

Transition Finance Tracker







A quarterly report on financing the
shift to a low-carbon economy

Third quarter 2025



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Foreword

Private-sector investors continue to power the energy transition, signaling that investors have decided they can make money in low-carbon technologies.

They just have to be smarter about where and when. As Henry Fernandez, MSCI's chairman and CEO, [noted to global investors recently](#), "the transition will lead to many winners and many losers, and they're all in your portfolio today."

The opportunity set may be broadening. Climate investment runs across regions but has recently shifted toward both Europe and the Asia-Pacific region as the transition drives demand for new solutions throughout the value chain.

At the same time, the private sector is being forced to play defense. Extreme weather, amplified by a warming world, is already costing companies. As we show in this report, risks ranging from dangerous heat to flooding could cost listed companies as much as USD 1.3 trillion over the next year based on estimates of damage to assets and lost revenue. Companies are making investments to protect their operations and people, creating unavoidable demand for new products and solutions.

The risks of a warming world are likely to intensify. Most corporate risk officers, investors and climate scientists say they expect average global temperatures to rise around 2.8°C (5°F) above preindustrial levels this century, exceeding the science-based threshold for preventing the costliest warming.

The evidence backs their expectations. We estimate that the emissions trajectories of the world's listed companies in aggregate would take the world to 2.7°C (4.9°F).

Can the world reverse course? The vast ambitions of the Paris Agreement have yet to be reflected by all signatory countries, based on their nationally determined contributions and country transition plans. Regardless of formal statements, the credibility and stability of country policies are now in question, as governments reflect geopolitical developments and domestic concerns.

Private-sector investors, in turn, have had to recalibrate just how far ahead finance can lead a transition that is not happening on the ground as fast as hoped and anticipated. As Martin Moloney, deputy secretary general of the Financial Stability Board asked ahead of Eurofi's Financial Forum in September, "Does the financial sector need a new vision of its role in the transition to net-zero?"

"When undertaking a complex course of action, sometimes the last thing people want to hear is the voice telling them the plan needs to be adjusted," he noted. "When dealing with climate, there is a fear that 'climate change denial' hides behind every critical voice."

The policy signals that private-sector investors seek will skew more domestic than multilateral. The calculus for allocating climate investments increasingly builds in policy resilience against headwinds and tailwinds for different technologies and sectors in each jurisdiction.

Where multilateral coordination must still lead to unleash private-sector capital is in enabling emissions trading under Article 6 of the Paris Agreement. The costs of reducing emissions in countries and companies in developed markets will escalate as the easiest decarbonization opportunities are achieved. But the opportunity to deliver decarbonization at a lower cost while helping emerging economies depends on clear policies and consistent standards that can incentivize private-sector investors to participate. Harmonizing carbon markets will be an objective for COP30 that is essential for unlocking investment.

Geopolitics, artificial intelligence, macroeconomic shifts and domestic challenges all compete for investor attention. The energy transition and the physical impacts of our changing climate and natural world are interlinked with these themes, complicating the path toward a fast, resilient and inclusive transition. Yet it is precisely the systemic nature of the challenges that ultimately are driving the mainstreaming of climate considerations into investment decisions.



Linda-Eling Lee

Founding Director,
MSCI Institute

Highlights

1. Climate capital proves sticky.

Assets in public climate-themed funds rose nearly 12% in the first nine months of the year, to USD 625 billion, extending the double-digit growth of recent years after a rapid expansion of investment between 2018 and 2021.

2. Transition opportunities are expanding globally.

European companies' share of assets in climate-themed funds rose 8 percentage points since the start of the year, while the share of assets in Asia-Pacific companies climbed 7 points. The share of climate-themed assets in U.S. companies fell nearly 12 points over the same period, compared with a 3-percentage-point drop in the weight of U.S. stocks within the MSCI ACWI Index. China-listed companies dominate clean-tech revenue leadership, while the country now holds an overwhelming share of renewable energy patents.

3. Corporate progress continues.

One-fifth (21%) of listed companies have set a climate target validated by the Science Based Targets initiative, as of Sept. 30, 2025, up from 15% a year earlier. Companies with climate targets have demonstrated a track record of holding down emissions, versus those without.

4. Investment in resilience is becoming unavoidable.

The world's listed companies could lose USD 1.3 trillion from physical climate hazards over the next year, reflecting both direct asset damage and lost revenue opportunities. Most corporate risk officers, investors and climate scientists say they expect average global temperatures to rise around 2.8°C (5°F) this century, exceeding the threshold for preventing the costliest warming.

5. Countries make strides in emissions trading.

More than 30 countries have reached agreements to implement bilateral trading of emissions reductions under Article 6 of the Paris Agreement. Much work remains to realize the promise of Article 6 in scaling investments from both the public and private sectors.

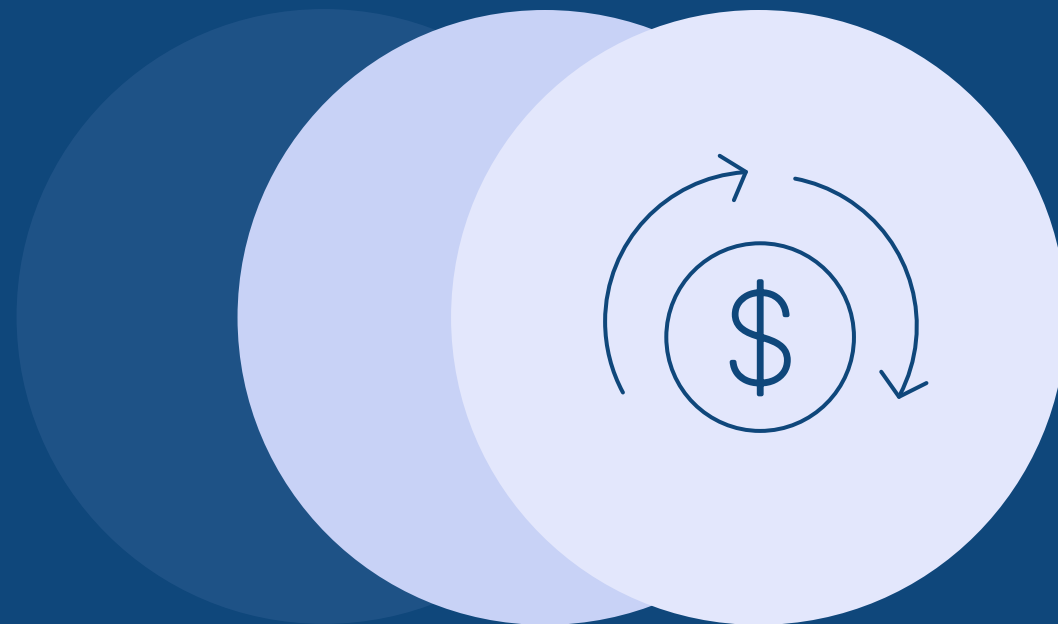
6. Private-sector investment is essential.

Private-sector investment accounted for 57% of total project finance over the six years ended 2023, the latest year for which data is available.

Financial flows

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Third quarter 2025

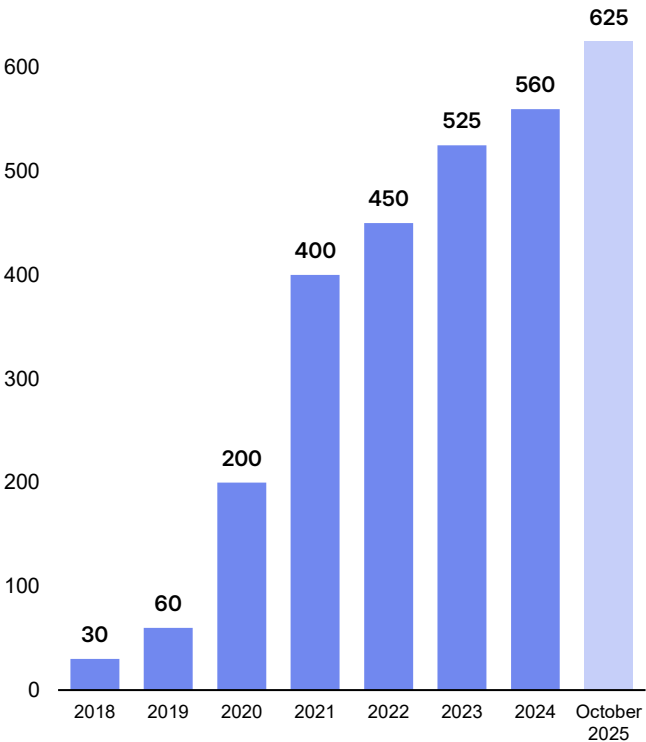


Climate capital across asset classes

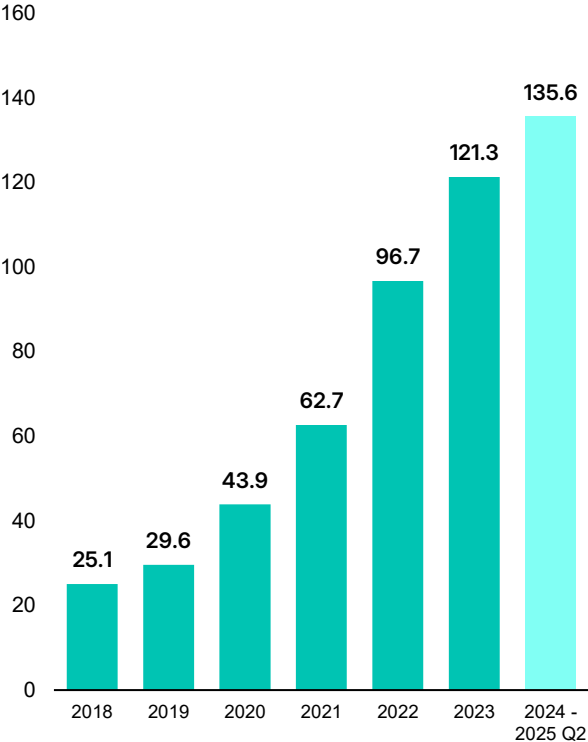
- Climate-themed funds have expanded rapidly across both public and private markets in recent years, reflecting growing investor interest in the energy transition and decarbonization opportunities across asset classes.
- Assets in public climate-themed funds rose nearly 12% in the first nine months of the year, to USD 625 billion, extending the double-digit growth of recent years after a rapid expansion of investment between 2018 and 2021.
- As of June 30, 2025, there were about 228 climate-named private capital funds globally — including private equity, private credit, infrastructure and venture capital — with combined capitalization of about USD 136 billion.
- Private-capital climate funds launched between 2022 and June 30, 2025, represented 37% of the total private-climate fund count and accounted for about 54% of the cumulative capitalization.

Capital in climate funds (USD billion)

Publicly traded climate funds (assets under management)



Private climate funds (cumulative capital raised)



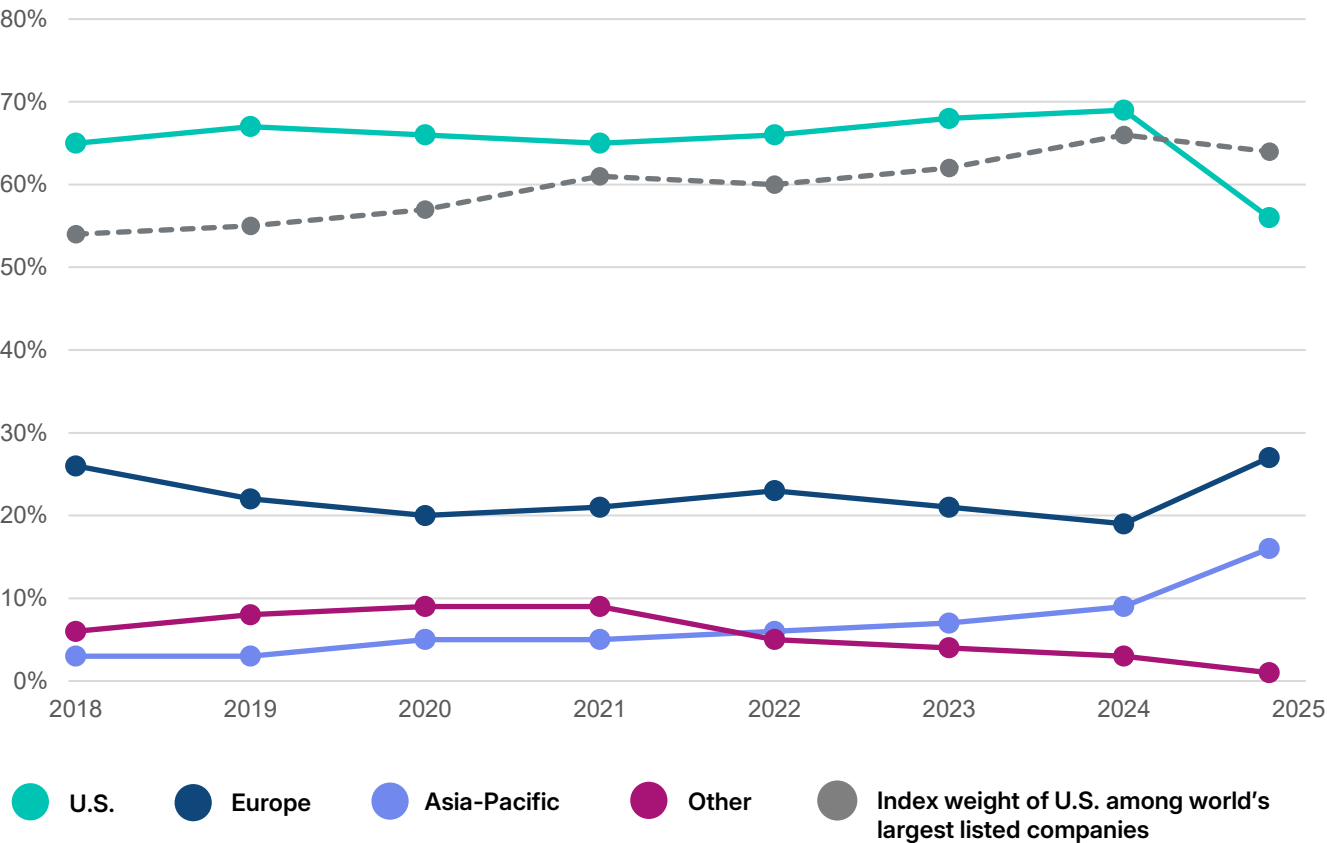
Source: MSCI ESG Research and MSCI Private Capital Universe. Public funds data as of Sept. 30, 2025. Private funds data as of June 30, 2025. Public funds include equity and fixed income ETFs and mutual funds. Private funds include private equity, private credit, and private real assets funds.

Transition opportunities are expanding globally

- Investment in public climate-themed funds remains concentrated in U.S.-based companies. This year, however, investors have moved part of that capital elsewhere, with companies in Europe and Asia emerging as the main beneficiaries.
- European companies' share of assets in climate-themed funds rose 8 percentage points since the start of the year, while the share of assets in Asia-Pacific companies climbed 7 points.
- The share of climate-themed assets in U.S. companies fell nearly 12 points over the same period, compared with a 3-percentage-point drop in the weight of U.S. stocks within the MSCI ACWI Index.

New

Investments of climate-themed funds by region (%)

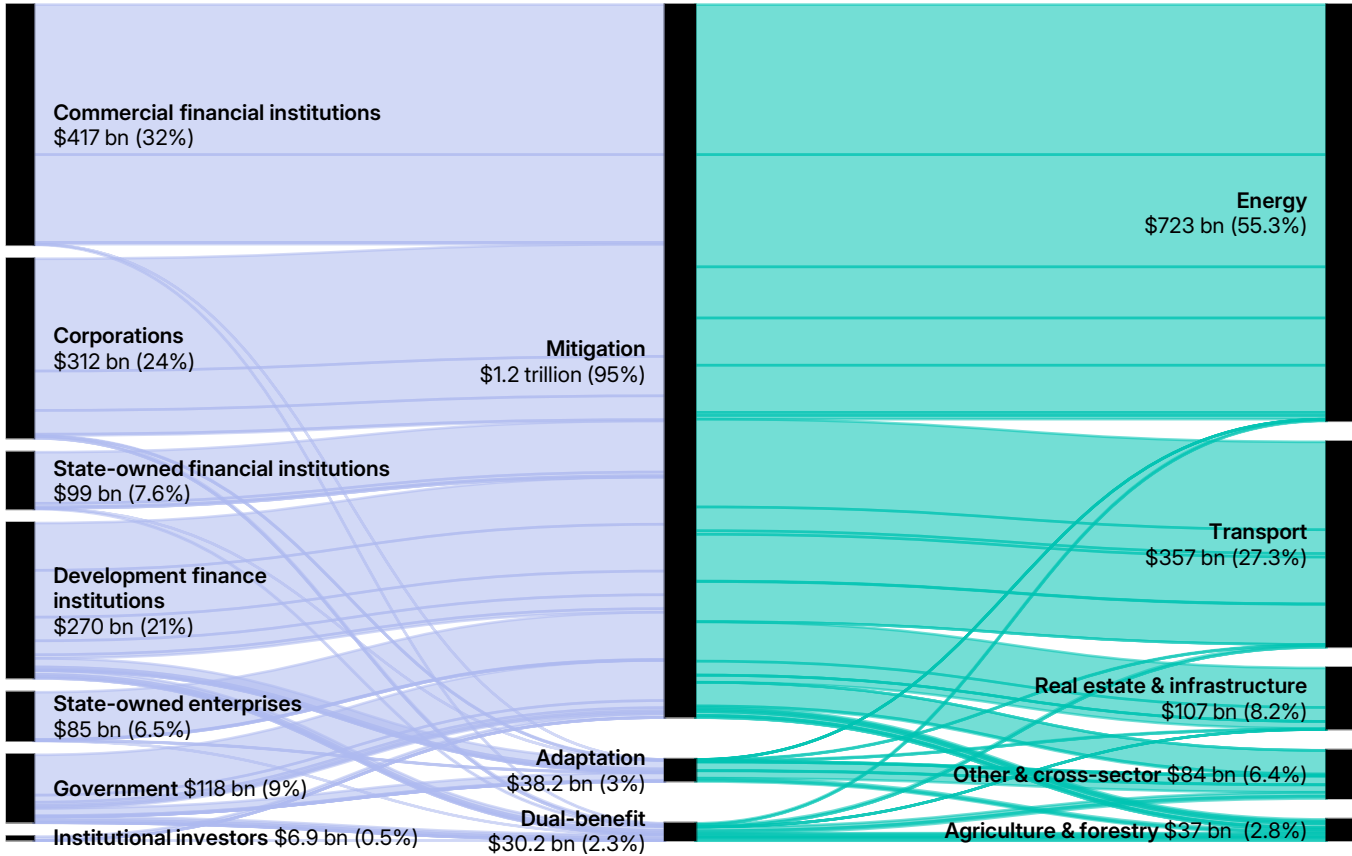


Source: MSCI ESG Research, data as of Sept. 30, 2025.

Climate finance sources and sectors

- Climate project finance, which comprises investment in mitigation and adaptation projects globally, totaled about USD 1.9 trillion in 2023, the latest year with full data available, as estimated by Climate Policy Initiative. The estimate includes both direct investment as well as capital flows from project financing (including projects combining concessional and commercial capital), balance-sheet financing (such as from companies' own funds or borrowing) and grants.
- The diagram shows the origin and flow of project finance for five carbon-intensive areas: energy, transport, real estate and infrastructure, agriculture and forestry, together with cross-sector flows, totaling a combined USD 1.3 trillion. The left column shows entities putting money into project finance, the middle section describes the use of the money, and the right shows the receiving sectors.
- About one-third of project finance originated from commercial financial institutions and private-sector institutional investors. Corporations contributed nearly one-quarter (24%) through capital expenditures and other investments in climate mitigation and adaptation. Governments, directly or via state-owned institutions and enterprises, provided roughly 23% of total investment, while development finance institutions accounted for about one-fifth (21%).

Climate project-finance flows (USD)



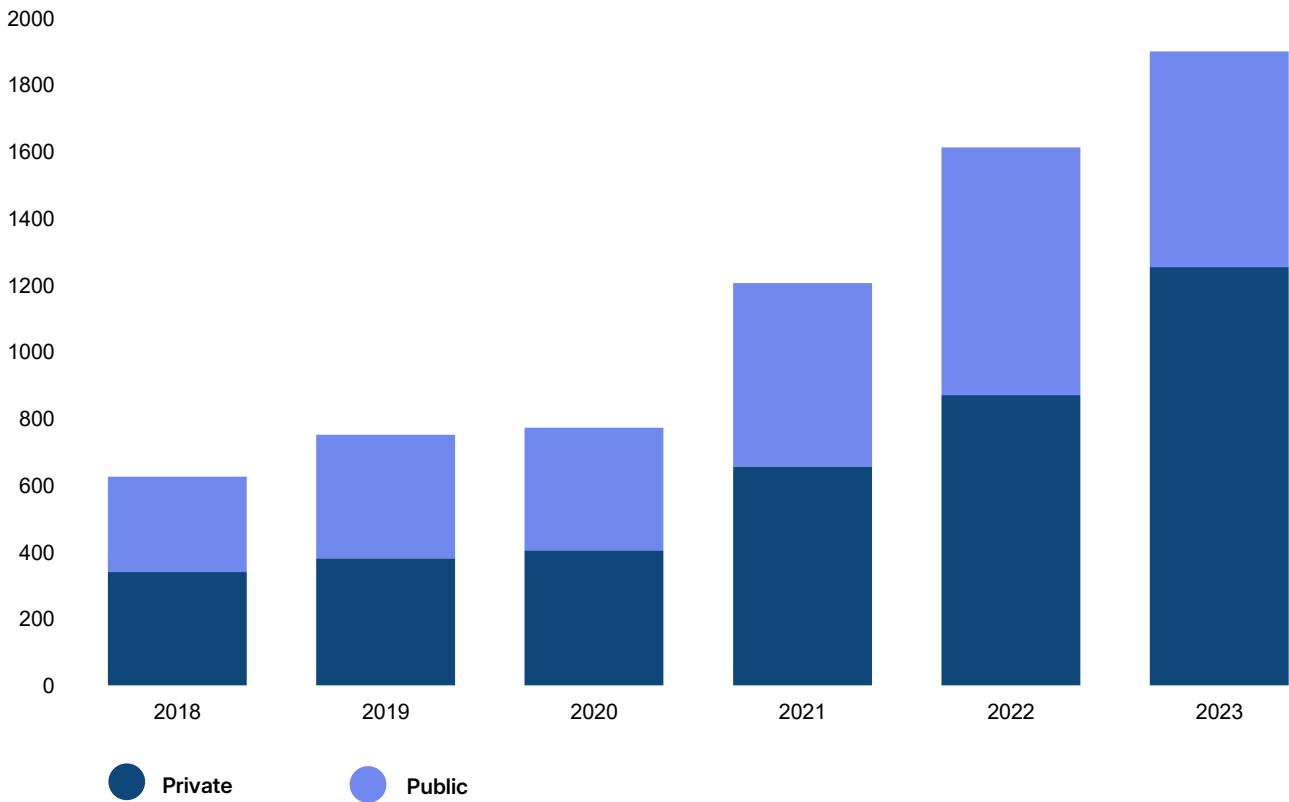
Source: MSCI Institute, adapted from the Climate Policy Initiative

The essential role of the private sector in climate project finance

- Between 2018 and 2023, public- and private-sector investment in climate mitigation and adaptation through project finance totaled an estimated USD 1.9 trillion, according to data from the Climate Policy Initiative.
- Private-sector commitments expanded rapidly, recording a compound annual growth rate (CAGR) of roughly 30%, compared with 18% for public-sector finance. Over the six-year period, private-sector investment accounted for 57% of total project finance.
- About one-third of project finance originated from commercial financial institutions and private-sector institutional investors.

New

Investment in climate project finance (USD billion)

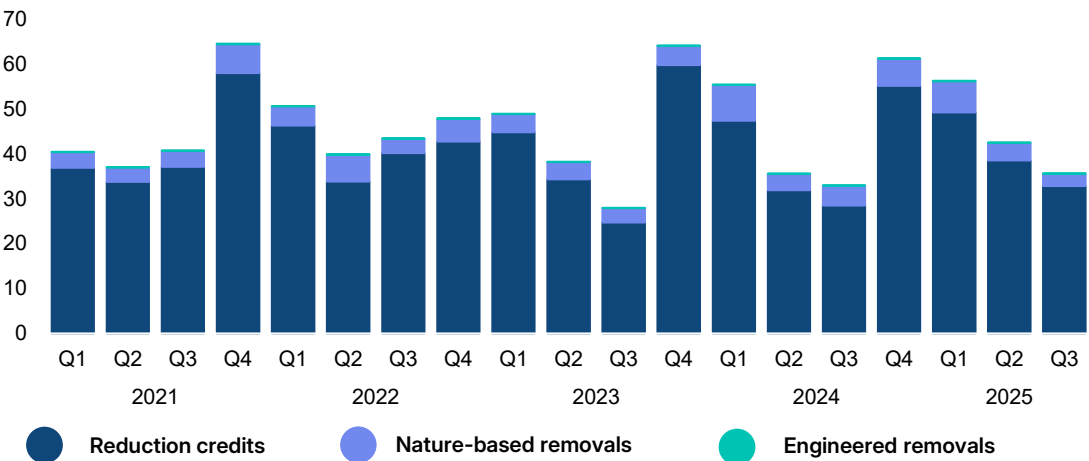


Source: Climate Policy Initiative

Tracking demand for carbon credits

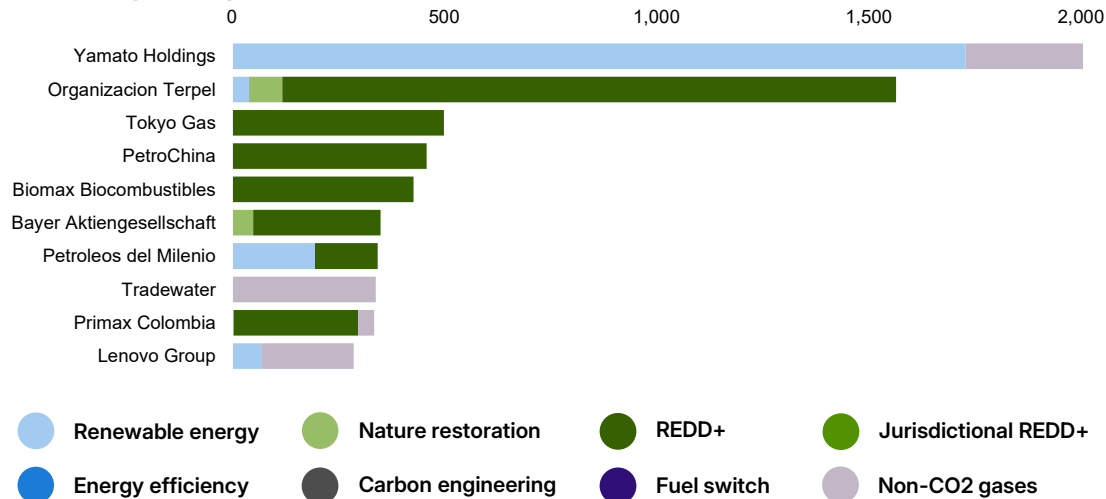
- Companies retired 36 MtCO₂e of carbon credits during the third quarter of 2025, down 16% from the prior quarter and up 8% from the same period a year earlier. (Retiring a carbon credit means it is taken out of circulation to indicate that the one tonne of emissions reduction or removal it represents has been claimed.) Despite the quarter-on-quarter decline, retirements in the first nine months of 2025 remain the highest on record.
- More than 90% of retirements in the quarter came from projects that reduce emissions, rather than those that remove them from the atmosphere. Among retired removal credits, the vast majority originated from nature-based projects, while engineered removals continued to represent a small share of total retirements.
- Japanese transport company Yamato Holdings, Colombian refiner Terpel, and Tokyo Gas topped the list of companies retiring the most credits in the quarter.

Amount of carbon credit retirements disclosed quarterly, by type (MtCO₂e)



Source: MSCI Carbon Markets, data as of Sept. 30, 2025, based on data from ACR, ART, BioCarbon, CAR, Cercarbono, Climate Forward, CDM (NDC eligible credits only), GCC, Gold Standard, Plan Vivo, Puro Earth and Verra.

Top 10 companies, by amount of carbon credits announced for retirement, Q3 2025 (tCO₂e)

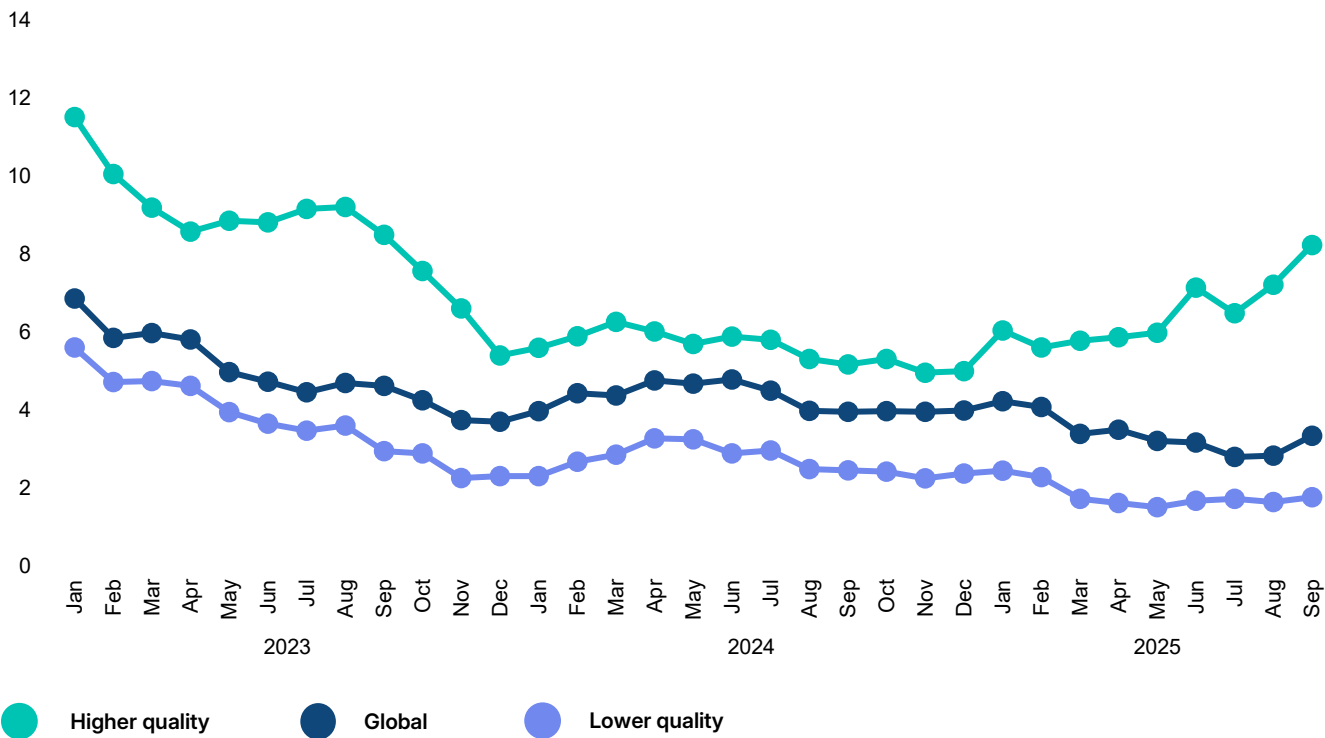


Quality matters

- MSCI Global Carbon Credit Price Index averaged USD 3.0/tCO₂e in the third quarter, down 9% from the previous quarter and 28% lower year-on-year, continuing the downward trend across the broader voluntary carbon market.
- Higher-quality credits (MSCI Global Rated BBB and Above Carbon Credit Price Index) rose to USD 7.3/tCO₂e, an increase of 16% quarter-on-quarter and 35% higher than a year earlier, highlighting sustained demand for premium, verifiable projects.
- Lower-quality credits (MSCI Global Rated BB and Below Carbon Credit Price Index) averaged USD 1.7/tCO₂e, up 7% from the prior quarter but 35% below the same period last year, underscoring the persistent discount applied to lower-rated and legacy credit types.

New

Monthly average carbon credit prices by integrity (USD/MtCO₂e)

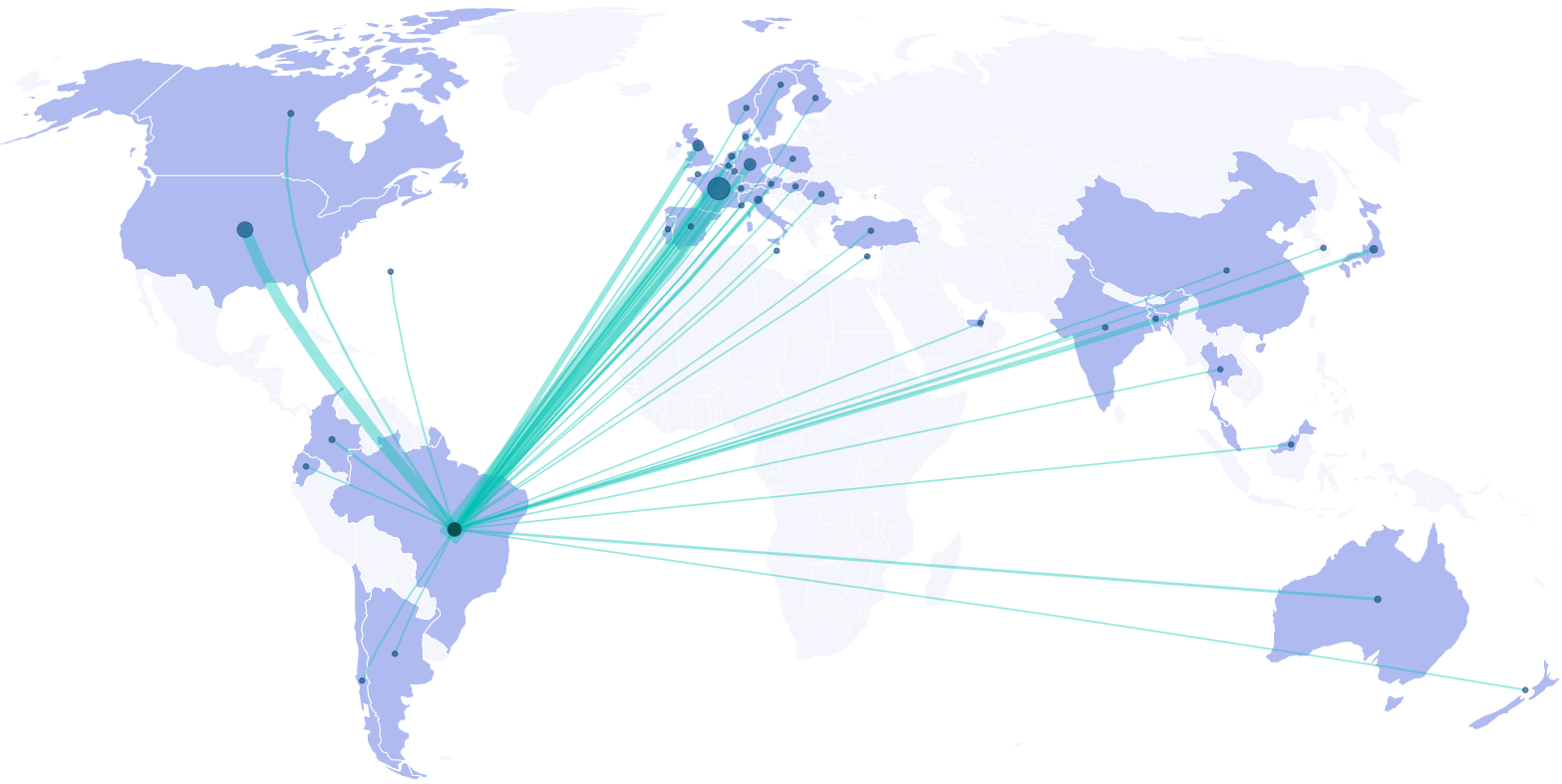


Source: MSCI Carbon Markets, data as of Sept 30, 2025. Note includes both exchange and over-the-counter trades and asks. Volume-weighted averages are weighted by reported volumes of asks and transactions, with asks given a lower weighting.

Connecting carbon projects to credit retirements: Brazil

- Retirements highlight the flow of carbon credits to corporate buyers or governments in developed countries from carbon projects in developing economies.
- In 2024, companies from more than 40 countries, for example, retired a total of 9 million carbon credits from nature-based projects in Brazil.
- Companies headquartered in France, the U.S. and Germany purchased more than 50% of nature-based credits from Brazil in 2024. Note, however, that not all credits from nature projects in Brazil leave the country. Last year, 1.4 million of them were retired by companies headquartered in Brazil itself.

Global destination of Brazilian nature-based credits used by corporates



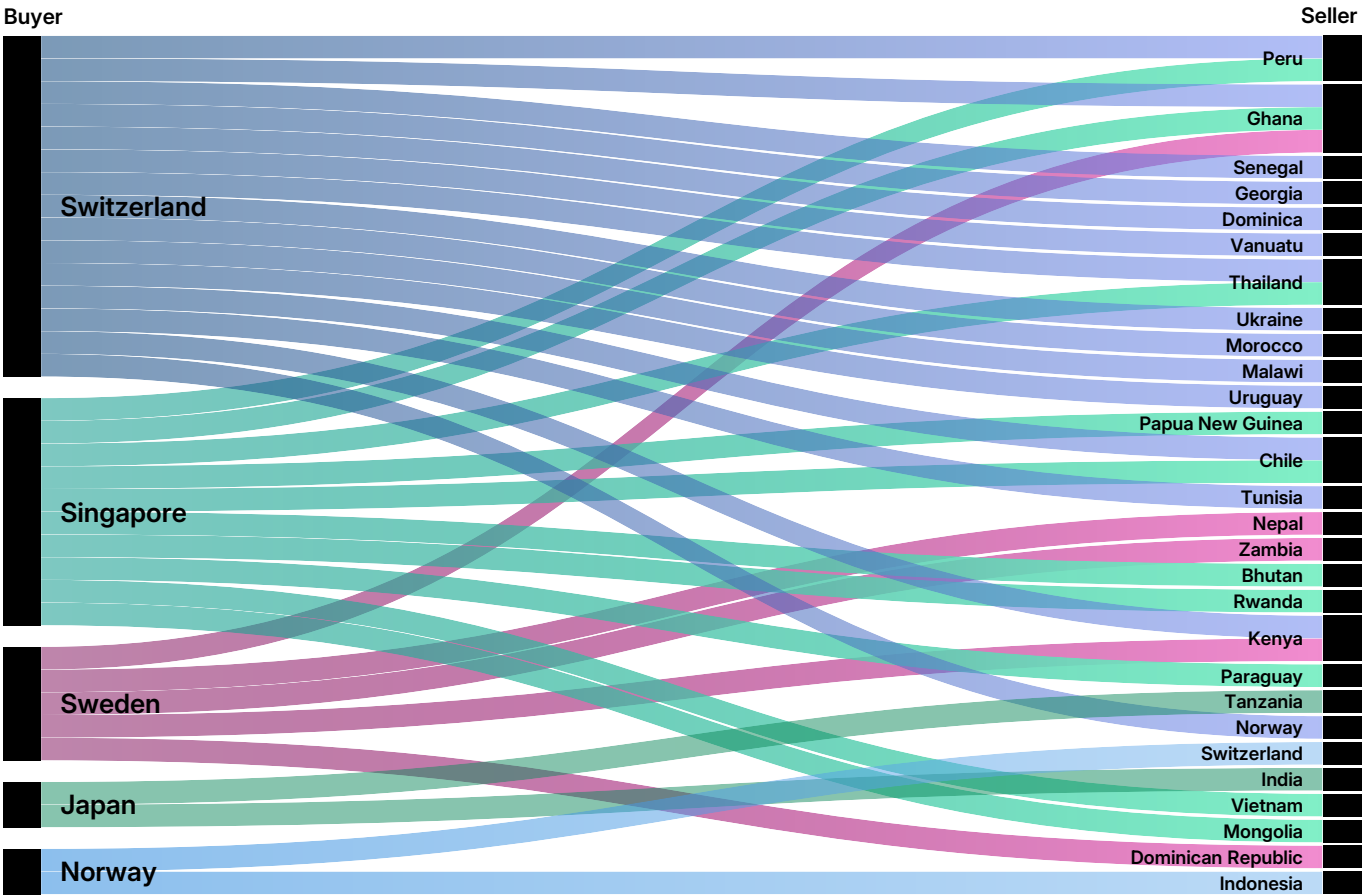
● Dot size and — line thickness are relative to total retired volume by companies headquartered in the destination country

Source: MSCI Carbon Markets, data as of Sept. 30, 2025.

Carbon trading between countries

- The foundations for carbon trading between countries are falling into place. The diagram shows the more than 30 seller countries that have reached so-called implementing agreements under Article 6.2 guidelines, as of Sept. 30, 2025, with Switzerland, Singapore, Sweden, Japan and Norway emerging as key buyers, and a broad mix of African, Asian and Latin American nations acting as sellers.
- At the same time, Article 6 has yet to attract private finance at the needed scale. According to market participants at [a forum MSCI hosted in September](#), realizing the promise of Article 6 will require a set of actions that start with governments sending clear signals on purchasing commitments, seller countries strengthening their regulatory environment, and both sellers and buyers standardizing national approaches.
- Forum participants further agreed that governments and institutions should demonstrate consistent commitment to high-integrity standards, transparent authorization processes, and credible monitoring systems that assure investors of stability and that their capital contributes to genuine climate outcomes.
- Country climate commitments, expressed in nationally determined contributions for 2035, provide an opportunity for countries to communicate plans to use the Article 6 market to meet a portion of their climate goals.

Article 6.2 implementing agreements



Source: MSCI Carbon Markets, data as of Sept. 30, 2025.

Physical risk & nature

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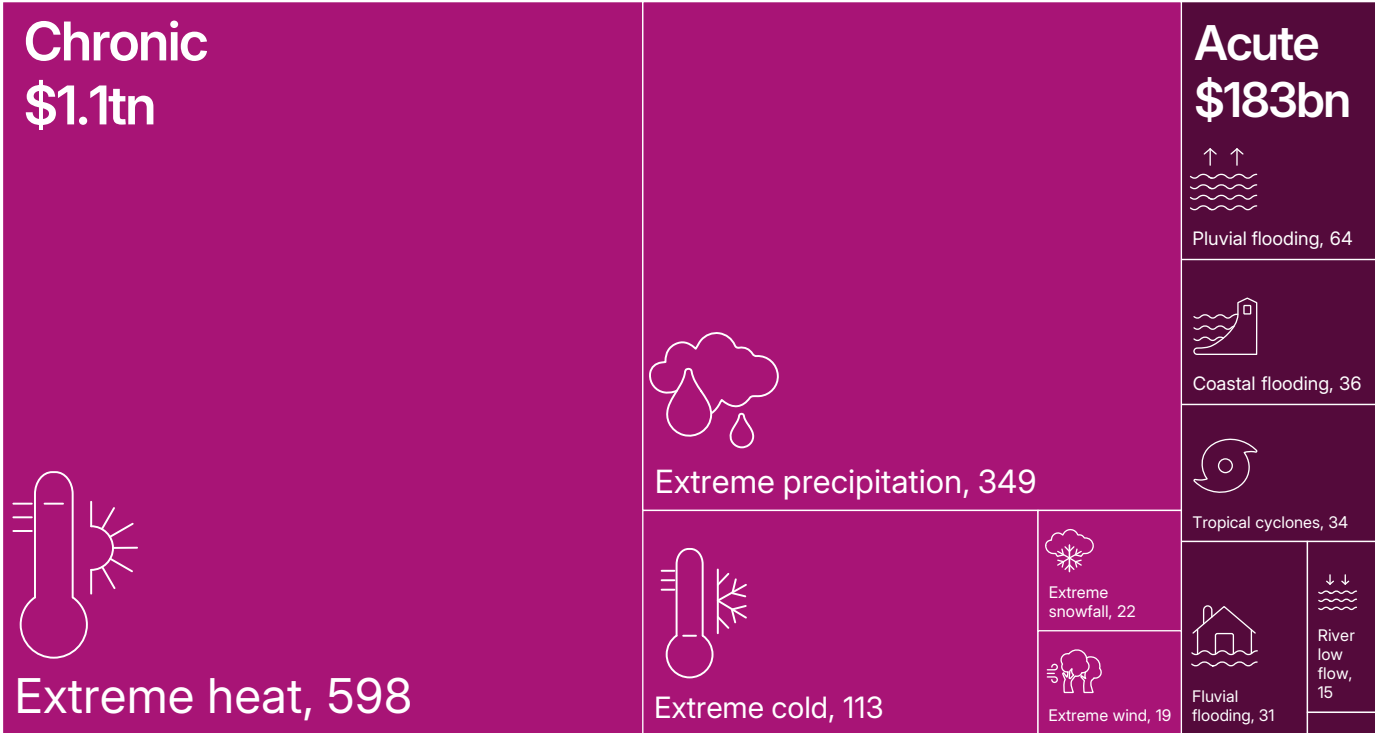
The bill is coming due

- Physical risk affects companies in the present, not in a hypothetical future. The world’s listed companies could face total losses of about USD 1.3 trillion from physical climate hazards over the next year, [according to MSCI analysis](#). These losses reflect estimates of direct asset damage and lost revenue opportunities.
- Acute hazards such as wildfires and hurricanes often dominate headlines, but chronic risks, including extreme heat and record rainfall, account for the majority (86%) of annual losses. The figures shown here are measured against a scenario without asset damage, productivity declines or operational disruptions from physical hazards.
- While companies have long faced physical losses, the accelerating upward trend in a warming world underscores their growing financial significance. For governments and investors, understanding this exposure requires analyzing companies’ facilities and dependencies at fine geographic scales.

New

How much physical risk could cost listed companies over the next year
(average annual loss, USD billion)

Total: \$1.3tn



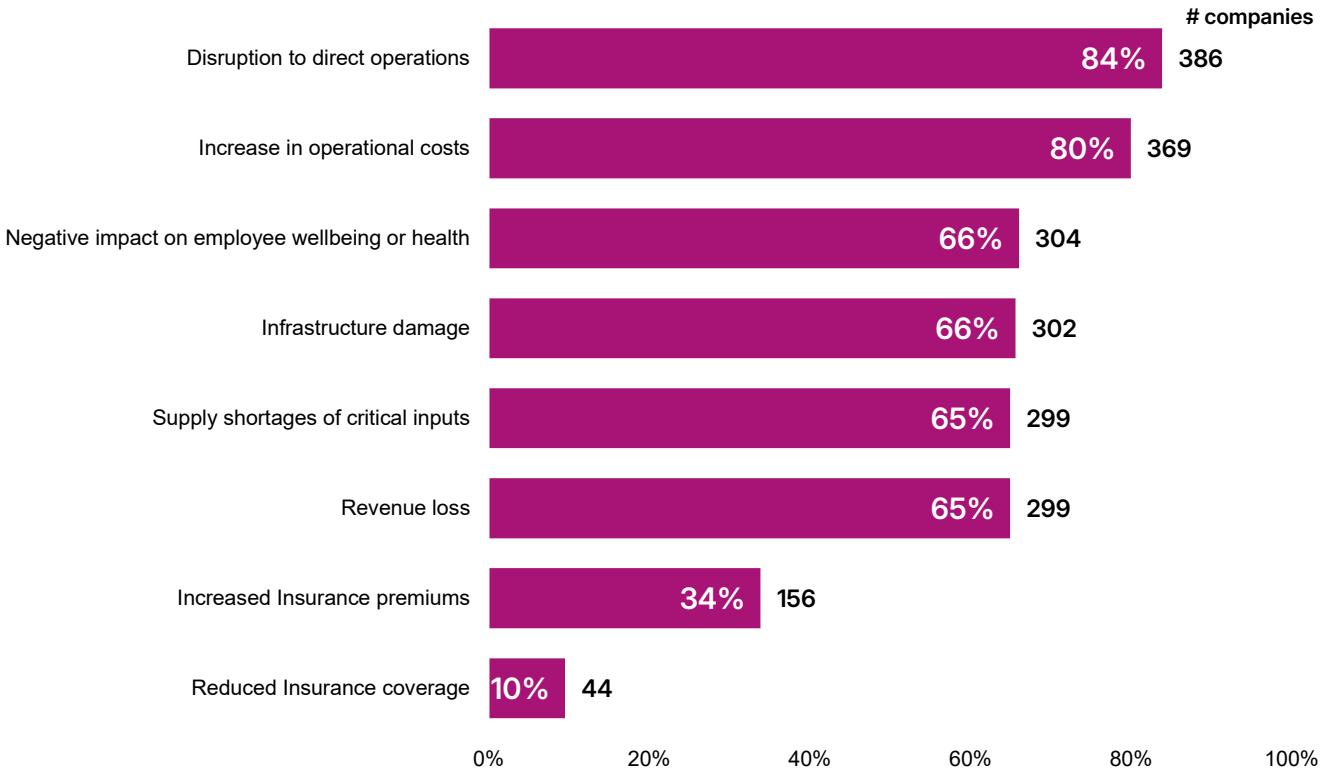
Source: MSCI ESG Research, based on data from MSCI's Physical Risk Metrics - Issuer Level, spanning the 9,350 companies in the MSCI Climate Change Metrics universe as of Aug. 22, 2025. Average annual loss (AAL) estimates do not reflect tail risk and extreme losses.

Companies feel the heat

- According to a survey by the MSCI Institute of risk, finance and operations officers at 550 listed and unlisted companies worldwide, a large majority of firms said that extreme weather events such as dangerous heat and flooding have disrupted operations or increased their operational costs.
- Two-thirds of respondents said such hazards have affected worker well-being, damaged critical infrastructure or reduced revenue. More than one-third (34%) of companies reported higher insurance premiums.
- The survey results highlight how extreme weather events can pose a systemic challenge, impacting companies across sizes, industries and geographies, and eroding business performance in multiple ways.

New

What has been the impact of severe weather events on your operations?



Source: MSCI Institute Corporate Resilience Survey, September 2025.

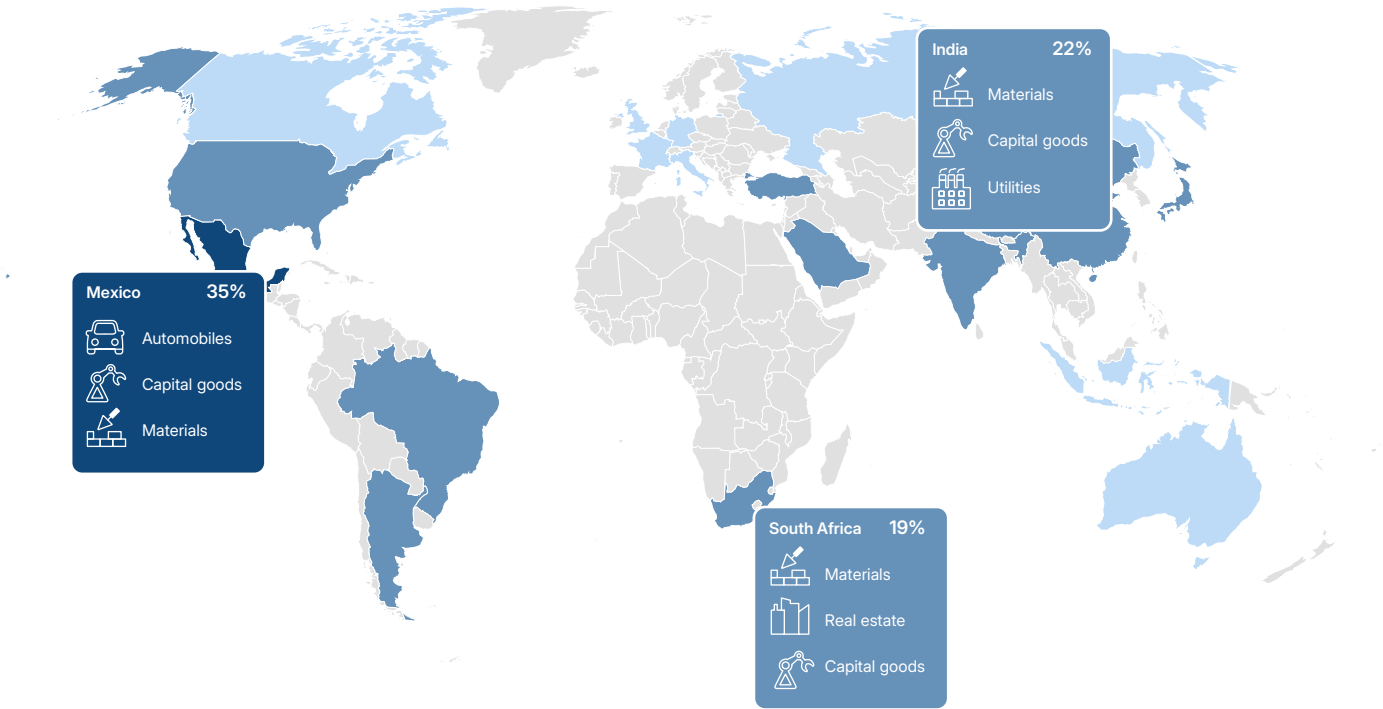
New

Water hazard

- Sustainable water management will feature prominently on the agenda at both COP30 and at a United Nations Water Conference scheduled for December 2026.¹ Conservation of water and restoration of wetlands lie at the core of both climate and biodiversity goals, as well as the UN Sustainable Development Goals, which aim to ensure clean water and sanitation for all.²
- As shown on the map, assets belonging to listed companies in several G20 countries are in areas at high risk of water depletion, water stress or inadequate surface and groundwater availability (collectively water-availability risk), based on the World Wide Fund for Nature’s Biodiversity Risk Filter.
- More than one-third (35%) of listed-company assets in Mexico are in areas of high water-availability risk, along with nearly 22% in India and nearly 19% in South Africa, followed by Saudi Arabia (13.4%) and Turkey (11.3%). Major economies such as the U.S., China and Japan also have around 10% of assets in high-risk areas. The data underscores that water-availability risk varies sharply by geography, with concentrations in regions already prone to scarcity.

1. United Nations Water Conference, United Arab Emirates, 2026
2. Goal 6: Ensure access to water and sanitation for all, UN Sustainable Development Goals

Locations of listed-company assets exposed to high water-availability risk

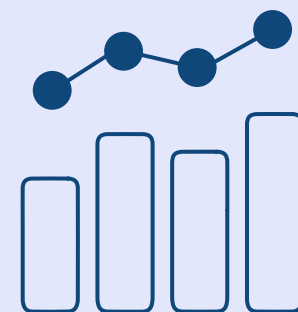


Source: MSCI ESG Research, based on data from the WWF Biodiversity Risk Filter 2.0, as of Sept. 30, 2025.

Transition

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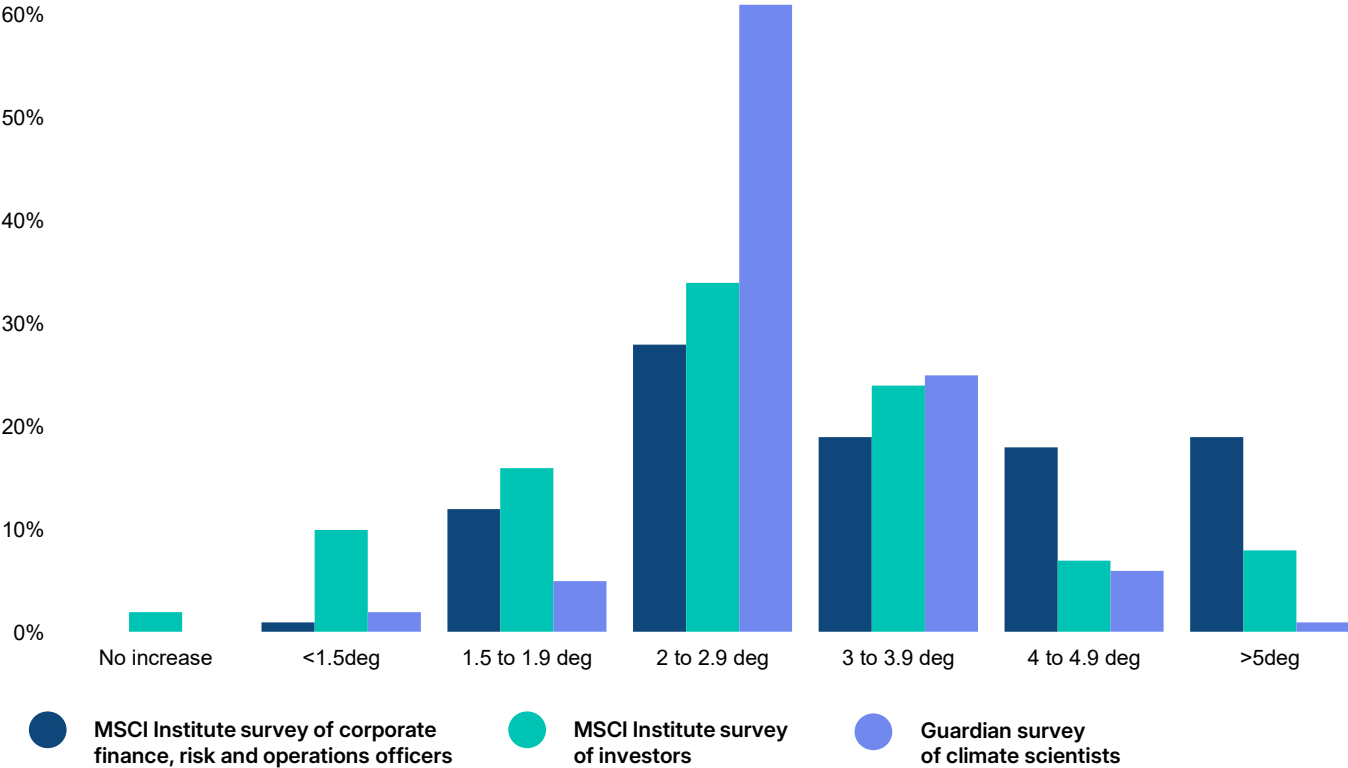
New

Consensus on warming

- There is broad consensus that temperatures will rise but opinions vary on the magnitude. The chart compares the results of our Institute’s September 2025 survey of corporate risk, finance and operations officers worldwide, with [our 2024 global investor survey](#) and a 2024 Guardian newspaper survey of climate scientists.¹
- The average expected temperature rise in 2100 is consistent across all three groups at around 2.8°C (5°F). A greater number of companies and investors assign higher probability to warming of more than 4°C.
- While most corporate officers say they expect temperature rise of 2.8°C, roughly equal shares (19%) of companies expect temperatures higher than 3°C, 4°C and 5°C, respectively. For their part, most investors anticipate warming between 2 and 4.9°C, while climate scientists express a much wider distribution of outcomes.

1. “World’s top climate scientists expect global heating to blast past 1.5C target,” The Guardian, May 8, 2024.

Most likely global temperature increase by 2100 (% of respondents)



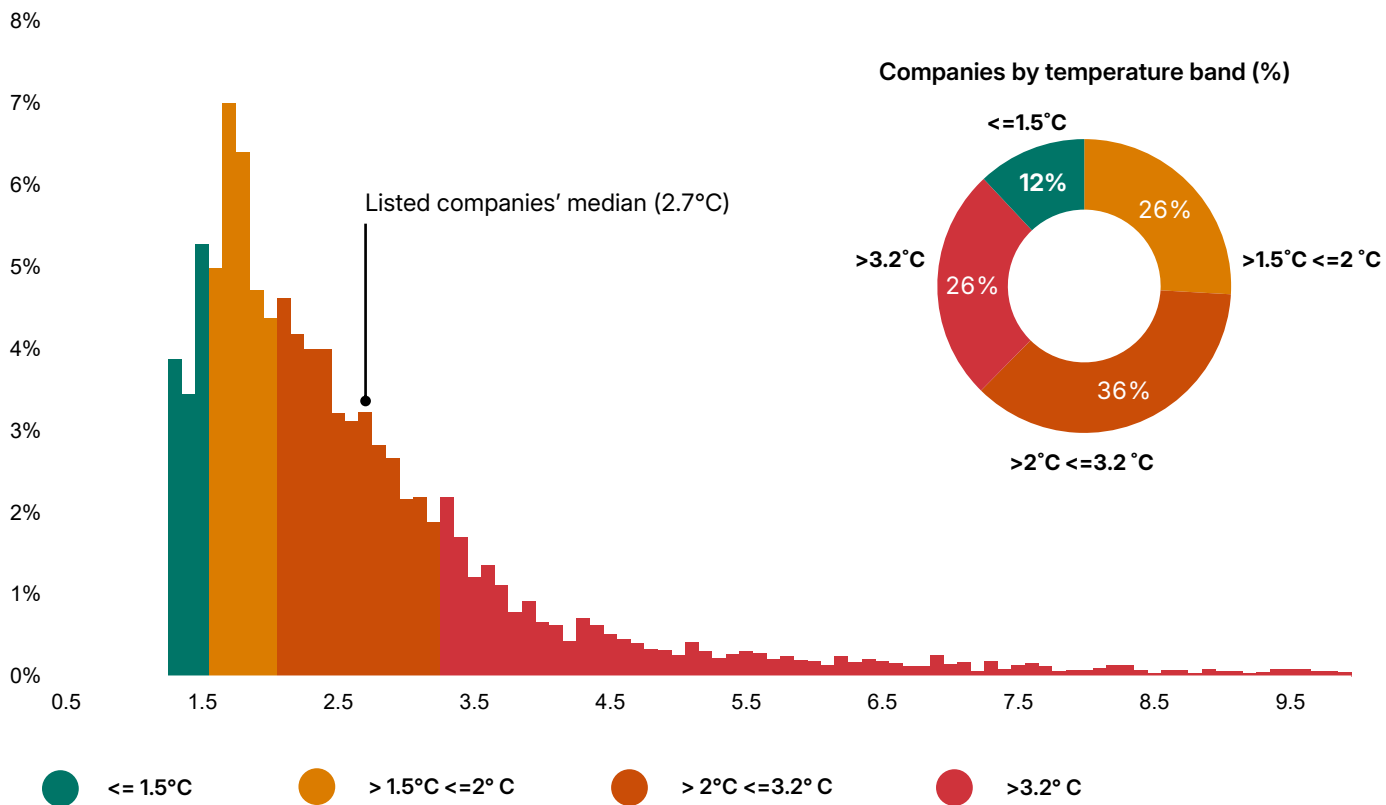
Source: MSCI Institute Corporate Resilience Survey, September 2025, and Global Investor Survey, 2024. Survey of climate scientists by The Guardian newspaper.

Temperature check: Listed companies

- The emissions trajectories of the world’s listed companies imply warming of 2.7°C (5°F) above preindustrial levels this century, based on their aggregate emissions, sector-specific carbon budgets and climate targets as of Sept. 30, 2025.
- Twelve percent of listed companies aligned with projected warming of 1.5°C (2.7°F) or less, while an additional 26% aligned with warming between 1.5°C and 2°C (3.6°F). Sixty-two percent of listed companies are on an emissions trajectory that would breach the 2°C threshold, including 26% of companies whose trajectories would exceed 3.2°C (5.8°F).
- Our extrapolation relies on MSCI’s Implied Temperature Rise, a forward-looking climate-impact metric that financial institutions use to assess the alignment of portfolios with global climate goals.
- Though MSCI Implied Temperature Rise is an issuer-based, investor-focused model, it finds the aggregate temperature alignment of listed companies correlates closely with policy-based projections such as those of the U.N. Environment Program, which currently estimates that existing national policies put us on a path to warming between 2.6°C and 3.1°C above preindustrial times, depending on the trajectory of countries’ national climate commitments.



Projected temperature alignment of the world’s listed companies (Implied Temperature Rise in °C)



Source: MSCI ESG Research, data as of Sept. 30, 2025. Not index weighted. The dataset used in this estimate comprises roughly 95% of ACWI IMI constituents, as roughly 5% of constituents lack data that would allow us to compute the relevant measures.

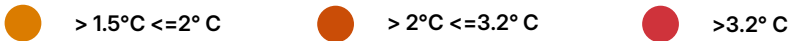
Comparing temperature alignment: Companies vs. countries

- Countries’ climate progress reflects differences in decarbonization targets, historical emissions, domestic politics and the constraints of carbon budgets. We estimate countries’ temperature alignment using MSCI’s Sovereign Implied Temperature Rise model, which considers greenhouse gas (GHG) emissions produced within a country’s borders (Scope 1).¹ In line with recommendations from the Institutional Investors Group on Climate Change and others, the model applies a fair-share approach, allocating proportionally larger carbon budgets to less-developed countries to reflect the trade-off between decarbonization and economic growth.²
- The table compares the emissions trajectories of listed companies domiciled in the G20 with the emissions trajectories of their respective countries. Companies domiciled in Saudi Arabia, such as the oil giant Saudi Aramco, for example, have a much higher estimated warming than the country itself due to emissions from exported oil that occur abroad, where those emissions become the Scope 1 emissions of importing countries. India’s national emissions correspond to a 1.9°C warming trajectory, roughly 40% lower than that implied by its listed companies. Other emerging markets, including Brazil, Indonesia, and South Africa, show similar patterns, reflecting both their larger allocated carbon budgets and lower per-capita emissions relative to advanced economies.
- National 2035 climate targets due this year may provide transition-focused investors with additional inputs for modeling sovereign-specific transition risks.

1. Significantly, the model does not consider emissions from the production of imported energy (Scope 2) or emissions from imported goods or services (Scope 3).
2. See “Sovereign Bonds and Country Pathways,” Institutional Investors Group on Climate Change, April 2024. For a summary of literature on the topic of fair-share budgets, see “Fair share,” Climate Action Tracker, available [here](#).

Projected temperature alignment of G20 countries and the listed companies based in them (Implied Temperature Rise in °C)

	ITR of domiciled listed companies	Sovereign ITR
China	3.7	3.8
Australia	3.2	3.4
Canada	2.6	3.3
Saudi Arabia	8.1	3.0
U.S.	2.7	2.9
Russia		2.6
Japan	2.4	2.3
Turkey	3.4	2.2
Italy	1.8	2.2
Brazil	3.5	2.1
Argentina		2.1
Indonesia	4.2	2.0
Mexico	2.0	2.0
Germany	2.0	2.0
India	3.2	1.9
France	2.3	1.9
South Africa	3.2	1.8
U.K.	2.4	1.8
South Korea	2.7	1.7



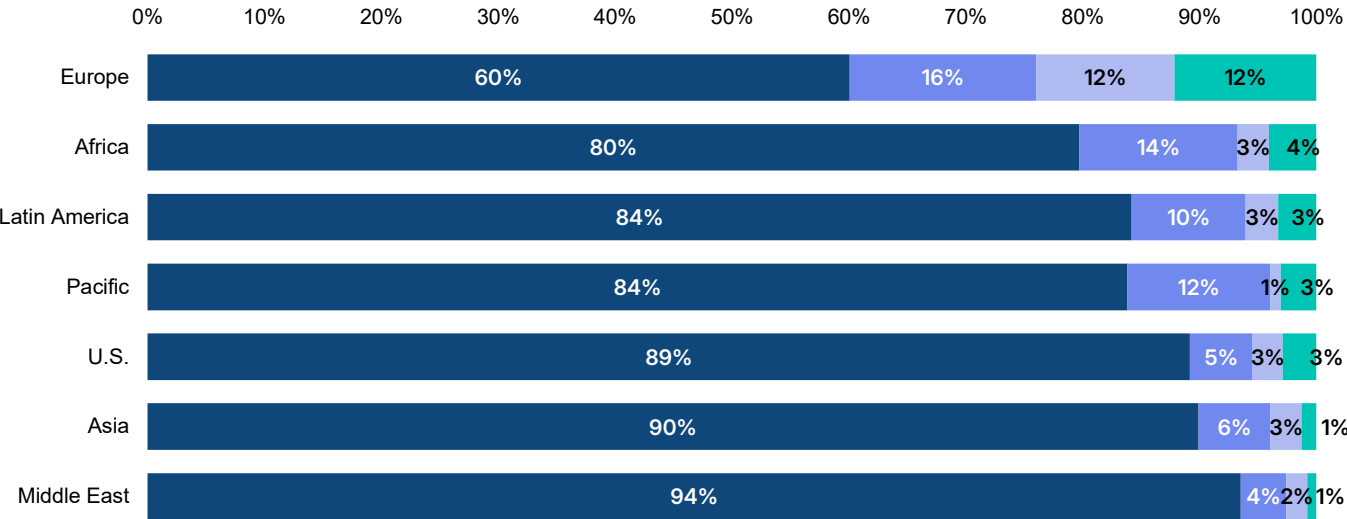
Source: MSCI ESG Research, data as of Sept. 30, 2025. The ITR of companies listed in Russia and Argentina is not shown because the securities of companies listed there are not included in the MSCI ACWI IMI.

Assessing alignment with a science-based pathway

- The Net Zero Investment Framework (NZIF) is designed to help institutional asset owners and managers analyze alignment of their investments with the low-carbon transition and develop climate strategies and plans in line with global goals.
- The voluntary framework, developed by the Paris Aligned Investment Initiative, a coalition of four investor networks, recommends a series of criteria for classifying companies into one of five categories representing a progression of alignment with science-based emissions trajectories that limit average global temperature rise to 1.5°C, ranging from “not aligning,” indicating the lowest degree of alignment with global climate goals, to “achieving net zero,” indicating full alignment.¹
- The chart categorizes the world’s listed companies according to the NZIF 2.0 maturity scale. It shows that degrees of regional alignment vary, with 24% of companies in Europe either aligning or aligned to a net-zero pathway, compared with 6% and 4% of their counterparts in the U.S. and Asia, respectively.

1. “Net Zero Investment Framework 2.0,” Institutional Investors Group on Climate Change, June 2024.

Listed companies by Net Zero Investment Framework 2.0 maturity scale category (%)



Source: MSCI ESG Research, data as of Sept. 30, 2025. The dataset used in this estimate comprises roughly 95% of ACWI IMI constituents, as roughly 5% of constituents lack data that would allow us to compute the relevant measures. Net Zero Investment Framework 2.0, Institutional Investors Group on Climate Change, June 2024.

The Net Zero Investment Framework 2.0 maturity scale

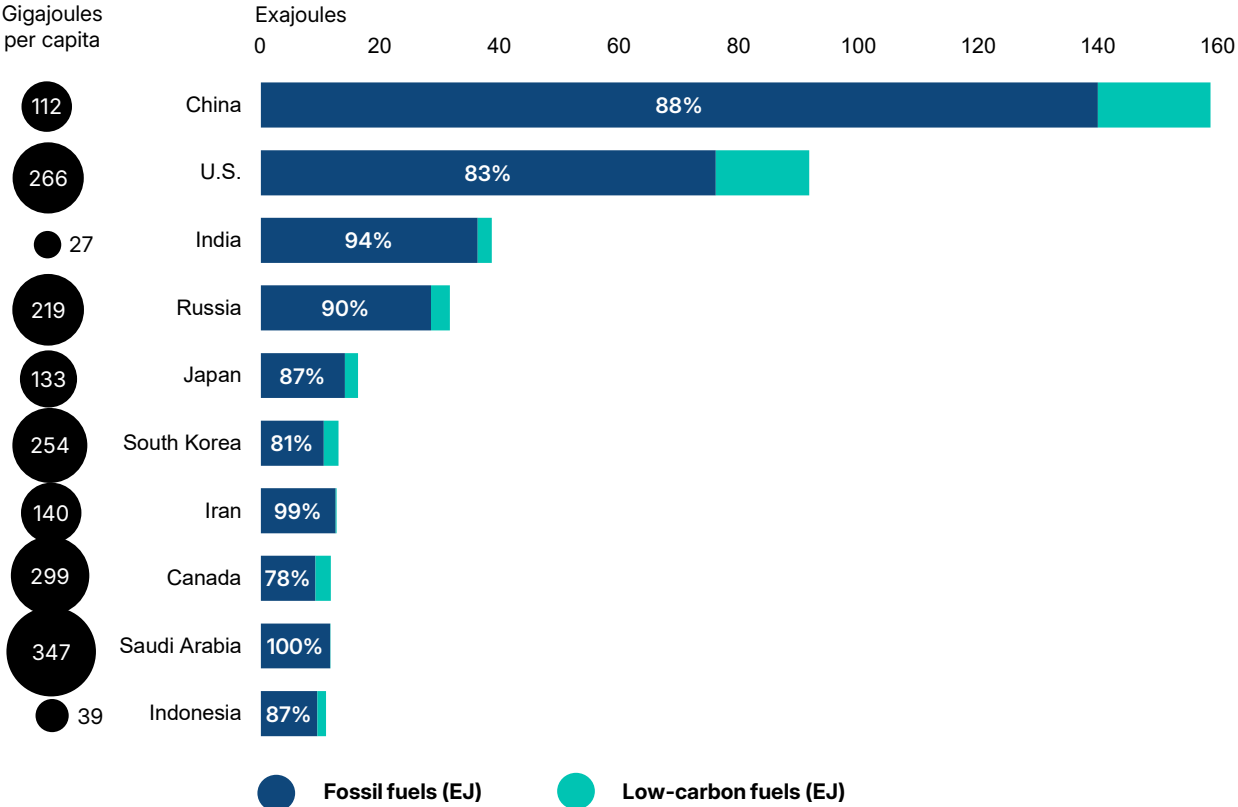
Not aligning	Committed to aligning	Aligning to a net zero pathway	Aligned to a net zero pathway	Achieving net zero
Companies without a commitment to decarbonize in a manner consistent with achieving net-zero emissions.	Companies with a long-term goal of reaching net-zero by 2050.	Companies that are not yet aligned with a net-zero pathway but have both a science-based target and a decarbonization plan that align with such a pathway.	Companies that have science-based targets, a decarbonization plan, and current absolute or emissions intensity at least equal to a net-zero pathway.	Companies that have current emissions at or near net-zero

Comparing countries' energy appetites

- Total energy supply represents the amount of energy a country provides to satisfy its final energy needs. It includes all energy either produced within the country or imported, after subtracting energy exports. It provides a measure of absolute demand for energy (countries' energy appetite) worldwide.
- Fossil fuels supply the lion's share of total energy in the 10 largest countries by total energy supply. Low-carbon sources (including nuclear, hydroelectricity, renewables and geothermal) supply about 12% of total energy in China and 17% in the U.S. (the first- and second-largest global emitters of GHG, respectively), and 6% in India, the third-largest emitter.
- At the same time, low-carbon sources, led by wind and solar, now meet the vast majority (84%) of new power demand in China.¹ The shift is reducing China's dependence on fossil fuels and, given the country's outsized role in driving global fossil-fuel growth, could signal a broader decline in fossil-fuel use worldwide. The picture differs in the U.S. where a combination of gas and renewables are meeting most growth in energy demand.²
- Per-capita energy use, which reflects the energy appetite of the average citizen, offers a different perspective on the world's top emitters. Per-capita energy supply in the U.S. is more than twice that of China and nearly 10 times that of India. In Canada and Saudi Arabia, per-capita use is about 12% and 30% higher, respectively, than in the U.S.. While all three countries have abundant energy resources and energy-intensive industries, differences in each country's population explain the differences in per capita energy supply.

1. "China Energy Transition Review 2025," Ember, Sept. 9, 2025.
2. "U.S. Electricity 2025 — Special Report," Ember, March 12, 2025.

Top 10 countries by total energy supply

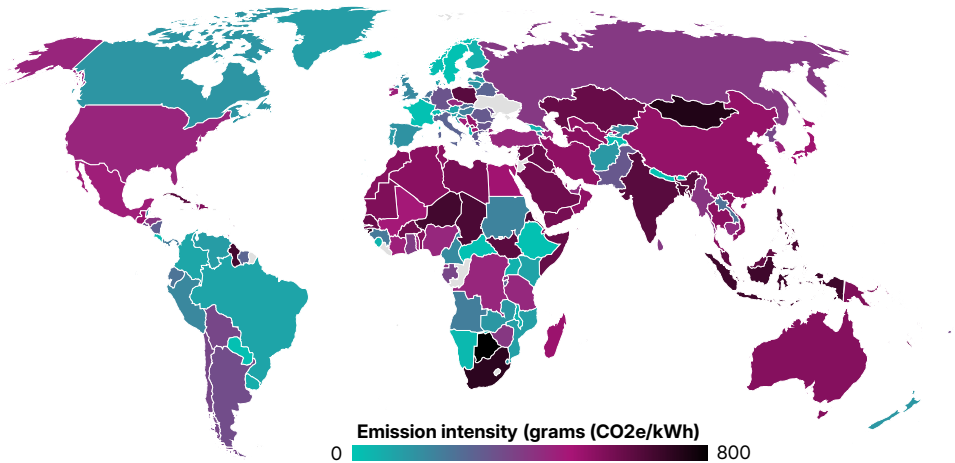
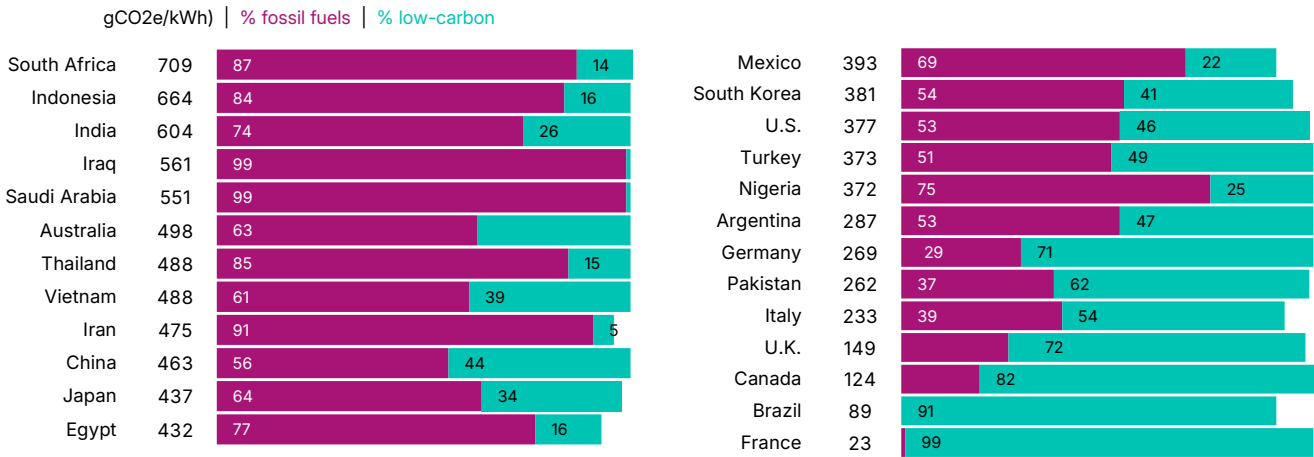


Source: MSCI ESG Research, based on data from the Energy Institute's Statistical Review of World Energy, 2025.

How green is your grid?

- Comparing countries by the carbon intensity of their electricity production provides a lens to identify markets where electrifying industrial processes, for example, may be most likely to deliver decarbonization, helping to spot potential energy transition leaders and laggards.
- Among the three top-emitting countries — China, the U.S. and India — the U.S., at 377 grams of carbon dioxide-equivalent (gCO2e/kWh) has a less carbon-intensive grid than either China (463 gCO2e/kWh) or India (604 gCO2e/kWh) in the latest quarter. Note that while China and the U.S. generated roughly similar shares of electricity from fossil fuels, China has the more emissions-intensive grid due to a higher share of coal in the country's electricity generation mix.¹
- France, Brazil and Canada have the least carbon-intensive electricity among countries with the most carbon-intensive grids over the three months ended Sept. 30, 2025, thanks to widespread deployment of hydropower in all three, together with nuclear in France and Canada, and renewables in Brazil.²

Top-25 emitting countries by carbon intensity of their electrical grid, 90-day average (grams CO2e/kWh)



Source: MSCI ESG Research, based on data from [Electricity Maps](#) indicating most-recent 90-day average as of Sept. 30, 2025. Note that ratios in the table do not always add up to 100% because the data contains a small share of energy sources marked as unknown. Russia not shown in chart because of limited data availability. Reference to top-25 country emissions based on data from the European Union's EDGAR database. According to Electricity Maps, fossil fuels represent most of such sources.

1. See "Energy system of China" and "Energy system of United States," International Energy Agency, available at "Countries and regions," [iea.org](#).
2. See "Energy system of France," "Energy system of Canada," and "Energy system of Brazil," International Energy Agency, available at "Countries and regions," [iea.org](#).

Seeing green

- The heatmap illustrates clean-tech revenue among the largest listed companies by country and region. It highlights the leadership of Chinese firms in solar (55%), energy-efficiency solutions (44%), and clean-transportation infrastructure (35%).
- U.S.-listed companies lead in biofuels (72%) and other alternative energy solutions (35%), including nuclear, geothermal and related energy sources.
- European firms excel in wind energy and maintain a presence across all clean-tech categories, reflecting a diversified clean-tech industrial base.
- Across the rest of Asia-Pacific, Japanese firms stand out in clean vehicles, while South Korean firms lead in energy storage.

New

Clean-tech revenue by country and region (%)

		China	Japan	South Korea	India	APAC (Others)	U.S.	Canada	Latin America	France	Germany	U.K.	Europe (Others)	Middle East & Africa	TOTAL
Alternative energy	Solar	55	4	-	1	1	18	1	2	4	1	1	9	1	98%
	Wind	21	4	-	-	-	18	2	4	4	10	-	35	-	98%
	Others	24	13	6	-	2	35	1	-	5	2	-	10	-	98%
Clean Transport	Vehicles	26	24	8	2	-	18	-	-	-	15	-	6	-	99%
	Infrastructure	35	21	-	-	-	11	-	-	12	11	-	5	-	95%
Energy efficiency & flexibility solutions		44	4	21	-	-	13	-	-	7	6	-	4	-	99%
Biofuels		-	-	-	-	-	72	4	-	-	-	5	19	-	100%

Note: Rows don't sum to 100%; only values above 1% are shown. Source: MSCI ESG Research, data as of September 6, 2025. Based on latest reported revenue of 648 constituents of the MSCI ACWI (as of June 30, 2025) that were assessed by MSCI to have derived revenue from clean-tech solutions. Clean-tech categories follow definitions from the MSCI Sustainable Impact Metrics and Business Involvement Screening Research methodologies. Alternative energy includes power generators and equipment providers; "Alternative Energy: Others" includes nuclear, geothermal, waste-to-energy, biomass, gas co-generation, small hydropower and fuel cells. Energy efficiency and flexibility solutions include energy storage, demand-side management and grid solutions. Clean transport infrastructure includes urban mass transit, electric vehicle charging and other sustainable transport solutions. Clean transport vehicles include hybrid and battery-electric vehicles.

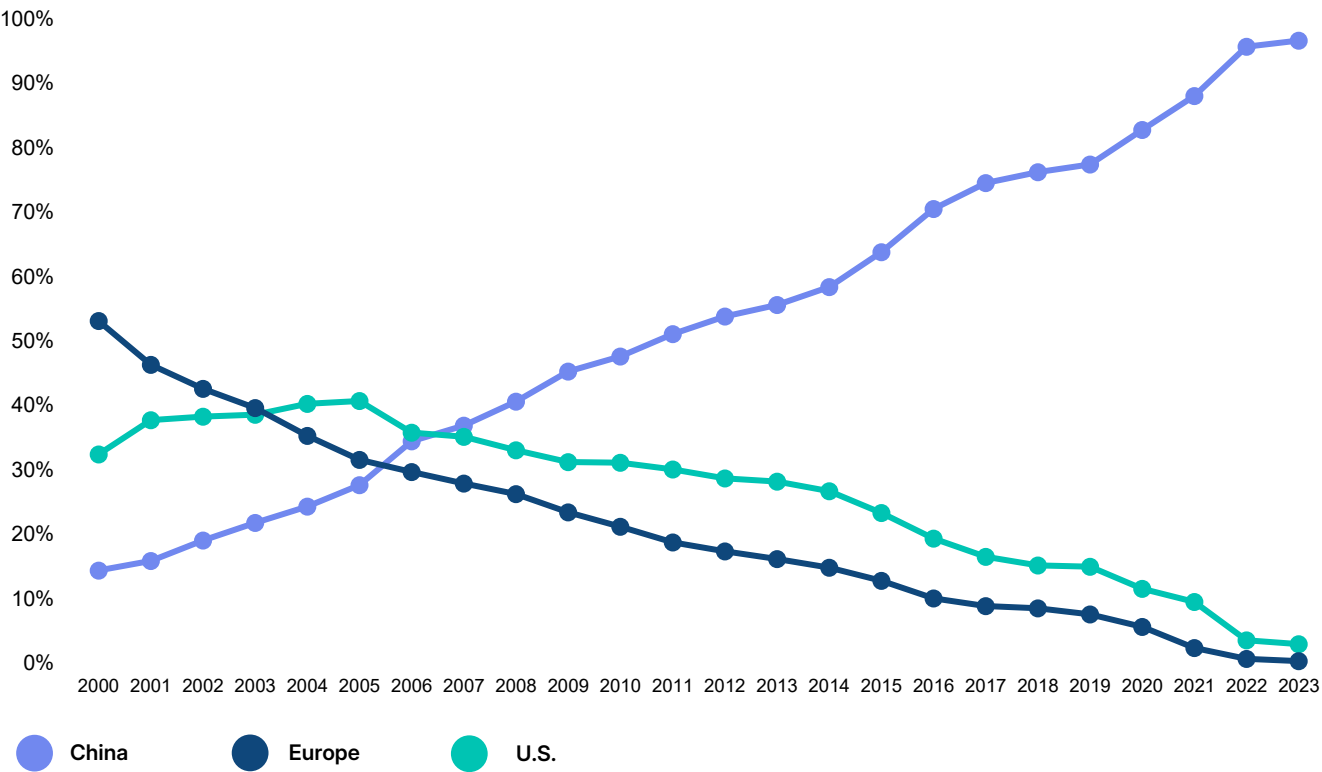
The epicenter of clean-tech innovation

- China has emerged as the epicenter of clean-tech innovation, based on the country’s global share of renewable energy patent filings in the past 25 years.
- Among China, the European Union and U.S., China now accounts for 97% of applications for renewable-energy patents, up from just 14% in 2000. The increase parallels China’s massive investment in renewable technologies, particularly solar, biofuels and energy efficiency.¹
- The shift also parallels China’s emergence as a center of electrification and clean-technology exports. The country dominates both global production of EVs and solar-energy supply chains.²

1. World Energy Investment 2025,” International Energy Agency, June 5, 2025.
2. “Global EV Outlook, 2025,” International Energy Agency, May 14, 2025. See also, “China solar cell exports grow 70% in 2025,” Ember, Aug. 12, 2025.

New

Share of applications for renewable energy patents (%)



Source: IRENA, MSCI Institute analysis

Emissions

Transition Finance Tracker

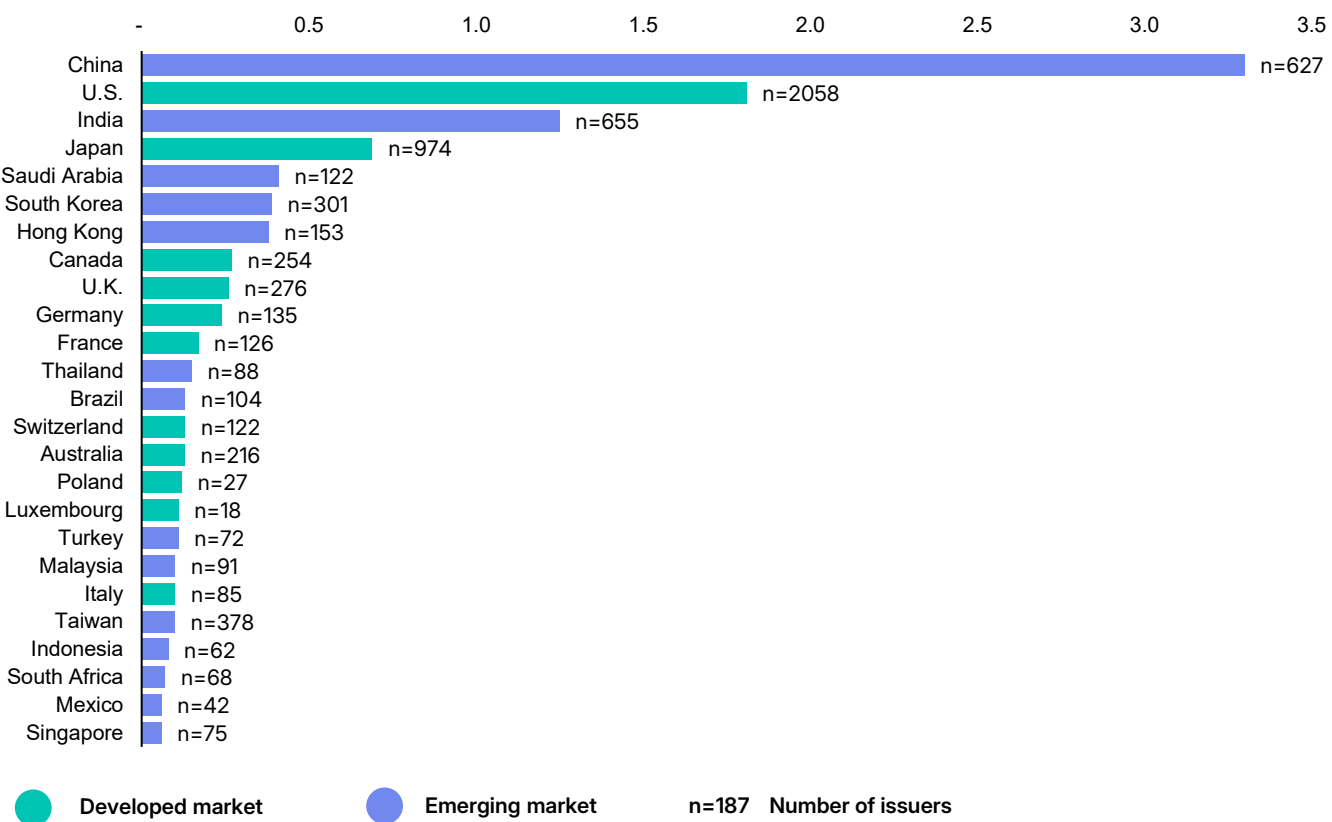
Third quarter 2025



Where corporate emitters are

- The chart highlights the annual Scope 1 GHG emissions of listed companies by their country of domicile. We refer here to listed companies' total emissions, not the share of their emissions in those countries.
- Companies based in China top the list, emitting nearly 3.3 Gt annually, followed by those in the U.S. (1.8 Gt) and India (1.3 Gt). Companies in Japan, South Korea and Saudi Arabia contribute moderate levels, while those in Canada, the U.K. and Germany emit comparatively less.

Annual emissions of listed companies by country/market of domicile (Scope 1 emissions/GtCO₂e)

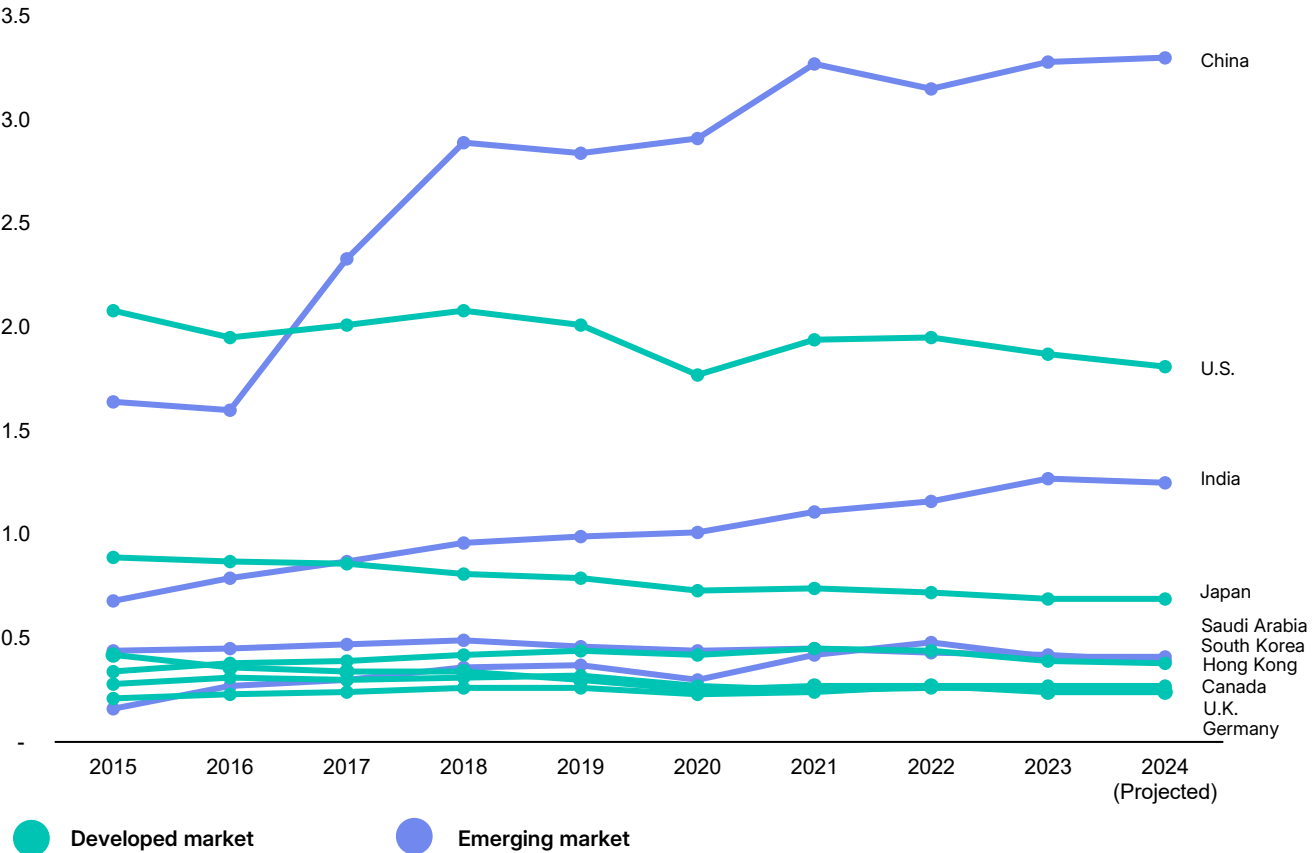


Source: MSCI ESG Research, data as of Sept. 30, 2025.

Tracking corporate emissions over time

- This time-series data tracks the Scope 1 emissions of listed companies in 10 economies where such emissions are highest over the nine years ended Dec. 31, 2024. (Note that the universe of listed companies in every market changes over time.) In aggregate, listed companies in China show a steady and significant rise in aggregate, from 2 to 3.3 GtCO₂e. Listed companies in India nearly doubled their emissions over the period.
- By contrast, emissions from listed companies in the U.S., Japan, Germany and the U.K. have declined over the same period. Emissions of U.S.-listed companies fell by about 10%, to an estimated 1.8 Gt, while emissions in Japan, Germany and the U.K. fell by 22%, 43% and 7%, respectively.
- This divergence highlights the continuing challenge of balancing economic growth with decarbonization, particularly in rapidly developing economies.

Emissions trend of listed companies by country/market of domicile (Scope 1 emissions, GtCO₂e)

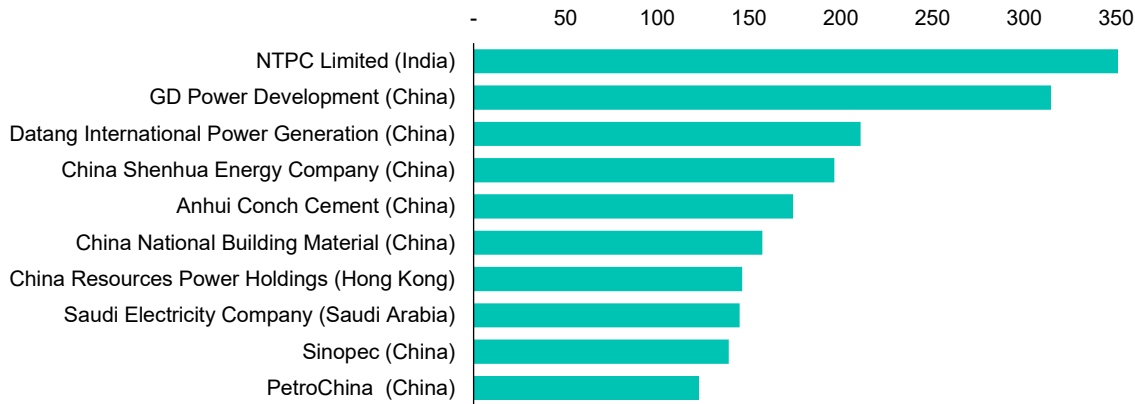


Source: MSCI ESG Research, data as of Sept. 30, 2025.

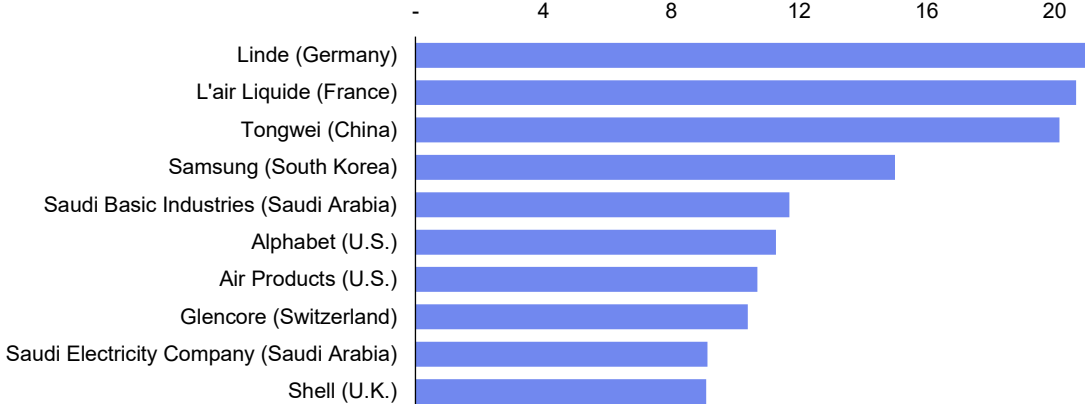
Listed companies with the largest absolute Scope 1 and 2 emissions

- Companies' emissions do not necessarily correlate directly with climate-related financial risk. But businesses with high emissions contribute to global warming and its physical and economic impacts.
- Utilities record the largest Scope 1 emissions, reflecting their reliance on fossil fuels for power generation. The highest Scope 2 emissions, those associated with purchased electricity, are concentrated among companies with energy-intensive industrial processes.¹
- Current emissions levels reveal little about a company's future trajectory. To assess that, we use forward-looking indicators such as companies' projected emissions and capital expenditures, along with MSCI's Implied Temperature Rise and other forward-looking climate-impact metrics.

The 10 largest listed-company Scope 1 emissions (MtCO₂e)



The 10 largest listed-company Scope 2 emissions (MtCO₂e)



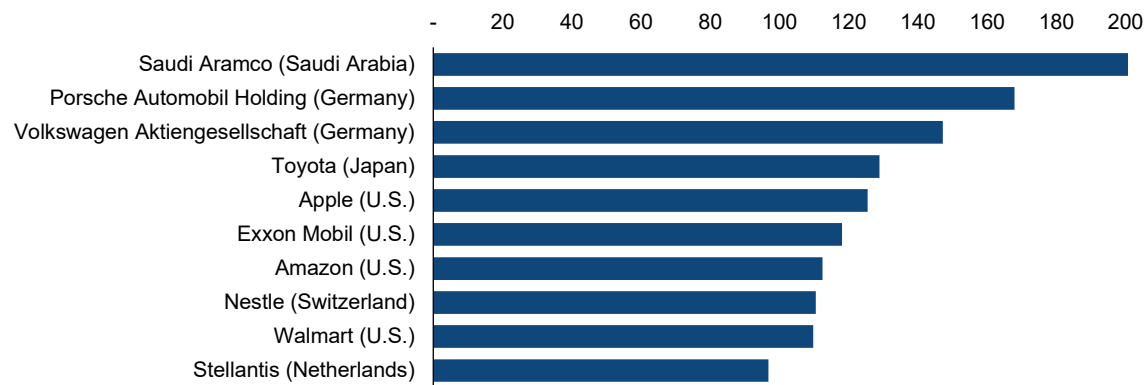
Source: MSCI ESG Research, data as of Sept. 30, 2025, based on company-reported emissions.

1. Change in companies with the highest Scope 2 emissions from the last edition of this report reflects our use of location-based Scope 2 data exclusively; that is, reporting by companies based on the average emissions intensity of the grid where the energy consumption occurs. Rankings may also vary from one quarter to another because issuers report at varied times throughout the year.

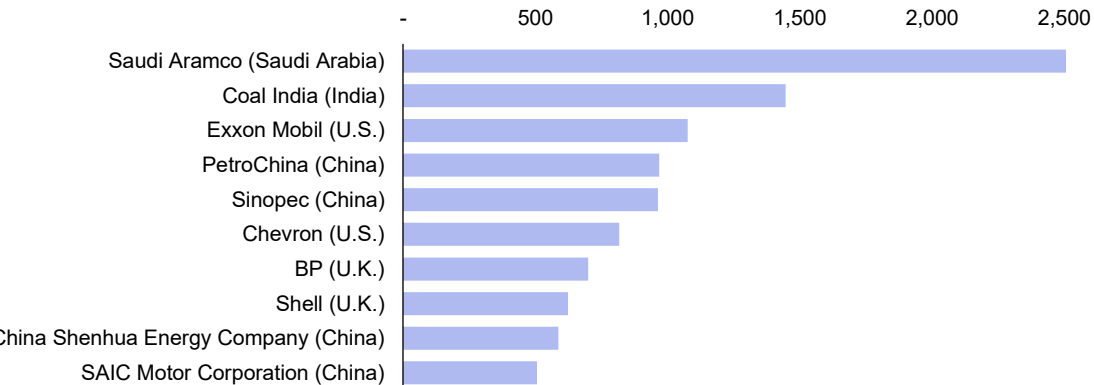
Listed companies with the largest absolute Scope 3 emissions

- The emissions from companies' value chains, or Scope 3, account for the largest share (about 75% on average) of most companies' total GHG emissions. Because reporting of Scope 3 emissions is often incomplete or inconsistent even within sectors, these figures are based on MSCI estimates, which follow the same methodology for each sector.
- Industries with large upstream Scope 3 emissions typically rely on emissions-intensive materials such as steel, aluminum or chemicals or, like Apple, Volkswagen or Walmart, rely on complex supply chains. Oil companies have the largest downstream carbon footprints, as the use of their products generates vast quantities of GHG emissions.
- Measuring and managing Scope 3 emissions remains a significant challenge, because such emissions occur outside companies' direct control, with data from value chains sometimes scarce. In its latest draft corporate net-zero standard, the Science Based Targets initiative proposes that companies track their share of procurement from net-zero-aligned suppliers and the share of revenue derived from net-zero-aligned products and services.¹

The 10 largest listed-company upstream Scope 3 emissions (MtCO2e)



The 10 largest listed-company downstream Scope 3 emissions (MtCO2e)



Source: MSCI ESG Research, data as of Sept. 30, 2025. We estimate Scope 3 emissions for all companies in our coverage based on company reporting of total Scope 3 emissions or, alternatively, by using company-specific information that considers both the revenue intensity of emissions and production data in line with the Greenhouse Gas Protocol framework. For more information, please see "MSCI Climate Change Metrics Methodology and Definition" and "Scope 3 Carbon Emissions Estimation Methodology," MSCI ESG Research.

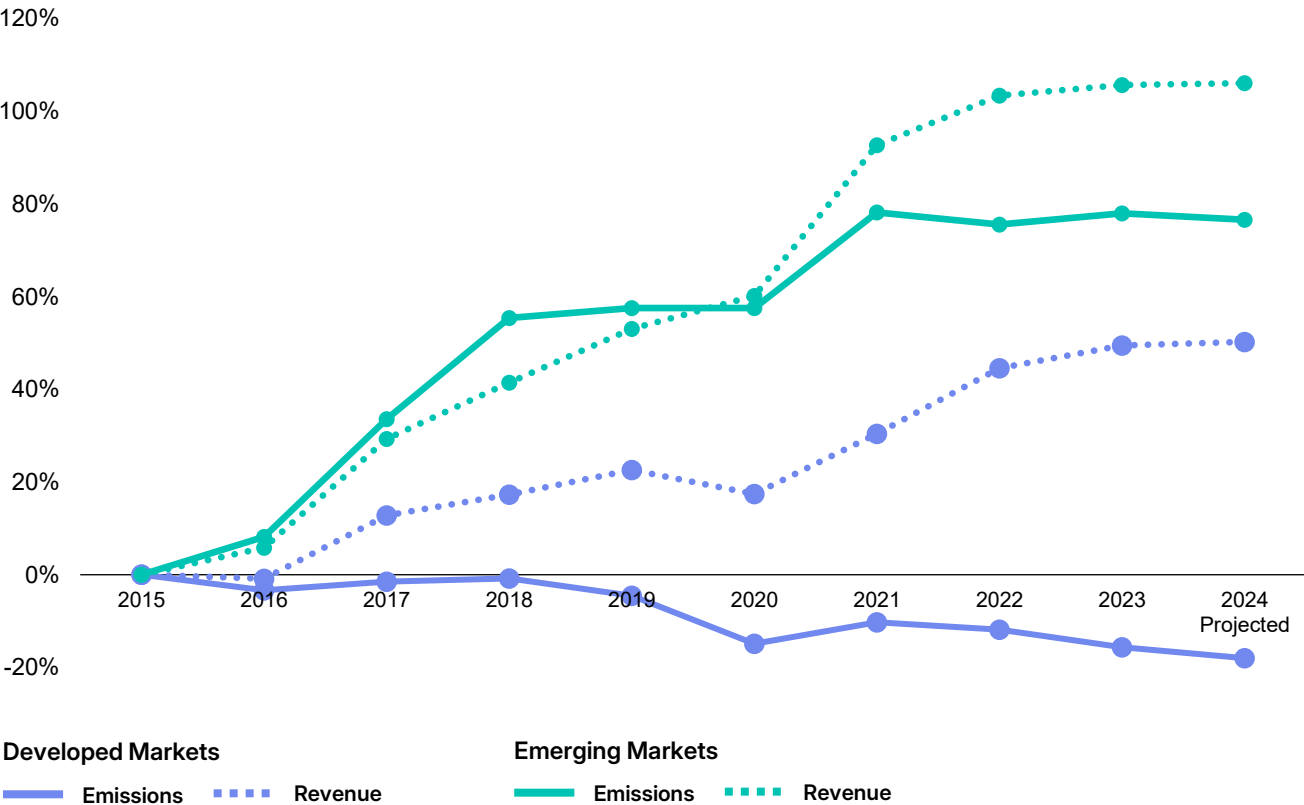
1. SBTi Corporate Net-Zero Standard, Version 2.0, March 2025.

Creating more value with fewer emissions

- Historically, economic growth and GHG emissions growth have moved in tandem. In recent years however, they have begun to decouple in advanced economies, reflecting progress toward more sustainable business practices, improved energy efficiency globally and the rising share of services in economic activity. According to the International Energy Agency, global emissions growth slowed to 0.8% in 2024, while the global economy expanded by more than 3%.¹
- Between 2015 and 2024, revenues of listed companies domiciled in developed markets rose an estimated 50%, while their direct emissions fell by about 18%.
- In emerging markets, emissions and growth have continued to climb roughly together. Over the nine-year period, revenues of listed companies domiciled in emerging markets more than doubled, while their emissions rose 77%.

1. ¹ "Global Energy Review 2025," International Energy Agency, March 24, 2025.

Revenue and Scope 1 emissions trend of listed companies (% change relative to 2015 levels)



Source: MSCI ESG Research, data as of Sept. 30, 2025.

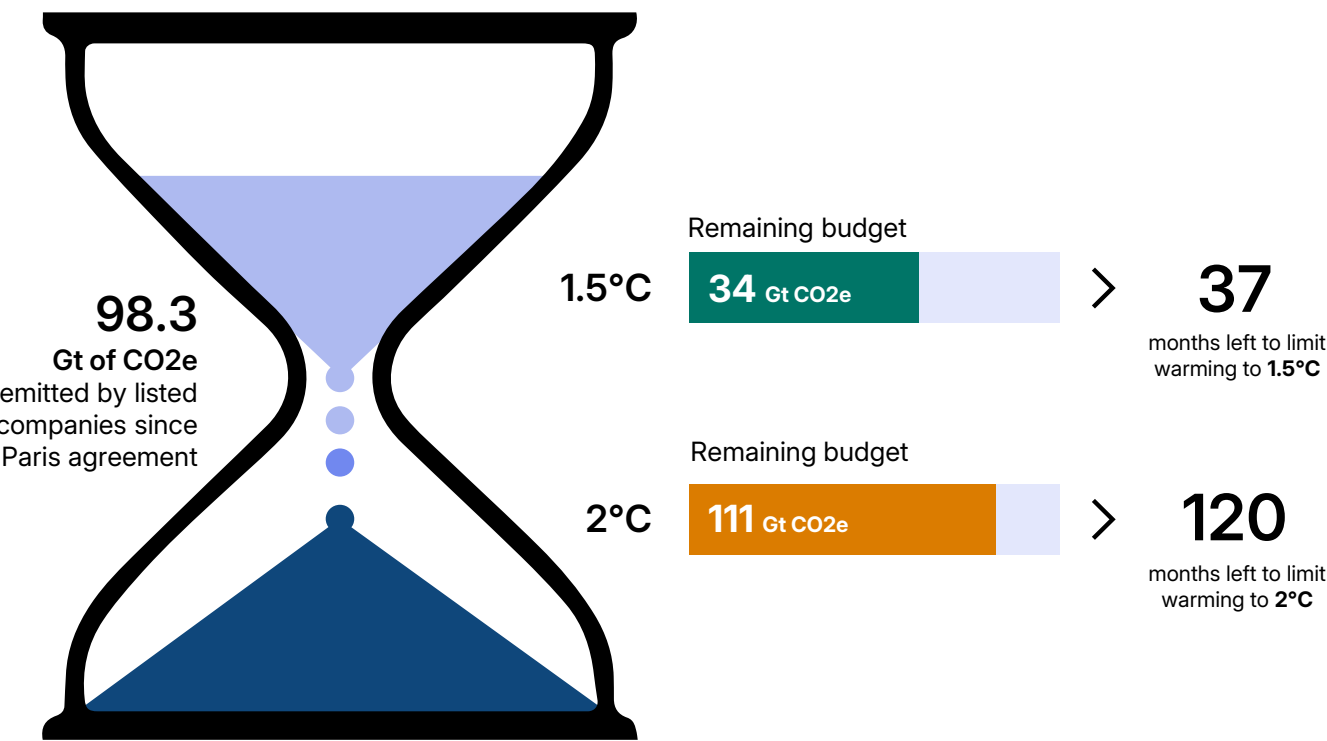
Emissions budgets 101

- We estimate listed companies' remaining GHG emissions budget is 34 Gt CO₂e for a 50% likelihood of limiting warming to 1.5°C, and 111 Gt CO₂e for a 50% likelihood of limiting warming to 2°C, as of Sept. 30, 2025.¹
- At the current pace, we estimate that the 1.5°C budget of listed companies will be exhausted in just over three years, consistent with scientific estimates of the global carbon budget.²
- An increasing number of companies have set climate targets in line with 1.5°C. They may still deplete their sector's share of the global carbon budget depending on how long the global economy takes to decarbonize at scale.

1. An emissions budget estimates how much carbon dioxide (CO₂) and other GHGs the world can emit while remaining likely to keep global warming within a certain threshold, such as to limit global warming to 1.5°C or well below 2°C above preindustrial levels. We calculate an emissions budget for listed companies that includes both emissions from CO₂ and other GHGs, which we refer to collectively as CO₂-equivalent (CO₂e) emissions.

2. Three years left to limit warming to 1.5C, leading scientists warn," BBC News, June 18, 2025.

Remaining emissions budget for listed companies (Gt CO₂e)

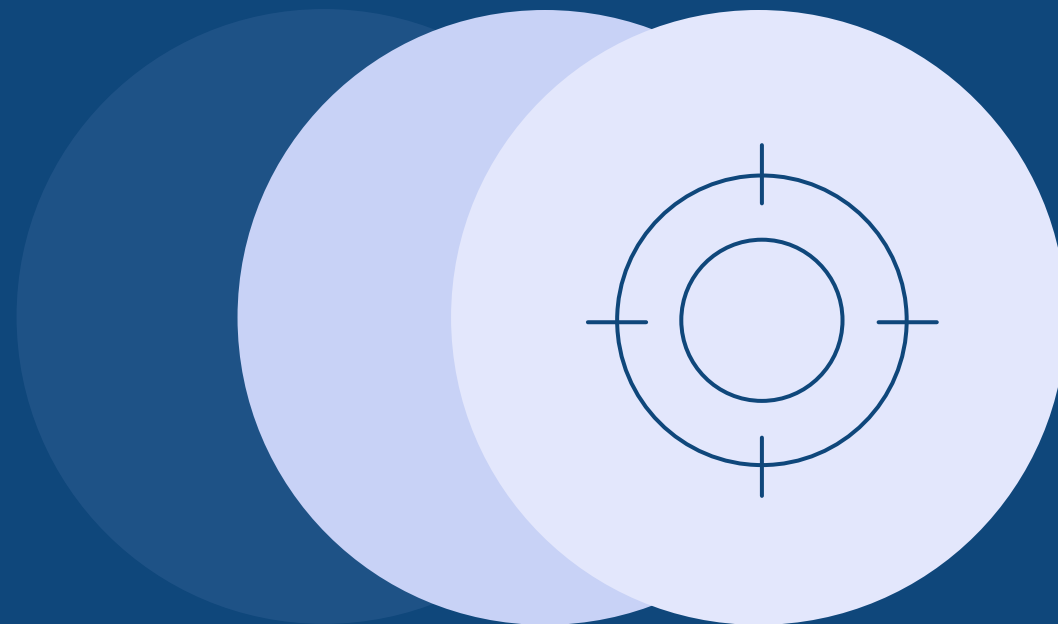


Source: MSCI ESG Research, data as of Sept. 30, 2025. The hourglass and countdown clock show annual total Scope 1 emissions of MSCI ACWI IMI constituents (not index weighted) based on listed companies' reported emissions data and MSCI estimates as of that date. Emissions that companies haven't yet reported are based solely on MSCI estimates, given a lag in company reporting. The remaining future emissions budget to achieve 1.5°C and 2°C warming scenarios are calculated based on bottom-up estimates (sum of remaining emissions budget of all MSCI ACWI IMI constituents) as of June 30, 2025. The dataset used in these estimates comprises roughly 95% of ACWI IMI constituents, as roughly 5% of constituents lack data that would allow us to compute the relevant measures.

Targets

Transition Finance Tracker

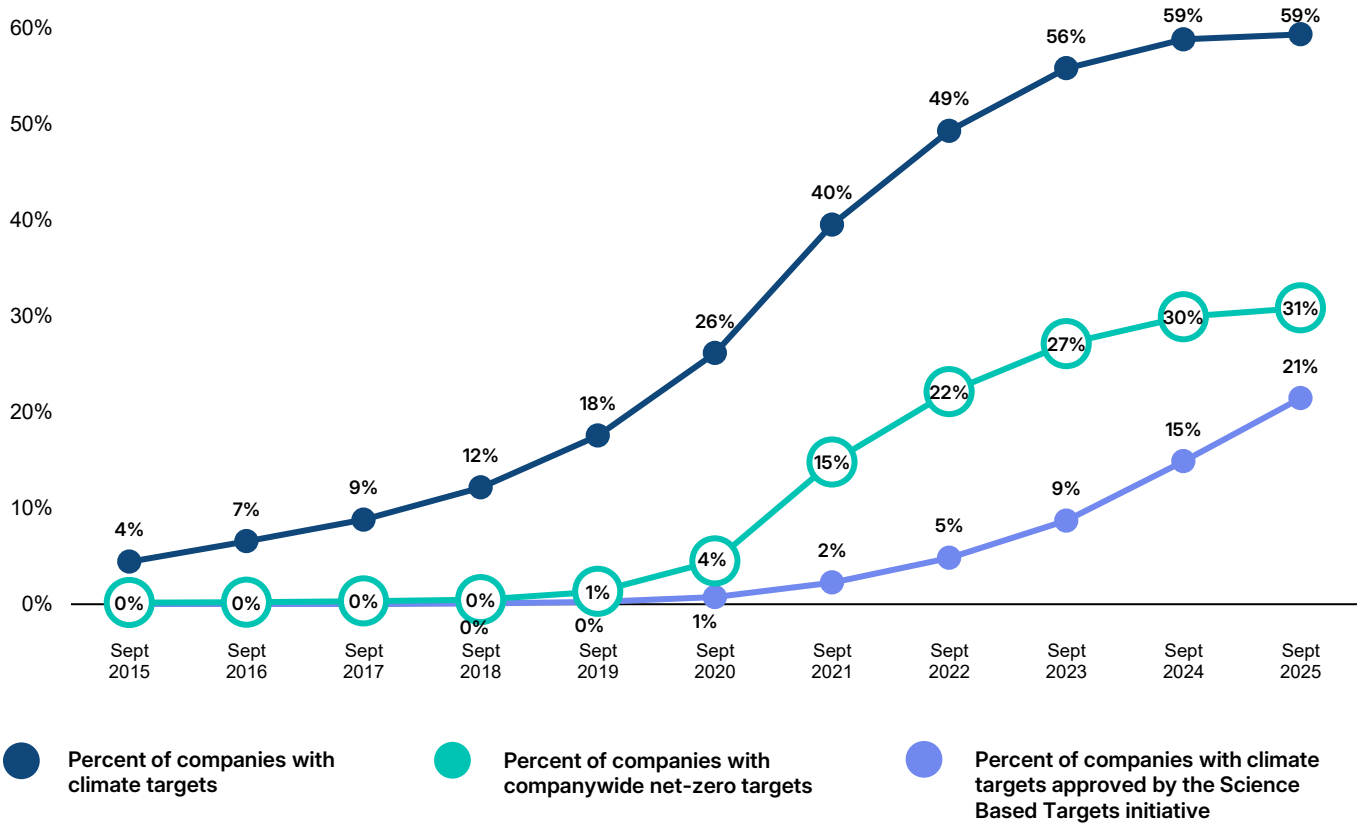
Third quarter 2025



Tracking climate commitments

- Corporate climate targets matter because companies setting ambitious goals need capital to decarbonize their operations. Such targets also help investors assess the scale of emissions reductions that companies may achieve. But the ambition and rigor of corporate targets differ markedly.
- While the overall share of listed companies that have climate targets generally or that aim to reach net-zero has plateaued in recent years, the share of companies that are setting science-based targets, which are typically more ambitious, has continued to climb.
- As of Sept. 30, 2025, 21% of listed companies have set a climate target validated by the SBTi, as of Sept. 30, 2025, up from 15% a year earlier. Many investors regard SBTi-approved targets as benchmarks of credibility, as the SBTi assesses whether targets align with limiting warming to 1.5°C.
- Thirty-one percent of companies have set a target that aspires to reduce emissions to net-zero (though not necessarily validated by the SBTi), roughly unchanged from a year earlier. In total, 59% of listed companies have published some kind of climate commitment, also about the same as a year ago.

Share of listed companies with climate targets for 2025 and beyond by target type

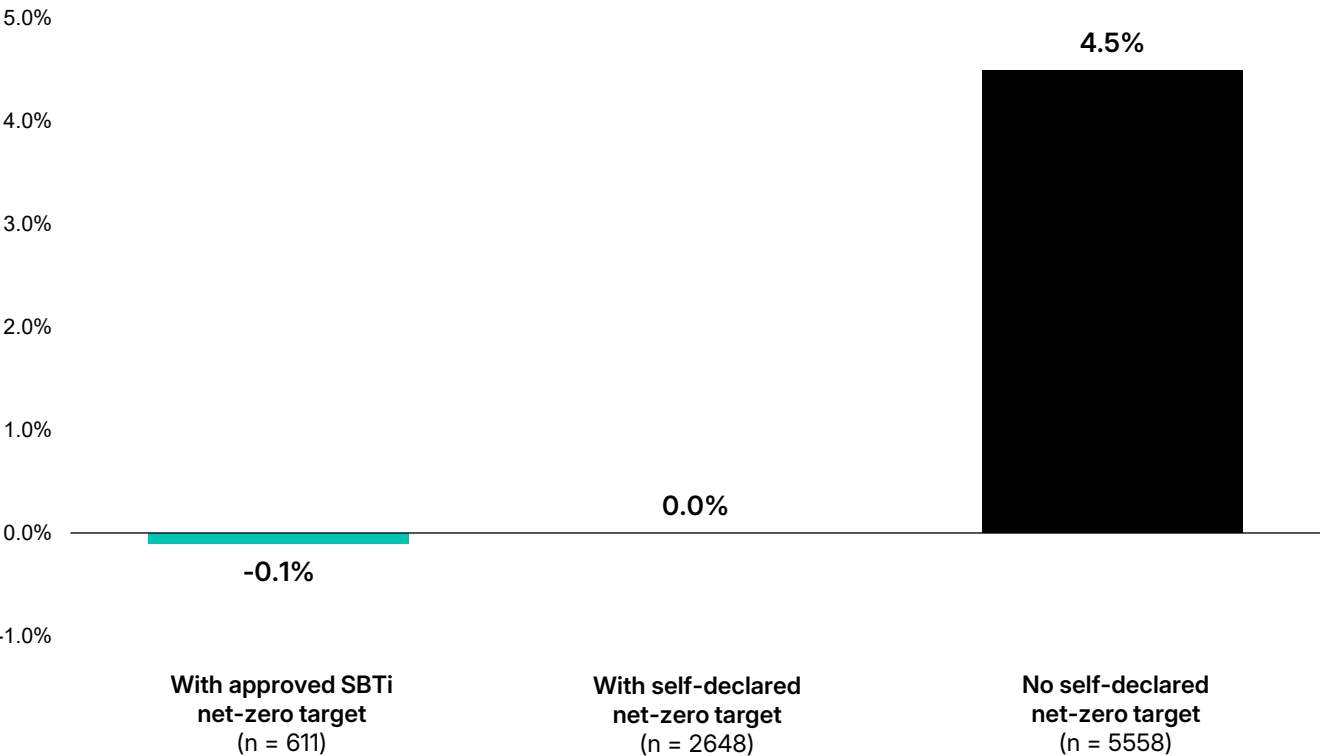


Source: MSCI ESG Research, data as of Sept. 30, 2025. Note that totals are cumulative. The share of corporate climate targets reported here reflects the relevant share of all companies in the MSCI ACWI IMI. Previous editions of this report show targets for roughly 95% of index constituents, hence the different shares of climate targets reported here. Please see note on p. 5.

Do climate targets matter? Yes.

- The GHG emissions of listed companies that have set climate targets grew less than the emissions of their counterparts that have not set a target, according to data as of the six years ending 2024, the most recent year for which we can review complete data on both corporate targets and changes in companies' emissions.
- The absolute Scope 1 GHG emissions of companies that obtained an SBTi-approved target fell by a median of 0.1% per year over the same period.
- Scope 1 GHG emissions among listed companies with self-declared net-zero targets (about 30% of listed companies) remained unchanged between 2018 and 2024, compared with a median annual increase of 4.5% among those without such targets.

Company Scope 1 emissions performance, by climate commitment type (median annualized change in absolute Scope 1 emissions, 2019-2024)



Source: MSCI ESG Research, data as of Sept. 30, 2025.

Disclosure

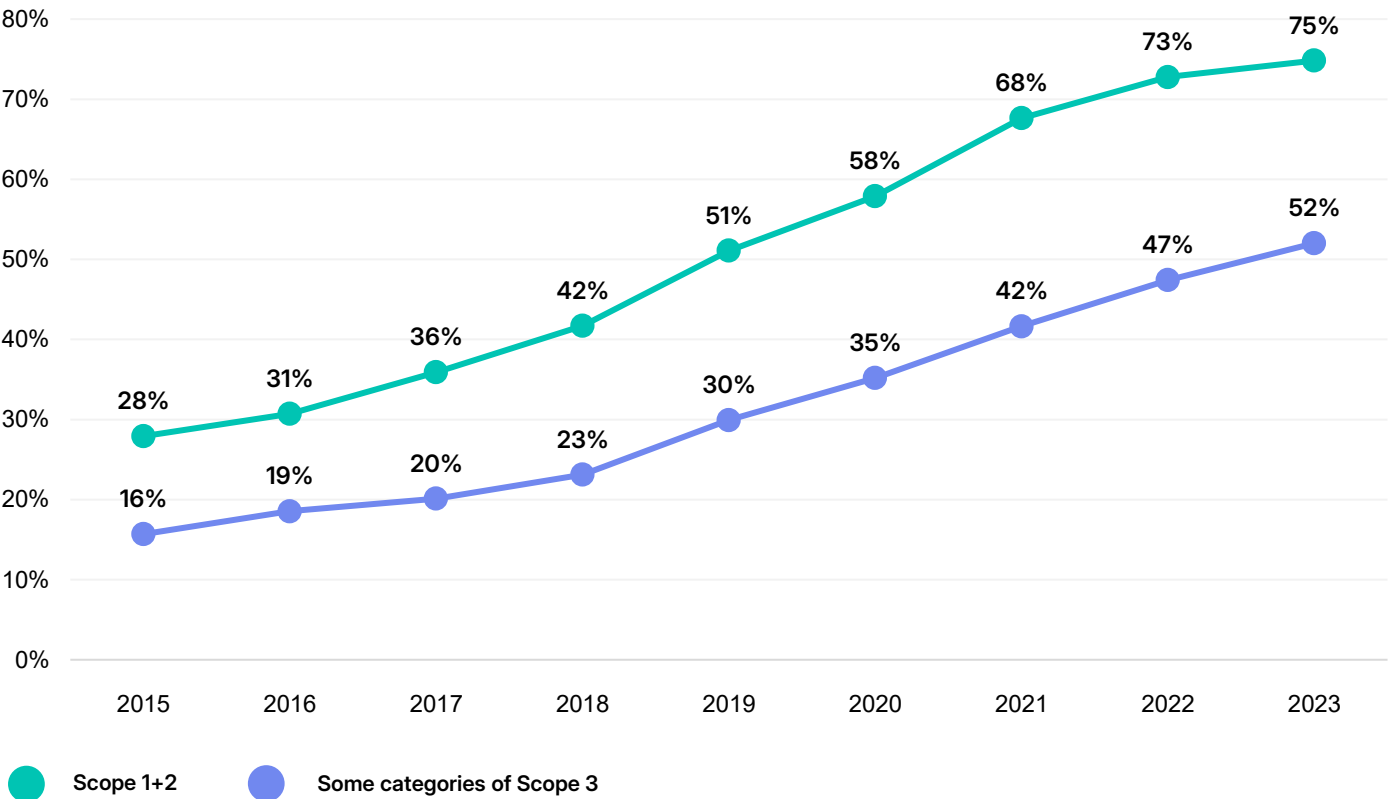
Transition Finance Tracker

Third quarter 2025

Emissions disclosure: Listed companies

- Disclosure of corporate GHG emissions enables investors to compare companies across sectors, track progress toward climate commitments and assess financially relevant risks in their portfolios and loan books.
- As of Dec. 31, 2023, the latest year for which comprehensive and verified reporting is available, nearly 75% of listed companies disclosed their Scope 1 and/or Scope 2 emissions, a rise of roughly 2 percentage points from a year earlier.
- More than half (52%) of companies reported at least some of their Scope 3 emissions, an increase of 5 percentage points from a year earlier. Because companies often struggle to quantify their value-chain emissions, reporting rates for Scope 3 remain comparatively low.

Emissions disclosure by listed companies (%)



Source: MSCI ESG Research, data as of Sept. 30, 2025.

Adoption of disclosure standards

A snapshot of climate reporting requirements

Countries across the map continue to adopt standards for climate disclosure, though some jurisdictions, including the U.S. and European Union, have either scaled back (or are in the process of rolling back) such efforts. Many national disclosure frameworks incorporate standards developed by the International Sustainability Standards Board, which has worked to harmonize a global baseline.



AMERICAS

Brazil: Mandatory reporting aligned with ISSB standards slated to start in 2026 for listed companies, funds and securitization entities, following a voluntary phase since from FY 2024.

Canada: Voluntary sustainability disclosure standards in place. The Canadian Securities Administrators paused mandatory climate-related disclosure requirements in April 2025, keeping CSDS 1 and 2 voluntary for now.

United States: *Securities and Exchange Commission (SEC):* Dropped court defense of a climate disclosure rule finalized in 2024. A federal appeals court in September paused a legal challenge to the rule pending a decision by the SEC either to revise the rule or resume its defense.

California Air Resources Board (CARB): The state passed two laws in 2023 that require large companies to report Scope 1 and 2 GHG emissions and disclose climate-related financial risks aligned with the TCFD, starting in 2026. While CARB confirmed it has missed a July 1, 2025, deadline to adopt implementing regulations, companies must still collect 2026 data for reporting in 2027.



EUROPE, MIDDLE EAST & AFRICA

European Union: Mandatory sustainability reporting subject to double materiality for listed and unlisted companies and financial institutions depending on certain thresholds. Companies also expected to align their reporting with the EU Taxonomy regulation governing activities considered environmentally sustainable. The European Commission has proposed removing CSRD reporting obligations for roughly 80% of entities.

Switzerland: Mandatory TCFD-aligned climate disclosures for large companies. The Federal Council launched a consultation in December 2024 on aligning with ISSB and EU Sustainability Reporting standards but paused the revision in June 2025 to await clarity on the EU's Omnibus reforms.

United Kingdom: Mandatory TCFD-aligned disclosure of Scope 1, 2 & 3 GHG emissions for listed companies and financial institutions in place since 2022. Pending consultation on adoption of an enhanced sustainability disclosure regime based on ISSB standards.

United Arab Emirates: The Federal Decree-Law on the Reduction of Climate Change Effects and Cabinet Resolution No. 67 (2025) introduces mandatory GHG reporting and establishes a national carbon credit system effective mid-2025.



ASIA PACIFIC

Australia: Mandatory ISSB-aligned disclosures through AASB S2 and voluntary through AASB S1 apply to in-scope entities from FY 2025, covering Scope 1 and 2 emissions from the first mandatory reporting year (Group 1: FY 2025, Group 2: FY 2026, Group 3: FY 2027). Phased rollout of Scope 3 reporting begins in FY 2026.

Mainland China: Exchanges regulated by China's Securities Regulatory Commission (Shanghai, Beijing, Shenzhen) have issued guidelines for sustainability and climate reporting aligned with ISSB. In April 2025, the Ministry of Finance and Ministry of Ecology and Environment released a draft climate disclosure standard for consultation, aiming to align with global sustainability goals.

Hong Kong: Mandatory ISSB-aligned disclosure requirements for companies on the Hong Kong Stock Exchange, effective from Jan. 1, 2025, with Scope 1 and 2 emissions reporting required immediately and Scope 3 phased in from 2026 for large issuers. Separately, Hong Kong Institute of Certified Public Accountants (HKICPA) has issued HKFRS S1 and S2, aligned with the ISSB standards, effective from Aug. 1, 2025, with full adoption by large publicly accountable entities expected by 2028.

Indonesia: The Indonesia Sustainability Standards Board (DSK IAI) has ratified PSPK 1 and 2, aligned with ISSB standards. These standards will take effect from Jan. 1, 2027. Preparatory consultations have closed, with implementation planning underway in collaboration with financial and regulatory authorities.

Japan: Phased implementation of mandatory sustainability and climate reporting starting with issuers listed on the Prime Market of the Tokyo Stock Exchange from financial years ending March 31, 2027.

Malaysia: ISSB-aligned climate-related disclosures will become mandatory in phases. Large Main Market-listed issuers must begin climate disclosures (Scope 1 and 2 emissions) from FY 2025, with full adoption including Scope 3 emissions and broader sustainability disclosures expected by FY 2027.

New Zealand: Mandatory TCFD-aligned climate disclosures (under NZ climate standards 1-3) have applied since reporting periods beginning Jan. 1, 2023.. In 2025, the government and the External Reporting Board began consultations on potential alignment with ISSB standards.

Glossary

International Sustainability Standards Board (ISSB): A reporting framework that includes standards covering sustainability reporting (S1) and climate disclosure (S2).

Task Force on Climate-related Financial Disclosures (TCFD): A global baseline for climate disclosure released in 2017. The TCFD was taken over by the ISSB as of 2024.

Corporate Sustainability Reporting Directive (CSRD): An EU reporting framework that covers a broad spectrum of ESG topics.

Philippines: The Securities and Exchange Commission Philippines released a draft circular proposing the adoption of PFRS S1 and S2, aligned with ISSB standards, for publicly listed and large non-listed companies.

Singapore: ISSB-aligned climate reporting remains mandatory from FY 2025 for all listed companies (Scope 1 & 2 emissions). Straits Times Index constituents must also disclose Scope 3 emissions from FY 2026 and broader ISSB-based disclosures from FY 2025.

South Korea: The Korea Sustainability Standards Board (KSSB) has published exposure drafts of the Korean Sustainability Disclosure Standards (KSDS 1 and 2), aligned with ISSB standards. The Financial Services Commission (FSC) is expected to finalize the standards in late 2025, with mandatory adoption planned from 2026 for large listed companies.

Taiwan: The Taiwan Stock Exchange introduced ISSB-aligned sustainability disclosures-, entering into force 2026 for all issuers, with transition relief for Scope 3.

Thailand: The SEC Thailand published its ISSB Roadmap Principles for consultation in December 2024, outlining a phased adoption of IFRS S1 and S2 starting in 2027 for SET50 companies. A second consultation launched in 2025 is now refining draft sustainability disclosure rules and transition provisions.

Key terms

Article 6: Section of the Paris Agreement that sets out mechanisms for voluntary cooperation toward climate goals, including emissions trading between countries.

Biodiversity: Short for biological diversity, biodiversity is the diversity within and among species and ecosystems.

Carbon credit: A unit representing the avoidance or removal of 1 ton of CO₂e, created by an activity or set of activities in relation to a counterfactual baseline that considers what emissions would be but for the activity or activities.

Carbon dioxide equivalent (CO₂e): Greenhouse gas emissions with the same global warming potential as 1 metric ton of carbon.

Carbon emissions revenue intensity: Greenhouse gas emissions in metric tons that a company emits to generate every USD 1 million of revenue.

Carbon engineering: Carbon credit projects that remove and store carbon dioxide emissions from the atmosphere and into materials that do not create or increase biomass carbon stocks.

Financed emissions: Greenhouse gas emissions associated with investments, loans and insurance.

GICS®: The global industry classification standard jointly developed by MSCI Inc. and S&P Global Market Intelligence. The GICS structure comprises 11 sectors, 24 industry groups, 69 industries and 158 subindustries.

Gigaton (Gt): 1 billion tons (of emissions).

Implied Temperature Rise: A forward-looking climate impact metric that estimates the increase in average global temperature that would occur this century if the economy were to overshoot or undershoot the global carbon budget by the same amount as the company or investment portfolio in question.

Megaton (Mt): 1 million tons (of emissions).

MSCI ACWI Investable Market Index: Captures large-, mid- and small-cap listed companies across 23 developed-market and 27 emerging-market countries. With 8,274 constituents, the index covers approximately 99% of the global equity investment opportunity set, as of June 30, 2025.

Nature: Includes biodiversity and the geology, water, climate and other inanimate components of Earth.

Physical risk: Harm to people or property that may result from severe weather, extreme heat and other climate-related events.

Remaining emissions budget: A company's future GHG emissions budget, in tons of CO₂e, for limiting warming this century to 1.5°C or 2°C above preindustrial levels.

Renewable energy: The installation of new power generation capacity that uses carbon-free energy sources.

Science Based Targets initiative: A nonprofit organization established by CDP, the U.N. Global Compact, the World Resources Institute, the U.N. and the World Wildlife Foundation to assess corporate climate targets.

Scope 1 emissions: Companies' direct greenhouse gas emissions in tons of CO₂e.

Scope 2 emissions: Companies' greenhouse gas emissions from electricity use in tons of CO₂e.

Scope 3 emissions: Companies' indirect greenhouse gas emissions in tons of CO₂e from their upstream supply chain, emissions inherent in products and services or emissions from portfolio companies.

Sovereign Implied Temperature Rise: A forward-looking climate impact metric that estimates a global warming value for each country based on the extent to which the country's projected Scope 1 emissions overshoot or undershoot its 1.5°C carbon budget and extrapolates the over- or undershoot to the world.

Transition risk: Financial risk that may result from the shift to a low-carbon economy.

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About the data in this report

Listed companies referenced in this report are constituents of the MSCI ACWI Investable Market Index (IMI), which includes large-, mid- and small-cap companies across 23 developed and 24 emerging market countries. As of Sept. 30, 2025, the index comprises 8,000 companies and captures approximately 99% of the global equity investment opportunity set.

Unless otherwise specified, the data in this report reflects all constituents of the ACWI IMI as of the relevant date. (Please note that both the composition and number of index constituents vary over time.) Exceptions include the estimated Scope 1 emissions of listed companies, their projected temperature alignment, and their classification under the Net Zero Investment Framework maturity scale. These datasets cover approximately 95% of ACWI IMI constituents, as roughly 5% of companies lack data that would allow us to compute the relevant measures.

About

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