

STATE OF
**SUPPLY CHAIN
SUSTAINABILITY**

ISSUE NO.07

2026

Sustainability Under Pressure:

*AI, Geopolitics, and the Path
Forward*

 **Sustainable
Supply Chain Lab**

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A note on the use of AI

This report and the analyses underlying it were prepared with the assistance of artificial intelligence. AI tools were used to process the source data, compute the reported statistics, generate the figures, and assist in drafting the accompanying text. All inputs and analyses, figures, and text were reviewed and validated by the authors.

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Version 1

Last updated: **September 17, 2026**

Suggested Citation:

Rajagopalan, S., & Arnold, V. (2026, September). State of Supply Chain Sustainability 2026. MIT Center for Transportation & Logistics. <https://sustainable.mit.edu/sscs-report/>

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EXECUTIVE SUMMARY

Corporate sustainability commitment has reached its highest recorded level, and the challenge has shifted from building conviction to building the systems capable of delivering on it.

The 2026 State of Supply Chain Sustainability report, produced by the MIT Sustainable Supply Chain Lab at the MIT Center for Transportation and Logistics (MIT CTL), examines how organizations are responding to a sustainability landscape being reshaped by geopolitical disruption, changing policy, rapid advances in artificial intelligence, and the continuing challenge of decarbonizing supply chains.

This year's study draws on **1,810 responses from professionals across 91 countries**, spanning supply chain, procurement, operations, logistics, and sustainability roles.

This year's study explores four major themes:
Two Gaps: How Geopolitics and Governance Are Testing Corporate Sustainability

How stronger corporate commitment is colliding with external disruption, while public sustainability ambition is outpacing the internal governance and accountability needed to deliver it.

Where Sustainability Lives in the Supply Chain

Where sustainability is actually embedded in supply chain decisions, where it remains weak, what benefits companies are realizing, and how measurement and collaboration are expanding across the value chain.

AI and Sustainability

How Industrial and Agentic AI are strengthening efficiency, emissions measurement, and sustainability performance, while creating new questions about net environmental impact as AI becomes more widely deployed and autonomous

Freight Transportation and Warehousing

How two critical physical parts of the supply chain are progressing on decarbonization, where efficiency gains are reaching their limits, and how technology, economics, infrastructure, and regional differences are shaping what comes next.



Several insights stand out in the 2026 findings. The first set of findings points to two gaps between sustainability ambition and the conditions needed to deliver it. **The first gap is external: companies are becoming more committed to sustainability even as the operating environment makes delivering on that commitment increasingly difficult.** 83% of respondents now rate sustainability as important or very important to long-term business success. Following recent U.S. climate-policy shifts, 59% report becoming more committed to sustainability, while only around 13% report becoming less committed. Yet 68% say tariff uncertainty has forced their organizations to delay, scale back, or compromise sustainability strategies, and more than eight in ten respondents across North America, Europe, and Asia agree that geopolitical conflict is reducing the effectiveness of climate action. **The will to act is strengthening, but the room to act is shrinking.**



The second gap is internal: public sustainability ambition is outpacing the governance and accountability needed to deliver it. Companies with formal cross-functional sustainability teams are far more likely to embed sustainability in everyday decisions: 57% do so frequently or always, compared with 13% where responsibility sits within a single function. Yet only 51% of companies with public sustainability goals have a formal cross-functional team, and only 33% place oversight at board level. **Many companies have set the direction, but have not yet built the internal structures needed to turn those commitments into consistent action.**

The second set of findings shows **where sustainability actually lives inside the supply chain.** It is most visible in the decisions closest to daily operations, such as transportation and logistics, procurement, warehousing, and product and packaging design, and is less prevalent in longer-term structural decisions such as capital investment, network design, and risk planning. The pattern suggests that sustainability is becoming part of how companies **operate** their supply chains faster than it is becoming part of how they **design** them. At the same time, the business benefits are tangible: compliance, operational efficiency, and supply chain visibility are the most widely reported gains, while resilience and risk reduction also rank ahead of direct cost savings. **The business case for sustainability is driven more by operational gains than by direct cost savings.**

The picture extends beyond internal operations: Scope 3 measurement and collaboration are deepening across the value chain. Companies are increasingly recognizing that they cannot manage these emissions alone. Participation in joint supplier engagement and decarbonization programs rose from roughly 31% to 58%, while partnerships focused on shared suppliers more than doubled from 23% to 55%. But the infrastructure remains fragmented: specialized carbon-accounting systems have expanded, yet spreadsheets remain deeply embedded. **Companies are measuring more and collaborating more, but the systems underneath that progress are still catching up.**

Third, **AI is becoming a real sustainability tool**, with 47% of organizations using it while still weighing its environmental footprint and 37% believing that the benefits clearly outweigh the environmental costs. Among adopters, 87% say AI has had a positive impact on their sustainability goals, particularly through operational efficiency, stronger emissions measurement, and better identification of reduction opportunities. While 63% use AI to estimate emissions where supplier data are missing and a similar share use it to aggregate

information from multiple sources; only 25% use it for forward-looking scenario analysis. **For now, AI is strongest at making sustainability work more efficient and measurable; its strategic role is still emerging.**

But that positive story comes with an important tension. AI users report clear reductions in material waste and energy or fuel use, yet among more mature Agentic AI users, total greenhouse gas emissions do not move uniformly: more than half perceive a reduction, while nearly one in three perceive an increase. This does not mean that AI is causing those increases. It shows that improvements in individual processes and the net environmental outcome of AI are not the same thing. **As AI becomes more deeply embedded in supply chains, companies will need to measure its net environmental impact, weighing the operational and sustainability benefits it enables against the additional energy, computing demand, and system effects that can accompany its use.**

Finally, freight transportation and warehousing show how difficult the next stage of decarbonization will be. In freight, the most accessible efficiency measures, such as route optimization, load consolidation, and driver programs, are already widely deployed. Yet **43% of fleets still operate mostly or entirely on diesel**. Moving beyond these gains requires more capital-intensive technologies, supporting infrastructure, and clearer policy signals. Europe and North America are moving on different trajectories: Europe is being pulled forward by stronger regulation, infrastructure, and policy support, while North American operators face greater policy uncertainty and rely more heavily on customer requirements and technology readiness to guide investment decisions. **The first stage of freight decarbonization was about using existing assets better. The next is about changing the assets themselves.**

Warehousing presents a different version of the same challenge. Automation and AI are advancing rapidly, and respondents report the strongest economic returns from space optimization and automation and robotics. But sustainability gains do not automatically accompany those investments: energy use and waste have increased for many AI adopters, while only 24% of warehouses use real-time AI-driven sustainability monitoring. **The warehouse of the future may be more intelligent and more productive, but it will not necessarily be more sustainable unless sustainability is deliberately designed into it.**

In sum, the 2026 findings reveal a sustainability agenda that has **not lost momentum, but has reached a more difficult stage**. Commitment is strong. Measurement is expanding. AI is accelerating. Efficiency gains are real. What comes next is harder: converting commitment into accountability, operational integration into strategic decision making, measurement into management, AI efficiency into net environmental benefit, and incremental decarbonization into genuine transition.

In 2026, sustainability still matters. The question is no longer whether companies want to act. It is whether they can build the governance systems, technologies, and operating models needed to deliver.

In this report, we use the terms Industrial AI and Agentic AI as follows:

- Industrial AI: AI systems used to support prediction, optimization and decision making in operational or organizational processes.
- Agentic AI: AI systems that can autonomously or semi-autonomously make, adapt, and execute decisions to achieve goals with limited human intervention.



INTRODUCTION

Supply chain sustainability is entering a different phase.

For much of the past decade, the central questions were whether companies would prioritize sustainability, set targets, measure emissions, and begin integrating environmental considerations into business decisions. Those questions have not disappeared, but the context around them has changed substantially.

Companies are now pursuing sustainability in a world of greater geopolitical uncertainty, shifting policy signals, trade tensions, and rapidly evolving technologies. At the same time, artificial intelligence is changing how supply chains are planned and managed, emissions measurement is extending deeper into the value chain, and the physical systems of freight transportation and warehousing are undergoing their own technological transitions.

These developments make sustainability increasingly difficult to examine as a stand-alone corporate initiative. What matters is not simply whether an organization has a sustainability strategy, but **where sustainability sits inside the organization, where it enters supply chain decisions, what technologies are shaping those decisions, and whether the underlying operating systems are evolving with the ambition.**

The *2026 State of Supply Chain Sustainability* study approaches the question from that perspective.

The first part of the report examines two forces testing corporate sustainability from different directions. Geopolitics and policy shape the environment in which companies operate; governance determines how well organizations respond within it. Looking at these together allows us to distinguish between constraints coming from outside the organization and those created by the way sustainability is structured and governed internally. The governance section explicitly frames these as the report’s “two gaps”: the external gap created by disruption and the internal gap between ambition and accountability.

The report then asks a more practical question: where does sustainability actually live in the supply chain? Rather than treating sustainability as a single organizational practice, we examine where it enters decisions, where it remains less embedded, what prevents further progress, and what organizations gain when sustainability becomes part of supply chain management. This perspective also extends into Scope 3 emissions, where measurement increasingly depends on visibility, supplier engagement, data infrastructure, and collaboration across organizational boundaries.

A third focus is AI and sustainability. The rapid adoption of Industrial and Agentic AI raises questions that did not exist at the same scale in earlier editions of this study. AI can improve measurement, analysis, prediction, and operational decision-making, but it also changes where decisions are made and how much autonomy organizations delegate to technology. The report therefore examines AI not simply as another sustainability tool, but as a capability whose environmental impact depends on the decisions it supports, the autonomy it is given, and the objectives it is used to pursue.

Finally, the study turns to freight transportation and warehousing, two areas where sustainability goals encounter the realities of physical assets, infrastructure, energy use, technology adoption, and operating economics. Freight illustrates the challenge of moving from improvements within existing systems toward deeper technological transition. Warehousing provides an especially useful setting for examining the interaction between automation, AI, operational performance, and environmental outcomes.





Overall, these four perspectives allow the 2026 study to move beyond asking whether sustainability remains important. Instead, the report examines **how sustainability is being governed, where it is becoming embedded, how technology is changing its execution, and what happens when ambition meets the constraints of real supply chain systems.**

Now in its seventh year, the State of Supply Chain Sustainability study continues to track the evolution of corporate sustainability while expanding its focus to reflect the issues increasingly shaping implementation in practice.

The central question for 2026 is therefore no longer simply one of progress, but whether organizations can sustain and deepen it.

The remainder of the report is structured as follows.

The Methodology outlines the research approach and characteristics of the 2026 survey sample. The section titled Two Gaps: How Geopolitics and Governance Are Testing Corporate Sustainability examines how organizational structures and accountability mechanisms shape the depth and consistency of sustainability integration across organizations. In the section titled Where Sustainability Lives in the Supply Chain, we explore the most pressing sustainability challenges organizations face in their supply chain operations, where sustainability considerations are most embedded, and the business benefits organizations report from integration efforts. Scope 3: Measurement and Collaboration Are Deepening examines how organizations are expanding emissions tracking across value chain categories, the tools they rely on, and how supplier engagement and industry collaboration are evolving.

AI and Sustainability assesses how organizations are approaching AI adoption in the context of their sustainability goals and what adopters report in terms of impact. AI Use in Supply Chains: Operational and Emissions Impacts examines the current state of AI autonomy across supply chain functions and what organizations report in terms of operational performance and net emissions outcomes. Freight Transportation: Broad Effort, Narrow Progress analyzes the current state of freight decarbonization, including regional divergence, the role of policy, and where near-term investment is headed. Warehousing: Automated, Intelligent, and Using More Energy examines the relationship between warehouse automation, AI autonomy, and energy and waste outcomes. The report closes with a Conclusion section presenting the key findings and their implications.

Seven years into this research, commitment to sustainability is no longer what separates leading organizations from the rest – execution is.

METHODOLOGY

The study maps the current state of corporate sustainability across sectors, with particular attention to how geopolitical tensions and governance shape sustainability integration, how AI is being used in sustainability and supply chain decision making, and what those applications mean for operational and emissions outcomes. It also examines freight transportation and warehousing, including the adoption of low emissions technologies, alternative fuels, automation, and AI.



We conducted the survey from February to April 2026 as the latest wave of our multi-year State of Supply Chain Sustainability study. The survey captured standardized quantitative data from a broad pool of professionals in supply chain, sustainability, operations, procurement, and logistics, enabling comparability with prior waves. Using purposive and snowball sampling through professional associations, the MIT Global SCALE Network, MIT CTL partner lists, Qualtrics, and social media, we gathered 1,810 valid responses from 91 countries. Eligibility required current employment and experience with supply chain or sustainability activities. Participation was voluntary, anonymous, and limited to one response per individual. The survey, averaging 45 questions, was offered in English, Spanish, French, Simplified Chinese, and Portuguese. It used role-based question pathways, with respondents receiving different sets of questions depending on their professional function, including supply chain, logistics and transportation, sustainability, operations, and procurement. Questions were presented using multiple choice, matrix, and Likert scale formats (1–5). In addition to capturing the respondents' business function, the extent of their involvement in sustainability initiatives, and the geographical locations of their companies, the survey questions revolved around the following four major themes:

**Geopolitics and
Governance**

AI and Sustainability

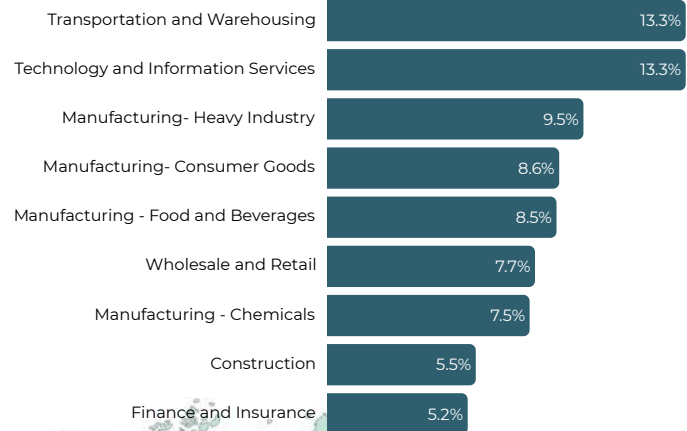
**Sustainability in the
Supply Chain and Scope 3**

**Freight Transportation
and Warehouse
Automation**

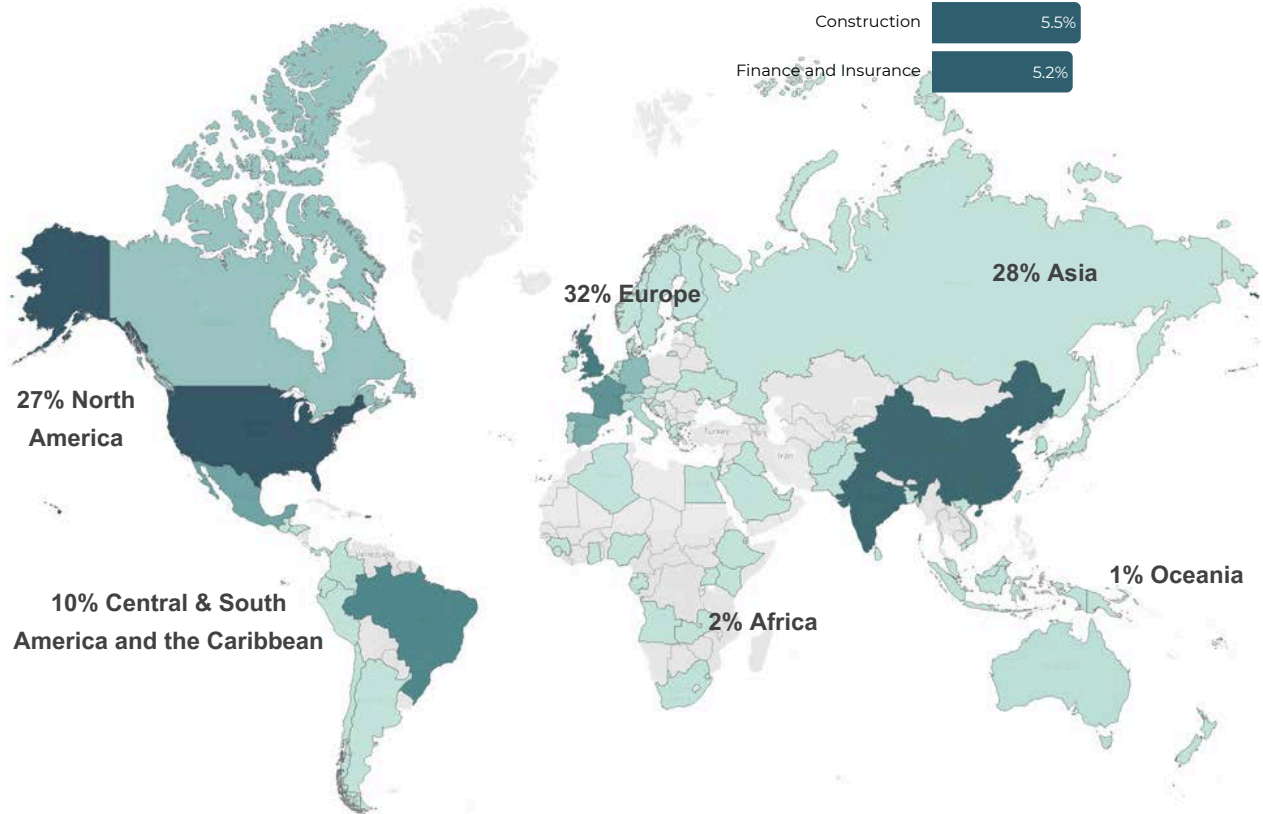
1,810 RESPONSES
91 COUNTRIES
5 LANGUAGES

Business Sector

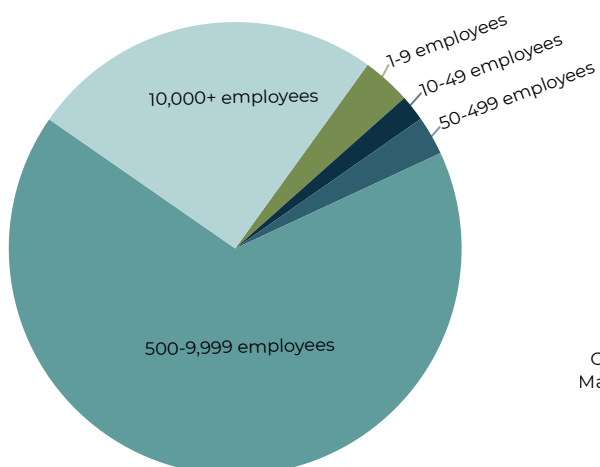
*top sectors



Respondent Company Location



Company Size



Respondent Roles

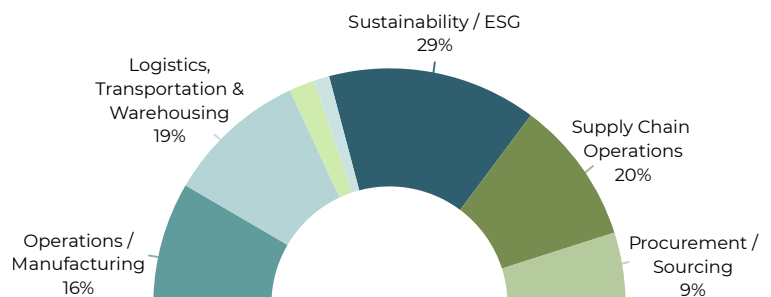


Figure 1: Demographics of the 2026 State of Supply Chain Sustainability Survey.
 Due to low response counts in Central and South America and the Caribbean, Africa and Oceania we do not focus on those areas in the report.

TWO GAPS: HOW GEOPOLITICS AND GOVERNANCE ARE TESTING CORPORATE SUSTAINABILITY

Corporate sustainability commitment has continued to strengthen, even amid significant policy shifts and economic uncertainty. Yet commitment alone does not determine outcomes. This section examines how organizations are structured to govern and deliver on their sustainability priorities, and where gaps between stated ambition and operational reality persist. The findings make clear that formal governance structures play a meaningful role in how deeply sustainability becomes embedded across an organization, and that external pressures are increasingly testing the resilience of even well-established commitments.

Response to U.S. Policy Shifts and Geopolitical Conflict

Recent shifts in U.S. climate policy have not weakened corporate commitment to sustainability. Instead, a majority of respondents report becoming more committed following President Trump's re-election and the U.S. withdrawal from the Paris Agreement. As shown in Figure 2, approximately 59% of respondents indicate that their organizations are somewhat or significantly more committed, compared with only around 13% reporting reduced commitment.



Sustainability Is Rising in Importance—but Corporate Governance Has Yet to Catch Up

This shift is also visible across regions. The share of respondents reporting greater commitment from 2025 to 2026 increased from 16% to 64% in Asia, from 13% to 64% in Europe, and from 11% to 55% in North America (Figure 3). The pattern holds broadly across carbon-footprint categories, though higher-footprint organizations report somewhat stronger increases in commitment (Figure 4). This is not a story of companies quietly holding the line. It is a story of active reinforcement. Faced with greater policy uncertainty, most organizations concluded that sustainability was more central to long-term resilience, not less.

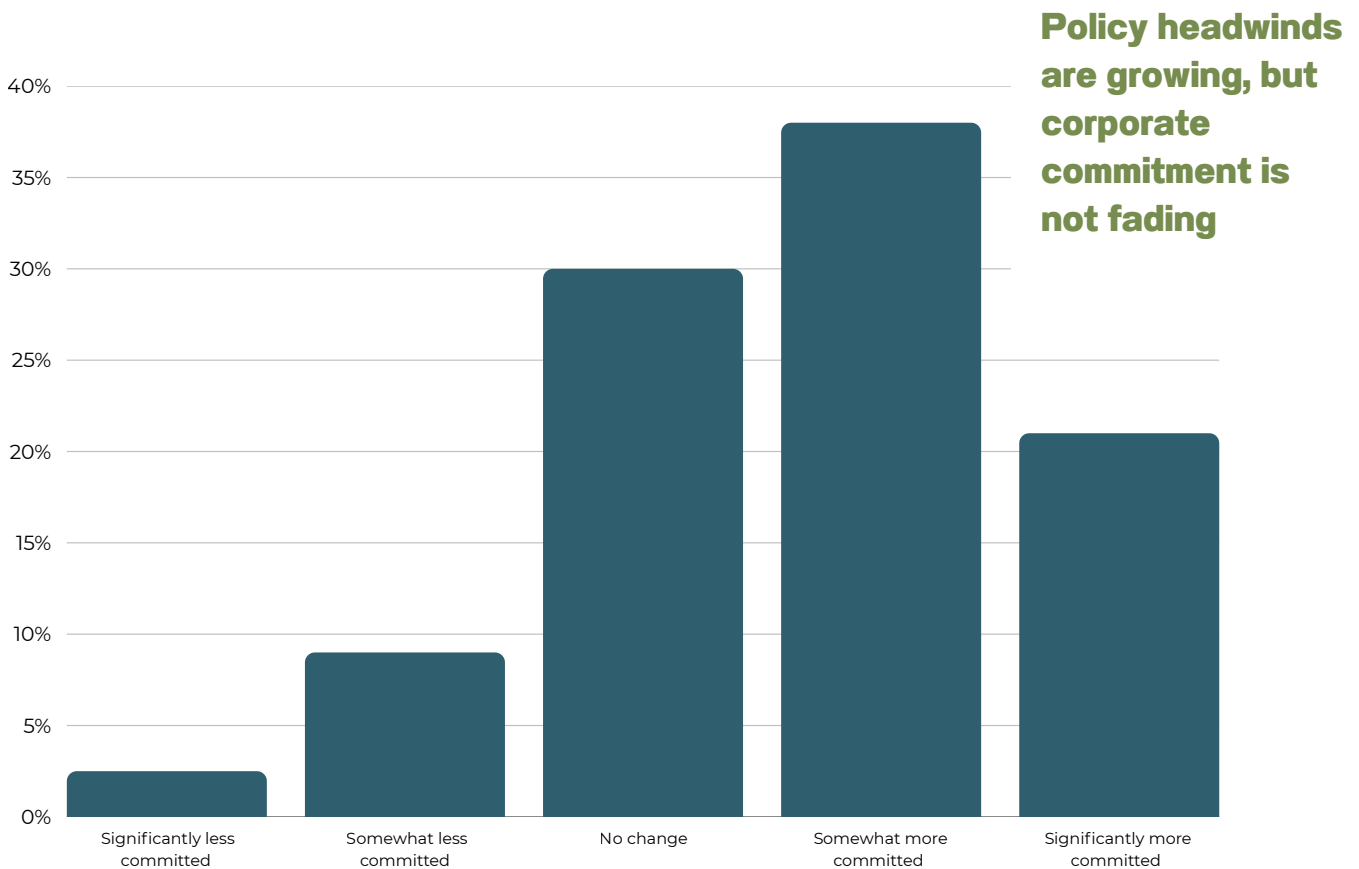


Figure 2. Change in companies' overall commitment to sustainability following recent U.S. climate policy shifts.

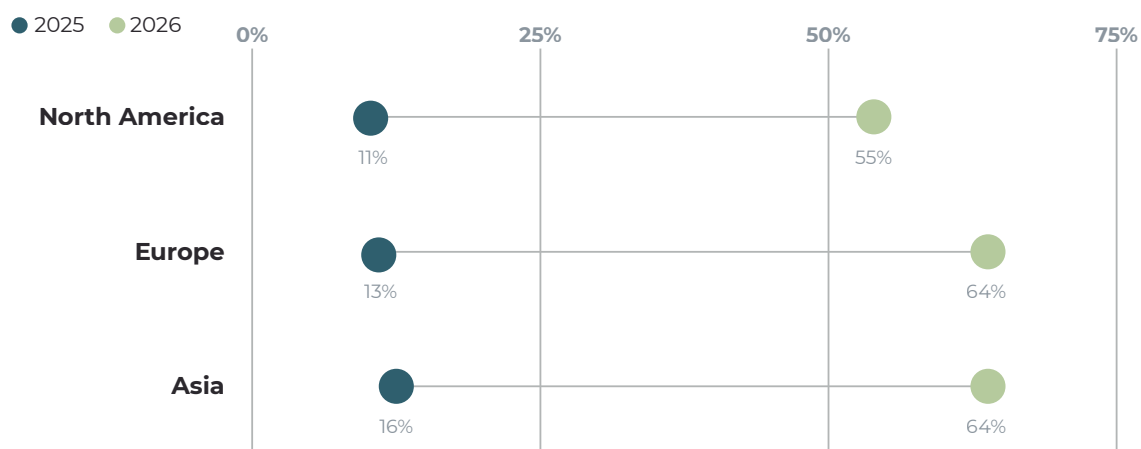


Figure 3. Share of businesses reporting greater sustainability commitment, by region, 2025 versus 2026.

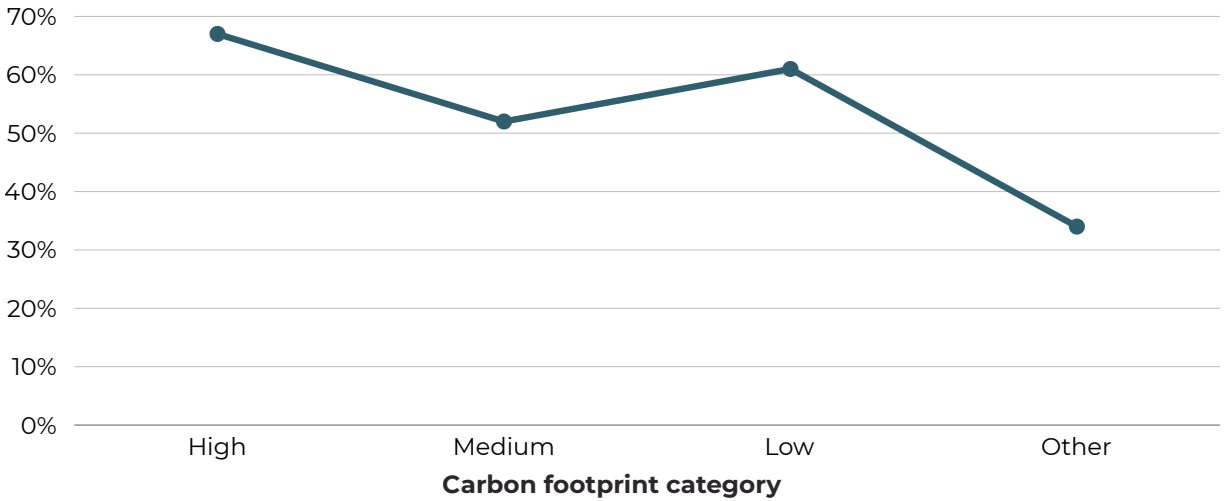


Figure 4. Share of businesses reporting greater sustainability commitment (somewhat and significantly more committed are combined), by carbon-footprint category.

But Commitment Is Not the Same as Capacity

However, stronger commitment does not always translate into implementation. Approximately 68% of respondents report that tariffs and the frequent and uncertain tariff changes have forced their organizations to delay, scale back, or compromise elements of their sustainability strategies (Figure 5). Worse, the disruption is not just slowing progress; in some cases it is reversing it.

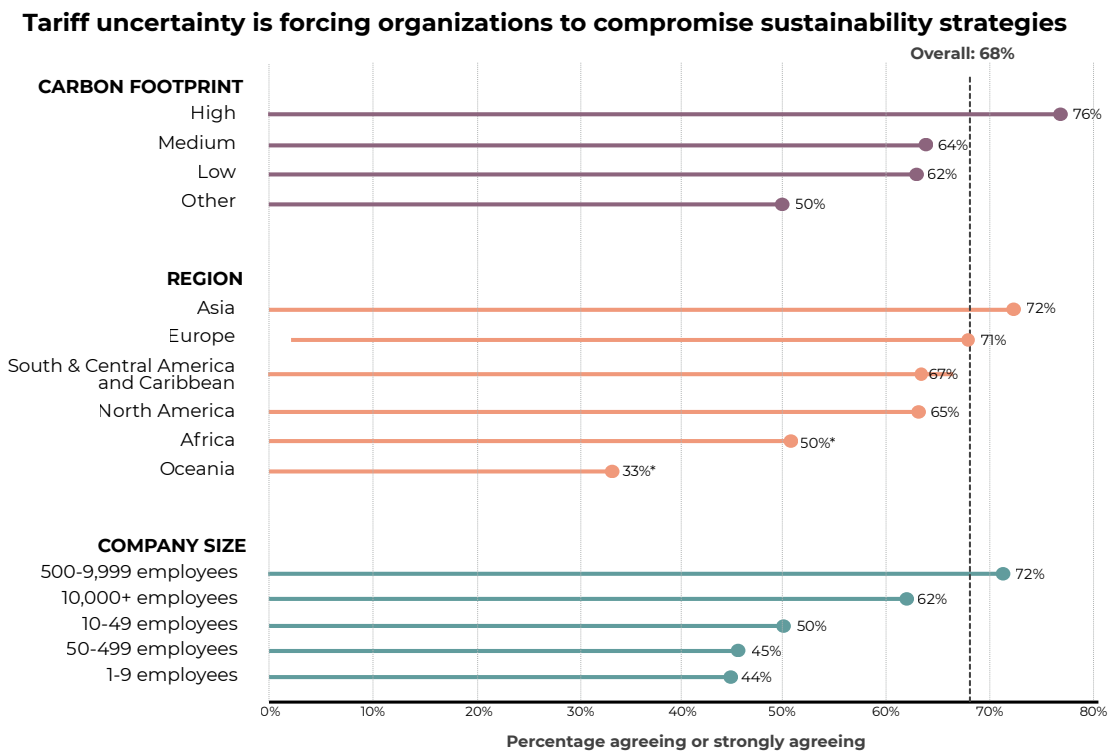


Figure 5. Share of organizations reporting that tariff uncertainty has compromised sustainability strategies.

Roughly one in three organizations report that tariff changes or trade disputes have actually increased their operational emissions, as they reroute freight, switch suppliers, or move sourcing to less efficient locations (Figure 6). Decarbonization plans built on stable trade routes do not survive a trade war intact.

The challenge extends beyond these direct operational disruptions. **Across North America, Europe, and Asia, more than eight in ten organizations agree that ongoing geopolitical conflict is reducing the effectiveness of the climate action they are taking** (Figure 7). Respondents appear to see armed conflict as creating emissions at a scale that can offset, or even overwhelm, the reductions companies are working to achieve through their own climate initiatives.

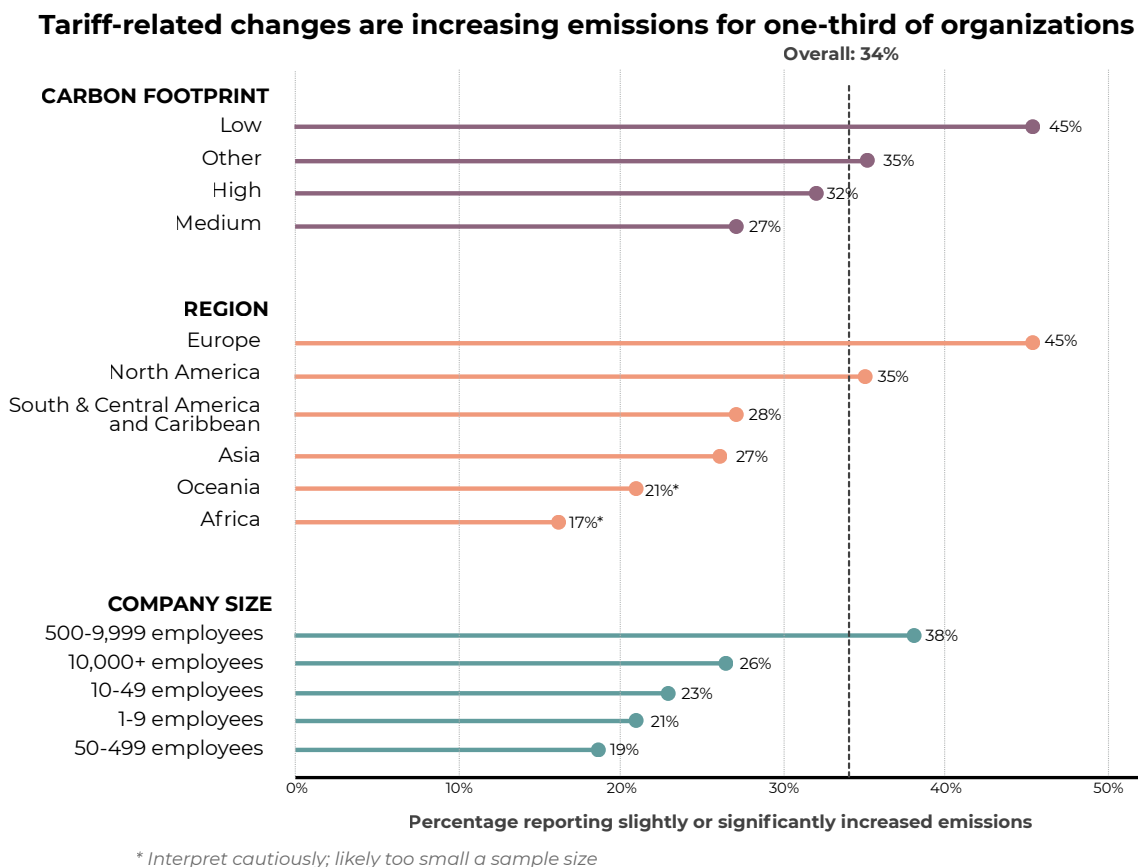


Figure 6. Share of organizations reporting increased emissions due to tariff changes or trade disputes.

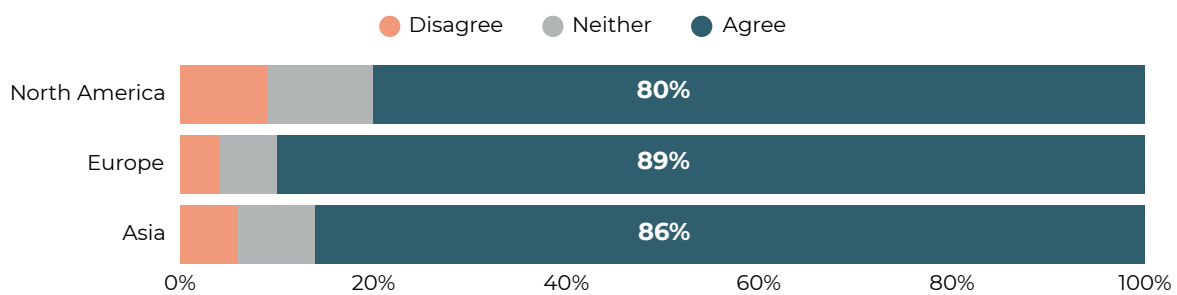


Figure 7. Across regions, ongoing geopolitical conflict is reducing the effectiveness of the climate action they are able to take. Overall, 84% of businesses agree that conflicts undermine climate action.

The findings reveal a clear tension: corporate sustainability commitment remains resilient, but organizations' ability to deliver on that commitment is increasingly being constrained by tariffs, trade disruption, policy uncertainty, and geopolitical instability.

The will to act is stronger than ever. The room to act is shrinking. That gap between conviction and capacity is the defining tension of the year.

The Other Gap: Ambition Is Public, Accountability Is Not. Sustainability Is Rising in Importance, but Corporate Governance Has Yet to Catch Up

If geopolitics is the external constraint, governance is the internal one. Sustainability has never been more strategically prized: 83% of respondents now rate it as important or very important to long-term business success, up from 80% a year ago (Figure 8). But rising importance has not been matched by the internal structures needed to deliver on it.

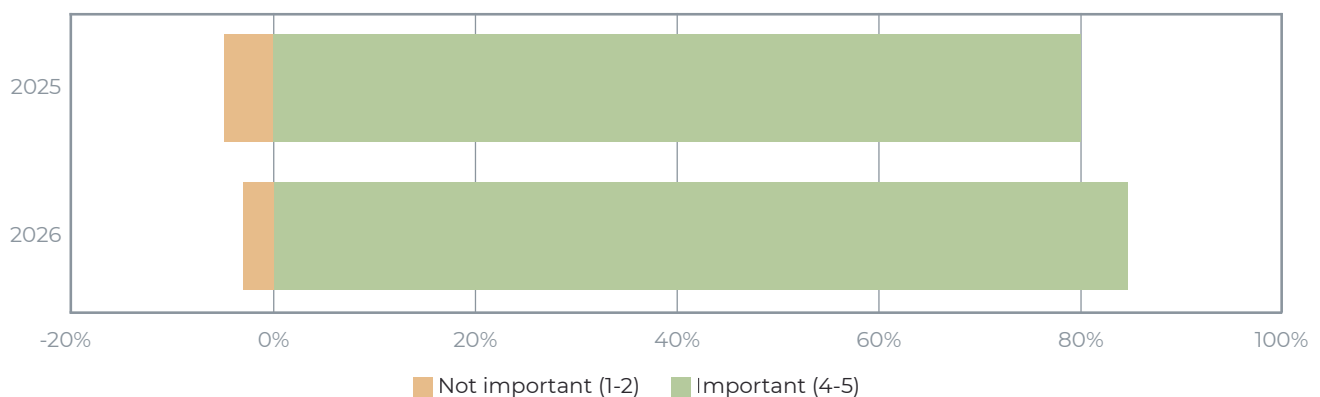


Figure 8. Importance of sustainability for long-term business success, 2025–2026.
Percentage of respondents rating sustainability as not important (1–2), neutral (3), or important (4–5).

Where formal structure does exist, it works, and the difference is stark. Among companies with a formal cross-functional sustainability team, 57% say sustainability is frequently or always built into day-to-day decisions; where responsibility sits in a single function, only 13% do (Figure 9). That 44-point gap is what cross-functional coordination buys: it turns sustainability from a stated corporate value into an operational habit, creating clear ownership across procurement, operations, logistics, and finance rather than leaving it stranded in a single department.

The problem is that this structure remains the exception, even among businesses that have publicly stated sustainability goals. **Only 51% of companies with public commitments have a formal cross-functional team**; 37% run a sustainability team with little cross-functional reach, and 12% park the responsibility inside a single function (Figure 10). Put plainly: nearly half of the companies making public promises lack the internal wiring to keep them.

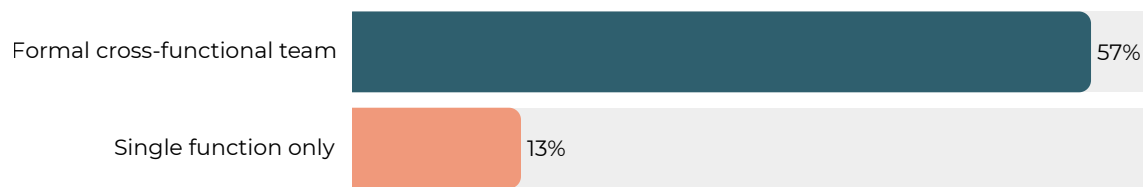


Figure 9. Day-to-day sustainability integration, by organizational structure. Share reporting sustainability is frequently or always integrated into day-to-day decisions, companies with a formal cross-functional team versus those where responsibility sits in a single function.

In other words, nearly half of companies with public sustainability goals lack a formal structure that systematically connects sustainability with the functions responsible for implementing those commitments. This gap suggests that **external commitment may be advancing faster than internal organizational follow-through**. Public goals can establish direction and accountability, but achieving them often depends on whether sustainability is embedded in the structures, responsibilities, and decision processes of the wider organization.

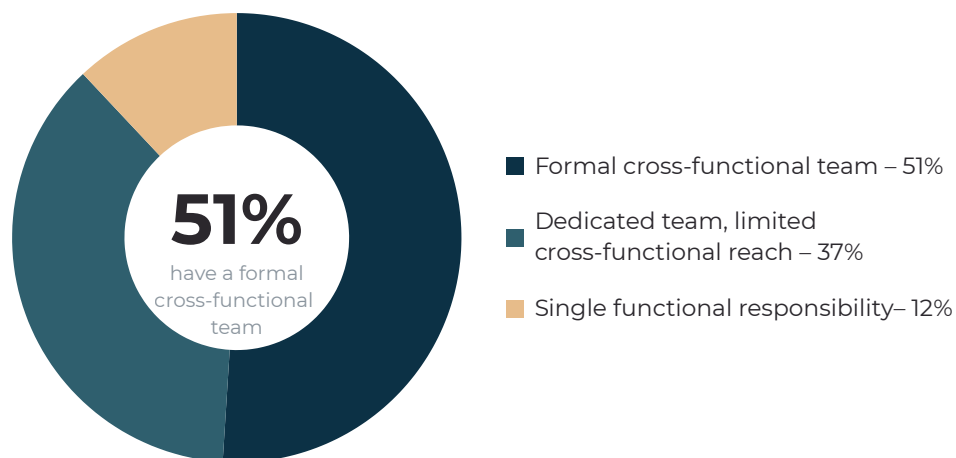


Figure 10. Sustainability team structure among companies with publicly stated sustainability goals. Distribution of sustainability governance structures among businesses with public sustainability commitments.



Figure 11. Sustainability Goal Oversight Among Businesses with Publicly Stated Goals.

The accountability gap runs all the way up. Among companies with public sustainability goals, just 33% place oversight at the board level, while 52% keep it at executive or management level and 15% have no formal oversight at all (Figure 11). When a commitment is managed operationally rather than owned in the boardroom, it competes for attention with everything else on a manager's desk — and is far easier to quietly drop when conditions tighten.

Public goals set the direction. Governance decides whether anyone is holding the wheel. Right now, in half of committed companies, no one is.

The Takeaway

Two gaps define the state of corporate sustainability this year. The first is external: commitment is outrunning the operating environment, as tariffs and geopolitical conflict erode the ability to deliver on genuinely stronger intent. The second is internal: public ambition is outrunning the governance built to support it, with board-level accountability and cross-functional structure still not the standard, when it should be the rule.

Sustainability has never been more wanted, or more constrained. Companies that close both gaps, hardening their supply chains against disruption and hard-wiring accountability into their governance, are the ones whose commitments will still be standing when the next shock arrives.



WHERE SUSTAINABILITY LIVES IN THE SUPPLY CHAIN



Supply chains sit at the intersection of sustainability ambition and operational reality. This section examines where and how organizations are integrating sustainability across their supply chain operations, from the challenges they face to the functions where sustainability considerations are most embedded, and the business benefits they report as a result. The findings reveal both meaningful progress and persistent gaps, reflecting the complexity of embedding sustainability into extended, multi-party supply chain networks.

The hardest challenges are as much about seeing as about greening

Ask supply chain leaders about their toughest sustainability challenges, and the answers split between environmental pressures and the capabilities needed to address them. **Energy consumption tops the list at 39%**, with waste reduction and end-to-end supply chain visibility close behind at 33% each (Figure 12). Technology and data integration and supplier compliance also rank prominently, pointing to the practical challenges of turning sustainability ambition into action.

That combination is the real story. **The leading obstacles are not only environmental outcomes but the capabilities, such as visibility, data, and coordination, that make progress on those outcomes possible.** The regional picture shows both common ground and important differences. **Waste reduction ranks among the top three challenges in North America, Europe, and Asia**, while energy consumption is the top challenge in both North America and Europe. Asia places greater emphasis on end-to-end visibility and supplier compliance (Figure 13).

Financial barriers are also prominent: 29% include cost pressures and business-case justification among their top three challenges, while 21% select the cost and effort required for sustainability data collection and reporting.



Environmental



Operational



Financial



Figure 12. Most pressing sustainability challenges in global supply chains.
Percentage of respondents selecting each issue as one of their three most pressing sustainability challenges.

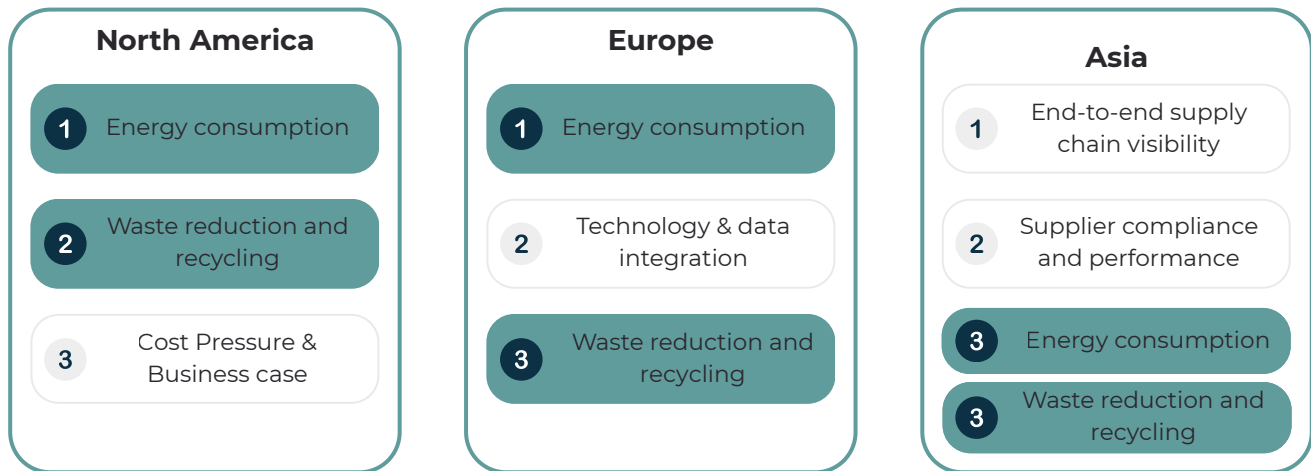


Figure 13. Top sustainability challenges, by region.
The figure shows the three most frequently selected challenges in North America, Europe, and Asia.

The hardest sustainability challenges are not only about what companies need to reduce, but whether they have the visibility, coordination, and business case to act.

Sustainability in Supply-Chain Decisions: Operational, Not Structural

Sustainability shows up most where the work is most immediate. **It is explicitly considered in transportation and logistics (39%), procurement (35%), warehousing (34%), and product and packaging design (33%),** the functions closest to operational decisions (Figure 14). Where it thins out is telling: capital investment, network design, and risk planning; the structural decisions that lock in a supply chain's footprint for years.

The implication is that sustainability is being managed as an operating consideration, not yet a design principle. Companies weigh it when choosing a carrier or a supplier, but far less when deciding where to build, how to structure the network, or how to plan for disruption — the choices that shape emissions long before day-to-day operations begin.

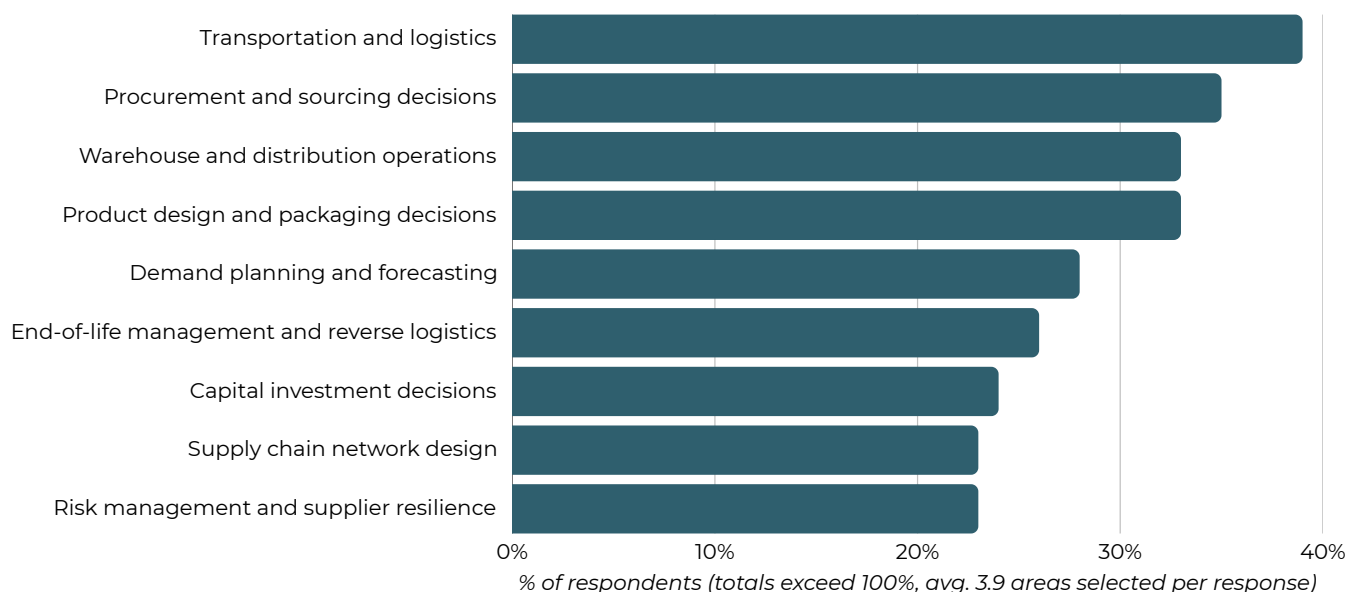


Figure 14. Areas where sustainability is explicitly considered in supply chain decision-making. Percentage of respondents selecting each area; respondents could select more than one area.

Business Benefits of Integrating Sustainability into the Supply Chain

When companies embed sustainability into supply chain decisions, the benefits extend well beyond direct cost savings. Improved supply chain visibility, greater operational efficiency, and stronger compliance with regulations and customer requirements lead the list, each reported by about 61–62% of respondents (Figure 15). More than half also report better risk identification, improved supplier reliability and performance, greater resilience to disruptions, and reduced waste. Lower supply chain operating costs are reported by 51%.

The broader business case, therefore, is driven more by operational gains than by direct cost savings alone. **Efficiency can lower operating costs, resilience can reduce disruption losses, and stronger risk identification, visibility, and compliance can help avoid costly failures. These benefits may not always appear as a distinct “sustainability saving,” but they still affect the P&L.** Evaluating sustainability only through direct cost reduction risks understating its business value.

The return on sustainability shows up as control before it shows up as cost. Compliance, visibility, and resilience outrank direct savings.

OPERATIONAL PERFORMANCE

– 61.4% avg

Improved compliance with regulations /
customer requirements

62.0%

Improved operational efficiency

61.6%

Improved supply chain visibility

60.7%

RISK & COMPLIANCE

– 55.9% avg

Improved identification of supply chain risks

56.9%

Improved supplier reliability or performance

56.9%

Increased supply chain resilience to
disruptions

55.6%

Reduction in waste

54.4%

FINANCIAL

– 51.0% avg

Reduction in supply chain operating costs

51.0%

40%

50%

60%

Figure 15. Operational and business benefits from integrating sustainability into the supply chain.
Percentage of respondents reporting a high or very high impact for each outcome.

Sustainability's payoff isn't just direct savings. Greater efficiency, resilience, and risk reduction are real benefits, and they all reach the P&L.



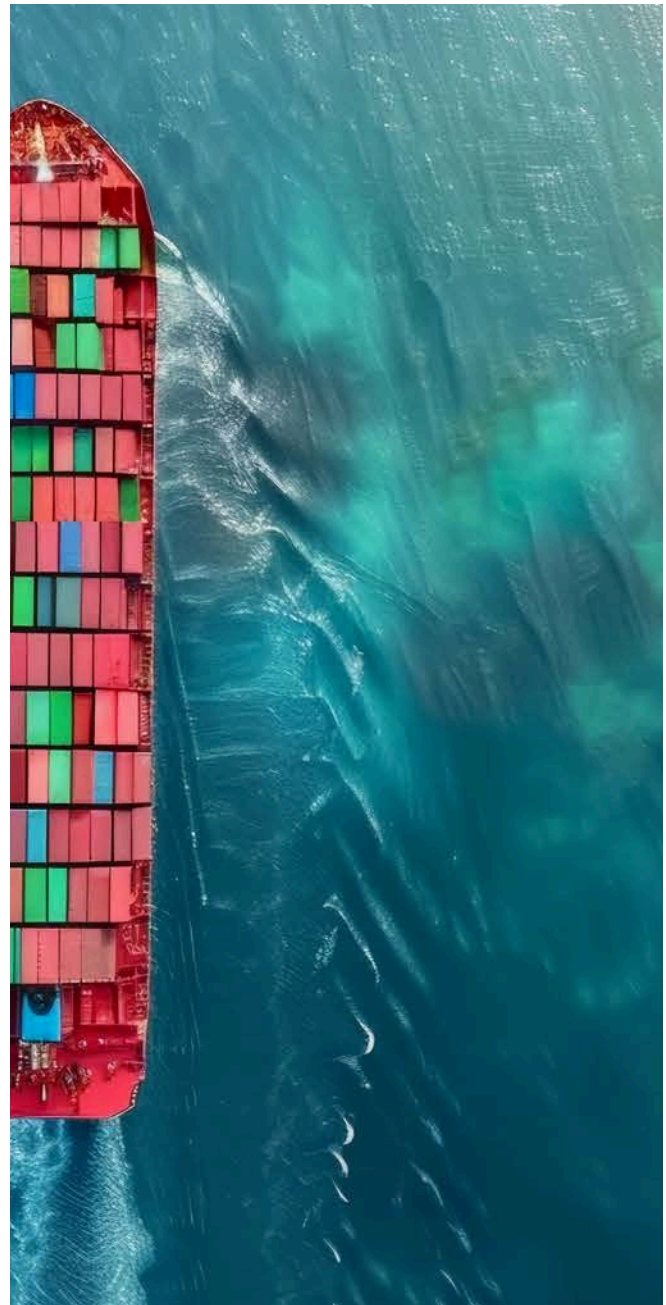
SCOPE 3:

MEASUREMENT AND COLLABORATION ARE DEEPENING

Scope 3 emissions, those spread across a company's value chain rather than inside its own walls, are the largest and hardest part of most carbon footprints. This year's data show real momentum on both measuring them and sharing the work, even as the underlying infrastructure stays fragmented.

Organizations Are Expanding Emissions Tracking Across the Value Chain

The share of organizations tracking and reducing emissions increased across every category shown between 2025 and 2026 (Figure 16). The largest gains occur in **product end-of-life and packaging (+32 percentage points)**, **capital goods production (+29 points)**, and **upstream transportation and distribution (+27 points)**. Gains exceeding 20 percentage points are also reported across purchased materials, downstream logistics, customer product use, and employee-related travel. Growth is more modest for Scope 2 electricity and heat, and Scope 1 buildings and vehicles, which is consistent with their position as the most established categories in last year's survey.



The pattern suggests that emissions management is moving beyond direct operations toward a broader set of value-chain categories. Organizations appear to be extending measurement and reduction efforts into purchased materials, logistics, product use, and end-of-life impacts — areas that are often more difficult to quantify and act on.

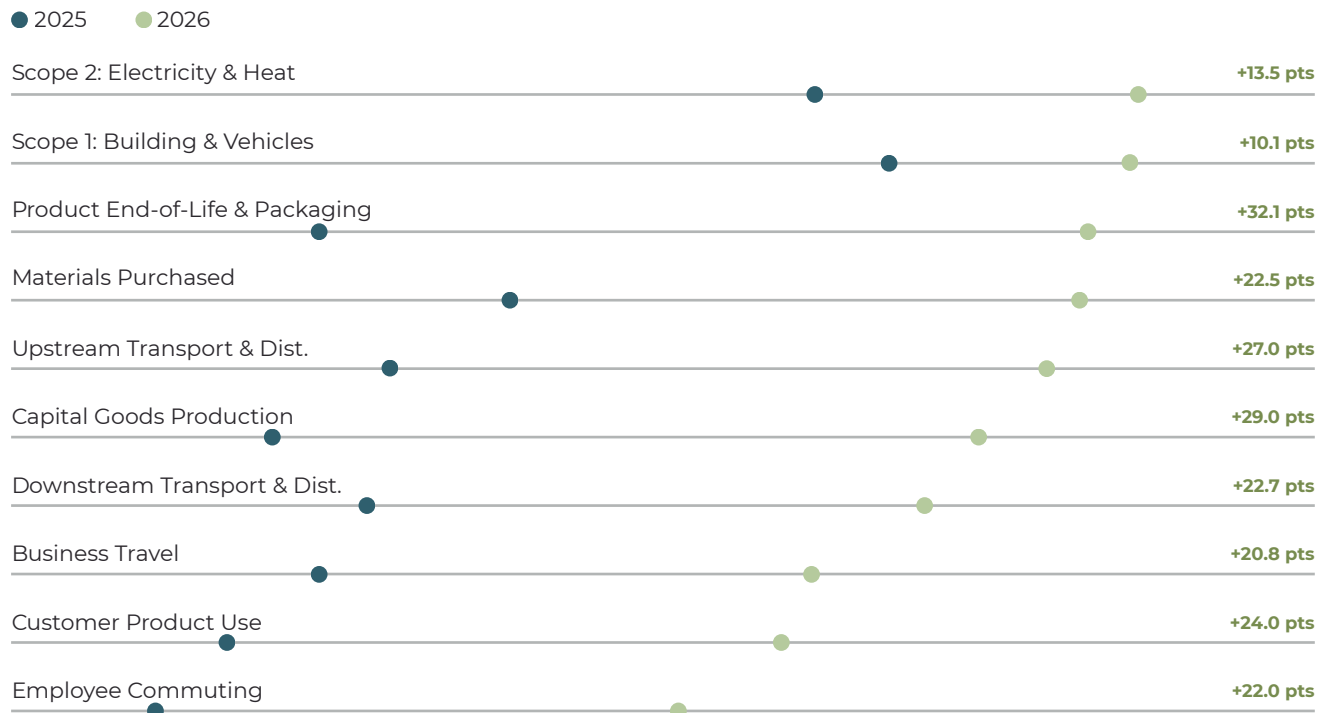
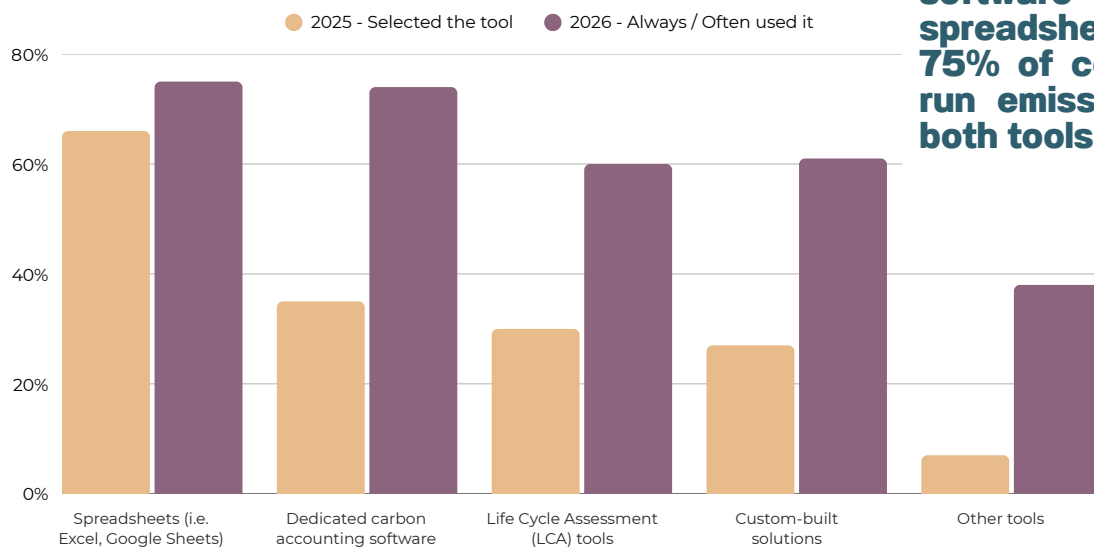


Figure 16. Year-over-year change in the share tracking and reducing emissions, by category.

Specialized Tools Are Growing, but the Spreadsheet Never Left

Dedicated carbon-accounting software is now used as often as spreadsheets, **each is used always or often by roughly 75% of respondents**, with life-cycle assessment and custom tools close behind at around 60% (Figure 17). Specialized platforms have clearly arrived. They just haven't displaced other systems, yet.

The picture is a hybrid, not a handover. Spreadsheets remain embedded in emissions workflows, which are prized for the flexibility to bridge fragmented, mismatched data sources that purpose-built tools still struggle to connect. Even companies that have adopted dedicated carbon software still fall back on spreadsheets to bridge the gaps; the tools coexist rather than replace one another.



The carbon-accounting software arrived. The spreadsheet never left. 75% of companies still run emissions work on both tools.

Figure 17. Scope 3 tools: 2025 selection rate versus 2026 regular-use rate.

The two years use different metrics — the 2025 question captures whether respondents selected a tool, whereas the 2026 measure captures whether they use it always or often — so the 2025 and 2026 bars should not be interpreted as a direct year-over-year growth measure.

Supplier Engagement Is Becoming More Active and Collaborative

Organizations report frequent use of multiple mechanisms to engage suppliers on Scope 3 emissions. In 2026, active engagement is most common through sustainability criteria in supplier selection, training and resources for suppliers, requests for supplier emissions data, and long-term sustainability contracts, each reported as being used always or often by more than 70% of the respondents (Figure 18). Third-party audits and certifications, and financial incentives or penalties are also widely used.

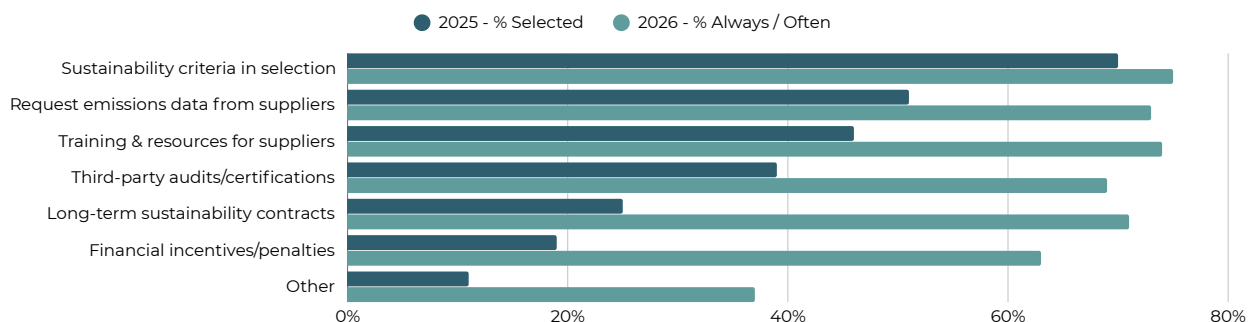


Figure 18. Supplier engagement methods for reducing Scope 3 emissions, 2025 versus 2026.

2025 shows the percentage selecting each method; 2026 shows the percentage reporting that the method is used always or often.

The two years use different metrics — the 2025 survey records whether a method was selected, while the 2026 survey measures how frequently it is used. The figure therefore provides stronger evidence about the intensity of current engagement than about the exact magnitude of year-over-year change.

But the sharpest shift is in industry collaboration. **Participation in joint supplier and decarbonization programs jumped from roughly 31% to 58% in a single year, cross-sector alliances rose from 28% to 47%, and partnerships to manage shared suppliers' emissions more than doubled, from 23% to 55%** (Figure 19). Meanwhile the share going it alone (meaning no collaboration at all) collapsed from 18% to 6%.

Scope 3 is proving too big to solve alone, and companies have noticed. The work is shifting from an organization-by-organization exercise to a coordinated one, as businesses realize they often share the same suppliers, the same lanes, and the same emissions to cut. The infrastructure is still uneven, the persistent spreadsheet is proof of that, but the direction is unmistakably toward shared effort.

Companies are realizing that Scope 3 cannot be solved alone.

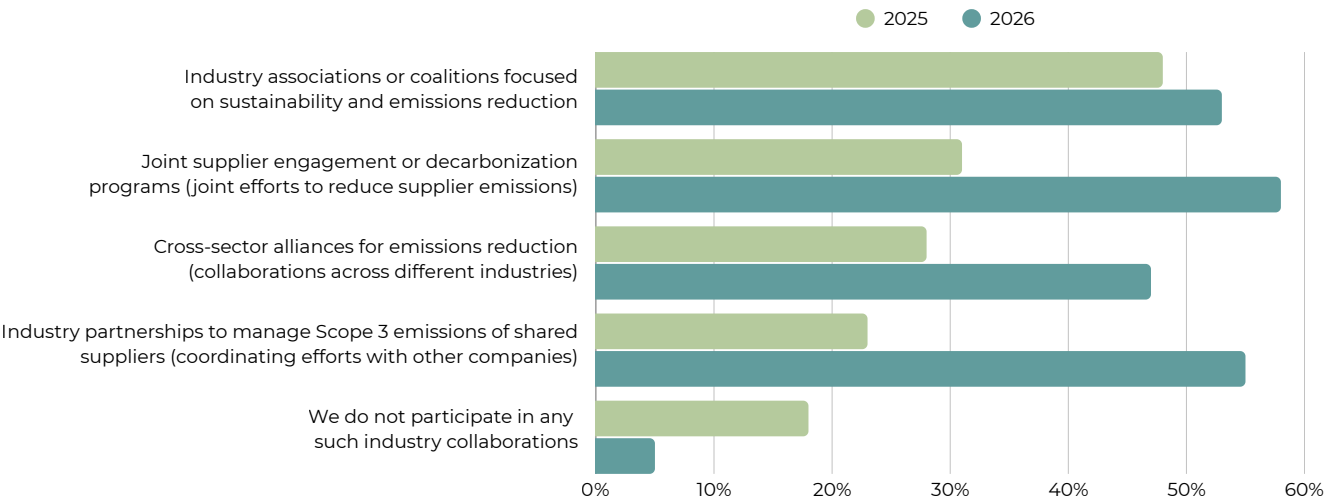
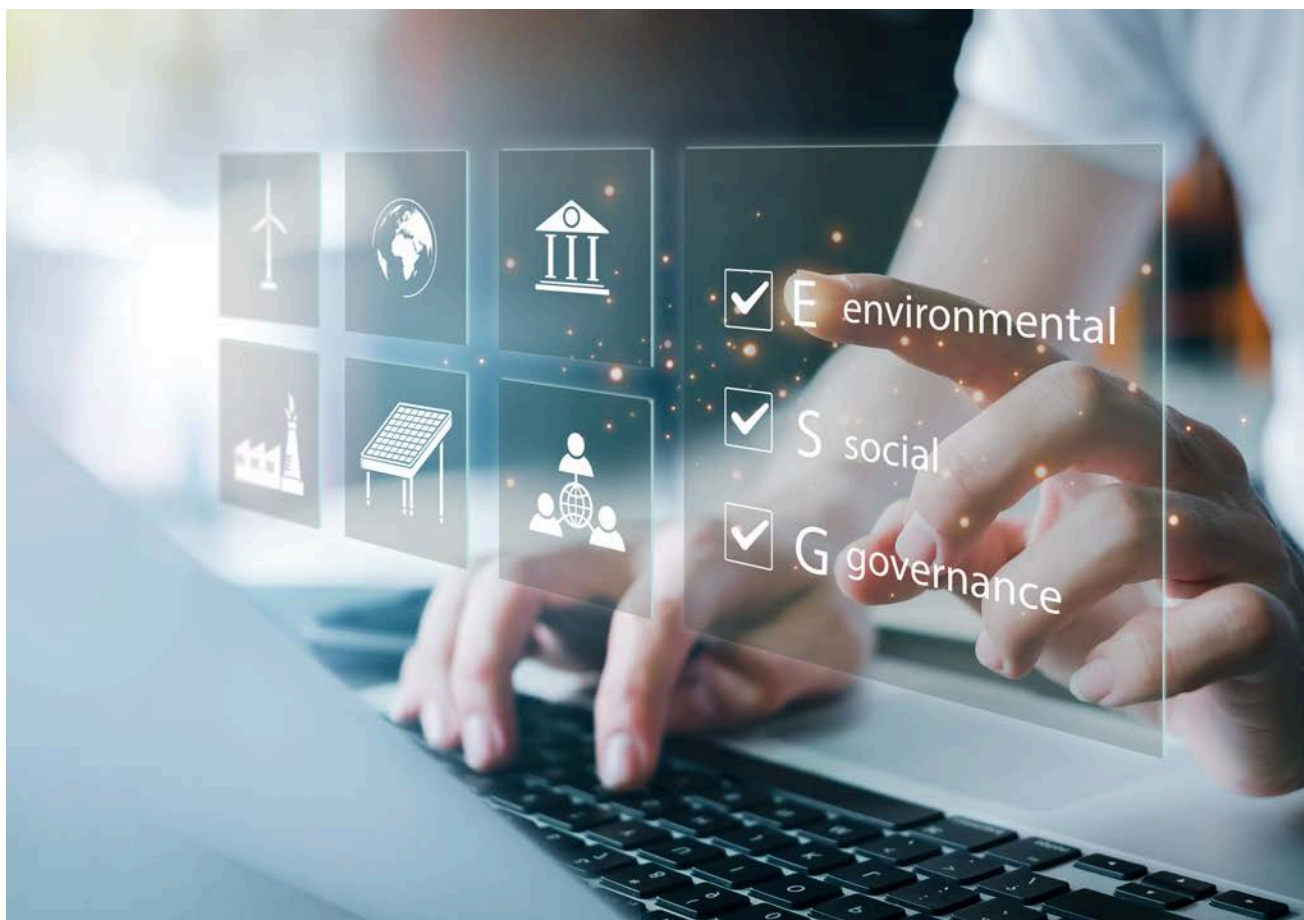


Figure 19. Industry collaboration participation, 2025 versus 2026. Percentage selecting each form of collaboration; respondents could select more than one option.



AI AND SUSTAINABILITY

Artificial intelligence is increasingly intersecting with corporate sustainability efforts, creating both new capabilities and new questions. This section examines how organizations are approaching AI adoption in the context of their sustainability goals, including their stance on AI's own environmental footprint, where Industrial AI is being applied across sustainability initiatives, and how it is being used to strengthen emissions measurement and reporting. The findings suggest that AI is becoming an operational tool for sustainability, though its role in more advanced applications such as scenario planning and strategic decision-making remains at an early stage.

Organizations Are Embracing AI, but Environmental Concerns Remain Active

Organizations are generally moving forward with AI despite its environmental footprint, but most have not dismissed that footprint as irrelevant. Approximately 37% of respondents are fully embracing AI, indicating that they believe its benefits clearly outweigh its environmental cost. A larger share, roughly 47%, uses AI while continuing to weigh or monitor its environmental implications, while around 9% avoid or limit its use because of those concerns; the remainder did not indicate a clear stance (Figure 20).

The dominant position is therefore neither rejection nor unconditional adoption. Most organizations are pursuing AI while retaining some level of environmental scrutiny, suggesting that governance frameworks capable of weighing the energy and emissions consequences of AI alongside its operational benefits may become increasingly relevant.

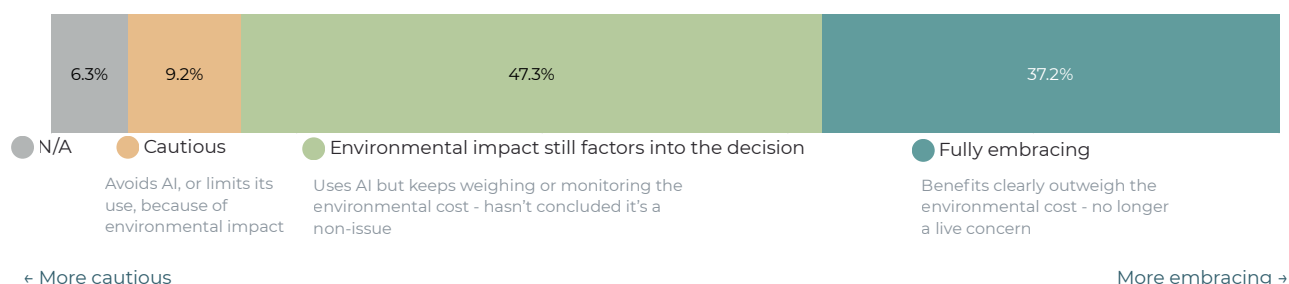


Figure 20. Organizational stance on AI use, given its environmental downsides.

Industrial AI Is Already Widely Used in Sustainability Initiatives

Industrial AI use in sustainability initiatives is widespread across the regions, approximately **78% of North American respondents, 77% of European respondents, and 76% of respondents in Asia** (excluding China) report current use. All respondents in the China subsample report current use, though this result could reflect the composition of the survey sample, the government's active push for enterprise AI adoption or both, rather than a population-wide estimate (Figure 21).

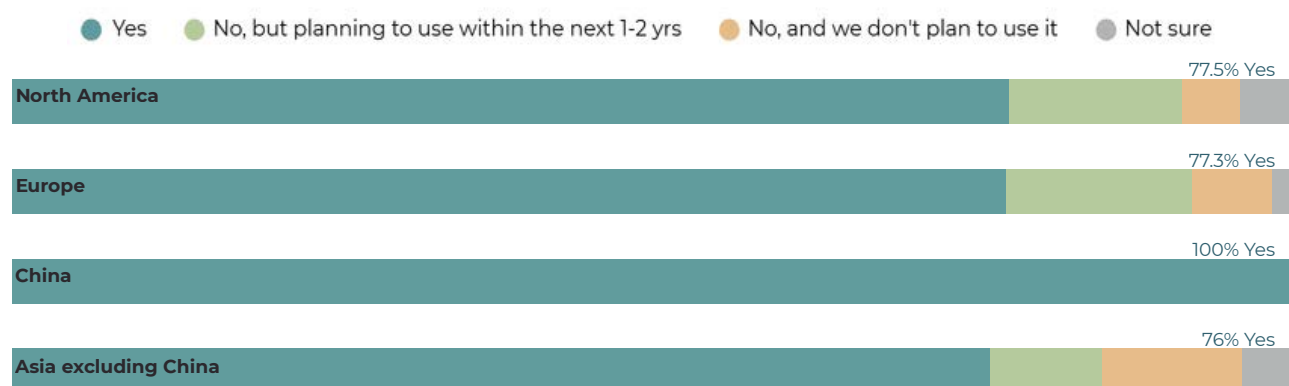


Figure 21. Current use of Industrial AI in sustainability initiatives, by region. Percentage of respondents reporting current use, planned use, no planned use, or uncertainty.

Where Industrial AI Is Most Deeply Embedded

Among companies that use industrial AI, its role is not spread evenly across sustainability work. Figure 22 shows where AI is most deeply embedded for each of six sustainability areas. The pattern is consistent and intuitive: AI is embedded most deeply where the problem is a well-defined optimization task with abundant operational data, and least where the work is judgment-heavy or depends on external markets.

Energy efficiency and carbon reduction leads, with 74% of businesses reporting extensive use or deeply embedded AI use. This is the natural home for industrial AI: equipment energy use, logistics-network design, and operational emissions are continuous, data-rich optimization problems where machine learning has a clear and measurable payoff. Product innovation (73%), sustainable sourcing (69%), and emissions estimation (66%) follow closely, which are data-matching and calculation problems (supplier scoring, Scope 1–3 allocation) that suit AI well, even if the underlying data is often incomplete.

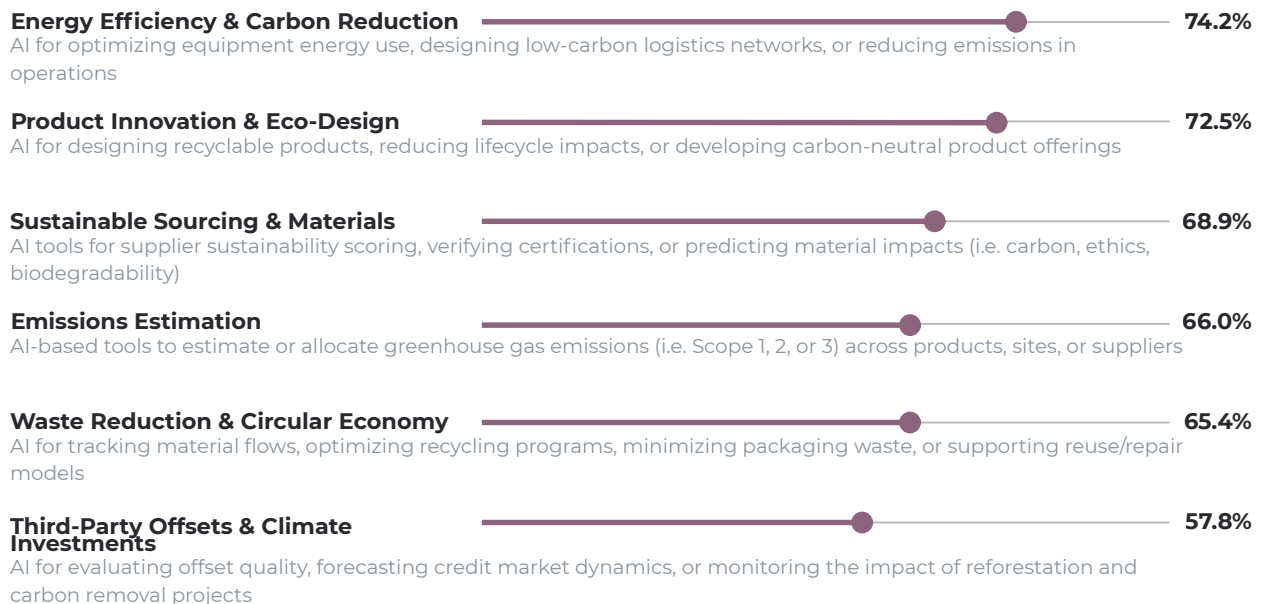


Figure 22. Extent of Industrial AI use across selected sustainability initiatives.
Percentage reporting extensive use and deeply embedded Industrial AI use; China excluded.

“As the circular and experience economies converge to form a Generative economy, thinking on a systems-scale before committing material & capital is key to accelerate our climate goals and the necessary transformation to achieve them. Up to 94% of senior leaders have experienced a financial loss from climate-related supply chain disruption in the past 24 months. This underlines the urgency of looking at the supply-chain from the start. Using eco-design principles and leveraging technologies such as virtual twins and industrial AI can help us in those endeavors.

-Dr. Philippine de T'Serclaes
Chief Sustainability Officer, Dassault Systèmes

AI Is Used More for Data Gaps and Reporting Than for Scenario Planning

Where AI is applied to emissions, it is doing the unglamorous, essential work of measurement. **Roughly 63% use it to estimate emissions when supplier data are missing, and an equal share use it to collect and aggregate data from scattered sources** (Figure 23). More than half automate carbon accounting and reporting; 43% use it to find emissions hotspots. Only 25% use it for the forward-looking work, such as simulating emissions under alternative scenarios.

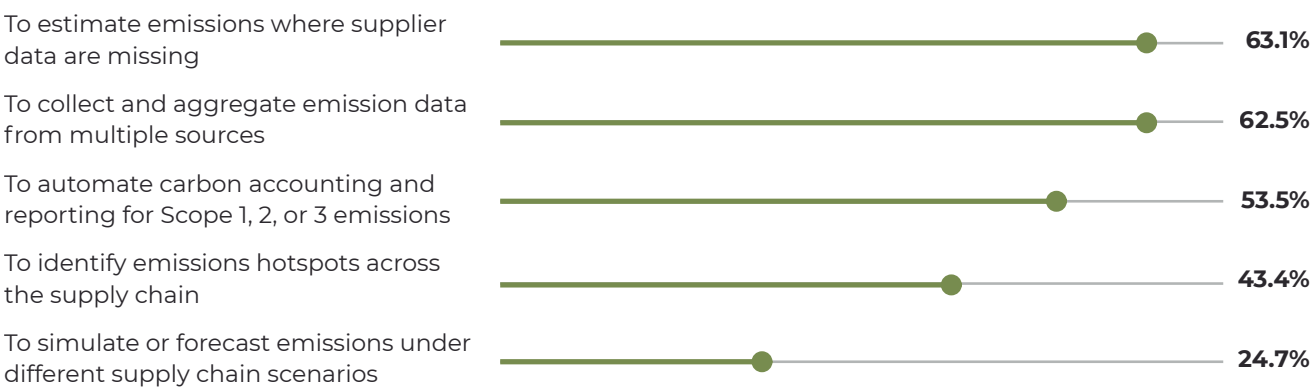


Figure 23. How organizations use AI tools to track and measure emissions. Percentage selecting each use case; respondents could select more than one.

AI’s real job today is filling the data gaps

AI use is associated with a much stronger sense of confidence in Scope 3 emissions accuracy. **About half of organizations using AI for emissions tracking report being very confident in the accuracy of their Scope 3 estimates**, compared with only about 15% of organizations that do not use AI for this purpose (Figure 24). The survey does not establish causality, but the difference suggests that AI enabled data collection, estimation, and aggregation may help organizations reduce uncertainty in their emissions inventories.

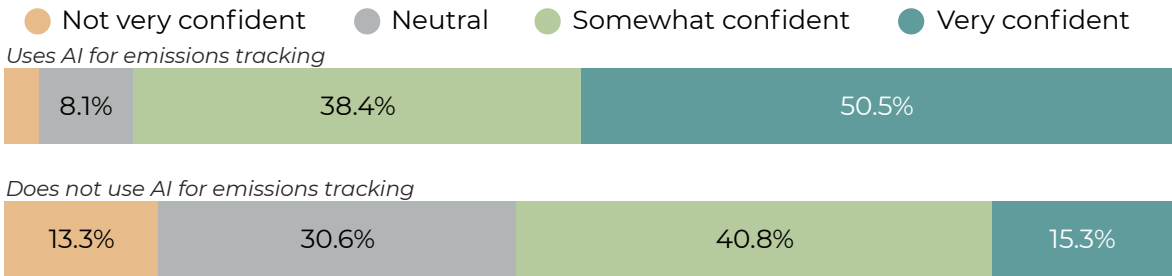


Figure 24. Confidence in Scope 3 emissions accuracy, by use of AI for emissions tracking.

AI's first job in sustainability isn't strategy, it's trust. The companies using it to fill data gaps are far more confident their emissions numbers are right.

Respondents See AI as Advancing Sustainability, Primarily Through Efficiency and Measurement

Among adopters, the verdict on AI is overwhelmingly positive: **87% say it has had a positive impact on their sustainability goals (47% very positive, 40% somewhat)** against just 6% who report a negative effect (Figure 25). But the nature of the benefit is specific. Asked where AI helped most, adopters point to operational efficiency (57%) first, then emissions reduction (41%) and better measurement (40%); its contribution to supplier engagement and strategic decisions trails well behind (Figure 26).

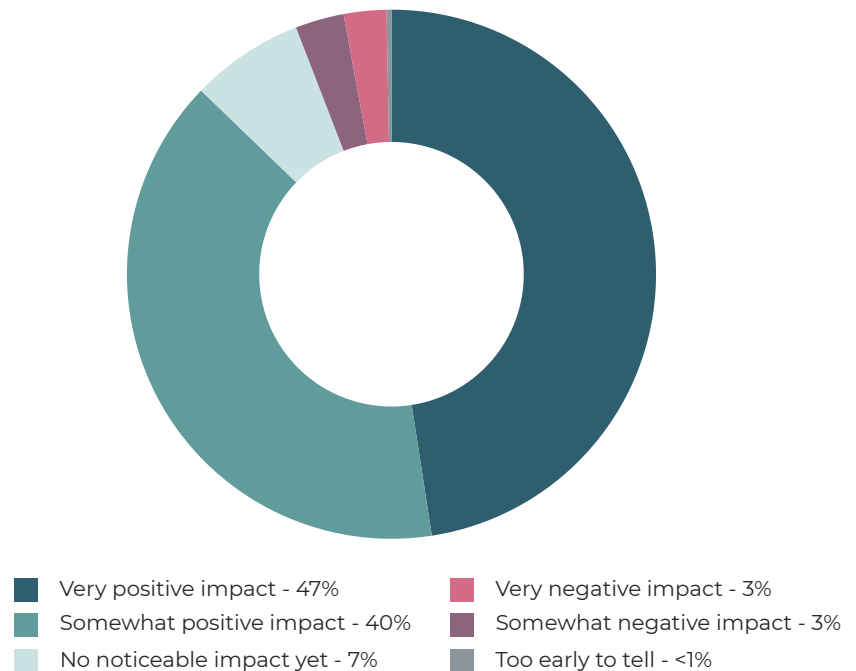


Figure 25. How AI adoption has influenced progress toward sustainability goals. Distribution of reported impact among respondents.

The consistent signal across this section is that AI's sustainability value today is in doing the existing work better, meaning more efficiently, or more measurably, rather than in changing what work gets done. It is a powerful instrument for efficiency and measurement, and a still-emerging one for strategy. Realizing the strategic upside will take deliberate effort; it will not arrive as a by-product of the measurement gains.

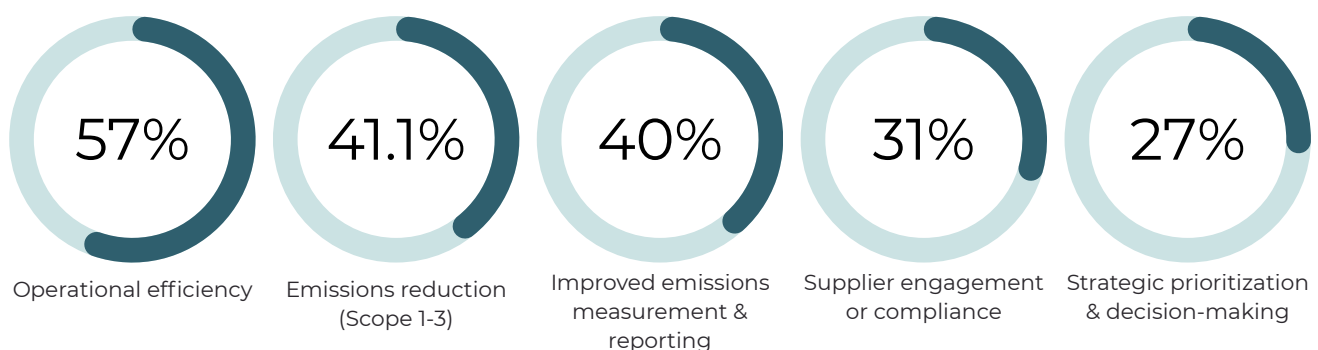


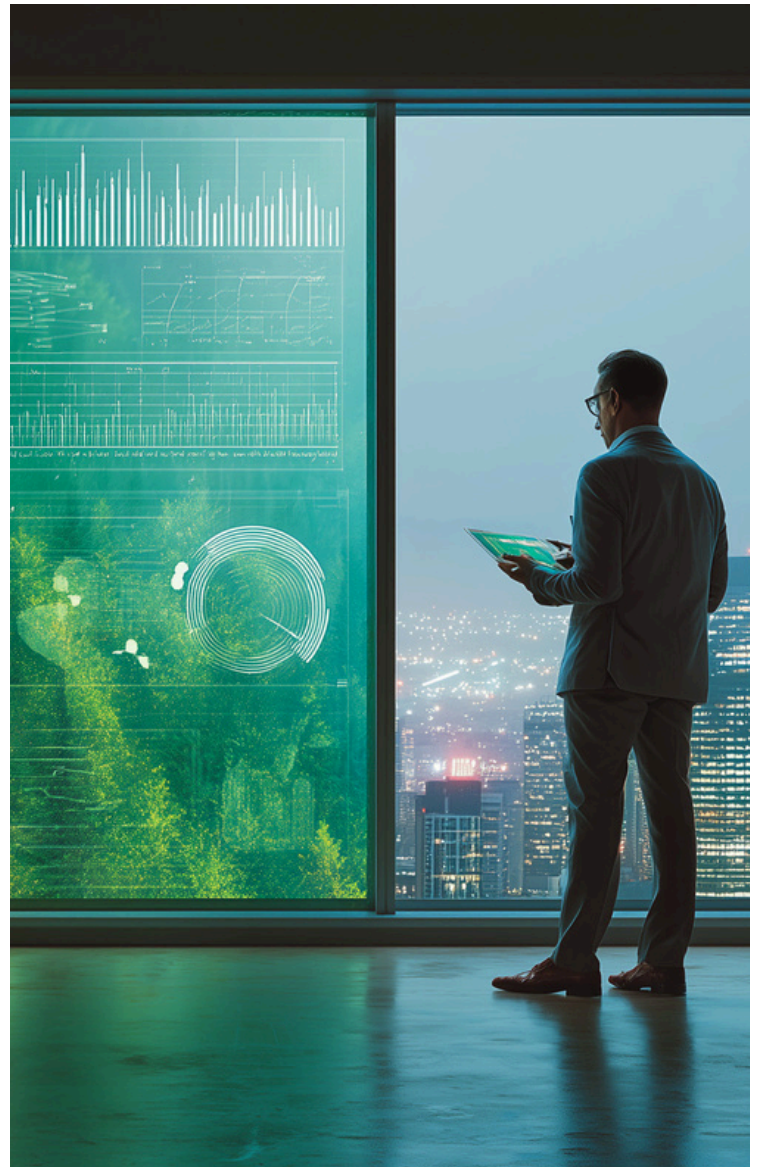
Figure 26. Sustainability goals to which AI has contributed most. Among respondents reporting a positive or very positive AI impact; respondents could select up to two goals.

AI USE IN SUPPLY CHAINS:

OPERATIONAL AND EMISSIONS IMPACTS

As AI adoption accelerates across supply chain functions, organizations are increasingly deploying both Industrial and Agentic AI to improve operational performance. This section examines the current state of AI autonomy in supply chain decision-making, where adoption is most concentrated, and what organizations report in terms of operational and emissions outcomes. The findings indicate that while AI is delivering measurable efficiency and resource benefits, its net effect on greenhouse gas emissions is more complex, and warrants closer scrutiny as deployment scales.

AI is moving rapidly from decision support toward more autonomous roles across supply chain operations. Industrial AI remains more widespread, while Agentic AI is gaining ground in structured functions such as production, procurement, and warehousing. Adopters report clear operational benefits, including lower material waste and energy or fuel use, but the picture is less consistent for total greenhouse gas emissions. This section examines where AI is being deployed, how autonomous it has become, and whether operational efficiency gains are translating into net emissions reductions.



Agentic AI Is Scaling, but Full Autonomy Remains Limited

For most organizations, AI has already crossed the line from recommending decisions, to actually making them. The question is no longer whether to let AI act, but where.

AI in the supply chain is no longer just an advisor. **Across the sample, 51% of respondents describe their AI use as partially or largely autonomous**, meaning systems that execute decisions, not just inform them (Figure 27). The shift is uneven by geography: autonomy runs highest in Asia at 60%, against 52% in Europe and 47% in North America. Company size matters less than expected — mid-size and large organizations report near-identical rates.

Autonomy, in other words, is already a part of the majority of companies, but it is spread unevenly, and regional gaps likely reflect differences in industry mix and the kinds of AI being deployed as much as any difference in ambition. The line between AI that recommends and AI that acts has already been crossed for most organizations.

Overall



By Region



By Company Size

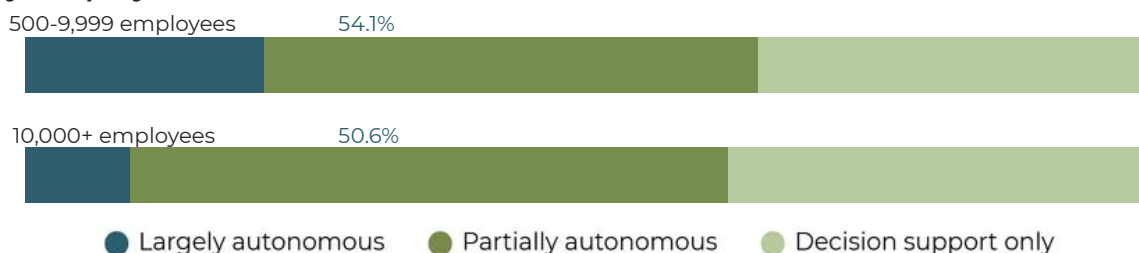


Figure 27. Industrial and Agentic AI maturity across supply chain functions. Distribution of decision-support-only, partially autonomous, and largely autonomous use overall and across selected regions and company-size groups.

Industrial AI Leads Everywhere — Agentic AI Is Catching Up in Structured Work

Across every function surveyed, Industrial AI is still more common than Agentic AI (Figure 28). **Adoption peaks in demand forecasting and inventory planning (46% Industrial), procurement and risk management (45%), and production scheduling (44%),** with transportation and warehousing close behind. Agentic AI trails but is already visible, from 23% in demand forecasting up to 28% in production scheduling.

The exception at both ends is supply-chain network design, the least automated function for either type (**18% Industrial, 11% Agentic**). The persistent gap suggests that organizations remain more comfortable using AI to support prediction, optimization, and operational decision-making than allowing autonomous agents to act with limited human intervention. Agentic AI appears to be gaining the most traction in relatively structured operational areas such as production scheduling, procurement, and warehouse operations. More strategic and system-wide applications, particularly network design, remain less automated.

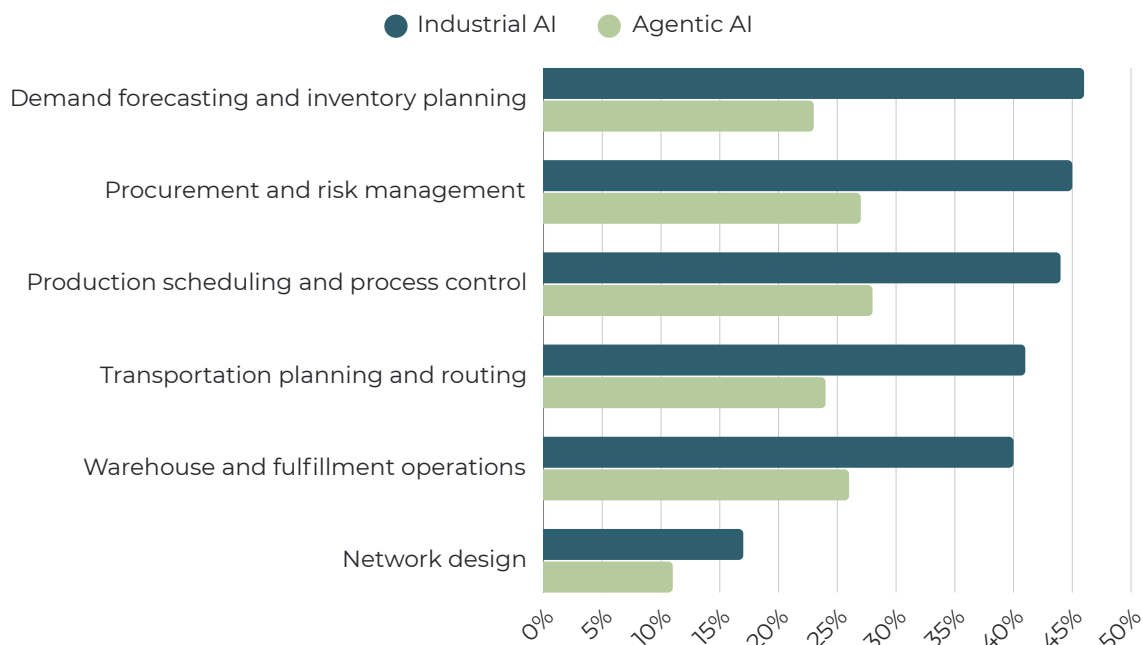


Figure 28. Use of Industrial AI and Agentic AI across supply chain functions.
Percentage of respondents reporting use in each function.



Most AI Adopters Are Past Pilots — Few Are Fully Integrated

Among businesses using Agentic AI, deployment has moved well beyond experimentation. **Half report broad use across multiple functions, and another 19% have reached integrated, autonomous decision support across most of the organization** (Figure 29). At the earlier end, 27% remain at limited use and just 5% are still piloting.

So the pilots are largely over, but broad use is not the same as enterprise-wide autonomy. Less than 20% have reached full integration, which leaves a wide gap for governance, process redesign, and workforce adaptation to close before deployment outruns the controls around it.

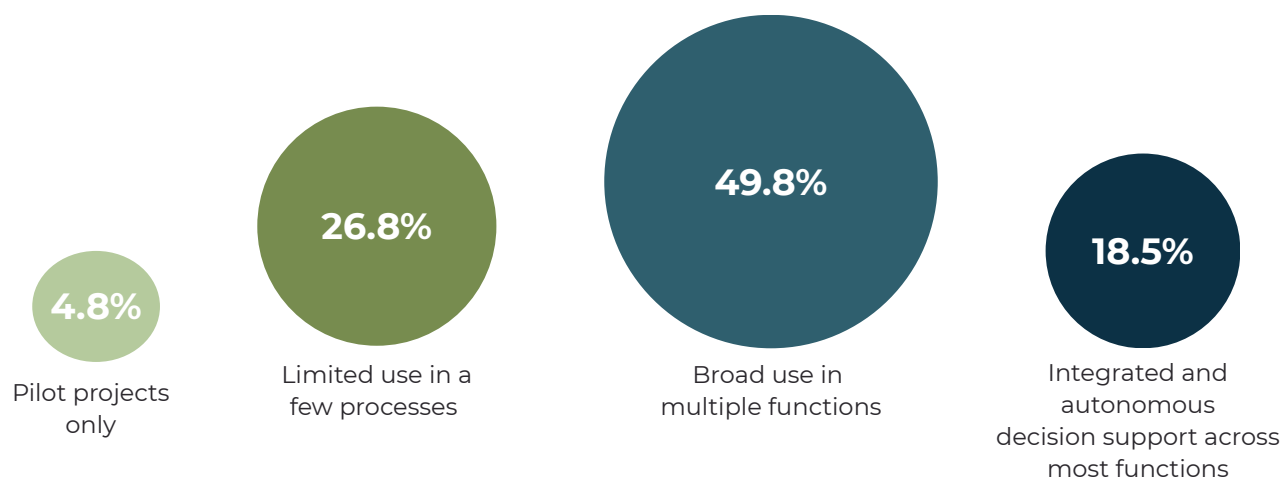


Figure 29. Overall maturity of Agentic AI use in supply chain operations. Bubble size represents the percentage of respondents at each maturity level.

The Operational Wins Are Real

Ask adopters what AI has done for their operations, and the answer is emphatic. 86% say it has reduced material waste, 84% that it has helped identify emissions-reduction opportunities, and 81% that it has cut energy or fuel use (Figure 30). On the operational scorecard, AI is doing exactly what it was bought to do: finding inefficiencies and squeezing more out of the same resources.

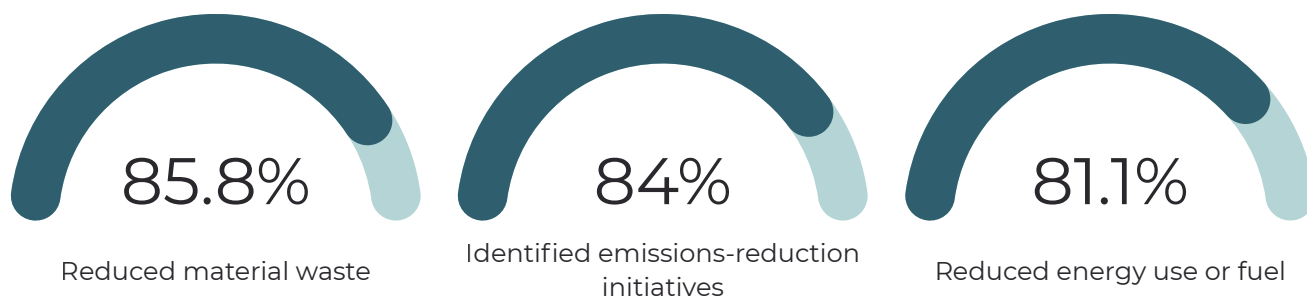


Figure 30. Reported impact outcomes of AI tools in supply chains. Percentage agreeing or strongly agreeing with each outcome.

...But the Emissions Story Doesn't Follow

Here the narrative turns. Asked about the perceived impact of AI use on total greenhouse gas emissions, the picture becomes more mixed. Among relatively mature AI adopters, those reporting broad use across multiple functions or integrated and autonomous decision support across most functions, **53% report a reduction in total emissions, while 29% report an increase and 15% report no material change** (Figure 31). This contrasts with the strong process level gains reported in Figure 30, where large majorities credit AI with reducing material waste and energy or fuel use.

The potential for AI to reduce emissions through greater efficiency is therefore clear, but the net climate benefit is not yet consistent across organizations. Improvements in procurement, inventory, logistics, energy use, or waste can contribute to lower emissions, but whether those gains translate into a reduction in the organization's total footprint depends on what happens across the wider system. At this stage, the data suggest that many companies are still learning how to translate AI-enabled efficiency into measurable net emissions reductions. The next challenge is not simply to make operations more efficient with AI, but to ensure that those efficiency gains ultimately translate into lower total emissions.

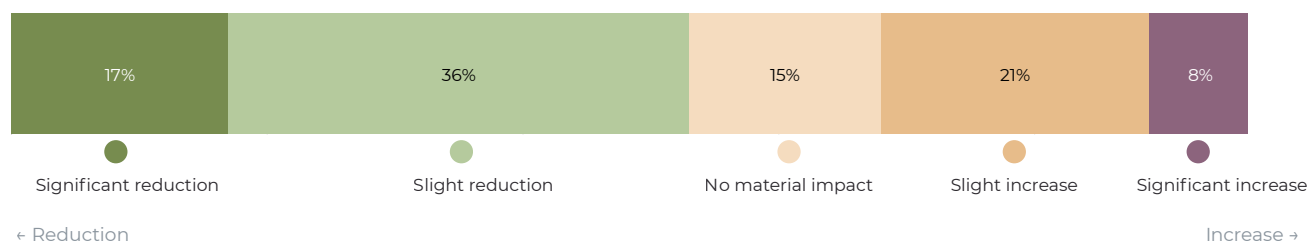


Figure 31. Perceived impact of AI adoption on greenhouse gas emissions among relatively mature AI users. Among respondents reporting broad or integrated/autonomous AI maturity. 3% did not respond to this question.

AI can improve efficiency and reduce waste. The challenge is ensuring those gains translate into a lower overall footprint.

The next wave of enterprise AI won't be won by better copilots, but by applying AI to the messy operational data and workflows that actually move the P&L across procurement, supply chain, operations and sustainability. Early deployments are already showing 8-15% procurement savings², 20-30% inventory reductions and 15-20% logistics improvements³ – while the same operational levers can simultaneously reduce waste, energy use and carbon emissions. That's the promise of Applied AI. Thoughtfully deploying one operational transformation can deliver multiple positive business outcomes.

-Charlotte Degot
Chief Executive Officer, CO2 AI

2- [bcg.com/publications/2026/ai-in-procurement-drives-competitive-advantage](https://www.bcg.com/publications/2026/ai-in-procurement-drives-competitive-advantage)

3- [mckinsey.com/industries/industrials/our-insights/distribution-blog/harnessing-the-power-of-ai-in-distribution-operations](https://www.mckinsey.com/industries/industrials/our-insights/distribution-blog/harnessing-the-power-of-ai-in-distribution-operations)

FREIGHT TRANSPORTATION

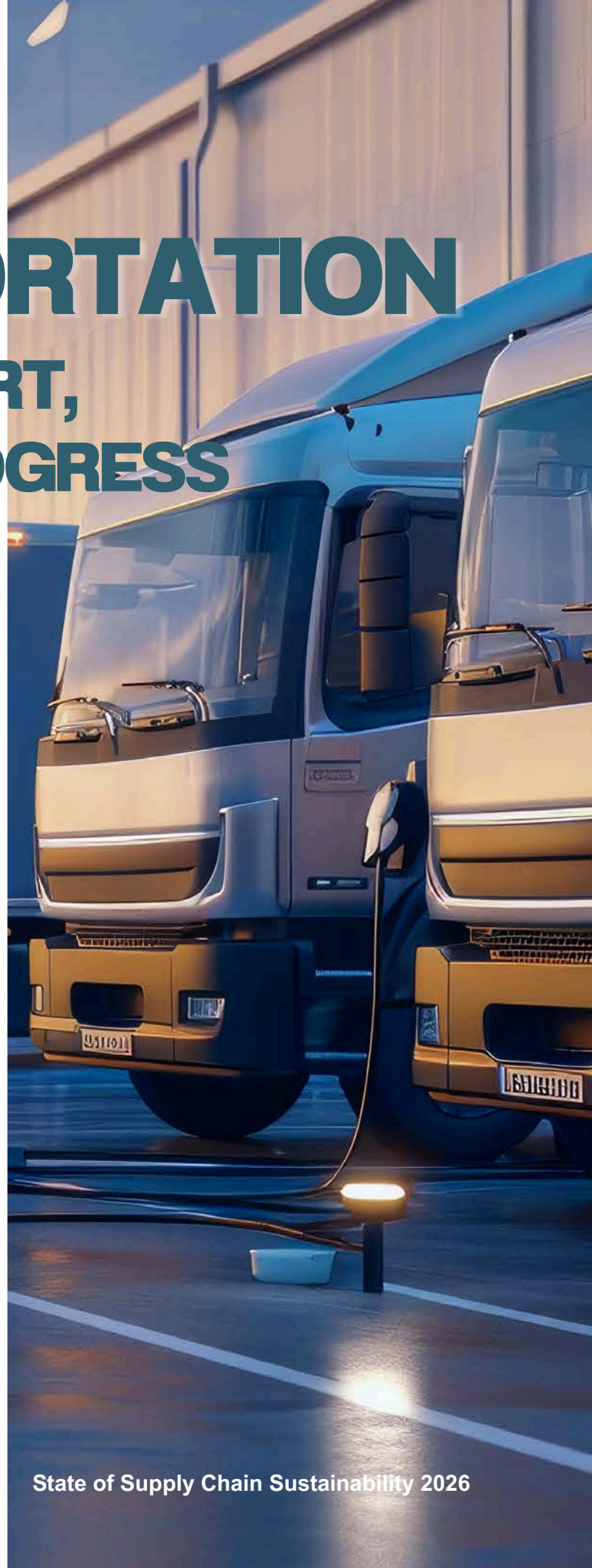
BROAD EFFORT, NARROW PROGRESS

Based on 2026 survey responses from freight transportation companies, approximately 348 responses for this section.

Freight is one of the largest sources of Scope 3 emissions, and nearly every company is doing something about it. But breadth of effort is masking a narrowness of progress: the methods in full deployment make diesel operations more efficient, while the methods that would replace diesel remain stuck in pilots. This section traces where freight decarbonization really stands, why the regions have split, and what is actually driving the decisions.

Broad Effort, Narrow Progress

Engagement is broad across the board. Route optimization leads, 76% of respondents state that it is at scale or embedded in their organization. Load consolidation, driver-behavior programs, and carrier requirements are each above 67% (Figure 32). But adoption of the harder methods isn't far behind: modal shift reaches 63%, drop-in alternative fuels like biodiesel 61%, and close to half of companies (54%) have scaled or embedded battery-electric vehicles. Fewer than 8% use no method at all.



So the story isn't a lack of adoption, it's a gap between adoption and full transition. Companies are running electric trucks and biofuels on some lanes, but not yet across the fleet. The methods that work within existing assets and infrastructure (efficiency programs, drop-in fuels) scale fastest; the ones that demand new vehicles and charging or refueling networks scale more slowly and, crucially, more shallowly.

Nearly every freight company is cutting emissions. But most of it comes from burning diesel more efficiently, not from burning less of it.

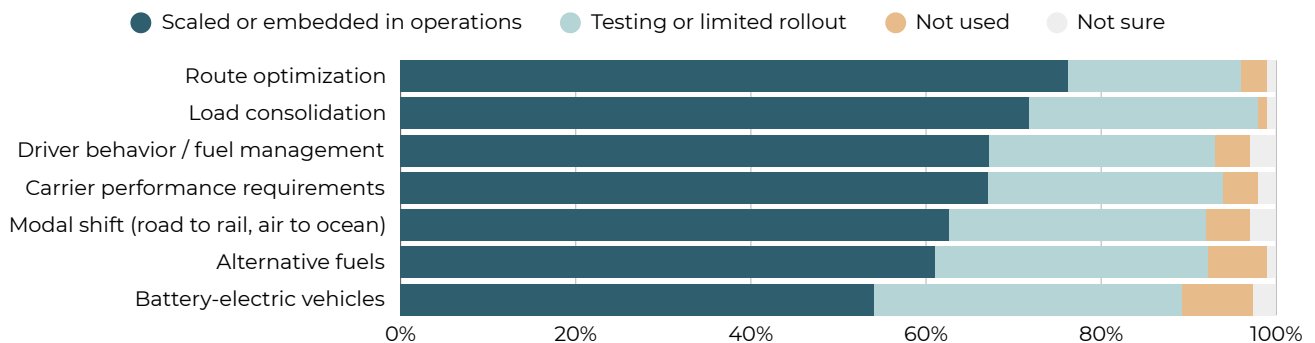


Figure 32: How far each freight emissions-reduction method has progressed. The remaining share to 100% is respondents who answered “not sure.” Hydrogen is excluded.

**A note on hydrogen: Hydrogen responses are excluded from Figure 32 because reported adoption levels were inconsistent with external deployment data and with the survey's own follow-up question on hydrogen. They are addressed separately in the subsequent section.*

The same picture, split by region

The efficiency methods look nearly identical across North America and Europe — route optimization, load consolidation, and modal shift differ by a point or two at most. These are settled practices everywhere. The regions diverge only where new capital is required.

And there, the gap is stark. Battery-electric vehicles are at scale or embedded by 60% of European respondents versus just 36% in North America, that is a 24-point gap, the widest of any method (Figure 33). Alternative fuels follow the same pattern (63% vs 50%). North America is also far more likely to report no use at all: 21% haven't touched electric trucks, against roughly 4% in Europe.



The divide isn't about willingness to run efficient operations, both regions do that. It is about willingness, or ability, to invest in new assets. This gap is consistent with the policy findings discussed later in this section: where the regulatory signal has been clearest and most sustained, capital investment in lower-emission assets has advanced furthest.

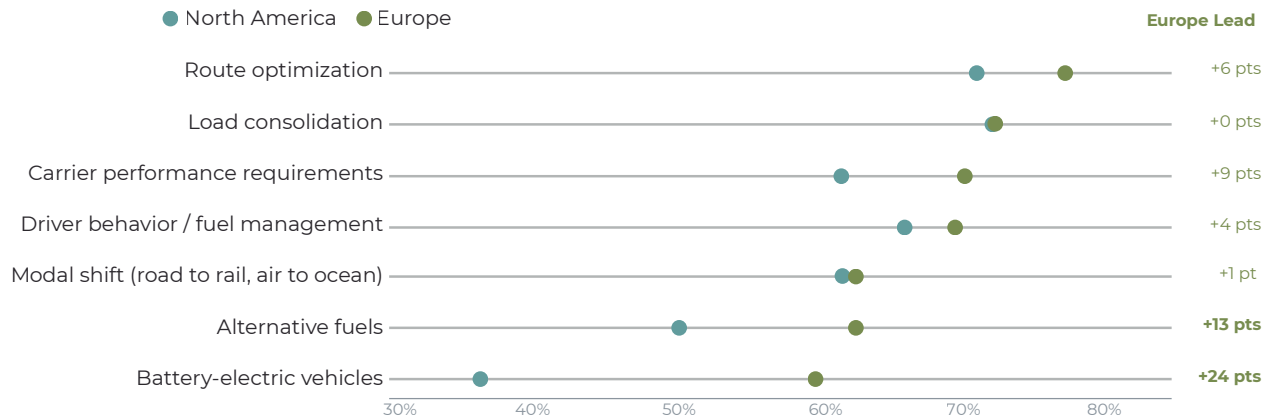


Figure 33: Share reporting each method is scaled or embedded in operations, North America against Europe. The figure at the right of each row is the size of the European lead in percentage points.



The fuel mix has not changed much

The current fuel mix provides a more direct measure of where freight decarbonization stands. As shown in Figure 34, 43% of companies still operate fleets that are entirely or mostly conventional diesel. Only 19% have reached a point where more than half of their fleet energy comes from low-emission sources, and another 8% have completed a full fleet transition.

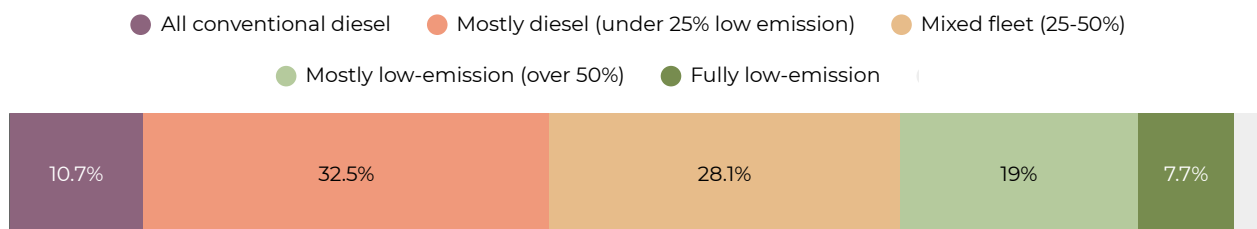


Figure 34: Current energy mix of freight volume. Excludes 2.0% who answered "not applicable" or "do not know."

Read alongside Figures 32 and 33, this profile clarifies the nature of progress to date. Activity is widespread and efficiency methods are delivering results, but those results have come primarily from reducing diesel consumption rather than replacing it. The emissions savings achieved so far reflect improved fuel efficiency within existing fleets. The next round of reductions will require more substantial asset and infrastructure investment and will be correspondingly more difficult and expensive to achieve.

Only 8% of freight companies have fully converted to low-emission energy. 43% still run fleets that are entirely or mostly diesel. The tank tells the real story.

What is driving the decisions

When asked which factors strongly influence their freight decarbonization decisions, respondents in Europe and North America reveal distinctly different decision environments (Figure 35). In Europe, regulation and infrastructure are among the strongest drivers: emissions regulations and standards are cited by 69% of respondents and infrastructure availability by 68%, compared with just 43% and 45%, respectively, in North America. European respondents also place considerably greater weight on access to incentives and subsidies (62% vs. 48%), current or anticipated carbon pricing and emissions trading exposure (60% vs. 45%), and investor and ratings pressure (59% vs. 39%).

North American decisions, by contrast, are more strongly anchored in commercial and operational considerations. Customer and tender requirements are the leading influence at 66%, nearly identical to Europe at 67%, while technology readiness and reliability also ranks highly in both regions (64% in North America and 68% in Europe). Total cost of ownership matters on both sides of the Atlantic, but more strongly in Europe (68% vs. 56%). The contrast is clear: European freight decarbonization is being shaped by a broader combination of regulation, infrastructure, economics, and external pressure, while in North America the strongest pressures come from customers and the practical readiness of the technology itself.

While policy can accelerate adoption, long-term progress depends on creating business cases that survive policy cycles. Organizations that successfully decarbonize freight are increasingly connecting emissions reduction initiatives to resiliency, customer expectations, and transportation network performance.

-Heather Ewing,
VP Enterprise Solutions, Breakthrough



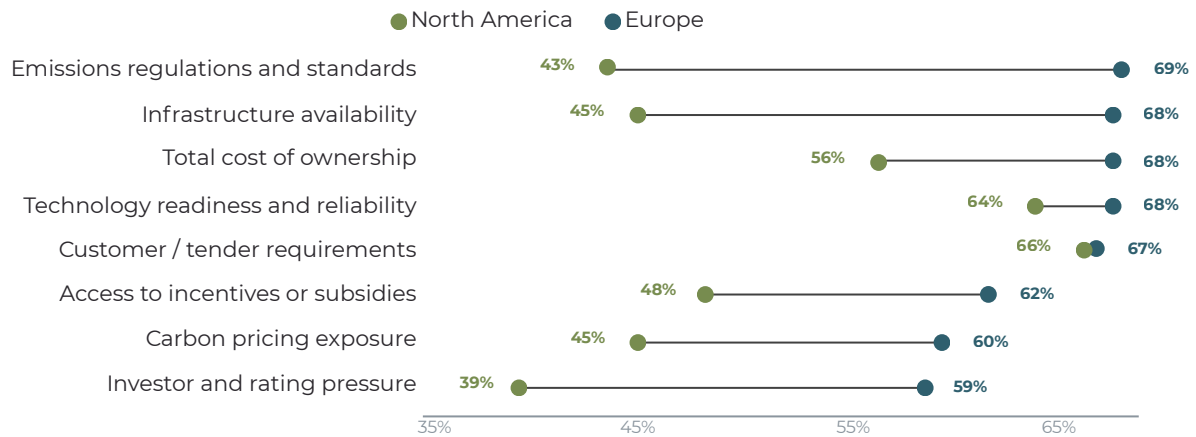


Figure 35. Share rating each factor as a “strong influence” or the “primary driver” of freight decarbonization decisions.

Europe is driven by a broader policy and infrastructure push; North America by commercial and operational realities.

Policy has pulled the regions apart

The sharpest regional divergence in this year's freight data concerns the effect of policy and regulatory changes on decarbonization strategy. 84% of European freight companies report a positive effect from policy changes over the past year; in North America, only 44% do; that is a wide 40-point gap (Figure 36).

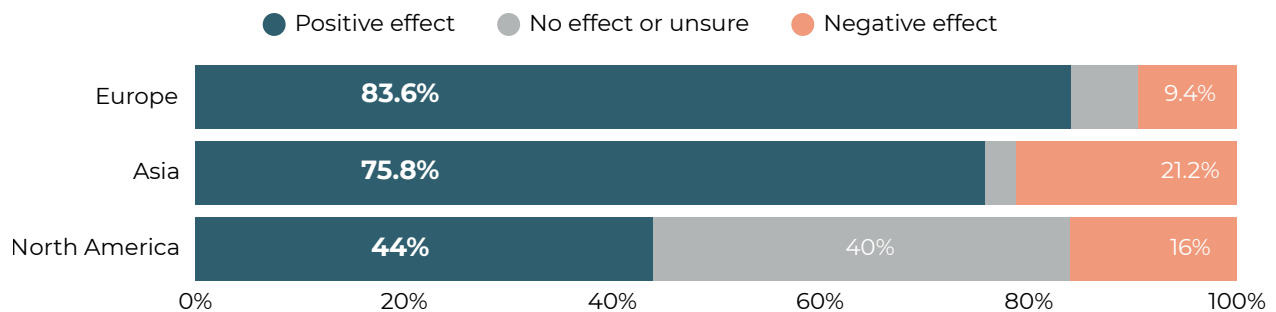


Figure 36. Effect of policy and regulatory changes on freight decarbonization strategy over the past 12 months, by region. No effect and unsure have been grouped together to focus on comparing the positive vs negative effects, because these responses reflect different assessments, the combined share should not be reflected as policy uncertainty.

The gap is not primarily explained by negative sentiment in North America. Only 16% of North American respondents report a negative policy effect, compared with 9% in Europe. What distinguishes the North American response is the proportion reporting no effect or uncertainty: 40% of North American freight companies fall into this group, compared with roughly 6% in Europe.

So the divergence reflects confusion more than resistance. A large share of North American operators simply haven't determined what the shifting policy environment means for them. The removal of electric-vehicle mandates has been read two ways — by some as flexibility to pursue alternatives like biodiesel, by others as a cue to wait and watch.

Companies responded to policy change in two different ways

Among companies that experienced some policy effect, responses point in two directions simultaneously. The most common was to increase investment in specific technologies or fuels, reported by 63% of this group. At the same time, 49% report becoming more cautious about long-term planning and contracting, and 36% report having reduced or paused investment in those same technology categories.

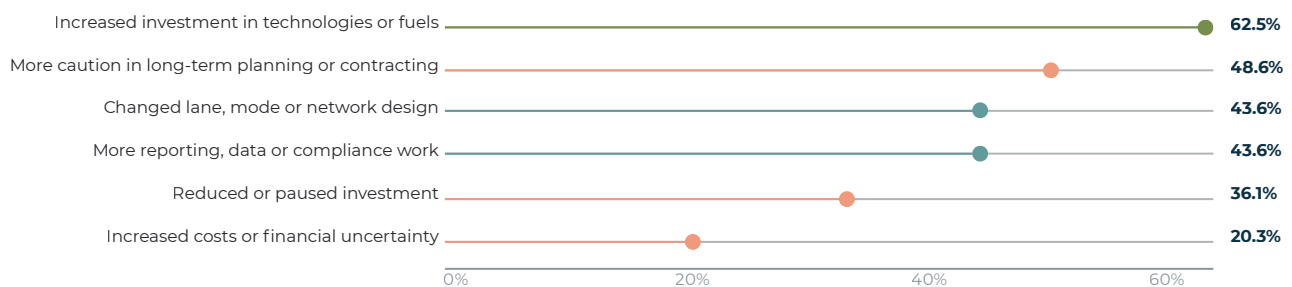


Figure 37. How policy and regulatory changes affected company approach (multiple-response question).

These responses are not contradictory. They reflect two distinct strategies forming under the same conditions of uncertainty. Organizations with sufficient confidence in the policy and market direction moved forward with targeted investment; those without that confidence preserved optionality by deferring commitment. The net effect is that policy uncertainty appears to be widening the gap between freight companies that are accelerating and those that are holding back.





Figure 38. Company position on hydrogen for freight.

Hydrogen: widely watched, rarely deployed

Hydrogen presents the widest gap between interest and deployment of any option in the survey. As shown in Figure 38, only 6% of freight companies are deploying hydrogen at meaningful scale, while approximately 8% have ruled it out entirely. The substantial majority sit between those positions: monitoring developments, assessing business viability, planning deployment within the next one to three years, or running pilots.

Regional patterns mirror those observed for policy response. European freight companies are approximately twice as likely as their North American counterparts to be actively engaged with hydrogen through pilots, planned deployments, or existing operations. The technology is only part of the equation. Europe's higher hydrogen engagement is consistent with its stronger policy signals and more developed institutional support for refueling infrastructure. The survey cannot establish causality, but it reinforces the broader finding that hydrogen adoption depends heavily on the ecosystem being built around it. This is consistent with the conclusion in last year's report that hydrogen remains a longer-term option, with wider adoption dependent on infrastructure development and continued cost reduction.

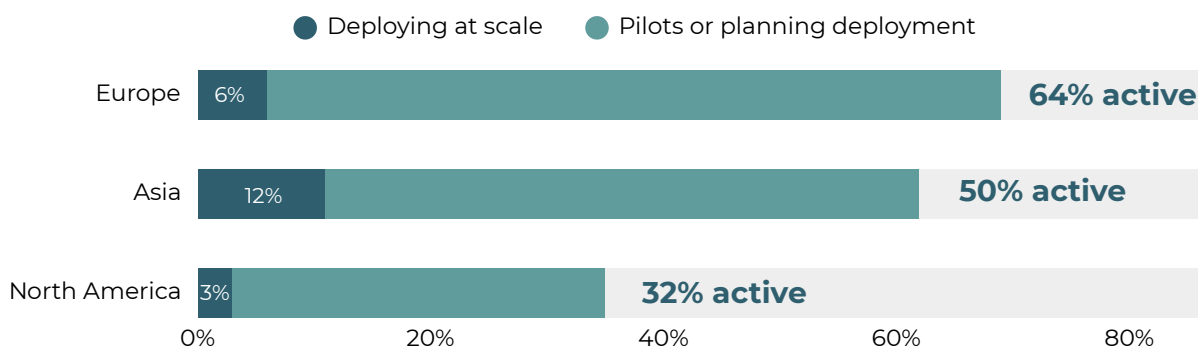


Figure 39. Share of companies actively engaged with hydrogen (running pilots, planning deployment, or deploying at scale) by region.

The Takeaway

Freight decarbonization is broad but shallow: nearly everyone is acting, yet the fuel in the tank hasn't changed much, because the gains so far have come from running diesel more efficiently rather than replacing it. The methods that would actually displace diesel (electric trucks, alternative fuels, and hydrogen) require substantial capital investment and supporting infrastructure, and they have progressed furthest where policy signals have been clearest. The easier efficiency gains are nearing their limits; the next phase of freight decarbonization will depend on capital, infrastructure, and greater policy clarity.

As the findings show, the North American freight market is complex, making collaboration across the supply chain especially important. Forums and partnerships that bring different parts of the supply chain together are critical to advancing progress. Carriers want to explore new solutions, while shippers are looking for practical ways to advance their sustainability goals. One of the clearest themes we see is that progress accelerates when those needs are better connected. Organizations that bring together diverse perspectives across the supply chain help create the confidence needed to move from intention to action.

-Rachel Schwalbach,
Vice President ESG, C.H. Robinson



WAREHOUSING

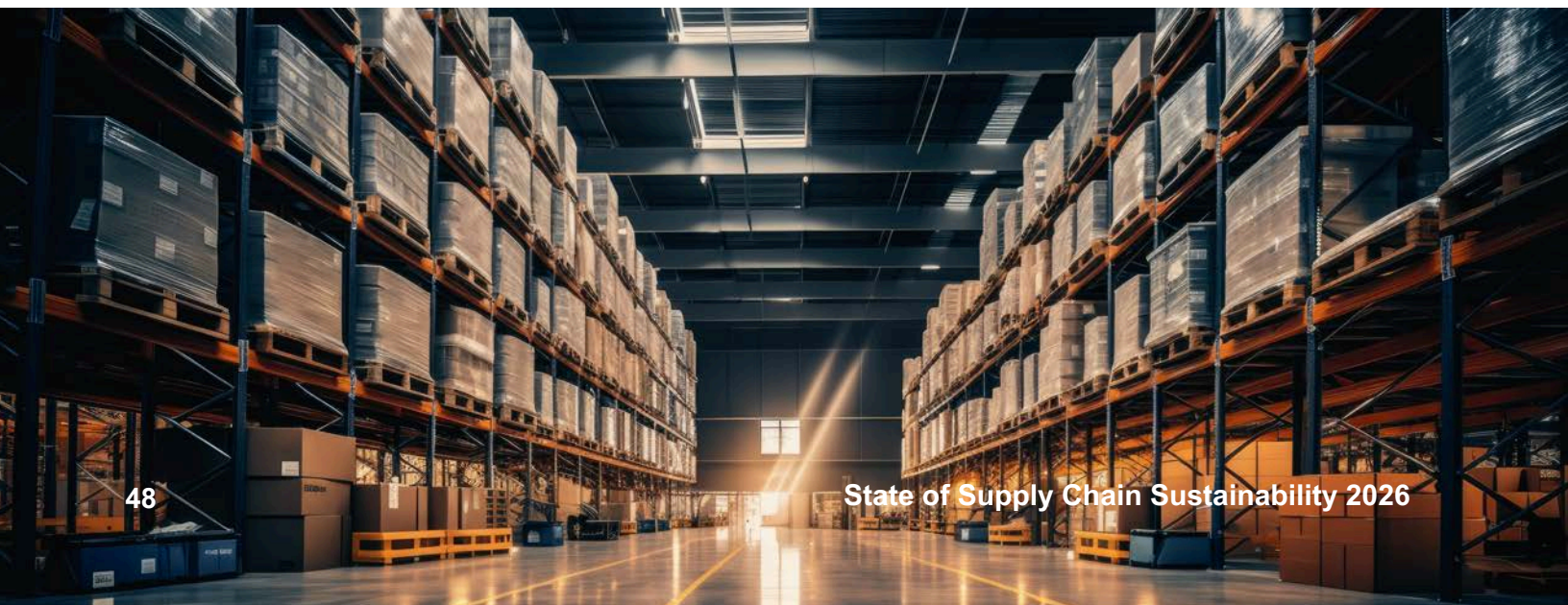
AUTOMATED, INTELLIGENT, AND USING MORE ENERGY

Based on 2026 survey responses from companies with warehouse or distribution operations, approximately 368 responses for this section.

The warehouse is one of the most automated and AI-intensive parts of the supply chain, making it an important test of how technology and sustainability interact. The picture this year is complicated: as automation and AI become more advanced, many warehouses also report higher energy use and waste. The survey cannot determine how much of this reflects AI itself, the underlying automation, higher throughput, or other characteristics of these operations. At the same time, most warehouses still lack real-time sustainability monitoring capable of detecting these changes as they occur. This section examines how far automation has progressed, how autonomous warehouse AI has become, and what these changes mean for environmental performance.

About the warehouse sample

The warehouse questions were answered by respondents directly responsible for or indirectly involved in warehouse and distribution operations, the sample also skews toward large, multi-site operators. As you can see in Figure 40, most manage networks rather than single facilities: 37% operate between six and ten warehouses, and a further 29% run more than twenty. Nearly all are large enterprises (approximately 66% employ between 500 - 9,999 people, and 22% employ more than 10,000).



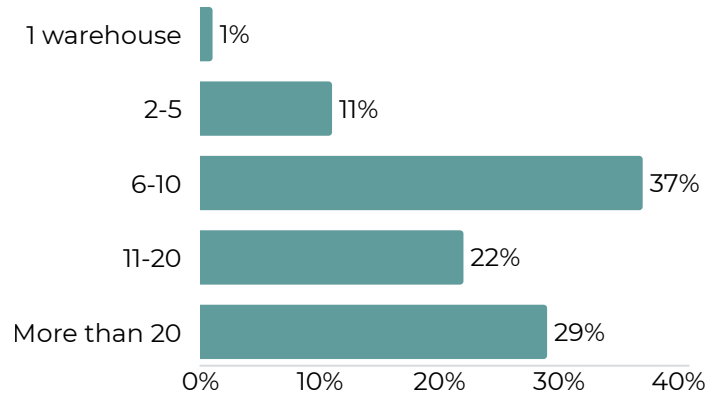


Figure 40. Warehouse sample composition.

Two in five warehouses run advanced or full automation

As shown in Figure 41, 40% of warehouses operate at an advanced or fully automated level, incorporating robotics or automated systems across multiple functions. The largest single group operates at moderate automation (42%), with automated storage and retrieval or robotics in selected areas. 17% remain at a basic or fully manual level.

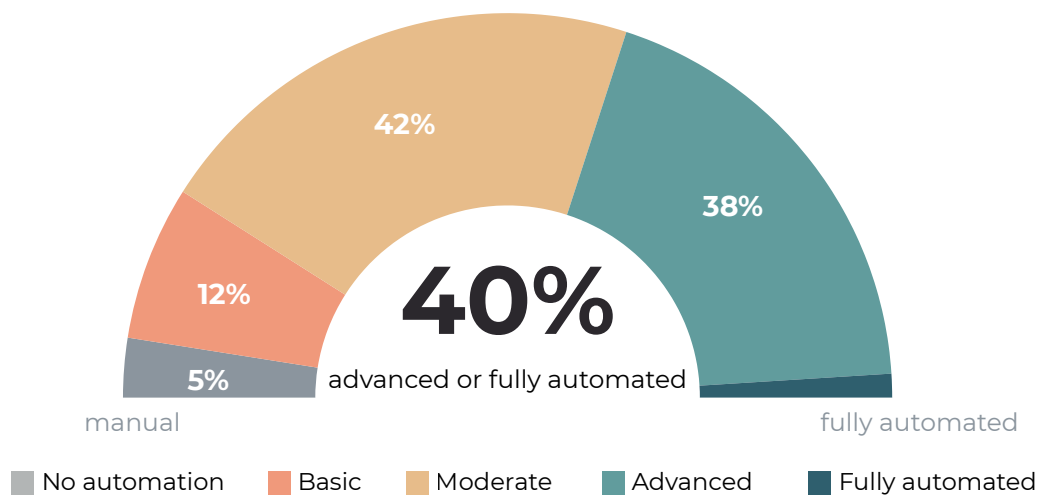


Figure 41. Current level of warehouse automation. The center figure combines advanced and fully automated operations.

The distribution has direct implications for AI deployment. Advanced and fully automated facilities are more likely to have the robotics, sensors, and connected systems that enable greater AI autonomy. Moderate automation, still the most common level, provides some of this infrastructure but often only in selected processes. The sector therefore appears to be in transition, with many facilities building the foundation for broader AI autonomy.

Seven in ten AI-using warehouses have crossed from AI that recommends to AI that acts. The warehouse has quietly become the supply chain’s most autonomous environment.

Most AI-using warehouses have moved beyond decision support

The survey captures AI use along a spectrum of autonomy. **For this study, decision-support AI is classified as Industrial AI, while partially and largely autonomous use is classified as Agentic AI.** Industrial AI supports prediction and optimization, such as forecasting demand, optimizing inventory, or predicting equipment failures. Agentic AI goes further by making and executing decisions, such as dynamically reallocating picking tasks, reprioritizing orders, or adjusting equipment schedules with limited human intervention.

Among AI-using warehouses, **29% remain at decision support, while 71% report some degree of autonomous AI use:** 48% are partially autonomous and 23% largely autonomous. This suggests that autonomy is moving beyond pilots, but is being introduced selectively rather than replacing decision-support AI across warehouse operations.

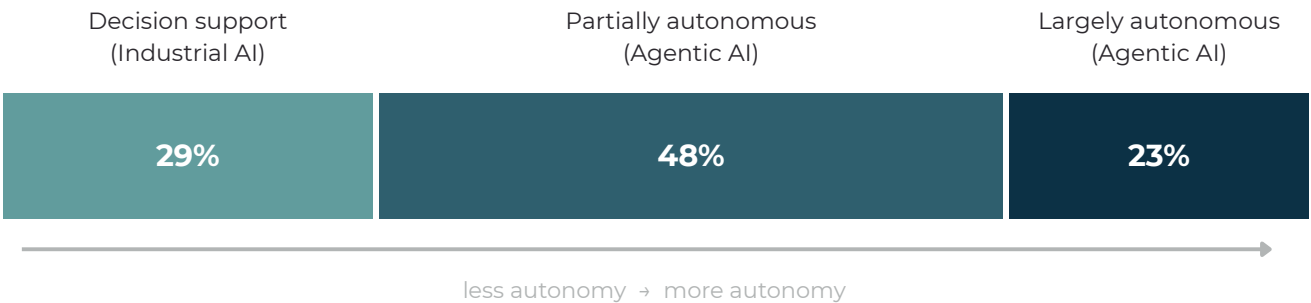


Figure 42. Level of AI autonomy among warehouses that use AI. Decision support corresponds to Industrial AI; partially and largely autonomous correspond to Agentic AI.

AI is pointed at efficiency first, emissions last

Across both forms of AI, operational applications dominate, as shown in Figure 43. Inventory optimization is the most common use, reported by 64% of Industrial AI users and 56% of Agentic AI users, followed by demand forecasting and energy management. Industrial AI may, for example, forecast inventory requirements or recommend energy-saving settings, while Agentic AI can act on those insights by reallocating inventory, adjusting workflows, dynamically adjusting the picking or fulfillment priorities, modifying HVAC, charging, or modifying equipment schedules. Real-time carbon tracking ranks last for both by a substantial margin, at only 36% for Industrial AI and 26% for Agentic AI.

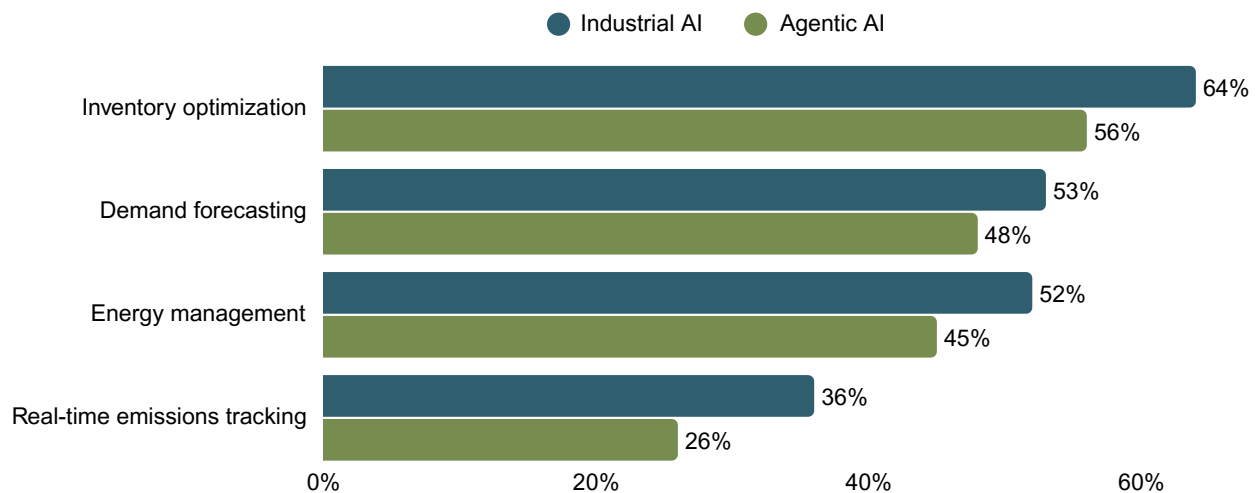


Figure 43. Warehouse AI applications, Industrial versus Agentic (multiple-response question). Each row shows the adoption rate of the same application for each type of AI.

What is more revealing is the gap between optimization and measurement. Energy management is already a relatively common AI application, showing that warehouses are using AI to influence resource consumption directly. Yet far fewer use AI to track the carbon consequences of those decisions in real time. As a result, warehouse operations may be becoming more capable of optimizing inventory, workflows, and energy use faster than they are becoming capable of evaluating the resulting environmental impact. This measurement gap becomes important in the sections that follow, where we examine whether greater automation and AI maturity are accompanied by better sustainability outcomes.

AI is increasingly shaping warehouse decisions, but the ability to measure the environmental consequences of those decisions is lagging behind.

Energy and Waste Climb with Automation

The energy and waste increases that follow AI adoption are not uniform — they are largest in the most automated warehouses. Among moderately automated warehouses, 59% report that energy use has risen since implementing AI and 54% report higher waste; among the advanced or fully automated, those shares climb to 78% and 76% (Figure 44). Automation and AI are difficult to disentangle here, since the most automated warehouses tend to run the most AI. But the direction is consistent: the more built-out a warehouse's automation, the more likely it is to have seen its energy and waste climb — the efficiency of the operation and the growth of its footprint advancing together.

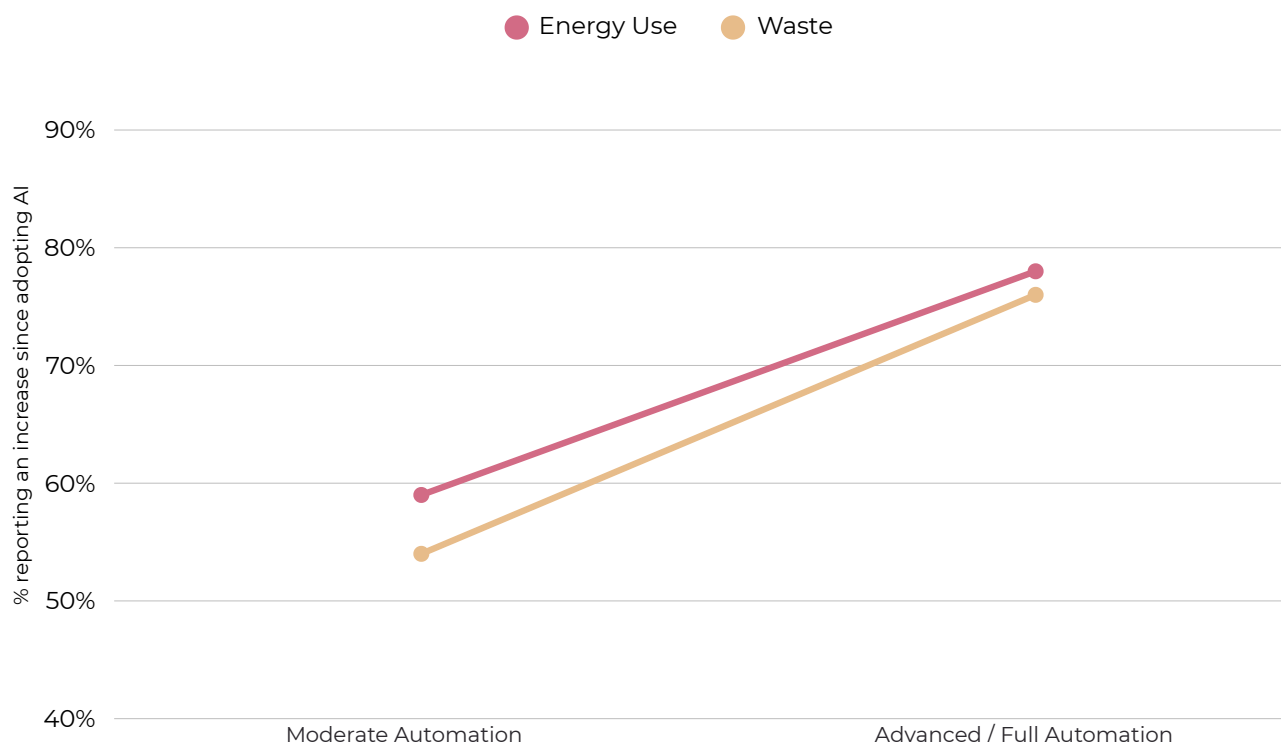


Figure 44. Share reporting higher energy use and waste since implementing AI, by automation level

Two interpretations are consistent with this pattern, and the survey data cannot distinguish between them. The first is that autonomous AI drives harder operational performance, such as keeping equipment active longer or increasing throughput in ways that consume more energy and generate more waste. The second is that the warehouses granting AI the greatest autonomy are also the highest-volume and fastest-growing operations, meaning energy and waste may have increased regardless of AI adoption. What the data does make clear is that warehouse AI adoption does not reliably produce sustainability gains in these areas. Organizations are adopting AI primarily for operational performance — and on this evidence, it is delivering operational performance rather than reductions in energy use or waste.

The paradox has a scale: AI's energy and waste cost hits smaller operators hardest

The relationship between AI adoption and rising energy use and waste also varies by the size of the warehouse network. To separate this effect from differences in automation maturity, Figure 45 looks only at advanced and fully automated warehouses. Among operators with ten or fewer warehouses, 92% report higher energy consumption and 92% higher waste since adopting AI. Among those operating more than ten warehouses, the corresponding shares fall to 65% and 59%, while roughly a quarter report decreases.

The pattern suggests that automation alone does not explain the increases. Even among similarly automated operations, larger warehouse networks report substantially better energy and waste outcomes. The survey cannot establish why, but scale may be associated with stronger energy-management, measurement, or operational capabilities that help organizations contain the additional resource demands associated with AI-enabled operations. This adds another dimension to the warehouse paradox: the environmental consequences of AI appear to depend not only on how autonomous the technology is, but also on the operating context in which it is deployed.

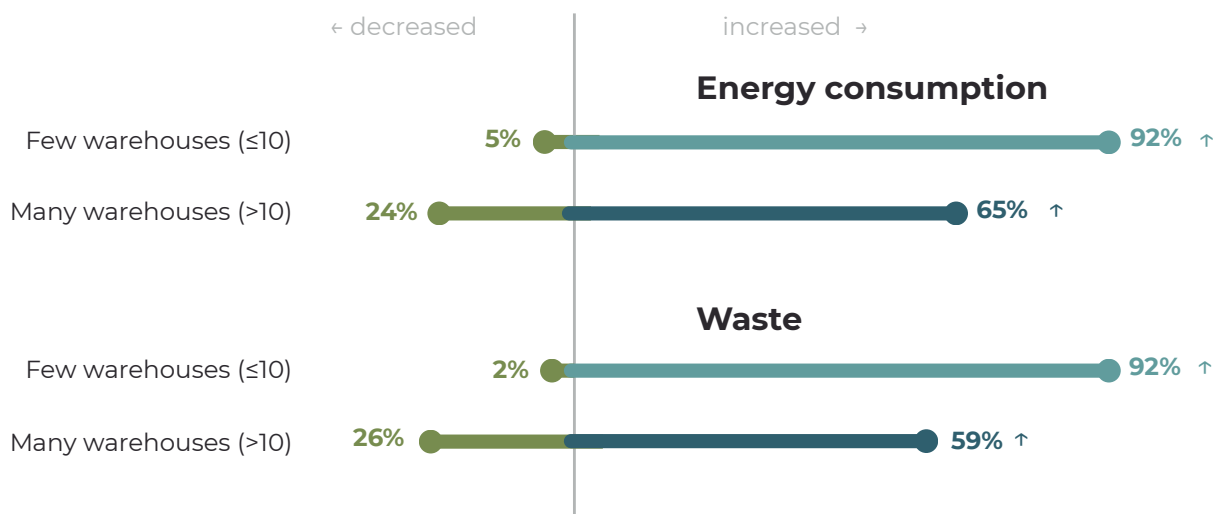


Figure 45. Reported change in warehouse energy use and waste since adopting AI, among advanced/fully automated warehouses, by number of warehouses operated.

Scale appears to soften the sustainability penalty of AI.

Emissions measurement is widespread, but real-time monitoring is rare

Effective emissions measurement is a prerequisite for identifying and responding to the energy and waste increases described in the preceding sections. Headline adoption rates are encouraging: 88% of warehouses report measuring, managing, or overseeing sustainability at the warehouse level, and as shown in Figure 46, this share rises with automation — from 74% of basic or manual facilities to 96% of the most automated.

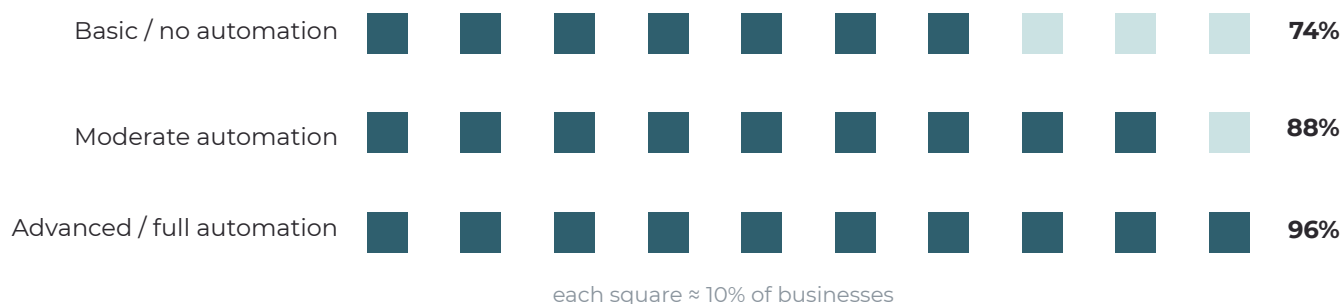


Figure 46. Share measuring warehouse-level sustainability, by automation level.

The methods in use, however, tell a more qualified story. As shown in Figure 47, only 24% of warehouses use an AI or sensor-driven system with real-time monitoring. This is the approach best suited to detecting energy or waste changes as they occur. Nearly half (49%) rely on partially automated software without AI capability, and a quarter (24%) still use manual data collection and periodic reporting such as spreadsheets and annual summaries. Warehouses are deploying AI extensively for inventory optimization and demand forecasting, but most are still tracking their own emissions through non-AI tools, often on an annual basis, which means the energy and waste increases shown in Figures 44 and 45 may not be visible to the organizations experiencing them until well after the fact.



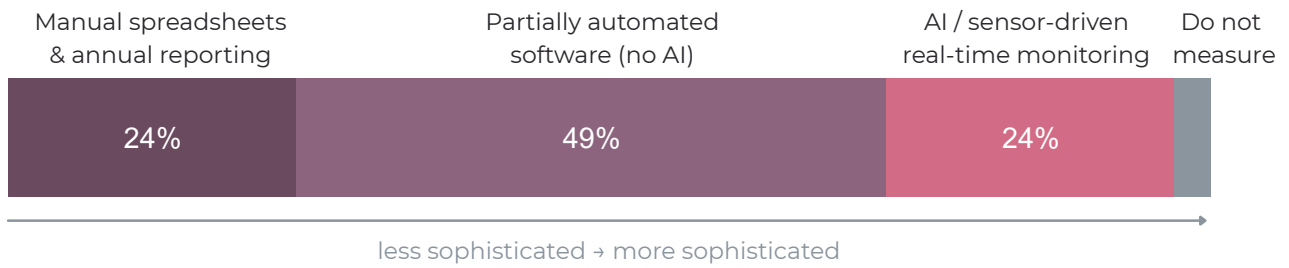


Figure 47. How warehouses primarily measure carbon emissions.

Takeaway

Warehouse automation and AI are delivering clear operational value, but greater automation and autonomy do not automatically reduce environmental impact. Energy use and waste rise for many adopters, while real-time sustainability measurement remains limited. The next challenge is therefore to ensure that productivity gains are matched by equally strong measurement and management of energy, waste, and emissions.



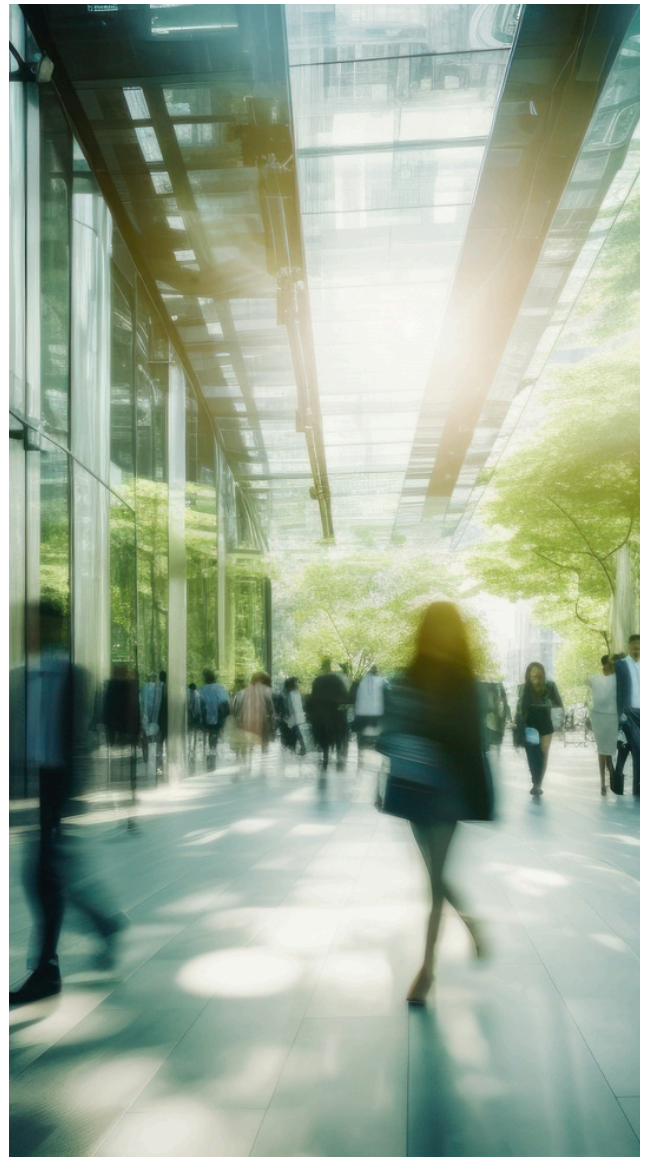
CONCLUSION

The 2026 survey finds corporate sustainability commitment at a record high. Organizations have not retreated in the face of policy uncertainty, geopolitical disruption, or economic pressure. If anything, those conditions appear to have reinforced the case for sustainability as a long-term strategic necessity. That is the encouraging headline.

The harder finding is what lies beneath it. Commitment is not the constraint. Structure, measurement, and execution are.

Across governance, supply chains, freight, and warehousing, a consistent gap emerges between what organizations say they are committed to and the systems they have built to deliver it. Public sustainability goals are common; board-level accountability for those goals is not. Cross-functional governance is associated with meaningfully deeper sustainability integration, yet only about half of companies with public commitments have built one. Sustainability is becoming embedded in operational decisions, but the longer-term structural decisions that shape supply chains remain less connected to sustainability considerations than the near-term ones.

Technology tells a similar story. AI is being adopted at scale, and organizations report genuine benefits in emissions identification, operational efficiency, and measurement. Yet its sustainability value is not automatic. AI is currently most established in operational optimization and measurement, while more strategic sustainability applications remain less mature. Warehousing makes this tension especially visible: in highly automated, AI enabled environments, many operators report higher energy use and waste, while real-time environmental monitoring remains limited. The survey cannot isolate the effects of AI from automation, operating scale, or other factors, but the broader message is clear: smarter operations do not automatically translate into better environmental outcomes.

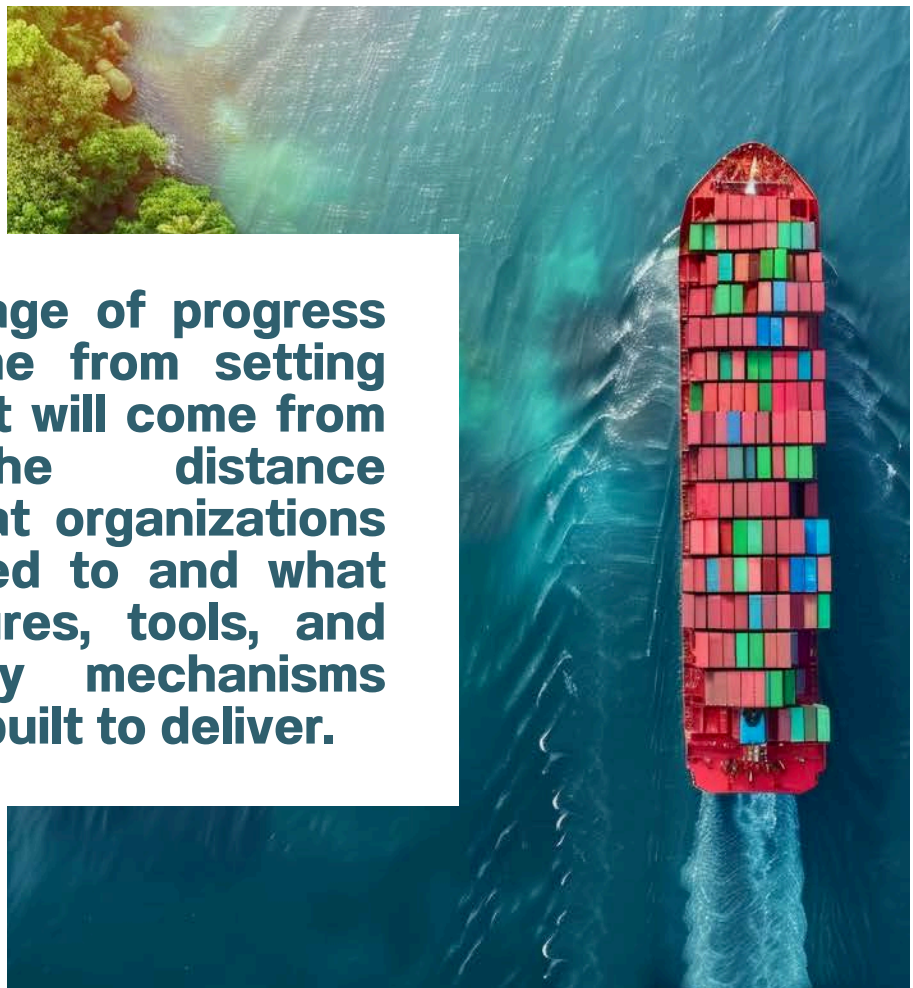


The next challenge is to ensure that AI-enabled efficiency gains translate into measurable net environmental benefits. In freight, the gap takes a different form. Efficiency methods are working and widely deployed, but 43% of fleets still run mostly or entirely on diesel. That transition is also unfolding differently across regions. Europe is being pulled forward by a clearer policy and infrastructure environment, reflected in stronger battery-electric and hydrogen engagement and a far more positive response to recent policy changes. In North America, the issue is less resistance than uncertainty: many operators remain unclear about what shifting policy signals mean for long-term investment, leading some to move ahead selectively while others delay commitment.

Scope 3 measurement and supplier collaboration are both expanding, which represents genuine progress. But the underlying data infrastructure remains fragmented: spreadsheets continue to sit alongside dedicated carbon accounting systems, while the ability to translate better measurement into consistent emissions reduction across the value chain remains uneven. Organizations are measuring more and engaging suppliers more actively; the next challenge is turning that growing visibility into more continuous and effective emissions management.

The picture that emerges is of a sustainability agenda that is broadening in ambition but unevenly supported by the governance, technology, and measurement systems needed to execute it.

The next stage of progress will not come from setting more goals. It will come from closing the distance between what organizations are committed to and what their structures, tools, and accountability mechanisms are actually built to deliver.



APPENDICES

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This project is made possible by the generous efforts of a group of dedicated contributors and collaborators.

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CO2 AI x Dassault Systèmes

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