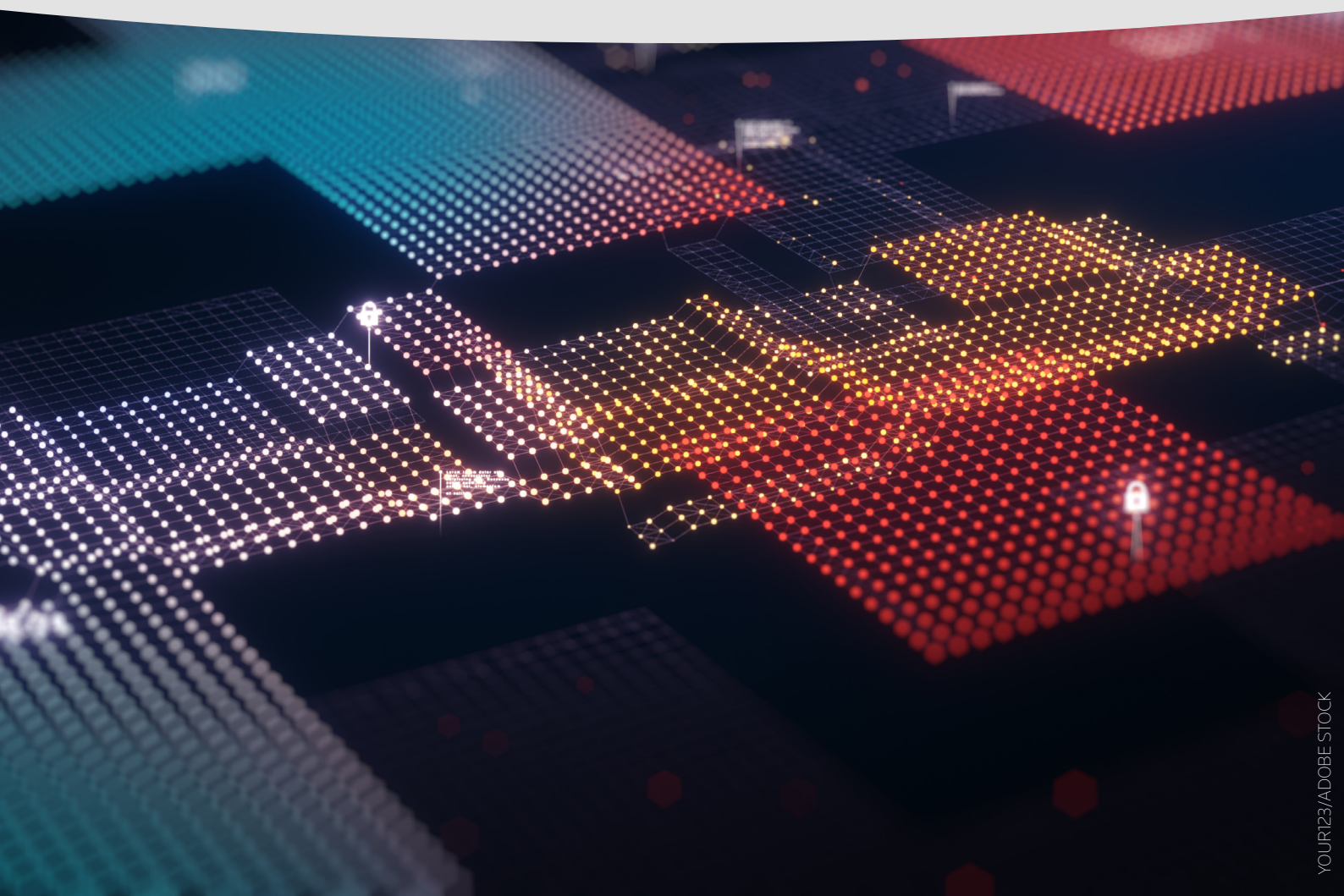


FROM PILOTS TO PERFORMANCE

How Industrial AI is Helping to Scale Sustainability Impact

In cooperation with

SIEMENS





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ABOUT OUR RESEARCH

To form the basis of this report, Siemens and Reuters Professional collaborated on a study of 263 senior sustainability professionals in Q3 2025. The survey was conducted via web form, and a methodology can be seen on page 21. Comparisons are made to last year's study of the same nature, data for which was collected in Q2 2024.

To elaborate on survey findings and capture qualitative sentiment, a focus group discussion was held during Climate Week New York on 16 September. Chief Sustainability Officers and other senior sustainability professionals from major organizations were present and participated in a structured discussion.

This report also uses data from the Siemens Infrastructure Transition Monitor 2025, published in October 2025. More information regarding this separate report and its methodology can be [found here](#).

FOREWORD

Humankind is at an inflection point. Two historic transformations are reshaping our world: the shift from fossil fuels to renewables, and the shift from a linear economy to a circular one. These transitions will define this century – and both need to be addressed simultaneously in a world of complexity and disruptions.

I'm optimistic we can solve this. We're witnessing an unprecedented convergence of technological capability, economic incentive, and environmental necessity. Artificial intelligence is the catalyst that can unlock their combined potential at the speed and scale we need.

AI is like a magic wand—it opens up possibilities we've never had before. We can now simulate before we build, optimize before we operate, and think even deeper and broader than ever before. AI enables us to orchestrate complexity across entire value chains—transforming energy systems, supply chains, and infrastructure from fragmented parts into intelligent, sustainable ecosystems.

As electrification advances and renewable energy sources increase, industrial AI ensures grid stability and efficient energy use—unlocking up to 30% more utilization of existing infrastructure. This contributes to meet the 20% grid growth needed by 2030. Through digital twins and AI in product design, we increase resource efficiency, reduce waste, and unlock entirely new designs that were previously impossible. For transportation, AI enables highly automated vehicles to perceive their environment—infrastructure, obstacles, and passenger load—and respond in real time, making complex transport systems possible and increase availability to 99%.

AI-driven sustainability is no longer emerging—it's delivering measurable results and benefits today. 65% of organizations report energy savings by industrial AI and, most telling, 81% of manufacturers believe future sustainability innovation will be AI-driven. For industrial AI, the benefits far outweigh the costs.

Siemens is uniquely positioned to lead this transformation, empowering our customers to become more competitive, more resilient, and sustainable. We combine the real and the digital worlds, combining domain know-how in societal infrastructure with the world's largest industrial software business. Our digital twins span buildings, industry, and grids, while our industrial AI expertise goes back more than 30 years, now accelerated by millions of connected devices, compute power and industrial data.

The opportunity is now - it's here, it's proven, and it's rapidly becoming the competitive baseline. The question isn't whether to integrate AI into sustainability strategy, but how quickly you can move from pilot to scale.



Dr. Eva Riesenhuber
Global Head of Sustainability
Siemens AG

SIEMENS

FOREWORD

Welcome to the From Pilots to Performance report, produced by Reuters in cooperation with Siemens.

Following the successful launch of our inaugural report in 2024, this year's study builds upon our original research to chart the continued evolution of industrial AI's role in sustainability-focused initiatives and operations. Where our first report captured organizations at the early stages of their industrial AI journeys, this edition reflects a landscape where adoption has matured, revealing both the realized potential and persistent complexities of implementation at scale.

This study has been conducted to explore how organizations are advancing their industrial AI strategies today, the measurable outcomes they are achieving and the lessons learned from moving beyond pilot phases toward enterprise-wide integration. We have examined the specific use cases, strategic imperatives, and organizational shifts that characterize this new phase of industrial AI adoption, alongside the evolving challenges that remain.

We have used a mixed-methodology research approach to inform the contents of this study. Building upon our quantitative survey foundation, this edition incorporates qualitative insights gathered through in-person focus group discussions with sustainability leaders from major global corporations. These conversations have provided invaluable depth and context to

complement our survey data, revealing the practical realities of industrial AI implementation across diverse industrial contexts.

In total, more than 260 senior executives participated in this year's survey, with respondents filtered to ensure sufficient seniority and relevance to their organization's AI and/or sustainability strategies. Qualitative interviews with thought leaders and senior executives within the space have supported quantitative analysis of survey data. Further detail on the breakdown of participants can be found in the methodology section of this report.

We would like to take this opportunity to thank all who participated in the survey, alongside those who contributed their time and expertise to our qualitative research, including focus group participants who generously shared their experiences and insights. This report would not have been possible without their valuable contributions.



Liam Stoker
Head of Market Insights
Reuters Events



AI'S ROLE IN ACCELERATING A SUSTAINABLE TRANSITION

Organizations are in a race against time. Tackling climate change – and doing so with sufficient pace to avert the worst impacts of a warming climate – requires a complete operational transformation of modern businesses. This must include a transition from fossil fuels to renewable energy sources and a move towards a circular economy from a linear one.

These twin transformations require a unified approach at sufficient speed and scale. As such, the current decade is crucial. “I would say that the climate agenda is here and now and not in the future, and it’s being assessed from that business competitiveness lens,” Kari Stoevers, Chief Growth Officer at the Climate Disclosure Project, says.

Businesses can strategize for the convergence of three particular areas of impact in order to respond effectively and adequately to this escalating threat:

- Decarbonization and energy efficiency
- Resource efficiency and circularity
- People centricity and society

Dr. Eva Riesenhuber, Global Head of Sustainability at Siemens AG, says: “This is important because you cannot choose what challenge you address in the world. We talk about decarbonization, but really we also need to conquer circularity at the same time, and we need to keep people and society at the center of our thinking.”

“When you look at the twin transitions that humanity has to master, it is the energy transition and it’s a circularity transformation. Both of them are super complex. This is really



AI is already transforming how we build and power the world - making it more sustainable every step of the way.

Peter Koerte, Managing Board Member, Chief Technology Officer and Chief Strategy Officer, SIEMENS

where AI will help us more and more, looking at it holistically and finding the way forward that works for all three impact areas thought together.”

This change will require a complete rewiring of industry as we know it. Despite the scale of this challenge, organizations are evidently not shirking or shying away from the challenge at hand, they are embracing it and doubling down on ambitious goals.



The benefits of successfully navigating these transitions are not just related to sustainability. Through embracing cleaner, more circular economies, businesses also stand to become increasingly resilient to emerging threats and more competitive in evolving marketplaces.

As a result, net zero commitments are tightening dramatically. In this year’s survey, 74% of respondents said their organization has set the aim of being net zero by 2040.

REGULATORY COMPLEXITY COMPOUNDS CHALLENGES

Business teams and individuals tasked with leading this charge face what Pina Schlombs, Sustainability Lead at Siemens Digital Industries Software, describes as a “tsunami of regulations.” Understanding and applying evolving requirements to product lines requires significant expertise and a resource that few organizations have access to.

“That usually takes hundreds of experts to understand, comprehend and then deduct what products are affected,” Schlombs explains. “This can all be captured today with AI models, and we can go further and look into what upcoming regulations are being worked on, and have a forecast or predictive view.”

Schlombs identifies the challenge: “You have financial aspects, regulatory compliance and market access as well as product performance and the environmental impacts that follow different timescales. Simply being able to capture all of these and put them in concert with each other, addressing how they interrelate - that’s a real benefit of what AI knowledge grants.”

INDUSTRIAL AI: A SCALABLE SOLUTION

“In industry, our customers are using AI to make production lines smarter and less wasteful. In infrastructure, AI helps to boost grid capacity, conserve precious water resources, and reduce the energy demands of buildings. Some of our data center customers have cut their energy costs in half using industrial AI”, explains Peter Koerte, Managing Board Member, Chief Technology Officer and Chief Strategy Officer at Siemens.

Speaking at a focus group gathering of sustainability leaders organized by Reuters and Siemens at Climate Week New York 2025, participants also consistently described AI as unlocking productivity and efficiency gains by automating routine tasks, freeing sustainability professionals for more complex or strategic work. One participant said their organization established a dedicated data and AI team within its sustainability function specifically to demonstrate value and drive cultural adoption, reducing workload for stretched teams handling customer sustainability inquiries.

“Scaling quickly is essential, but finding enough people with the specialized sustainability expertise required can be challenging,” Schlombs explains. “We could try to approach this purely through human resources, but this is a prime example of where AI can make a real difference. By democratizing critical knowledge and making it accessible across the organization, we can accelerate transformation and ensure we meet the timelines needed to achieve net-zero.”

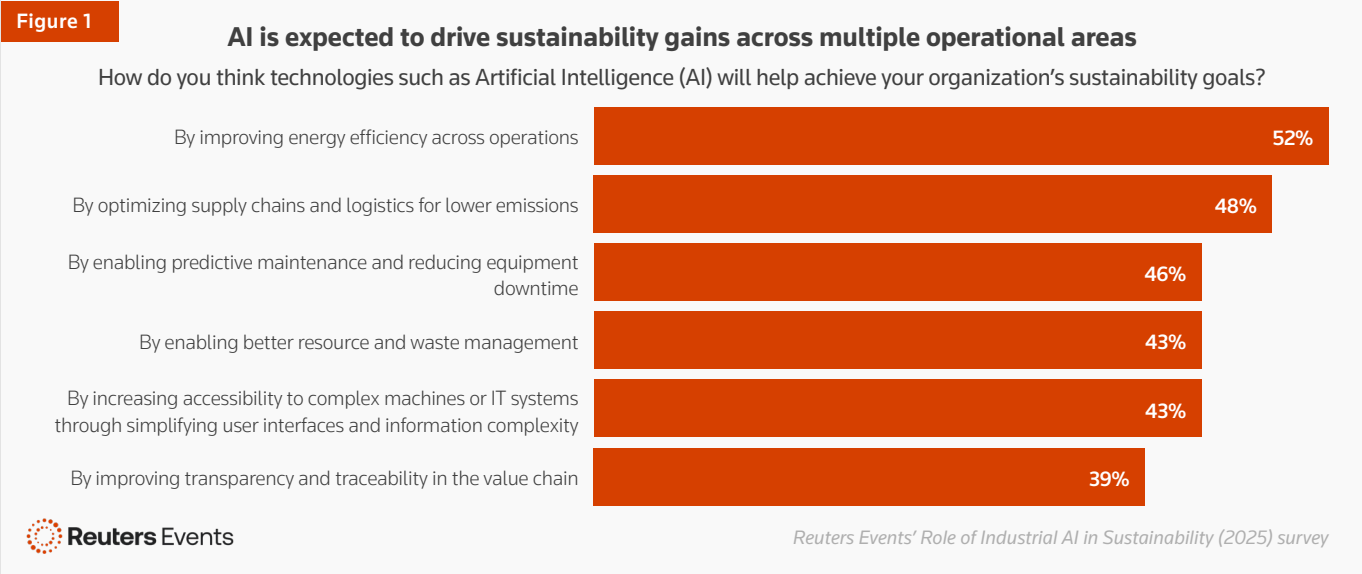
With time of the essence and organizations needing to act faster than ever, the question is no longer whether industrial AI belongs in the sustainability toolkit, but how quickly organizations can deploy it at scale effectively.

MAXIMIZING GRID INFRASTRUCTURE FOR FLEXIBILITY, UTILIZATION AND SCALABILITY

Dutch network company Alliander, needed to develop more flexible, intelligent grid management in order to address mounting congestion and to support the energy transition. Serving 3.5 million customers, Alliander faces both rising energy demand and challenges related to integration, with some users facing waits of up to 10 years for grid connections.

Alliander has partnered with Siemens to implement Gridscale X software. This technology draws upon an open innovation ecosystem and will empower Alliander to boost grid utilization by up to 30%.

The software offers real-time visibility and actionable insights, enabled by a digital twin of the grid, allowing Alliander to distinguish between grid segments that require physical upgrades and those that can be optimized through flexibility.



FROM PILOTS TO PRACTICE: INDUSTRIAL AI COMES OF AGE

With businesses needing to accelerate their climate response, industrial AI stands at an inflection point. Practical applications of the technology are evolving, further driven by organizations realizing measurable results on pilot projects. Our research clearly indicates this transformation from pilots to practice clearly.

Just 13% of respondents said their organization remains at the exploration phase, while 24% said pilot projects are underway. Combined, nearly two-thirds (63%) of organizations have moved beyond pilots. This finding

aligns with Siemens' Infrastructure Transition Monitor 2025, where 59% of respondents reported using AI to help decarbonize operations.

66%

Organizations who said AI will transform the way their business operates.

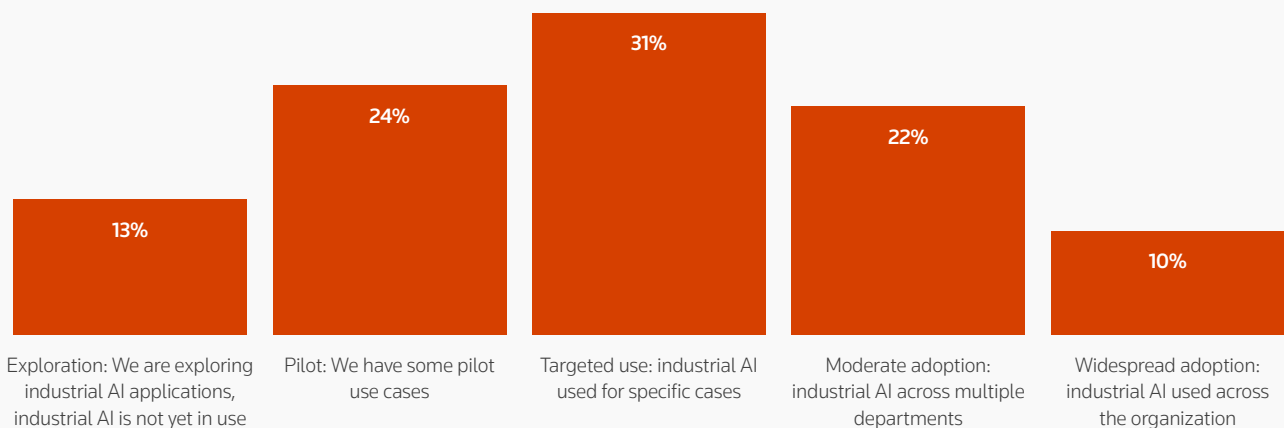
Source: Siemens
Infrastructure Transition
Monitor 2025

Siemens has witnessed this maturation firsthand. Pina Schlombs describes progression from single-process steps being augmented with AI toward full process flows being captured. From an engineering perspective, this evolution extends to entirely new software features being developed by multi-agent teams, an approach which is now extending into hardware development.

Figure 2

A majority of respondents said their organization had moved beyond pilot projects of implementing industrial AI

Thinking about your organization broadly, how would you describe the extent of industrial AI?



"We're much more mature in understanding where this specific technology is in the sweet spot of industrial use cases," Schlombs explains. "Now it's a case of building from this and understanding how we can scale it across the organization, how does it fit into processes that are complex and have certain legacies."

OPERATIONAL APPLICATIONS SHOW GROWTH

This is further supported by our research, which reveals a significant surge in the implementation of industrial AI across both sustainable operations and products year-on-year.

For operational sustainability, nearly three-quarters (74%) of respondents said their organization had already implemented

industrial AI for quality control and 65% said it had been implemented for energy management, as shown in *figure 3*. These are followed by production process optimization (62%), predictive maintenance (60%) and resource efficiency management (60%) as the most common instances where industrial AI has been implemented to date.

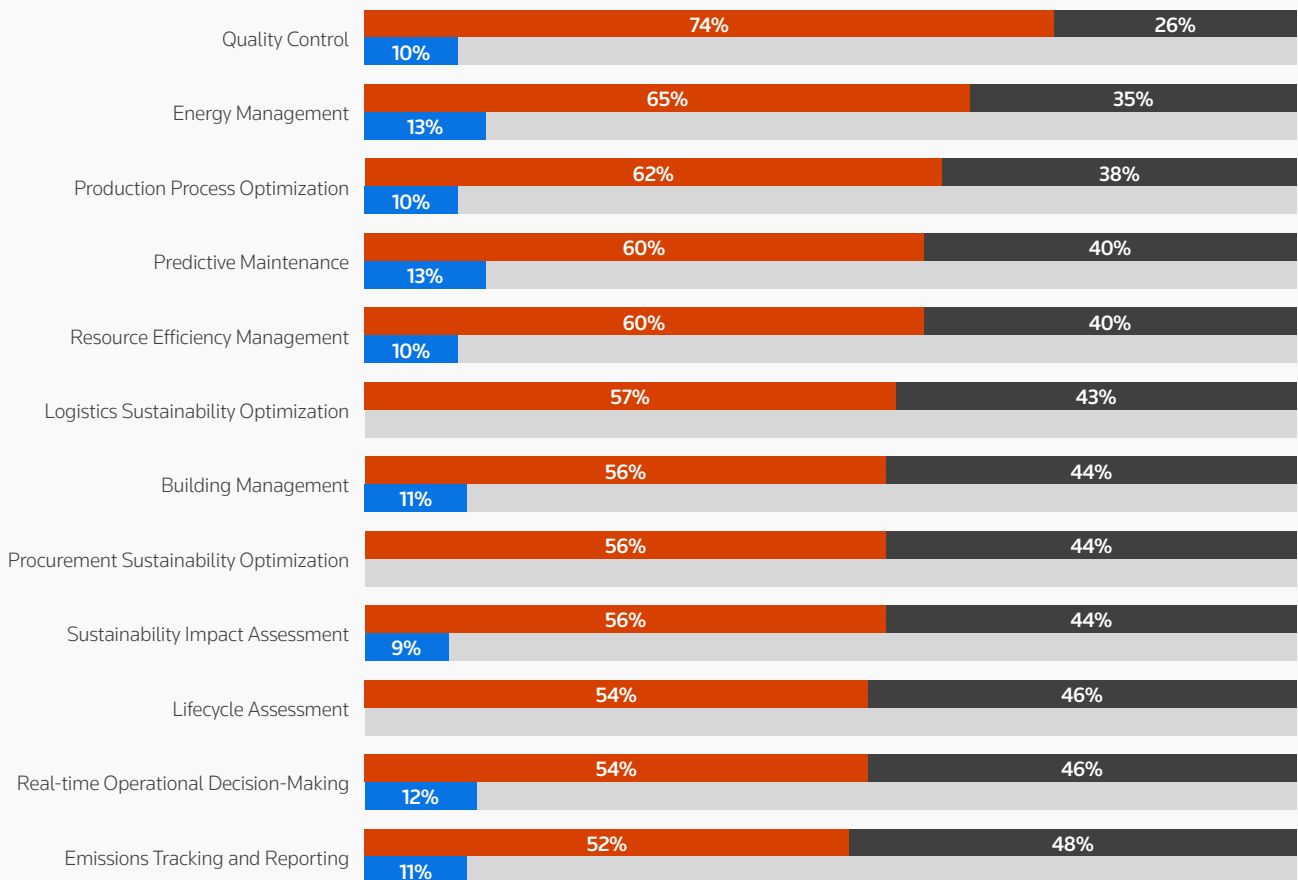
Across all operational use-cases, implementation rates exceed 50% of our survey cohort, a significant increase from rates seen in last year's research, when implementation rates did not exceed 13% (see *figure 3*). This breadth and scale of deployment indicates industrial AI's versatility in addressing diverse sustainability challenges simultaneously, enabling the scale and speed so critically required in the pursuit of sustainability.

Figure 3

Implementation of industrial AI across operational use cases has surged year-on-year

For the following use operational cases, please indicate in which ones your organization have implemented / planning to implement industrial AI.

■ Has been implemented within your organization (2025)
 ■ Will implement within next 3 years
 ■ Has been implemented within your organization (2024)



This is further supported by case studies across decarbonization and energy efficiency, resource efficiency and circularity, and people centricity and society that act as proof points for industrial AI's maturity.

Siemens is driving energy savings of up to 30% in buildings with the organization's building automation solutions, Building X digital building platform and advanced AI analytics.

Predictive maintenance, one pivotal area of future deployment for industrial AI as highlighted in our research, is extending its use by extending component life in the field, maximizing the use of assets before replacement in support of circularity.

PRODUCT-LEVEL INTEGRATION ACCELERATES

It is a similar story at the product level, where industrial AI adoption is also showing momentum. Organizations are implementing industrial AI for generative design for physical products (63%), product lifecycle management (57%), and product customization (56%), as indicated by *figure 4*.

Generative product design has the potential to provide particular sustainability benefits, as Siemens has demonstrated through its development of lightweight robot grippers that are not only manufactured using fewer materials, but are also more efficient to use.

Addressing this point within our focus group discussion, Eryn Devola, Head of Sustainability, Digital Industries at Siemens, described how AI tools integrated into design software enable sustainability improvements without burdening design teams:

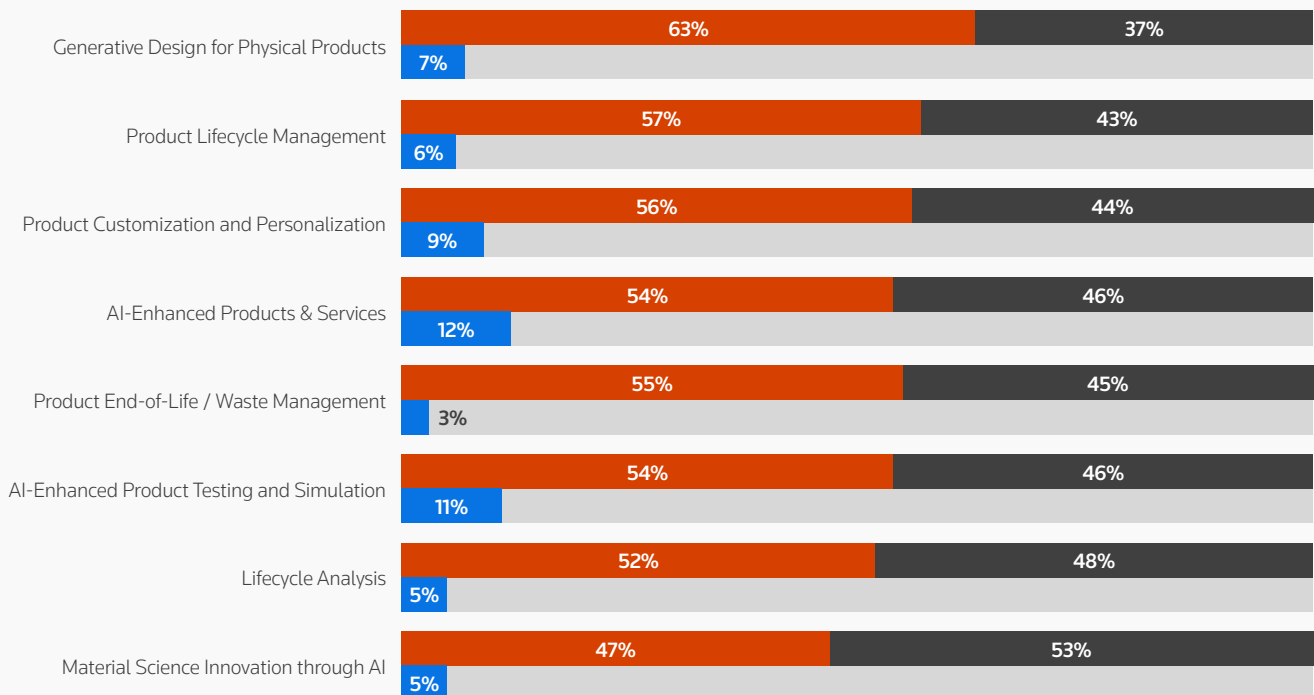
"It's now easier to say, 'While we're working on this design, let's also address resource efficiency and carbon footprint.' Today, we can model these factors and embed them into decision-making to achieve the right trade-offs without adding major effort for engineering. And we can go further: since we're already touching the design, we should also explore how to dematerialize, reduce size, increase modularity, etc. These are all key factors that contribute to creating a truly sustainable product for the long term."

Figure 4

Applying industrial AI to generative productive design is the most popular use case for sustainable products today

For the following use cases impacting sustainable products, please indicate in which ones your organization have implemented / planning to implement.

■ Has been implemented within your organization (2025) ■ Plan to implement (within next 3 years) ■ Has been implemented within your organization (2024)



Looking ahead three years, these figures are expected to reach near-universal adoption across most use cases, with combined current and planned implementation rates exceeding 95% in multiple categories.

The data supports an important strategic conclusion: organizations are starting to apply AI to operational processes, where demonstrating ROI may be more straightforward, before expanding to product-level innovations. Energy management and predictive maintenance offer clear, quantifiable benefits in reduced utility bills and avoided downtime costs, helping foster organizational support and confidence. Once proven, organizations can extend AI to more complex product design, material innovation, and lifecycle optimization challenges.



We implemented AI in our manufacturing operations and the focus was actually to help improve product quality and yield. But by doing that we also reduced waste and energy consumption. That's a tangible result with real dollar values associated with it, which resonates with people.

Brooke Tvermoes, PhD, DABT, Director, Climate, Energy and Environment, IBM CHIEF SUSTAINABILITY OFFICE

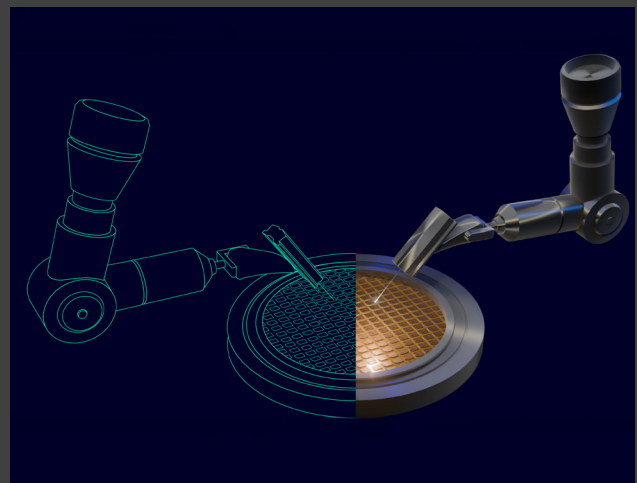


AI-DRIVEN PROCESS OPTIMIZATION SAVES MATERIALS, ENERGY AND CO₂

Automation Innovation transformed its glass production mold cleaning operations by strategically deploying AI-driven analytics and digital twin technology. The organization was previously reliant on a cleaning approach that took five hours per cycle and required harmful chemicals. A new, automated approach helped tailor cleaning processes to each mold's specific condition, reducing that time from five hours to just two seconds per mold while eliminating the use of harmful chemicals. Furthermore, the new approach has saved 700,000 tons of raw materials per year, reduced on-site energy consumption by 30% and avoided nearly 1 billion kilograms of CO₂ emissions to date.

LIGHTWEIGHT ROBOT GRIPPERS OPTIMIZING MANUFACTURING PROCESSES AND OUTCOMES

Used in manufacturing lines, classic metal grippers weigh nearly 50kg, comprise more than 30 parts built from aluminum, have CO₂e emissions of around 670kg from cradle to gate and have a product lead time of more than one month. Industrial AI helped Siemens in the design of a new lightweight gripper made using a carbon-reduced polymer. This gripper weighs less than 2kg, has CO₂e emissions from cradle to gate of just 30kg and has a product lead time of just two days. The impact of switching to such lightweight grippers has been demonstrable: energy consumption from the modernized lines has approximately halved, more than 3 tonnes of CO₂ emissions have been saved and lines have become more efficient in the process, demonstrating 20% faster cycle times.



CONFIDENCE RISES ON GROWING EVIDENCE

The share of respondents expecting high or medium positive impact from industrial AI in accelerating the energy transition today has jumped from 42% in 2024 (as recorded in last year's *A New Pace of Change* report) to 71% in 2025, as seen in figure 5.

This confidence may be attributable to a multitude of factors, including an expanding evidence base and demonstrable, tangible results. Organizations are also seeing their peers succeed with pilots, while technology providers are offering more mature products.

Focus group participants described this progress as starting with conservative pilots focused on specific pain points, then expanding after achieving success.

Our survey respondents indicated this demonstrable success was particularly true of energy management-related applications, where 70% said the technology had met expectations and 17% stated it had exceeded them. Building management, emissions tracking and reporting, and procurement sustainability optimization each show similar positive outcomes, with less than 10% of implementations falling short of expectations across most categories.

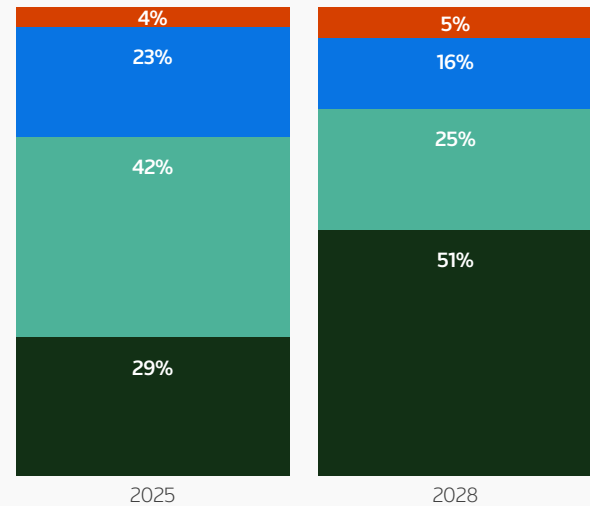
Narratives building around industrial AI continue to reflect broader technology adoption patterns. Early pilots validated technical feasibility and identified high-value applications. Mid-stage implementations build organizational capabilities, establish best practices, and demonstrate ROI.

Figure 5

A significant majority believe industrial AI will have a 'medium' or 'high' positive impact on accelerating the energy transition today

Thinking about your industry more broadly, what level of positive impact would industrial AI applications have in accelerating the energy transition?

■ No Impact ■ Low Impact ■ Medium Impact ■ High Impact



Values do not add precisely to 100% due to rounding and exclusion of respondents who answered 'Don't Know'

Reuters Events

Reuters Events' Role of Industrial AI in Sustainability (2025) survey

AI-POWERED PIT STOPS FOR TRAINS

The fleet of Rhein-Ruhr-Express (RRX) trains, operated by National Express, runs around the clock and achieves nearly 100% system availability. AI helps this achievement through condition monitoring and smart inspections, providing assistance with decision-making and defect forecasting.

AI helps monitor the condition of the 84 RRX trains at the Rail Service Center (RSC) in Dortmund, Germany, helping to plan repairs before parts break down and predict failures that will not occur until a few months later. Spare parts, some of which are produced on a 3D printer, can then be made available on the predicted date.

While humans continue to play a leading role at the RSC, AI aids in decision making. It evaluates specific measurements from sensors on board the train, with data



transmitted in near real time to Railigent X, a suite of services and applications built on the principles of Siemens Xcelerator. Work orders are automatically generated within the maintenance management system while the train is operational, allowing for works to be prepared for when the train rolls into the RSC.

DELIVERING RESULTS: WHAT SUCCESS LOOKS LIKE

It continues to be imperative that investments in industrial AI deliver tangible ROI for businesses. More than half of respondents (57%) cited cost savings and ROI as the most important factor determining project success.

However, the financial discussion has evolved dramatically over the past year. While concerns about ROI persist, the share of respondents citing difficulty projecting or measuring returns has fallen from 38% in 2024 to 23% in this year's study, reflecting greater confidence in the technology.



We have what we call an AI fusion team that brings across leaders from the CIO, CAO, our sustainability office and research to look for those use cases, but the goal is to unlock productivity across the business.

Brooke Tvermoes, PhD, DABT, Director, Climate, Energy and Environment, IBM CHIEF SUSTAINABILITY OFFICE

"The financial argument is still very much core to decision making, but what's become clearer now is that companies are much more focused on determining what it is they actually want to get out of AI pilots," Schlombs says, adding: "The target KPIs and benefits are much more clearly defined, so the ROI can be calculated more precisely."

Focus group participants characterized the budget conversation as surprisingly straightforward. One participant described the financial case as "the easiest piece" today, with productivity gains clearly defined. Another noted that when discussing AI investments, the conversation has become simpler: time saved equals money saved – an equation any budget holder can reconcile.

ROI is not the only quantifiable metric important for businesses. Around one-third (35%) of respondents emphasized the need for industrial AI investments to increase output quality to be deemed successful, while 30% pointed to production capacity gains and 28% focused on environmental footprint reduction.



SIEMENS

HOW AI IS MAKING DATA CENTERS MORE ENERGY EFFICIENT

Greenenergy Data Centers' facility near Tallinn, Estonia is at the forefront of sustainable operations. The facility's operators rely solely on renewable energy to power the data center, while smart technology is used to increase efficiency. Despite Tallinn's cool environment, temperature management remains a significant contributor to the facility's energy consumption. To support this, a White Space Cooling Optimization (WSCO) management system provided by Siemens is used to optimize temperature management in a scalable, automated and AI-supported way. Sensors continuously monitor the temperature and airflow of the center's white space – the area where servers are located – with the WSCO system dynamically adjusting cooling units and airflow to match specific requirements. The center was the first in the region to deploy Siemens' WSCO system and Greenenergy has seen tangible business benefits. "When we first launched the system, it improved our efficiency by approximately 30% at the push of a button," said Kert Evert, Chief Development Officer of Greenenergy Data Centers. "But this was just the beginning, because the system learns, adapts and improves over time."

Therefore, while we can conclude that successful industrial AI implementations deliver financial returns first and foremost, a number of additional KPIs are also important to consider.

QUANTIFIABLE SUSTAINABILITY OUTCOMES

Case studies show that implementing industrial AI can drive system-wide improvements, from reducing energy consumption to extending equipment life through better maintenance or product quality through tighter process control. While there is no 'silver bullet' solution for sustainability, the compounding benefits of industrial AI strengthen business cases further.

Our research provides further proof that organizations are realizing direct sustainability-related benefits, serving as compelling evidence that industrial AI is being implemented with success.

As figure 6 shows, organizations implementing industrial AI for sustainability are reporting quantifiable improvements. Furthermore, these are improving year-on-year. Nearly two-thirds (65%) achieved energy savings averaging 23%, while 59% realized CO2 reductions averaging 24%, as indicated in figure 6. These figures represent real, tangible sustainability outcomes that also benefit an organization's bottom line.

THE CRITICAL NEED FOR STRATEGIC PLANNING

Among successful implementations, effective planning and execution was cited nearly twice as frequently as any other factor. Organizations can access identical technologies, work with the same vendors, and target the same applications, yet achieve dramatically different results based on planning quality.

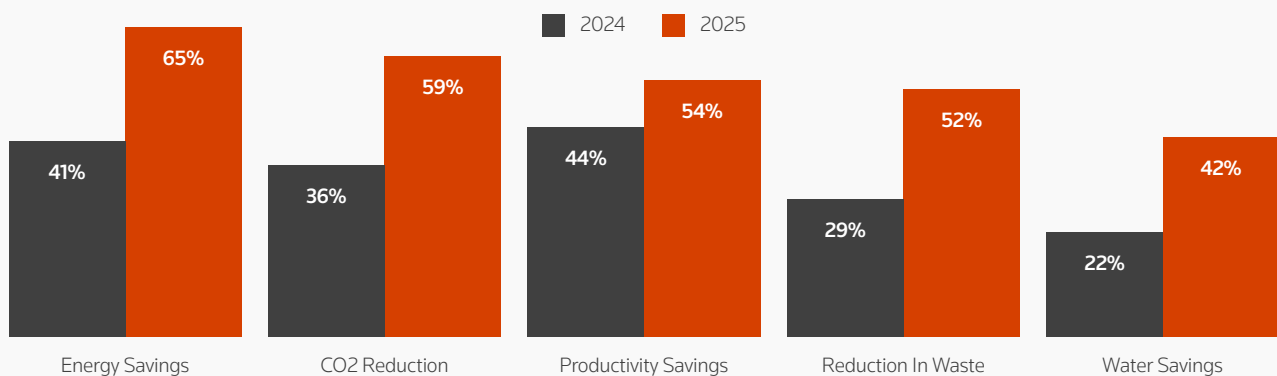
Success requires the establishment of a comprehensive data strategy. Businesses must assess data quality, identify gaps, build necessary infrastructure and establish governance frameworks. Projects must have clear definitions aligned across business functions. Potential skill and expertise gaps are identified and addressed early. Technical capabilities combined with domain expertise ensure AI applications address genuine business problems.

Industrial AI's value proposition rests on multiple pillars: clear financial returns, measurable sustainability improvements, operational quality gains, and strategic necessity. Organizations approaching implementation with rigorous planning, clear objectives, and comprehensive stakeholder engagement can achieve these outcomes.

Figure 6

A growing share of organizations are realizing quantifiable sustainability impacts from industrial AI

Please elaborate on the positive impact of industrial AI on efficiency in your organization?



Magnitude of savings on average

23%
Energy Saved

24%
CO2 Reduced

26%
Productivity Saved

26%
Waste Reduced

19%
Amount of Water Saved

NAVIGATING THE REMAINING ROADBLOCKS

While financial concerns have decreased, other barriers demand attention as organizations scale industrial AI. The challenges faced by organizations have evolved, with organizational factors assuming greater prominence alongside persistent technical and governance issues, as shown in *figure 7*.

Data and cybersecurity top the list of challenges, cited by almost half (49%) of organizations as preventing industrial AI growth. This is perhaps unsurprising given the sensitive nature of industrial data and the increasing sophistication of cyber threats. Organizations must balance AI's hunger for data with legitimate security concerns, implementing robust governance frameworks that enable innovation while protecting critical assets.

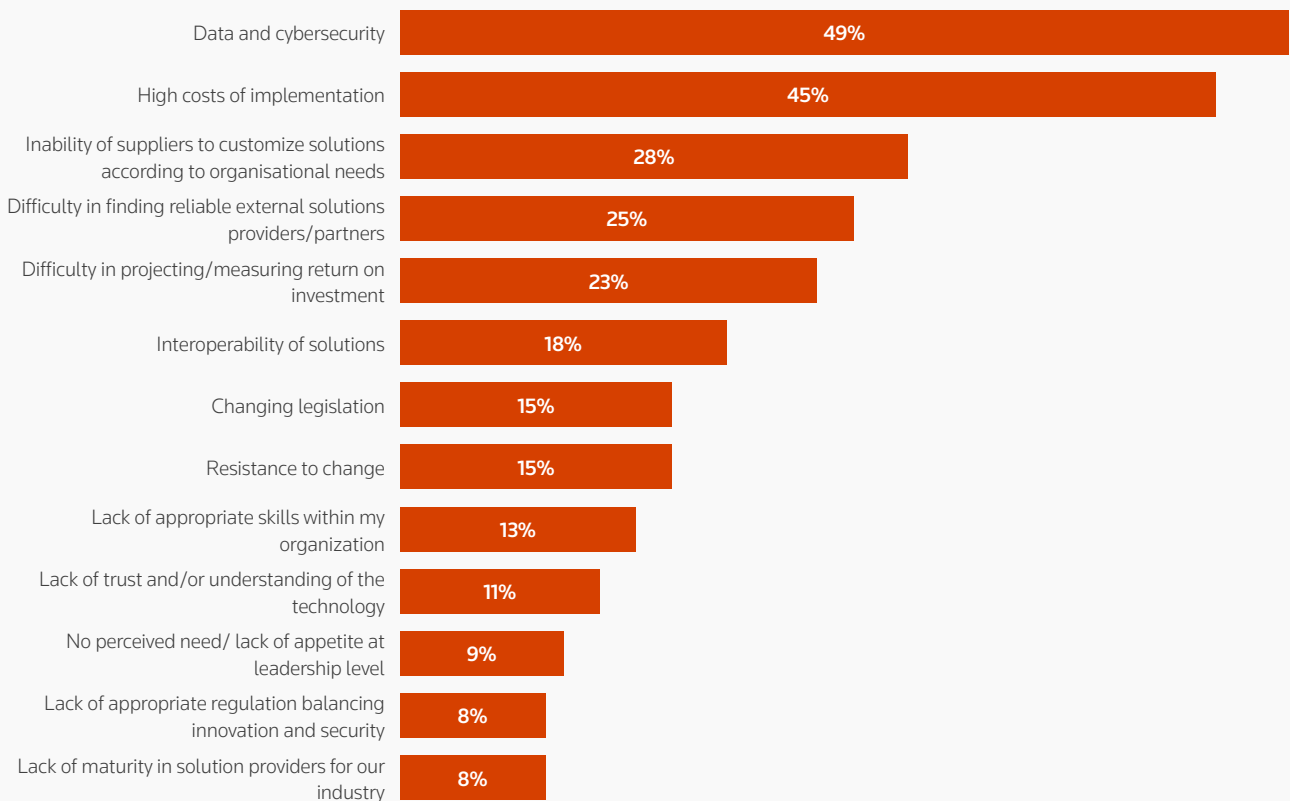
Kari Stoevers, Chief Growth Officer at The CDP, speaks of how her organization has looked forensically at its data ingestion capability to help pre-populate disclosures with various documents, with AI ensuring information is congruent, accurate and not impeded by entry errors. Copilots also help prompt against user errors during that disclosure process, aiming to improve the overall dataset.

"AI can't fix big bad data, right? It can only work with the data that it's given, so one of our approaches is to reduce human error and make it easier for companies to give us accurate information," Stoevers says.

Figure 7

Data and cybersecurity and implementation costs are preventing greater implementation of industrial AI today

What are the key challenges that are holding back the growth of Industrial AI within your organization?





Successful organizations address such data-related concerns through comprehensive security protocols, clear data handling policies and transparent communication about how AI systems access and use information. There is ample evidence to suggest this challenge is being addressed, with 65% of respondents to Siemens Infrastructure Transition Monitor 2025 stating that their organization is increasing investment in data integration technologies.

Implementation costs also remain significant, with 45% of respondents to our survey citing high costs as a barrier.

Outside of technology and cost, survey respondents also expressed concern on the vendor side, referencing both suppliers' inability to offer truly customized offerings and a difficulty in finding reliable partners or providers.

When asked about qualities sought in industrial AI vendors, 56% of respondents to our survey prioritized cost effectiveness, 52% emphasized reliability and security, and 41% required ability to integrate with existing systems. These criteria reflect pragmatic concerns relating to both cost and security, two of the foremost challenges holding back further adoption of industrial AI. Organizations also require solutions that work within existing systems and infrastructure, deliver dependable performance, and provide fair value.

Effective partners fill capability gaps, accelerate time-to-value and provide knowledge transfer that builds internal

expertise. One participant described seeking partners who bring complementary capabilities enhancing the customer journey rather than merely filling technical gaps, positioning partnerships as strategic rather than transactional.

Trust emerges as an important factor across the industrial AI implementation journey. Focus group participants described trust operating on multiple levels: trust in the AI system's outputs, trust in the data feeding the system, and trust in the speed – and accuracy – of AI-driven processes.

2/3

Two in three organizations say they are increasing investment in data integration technologies

Source: Reuters Events' Role of Industrial AI in Sustainability (2025) survey

Trust in the security of data is also paramount, with nearly half (49%) of respondents highlighting data and cybersecurity as preventing greater implementation of industrial AI today.

Each element requires careful consideration.

For technical trust, rigorous testing, validation against known outcomes, and transparency about AI limitations prove effective. For process trust, involving affected stakeholders in design decisions, maintaining human oversight of critical decisions, and demonstrating consistent, reliable performance build confidence over time.

OVERCOMING AI'S ENVIRONMENTAL IMPACT

Concern has also been raised over AI's environmental impact. Data centers used to fuel AI's development consume substantial amounts of both energy and water for cooling, and this issue is only set to become more prevalent as data center demand rises on increased demand for AI.

While the ability to calculate the precise environmental impact on AI model training remains a work in progress, the development of more efficient models (as illustrated by DeepSeek) alongside hardware improvements could deliver net positive impacts for industrial and sustainability-related use cases.

Pina Schlombs says this positive impact is visible much faster as the more negative impacts subside in tandem with technology maturity. "It's not a set status - the efficiency of the models, the architecture and the full AI tech stack is evolving very fast. I think it's very much a consideration of understanding how we apply AI for positive outcomes," Schlombs says, emphasizing that industrial AI is applied sensibly so any energy water consumed is done so for positive impact.

CULTURE AND CHANGE

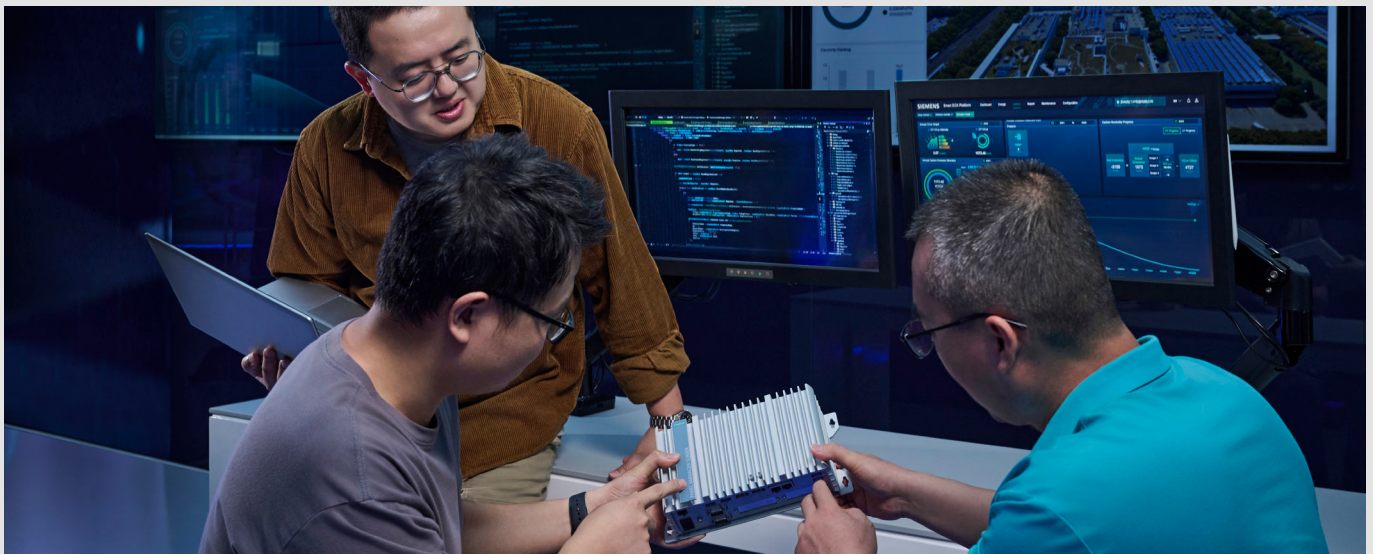
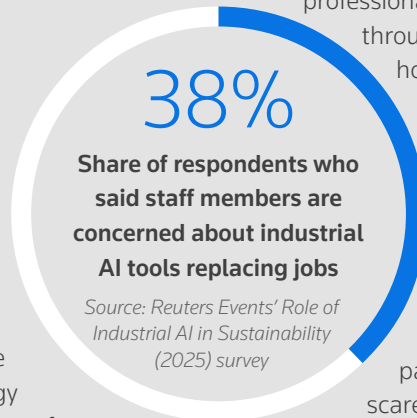
The human element presents complex challenges that technology alone cannot solve. Focus group participants repeatedly emphasized that the biggest barriers to scaling industrial AI are fundamentally cultural and organizational, rather than technical.

One participant captured the sentiment: "The technology is getting there and will be there, but getting the comfort with adoption, comfort with data, comfort with the implications of changes and what it means for teams and roles, that's the bigger piece."

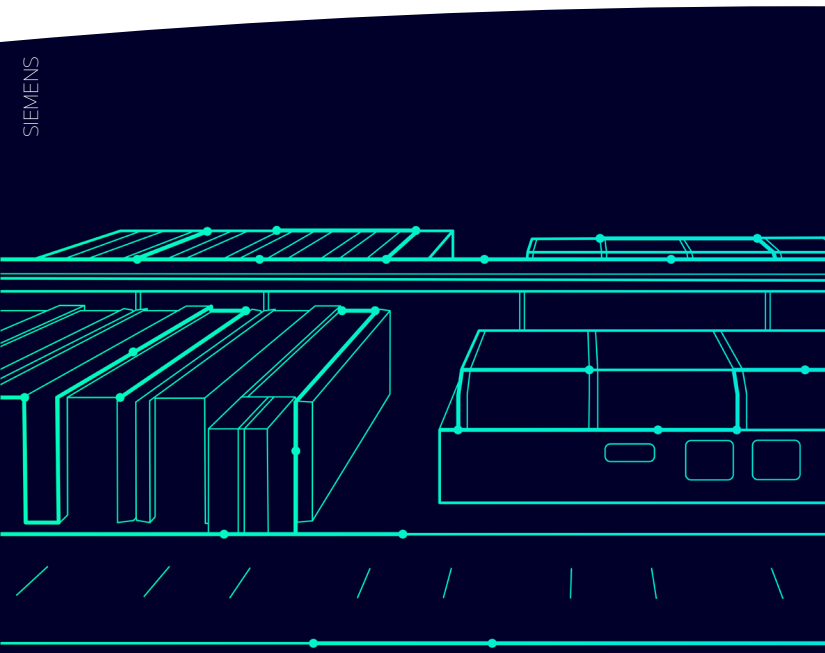
Other participants described highly educated sustainability professionals expressing fear of cognitive fatigue through AI over-reliance. Participants discussed how professionals worry not just about losing their jobs, but about losing expertise, judgment and the satisfaction of solving complex problems. What happens to professional identity when AI handles increasing portions of highly specialized work?

"There are barriers to adoption, I think partially due to mindset. Some people are scared. They say, 'I am a PhD, is AI going to take my knowledge away?'. These are some of the conversations we are having, looking at how do we break through that mindset barrier and help people to understand the benefits of using AI," Daniella Foster, Senior Vice President & Global Head, Market Access, Sustainability & Public Affairs, says.

Successful organizations address these anxieties by emphasizing augmentation over replacement. They describe AI as removing "the robot out of the human", eliminating tedious, repetitive tasks that drain time and energy, freeing professionals for higher-value strategic work. They encourage employees to envision how roles could evolve over five to ten years, empowering them to



SIEMENS



design futures alongside AI rather than having futures imposed upon them.

Schlombs emphasizes that easing change management concerns requires leadership from the top, with senior executives needing to “lead by example.” Leadership must encourage exploration and sharing of not just successes but also applications where AI may not be well-positioned.

“People have to get access [to AI tools] and have to get over the hurdle of ‘how does it relate to me, and how does it help me in what I do?’ This is the bridge that we need to help people build. While innovation is tech-driven, change really is people driven. While we’re talking about a technology and how we can scale that in an organization, we need to think from the people first and how can we get them to embrace the technology.”

Stoever concurs, adding: “AI isn’t going to replace the Chief Sustainability Officer. Somebody has to drive it, somebody

has to know how to query it. Even though it makes a lot of tasks easier, you still need your knowledge partner in the human, sitting there driving the machine.”

BUILDING INTERNAL CAPABILITIES

Dr. Eva Riesenhuber, Global Head of Sustainability at Siemens, explains how internal structures support AI integration and bring people along. “Our sustainability data and AI team is driving ‘AI for Good’ - not only accelerating impact but also transforming how we work. By automating analyses, we make daily tasks easier and free our people from tedious tasks. Our goal is to augment our teams with AI, giving them more time to think strategically, innovate, and achieve better balance.”

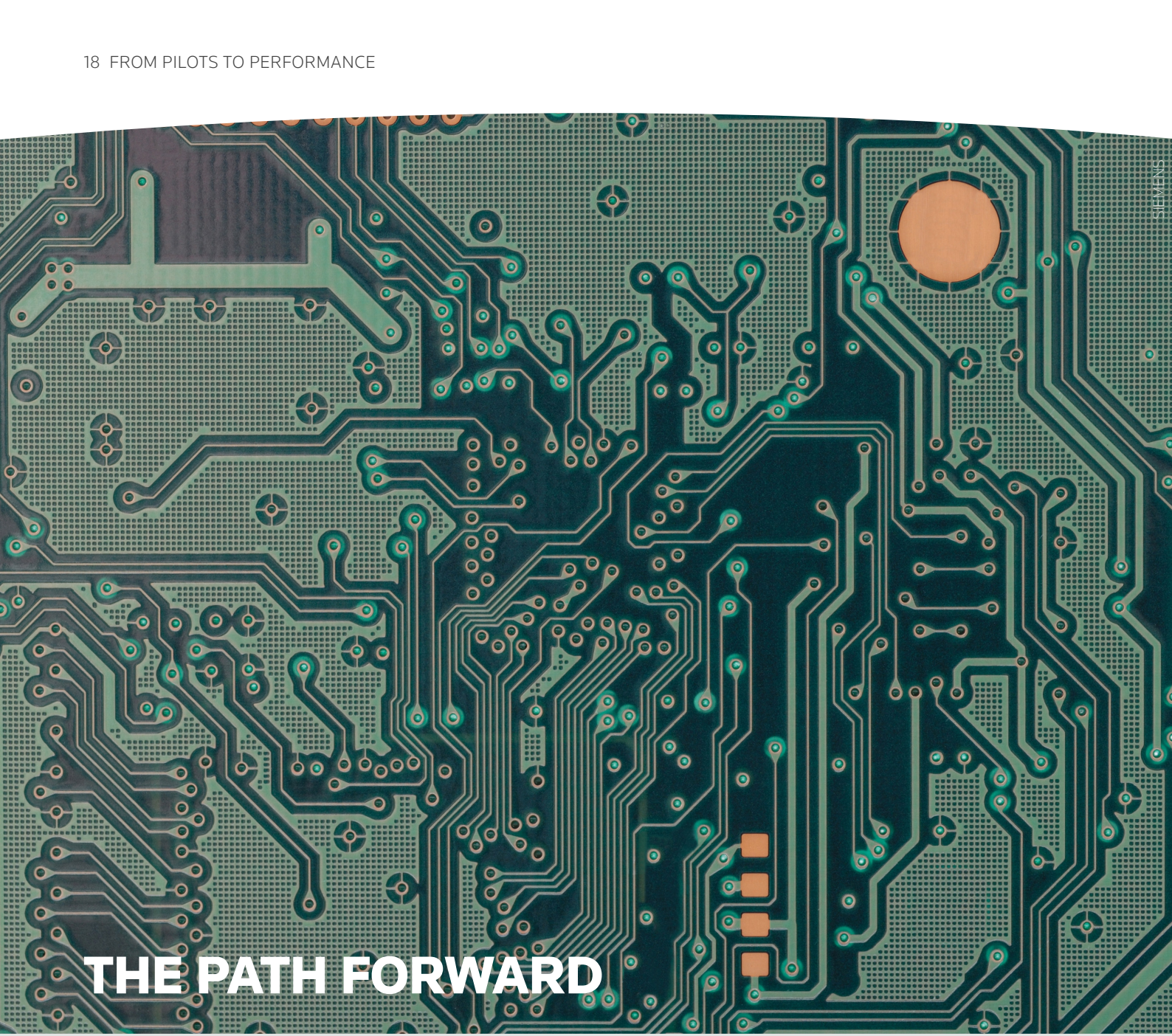
The 58% of respondents who said their organization lacks internal expertise to implement cutting-edge industrial AI highlight a persistent challenge. This skill gap drives demand for external partnerships but also necessitates internal capability building. Organizations cannot outsource AI strategy or remain perpetually dependent on external expertise. They must develop capabilities through targeted hiring, comprehensive training programs, and cross-functional collaboration combining technical skills with domain expertise.

Effective change management is essential for lasting AI adoption. Organizations must create safe spaces for employees to experiment with AI, provide training and support, and demonstrate through real examples how AI enhances rather than threatens professional work. When executives model AI adoption and speak openly about benefits and limitations, workforce anxiety diminishes.

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There are two skillsets lagging generally: data scientists and AI experts, and then process experts. The question is how do you get these skill sets to be able to communicate and talk to each other, and not just talk right over each other.

Focus group participant



THE PATH FORWARD

The strategic imperative for industrial AI grows clearer as organizations look to the future. That organizations expect industrial AI investments to yield results within one to three years, far quicker than timeframes traditionally associated with major technology transformations, is indicative of the distinct need to accelerate change. This compressed timeline reflects both technological advancement pace and competitive pressure.

Organizations pursuing sustainability targets cannot wait for decade-long implementations; they need rapid results to maintain momentum and reach accelerating sustainability targets. Time is the crucial aspect here. That's exactly where AI can be an organization's biggest ally, because the complexity and speed of which we need to tackle problems is exactly where AI's sweet spot is.

INDUSTRIAL AI'S INNOVATION ENGINE

Perhaps most significantly, 81% of organizations agree that future innovation in sustainability will be driven by industrial AI, an increase on the 70% of respondents who said as such in last year's survey. This represents a fundamental shift: AI is no longer one tool among many, but could serve as the primary engine of innovation.

Schlombs uses the term "flywheel to spur innovation" when discussing industrial AI, referencing how it is capable of taking a "revolutionary step into the future".

"We are able to go beyond what we have been able to comprehend and build upon, especially now that AI models have the capability of going from imitation learning

to exploration learning, where they're not only taking what we feed them - which is how humans have approached and solved these kind of problems. We can now extrapolate from that and go into an exploration learning approach that takes us beyond human knowledge and expertise. This is where I really see a step change going from incremental improvements to radical innovations in the solutions we are building."

This perspective carries profound implications for investment priorities, talent strategies, and organizational structures. Organizations failing to develop industrial AI capabilities risk falling behind as competitors leverage the technology to innovate faster, operate more efficiently, and meet sustainability targets more effectively.



Climate change, biodiversity loss, population growth require customers to embrace energy transition, circularity transition and societal changes at the same time.

The complexity of juggling global interconnected system transitions in times of major disruptions can only be mastered with AI.

Dr. Eva Riesenhuber, Global Head of Sustainability, Siemens AG



YULIA/ADOBE STOCK

THE COMPETITIVE IMPERATIVE

The convergence of need, capability, and conviction, coupled with the potential for industrial AI to act as a catalyst for sustainability innovation, creates a powerful driver for change. This is borne out in research: a significant majority (71%) of respondents expect industrial AI to have a 'medium' or 'high' positive impact in accelerating the energy transition, while two-thirds (66%) of respondents to the Siemens Infrastructure Transition Monitor 2025 said AI will transform the way their business operates.

Organizations face intensifying pressure to deliver sustainability results against challenging timelines and economic constraints. Industrial AI offers a proven pathway to address these challenges, with technology that has matured beyond experimental status into operational reality.

The business case has been made successfully, the implementation playbooks are being written and the rapid adoption of industrial AI provides a competitive edge. The organizations that move decisively now to scale industrial AI will define the next era of sustainable progress.

MOVING FROM STRATEGY TO EXECUTION

The organizations defining the next era of sustainable progress are those moving decisively now to scale industrial AI. This requires:

- 1 Leadership Commitment:** Senior executives must champion AI adoption, model its use, and allocate resources for comprehensive implementation—not isolated pilots.
- 2 Strategic Planning:** Develop clear roadmaps with defined objectives, success metrics, and three-year maximum timeframes. Align cross-functional stakeholders before technology deployment.
- 3 Capability Building:** Invest in training programs, hire targeted expertise, and create internal competencies that reduce dependence on external partners.
- 4 Change Management:** Address workforce concerns proactively through communication, safe experimentation spaces, and reframing AI as opportunity.
- 5 Partnership Development:** Identify strategic partners who bring complementary capabilities. Prioritize vendors offering integration capabilities, security, and knowledge transfer.

ACTIONABLE INSIGHTS

Organizations integrating industrial AI into their sustainability strategies should focus on these evidence-based priorities:



Align Industrial AI Strategy with Holistic Sustainability Objectives

Sustainability is not a single challenge, but an interconnected system spanning key pillars including decarbonization and energy efficiency, resource efficiency and circularity, and people centricity and society. Organization must approach industrial AI deployment through this holistic lens, recognizing that solutions addressing one area often have cascading benefits across others.



Accelerate Decarbonization Through Targeted Energy Applications

Industrial AI is delivering measurable results in energy management today. Nearly two-thirds (65%) of organizations have deployed AI solutions in this domain, achieving average energy savings of 23% and CO2 reductions of 24%. These advances build momentum and demonstrate value. Adoption in this area is equally expected to grow over the next three years.



Embed Circularity Principles Through Data-Driven Design

The transition to circular economies demands reimagining product lifecycles from linear consumption models to regenerative systems. Industrial AI enables this transformation by integrating sustainability considerations directly into design processes, extending asset life through predictive maintenance, and optimizing material use through AI-driven process control.



Navigate Regulatory Complexity with AI-Enabled Compliance

Sustainability professionals face what industry leaders describe as a “tsunami of regulations” requiring hundreds of experts to interpret and apply. With 60% of organizations citing regulatory uncertainty as discouraging investment in renewables, compliance complexity has become a strategic barrier to sustainability progress. Industrial AI offers a scalable solution, capturing regulatory requirements across jurisdictions.



Place Human Expertise at the Center of Your AI-Augmented Sustainability Transformation

The most significant barriers to scaling industrial AI are not technical but financial, cultural and organizational. Professionals express legitimate concerns about cognitive fatigue, skill atrophy and professional identity when AI handles increasing portions of specialized work. This human dimension directly impacts sustainability outcomes: without workforce engagement, even technologically sound implementations fail. Successful organizations reframe AI as removing “the robot out of the human,” eliminating routine tasks that lead to burnout while freeing professionals for strategic sustainability work that demands human judgment, creativity, and ethical reasoning.

METHODOLOGY

This report is based on findings from *Reuters Events' Role of Industrial AI in Sustainability (2025)* survey, carried out in Q3 2025, supplemented by qualitative insights from focus group discussions with senior executives from major corporations.

For this study, Sustainability and Industrial AI were defined as:

"Sustainability" was considered in the context of energy savings, electrification, integration of renewables, resource efficiency, circularity and carbon reduction that can be addressed via production, operational efficiency, product design, alternative materials, commodities or business models.

"Industrial AI" refers to the application of AI within the industrial world (industries such as manufacturing, infrastructure, transport and healthcare) to help drive efficiencies and sustainability in and across industries. Industrial applications of AI help monitor, produce, optimize and scale products and processes. In this survey we were not looking at applications of AI in "professional" functions like HR, customer service, or legal services that support organizations.

A total of 263 professionals took part in the survey. Professionals who participated in this study were from a range of industries such as Automotive, Data Centers, Utilities, Transportation and

others. To qualify for the study respondents' organizations were required to adopt or plan to adopt industrial AI or their role in the organization needed to be related to developing, implementing and/or oversight of sustainability strategies.

55% of respondents were based in the US and Canada, 44% in Europe and 1% in Latin America. 18% were board member/organizational leadership/C-suite level, 46% were senior management, 24% were mid-management and 12% were supervisor or team-level.

A tenth of respondents' organizations had a revenue of \$0-5m, 28% said \$6m-50m, 28% said \$51-250m, 22% said \$251m-\$1bn and 8% said more than \$1.1bn. 32% of respondents said their organization had 0-500 employees, 21% said 500-1,000, 29% said 1,001-5,000, 11% said 5,001-10,000 and lastly, 7% said 10,000+.

The data was gathered through web surveys which were designed and implemented following strict market research guidelines and principles. For data analysis, significance testing at 95% confidence intervals was conducted. There might be limitations where the survey cannot represent an overview of all professionals; the representativeness might be limited in certain regions.