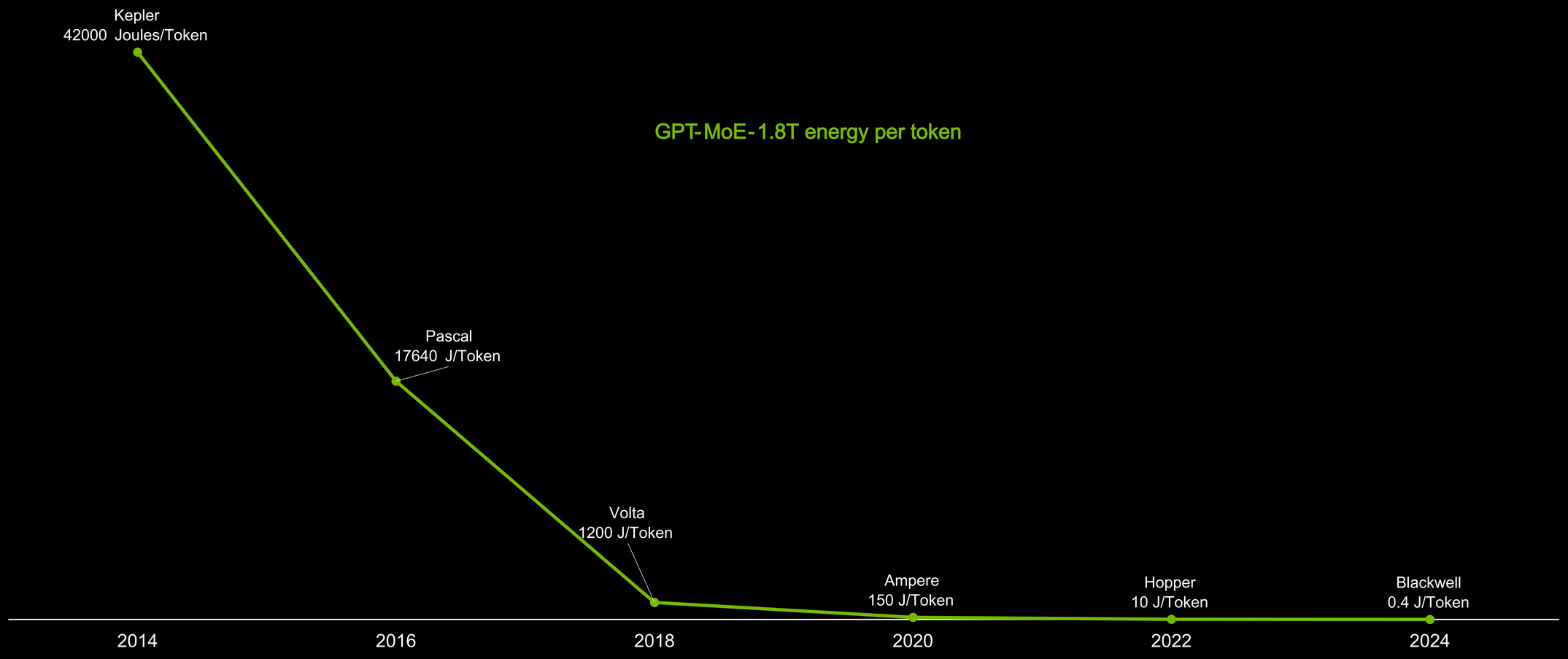
Accelerated computing starts with the most advanced processors and ends with AI factories. From chip architecture to advanced networking to acceleration libraries, NVIDIA builds the entire computing system at data center scale to produce intelligence at scale.

NVIDIA Powers AI Factories

Sustainable Innovation Across the AI Stack

AI Energy Efficiency Gains: Dramatic & Reliable

Energy efficiency in LLM inference has improved 100,000x in 10 years



AI Water Efficiency Gains: 300x

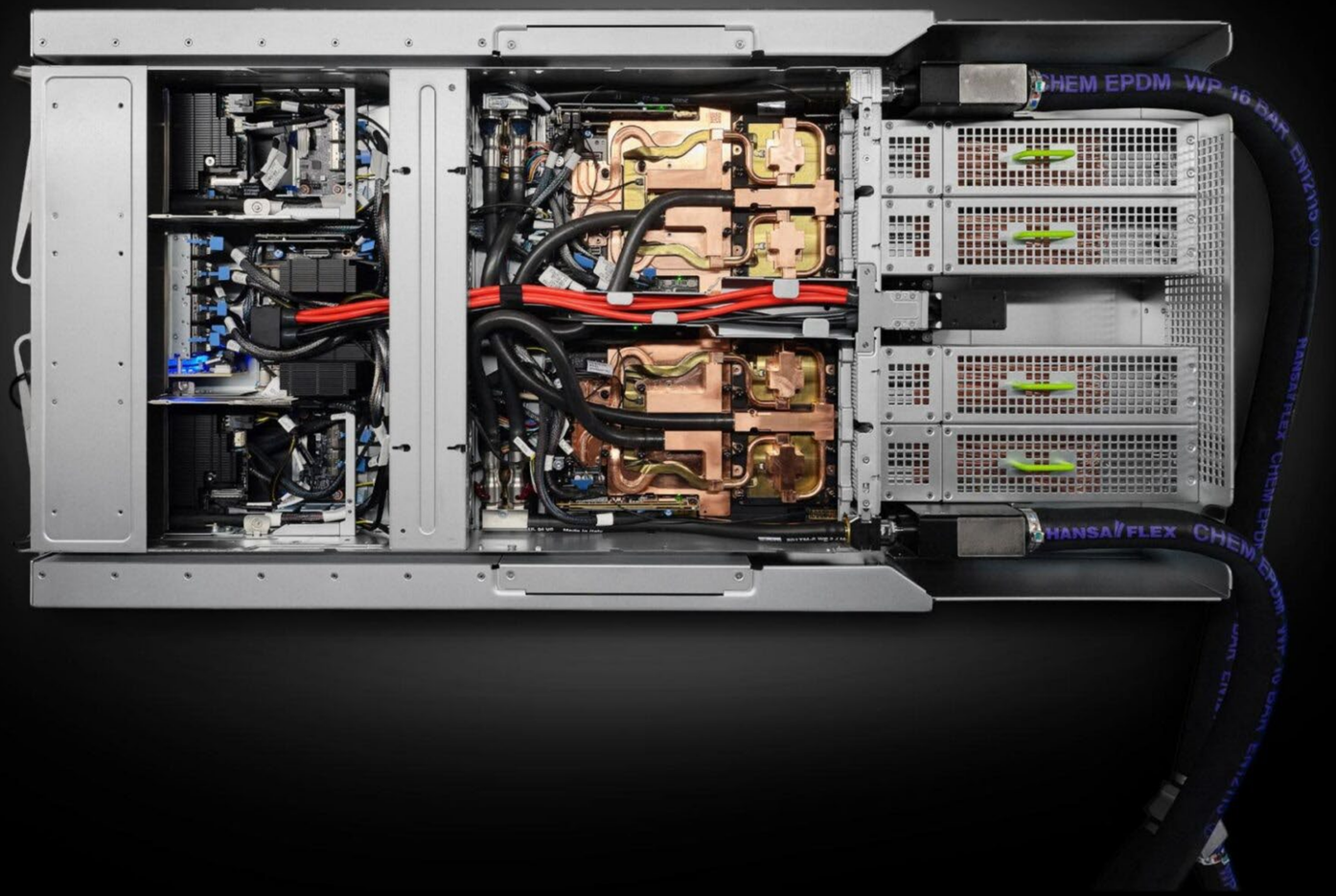
Efficiency -focused innovation leads to reduced water *and* energy consumption

Many datacenters rely on chillers and/or evaporative cooling to keep servers cool.

These traditional cooling techniques could be responsible for up to 40% of a datacenter's energy consumption.

NVIDIA's Blackwell platform was designed for direct-to-chip liquid cooling, feasible because of the platform's high compute density.

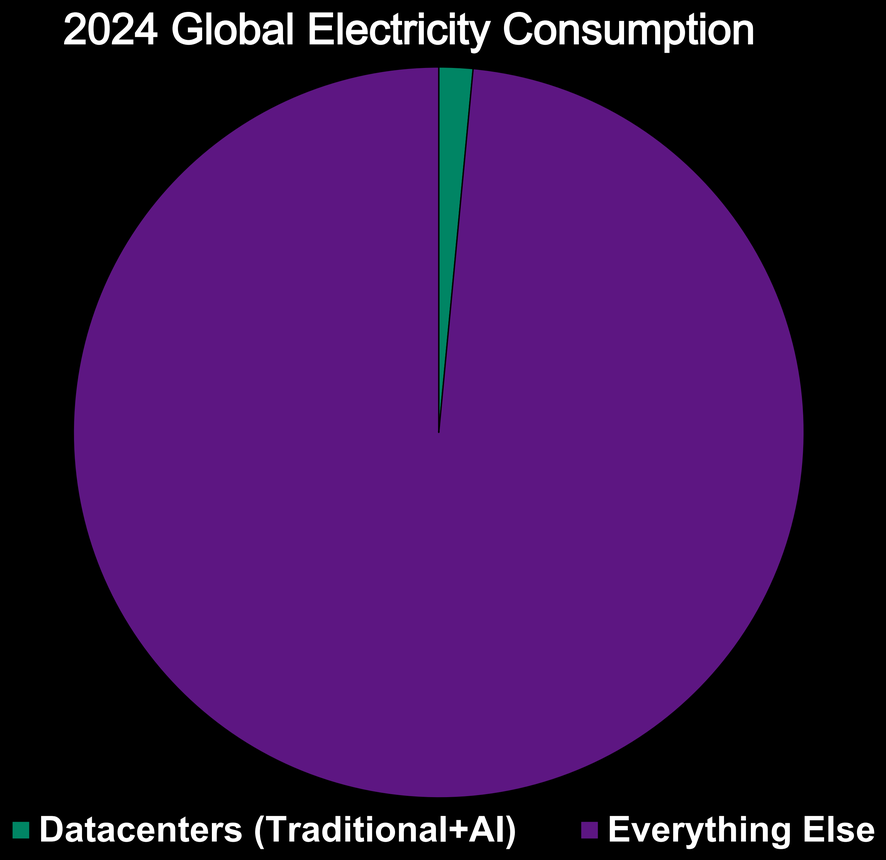
This advanced cooling reduces water consumption by **300x**, and contributes to a **30x** improvement in energy efficiency for inference.

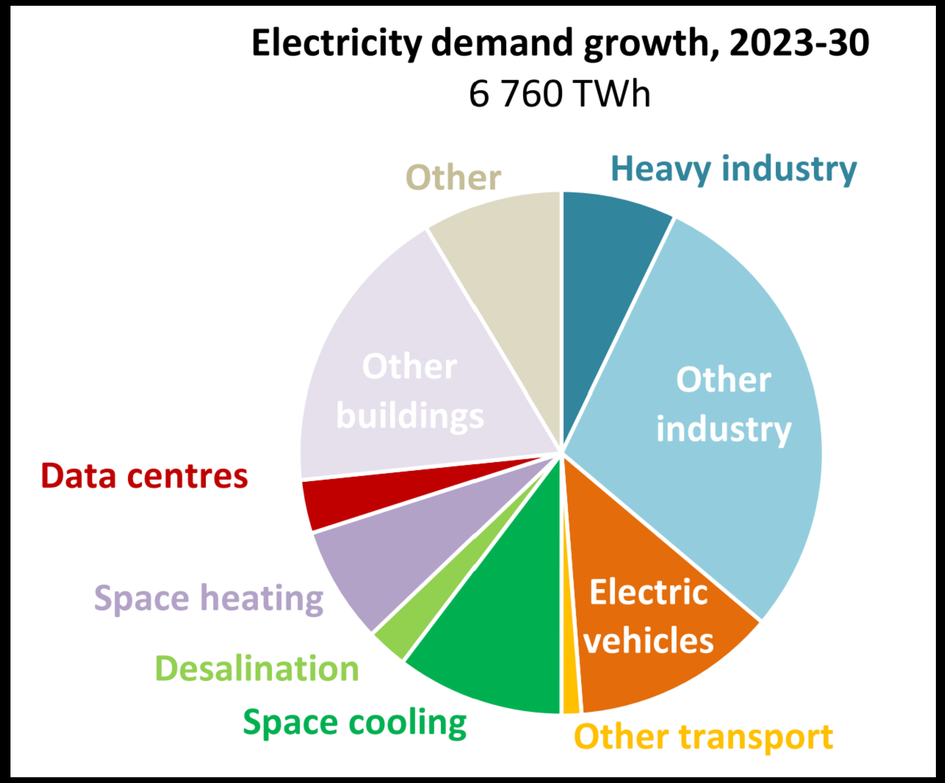


Sustainable AI: Measuring AI's Footprint

AI Is Driving *Some* Electricity Load Growth

Datacenter load growth is accelerating, but AI still accounts for a small proportion of total electricity demand





Sources: IEA World Energy Outlook 2024; IEA Energy & AI Report 2025

Many AI Datacenters Use Clean Energy

Emissions generated by AI datacenters are generally much lower than other sectors (per MWh)

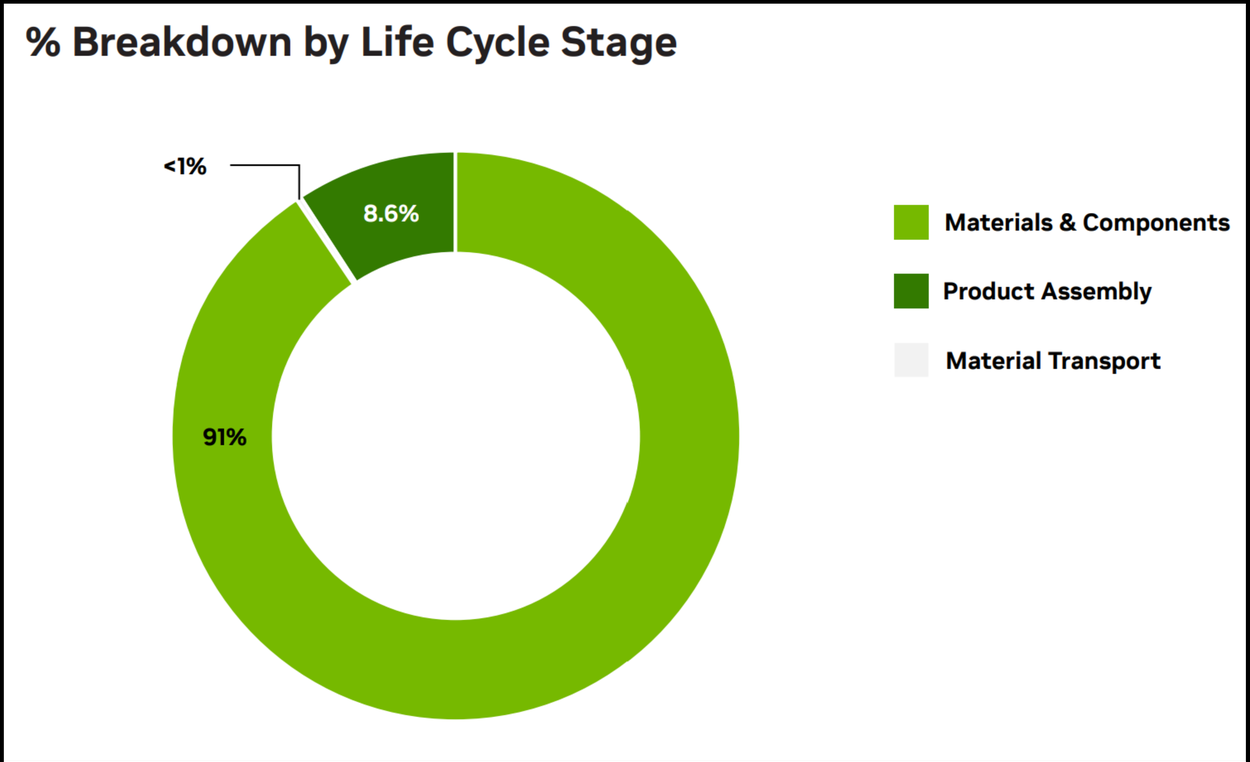
Table 2.2 ▻ **Emissions reduction and clean energy targets of corporate data centre operators**

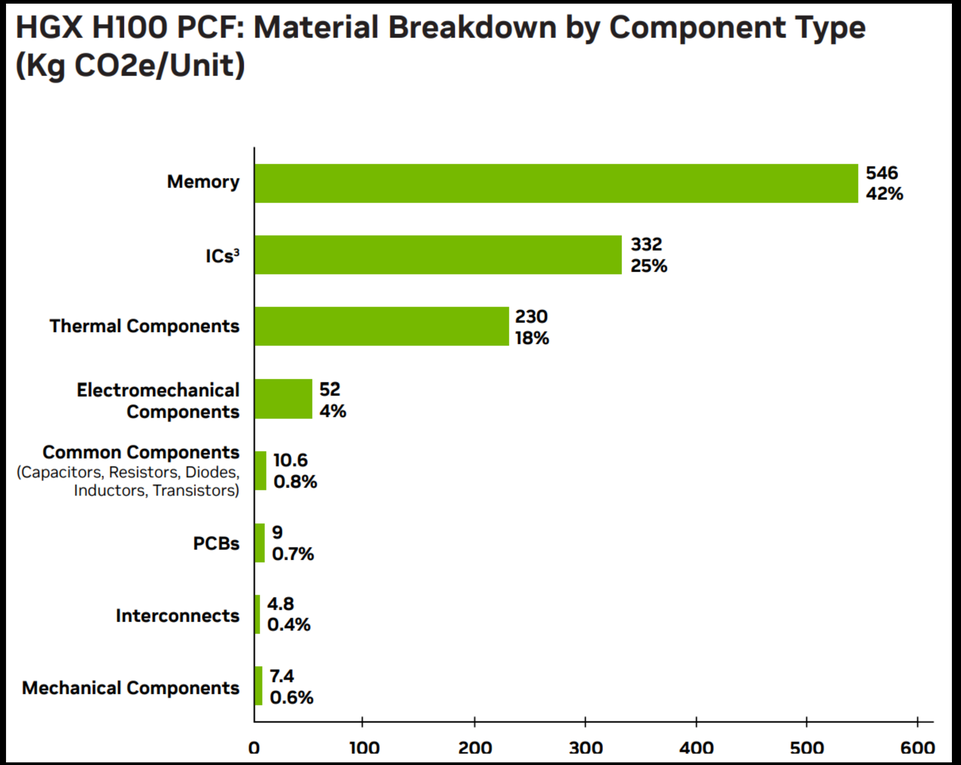
Company	Estimated data centre capacity (MW)	Net zero emissions target year	Corporate clean, green or renewable electricity target*	Current share	Hourly matching target*
Meta	9 780	2030	100% renewable since 2020	100%	
Google	8 960	2030	100% renewable since 2017	100%	100% by 2030
Amazon	7 660	2040	100% renewable since 2023	100%	
Microsoft	6 970	2030	100% renewable by 2025	100%	100% by 2030
Digital Realty	2 740			66%	
Equinix	1 850	2030	100% renewable by 2030	96%	
Tencent	1 760	2030	100% green by 2030	12%	
Alibaba Cloud	1 660	2030	100% clean by 2030**	56%***	
Aligned	1 290	2040	100% renewable since 2020	100%	
Huawei	1 260	2040		> 50%	
Apple	1 240	2020	100% renewable since 2018	100%	

Source: IEA Energy & AI Report 2025

Embodied Emissions: New Data

New cradle-to-gate analysis identifies hotspots for prioritized decarbonization





Source: NVIDIA/WSP Product Carbon Footprint Analysis (ISO-aligned; third-party reviewed)

AI Is Likely Already More Sustainable Than You Think

- AI is starting from a very small baseline
  - Datacenters: ~1.5% of global electricity in 2024
  - AI: ~0.3%
- AI can be flexible geographically and temporally
- Most large AI datacenter developers are pursuing 100% clean energy
- AI is accelerating existing workloads

AI for Sustainability: AI’s Positive Impacts

AI in Manufacturing: Digital Twins

Foxconn uses Omniverse to build and optimize their robotic factories, leading to a **30% energy reduction** in their new manufacturing facility in Gaudalajara, Mexico.

Omniverse Digital Twin

Real Factory

AI in Datacenters: Cooling and Energy

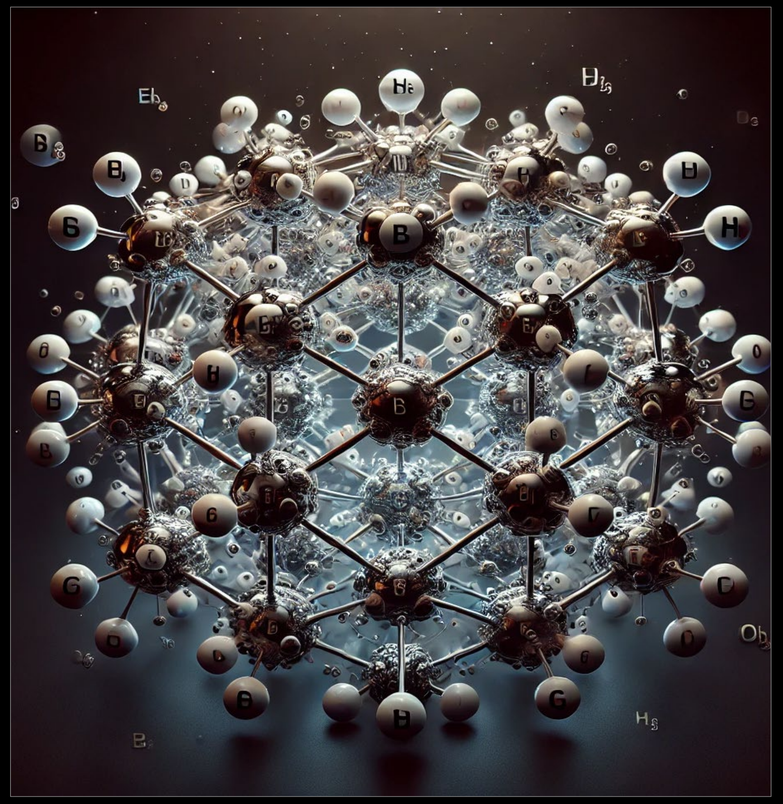
Google’s DeepMind used machine learning to analyze datacenter cooling requirements and reduce the energy used for cooling by **40%**.

AI in Nature: Waste and Restoration

Startup Clearbot is using AI and efficient battery -powered automated boats to collect waste (200 kg/hour) and track potential sources for mitigation efforts.

AI for Sustainability: Innovation is Rapid

Sustainability efforts are broadly benefitting from access to new intelligence



Material Science and Resource Conservation

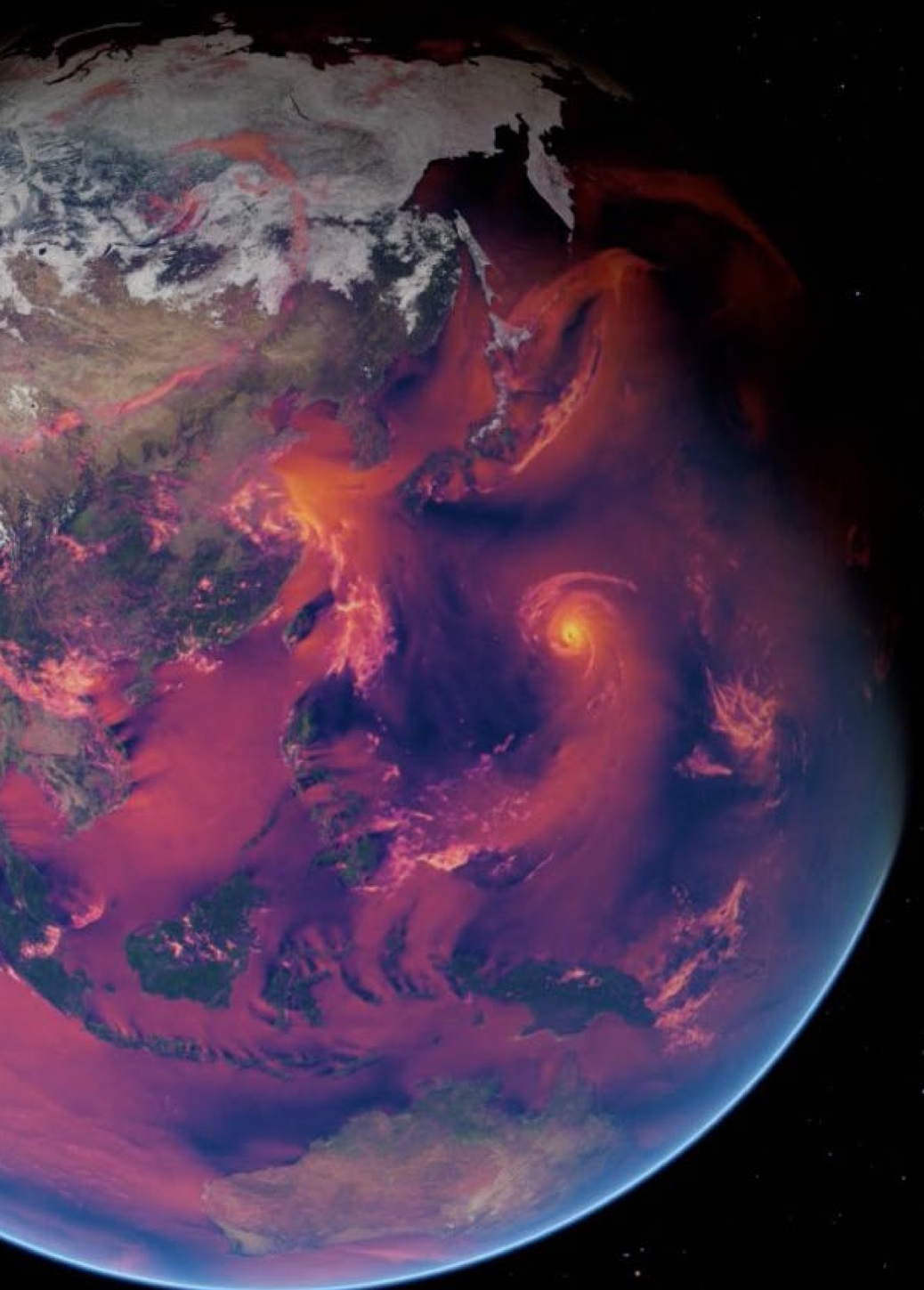
Microsoft identified 500,000 battery electrolytes from 32 million potential materials

Waste and Recycling

Greyparrot recognizes and sorts recyclable materials with AI

Transportation

NoTraffic uses AI for road scenarios to reduce traffic and emissions

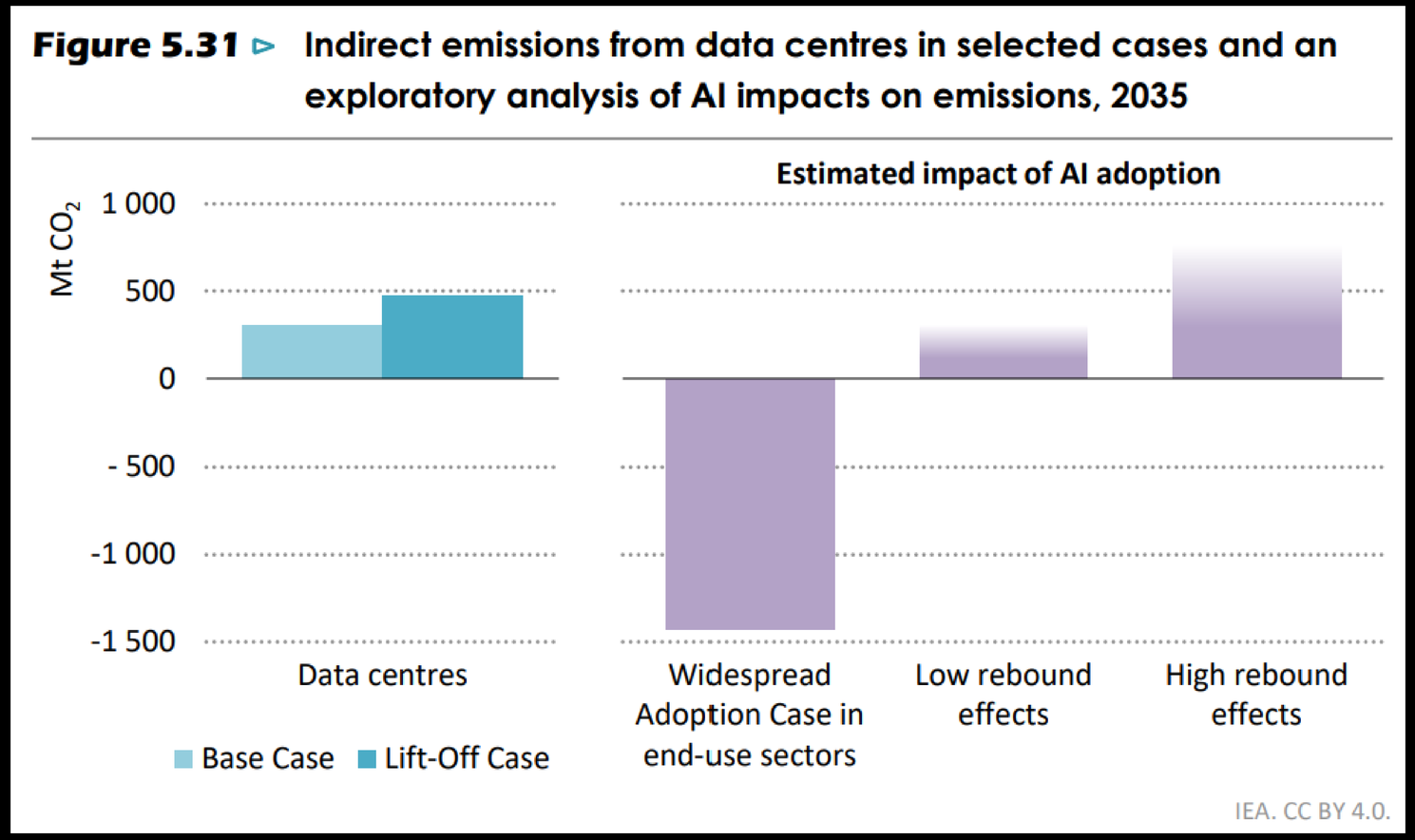


Earth -2: A Critical Digital Twin

This will take more than a village

- Platform enables a quantum leap forward in weather and climate modeling
- Combines accelerated computing, AI and visualization technologies
- Based on three moonshot goals:
  - Efficiently generate high -fidelity data
  - Achieve low-latency interaction with exabytes of data
  - Make climate data accessible

AI's Emissions Impacts: A Reason for Credible Optimism

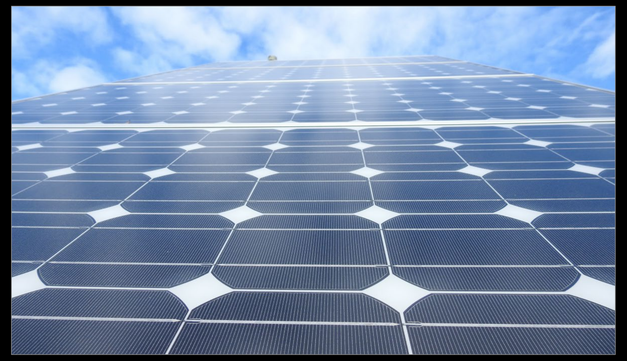


Source: IEA Energy & AI Report 2025

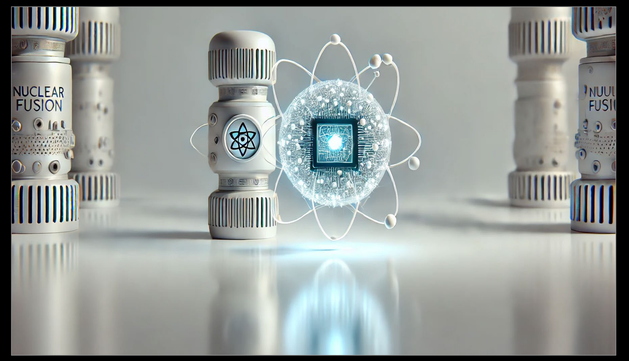
Artificial Intelligence: A Sustainability Moonshot Enabler and Accelerator

Innovation in AI could help us innovate our way to long -term sustainability solutions

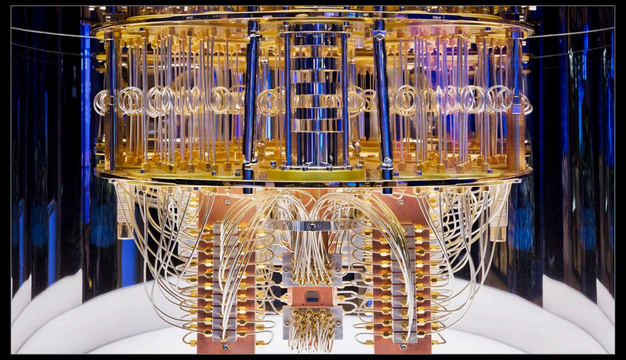
Carbon Capture & Storage



Green Grid Acceleration



Nuclear Fusion



Quantum Computing

Climate-Positive Ag

Ocean Regeneration

Clean Tech Discovery

Biodiversity Restoration


Thank You