

Strategic Guide: Aligning Frontier Transforma with Sustainability Goals



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Introduction: About this guide



Business leaders face rising pressure to capture the value of AI, while simultaneously answering intensifying demands for sustainability from customers, investors, and regulators.

As these pressures mount, one insight should stay front and center: purposeful Frontier Transformation is key to strengthening both organizational performance and sustainability. The same innovations that drive efficiency and business growth can also accelerate progress toward sustainability goals.

When AI is deployed with strong governance and well-defined controls, this strategic approach can deliver a dual return on investment: reducing environmental impact while accelerating business performance.

This guide explores how organizations can:

Build a plan with five essential practices and a checklist to get started

To help leaders advance their AI and sustainability efforts, this guide offers a clear, actionable roadmap built around five practices, from adopting a modern cloud strategy to choosing efficient models to fit your needs. At the end, you'll find a checklist of actions to help you get started, including identifying quick wins.

Learn from real-world success stories

Frontier Firms are the future of business in the age of AI. As human-led, agent-operated organizations, they're moving beyond experimentation to redesign workflows for new forms of collaboration between people and intelligent systems, creating ripple effects that will transform business and society. They use AI as a catalyst to enrich employee experiences, reinvent customer engagement, reshape business processes, and bend the curve on innovation.

In this guide, you will discover how organizations are using AI to drive innovation and sustainability in parallel. They're lowering operating costs, improving margins, strengthening resilience, and moving faster on compliance. At the same time, they're cutting emissions, reducing waste, and making smart use of resources. In every case, they're finding smart, efficient ways to build a lasting advantage.



Guiding AI sustainability for your organization: 5 essential practices



Leading companies treat digital innovation and sustainability as one strategy. To realize their full potential, organizations weave efficiency, responsibility, and resilience into every part of their digital transformation.

Taking these steps will position companies to use AI efficiently and open up opportunities for greater business and sustainability impact. Each of the following practices helps businesses move from ambition to execution.

The five practices of AI sustainability

Each practice helps organizations use AI more strategically and efficiently—reducing environmental impact while driving business performance.

1

Adopt a modern cloud strategy

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Assess your cloud provider's sustainability and trust goals

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Manage data responsibly for efficient and accurate AI

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Optimize cloud workloads

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Fit the model to the mission

1. Adopt a modern cloud strategy



Understand the why: Research from Accenture suggests that companies with average on-premises-to-cloud migrations can drive carbon emissions reductions of 80% or higher.¹ Modern cloud platforms are designed to run workloads more efficiently, saving energy and optimizing cooling. And they continue to advance: at Microsoft, even as customer AI workloads increased in fiscal year 2024, our rate of datacenter power savings doubled. Modern cloud providers also support consistent governance, encryption, and compliance controls, strengthening both sustainability and security.



Take action: Revisit your company's cloud approach with guidance from our [Cloud Adoption Framework Strategy](#):

- **Assess your cloud adoption strategy.** Evaluate your organization's on-premises, cloud, or multi-cloud footprint and readiness for what's next. A concise assessment can gauge your organization's cloud adoption maturity and future opportunities. Consider these evaluations part of an iterative process that evolves with your business.

- **Define your motivations, mission, and objectives.** Clarify your company's strategic reasons for adopting cloud technologies. You might prioritize boosting resiliency through multi-region deployments, so you can ensure continuity if one region experiences an outage or disruption. Or perhaps agility and efficiency are top of mind, and your business needs to use more consistent platforms across disciplines. Anchor your mission in measurable goals, and share example objectives and success metrics across your teams.
- **Engage your stakeholders.** Form a cloud strategy team to square your adoption with your business needs and goals. This list offers some typical functions to include, from central IT to business decision makers to cloud security teams to compliance teams. Putting sustainability leads on your cloud strategy team means that you're considering environmental impact and tracking success.
- **Prepare your organization.** Align your company's strategies on business, digital, IT, and adoption. Agile feedback loops can help gather input from the main stakeholders and leaders, so your business can quickly revisit and adapt strategies to meet changing needs. You'll also need to identify and define your partner relationships.
- **Inform your strategy.** Explore strategic considerations for key cloud areas, such as financial efficiency, security, resilience, and sustainability. Since disruptions from natural disasters or outages can cause financial and reputational damage, resilience and sustainability go hand in hand. Building resilient systems reduces risk and encourages continuity. Proactively advancing sustainability strengthens trust and helps attract new talent, partners, and investors.



Go deeper

Plan: Azure Migrate can compare the emissions of on-premises and cloud workloads, and establish carbon baselines before migration.



2. Assess your cloud provider's sustainability and trust goals



Understand the why: Your organization's environmental footprint extends beyond your own operations—it also includes the partners you choose. Cloud providers are critical enablers of Frontier Transformation, and their sustainability and trust commitments directly impact your business and sustainability goals, regulatory compliance, and brand reputation. Water and energy are two important elements, and they belong at the center of your provider's sustainability strategy.



Take action: Evaluate whether your cloud provider's commitments match the rigor you expect in your own enterprise. Leverage [Researcher in Microsoft 365 Copilot](#) or other support tools to compare providers' sustainability and trust practices.

A few fundamentals:

- **Net-zero and reporting:** Does your provider have clear [net-zero](#) and carbon reduction targets? Do they publish regular sustainability reports and disclose progress transparently?

Standards and oversight: Are your cloud provider's goals aligned with widely accepted [standards](#) such as the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), and the International Organization for Standardization (ISO)? Is there third-party review or independent assurance of their data and claims?

- **Transparency and accountability:** Look for transparency through regular updates, targeted goals, quantifiable tracking toward those goals, and long-term investments in solutions.
- **Innovation and circularity:** Evaluate long-term investments in carbon-free energy, [circular-materials](#) design, and water-efficient datacenter operations.
- **Trust:** Choose a partner that treats trust as a full system commitment, grounded in responsible AI, security and sovereignty protections, accessibility, and sustainability. As part of that foundation, sustainability helps make technology efficient, durable, and built for long-term impact.



Go deeper

- **Explore our sustainability work:** The [Environmental Sustainability Report 2025](#) shares our progress on reducing emissions, scaling carbon removal, and using AI to support major sustainability challenges.

Learn about our approach to responsible AI: The [Responsible AI Transparency Report](#) outlines how we build, test, and govern AI systems, and the practices that guide our approach to trust and safety.

SPOTLIGHT

AI and Trust

The future of AI depends on trust. Organizations cannot scale or unlock the full value of AI without it. Building trust starts with putting people at the center of how AI is designed, developed, and deployed. It is a continuous practice that grows as technology evolves and real-world needs shift. Trustworthy AI rests on security, responsibility, transparency, and accessibility. These principles help organizations adopt AI with confidence and make systems fair, reliable, and accountable. Paired with sustainability, they create technology that is more credible, more resilient, and ready for long-term impact.



Security

comes first when gaining trust. Strong security allows organizations to move with speed and confidence. This includes protecting the full AI stack across cloud, data, applications, and agents; supporting compliance; managing agent identity, behavior, and risk; and reducing the chance of data exposure.

Digital sovereignty

is about enabling participation in the digital economy securely, independently, and with self-determined controls. Sovereignty is a core requirement for governments and public institutions and enterprises seeking to harness the cloud while retaining control over their data and operations. Sovereign controls can differ by market, industry, and within workloads, while aligning to local laws, organizational policies, and strategic priorities.

Responsible AI

is about building systems that earn trust through clear standards and consistent practice. It focuses on fairness, reliability, safety, privacy, and transparency. Strong governance helps teams put these principles into action by setting expectations, reviewing risks, and making sure AI behaves as intended. It also includes careful attention to data quality, reducing bias, and aligning outcomes with the values and commitments of the organization.

Accessibility

strengthens AI for everyone. Technology should work for people of all abilities and all levels of expertise. AI should offer flexible ways to interact, including options like voice. Access should also reach across communities and regions. Microsoft has committed to extending high-speed internet access to 250 million people in unserved and underserved areas worldwide, including 100 million in Africa.

SPOTLIGHT

Our Fairwater datacenters

Microsoft's Fairwater AI datacenters—in Atlanta and Mount Pleasant, Wisconsin—represent the next leap in the Microsoft Foundry infrastructure and reflect our experience running the largest AI training jobs on the planet. These sites combine breakthrough innovations in compute density, sustainability, and networking systems to efficiently serve the massive demand for computational power we are seeing.

The Fairwater AI datacenters use a facility-wide cooling system designed for longevity, with a closed-loop approach that reuses the liquid continuously after the initial fill with no evaporation. The water used in the initial fill is equivalent to what 20 homes consume in a year and is only replaced if water chemistry indicates it is needed, making it extremely efficient and sustainable.

3. Manage data responsibly for efficient and accurate AI



Understand the why: High-quality data is one of the biggest drivers of both accuracy and sustainability in AI. When data is incomplete or messy, models perform worse and systems use more compute to make up for it. Organizing data, removing duplication, and keeping only what is needed reduces waste and sharpens results. Good data practices also lower storage and processing demands. In some cases, processing data closer to where it is created can cut latency and reduce network energy use.



Take action: A well-managed data foundation shapes how effectively AI delivers value. It determines how confidently leaders can rely on insights, scale innovation, and show progress toward sustainability commitments. Some focus areas:

- **Governance and quality:** When data is well-governed, decision makers get clarity on where it comes from, how it's used, and whether it meets compliance and reporting needs.

Check out: [Microsoft Purview](#) can catalog, classify, and govern enterprise data.

- **Automation and integration:** Automation helps data flow cleanly across the business, reducing manual effort and the energy spent on redundant processing. The result is a system that's leaner and easier to scale.

Check out: [Microsoft Fabric](#) automates and orchestrates data pipelines. [Azure Blob Storage](#) life cycle management can archive or delete stale data sets and cut storage waste and energy use. [Azure Machine Learning](#) streamlines data preparation and cleaning for AI model training.

- **Unified data insights:** Bringing data together in one environment gives leaders a clearer view of performance and risk. It also simplifies sustainability tracking, so it's easier to measure energy use and resource efficiency across the organization.

Check out: [Microsoft Fabric](#) unifies your data in a single open format data lake.



Go deeper

Expanding data sets—using approaches like synthetic data, which mimics the statistical properties of real-world data—can strengthen models without creating privacy risks or unnecessary compute demand. Organizations can explore [synthetic data generation in Microsoft Foundry](#).



4. Optimize cloud workloads



Understand the why: Workloads—the applications and data that deliver business outcomes—become more costly and energy-intensive when they're inefficient. Energy efficiency starts at the design level. Smart optimization, such as consolidating tasks and eliminating idle capacity, can reduce energy use, lower costs, and boost overall system performance.



Take action: Embed efficient, sustainable principles into your organization's engineering practices.

- **Batching:** Continuously monitor and right-size workloads. For compute-intensive tasks such as document processing, [Azure Batch](#) enables large-scale processing—like analyzing thousands of PDFs or running multiple AI queries—by using spare datacenter capacity. This approach lowers costs and improves efficiency.
- **Prompt caching:** Customer-facing companies using chatbots often field the same questions, and not every query needs filtering through AI. Instead, use "[prompt caching](#)," which brings up pre-written responses and saves compute.
- **Learning:** Familiarize your engineering team with [sustainable AI design principles](#), and ensure they have the right internal practices for efficient, cost-effective design.



Go deeper

Optimize: [Azure Advisor](#) offers personalized recommendations to optimize workloads for cost, performance, and sustainability.

Be carbon-aware: [Carbon optimization in Azure](#) allows you to measure and minimize your carbon impact by tracking emissions, accessing carbon emissions data, and optimizing resources to lower emissions and cost.

Map your workloads: Query your workloads via [Azure Resource Graph](#) and align them with your sustainability goals.

Engage the developer community: GitHub's [Climate Action Plan for Developers](#) offers curated tools and projects to help you kick-start your climate action journey and contribute to achieving net-zero carbon emissions.

5. Fit the model to the mission



Understand the why: You don't need a large language model for every task—sometimes a smaller one will do the job more efficiently. Small language models (SLMs) can handle many of the same capabilities as large models but are trained on smaller data sets and can run on as little as one GPU in compute-strained environments. While large models remain popular, SLMs can be a better fit for specific use cases when you want to fine-tune a model with a custom data set, run a model locally (on smartphones or tablets, for example), or when cloud connectivity isn't required. They're cost-effective and, when used in the right scenarios, have the potential to be more sustainable.



Take action:

- A model router that automatically selects the best model for the task is now generally available in Microsoft Foundry. It can help developers balance cost, performance, and complexity by simplifying model selection and deployment.
- Learn more about how the Microsoft Phi family of open-source SLMs can help your business. Designed to be lightweight and resource-efficient, Phi models enable developers to create new tools without compromising on performance.



Go deeper

Build: Microsoft Foundry allows you to train, fine-tune, distill, and automatically upgrade models with minimal coding to optimize performance and costs.

SPOTLIGHT

Small models, big results

How two companies are using SLMs with major impact



Japan Airlines experimented with an SLM to streamline work in the sky.

Japan Airlines used Phi-4 in a successful proof of concept designed to help attendants quickly log medical issues, delays, or other irregularities midair—even without strong WiFi. Traditionally, documenting an in-flight incident can take an hour or more. In the proof of concept, powered by Microsoft Foundry, attendants could fill out a checklist, type a few keywords, and get a polished report in minutes. Phi-4 can run locally without the need for cloud connectivity. The model was fine-tuned on about 100 real reports, and trials suggested it could cut report-writing time by two-thirds.



Bayer's small model tackles big crop decisions.

Bayer's agronomic teams were spending hours sifting through lengthy crop protection labels, risking costly delays or compliance missteps. General-purpose AI models couldn't deliver the contextual accuracy required in a regulated industry. So Bayer created its own. The E.L.Y. Crop Protection (E.L.Y. Mini) is built on Microsoft's Phi small language models and deployed through Microsoft Foundry—fine-tuned on proprietary label data and internal Q&As, and designed to give label-accurate answers in under 30 seconds. Early users reported 5% to 10% productivity gains, with complex agronomic questions resolved instantly instead of over days.

Driving sustainable business transformation: Real-world impact



By putting these five practices into action, leaders can create a foundation for sustainable business transformation. In the real world, companies are already applying AI across every facet of their operations, from supply chains to energy management. A new imperative—resilience, efficiency, and innovation—offers a source of competitive advantage and a path to greater sustainability.

A new imperative

Sustainability is also smart business strategy



Build resilience

Adapt rapidly to disruption and novel constraints



Create efficiencies

Cut waste and boost performance



Innovate for growth

Create a trajectory for future business value

Build resilience

Use AI to anticipate risk and adapt with speed. Resilience is the new imperative for businesses: by 2035, for example, companies could lose the equivalent of 7% of their annual earnings to climate hazards.² Strategic action can help: businesses investing in adaptation, resilience, and decarbonization are seeing up to \$19 in value for every dollar spent, according to the World Economic Forum.³ AI can be part of the solution, helping organizations see what's around the corner and meet that rapid change, whether from climate risks or geopolitical uncertainties. It can model climate, supply chain, or tariff risks, predict disruptions to the status quo, and support faster decisions when systems are under stress.



Create efficiencies

Leverage AI to do what you already do, but smarter. Look for ways to apply that efficiency to cut waste, reduce energy and water use, and streamline operations. There are further opportunities in optimizing data and workloads, or improving how factories, offices, and supply chains run. By making existing systems leaner and faster, organizations can lower costs while shrinking their footprint. Nearly three-quarters of business leaders already see positive ROI from AI investments, according to a 2025 study from the Wharton School of the University of Pennsylvania.⁴

Innovate for growth

Rethink what's possible with AI and create a trajectory for future business value. This technology can advance research and innovation to create new products, services, and business models—and design processes that are efficient and sustainable from the start. Frontier Firms are already reimagining what AI can do, actively exploring novel concepts, piloting new approaches, and quickly iterating based on results to accelerate performance and growth. McKinsey & Co. projects that generative AI has the potential to generate \$2.6 trillion to \$4.4 trillion across dozens of use cases.⁵



Go deeper

- [AI Use Cases: Achieve Business Goals with Microsoft AI](#) presents real-world examples to inspire you to accelerate your organization's goals.
- [Insight to Impact: AI Use Cases for Sustainability](#) highlights five core AI use cases to help you accelerate your sustainability and business goals, and it demonstrates how companies are already seeing impact from doing so.

How companies are using AI for sustainability and business growth.

Innovation and sustainability increasingly share the same engine: AI. A wave of AI innovation is emerging at the intersection of sustainability and business value. From cutting food waste to decarbonizing manufacturing, AI is enabling breakthroughs that redefine what’s possible for industries and the planet.



ABB boosts reliability, efficiency, and sustainability

ABB, a global technology leader in electrification and automation, is enabling a more sustainable future. Industries advancing digital transformation faced challenges because systems and assets were not fully connected. ABB’s market-leading Genix Industrial IoT and AI Suite integrates data across operational, engineering, and IT systems, then contextualizes it and delivers analytics and AI for real-time insights and optimization. Combining ABB’s technology with Microsoft Azure, Genix advances industrial customers toward autonomous operations. Using Azure OpenAI in Foundry Models, Genix Copilot brings GenAI to field engineers, specialists, and executives, improving collaboration and productivity. Genix helps customers achieve up to 18% energy optimization across critical processes in energy-intensive industries like cement, and up to 15% higher reliability of critical assets while reducing downtime.



Schneider Electric advances grid reliability and sustainability

Schneider Electric is powering AI-driven industry innovation by addressing grid stability and enterprise sustainability challenges. Built using Microsoft Azure, its solutions help organizations act faster and smarter while delivering measurable improvements in grid reliability and enterprise ESG management. Resource Advisor Copilot transforms raw ESG and energy data into actionable insights via natural-language queries to support knowledge-based and system data questions, which saved sustainability managers hundreds of hours annually in data analysis and reporting tasks in early testing. Grid AI Assistant, embedded in EcoStruxure ADMS, allows operators to interact with complex grids using natural language to improve response times and accuracy during critical events.



Super Hosokawa cuts food waste and boosts sales

Japanese supermarket chain Super Hosokawa wanted to reduce food waste while increasing sales—a goal complicated by fragmented supply chain data and inaccurate demand forecasts. In a government-backed pilot, Super Hosokawa partnered with supermarket cooperative Imamura Shoji to build a demand forecasting system using Azure Databricks, Azure Blob Storage, and Snowflake on Azure. By forecasting demand two days in advance and leveraging Azure OpenAI in Foundry Models to optimize shelf layouts, the team made smarter, data-driven decisions. Food waste for tofu and fried products dropped from 0.52% to 0.20%, and for fish paste from 0.52% to 0.13%. Despite a 20% storewide sales decline, the trial products maintained performance—effectively a 20% gain.



Ecolab helps companies use less water and optimize costs

Ecolab is embedding AI into its proven sustainability solutions to deliver measurable business and environmental impact.⁶ Through platforms like ECOLAB3D, Dish IQ, Water Track IQ and the AI-enabled Smart Water Navigator, Ecolab combines decades of operational expertise with advanced analytics to help customers optimize water, energy, and resource use at scale. This approach transforms operational data into actionable insights—predicting risk, improving efficiency, and quantifying customer financial savings and environmental impact. By 2030, Ecolab aims to help customers conserve 300 billion gallons of water and avoid 6 million metric tons of greenhouse gas emissions, delivering over \$11 billion in customer value. Its AI-driven solutions make sustainability a growth engine—reducing risk, improving resilience, and unlocking enterprise value.



Giatec tackles an emissions problem

Concrete accounts for nearly 8% of global CO₂ emissions. Giatec, a Canadian construction tech company, saw an opportunity for change. It used Microsoft AI and IoT technologies to develop tools like Roxi, SmartRock, SmartMix, and MixPilot, monitoring and optimizing concrete mixes and reducing emissions. The solutions have already reduced 2.5 million tons of carbon emissions, saved time and costs for construction projects, and increased profit margins for concrete producers.

“From a sustainability perspective, these AI innovations have led to measurable outcomes: 2.5 million tons of carbon emissions reduced, \$10,000 saved per pour, and profit margins increased by up to 100%.”

SARAH MCGUIRE,
VP OF BUSINESS DEVELOPMENT,
GIATEC



ADNOC accelerates energy workflows

Energy group ADNOC is helping meet the world’s growing energy needs safely, reliably, and sustainably, while accelerating progress across its operations and workforce. As part of its commitment to building long-term capability in an evolving energy landscape, the company introduced OneTalent—a unified, AI-powered platform that consolidates HR processes to streamline learning, development, and talent mobility for its workforce. Partnering with Microsoft and AIQ, ADNOC is also applying AI across its operations to enhance efficiency, improve safety, and reduce environmental impact with its ENERGYai agentic AI platform. Neuron 5, the company’s predictive maintenance system, uses AI-driven models across thousands of critical equipment assets to reduce unplanned downtime, while extending asset life and improving energy performance. Together, these platforms advance ADNOC’s broader sustainability ambitions by enabling intelligent operations, optimized energy use, and a future-ready workforce.



RESEARCH SPOTLIGHT

How AI can complete a typical work task faster, better, and with far less energy

A Microsoft experiment found that Copilot delivered higher-quality results while using a fraction of the time and resources.

In a simple experiment, Microsoft researchers set out to measure how well—and how sustainably—AI could perform a typical work task.

The team asked five professionals to summarize a 3,000-word technical report in 200 words. The group spent a median of 41 minutes and was estimated to use a median of 13.7 watt-hours (Wh) of laptop energy.⁷ In a single prompt, Copilot completed the same task in under a minute, consuming just 0.29 Wh of datacenter energy⁸—roughly 55 times faster and 47 times more energy efficient.

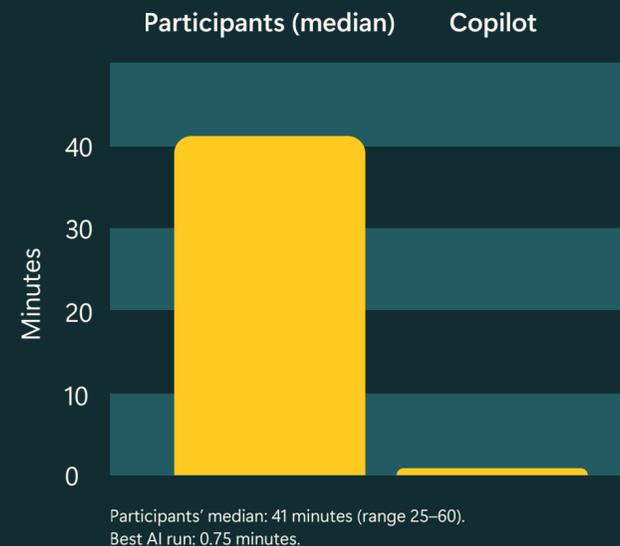
Two business managers graded each result for quality, clarity, accuracy, and completeness. They weren't informed on who wrote each summary, or whether it came from a person or from Copilot. All responses were formatted the same way before being sent to reviewers. The AI achieved A-level scores in most areas, compared with median human grades of B and C.

This experiment illustrates an emerging pattern: for cognitive work grounded in reading, synthesis, and structured reasoning, AI can often deliver higher quality in a fraction of the time and energy.^{9,10} In one study, for example, developers using GitHub Copilot completed a standardized task 55.8% faster while maintaining comparable accuracy.¹¹ By contrast, another study of AI agents on long, multi-step work tasks found that, although the agents worked much faster, humans generally produced higher-quality results.¹² Such findings underscore that it's important to properly adapt AI to the human workflow.

These results highlight how purposeful AI use can drive productivity and sustainability at the same time—illustrating, at the task level, the same dual benefits this guide explores at enterprise scale.

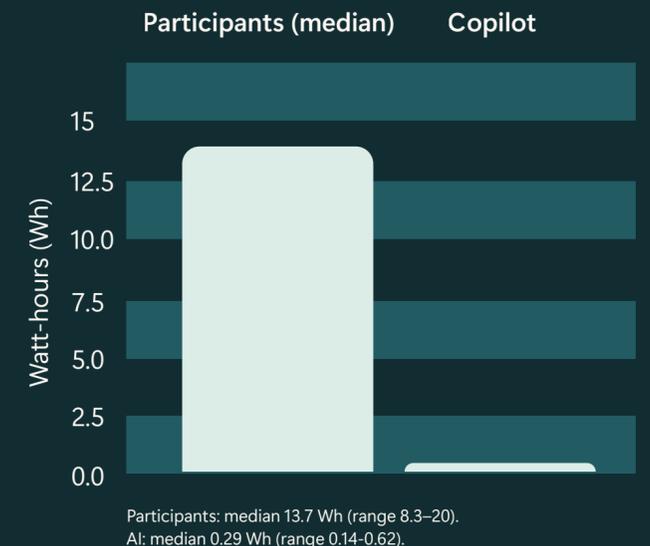
Saving time

Copilot completed a typical work task 55 times faster than people doing the same project—saving over 40 minutes.



Saving energy

Copilot used 47 times less energy on average than people working on the same task.

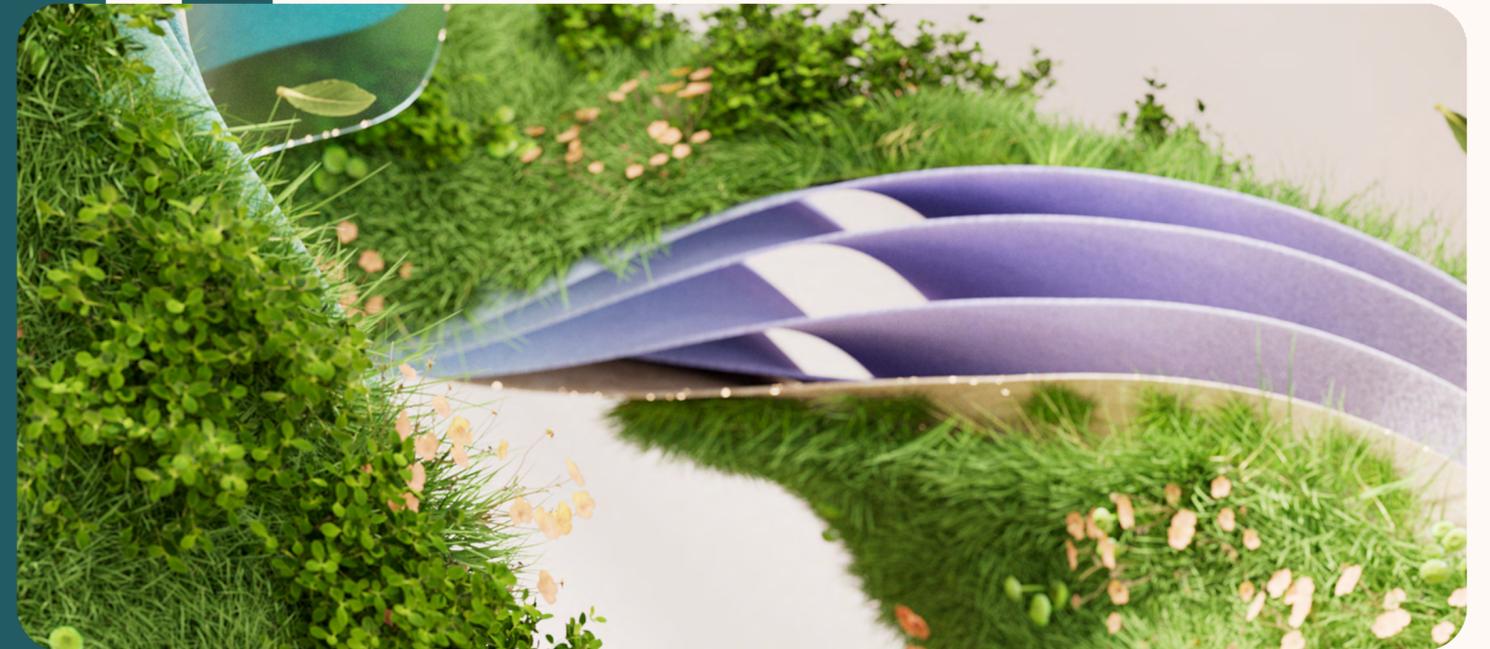


Improving performance

Copilot's performance was rated higher than the study participants' in clarity, accuracy, and completeness.

Group	Overall	Clarity	Accuracy	Completeness
Study participants (mode)	C	C	B	C
Copilot	A	A	A	B

The bigger picture: From business gains to global progress



AI has the potential to help solve some of the world's biggest sustainability challenges. It can enable every industry to operate with greater efficiency, use resources more wisely, and accelerate the transition to clean energy.

Like virtually all technologies, AI requires energy and water to build and operate. The datacenters that power AI and other digital technologies account for about 1.5% of the world's electricity consumption, according to the International Energy Agency.¹³ As AI adoption and datacenter demand rise, continued progress in sustainability is essential. Innovations in areas such as datacenter design are already helping cut the energy and water required to run AI systems—and must keep accelerating.

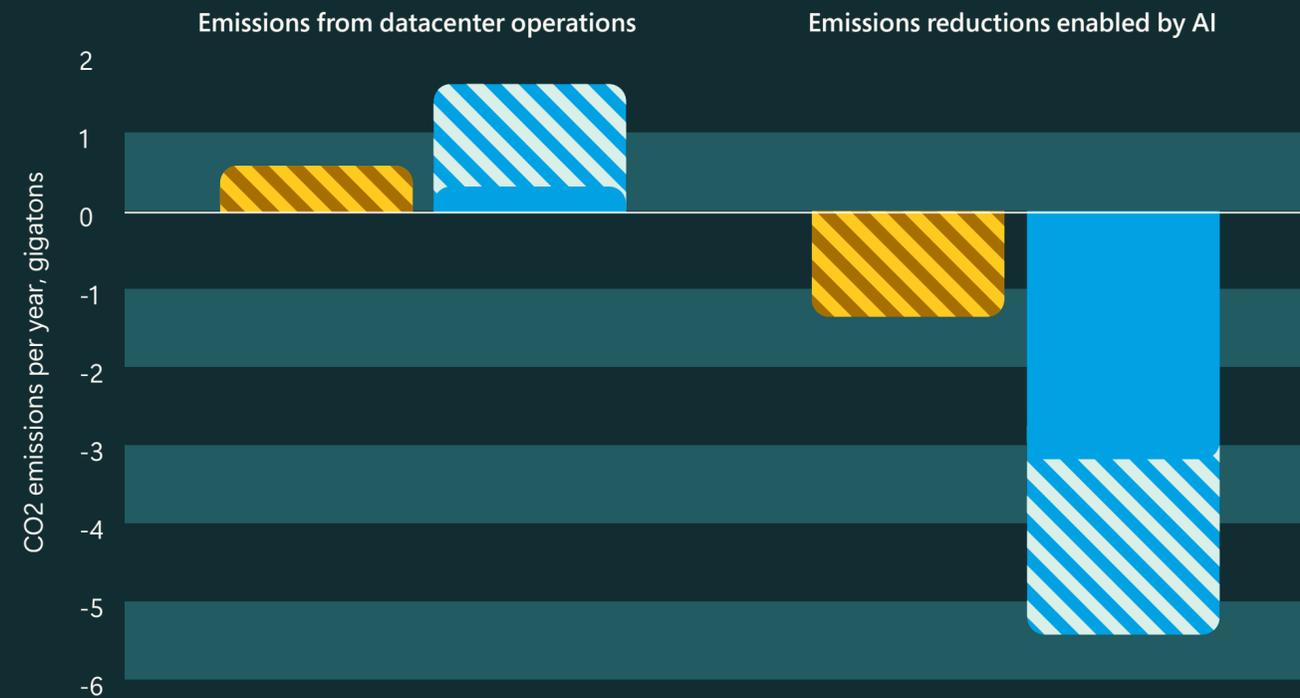
The potential of AI to cut more carbon than it creates

By 2035, widespread AI adoption across major energy-using sectors could reduce global CO₂ emissions by about 1.4 gigatons, more than twice the amount projected from datacenter operations. Actual results will depend on how broadly and efficiently AI is deployed.

Projections by 2035

AI rollout

- Energy sector alone
- Electricity, food, and transport
- Limited
- Accelerated



Source: Adapted from Luers, Nature (2025), with data from the International Energy Agency (2025) and Stern et al., Nature npj Climate Action (2025).



Research shows that AI is needed to solve sustainability challenges. Many of the difficulties of sustainability—such as managing energy grids, improving resource use, and protecting ecosystems—have grown too complex for traditional tools and approaches. Second, innovation often moves

too slowly, as conventional research and development processes are time-consuming and costly. Third, there is a significant workforce gap, with too few people equipped with the tools and knowledge needed to advance sustainability solutions. AI has game-changing potential to:



1. Measure, predict, and optimize complex systems

AI's capacity to analyze vast amounts of data, identify patterns, and make real-time predictions means it can optimize the complex systems that are central to sustainability, such as electricity grids and supply chains, while helping to transform understanding and management of biodiversity challenges and climate risks.

The potential impact is enormous. By 2035, widespread AI deployment across sectors, including energy, could cut annual CO₂ emissions by upward of 1.4 gigatons, according to the International Energy Agency.¹³ That's more than twice the amount of emissions projected from datacenter operations. In other words, if AI is broadly embraced, it could cut far more emissions than it creates.

2. Accelerate the development of sustainability solutions

AI is transforming the speed and scale of innovation by rapidly analyzing complex data, quickly identifying potential optimal solutions, and automating processes that previously required significant time and resources. Organizations around the world are already investing in putting this second game-changing AI capability to work. For example, organizations around the world are starting to use AI to accelerate the discovery of new materials for low-carbon manufacturing¹⁴ and the identification of crop varieties resilient to a changing climate.¹⁵

3. Empower the sustainability workforce

Addressing challenges requires a workforce that is knowledgeable about a range of rapidly evolving environmental science, technologies, regulations, and more. But wide gaps in expertise and resources exist, which can hinder progress. AI is helping to close these gaps by providing access to knowledge, personalized training, and personalized assistants—such as Microsoft 365 Copilot—that make the rapidly expanding sustainability data and information more broadly accessible. At the same time, AI is scaling the impact of people and organizations by enhancing decision-making, automating tasks, and delivering advanced insights.



Go deeper

[Accelerating Sustainability with AI: Innovations for a Better Future](#) is Microsoft's own playbook, shared with other organizations that want to apply AI to sustainability challenges.

SPOTLIGHT

Advancing the sustainability of AI

No matter our level of growth and innovation, Microsoft remains committed to our core value of environmental sustainability. We're making meaningful progress toward our ambitious 2030 goals: to be carbon negative, water positive, and zero waste, while protecting ecosystems. Now, as the demand for AI grows, **we have continued our focus on sustainability with three target areas for AI:**



- **Optimizing datacenter energy, water, waste, and ecosystems.** We're advancing energy-efficient designs and expanding carbon-free electricity. We regularly audit our datacenters and use advanced prediction models to identify inefficiencies. Our next-generation cooling system saves more than 125 million liters of water per facility each year. And we're exploring breakthrough chip-level cooling technologies, including a microfluidic design that pulls heat from inside the silicon and cools up to three times better than standard cold plates. We're simultaneously working to reduce peak power, safely harvest unused power, increase server density in existing datacenters, and bring more renewable energy online.



- **Advancing low-carbon materials.** Because steel and cement are among the largest carbon contributors in construction, we're reevaluating how we design and build datacenters. Through our \$1 billion Climate Innovation Fund, we're investing in green steel and lower-carbon cement, including near-zero carbon steel, which can cut emissions by up to 95% compared to conventional steel. We also use hybrid timber-steel designs that reduce embodied carbon.



- **Improving the energy efficiency of AI.** We're making AI more sustainable through carbon-aware workload optimization and more efficient model design, including small language models (SLMs) like Phi that deliver strong results with fewer resources. We're also advancing silicon-level innovations—from new power-aware architectures to chip-level telemetry—to reduce energy use and improve performance across our AI infrastructure.

[Explore more sustainability news and solutions.](#)

Putting it all together: A checklist to get started



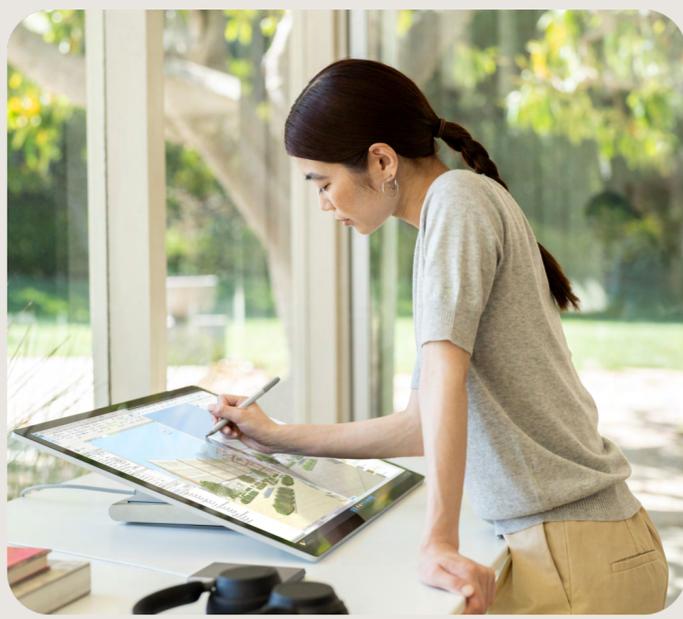
Becoming a Frontier Firm means leveraging AI to reimagine the future of business. AI can unlock entirely new ways of creating value and operating more sustainably. The organizations that master this challenge will define the next era of business.

In this guide, we've shown how leaders can translate that vision into action—by modernizing cloud strategy, aligning with trusted providers, managing data efficiently, optimizing workloads, fitting models to the mission, and applying AI across their business to unlock new potential. Sustainability and AI aren't a contradiction—they're the competitive advantage.

Ready to put your AI strategy into action? Download the [AI Strategy Roadmap](#) for step-by-step guidance on building a responsible, scalable AI foundation.

Checklist: How to get started

Our five essential practices are the foundational actions that will set your organization on a path to stronger business value and sustainability. Many of those practices are iterative—an evolving process rather than a one-and-done action to take. If you're wondering how and where to begin in the nearer term, and what the key steps should be to align your Frontier Transformation with your sustainability goals, start with this checklist:



1. Align leaders around a shared AI vision.

Convene decision makers to prioritize the AI use cases that will drive the greatest value and impact. Use research on [Frontier Firms](#) to inform your choices and strategy.

2. Establish your baseline.

Use the [Cloud Adoption Framework Strategy](#) to assess your current cloud footprint and identify where sustainability fits into your strategy. [Azure Migrate](#) can compare the emissions of on-premises and cloud workloads and establish a clear baseline for energy and carbon performance. Then try Researcher in [Microsoft 365 Copilot](#) to gather and compare information about cloud providers' sustainability and trust commitments.

3. Take steps to get your data in order.

You can catalog, classify, and govern your organization's data within [Microsoft Purview](#).

4. Explore practical AI use cases for sustainability.

Identify where AI can help your business operate more efficiently or accelerate progress on sustainability goals. Pilot projects like small model applications or energy-efficient optimizations.

5. Act on easy wins.

Look for quick, high-impact optimizations across workloads and infrastructure. Small adjustments—such as batching compute-intensive tasks with [Azure Batch](#), applying prompt caching for repetitive queries, or right-sizing and archiving unused resources—can deliver immediate cost and carbon savings.

6. Embed sustainability into your AI governance.

Update your AI principles and governance frameworks to integrate sustainability alongside ethics, trust, and accountability.

7. Develop your team's AI readiness.

Make sure employees across functions can access training on the basics of AI, business value, and sustainability. For developers, GitHub offers a library of resources on sustainability. Training every role—from engineers to business managers—helps turn AI literacy into smarter, more sustainable action.

8. Measure and communicate progress.

Document outcomes, starting with your early efforts—what pilots launched, what efficiencies you gained, and what you plan to scale next. Tools like [Microsoft Sustainability Manager](#) can help you track and analyze your organization's environmental impact. Tracking impact builds credibility and keeps momentum moving forward. As you progress, revisit these steps to ensure you're always moving on the best path forward.

References



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