Interconnectivity

AI at a Sustainability Crossroads

Nymark

WHAT IS NEXT?

Unpack the conversation around AI and the environment. Can the AI race unlock green innovation?

‘25 ‘30 ‘50

March 2025

This report offers insights and reflections on emerging trends in technology, shared for informational purposes only. Nymark presents these perspectives to contribute to broader industry conversations and to inspire further exploration. While we aim for accuracy, the report is not exhaustive and does not replace expert consultation or tailored guidance. Readers are encouraged to interpret and apply this information thoughtfully within their unique contexts.

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Driving Positive Tech

First, a note on what we're publishing and why. At Nymark, we focus on bridging the gap between potential and sustainable success for technologies that truly matter. Our research unpacks developments across these sectors. Interconnectivity 2025 shows how these Positive Technologies reinforce one another, forming a larger ecosystem of progress for the decades ahead.

The focus of this report is artificial intelligence (AI), a force at the centre of Positive Technology industries. AI-driven tools are improving so rapidly, and in so many places at once, it's only a matter of time until the world's systems are transformed by powerful AI models. The challenge today is minimising the risks associated with the accelerating AI race.

The 'techno-optimist' perspective sees AI as the ultimate problem-solver, capable of optimising industries, accelerating innovation, and tackling global crises. To hardcore techno-optimists, technology is seen as inherently beneficial, and growth is pursued at all costs.

This ideology has been criticised for its blind spots in the development of AI. AI is often deployed under the guise of efficiency, but efficiency does not equal ethical or human-centric outcomes. The pace of AI far outstrips regulation and public understanding, creating a gap in accountability. And the reality of unchecked AI consumption has unexpected consequences. The goal should not be unchecked expansion but sustainable, intentional integration and frameworks to enhance AI's long-term impact.

In 2025, this story is playing out among AI's environmental impact. AI is expected to accelerate a web of climate solutions, but its rapid expansion is leading to significant increases in energy consumption. As this report explores, interconnectivity is at the heart of the solution: the rollout of AI infrastructure could advance clean energy .

Read this report to see how AI aligns with global climate goals, emerging strategies to meet demand sustainably, and what's coming next.

The Nymark Team

Research Enhanced With Open AI's Deep Research Model

$$(400W \times \frac{26}{60}) = 173.3Wh \quad (\approx 0.173kWh)$$

The popularity of the latest generative AI models such as ChatGPT are everyday contributors to the carbon footprint of AI operations. As it stands, the topic of regulating corporate AI use raises more questions than answers. Should companies be required to justify their AI usage?

For this report, we put ours into context. Research was partly enhanced with ChatGPT's Deep Research model. We estimated the energy consumption of running Deep Research for around 26 minutes. Based on publicly available data on AI inference energy use, Deep Research Likely Uses: ~ 300–500 watts per hour, assuming it runs on dedicated AI compute servers.

Running Deep Research for 26 minutes likely consumed ~0.173 kWh of energy, emitting ~69g CO_2 if from a standard grid.

This is roughly equivalent to:

- Running a 100W light bulb for ~1.7 hours.
- Charging a smartphone ~15 times (typical smartphone battery ~11Wh).
- Running a modern laptop for ~3 hours.

Carbon Emissions Equivalent:

- If powered by a typical grid (average 400g CO_2/kWh emission intensity) This is equivalent to:

  Driving ~300 meters in a petrol car.

  Watching Netflix for ~3 hours (typical streaming footprint).

- if powered by renewable energy, emissions could be close to zero.

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The Mission

The Mission

AI and Climate: The Case for Optimism

AI's sustainability story could define the coming decades in an unprecedented technological shift. We are only beginning to see AI's potential to accelerate scientific advancements and address global challenges. Today, Google's DeepMind is compiling a wishlist of datasets that could unlock AI-driven climate and sustainability solutions.

The innovation is expanding, spanning sustainable protein development, progressive bio-diversity conservation, and the discovery of new materials for energy and climate solutions.

AI-powered breakthroughs will be essential in meeting net-zero emissions targets by 2050. As climate change accelerates, so does the technology that can mitigate its impacts. Experts hope that the acceleration in computing power and AI, if matched by progress in industrial pillars such as hardware, materials, and battery technology, could generate the momentum needed to achieve ambitious climate goals. The scale of AI's incremental improvements is difficult to predict, from optimising energy storage and circular economy methods to entirely new applications.

Then there are the potential game-changers: the as-yet undeveloped breakthroughs that could redefine sustainability. Nuclear fusion tops that list. AI is already being deployed to model sustainable nuclear fusion simulations, aiming to safely harness this energy source, which, if realised, could be a transformative driver of the clean energy transition.

First, AI itself requires power. The AI race now sits at the centre of global economic development, but its momentum is part of a broader structural shift—one that mirrors the trajectory of the green economy and energy transition over the past decades. Investment in green infrastructure has reached record levels, driven by both private capital and supportive government policies. Increasingly, such commitments are seen as vital to national competitiveness and economic security. The effects of this shift are already more evident: sustained investment in research and development has led to recent breakthroughs in renewable energy and battery storage, triggering rapid cost reductions followed by large-scale adoption at an accelerating pace.

“The European Commission launched a fund to mobilise €200 billion in AI investment, including €20 billion for AI gigafactories to support collaborative development and training complex AI models.”

The Mission

AI and Climate: The Case for Optimism

As global AI adoption intensifies, so does the need for green infrastructure. Northern European countries are at the forefront of clean energy development (Sweden, Denmark, Finland, and Switzerland ranked highest in the World Economic Forum's Energy Transition Index in 2024). However, Europe lags in AI infrastructure. France (ranked fifth in the Energy Transition Index) launched the Paris AI Action Summit in an effort to establish itself as a global AI leader.

The country announced a €30-50 billion deal with the United Arab Emirates to build an AI campus and data centre. Meanwhile, the European Commission has launched a fund to mobilise €200 billion in AI investment, including €20 billion for AI gigafactories to support collaborative development and the training of complex AI models.

China and the U.S. continue to compete for dominance in AI. In January, the U.S. unveiled plans for The Stargate Project, an unprecedented $500 billion AI infrastructure initiative designed to bolster the country's energy grid in response to rising AI-related power demands. Though the project has been met with scepticism, its sheer scale underscores the central role of infrastructure in the global AI race between the U.S., China, and Europe. Take a closer look at the strategy, and The Stargate Project is seeking partners that specialise in renewable energy and sustainability, according to a launch form from OpenAI.

In contrast to techno-optimism, some experts warn that AI's rapid expansion may drive up emissions rather than reduce them. Historically, periods of rapid technological growth, beginning with the Industrial Revolution, have led to increased emissions.

As we explore in the following chapters, AI's threat to increase emissions is real. But it's also driving a huge market for decarbonisation solutions.

Pushing tech firms into renewable energy investments and leveraging innovation in the green economy, to keep climate commitments in sight. Whether AI becomes a net positive or negative for the environment will depend on the choices made now by tech companies, policymakers, and researchers.

New Ground for Green AI

AI and Climate: The Case for Optimism

December 2019

The European Commission unveils the European Green Deal

This high-level policy backdrop accelerates sustainability mandates in digital infrastructure. It calls for the ICT sector to "undergo its own green transformation," in the push for EU-wide climate neutrality by 2050.

February 2020

EU Digital Strategy: data centres to be climate-neutral by 2030

The Commission pledges initiatives for "highly energy-efficient and sustainable" data centres within the decade, aligning digital policy with the Green Deal's environmental goals.

July 2021

China issues Three-Year Action Plan for new data centres

Policy from China's Ministry of Industry and Information Technology caps annual growth in data centre energy consumption at 20% and pushes Chinese cloud providers toward more efficient, greener operations.

January 2022

Corporate clean energy buying hits a record high

Tech firms drove this surge: Amazon (6.2 GW), Microsoft (6.15 GW), Meta (2.2 GW) were the top three buyers globally.

October 2022

The IEA's Tracking Clean Energy Progress: modest rise in emissions since 2010 due to efficiency and renewables

However, to align with a Net Zero 2050 scenario, the sector's emissions must drop ~50% by 2030, requiring rapid deployment of clean electricity and innovative cooling and hardware designs. This frames the 2020s as a critical decade for green AI infrastructure.

January 2025

The Stargate Project Launches $500 billion infrastructure initiative

U.S. President Donald Trump, Oracle Chairman Larry Ellison, SoftBank CEO Masayoshi Son and OpenAI CEO Sam Altman announce Stargate -- a new company focused on AI-centric data centre infrastructure.

The Challenge

The Challenge
AI's Environmental Cost

1-2

The rise of AI is inseparable from the explosion of data centres: the warehouses of servers that make AI's feats possible. Training and running large AI models require vast computational power, most of which is supplied by these energy-hungry data centres. For much of the 2010s, data centre energy use remained surprisingly stable thanks to efficiency gains that offset surging demand for digital services.

However, AI's recent advances have come with a hefty energy bill, and those efficiency gains have begun to plateau. In 2022, data centre (including cryptocurrency operations) energy use rose sharply as demand for cloud services and AI workloads soared. Accounting for roughly 2% of global electricity use; about as much power as a mid-sized country consumes in a year. If current trends hold, total data centre electricity consumption may double to 1,000 TWh or more by 2030, on par with the electricity usage of France and Germany combined.

It's important to put AI's energy demand in perspective. The International Energy Agency (IEA) notes that even with the AI boom, data centres are not (yet) the dominant driver of global electricity growth.

Between now and 2030, electrification of transport, industrial processes, and increased cooling/heating are expected to add far more to electricity demand than data centres. In the IEA's Stated Policies Scenario, data centres account for only about 3% of global electricity demand growth to 2030. In other words, AI's rise, while significant, is just one part of a larger electrification trend.

However, at local and regional scales, AI's energy impact is far less modest. Because computing infrastructure tends to cluster in specific locations, certain grids are feeling the strain. In countries like Ireland, data centres now consume over 20% of all electricity. EirGrid, Ireland's grid operator, warned that at current rates data centres could use one-third of national power capacity by 2030, threatening the country's climate targets and prompting officials to pause new connections in the Dublin area.

“Existing data centres are not equipped for AI, lacking the infrastructure to deliver enough power and cooling systems for the intense heat that GPUs generate.”

The Challenge
AI's Environmental Cost

A similar story is playing out in parts of the U.S.: data centres already account for more than 10% of electricity use in at least five U.S. states (for example, Virginia's data centre hub). In such hotspots, the race to build ever-larger AI supercomputing clusters risks overloading local grids and has even led to talk of moratoriums on new centres until grid upgrades catch up.

Many existing data centres are not equipped for AI infrastructure, lacking both the electrical infrastructure to deliver enough power and the cooling systems needed to handle the intense heat that GPUs generate. A single data centre can have cooling towers that require millions of gallons of water each year to prevent critical infrastructure from overheating. Concerns are rising over whether the industry's expansion will exacerbate water scarcity in drought-prone regions.

Many server farms rely on evaporative cooling; for instance, Google's data centres in The Dalles, Oregon were found to be guzzling over 25% of the city's water supply for cooling needs, a fact revealed only after legal action forced disclosure.

As AI workloads grow, such resource demands (power, water, land) are set to increase, raising environmental and community concerns.

From a climate standpoint, the carbon footprint of AI depends heavily on how the electricity is generated. Today, a significant portion of data centre energy still comes from fossil fuels, meaning AI's growth could lock in higher CO_2 emissions unless clean energy keeps pace.

Training a single large AI model can emit hundreds of tonnes of CO_2 if done in regions with coal-heavy power grids. And unlike one-off training runs, the ongoing usage of AI models (inference) by millions of users may become the larger energy drain over time. "As we move from text to video to image, these AI models are growing larger and larger, and so is their energy impact," one MIT scientist noted, echoing a widening consensus that AI's energy footprint is becoming too big to ignore.

New Ground for Green AI
AI's Environmental Cost

IEA Releases Electricity 2024 Report

The IEA forecasts that power demand from data centres and AI could double by 2026, adding electricity usage equivalent to that of Japan.

Data centres Cause Electricity Price Hikes in Virginia

Increased energy consumption by AI data centres leads to higher electricity prices and concerns about grid stability in Northern Virginia.

January 2024

August 2024

June 2019

May 2024

February 2025

Researchers from UMass Amherst quantify AI's carbon footprint

Study finds training a large transformer NLP model can emit ~626,000 pounds of CO_2 — roughly five cars' lifetime emissions, sparking calls for "Green AI" and more efficient model architectures.

AI's Energy Demands Impact Coal Plant Operations

Reports indicate that AI's substantial electricity consumption is delaying the closure of coal-fired power plants in the U.S.

IEA Projects 4% Global Electricity Demand Growth

The IEA forecasts a 4% increase in global electricity demand over the next three years, driven partly by AI data centre growth.

Regulating The Industry

Regulating The Industry
Government Policies & Regulations

1-2

While big tech moves to build more data centres, governments around the world are racing to regulate them. The substantial energy requirements of data centres in Ireland have been met with increasing local regulatory interventions.

And in the U.S., Atlanta's rapid data centre expansion became an urban planning dispute, criticised for prioritising land and power consumption over housing and retail development, and leading to stricter regulation. Other states are introducing zoning laws that restrict AI data centres from being built in water-scarce regions.

In the EU, new rules under the revised Energy Efficiency Directive will, for the first time, require large data centre operators to report detailed energy usage, efficiency, and even water use to authorities. Data centres above certain capacity must annually disclose key metrics (like Power Usage Effectiveness, renewable energy share, heat reuse, etc.) to an EU registry. This transparency is aimed at identifying inefficiencies and encouraging best practices across the industry.

The EU is also developing an EU-wide sustainability rating scheme for data centres, which could eventually tie into incentives or regulations. Effectively shining a light on which facilities are truly green and which are lagging.

In the UK, a parliamentary report in late 2023 called for mandatory disclosure of energy and carbon data from tech companies' data centres, noting that AI's rapid growth could otherwise undermine Britain's climate goals. The UK government has since classified data centres as critical national infrastructure and is exploring measures to ensure they don't destabilise the grid or blow the nation's carbon budget.

There are calls for requirements that new AI data centres be built "future-proof". For example, capable of running on renewable power and designed with heat-reuse systems from the outset.

"The Coalition for Sustainable AI, launched at the AI Action Summit in Paris, aims to establish sustainability as a core principle in AI policy and research globally."

Regulating The Industry
Government Policies & Regulations

Looking ahead, it is expected that governments and regulatory bodies will implement more stringent policies to manage AI's environmental impact. International focus on sustainable AI is building.

The Coalition for Sustainable AI, launched at the AI Action Summit in Paris, aims to establish sustainability as a core principle in AI policy and research globally. It was backed by 11 countries at the event in February 2025, and brings together stakeholders across the AI value chain for dialogue and collaboration.

The United Nations Environment Programme (UNEP) follows this up with more sustainability guidelines for data centres, providing a framework for public and private investments in energy-efficient AI infrastructure.

The message is clear: governance must evolve alongside technology, to maximise AI's societal benefits while minimising environmental downsides.

New Ground for Green AI Government Policies & Regulations

February 2010

U.S. launches the Federal Data centre Consolidation Initiative (FDCCI

FDCCI promotes “green IT” by reducing the energy and real estate footprint of federal data centres. This marks one of the first major government efforts to curb data centre power use in the cloud era.

June 2023

The European Parliament approves the EU Artificial Intelligence Act

In a world first, it includes transparency requirements for AI systems’ resource usage. Providers of large AI models must disclose their energy consumption and environmental impact, marking an initial regulatory step to address AI’s carbon footprint.

March 2024

Regulation for EU-wide sustainability rating scheme for data centres

Under the recast Energy Efficiency Directive, data centre operators must report key energy, water, and carbon metrics to an EU database starting September 2024.

January 2025

UK Government Proposes AI Growth Zones

The UK announces plans to create "AI growth zones" and invest in nuclear reactors to meet AI's energy demands while pursuing net-zero goals.

February 2025

Coalition for Sustainable AI launched at AI Action Summit

Over 100 partners, including 37 tech companies, eleven countries and five international organisations, have joined forces under the Coalition.

Technological Solutions

Technological Solutions
Softening AI's Energy Blow

1-2

Tech companies and researchers are racing to improve efficiency at every level, from smarter chips to greener power sources, to prevent AI's growth from derailing climate goals.

A first line of defense is making AI itself less power-hungry. Companies are investing in specialised hardware, from GPUs to custom AI chips, that perform AI computations far more efficiently than general-purpose machines.

Smarter software algorithms can also require less processing power, using techniques like "early stopping" in training (ending training once a model is good enough) to avoid wasted energy. Efficiency improvements like these have helped check data centre energy growth in recent years. But they struggle to keep pace with the explosive demand for AI services.

Each new breakthrough—a more efficient chip, a clever algorithm—is met by ever-greater use of AI. The result is a rapid build-out of power-hungry data centres worldwide. To counter this trend, renewable energy integration has become a mantra for AI providers.

Major cloud firms have pledged to run their data centres entirely on clean energy within the next decade.

Google vows to run on 24/7 carbon-free power by 2030, and says it already matches 100% of its annual electricity use with renewables. Microsoft aims to cover all its energy with renewables by 2025 and be carbon-negative by 2030. Meta claims it reached 100% renewable sourcing for its operations in 2020 and targets net-zero emissions by 2030.

This means investing in massive wind and solar farms, signing energy contracts so new renewable capacity is built to match AI's needs. Energy efficiency in data centre design is another piece: modern hyperscale centres boast advanced cooling systems and waste-heat recycling to squeeze more work from each watt. Some facilities are shifting to liquid cooling, running coolant over hot chips, to cut down on electricity used for air conditioning.

“Experimental software now exists to schedule AI tasks when solar and wind output is high, delaying non-urgent jobs to shrink their carbon output.”

Technological Solutions
Softening AI's Energy Blow

And because location matters, companies are siting data centres in places like the Nordics or Pacific Northwest to tap abundant hydro-electric power and naturally cool climates.

Numerous other creative strategies are emerging. Including shifting workloads to times of day or locations where green power is plentiful. Experimental software now exists to schedule AI tasks when solar and wind output is high, delaying non-urgent jobs to shrink their carbon output.

In tandem, using battery storage at data centres can store excess solar or wind energy for use at night, ensuring AI runs on renewables 24/7. MIT analysis found that a blend of such efficiency steps could shave 10–20% off global data centre electricity demand, and save companies money at the same time.

Emerging solutions, from better chips to greener grids, are tilting the balance toward sustainability, but their success is not guaranteed. What is clear is that AI's evolution is now tightly entwined with the clean energy transition.

Yet critical questions remain about how quickly these solutions can scale, and how companies can translate these promises into action.

New Ground for Green AI
Softening AI's Energy Blow

May 2016

Google unveils Tensor Processing Unit (TPU)

The machine learning chip is a breakthrough in AI-specific hardware, showing that tailored accelerators can dramatically improve energy efficiency for AI workloads.

July 2016

DeepMind's AI system slashes data centre cooling costs at Google

With a 40% reduction in energy used for cooling, this was a landmark in applying AI to improve its own infrastructure's efficiency, and demonstrated the power of AI-driven optimisation for cutting waste in real time.

June 2018

Microsoft's Project Natick proves the concept of subsea data centres

A 12-meter underwater data centre pod off Scotland's Orkney coast, powered entirely by locally generated wind and tidal energy. The sealed capsule, containing 864 servers, operated for two years on the seafloor with cooling provided by the surrounding ocean.

July 2020

Hydrogen fuel cells power promising break-through

A partnership between Microsoft and generator manufacturer Cummins successfully powers an entire row of data centre servers for 48 hours using a hydrogen fuel-cell system, eliminating the need for diesel backup generators during the test.

August 2024

Water-free cooling tech introduced across data centres

In a bid to conserve resources and reduce the environmental impact of the sector, plans propose to cut down water use by approximately 125 million litres annually for each facility.

2030 Outlook

Growth for advanced liquid cooling technologies

The market for advanced cooling technologies ($4.9 billion) is projected to expand to $21.3 billion by 2030.

In Practice

In Practice
Big Tech's Energy Ventures

1-2

AI's power-hungry data centres have put clean energy promises to the test.

In July 2024, Amazon announced that it had achieved its goal to power its global operations with 100% renewable energy, hitting the milestone seven years ahead of target. Noting the achievement, Amazon said its path to net zero was tied to "the increasing demand for generative AI" driving a requirement for different sources of energy.

Collectively, Big Tech has become one of the world's biggest backers of clean power. Amazon alone has contracted 33.6 GW of wind and solar, ranking as the eighth largest clean energy portfolio globally. Meta and Google are not far behind, each signing several gigawatts' worth of new solar and wind farms to fuel their expanding server fleets. This corporate buying spree is financing hundreds of new renewable projects globally, from West Texas wind farms to Asian solar arrays, helping push green energy to record levels.

Tech firms are also investing in energy storage and novel generation to bolster green supply.

In Belgium, Google installed a 2.75 MW battery system at its St. Ghislain data centre to replace diesel backup generators, cutting emissions and even feeding power to the local grid when needed. Microsoft has been testing hydrogen fuel cells as a zero-emission replacement for diesel and buying solar panels at unprecedented scale, agreeing to procure 9.5 GW of panels from a U.S. manufacturer to keep building out its solar farms.

Another striking shift is Big Tech's newfound embrace of nuclear energy. Both nuclear and renewables have distinct environmental trade offs. Solar panel and wind turbine production involves resource-intensive mining, and the intermittent output of renewables like wind and solar is problematic today. Nuclear energy operates continuously, and offers stability in the energy transition.

But public perception of nuclear energy remains cautious due to past incidents and concerns about safety and waste disposal. Nuclear projects also come with lengthy timelines and substantial investments.

“The nuclear push is a big part of this story. Google, Microsoft and Amazon are each backing advanced nuclear projects to secure round-the-clock clean power.”

In Practice
Big Tech's Energy Ventures

2-2

The nuclear power push is a big part of this story. Google, Microsoft and Amazon are each backing advanced nuclear projects to secure round-the-clock clean power. Google has signed a first-of-its-kind deal with startup Kairos Power to purchase energy from small modular reactors by the end of this decade, enabling up to 500 MW of new 24/7 carbon-free power for its U.S. data centres by 2035.

Microsoft made headlines by funding the restart of Three Mile Island's 50-year-old fission reactor. Signing the 20-year deal to revive the shut Pennsylvania reactor specifically to power its data centres, even at double the usual cost of renewable electricity. The plant was the location of a serious nuclear meltdown and radiation leak in March 1979, and significant investment will be required to restore the plant, including replacing or refurbishing the turbine, generator, main power transformer and cooling and control systems.

The company also signed the world's first commercial fusion energy contract in 2023, an ambitious plan to shorten the projected timeline for commercially viable fusion energy and draw 50 MW from Helion Energy's prototype reactor in 2028.

These dramatic bids to secure reliable, carbon-free energy shows how Big Tech's pledges face the reality of surging demand. As the AI data boom pushes tech companies into energy ventures once far outside their core business, from building solar farms to bankrolling next-generation reactors.

New Ground for Green AI
Big Tech's Energy Ventures

January 2021

Climate Neutral Data Centre Pact backed by industry leaders

In a collective commitment to avoid stricter EU regulations, 25 cloud and colocation providers in Europe sign a self-regulatory pledge (backed by the EU) to reach 100% carbon-free power by 2030.

March 2023

Amazon contracts 33.6 GW of wind and solar energy

Ranking eighth in the largest clean energy portfolio globally, surpassing the capacity of some utilities.

June-December 2023

Big Tech double downs on renewables

Microsoft agrees to procure 9.5 GW of solar panels from a U.S. manufacturer to expand its solar farms. Google and Meta sign agreements for several gigawatts of new solar and wind farms to power their data centres.

March 2024

Amazon Acquires Nuclear-Powered Data centre in Pennsylvania

Amazon purchases a Pennsylvania nuclear-powered data centre for $650 million to meet AI's growing power needs.

December 2024

Meta Seeks Nuclear Partnerships for AI Energy Needs

Meta searches for nuclear energy partners to power its energy-intensive AI operations, aiming for new capacity by the early 2030s.

2028 Projected

Microsoft Nuclear Projects Online?

Projected year for Microsoft nuclear projects to generate energy, from the restart of the nuclear reactor Three Mile Island and a reactor from private U.S. nuclear fusion company Helion Energy.

Reality Check

Reality Check
Rhetoric or Real Progress?

1-2

Despite this rush of clean energy deals, the sector faces formidable challenges in practice.

Renewable projects can take years to permit and build. Time that AI-fuelled data centres may not have. Across the U.S. and Europe, many planned wind and solar farms are hitting local opposition and red tape. About one-third of large wind and solar proposals in recent years were ultimately cancelled, a survey of developers found, with community opposition a leading cause alongside grid connection hurdles. Even approved projects see roughly 11–14 month delays on average from legal challenges and "not-in-my-backyard" protests.

These setbacks slow the influx of green power that data centres are counting on, and can leave them leaning on the existing grid, often still fossil-fuelled, in the interim. Intermittency is another important nemesis: Google's own numbers underscore the gap. While it has matched its total energy use with renewables for seven years running, only ~64% of the power actually powering Google data centres in 2022 was carbon-free at the exact time of use.

The company's overall emissions have climbed sharply, up 48% since 2019, largely due to exploding electricity needs for AI, outpacing the emissions avoided by new clean energy. Similar trends afflict peers. Analysis last autumn suggested that the in-house data centre emissions of Google, Microsoft, Meta and others may be under-reported: potentially seven-fold higher than official figures once fossil-based grid power is accounted for. All of this raises the question: are these firms truly lessening their footprint?

The picture is complex. On one hand, the AI revolution has made tech companies major drivers of clean energy investment. Their deep pockets and long-term purchase commitments are financing renewables and emerging technologies at unprecedented scale, arguably accelerating the broader transition to carbon-free power. In pushing for solutions like grid-scale batteries, green hydrogen and advanced nuclear, Big Tech's data centre arms race could spur innovations that benefit the entire energy system.

“Every delayed wind farm or deferred transmission line makes it harder to close the gap between sustainability pledges and on-the-ground reality.”

Reality Check
Rhetoric or Real Progress?

Yet the industry's meteoric growth means even bold efforts are struggling to keep up. The risk is that tech firms end up simply buying offsets or accounting tricks to claim "zero carbon" while continuing to burn fossil fuels behind the scenes.

Every delayed wind farm or deferred transmission line makes it harder to close the gap between glossy sustainability reports and on-the-ground reality. Activists are already gearing up to scrutinise projects like Microsoft's reactor revival and Amazon's SMR plans, wary of safety risks and greenwashing.

Uncertainty around the technology obscures the landscape further. In January 2025, DeepSeek rocked the AI world with claims its software may be more efficient than that of OpenAI and Anthropic, potentially requiring fewer AI processors for similar tasks. This sparked discussions on whether future AI models should be required to meet minimum efficiency standards before large-scale deployment.

But the story is still playing out; DeepSeek's energy efficiency has since come under question.

An article in MIT Technology Review notes the energy DeepSeek saves in training "is offset by its more intensive techniques for answering questions, and by the long answers they produce."

In February, projected investment figures confirmed that Google, Microsoft and Meta will continue to spend billions of dollars on AI data centres, despite the risk that rival AI platform upgrades may require less hardware for AI tasks.

The coming years will test whether corporate climate pledges amount to more than PR. Will the data centre buildout genuinely bankroll the wind turbines, solar arrays and reactors needed for a clean-energy future? The true measure of commitment may be whether the tech-driven AI boom leaves the power grids of 2030 greener and more robust, or simply under greater strain than ever.

New Ground for Green AI
Rhetoric or Real Progress?

January 2025

DeepSeek rocks the AI world with energy claims

DeepSeek news brings energy efficiency of AI models under scrutiny, before its own analysis comes under question.

November 2024

FERC Rejects Nuclear Power Supply for Amazon's Data centre

The Federal Energy Regulatory Commission denies Talen Energy's application to supply nuclear power to Amazon's data centre, citing grid concerns.

December 2025

The IEA's Global Conference on Energy & AI

Set to bring together global decision makers to foster a dialogue between the energy industry, tech sector and policy makers and assess the implications of AI in the energy sector.

February 2025

AI Energy Consumption Software Tool

Salesforce launches AI Energy Score, a tool that allows customers to compare the energy efficiency of their AI models.

Outlook 2030

Balancing Green Power and AI Demand

By 2030, most large data centers are expected to use carbon-free energy due to falling renewable costs. However, AI workloads will also surge to over 30% of data center power demand, up from 10% in 2020. The balance between these trends will determine the tech sector's sustainable growth.

Thank you.

Sustainable Growth For AI

Nymark solves growth complexities for technologies that matter. Through digital transformation and new ways of working, we pave the way for sustainable success.

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