Microsoft

E-book Series

INSIGHT TO IMPACT:

AI Use Cases to Advance Sustainability

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Section 01

The strategic imperative:

AI, sustainability, and business resilience

Business leaders today face an unprecedented convergence of economic volatility, regulatory pressure, and sustainability-related disruptions. What was once viewed as a compliance exercise is now a critical strategy for competitive advantage, efficiency, and long-term resilience.

In fact, according to a 2023 IBM report, more than 70% of surveyed executives say sustainability supports business growth,[1] and one in three CEOs report increased revenue from climate-aligned investments.[2] Sustainability is no longer separate from business performance. It is business performance.

Yet most organizations struggle to scale progress. Traditional approaches to sustainability management such as manual data collection, static reporting, and reactive decision-making cannot deliver the speed, scale, or precision needed to thrive today.

This is where AI becomes a powerful accelerator. AI delivers the speed, scale, and intelligence that traditional methods can't achieve, helping businesses act faster, adapt smarter, and move with precision.

In this e-book, you'll discover how leading companies are using AI to accelerate sustainability by improving efficiency, cutting emissions, and strengthening resilience across operations and supply chains.

> According to a 2023 IBM report, more than 70% of surveyed executives say sustainability supports business growth.[1]

Section 02

AI as a catalyst for sustainable business strategy

Organizations today face mounting external pressures that require immediate, strategic action:

1. **Sustainability-related disruption is a reality.** Extreme weather events, energy volatility, and material scarcity are already affecting operations, supply chains, and financial performance.
2. **Supply chain volatility is the new norm.** Global supply chains now operate in an environment defined by unpredictability. From shifting trade policies to sudden material shortages, the ability to adapt quickly and maintain visibility across the value chain has become a core business imperative.
3. **Regulatory demands are rising.** New and evolving requirements across jurisdictions are adding complexity across environmental, social, and governance (ESG) domains.
4. **Stakeholder expectations are intensifying.** Investors, customers, employees, and communities now evaluate organizations through the lens of sustainability performance.

These issues are deeply interconnected and increasingly compounded. Companies that are slow to react will fall behind. Those that respond strategically can turn sustainability into a competitive advantage.

To achieve that advantage, organizations are turning to AI as a strategic enabler that helps them move faster, adapt smarter, and lead with confidence.

Why traditional approaches fall short

Achieving sustainability goals requires more than incremental improvements—it demands a new way of operating. Businesses are navigating increasingly complex challenges, from evolving stakeholder expectations and shifting supply chains to expanding regulatory requirements.

Manual processes and aging systems can create blind spots. By the time problems are identified, opportunities may be lost, and risks can take root. Organizations need real-time visibility, predictive insights, and automated responses to keep pace and stay resilient.

AI as the strategic accelerator

AI can enhance existing processes and enable new ways to build resilience and drive impact at scale. It can also change the equation by helping organizations identify blind spots, anticipate risks, and uncover new opportunities.

Despite these significant advantages, AI also raises concerns around resource use. Understanding this dual nature is critical. Forward-thinking organizations must move quickly to adopt AI—while also managing sustainability, effectiveness, and resource impact.

Game-changing capabilities

Here's how AI helps overcome key barriers to sustainability performance:

1. **Measure, predict, and optimize complex systems**
   AI can deliver insights by analyzing and optimizing resource use, stakeholder dynamics, and sustainability metrics, enabling real-time visibility and predictive decision-making.
2. **Accelerate development of sustainability solutions**
   By analyzing data, predicting outcomes, and optimizing solutions, AI can enable shortened research and development cycles, cost savings, and can accelerate time to market.
3. **Empower the sustainability workforce**
   AI can improve productivity by automating tasks, delivering actionable insights, and making advanced tools more accessible. This helps teams focus on strategic initiatives with greater business impact.

Together, these capabilities make AI a critical accelerator of sustainability, helping organizations move faster, scale smarter, and deliver measurable outcomes that support long-term success.

Microsoft has identified three things that make AI an essential accelerator of sustainability progress. These capabilities are drawn from our **Accelerating Sustainability with AI** playbook and reflect our belief that AI must be deployed purposefully and responsibly to drive scalable, measurable impact.

Read now →

Section 03

Advancing the sustainability of AI

As businesses evaluate AI investments, questions about sustainability impact are legitimate and necessary. Datacenters consume approximately 1.5% of global electricity, and AI workloads are projected to increase this demand.[3]

The real question isn't whether AI uses resources. It's whether the sustainability and business value it delivers outweigh that cost. This is especially true when AI is deployed with purpose and managed responsibly.

The value of AI lies not in the technology itself, but in its ability to deliver outcomes that traditional methods can't achieve efficiently, affordably, or at scale.

Scaling AI responsibly: the Microsoft approach

To scale AI responsibly and sustainably, Microsoft is investing in three core areas that reduce environmental impact, enhance operational resilience, and support customers in achieving their own sustainability goals:

- **Optimizing datacenter energy and water efficiency:** We are committed to advancing energy-efficient design, optimizing power usage, and expanding carbon-free electricity. We continually seek to minimize water, energy, and environmental impacts.
- **Improving the energy efficiency of AI and cloud services:** We're making our AI and cloud services more energy-efficient and helping customers do the same with tools and insights that promote progress for everyone.
- **Advancing low-carbon materials:** We're driving innovation and adoption of low-carbon materials to reduce the environmental impact of digital infrastructure and global supply chains.

When deployed responsibly, AI can compound benefits in many ways, such as lowering costs, improving performance, and accelerating sustainability progress over time.

Section 04

How AI drives resilient, sustainable business performance

Explore use cases showing how organizations are applying AI to improve business performance by enhancing efficiency, reducing risk, and increasing agility.

- **Model, predict, and act on disruptions**
  Use insights to reduce risk, minimize disruption, and protect performance.
- **Create operational efficiency**
  Eliminate waste and optimize resource utilization across complex operations.
- **Optimize supply chains**
  Build adaptive supply networks that perform under pressure.
- **Simplify reporting and compliance**
  Automate reporting and uncover insights to support regulatory confidence.
- **Advance research and material innovation**
  Accelerate discovery of sustainable solutions that unlock new opportunities.

Each use case addresses a critical business challenge while contributing to long-term sustainability goals. Together, they demonstrate how AI can serve as a strategic accelerator for transformation and resilience.

Model climate risks to reduce disruption

Use insights to anticipate risk, limit disruption, and protect performance.

The strategic opportunity

Organizations now face growing exposure from climate volatility, supply chain disruption, regulatory pressure, and reputational scrutiny. What was once a distant concern has become a direct threat to business operations and resilience.

Traditional risk management approaches such as annual assessments, static models, and reactive responses are no longer sufficient. They cannot detect fast-moving threats or support timely, data-driven decisions.

AI changes this. With tools like digital twins and Microsoft 365 Copilot, organizations can turn risk into opportunity. AI enables leaders to simulate complex scenarios and uncover hidden vulnerabilities, then respond faster and with greater precision.

How AI enables better business decisions

AI-powered risk management helps organizations move from reaction to readiness:

- **Identify risk sooner to minimize disruption:** Analyze climate patterns, supply chain signals, and regulatory indicators at scale to surface early warnings and pinpoint vulnerable operations.
- **Make informed, strategic decisions faster:** Use AI to simulate thousands of risk scenarios, compare outcomes, and plan contingencies that support smarter sourcing, investments, and operations.
- **Act automatically when risks escalate:** Deploy AI-triggered mitigation plans the moment thresholds are reached to reduce downtime, control costs, and preserve continuity.

Business opportunities

- Reduced exposure to climate, compliance, and supply chain risks
- Increased operational and supply chain resilience
- Cost savings from faster intervention and recovery

Microsoft solutions

Microsoft Fabric →

Microsoft Copilot Studio →

Planetary Computer →

Digital twin builder in Microsoft Fabric Real-Time Intelligence →

esri THE SCIENCE OF WHERE

Esri helps cities gain key climate science insights using geospatial data, AI, and Azure.

Challenge

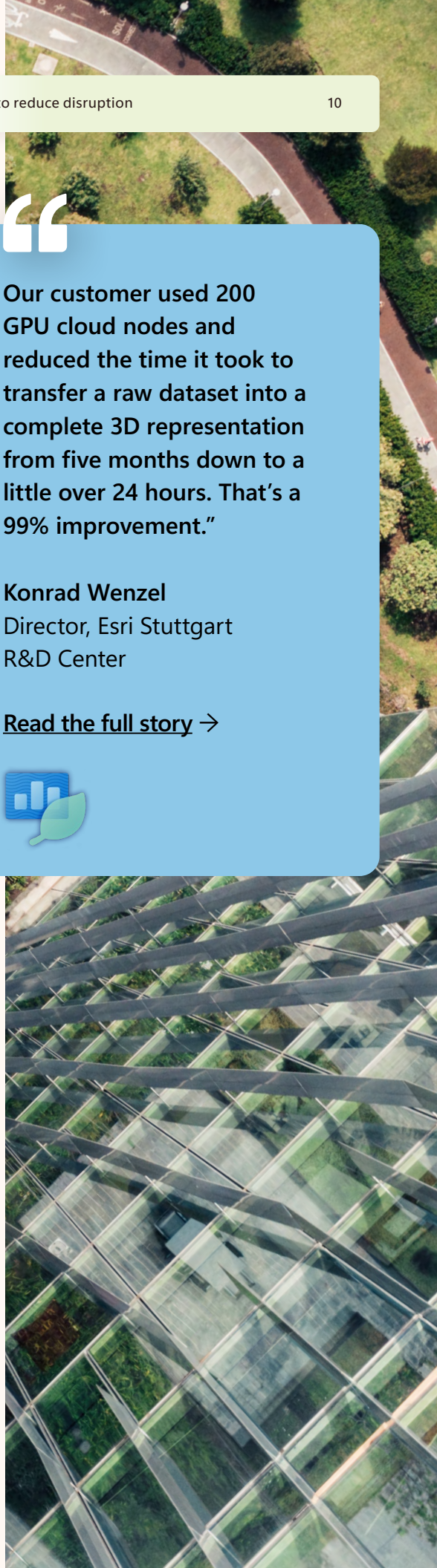
As extreme weather events became more frequent, the City of Stuttgart needed a faster, more reliable way to prepare for urban flooding. Traditional methods took up to five months to process the imagery required to build 3D city models—delaying insight and limiting the city's ability to make timely, informed decisions.

Solution

Esri partnered with Microsoft and NVIDIA to scale its ArcGIS platform using Azure and GPU-powered virtual machines. By leveraging cloud-based infrastructure and geospatial AI (GeoAI), Stuttgart created a full-scale 3D digital twin of the city in just over 24 hours—a 99% improvement in processing time. These digital twins now allow city planners to simulate heavy rainfall, model water flow, and test mitigation strategies.

Impact

With the ability to visualize and simulate weather scenarios in near real time, Stuttgart can identify vulnerabilities faster, act earlier, and reduce risk. Azure provides the scale, security, and performance to process large volumes of geospatial data—empowering city leaders to move from reactive planning to proactive resilience.



Our customer used 200 GPU cloud nodes and reduced the time it took to transfer a raw dataset into a complete 3D representation from five months down to a little over 24 hours. That's a 99% improvement."

Konrad Wenzel
Director, Esri Stuttgart R&D Center

Read the full story →

Create operational efficiency

Act on sustainability data and analysis to eliminate waste and optimize resource utilization across complex operations.

The strategic opportunity

Organizations face growing pressure to reduce operational costs, improve ESG performance, and accelerate decision-making. Yet many are hindered by fragmented data, outdated reports, and delayed access to insights. Without real-time visibility into sustainability performance, progress often stalls.

Generative AI helps solve this challenge. By enabling natural language queries of operational and sustainability data, AI empowers organizations to move from static reporting to dynamic intelligence. Teams can analyze trends, track goals, and uncover opportunities to reduce emissions, cut costs, and increase efficiency across functions.

How AI enables better business decisions

AI helps businesses shift from hindsight to foresight:

- **Unlock real-time operational insights:** Use natural language to access ESG and performance data instantly, helping teams make faster, smarter decisions with confidence.
- **Drive alignment maximize business value:** Compare sustainability performance across business units, suppliers, or regions, using shared metrics that support goal tracking and cross-functional collaboration.
- **Accelerate action on sustainability goals:** Continuously monitor progress against key targets, uncover gaps early, and take proactive steps to optimize outcomes.

Business opportunities

- Operational cost savings through better resource management
- Time savings by reducing manual reporting
- Improved ESG performance and transparency
- Lower risk through faster, insight-driven decisions

Microsoft solutions

Copilot in Microsoft Sustainability Manager →

Microsoft Sustainability Manager →

Microsoft Copilot Studio →

Microsoft Fabric →

SCHAEFFLER

Schaeffler uses Microsoft Sustainability Manager for systematic planning of decarbonization measures.

Challenge

Schaeffler set ambitious targets to reduce Scope 3 upstream emissions by 25% and avoid 90% of Scope 1 and 2 emissions by 2030. But fragmented data across business functions created blind spots in decarbonization planning—limiting the company's ability to identify emission drivers and take action at scale.

Solution

To address this, Schaeffler built a centralized platform using Microsoft Sustainability Manager, Microsoft Fabric, Power Platform, and Power BI. The Portfolio Decarbonizer tool simulates carbon reduction scenarios by combining integrated product, supplier, and sales data—enabling product managers to test the impact of switching materials or suppliers and prioritize the most effective actions.

Impact

Schaeffler now benefits from real-time transparency, dynamic Power BI dashboards, and faster deployment of new use cases—in as little as two to six weeks. With consistent, scalable data access across teams, Schaeffler is improving ESG performance, accelerating planning, and reducing manual reporting effort—empowering smarter, faster decisions across its operations.

"The Portfolio Decarbonizer allows us to simulate various combinations of measures, such as switching to other materials or suppliers, and choose the best way to reduce emissions."

Johannes Möller
Senior Specialist, Materials Simulation, Schaeffler

Read the full story →

Optimize supply chains

Use supplier and market intelligence to build adaptive supply networks that perform under pressure.

The strategic opportunity

Supply chain optimization is one of the most significant opportunities for AI to enhance both sustainability and business performance. Global supply chains have a substantial impact on corporate working capital, yet many organizations still lack the visibility and agility to manage these extended networks effectively.

Traditional supply chain models, built on historical data and periodic reviews, cannot respond quickly enough to today's dynamic disruptions. To keep pace, companies need supply chains that are predictive, adaptive, and optimized for cost, efficiency, and sustainability.

Business opportunities

- Increased supply chain resilience
- Cost savings and operational efficiency
- Competitive differentiation through data-driven sourcing
- Time savings from automated analysis and reduced manual workflows

How AI enables better business decisions

AI empowers teams to act with precision and speed:

- **Gain real-time visibility across your supply chain:** Monitor supplier performance, logistics networks, and regulatory indicators in real time to increase responsiveness and reduce blind spots.
- **Plan ahead with greater accuracy:** Forecast demand and anticipate disruptions using predictive models to support smarter sourcing, inventory, and investment decisions.
- **Adapt quickly to minimize risk and waste:** Dynamically adjust operations to sustain performance and minimize loss by rerouting shipments, reallocating inventory, or switching suppliers as needed.

Microsoft solutions

Microsoft Copilot Studio →

Microsoft 365 Copilot →

Copilot in Microsoft Sustainability Manager →

Microsoft Sustainability Manager →

Digital twin builder in Microsoft Fabric Real-Time Intelligence →

Microsoft Fabric →

Explore **Reduce Risk, Create Resilience: Advancing Supply Chain Sustainability** to see how AI can drive sustainable impact →

Fresh Foods スーパー細川

Super Hosokawa lowers food waste and boosts sales by sharing demand forecasts across the entire supply chain with Azure Databricks.

Challenge

Super Hosokawa, a Japanese supermarket chain, aimed to reduce food waste while increasing sales—a goal complicated by fragmented supply chain data and inaccurate demand forecasts. These inefficiencies led to overproduction, missed demand, and high waste rates across perishable product lines.

Solution

In a government-backed pilot, Super Hosokawa partnered with Imamura Shoji to build a demand forecasting system using Azure Databricks, Azure Blob Storage, and Snowflake on Azure. By sharing two-day-ahead forecasts based on ID-POS data across the supply chain, and leveraging Azure OpenAI in Foundry Models to optimize shelf layouts, the team enabled smarter, data-driven decisions across manufacturing, wholesale, and retail partners.

Impact

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, trial products maintained performance—effectively a 20% gain. Human-AI collaboration consistently outperformed traditional ordering methods, reducing operational waste and boosting supply chain precision. This success is driving broader AI adoption to improve demand visibility and resilience across Japan's food logistics ecosystem.

> **Since AI forecasting accuracy can continuously improve through learning, there's plenty of potential for AI to place orders on behalf of humans. Our system will reduce store ordering workloads, and we can expect full automation in the near future."**

Tadashi Hosokawa
CEO, Super Hosokawa

Read the full story →

Simplify reporting and compliance

Automate reporting and uncover insights to support regulatory confidence.

The strategic opportunity

Sustainability reporting and compliance consume enormous resources while delivering limited strategic value through traditional approaches. As regulations grow more complex, such as the EU's Corporate Sustainability Reporting Directive (CRSD) requiring disclosure of over 1,000 data points, traditional methods can't keep up. Manual compliance approaches cannot scale to meet these demands cost effectively.

AI turns compliance into a strategic advantage by automating reporting, identifying risks in real time, and aligning disclosures with specific regional requirements. With natural language queries and dynamic updates, teams can respond faster, reduce costs, and improve governance.

How AI enables better business decisions

- **Lower the cost and burden of compliance:** Automate data collection and validation to reduce time-intensive manual work and improve accuracy across complex regulatory requirements.
- **Deliver trusted, audit-ready reports faster:** Streamline report development and ensure timely alignment with evolving jurisdictional requirements to enhance transparency and build stakeholder confidence.
- **Stay agile amid constant regulatory change:** Proactively track updates and adjust disclosures in real time, reducing the risk of noncompliance and avoiding costly delays.

Business opportunities

- Time savings from automated reporting workflows
- Improved regulatory compliance and reduced risk
- Stronger data governance and transparency

Microsoft solutions

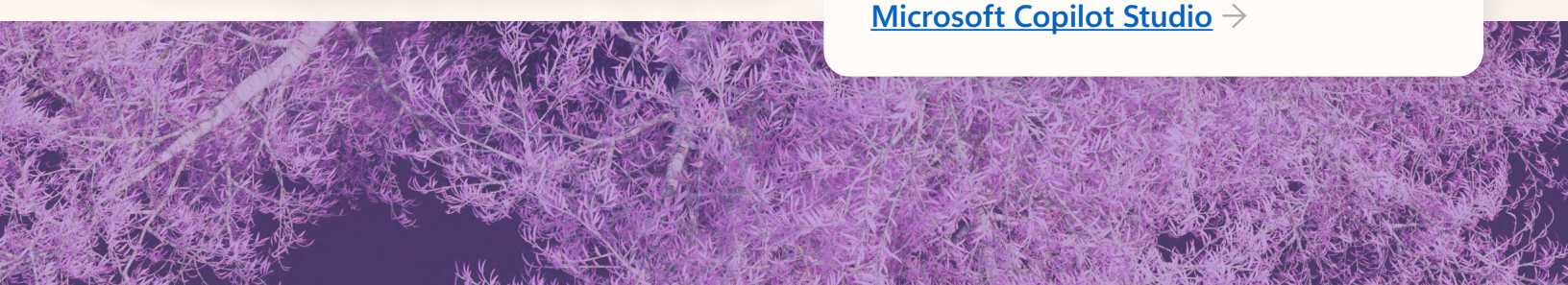
Copilot in Microsoft Sustainability Manager →

Microsoft Sustainability Manager →

CSRD template in Microsoft Purview Compliance Manager →

Microsoft Fabric →

Microsoft Copilot Studio →



Fellowmind

Fellowmind streamlines ESG reporting with Microsoft for Sustainability solutions.

Challenge

With regulations like the EU's CSRD requiring disclosure of more than 1,000 data points, ESG compliance has become increasingly resource-intensive. Fellowmind recognized that many of its customers lacked a unified approach to carbon data, slowing their ability to report accurately, respond to regulatory changes, and drive sustainability progress.

Solution

Built on Microsoft technologies, and Fellowmind's Footprint 365 tool, these solutions centralize emissions data, automate reporting, and ensure alignment with compliance requirements. Fellowmind also integrates Microsoft Dynamics 365, Power Platform, and Microsoft Fabric to help customers calculate emissions in real time, maintain audit trails, and streamline ESG reporting across business functions.

Impact

Fellowmind helps customers reduce the cost and complexity of ESG compliance while improving accuracy, transparency, and responsiveness. Drake & Farrell, for example, has refurbished 1.5 million electronic devices annually, preventing 4.3 million kg of e-waste from reaching landfills. OSTP has reduced CO_2 emissions by more than 70% since 2021 through real-time emissions tracking and automated reporting. These outcomes are enabling customers to accelerate progress toward sustainability goals while building trust with internal and external stakeholders.

With Microsoft technology, our customers get the support to improve their business processes and drive a greater sustainable impact at the same time."

Louise Ol-Ers
Group Sustainability Manager, Fellowmind

Read the full story →

Advance research and material innovation

Accelerate discovery of sustainable solutions that unlock new opportunities.

The strategic opportunity

Traditional research and development processes are too slow and costly to keep pace with urgent sustainability demands. Organizations face long development cycles, resource-intensive lab testing, and challenges managing complex datasets and validation workflows. This delays the commercialization of new, sustainable products and weakens competitive advantage.

AI changes this dynamic. Organizations using AI for research and innovation report shorter development timelines, higher success rates, and lower costs. AI accelerates discovery, simulates testing, and optimizes design, enabling faster innovation, reduced emissions, and better ROI.

How AI enables better business decisions

The benefits of AI-powered research and innovation come from three breakthrough capabilities:

- **Accelerate innovation cycles:** Use AI to uncover new product opportunities faster by analyzing complex data at scale, reducing costly delays and manual guesswork.
- **Accelerate testing and reduce risk:** Simulate and validate product performance virtually in hours instead of months, enabling faster decision-making and lower development costs.
- **Enable data-driven, low-carbon design decisions:** Use AI to evaluate materials, processes, and trade-offs to create solutions that align with both sustainability goals and business performance.

Business opportunities

- Faster time to market for sustainable products
- Reduced R&D costs and lab time
- Accelerated modeling and simulation
- Experts spend more time on strategic analysis, not routine tasks

Microsoft solutions

Microsoft 365 Copilot →

Microsoft Quantum →

Microsoft Discovery →

Planetary Computer →

Azure Synapse Analytics →

Pacific Northwest
NATIONAL LABORATORY

Pacific Northwest National Laboratory accelerates sustainable innovation with AI and high-performance computing using Azure Quantum Elements.

Challenge

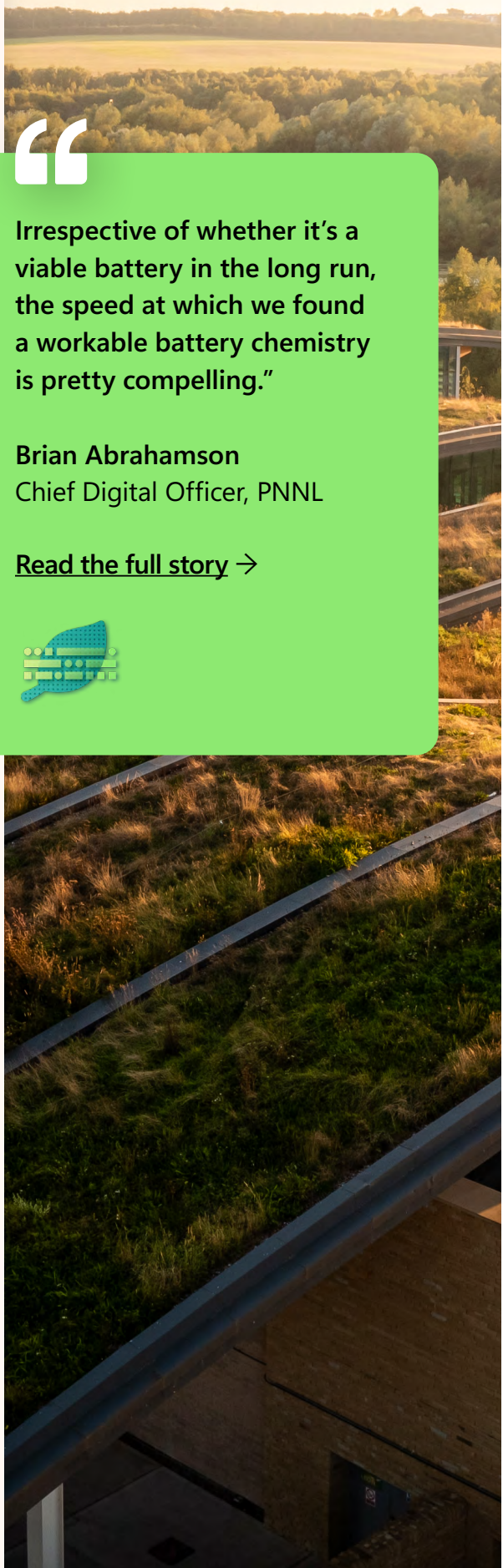
Research institutions and corporations needed to accelerate the development of sustainable materials and solutions to address urgent sustainability challenges. Materials discovery is traditionally slow and resource intensive. With the urgency to develop safer, more sustainable batteries, Pacific Northwest National Laboratory (PNNL) needed to reduce time to discovery and move beyond trial-and-error experimentation.

Solution

Built on Microsoft Discovery, and in collaboration with Microsoft, PNNL used agentic capabilities to apply AI and high-performance computing (HPC) to materials science. The system rapidly analyzed 32 million candidate compounds, narrowing the list to 18 promising battery materials in just 80 hours.

Impact

The resulting material could cut lithium usage by up to 70%. This AI–HPC approach shortened discovery cycles from years to weeks, helping scientists focus on strategic breakthroughs rather than routine calculations. The collaboration demonstrates how Microsoft tools accelerate innovation while supporting global decarbonization goals.



> **Irrespective of whether it's a viable battery in the long run, the speed at which we found a workable battery chemistry is pretty compelling."**
>
> **Brian Abrahamson**
> Chief Digital Officer, PNNL

Read the full story →

Section 05

Lead with resilience, act with AI

Resilience is the new measure of business strength

In today's environment of volatility and rising stakeholder expectations, sustainability and resilience are no longer separate goals. They are mutually reinforcing imperatives, and AI is the catalyst that makes both achievable.

The five use cases in this e-book show how AI advances sustainability outcomes while delivering measurable business value. Leading organizations are already using AI to:

- Model climate risks to reduce disruption
- Create operational efficiency and lower costs
- Optimize supply chain visibility and performance
- Simplify ESG reporting to build trust and ensure compliance
- Accelerate research and material innovation to accelerate time to market

These are not isolated initiatives. They signal a strategic shift. Organizations that act now will define the next era of resilient, sustainable leadership.

The path forward starts with focused action:

- **Prioritize high-impact opportunities**. Target use cases that offer fast, measurable ROI, such as emissions tracking, risk modeling, and regulatory reporting. Quick wins validate the value of AI and build organizational momentum.
- **Build a scalable foundation.** Invest in cloud-based AI and data platforms that support enterprise-wide goals, from sustainability to productivity. Integrated systems deliver the agility and insight required to thrive.
- **Scale what works.** Use early success to expand across business units, regions, and innovation areas. The most successful companies grow deliberately, aligning investments to outcomes.

AI gives you the power to lead with confidence and deliver real, sustainable impact.

Let’s build a more resilient, sustainable future together

Accelerate your progress with powerful Microsoft sustainability solutions

Explore more AI-powered use cases

[1] “Redesigning brand values,” IBM, 2023.

[2] “Reinvention on the edge of tomorrow,” PwC, 2025.

[3] “Energy and AI,” IEA, 2025.