MSCI Sustainability Institute

Transition Finance Tracker

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

Linda-Eling Lee, Tanguy Séné, and Sylvain Vanston

July 2025

Sections

Report information:

- Foreword →
- Key findings →
- Charts index →
- Key terms →
- Acknowledgements →

Report sections:

- Emissions →
- Disclosure →
- Physical risk & nature →
- Financial flows →
- Targets →
- Transition →

Foreword

Energy transition finance is shifting from a race to zero to a race to build resilience.

That's among the takeaways that resound in conversations among finance practitioners and that come through data presented in this latest Transition Finance Tracker. The urgency of the energy transition is colliding with the reality of a warming world — one where climate-related shocks are not distant risks but present-day events shaping economies, markets and communities.

In just the past year, nearly half the world's population experienced over 30 additional days of extreme heat, a stark reminder that physical climate risks are accelerating faster than many models anticipated. For investors, this means managing not just the transition risk associated with moving away from high-emission industries, but also the immediate financial and operational implications of severe weather and climate-induced disruptions. Our analysis shows that cities from Los Angeles to London and Madrid to Melbourne face a surge in dangerous heat days by 2050 if warming trends persist — a signal of the rising costs of climate adaptation.

Yet, the data also highlights areas of progress and opportunity. Assets in transition funds, which seek to engage and decarbonize high-emitting sectors rather than exclude them, rose 20% last year and now comprise almost 40% of all publicly listed climate funds. This speaks to a growing investor recognition that real-world emissions reductions require financing the hard-to-abate industries that underpin the global economy. Similarly, the number of companies committing to science-based climate targets is rising — 18.5% of listed firms now have validated targets, up more than 6 percentage points from last year — though the overall share of companies with any climate pledge has plateaued at 58%.

Our analysis of capital flows also shows a clear geographic pattern: Despite being headquartered across Europe and Asia, most climate funds are directing the majority of their investments toward the U.S. Meanwhile, the green bond market has contracted to a five-year low, underscoring the ongoing need for innovative financing mechanisms to meet global climate commitments.

The months ahead will be decisive. Major emitters such as China (3.8°C) and the U.S. (2.9°C) are misaligned with globally agreed targets, based on MSCI's Sovereign Implied Temperature Rise metric. Countries face a September deadline to submit new 2035 climate targets under the Paris Agreement, and developed nations have pledged to triple annual climate aid to $300 billion by 2035. These commitments will shape the landscape for blended finance, carbon markets and other tools aimed at catalyzing private-sector investment. As we look toward COP30 later this year, efforts to harmonize carbon accounting standards and mainstream climate considerations across investments and insurance could further transform transition finance.

Transition finance may look different six months from now. It's certainly different from a year ago. Investors will be watching.

Linda-Eling Lee
Founding Director,
MSCI Sustainability Institute

Key findings

1. Climate capital flows west

Regardless of where climate funds are based, they are primarily investing in the U.S. Yet a majority of publicly traded climate funds are based in Europe, while most private climate funds are U.S-based.

2. Green bond market sees sharp decline

Issuances of green bonds fell to a five-year low of USD 65.7 billion in the second quarter. The falloff primarily reflects a drop in issuances in the U.S., where issuers issued a total of USD 1.7 billion in green bonds in the quarter, down 88% from the same period a year earlier.

3. Carbon credit flows highlight role of voluntary markets

Companies in France, the U.S. and Germany purchased more than half of nature-based carbon credits from Brazil in 2024. The trend underscores a voluntary yet much-needed flow of climate finance to the Global South from the Global North and a return flow of credits from south to north.

4. Cities face surge in extreme heat days

Urban centers, especially mid-exposure cities such as Los Angeles, New York, Sau Paulo, London, Paris and Melbourne, will see more days of dangerous heat in a world that warms 3°C (5.4°F) above preindustrial levels by 2050. These changes signal rising climate adaptation costs.

5. Most companies breach 2°C threshold

Listed and unlisted companies together directly generate nearly one-third (32%) of global emissions. Nearly two-thirds of listed firms are on warming paths above 2°C, with a global average of 2.7°C. Companies in the energy, materials and consumer discretionary sectors far exceed 1.5°C limits but show potential for improvement through transition finance opportunities.

6. Walking the talk

The greenhouse gases (GHG) emissions of companies with net-zero targets grew more slowly over the five years ending in 2023 compared to companies with no targets, at +0.2% versus +4.3% among those without such targets. Companies whose net-zero targets were approved by the Science Based Target initiative (SBTi) fell by a median of 0.5% per year.

7. Corporate ambition rising

The share of listed companies with a climate target validated by the SBTi rose to 18.5% as of June 30, 2025, up 6.2 percentage points from a year earlier. Broader target-setting has plateaued. Fifty-eight percent of companies now have some form of climate pledge.

8. Big economies off track on climate goals

Major emitters such as China (3.8°C) and the U.S. (2.9°C) are misaligned with globally agreed targets, based on MSCI's Sovereign Implied Temperature Rise metric. Australia and Canada also lag. National 2035 targets due this September may help investors sharpen their view of sovereign transition risk.

9. U.S. grid least carbon-intensive among top emitters

Among the three top-emitting countries, the U.S., at 376 grams of carbon dioxide-equivalent (gCO2e/kWh), has a less carbon-intensive grid than either China (477 gCO2e/kWh) or India (609 gCO2e/kWh) over the 90 days ended June 30, 2025. France (23 gCO2e/kWh, Brazil (89 gCO2 e/kWh) and Canada (125 gCO2e/kWh) have the least carbon-intensive electricity in the G20, thanks to widespread deployment of nuclear energy (France) and hydroelectric power (Brazil and Canada). Seasonal gains in electricity generation from solar are visible in countries such as Germany.

10. Growth decoupling from emissions

Advanced economies show a break between emissions and economic growth. Listed companies in developed markets grew revenues nearly 50% while cutting emissions 16% between 2015 and 2023.

Charts

New in this edition

Emissions

Physical risk & nature

Targets

Disclosure

Financial flows

Transition

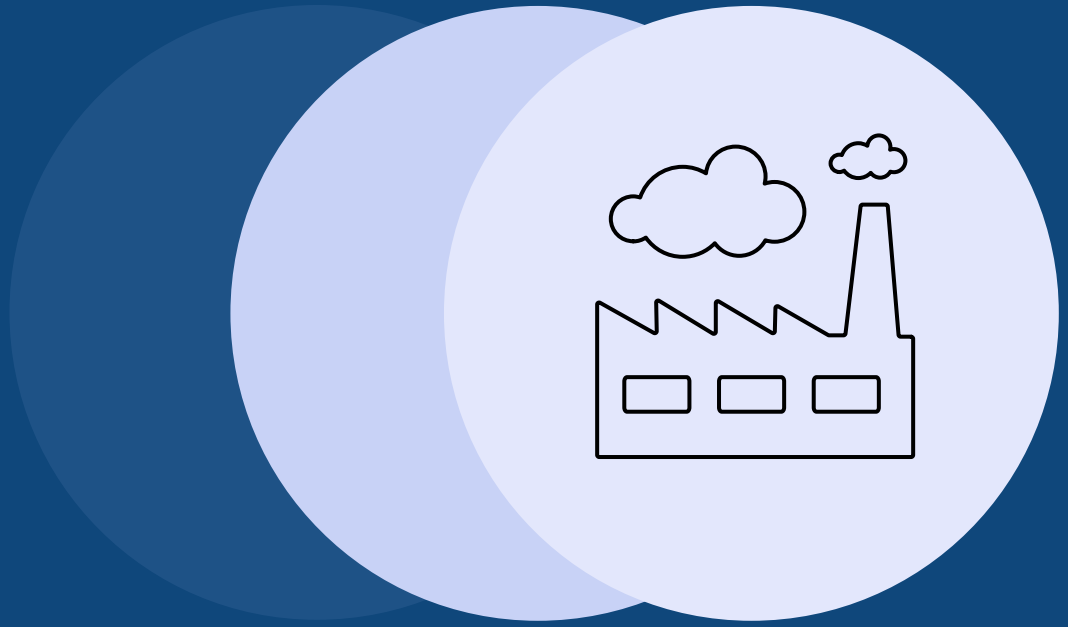
About the data in this report

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 June 30, 2025, the index comprises 8,274 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.

MSCI Sustainability Institute

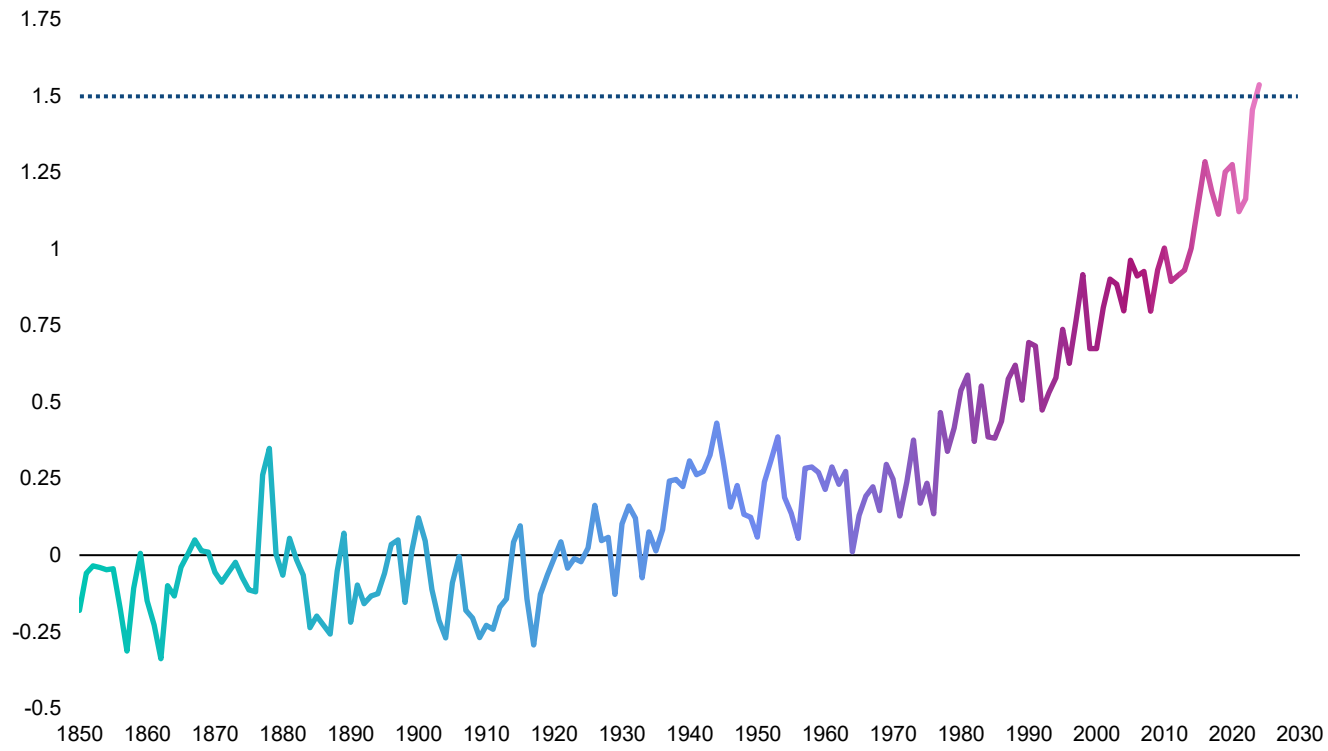
Emissions



A warming world

- 2024 was the hottest on record and the first to exceed 1.5°C (2.7°F) above the preindustrial era. While long-term warming (defined by scientists in decades) is expected to remain below 1.5°C, the past 10 years have been the 10 warmest on record.
- There is a 70% chance that Earth will be more than 1.5°C warmer, on a five-year trend between now and 2029, according to the World Meteorological Organization, up from 47% over the period 2024-2028.
- The buildup of GHG in the atmosphere from the burning of fossil fuels drives warming, which amplifies climate-related physical risk. A majority (57%) of investors in every region say that floods, wildfires and other extreme weather events are creating economic fallout and growing in severity sooner than current climate scenarios anticipate, a survey by our Institute finds.

Global mean temperature 1850-2024 (˚C)



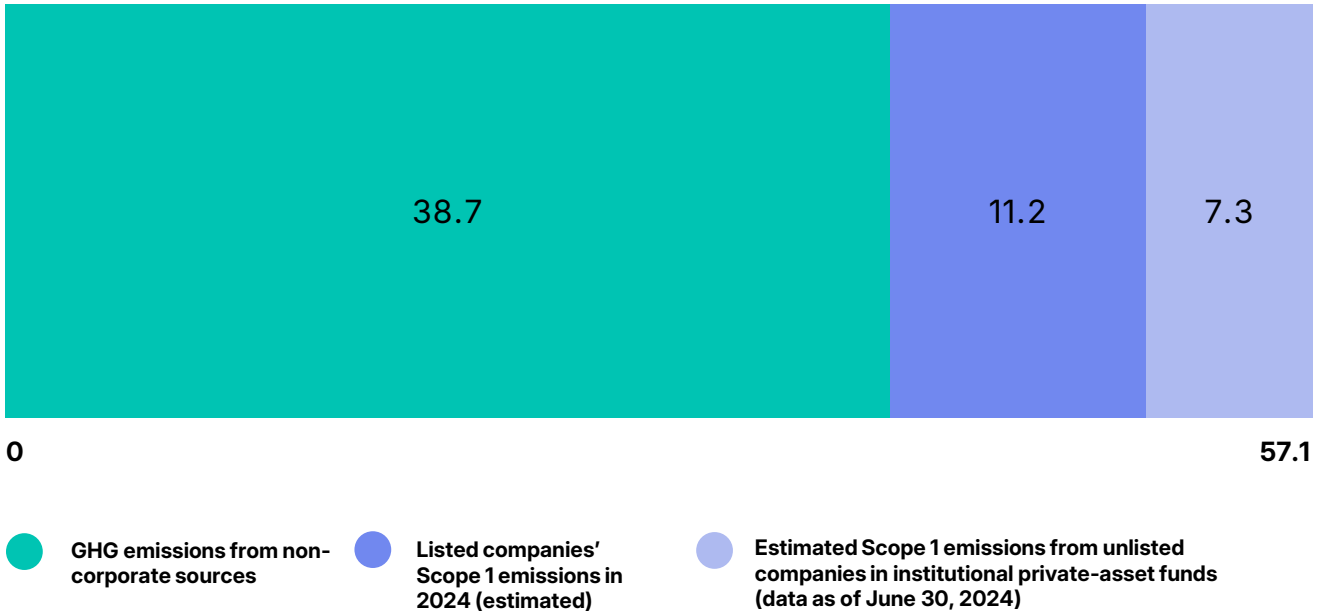
Source: "State of the Global Climate 2024," World Meteorological Organization, March 2025, based on an analysis of six datasets.

Corporate emissions count

Updated

- Taken together, listed companies and their investable unlisted counterparts directly contribute nearly one-third (32%) of GHG emissions.
- We estimate that the direct (Scope 1) GHG emissions of the world's listed companies ticked down by about 1% last year, to 11.2 gigatons (Gt).
- Listed-company emissions contribute nearly one-fifth (19%) of global GHG emissions, while Scope 1 emissions of the roughly 65,000 companies in private-asset funds add nearly 13%. A small share of both listed and unlisted companies generate the lion's share of corporate emissions.
- The nearly 200 signatories to the Paris Agreement are due to submit climate targets for 2035 by September, providing an opportunity for governments to detail national pathways for decarbonization in such sectors as power, industry and transportation that could spur action by companies and investors.

Global and corporate GHG emissions ($GtCO_2e$)



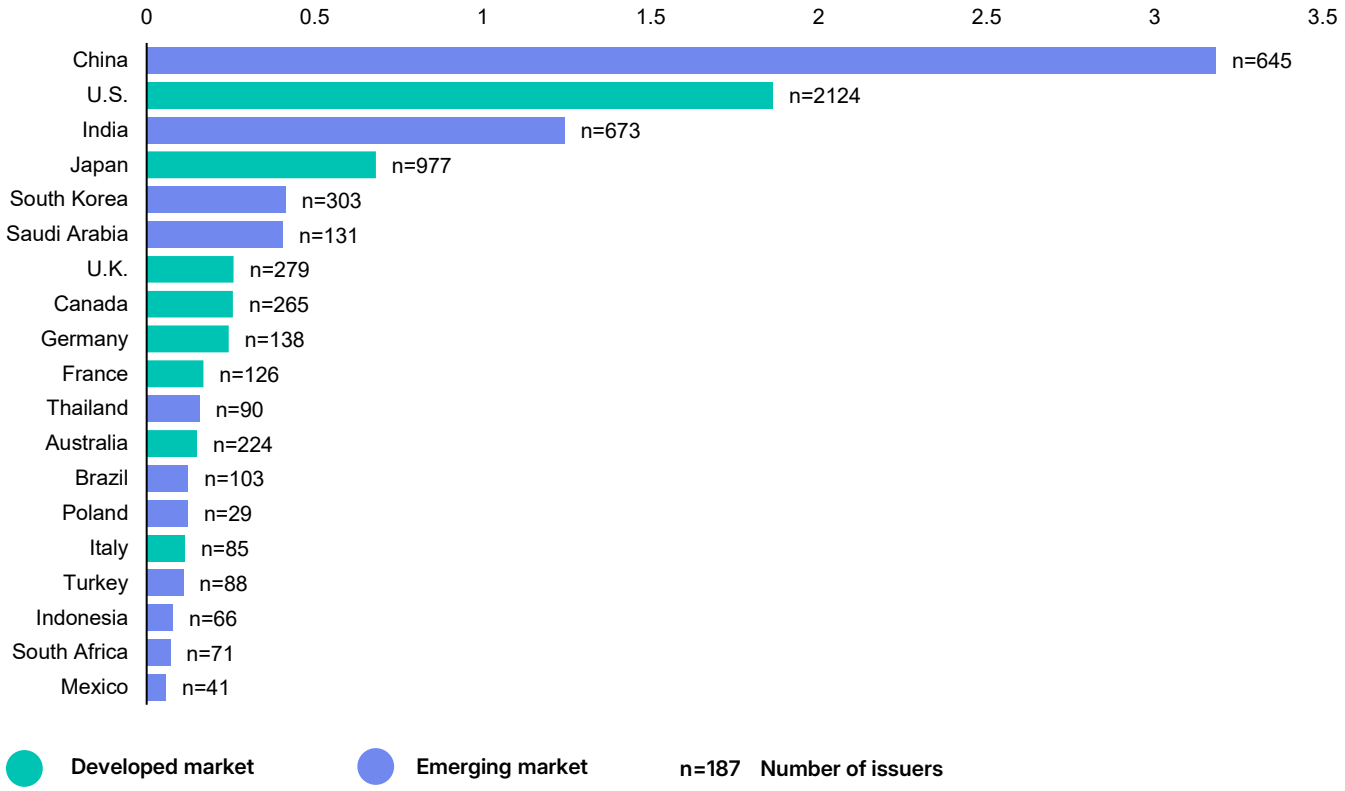
Source: MSCI ESG Research and MSCI Private Capital. Estimate for listed companies reflects the aggregate projected annual Scope 1 emissions in 2024, based on company reporting and decarbonization targets, including an assessment of specificity of the target and the company's track record toward achieving its targets. We assume that the emissions of listed companies that have yet to set a decarbonization target will rise 1% annually. The dataset used in the estimate for listed companies comprises roughly 95% of ACWI IMI constituents, as roughly 5% of constituents lack data that would allow us to compute the relevant measures. Estimate for unlisted company emissions based on estimated and reported carbon-intensity data for 65,000 companies globally held by private-capital funds as of June 30, 2024. Global emissions are based on annual UN Environment Programme reports. Note that we may revise estimates cited throughout this report post-publication.

Updated

Where corporate emitters are

- This data 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 3.2 Gt annually, followed by those in the United States (1.9 Gt) and India (1.2 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 (Scope 1 emissions/$GtCO_2e$)



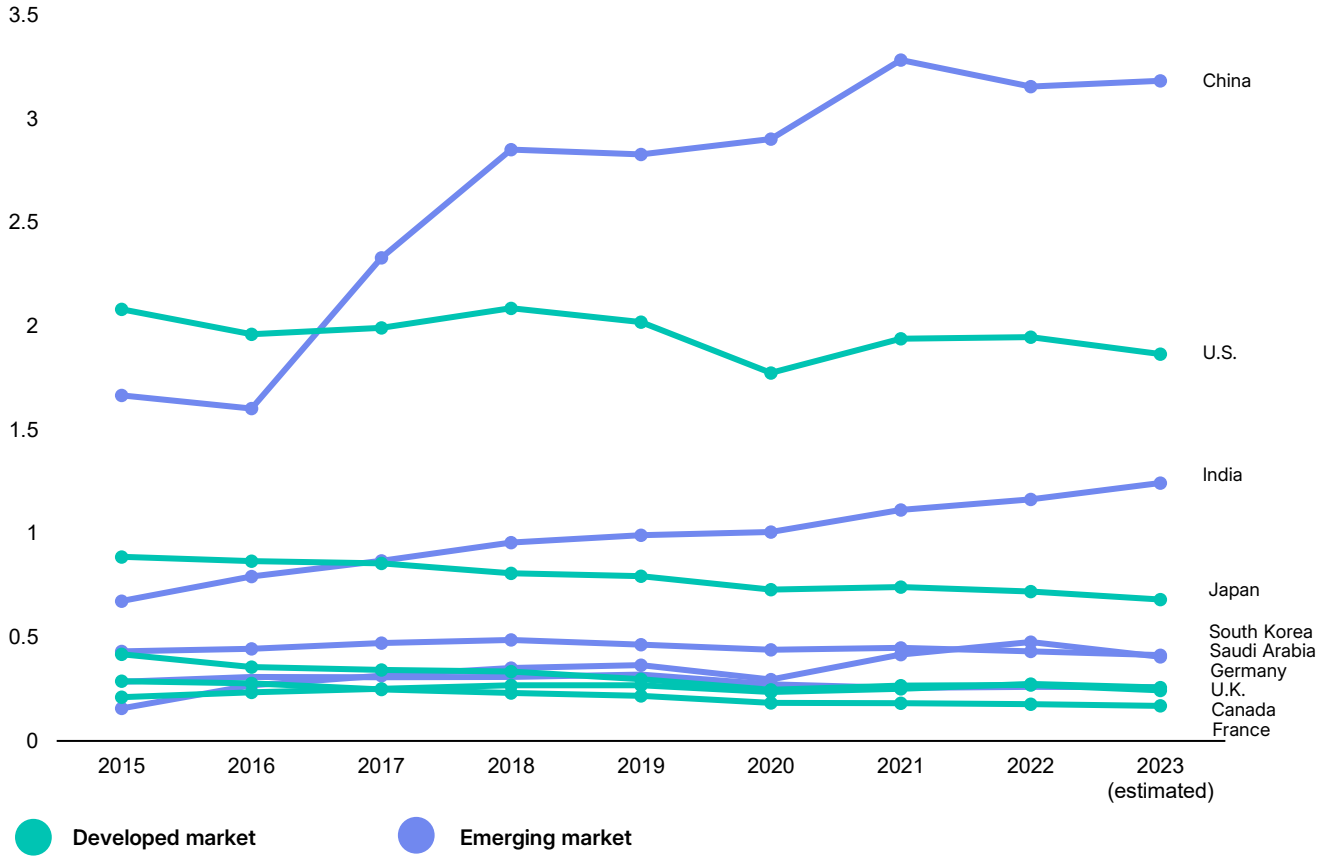
Source: MSCI ESG Research, data as of June 30, 2025.

Updated

Tracking corporate emissions over time

- This time-series data tracks the Scope 1 (direct) emissions of listed companies in 10 economies where such emissions are highest over the eight years ended Dec. 31, 2023. (Note that the universe of listed companies in every market changes over time.) In aggregate, list companies in China show a steady and significant rise in aggregate, from 1.7 to 3.2 GtCO2e. Listed companies in India nearly doubled their emissions over the period.
- The emissions of listed companies in the U.S., Japan, Germany and the U.K. have ticked down over the same period. Emissions of U.S.-listed companies in aggregate fell by more than 10%, to an estimated 1.9 Gt, between 2015 and 2023.
- The divergence highlights the ongoing challenge of balancing economic growth with decarbonization, especially in rapidly developing nations. But U.S.-based companies focused on domestic markets could face hurdles as well if tariff uncertainty and trade restrictions on imported solar panels, wind turbines and other key technologies drives up project costs. Restrictions on components and a weakening of federal incentives for clean technologies are expected to increase the costs of renewables projects and could raise energy costs for U.S. companies sourcing power domestically.

Emissions trend of listed companies by country of domicile (Scope 1 emissions, $GtCO_2e$)



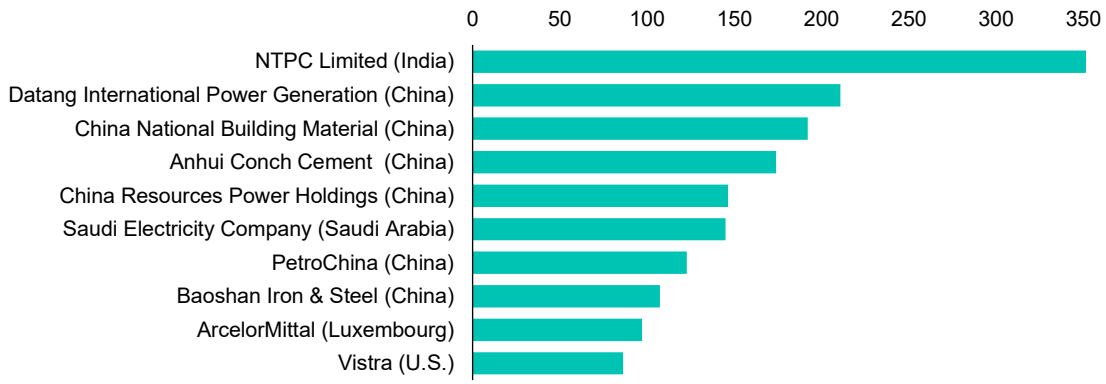
Source: MSCI ESG Research, data as of June 30, 2025.

Listed companies with the largest absolute Scope 1 and 2 emissions

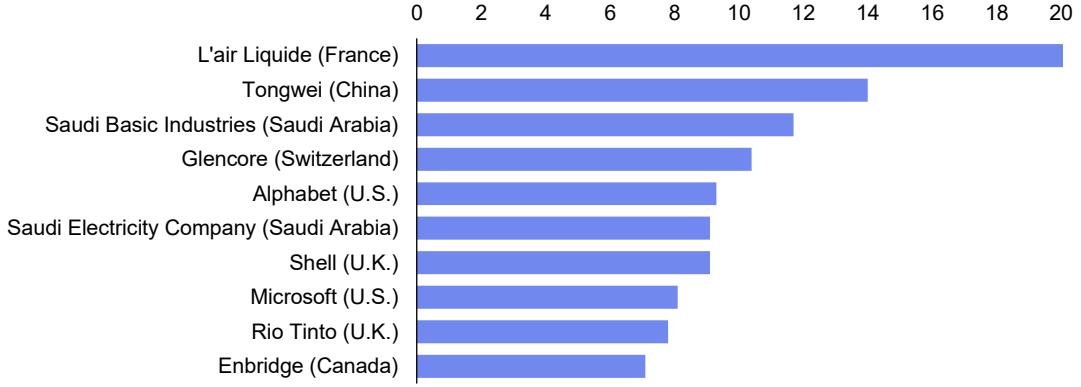
- Companies' emissions do not necessarily correlate directly with climate-related financial risk. But businesses with high emissions contribute to global warming and its effects.
- Utilities have the largest Scope 1 emissions because some rely on fossil fuels for power generation. The largest emissions based on electricity use, or Scope 2, belong to companies with emissions-intensive industrial processes.
- At the same time, companies' emissions today don't tell us much about their future trajectory. For that, we use forward-looking indicators such as companies' projected emissions and capital expenditures along with MSCI's Implied Temperature Rise and other alignment metrics.

Updated

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



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



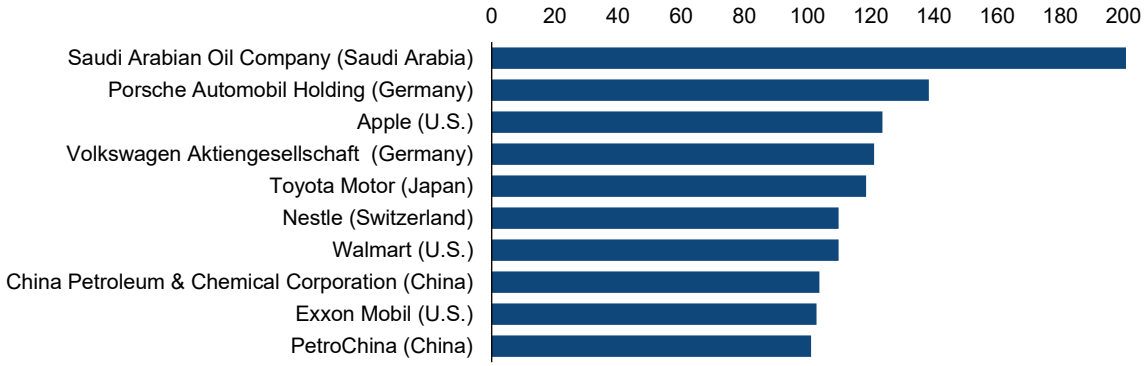
Source: MSCI ESG Research, data as of June 30, 2025, based on company-reported emissions.

Listed companies with the largest absolute Scope 3 emissions

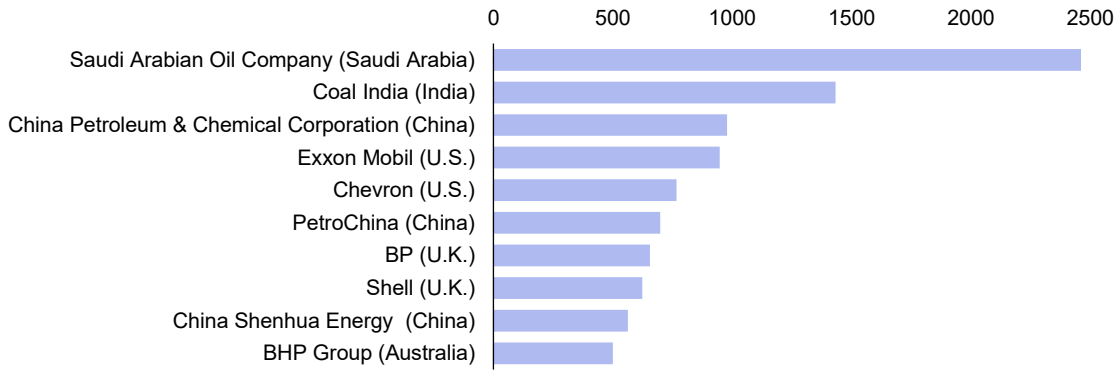
- The emissions from companies' value chains, or Scope 3, make up the largest share (about 75% on average) of most companies' total GHG emissions. Note that we estimate companies' Scope 3 emissions because reporting of such emissions is often incomplete or reported differently by companies even in the same sector.
- Industries with large upstream Scope 3 emissions tend to use a lot of steel, aluminum or chemicals that are emissions-heavy to produce or, for companies such as Apple, Volkswagen or Walmart, rely on complex supply chains. Oil companies have the biggest downstream carbon footprints because the use of their products produces massive quantities of GHG emissions.
- Measuring and managing Scope 3 emissions continues to challenge companies because such emissions occur outside their direct control. In its latest draft corporate net-zero standard, for example, the SBTi, an arbiter of corporate climate targets, proposes that companies measure the share of procurement from net-zero-aligned suppliers and the share of revenue derived from net-zero-aligned activities.

Updated

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



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



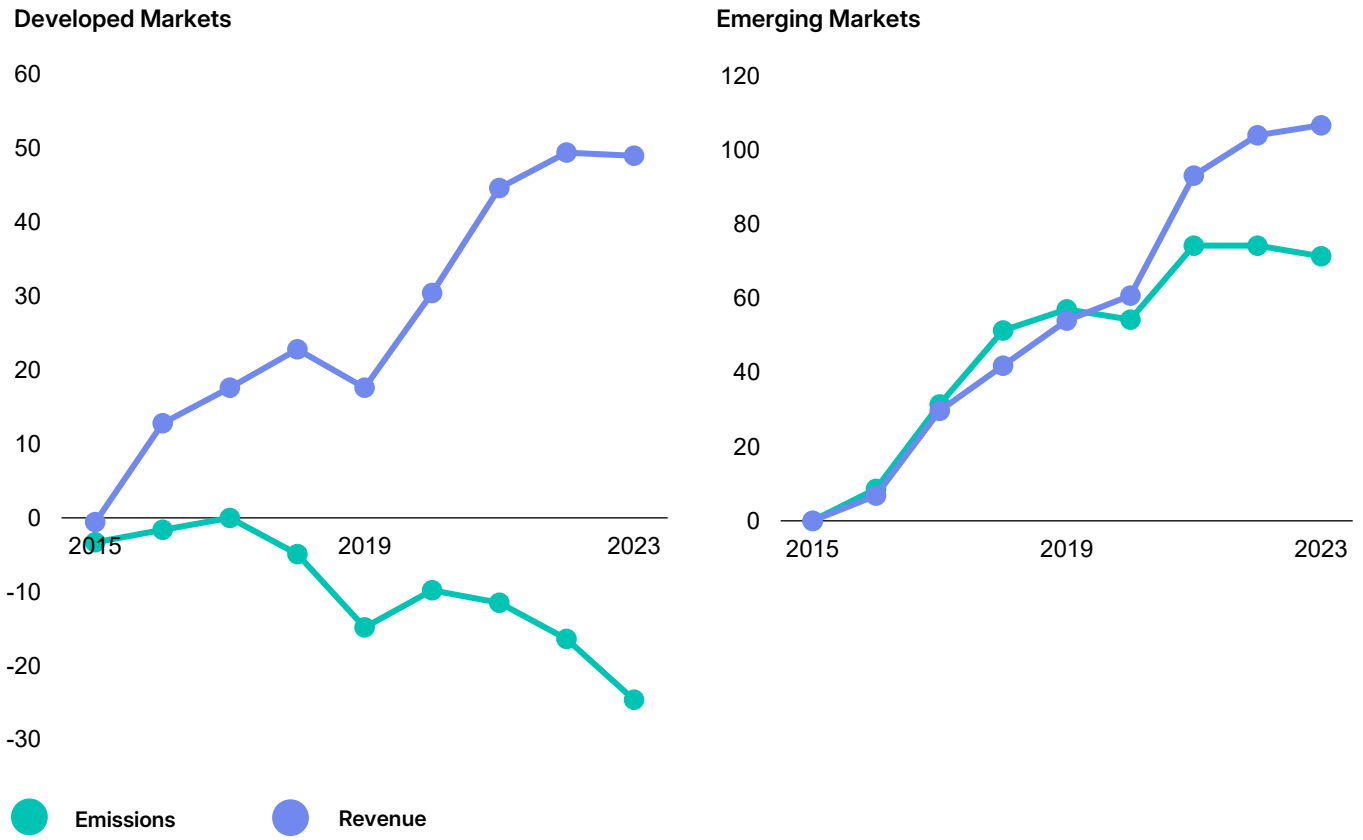
Source: MSCI ESG Research, data as of June 30, 2025. We estimate Scope 3 emissions for all companies in our coverage based on company reporting of total Scope 3 emissions or, alternatively, by using company-specific information that considers both the revenue intensity of emissions and production data 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.

Updated

Creating more value with fewer emissions

- Economic and GHG emissions growth have correlated historically. But that has begun to decouple in advanced economies, indicating progress toward more sustainable business practices and improved energy efficiency globally, as well as the growth in services as a share of activity. Global emissions growth slowed to 0.8% in 2024, while the global economy expanded by more than 3%, according to the International Energy Agency.
- From 2015 to 2023, revenues of listed companies domiciled in developed markets outpaced the growth in emissions, rising nearly 50%, while those companies' direct emissions fell by 16%.
- In emerging markets, emissions and growth have continued to climb roughly together. Over the nine years ended in 2023, revenues of listed companies domiciled in emerging markets more than doubled, while emissions grew 71%.

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



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

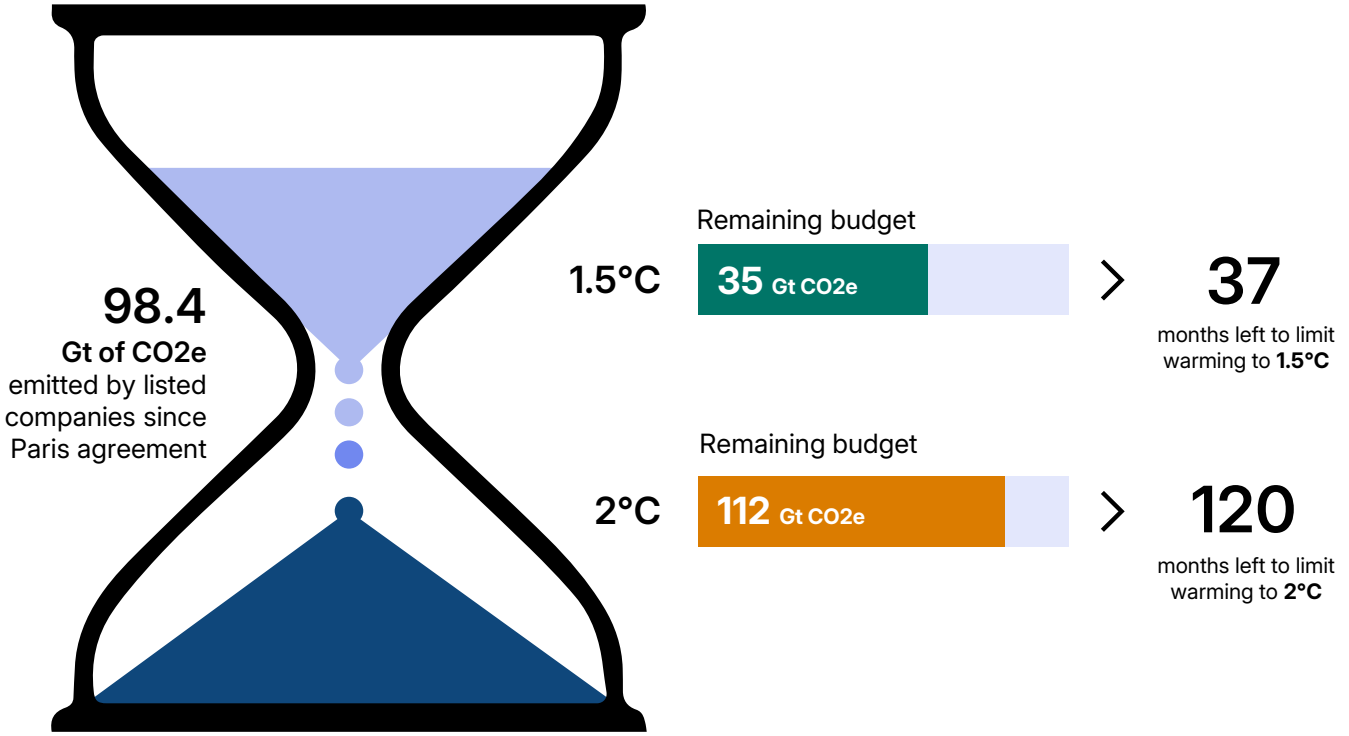
Updated

Emissions budgets 101

- We estimate listed companies' remaining GHG emissions budget to be 35 Gt CO2e for a 50% likelihood of limiting warming to 1.5°C and 112 Gt CO2e for a 50% likelihood of limiting warming to 2°C, as of June 30, 2025.*
- At this pace, we estimate that the 1.5°C budget of ACWI IMI companies will be exhausted within about three years, which is consistent with recent scientific estimates of the global carbon budget.
- A growing number of companies have mapped out climate targets in line with 1.5°C but may be unable to avoid using up their sector's share of the global carbon budget if the economy takes too long to decarbonize at scale.

*An emissions budget estimates how much carbon dioxide (CO2) and other greenhouse gases 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 2.0°C above preindustrial levels. We calculate an emissions budget for listed companies that includes both emissions from CO2 and other greenhouse gases, which we refer to collectively as CO2-equivalent (CO2e) emissions.

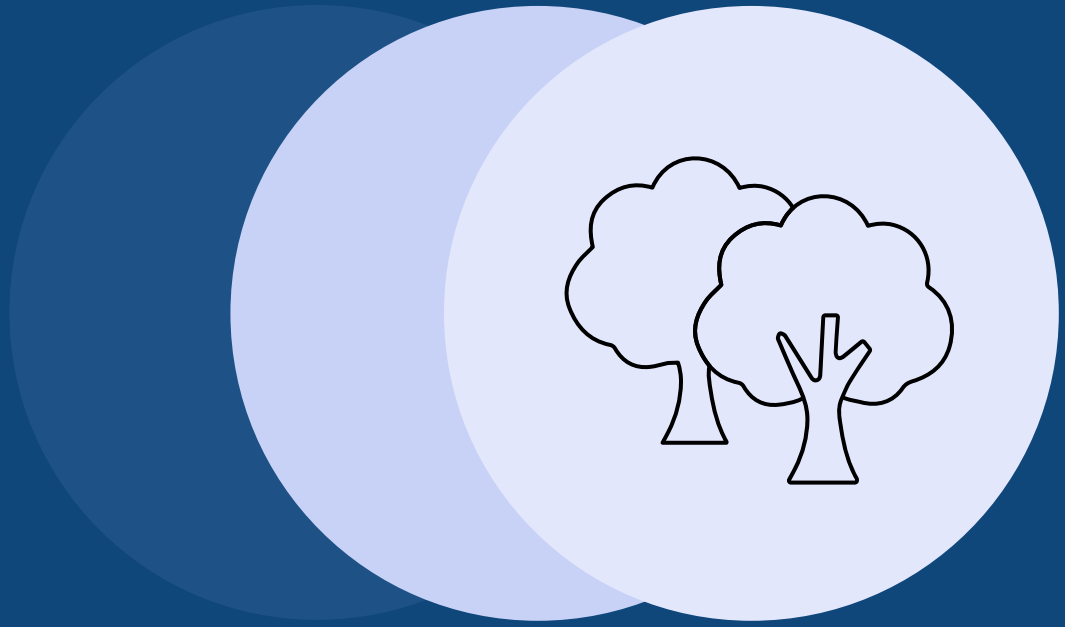
Remaining emissions budget for listed companies (Gt CO2e)



Source: MSCI ESG Research, data as of June 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.

MSCI Sustainability Institute

Physical risk & nature

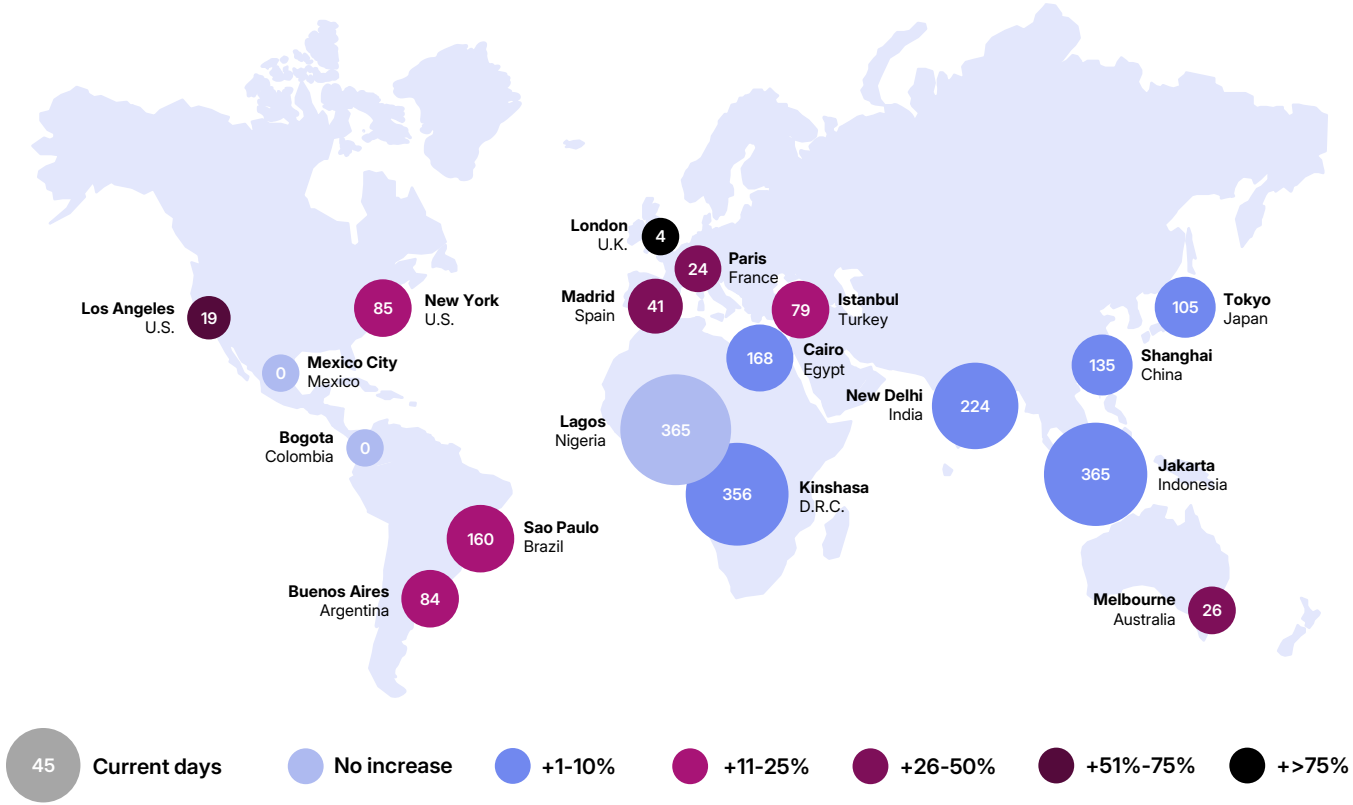


New

Slow burn

- A warming world adds to the number of days of extreme heat (defined as the average number of days exceeding a wet-bulb globe temperature of 20°C) that cities experience. The map shows the average number of such "heat-exceedance" days expected in 18 cities in the current climate and the expected change in such days by 2050 under a scenario associated with 3°C (5.4°F) of warming above preindustrial levels.
- Cities at either extreme — Mexico City and Bogota (0 days), and New Delhi, Lagos, Kinshasa and Jakarta (>220 days) — either have little exposure to extreme heat because of their elevation or, at the high end, some level of acclimatization because extreme heat characterizes their climate already.
- Our modeling suggests that cities in between these two extremes — across the U.S., South America, Europe and Australia — may experience a significant change in extreme heat days annually and hence mark locations where the costs of extreme heat could come as more of a shock than in regions that may be acclimatized to extreme heat already.

Additional days of extreme heat (average % change by 2050, based on 3°C warming)



Source: MSCI ESG Research, data as of June 30, 2025, using MSCI GeoSpatial Asset Intelligence, based on "Current Policies" scenario developed by the Network for Greening the Financial System.

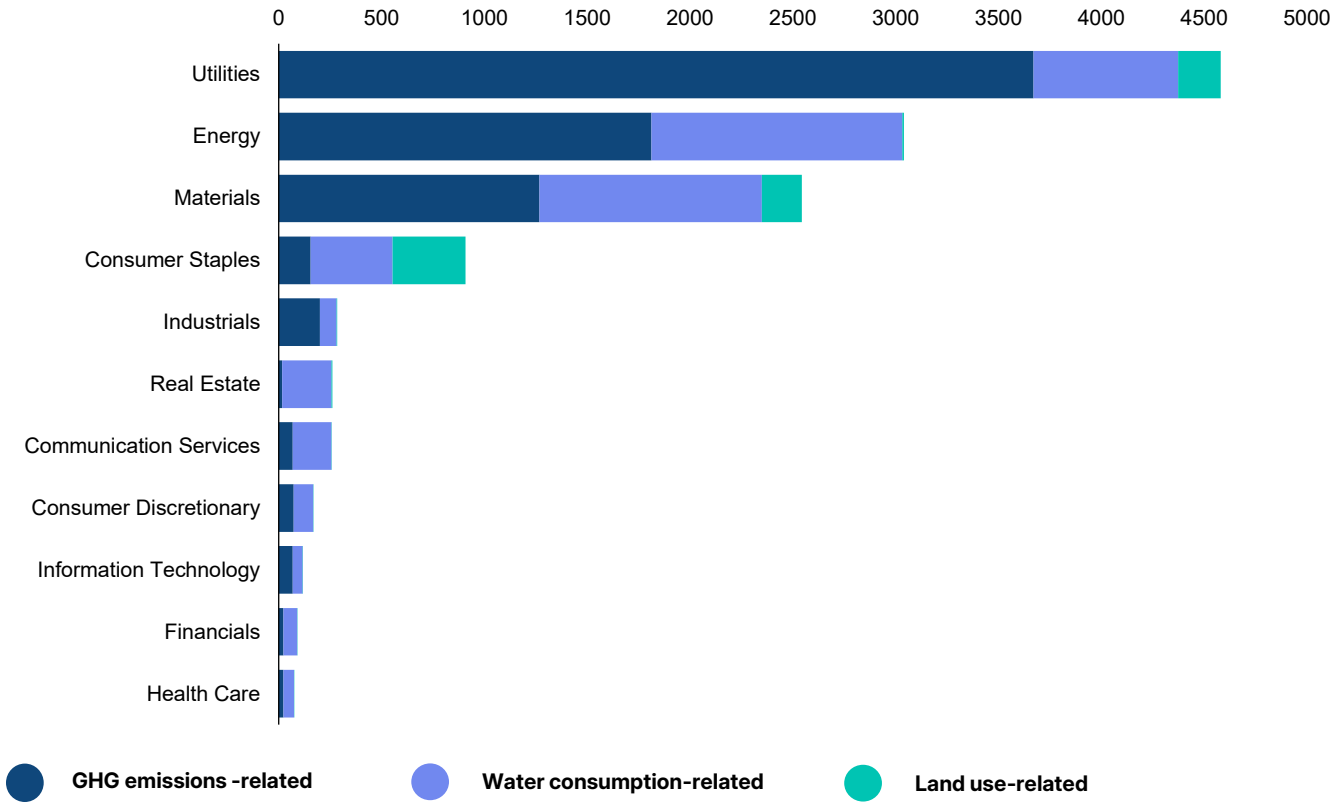
Quantifying biodiversity loss

Updated

- The chart shows the potential contribution to global species extinction of the world's listed companies in 11 industry sectors based on a metric known as potentially disappeared fraction (PDF) of species. A company's PDF represents the number of species that are expected to disappear globally due to location-specific pressures (land use, GHG emissions and water consumption) on nature exerted by the company. PDF is a long-term estimation model, not an actual observation of current impacts.
- Companies in the utilities sector, for example, have an average PDF of 4,580, meaning that the current activities of the average listed utility, if extended over the next 100 years, could contribute to the extinction of more than 4,500 species globally, chiefly through water consumption (PDF of 704) and carbon emissions (PDF of 3,670).*
- Companies in the utilities, energy and materials sectors typically contribute to global species extinction due to their carbon- and water-intensive businesses. Companies in the food and agriculture industry, part of the consumer staples sector, contribute to the high pressure on species that comes from land use.

*Note that the estimate assumes 100 million species on Earth, the upper limit of current scientific estimates. Because the actual number is uncertain and might be lower, the extinction figure represents a maximum estimate, not a precise count.

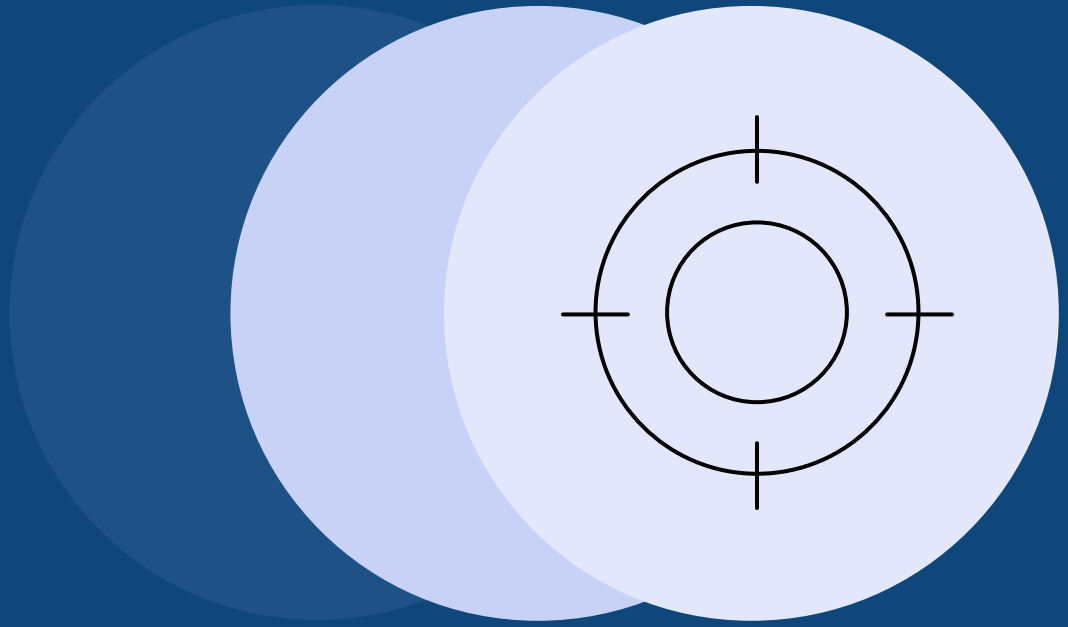
Potential contribution to future species extinction (number of species loss through activities of average company over the next 100 years)



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

MSCI Sustainability Institute

Targets

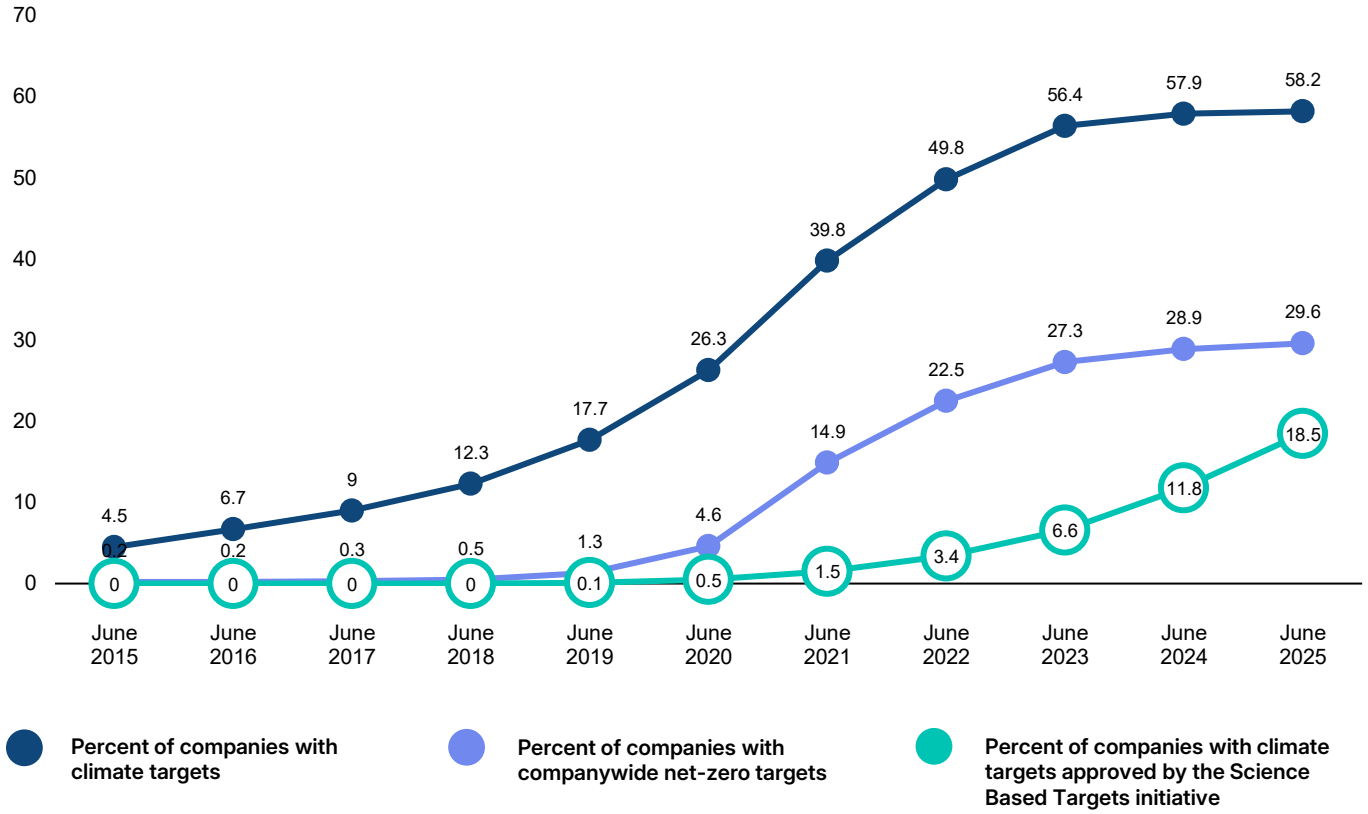


Tracking climate commitments

- Corporate climate targets matter because companies that are setting ambitious targets need capital to decarbonize their operations. Targets also help investors who are supporting emissions-intensive companies measure the quantity of emissions those companies may be expected to reduce. But targets differ markedly.
- Though 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 — typically more ambitious — has continued to climb.
- Overall, 18.5% of listed companies have set a climate target validated by the SBTi, as of June 30, 2025, an increase of 6.2 percentage points from a year earlier. Many investors view SBTi-approved targets as a gold standard because SBTi purports to ensure that the target ambition is consistent with the aim of constraining warming to 1.5°C.
- Nearly 30% of companies have set a target that aspires to reduce emissions to net-zero (though not necessarily validated by the SBTi), relatively flat compared with the same period a year earlier. Overall, 58% of listed companies have published some kind of climate commitment, also roughly the same as a year ago.

Updated

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



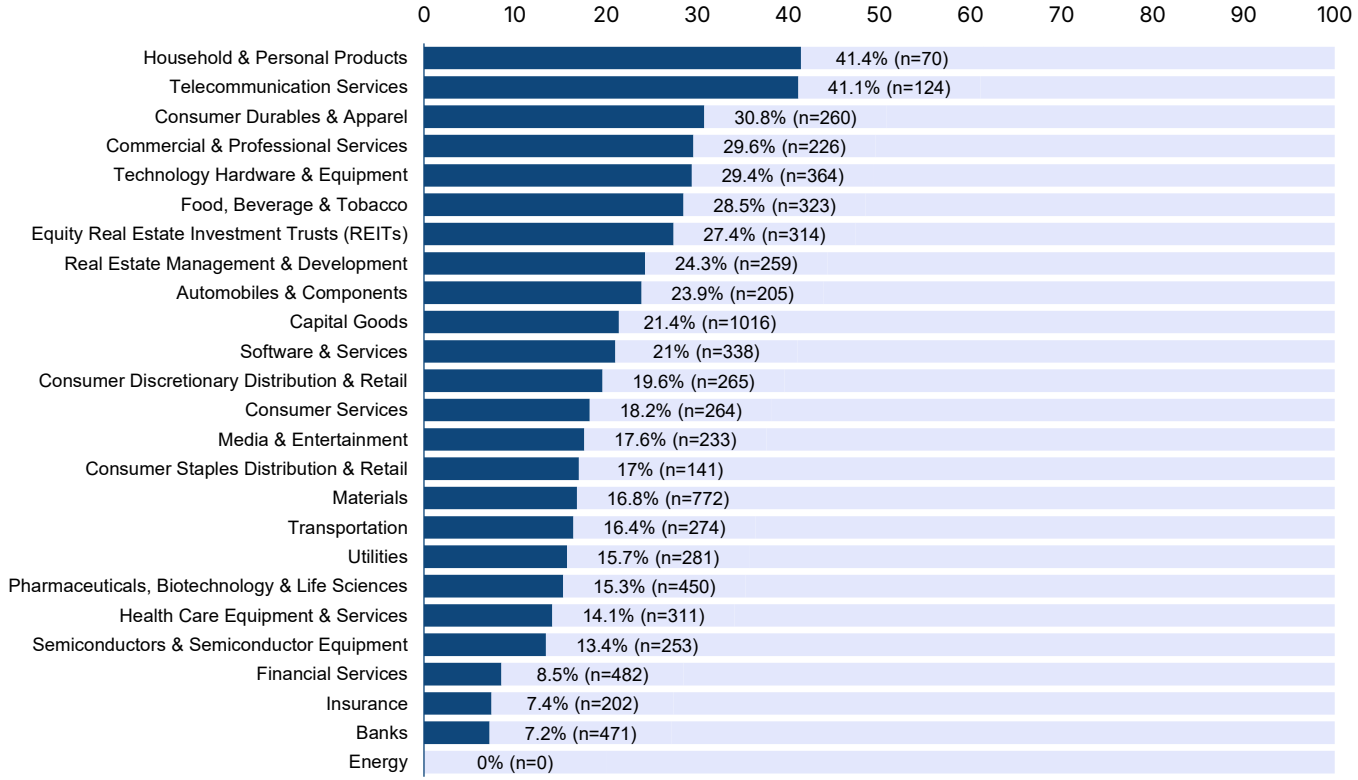
Source: MSCI ESG Research, data as of June 30, 2025. Note that totals are cumulative. The share of corporate climate targets reported here reflects the relevant share of all companies in the MSCI ACWI IMI. Previous editions of this report show targets for roughly 95% of index constituents, hence the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

Science-based targets by industry

Updated

- The household products and telecommunications industries top the list of industry groups based on climate ambition, with roughly 41% of companies in both industries having set at least one target approved by SBTi, as of June 30, 2025. The consumer durables and apparel industry ranks third, with 30.8%.
- Close to one third (29.6%) of companies in the commercial and professional services, and food and beverage industries, have an SBTi-approved target, as of the same date.
- By contrast, roughly 16% of utility-industry companies have at least one SBTi-approved target, despite the industry's large emissions footprint and its pivotal role in the energy transition, reflecting how demanding it is for some industries to get on a net-zero path. The absence of energy sector companies reflects the fact that SBTi does not currently validate targets from oil and gas companies.

Share of companies with SBTi-approved targets, by GICS® industry group (%)



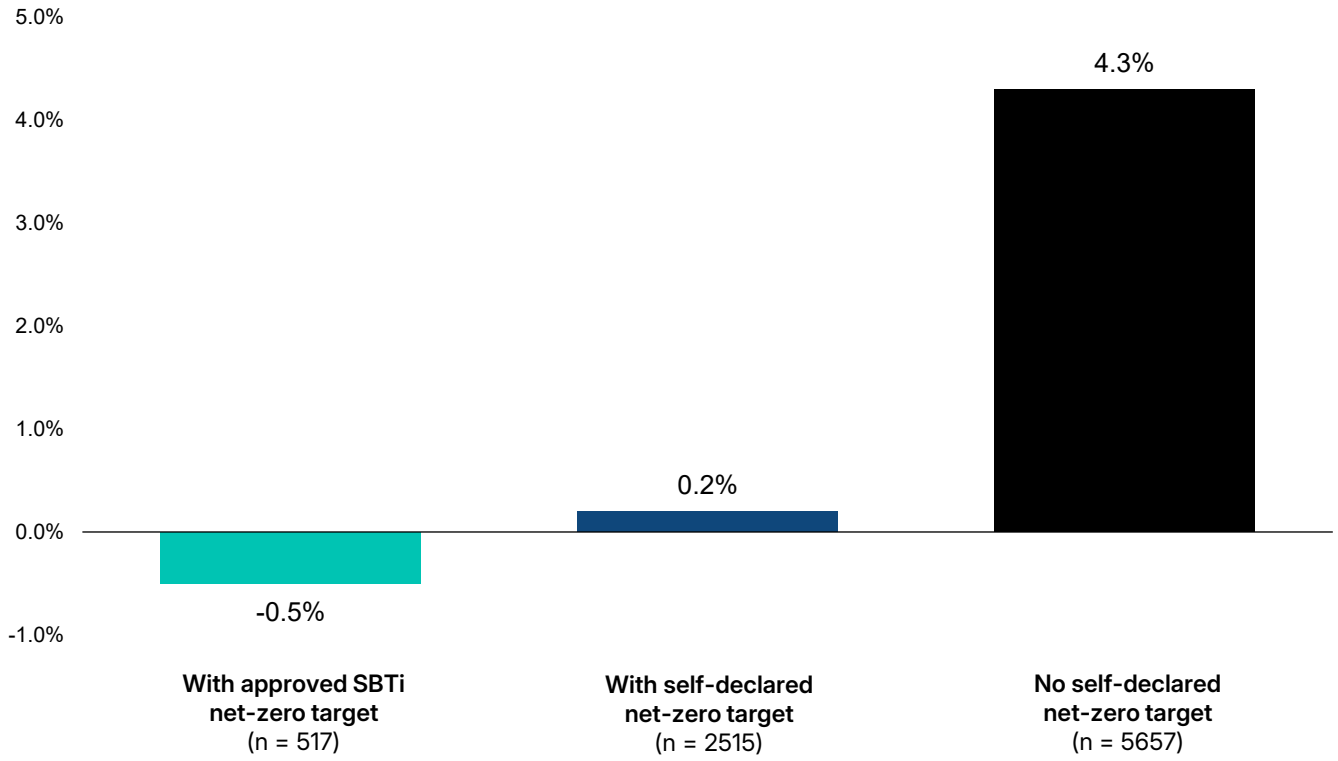
Source: MSCI ESG Research, data as of June 30, 2025. GICS® refers to the global industry classification standard jointly developed by MSCI Inc. and S&P Global Market Intelligence. The GICS structure comprises 11 sectors, 24 industry groups, 69 industries and 158 subindustries. The share of corporate 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% index constituents, hence the lower 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 five years ending 2023, the most recent year for which we can review complete data on both corporate targets and changes in companies' emissions.
- Median absolute Scope 1 GHG emissions among listed companies with self-declared net-zero targets (about 30% of listed companies) increased by 0.2% per year between 2018 and 2023, compared with the median annual increase of 4.3% among those without such targets.
- The Scope 1 GHG emissions of companies that obtained an SBTi-approved target fell by a median of 0.5% per year over the same period.

New

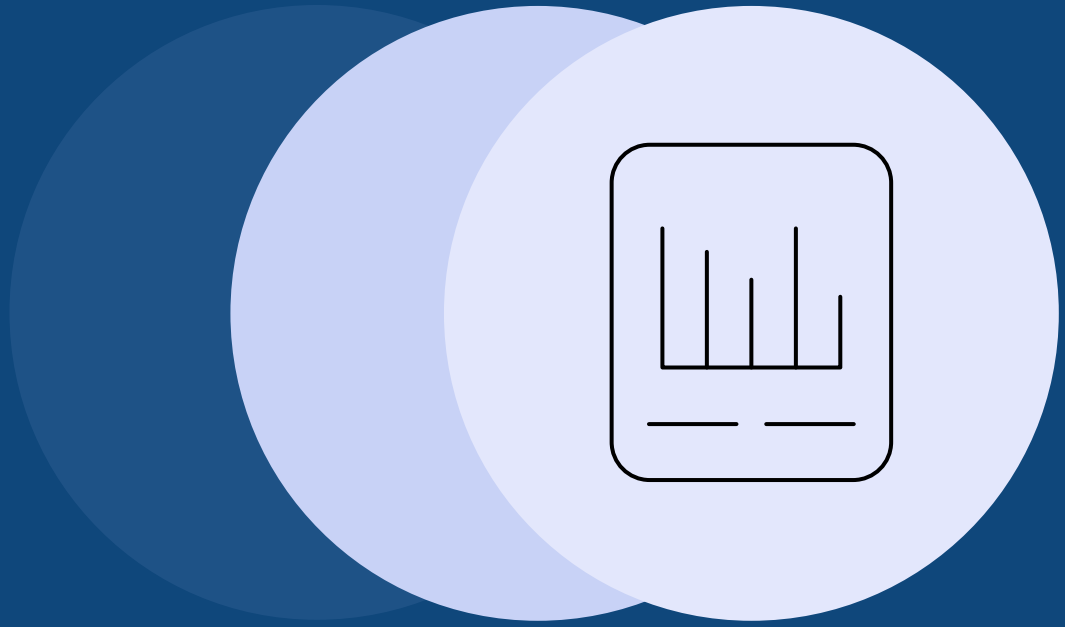
Company Scope 1 emissions performance, by climate commitment type (median annualized change in absolute Scope 1 emissions, 2018-2023)



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

MSCI Sustainability Institute

Disclosure

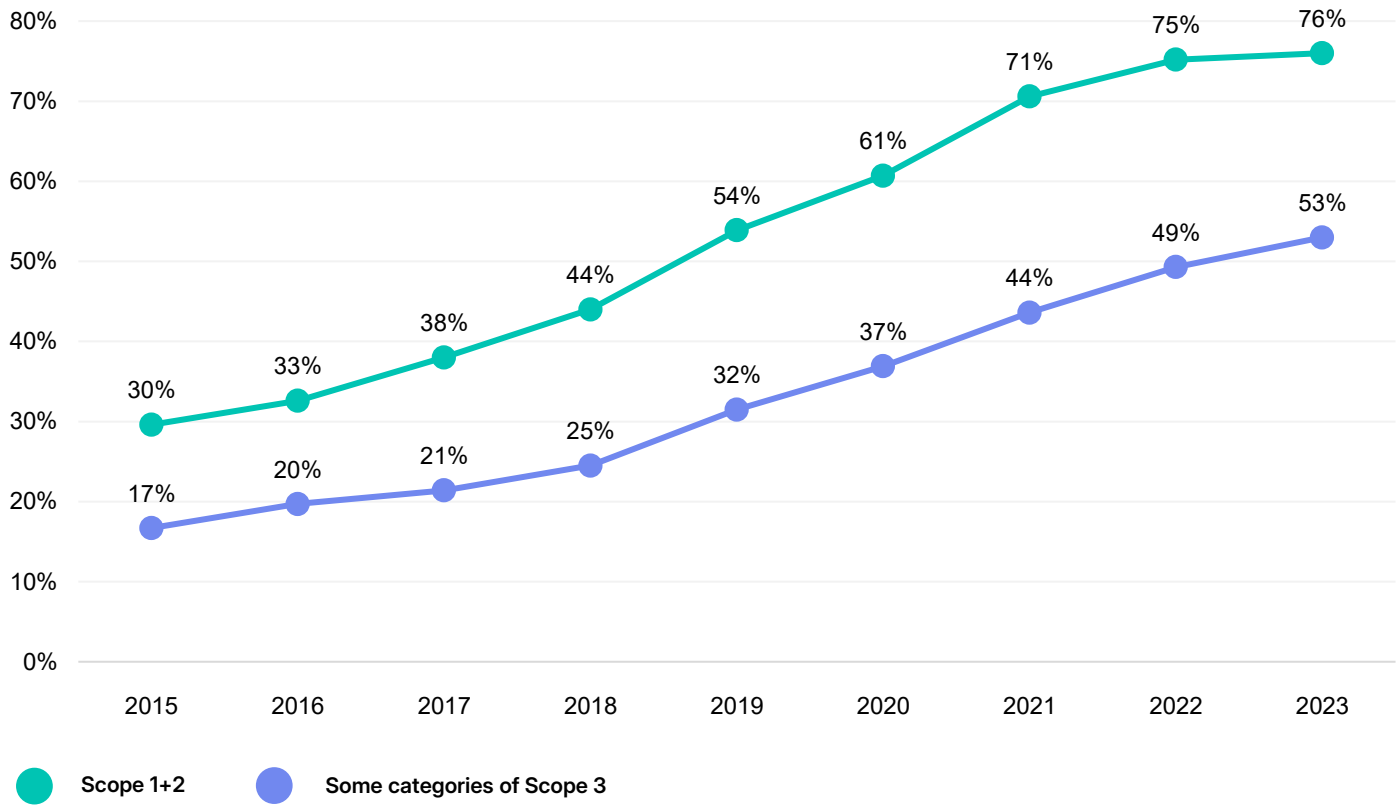


Updated

Emissions disclosure: Listed companies

- Disclosure of corporate GHG emissions allows investors to compare companies across sectors and track progress toward climate commitments, as well as to assess financially relevant climate risks in their portfolios and loan books.
- Overall, more than three-quarters (76%) of listed companies disclosed their Scope 1 and/or Scope 2 emissions as of Dec. 31, 2023, the latest year for which completely collected and vetted reporting is available, an increase of 1 percentage point from a year earlier.
- More than half (53%) of companies reported at least some of their Scope 3 emissions, a rise of 4 percentage points from a year earlier. Companies notoriously struggle to tally their Scope 3 emissions, hence the lower reporting rate.

Emissions disclosure by listed companies (%)



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

Updated

Adoption of disclosure standards

Countries across the map continue to adopt standards for climate disclosure, though some jurisdictions, including the U.S. and European Union, have either rolled 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.

Guide to map

- **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.

In force Pending rollback or delay

A snapshot of climate reporting requirements

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

United States: *Securities and Exchange Commission:* Dropped court defense of a climate disclosure rule finalized in 2024.

California Air Resources Board (CARB): The state passed two laws in 2023 that require large companies to report 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.

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.

European Union: Mandatory sustainability reporting subject to double materiality for listed and unlisted companies and financial institutions. 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.

Brazil: Mandatory reporting based on ISSB standards begins in FY2026 for listed companies and major financial institutions, with phased rollout through 2028.

Switzerland: Mandatory TCFD-aligned climate disclosures for large companies in place since 2023; launched a consultation in December 2024 on aligning with ISSB and EU Sustainability Reporting standards. Paused the revision in June 2025 to await clarity on the EU's Omnibus reforms.

Mainland China: Exchanges regulated by China's Securities Regulatory Commission (Shanghai, Beijing, Shenzhen) have issued guidelines for sustainability and climate reporting comparable to 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, Separately, the Hong Kong Institute of Certified Public Accountants has issued sustainability and climate disclosure standards, effective from Aug.1, 2025, with full adoption by large publicly accountable entities expected by 2028.

South Korea: Draft ISSB-aligned sustainability and climate disclosures expected to be finalized this year.

Singapore: ISSB-aligned disclosures mandatory for listed companies starting from fiscal year 2025. The Accounting and Corporate Regulatory Authority will require large non-listed companies to begin similar reporting from FY2027, with Scope 3 emissions disclosures to follow by FY2026 for listed issuers and no earlier than FY2029 for non-listed entities.

Malaysia: ISSB-aligned climate-related disclosures, including Scope 1 and 2 emissions, mandatory for listed companies starting from fiscal year 2025. Scope 3 emissions reporting is phased in, commencing from FY2027 for large Main Market issuers, with subsequent groups following in later years.

Indonesia: Pending consultation on ISSB-aligned reporting requirements.

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.

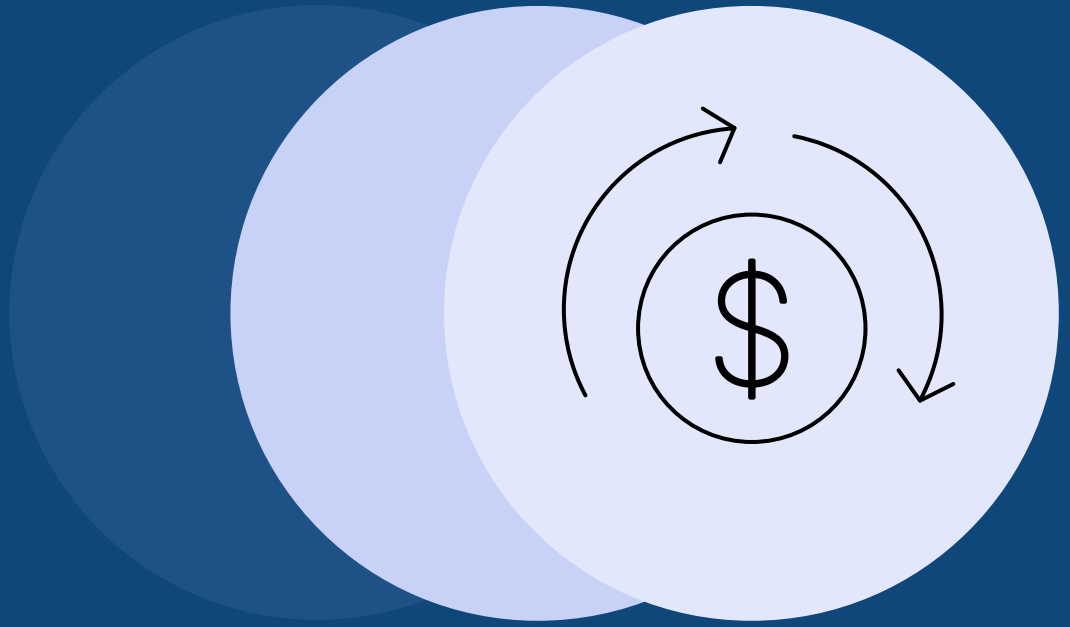
Australia: Mandatory ISSB-aligned disclosures and Scope 1 & 2 emissions reporting for listed and unlisted companies starting in 2026, with Scope 3 reporting to follow in 2027.

New Zealand: Mandatory TCFD-aligned climate disclosures since 2024. The government has launched a review exploring whether to raise the market capitalization threshold for listed issuers, potentially reducing the number of reporting entities, though current obligations remain unchanged.

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

MSCI Sustainability Institute

Financial flows



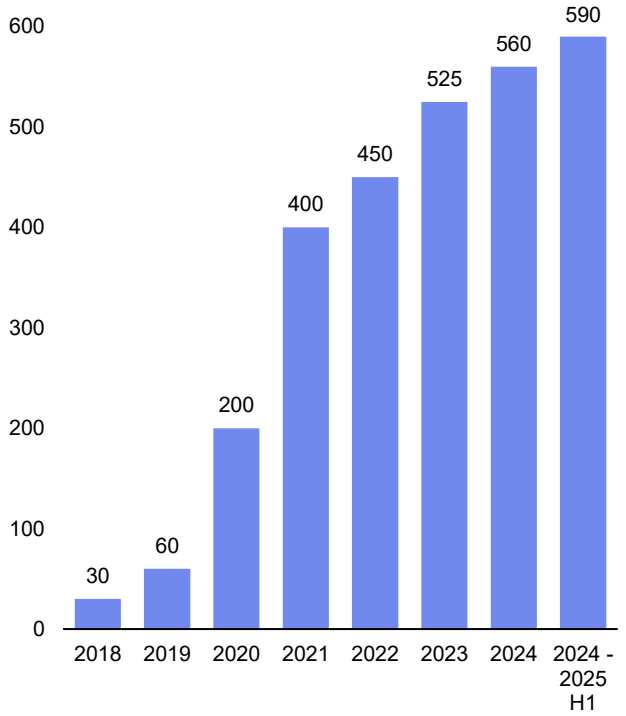
Climate capital across asset classes

Updated

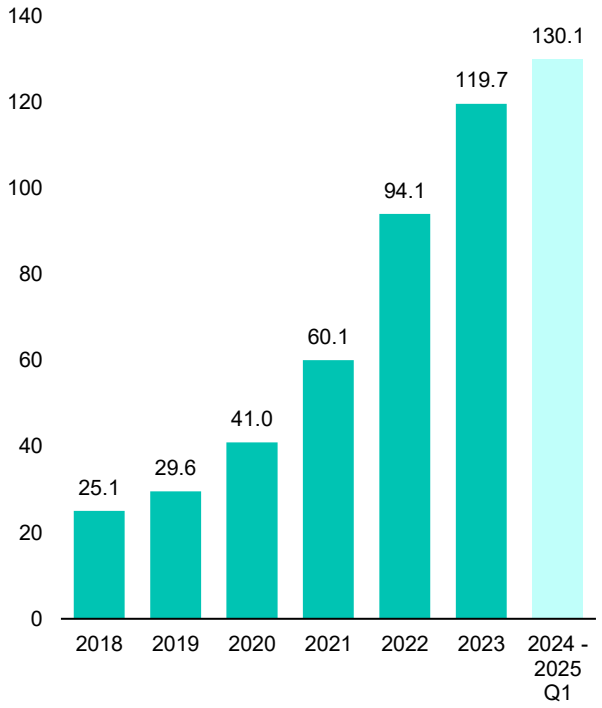
- Climate-named funds have expanded rapidly in recent years in both publicly listed and private capital markets, reflecting growing investor interest in the energy transition and decarbonization opportunities across asset classes.
- Assets under management in publicly traded climate funds grew nearly 20-fold to USD 590 billion over the roughly seven years ending June 30, 2025.
- There were about 220 climate-named private capital funds globally — including private equity, private credit and venture capital — as of March 31, 2025, with a cumulative capitalization of about USD 130 billion.
- Private capital climate funds launched between 2022 and March 31, 2025, represented 36% of the total private climate fund count and accounted for about 54% of the cumulative capitalization of such funds.

Capital in climate funds (USD billion)

Publicly traded climate funds (assets under management)



Private climate funds (cumulative capital raised)



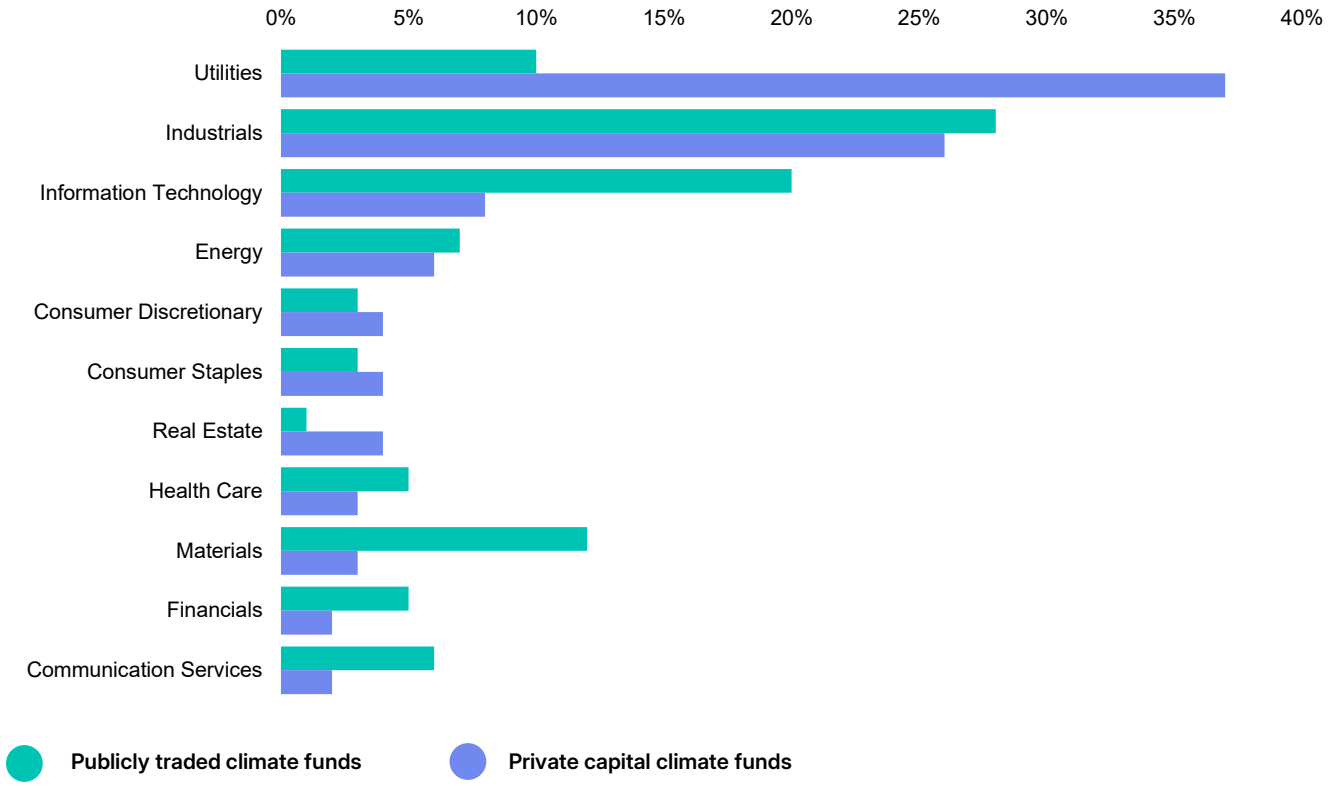
Source: MSCI ESG Research and MSCI Private Capital. Public funds data as of June 30, 2025. Private funds data as of March 31, 2025.

Investing in (and around) the transition

- Financing the energy transition requires investors to deploy capital in ways that help companies in hard-to-abate sectors reduce their emissions. Investors in privately held companies — whether through private equity, venture capital or hybrid funds — can often influence corporate behavior more directly by virtue of their controlling ownership stakes.
- Thirty-seven percent of investments in private capital climate funds are allocated to the utilities sector — an emissions-intensive industry that offers significant opportunities to support the energy transition — compared with just 10% of publicly-traded climate funds.
- Public climate funds tend to focus more on transition-enabling sectors. Twenty percent of investments in publicly-traded climate funds are in the information technology sector and 12% are in materials — both essential to scaling low-carbon technologies. In contrast, private capital funds allocate just 8% and 3%, respectively, to these industries.

Updated

Sector exposure of climate funds (% of assets)

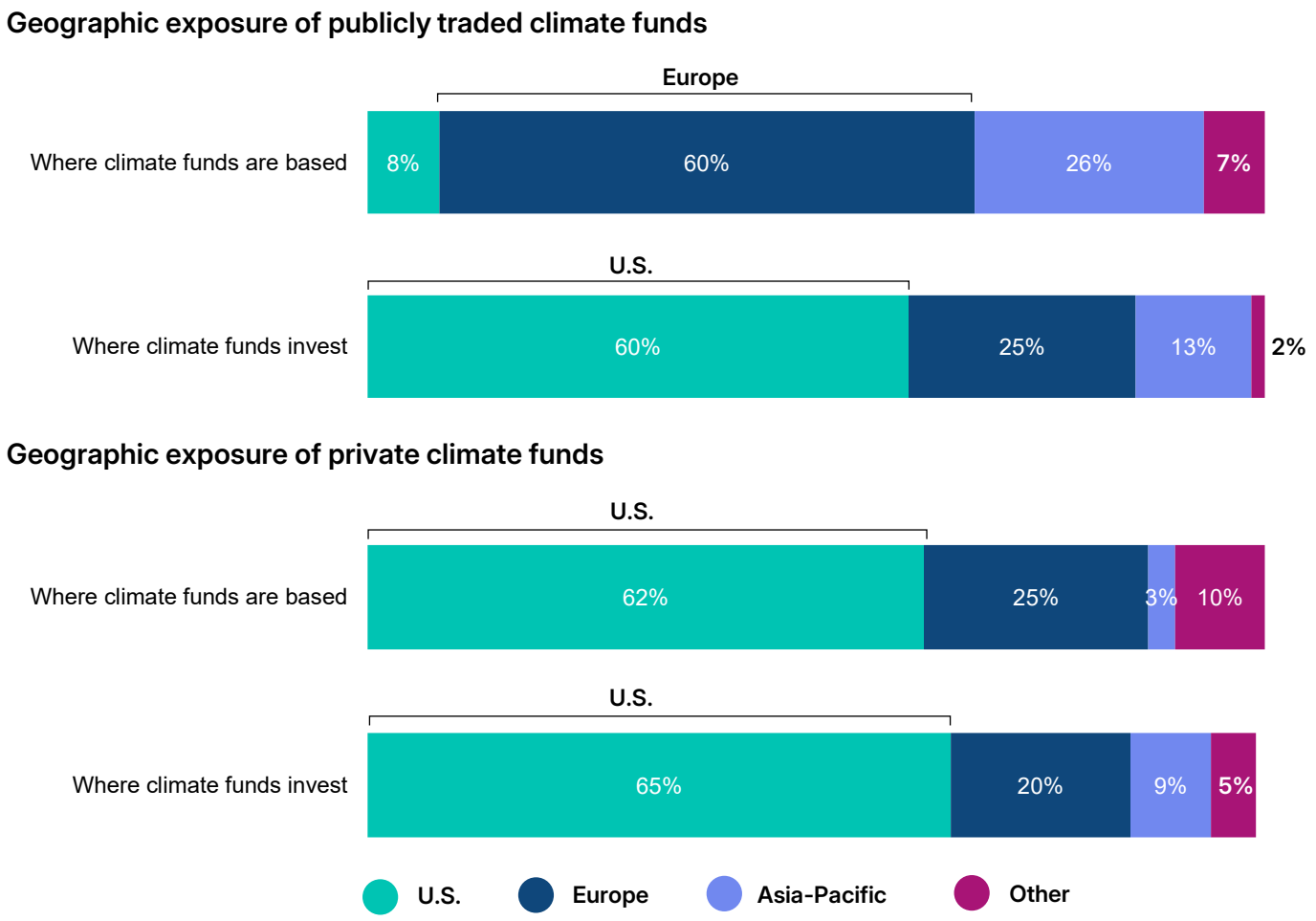


Source: MSCI ESG Research, data for publicly traded funds is as of June 30, 2025. Data for private capital funds comes from MSCI Private Markets, data is as of March 31, 2025.

Where the capital in climate funds is invested

- Regardless of where climate funds are based, they are investing primarily in the U.S. Yet a majority of publicly traded climate funds are based in Europe, while most private climate funds are U.S-based.
- Sixty percent of the investments in publicly-traded climate funds were in U.S.-listed companies or other U.S.-domiciled assets, as of June 30, 2025, with 25% in Europe-listed firms and 13% in APAC. Privately-held climate funds follow a similar pattern, with nearly two-thirds (65%) of assets allocated to U.S.-based investments.

Updated



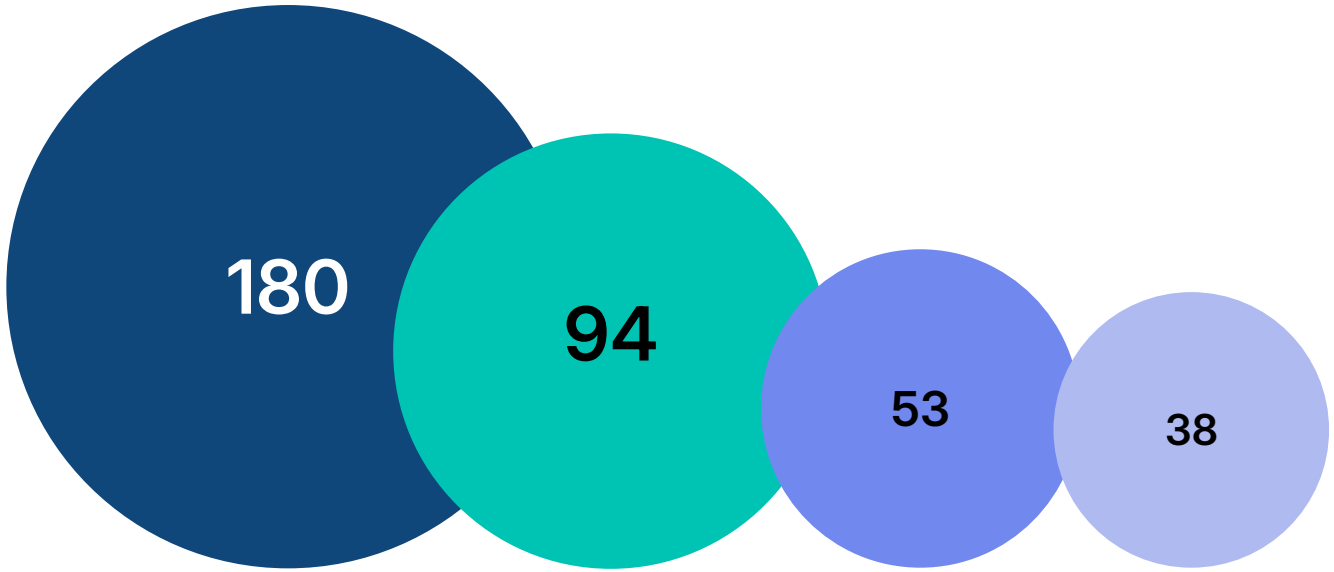
Source: For publicly traded funds, MSCI ESG Research, data based on asset-weighted exposures of 1,528 climate funds as of May 31, 2025. Data for private funds is as of June 30, 2025.

Transition finance in focus

- Transition finance focuses on investing in emissions-intensive sectors and encouraging long-term decarbonization — as opposed to decarbonizing portfolios by excluding high-emitting assets. A comparison of the carbon intensity of climate funds underscores this point.
- Transition funds have a carbon intensity (measured in tons of emissions per USD million dollars in sales) nearly 2.5 times that of so-called Paris-aligned funds, which avoid investing in fossil fuels and require steep annual emissions reductions in line with the goals of the Paris Agreement.
- Climate transition benchmarks, which feature a more gradual pathway and less-stringent exclusions, fall somewhere in between. All three fund types, however, display a much lower Scope 1 and 2 carbon intensity than the total funds universe.

Updated

Scope 1 and 2 weighted-average carbon intensity by climate fund type (tCO2e/USDm sales)



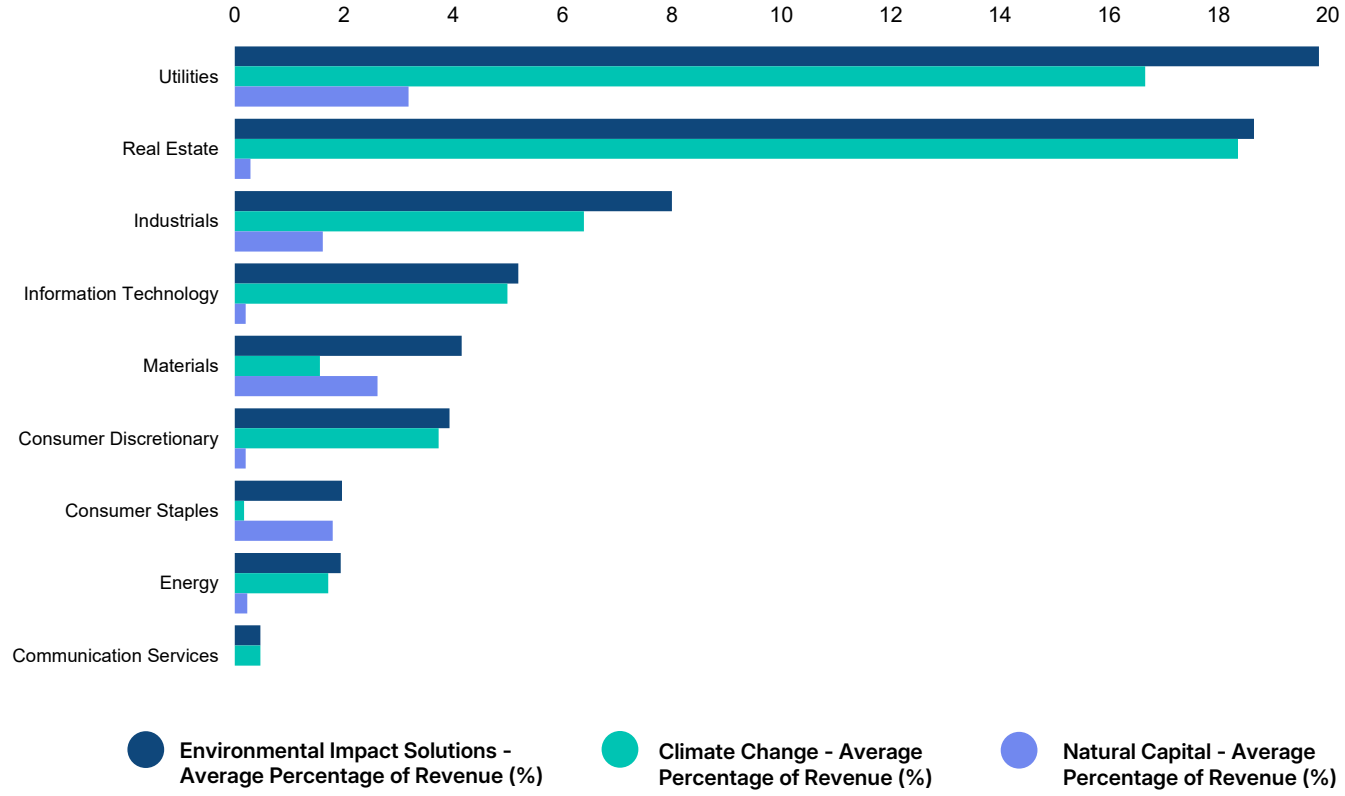
Source: MSCI ESG Research, data as of June 30, 2025.

New

Clean-tech sales

- Companies in the utilities sector earn the highest share of revenue from environmental impact solutions, climate change, and natural capital, as of June 30, 2025, with the real estate sector a close second. The revenue reflects both sectors' share of revenue from sources such as alternative energy, energy efficiency, and, for real estate, green building.
- The materials sector has a relatively high share of revenue from natural capital, reflecting companies' focus on products and services that improve resource management. Natural capital revenues in the consumer staples sector are likely due to products that meet environmental and organic certification requirements as well as pollution prevention.
- Overall, revenue from natural capital remains a niche contributor to green revenue, even in sectors that otherwise have significant revenue from environmental impact solutions and climate change.

Share of green revenues by GICS® sector (%)



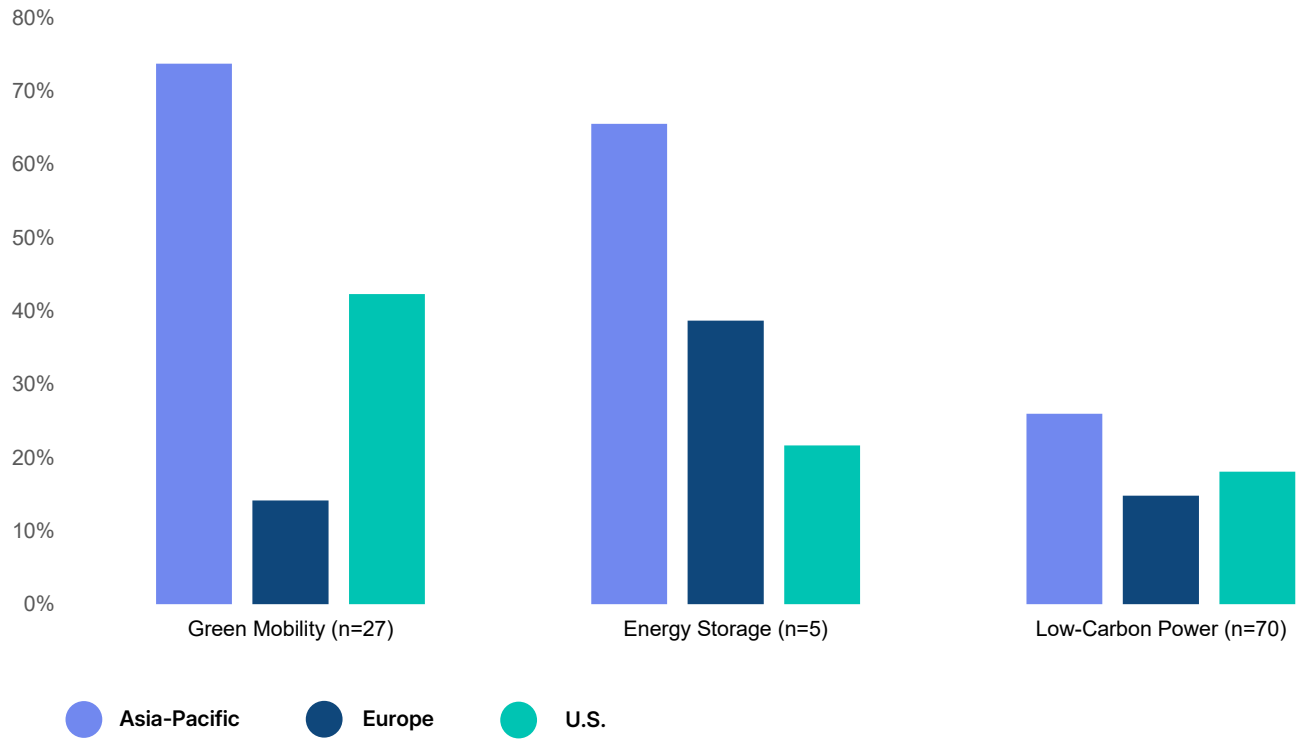
Source: MSCI ESG Research, data as of June 30, 2025. Data reflects maximum percentage of revenue from environmental impact solutions, climate change, and natural capital. For components of each revenue type, see "MSCI Climate Change ESG Select Indexes Methodology," August 2024, available at msci.com.

New

A battle for second place?

- Asia-listed companies, with Chinese firms in the lead, are dominating production of electric vehicles (EVs), based on annual revenue growth among companies that earned more than half their revenue from low-carbon solutions over the five years ended Dec. 31, 2024. Revenues for green mobility, including EVs, rose nearly 74% over the period for companies listed in Asia, compared with 42% for their counterparts in the U.S. and 14% for companies in Europe.
- A similar pattern appears among makers of fuel cells and batteries, with revenue among Asian companies rising nearly 66% over the period, compared with growth of 39% and 22% among manufacturers in Europe and the U.S., respectively.
- Renewables may be a toss-up. Providers of renewable and nuclear energy in Asia recorded revenue growth of 26% over the five years ended last December, compared with growth of 18% for providers in the U.S. and 15% for companies in Europe.

Pure-play providers, year-over-year revenue growth (2019-2024, revenue-weighted)



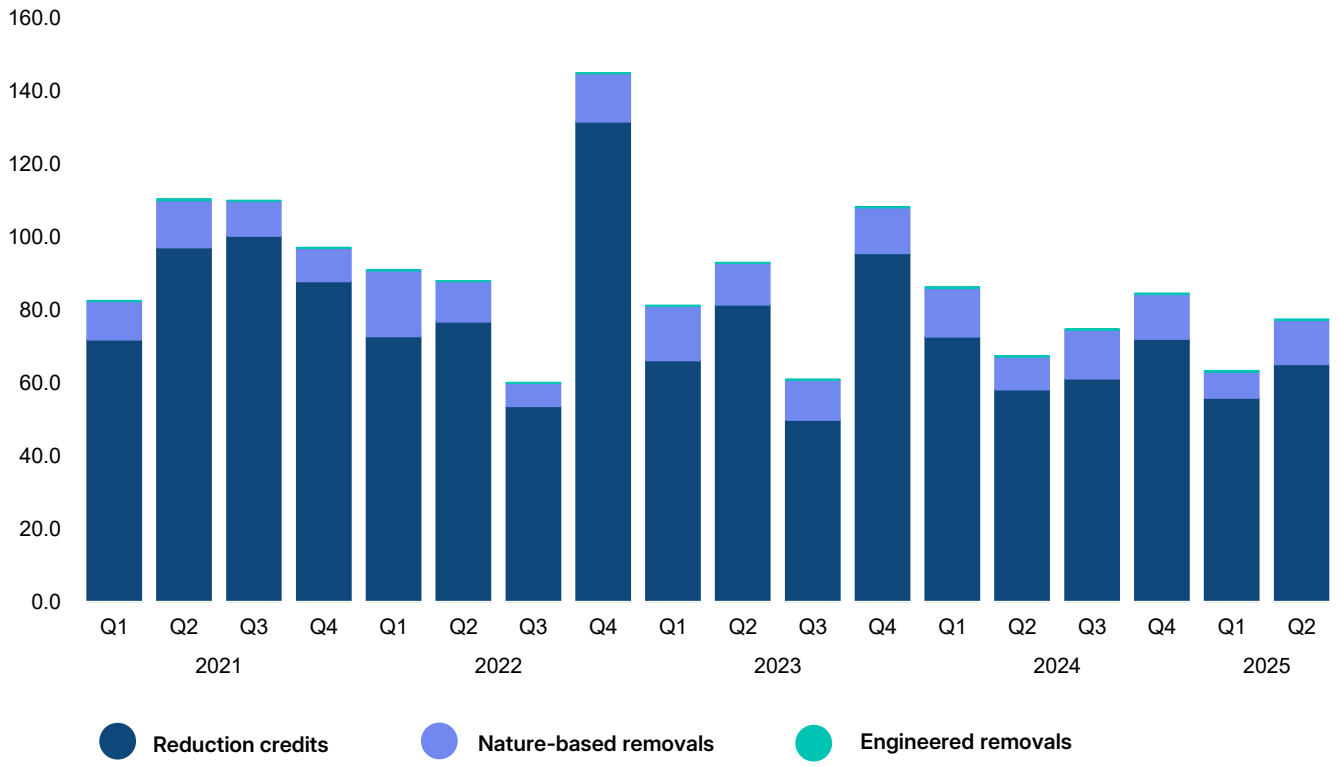
Source: MSCI ESG Research, FactSet. Pure-play solutions providers earn over 50% of revenue from low-carbon business lines, as defined by MSCI's Sustainable Impact Metrics. Broader low-carbon providers (non-pure-play) meet a 5% revenue threshold to capture firms in transition. Categories include Energy storage (e.g., fuel cells, battery systems), Green mobility (zero-emissions/hybrid vehicles, clean transport infrastructure), Low-carbon power (renewables and nuclear)Revenue growth is in USD, with company weights based on average revenues (2019–2024). Year-over-year growth rates were winsorized at the 5th and 95th percentiles to limit the impact of outliers.

Tracking the supply of carbon credits

- Registered projects issued credits for 77 million tonnes of CO2e (MtCO2e) in the second quarter of 2025, up 22% from the prior quarter and 15% from the same period a year earlier.
- The overwhelming share (84%) of carbon credits that entered the market in the quarter came from projects that reduce the amount of CO2e entering the atmosphere. Nearly all removal credits issued in the quarter came from nature-based projects.

Updated

Amount of voluntary carbon credits issued quarterly, by type (MtCO2e)



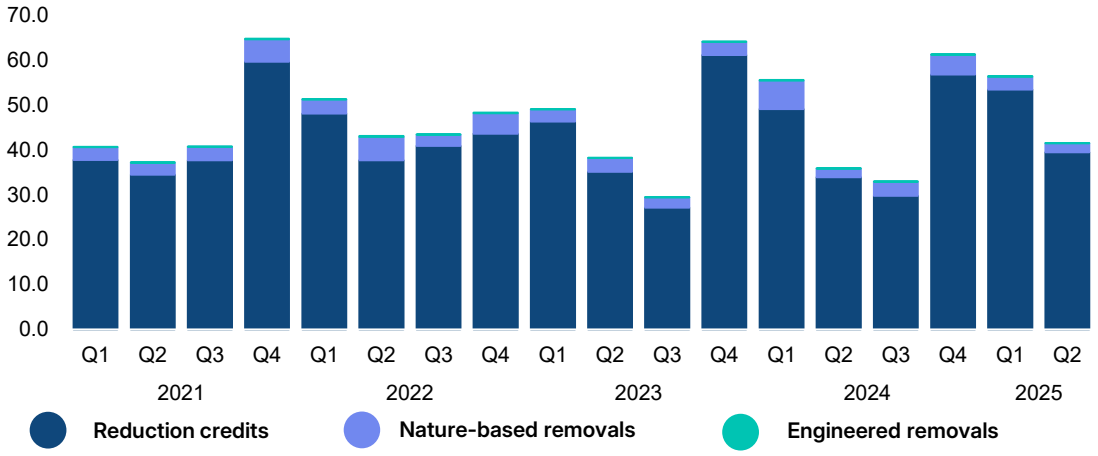
Source: MSCI Carbon Markets, data as of June 30, 2025, based on data from , based on data from ACR, ART, BioCarbon, CAR, Cercarbono, Climate Forward, CDM (NDC eligible credits only), GCC, Gold Standard, Plan Vivo, Puro Earth and Verra.

Updated

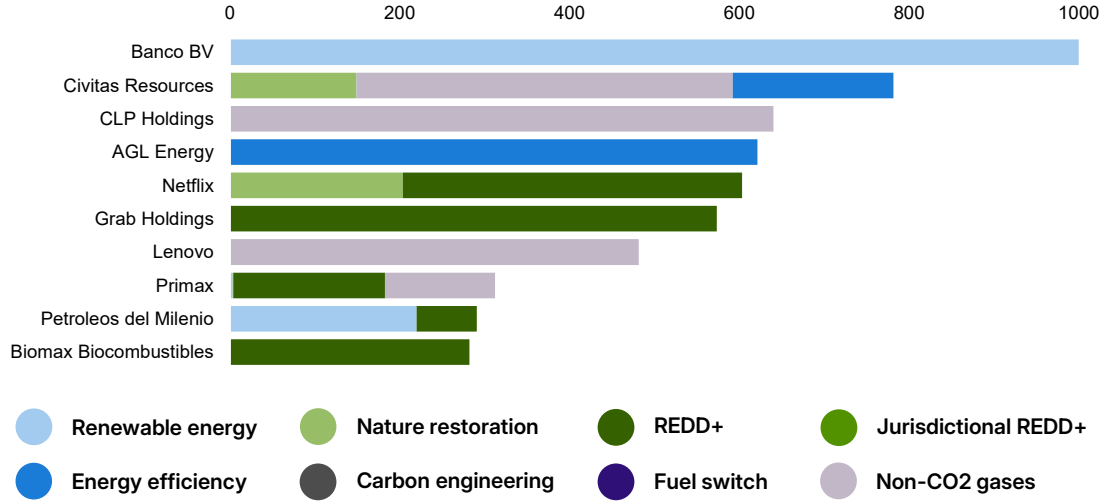
Tracking demand for carbon credits

- Companies retired 42 MtCO2e of carbon credits during the second quarter of 2025, down 25% from the prior quarter but up 17% from the same period last year. This marks the highest first half retirement volume on record.
- Over 90% of retirements in the quarter came from projects that reduce the amount of CO2e entering the atmosphere, compared with those that remove CO2e from the atmosphere. The overwhelming share of retired removal credits came from nature-based projects.
- Brazil's banco BV, oil and gas producer Civitas Resources, and electricity provider CLP Holdings topped the list of companies retiring the most credits in the quarter.

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



Top 10 companies, by amount of carbon credits announced for retirement, Q2 2025 (tCO2e)



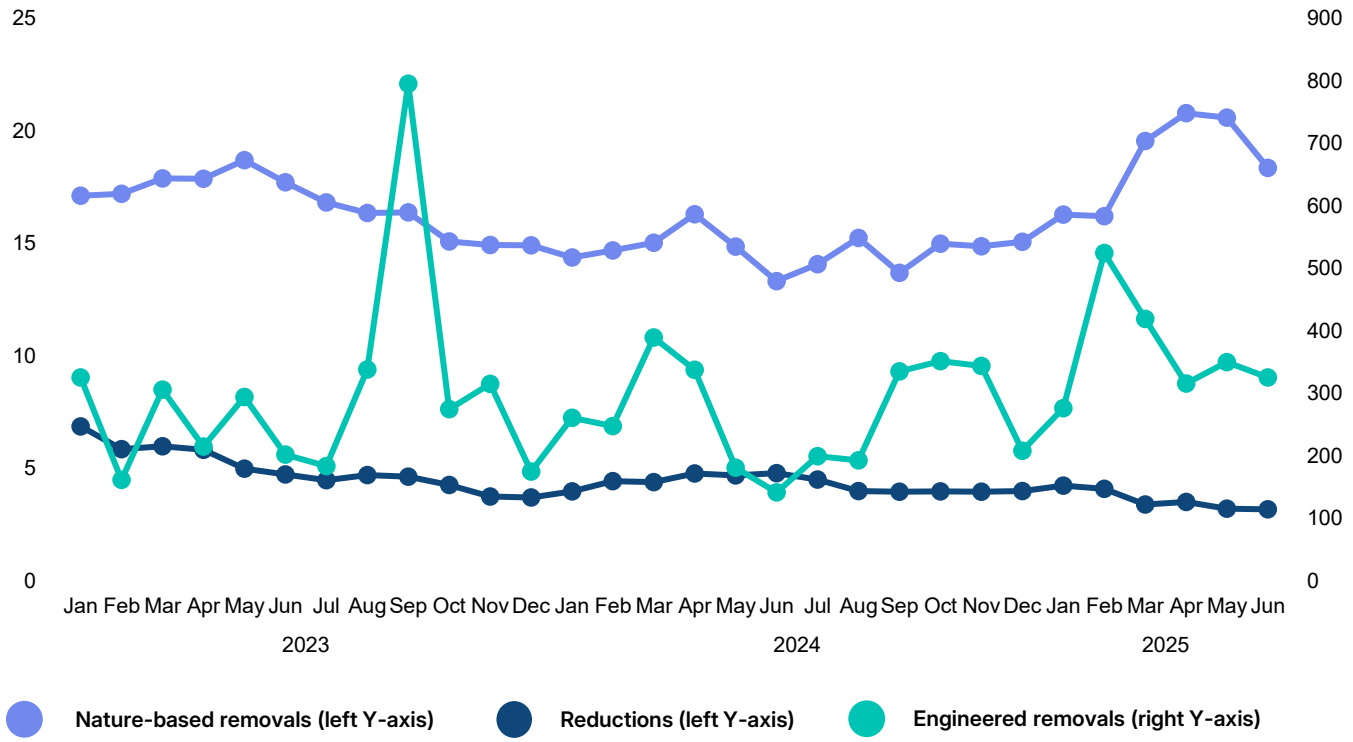
Source: MSCI Carbon Markets, data as of July 4, 2025, based on data from ACR, ART, BioCarbon, CAR, Cercarbono, Climate Forward, CDM (NDC eligible credits only), GCC, Gold Standard, Plan Vivo, Puro Earth and Verra.

Tracking the price of carbon credits

Updated

- MSCI's Global Carbon Credit Price Index, which represents prices across all project types, stood at USD 3.3 tCO2e in the second quarter, down 31% from the same period a year earlier and down 16% from the prior quarter.
- The average price for all credit types masks a disparity between the average price of credits for emissions reduction compared with those for emissions removal. The average spot price of nature-based removal credits stood at USD 19.9/tCO2e in three months ended June 31, 2025, up 34% from a year earlier, while the average spot price for engineered removal credits stood at USD 331 per tCO2e, up 50% from the same quarter in 2024.
- The Science Based Targets initiative (SBTi) is reviewing stakeholder feedback on a draft update to its Corporate Net-Zero Standard (v2), which proposes requiring companies to set interim carbon removal targets. If adopted, this could materially increase demand for removal credits.

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



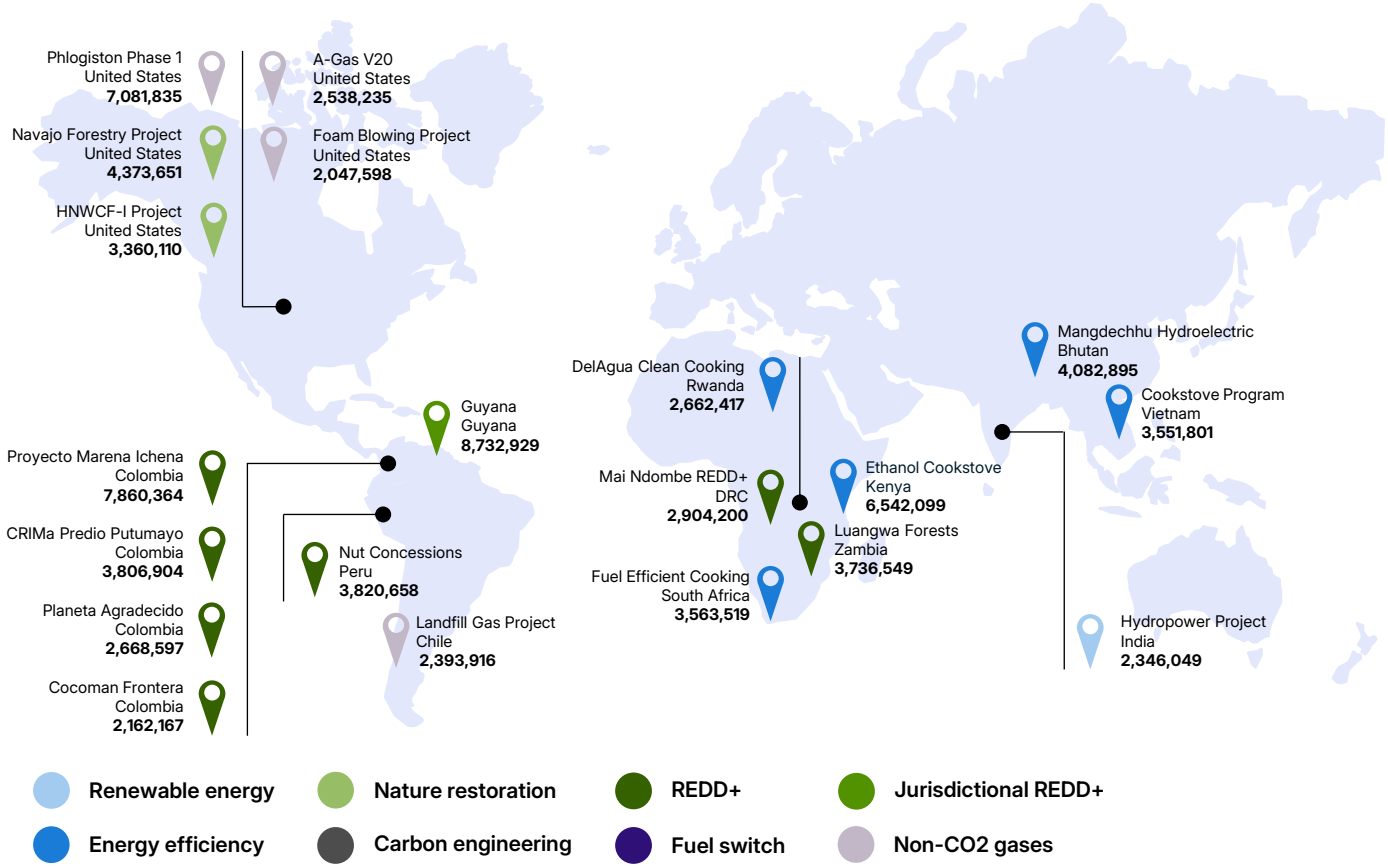
Source: MSCI Carbon Markets, data as of June 30, 2025. Note includes both exchange and over-the-counter trades and asks. Volume-weighted averages are weighted by reported volumes of asks and transactions, with asks given a lower weighting.

Updated

Tracking the biggest carbon projects

- The map opposite highlights the world's 20 largest projects by carbon credits issued (tCO2e) in the 12 months ended June 30, 2025. Leading the list is Guyana's jurisdictional REDD+ initiative, aimed at preserving high forest, low deforestation (HFLD) areas, with over 8.7 million credits issued in the past year.
- Reducing emissions through clean cooking is a recurring focus of projects underway in Kenya, Vietnam, South Africa and Rwanda. Across the Americas, efforts center on reducing non-CO2 gases, particularly through the capture of methane and elimination of ozone-depleting substances. Significant REDD+ projects in Colombia and the Democratic Republic of Congo aim to combat deforestation.
- These projects represent a diversity of approaches to tackling climate change through forest conservation, energy efficiency and emissions-reduction technologies. Together, they highlight the role of carbon trading in channeling climate- and nature-focused capital from companies and investors in developed markets to low-carbon projects in emerging economies.

The 20 largest carbon projects by credits issued, as of Q2 2025 (tCO2e)*



* Based on issuances from June 30, 2024 through June 30, 2025.

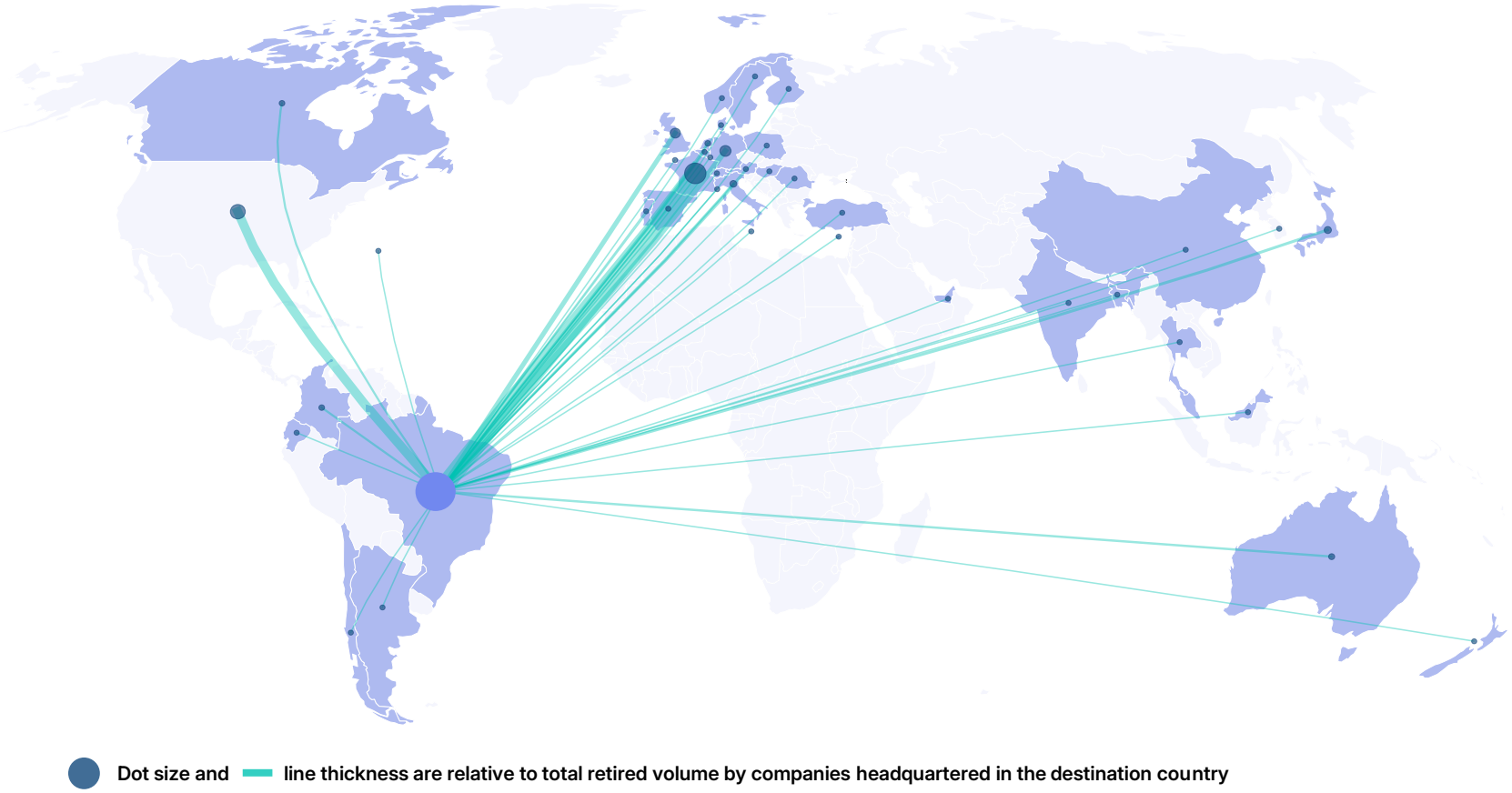
Source: MSCI Carbon Markets, data as of June 30, 2025, based on data from ACR, ART, BioCarbon, CAR, Cercarbono, Climate Forward, CDM (NDC eligible credits only), GCC, Gold Standard, Plan Vivo, Puro Earth and Verra.

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.

New

Global destination of Brazilian nature-based credits used by corporates



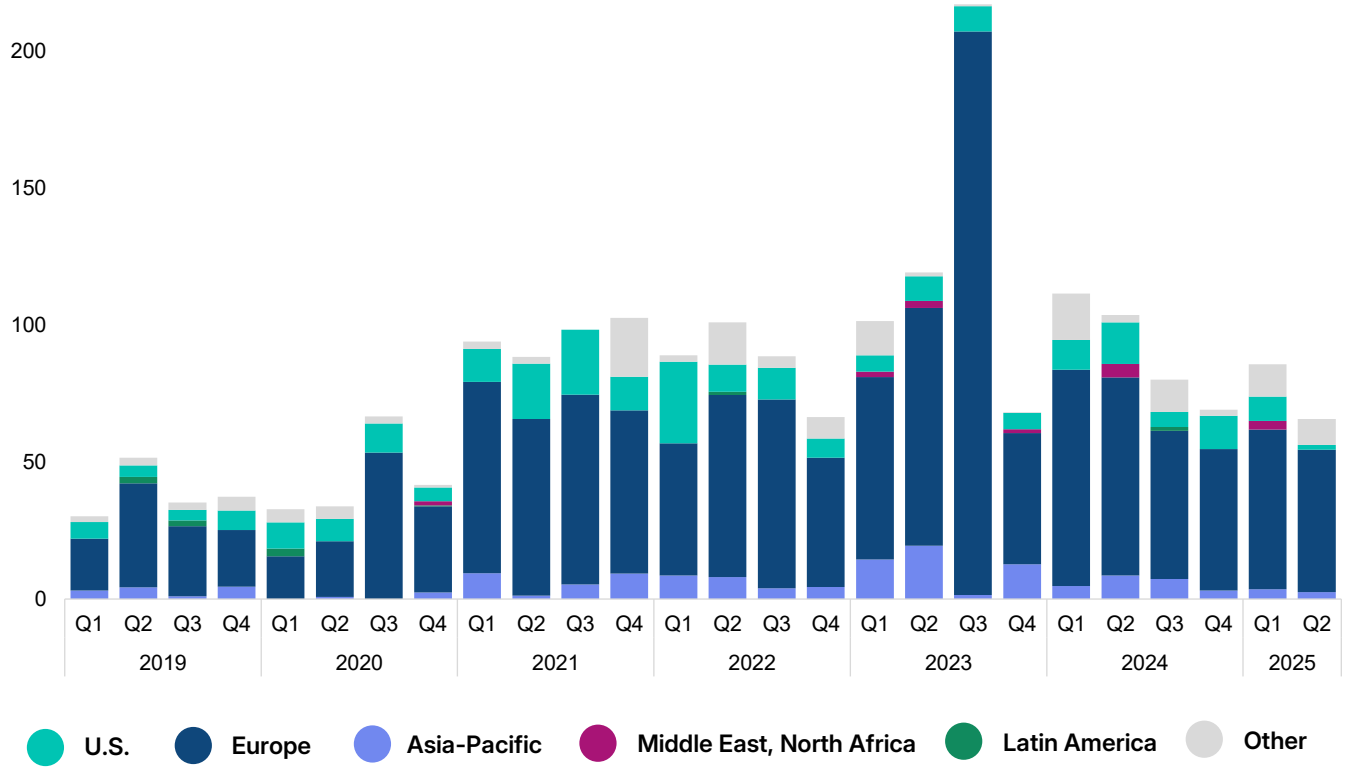
Dot size and line thickness are relative to total retired volume by companies headquartered in the destination country

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

A falloff in green finance

- Governments and corporate issuers use green bonds to borrow money specifically for projects that have environmental benefits, enabling investors to support green projects while earning a return on their investment.
- The global green bond market totaled USD 151.4 billion as of June 30, 2025, down nearly 30% from a year earlier. Corporate and sovereign issuers issued a total of USD 65.7 billion in green bonds over the three months ended June 30, 2025, the lowest total in nearly five years. The falloff primarily reflects a drop in issuances in the U.S., where issuers issued a total of USD 1.7 billion in green bonds in the second quarter, down 88% from the same period a year earlier.
- Nearly 80% of green bonds issued in the quarter were issued in Europe, followed by Asia (3.8%) and the U.S. (2.6%).

Amount of green bonds issued each quarter by region (USD billion)



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

MSCI Sustainability Institute

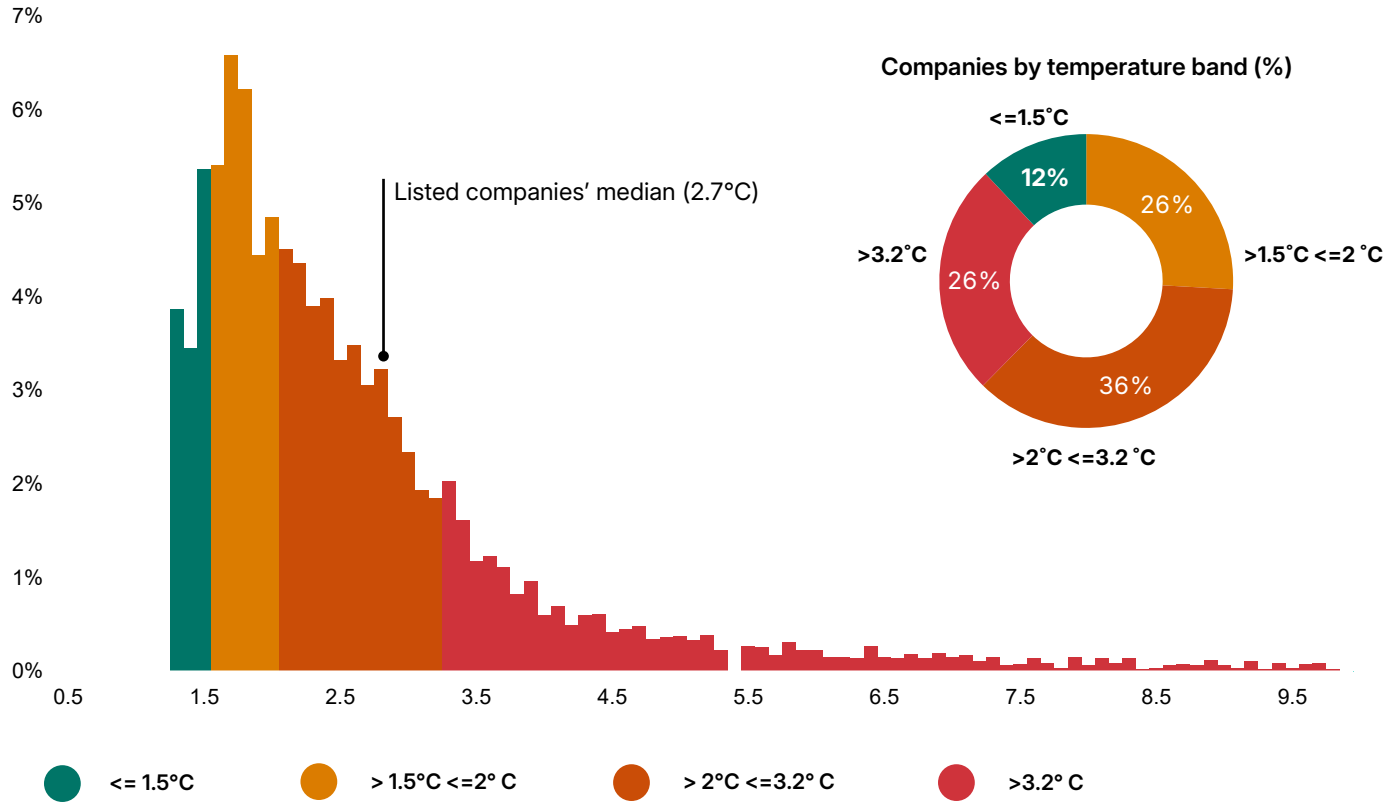
Transition

Updated

Temperature check: Listed companies

- The world's listed companies align with projected warming of 2.7°C (5.04°F) above preindustrial levels, based on their aggregate emissions, sector-specific carbon budgets and climate targets as of June 30, 2025.
- Twelve percent of listed companies aligned with projected warming of 1.5°C 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 (5.76°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 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 from the Climate Action Tracker (which projects warming of 2.7°C above preindustrial levels) and the United Nations Environment Program, which estimates that global warming would reach 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)



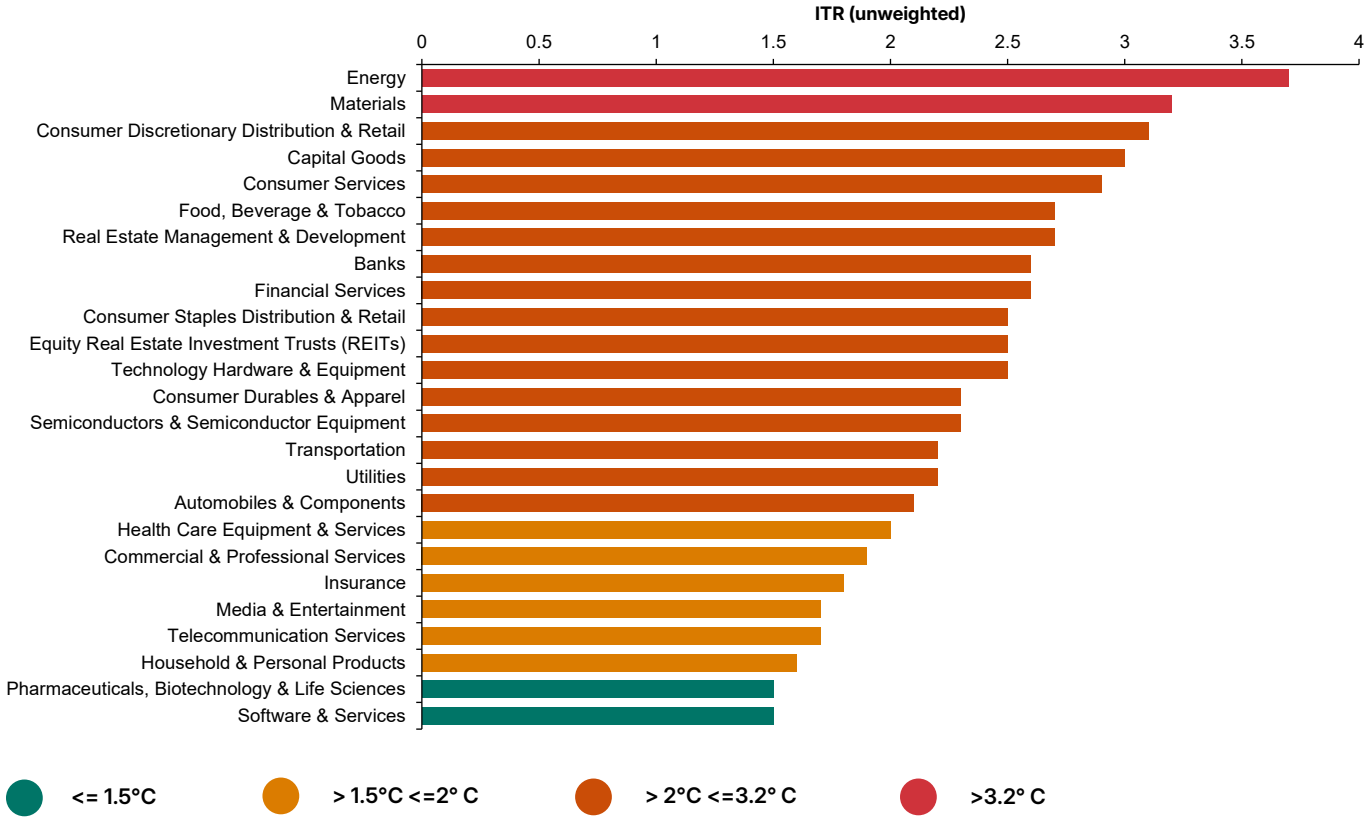
Source: MSCI ESG Research, data as of June 30, 2025. Not index weighted. The dataset used in this estimate comprises roughly 95% of ACWI IMI constituents, as roughly 5% of constituents lack data that would allow us to compute the relevant measures.

Updated

Temperature check: Industries

- The chart opposite shows the aggregate emissions trajectories associated with listed companies in 25 industries, reflecting how those trajectories align with global warming thresholds.
- Companies in industries such as energy (3.7°C), materials (3.2°C), and consumer discretionary and retail (3.1°C) have the highest estimated climate impact, significantly overshooting a 1.5°C warming threshold. Conversely, media, telecommunications, household and personal products, insurance, pharmaceuticals, and software and services show greater alignment, despite a lower allocated sector carbon budget, reflecting their comparatively lower present-day emissions intensity.
- The data highlights the opportunity for investors to finance the transition to a low-carbon economy, and the difficulty for companies in emissions-heavy industries to adopt Paris-aligned targets. Financing the transition means not just counting the total emissions financed but also considering carbon budgets and companies' forward-looking climate impact.

Projected temperature alignment of the world's listed companies by industry group (Implied Temperature Rise in °C)



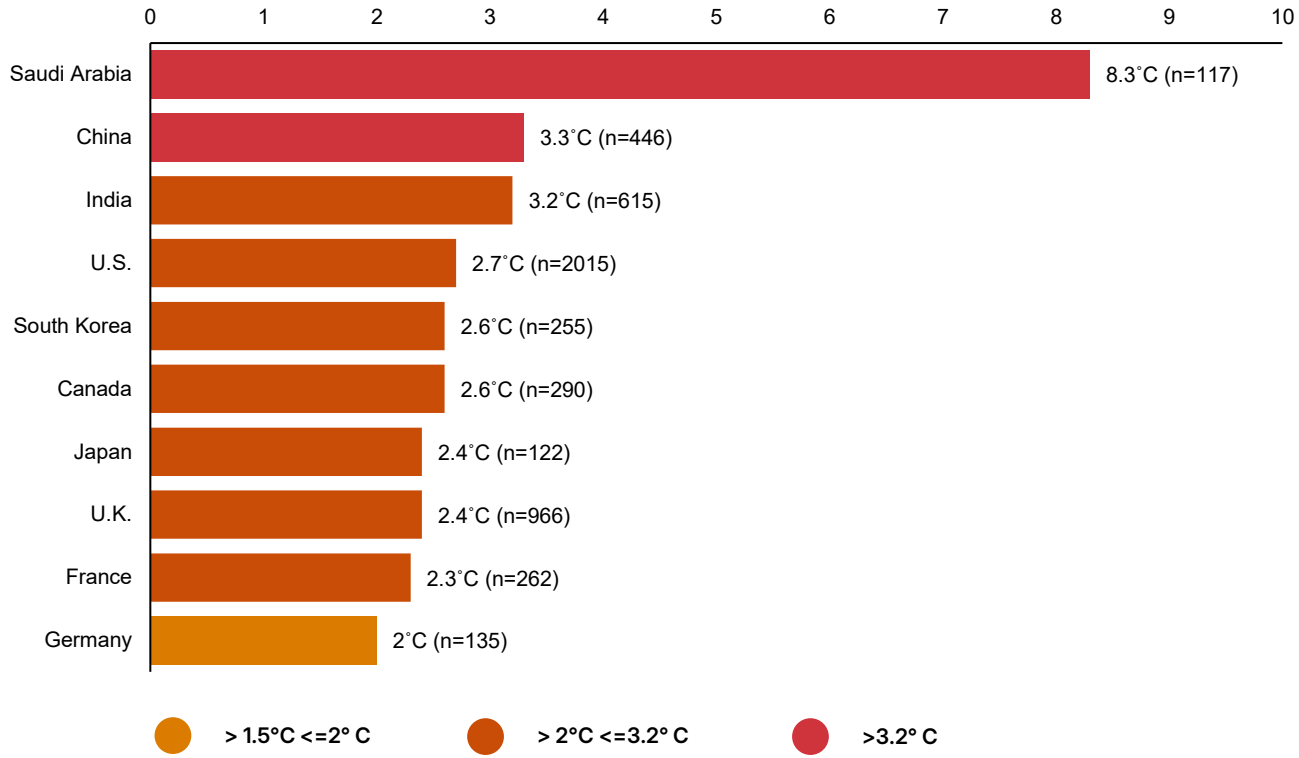
Source: MSCI ESG Research, data as of June 30, 2025. Not index weighted. The dataset used in this estimate comprises roughly 95% of ACWI IMI constituents, as roughly 5% of constituents lack data that would allow us to compute the relevant measures.

Updated

Temperature check: Companies by country

- The chart shows the estimated global warming associated with listed companies in the 10 countries with the highest total company emissions. Estimates are based on the companies' aggregate emissions, sector-specific carbon budgets, and stated climate targets, as of June 30, 2025.
- Listed companies based in Saudi Arabia top the list with a projected temperature rise of 8.3°C, reflecting the large value chain emissions of some of the world's largest oil and gas companies. Companies in China and India follow with 3.3°C and 3.2°C, respectively.
- Listed companies in the U.S. and Canada contribute to a 2.7°C rise, while the trajectories of companies in South Korea, Canada and Japan range from 2.6°C to 2.4°C. Companies in Germany rank lowest among the 10, with projected warming of 2°C.
- The estimate highlights differences in the projected climate impact of listed companies across nations and underscores both the value of country climate plans and the importance of additional action by global companies.

Projected temperature alignment of listed companies by country of domicile (Implied Temperature Rise in °C)



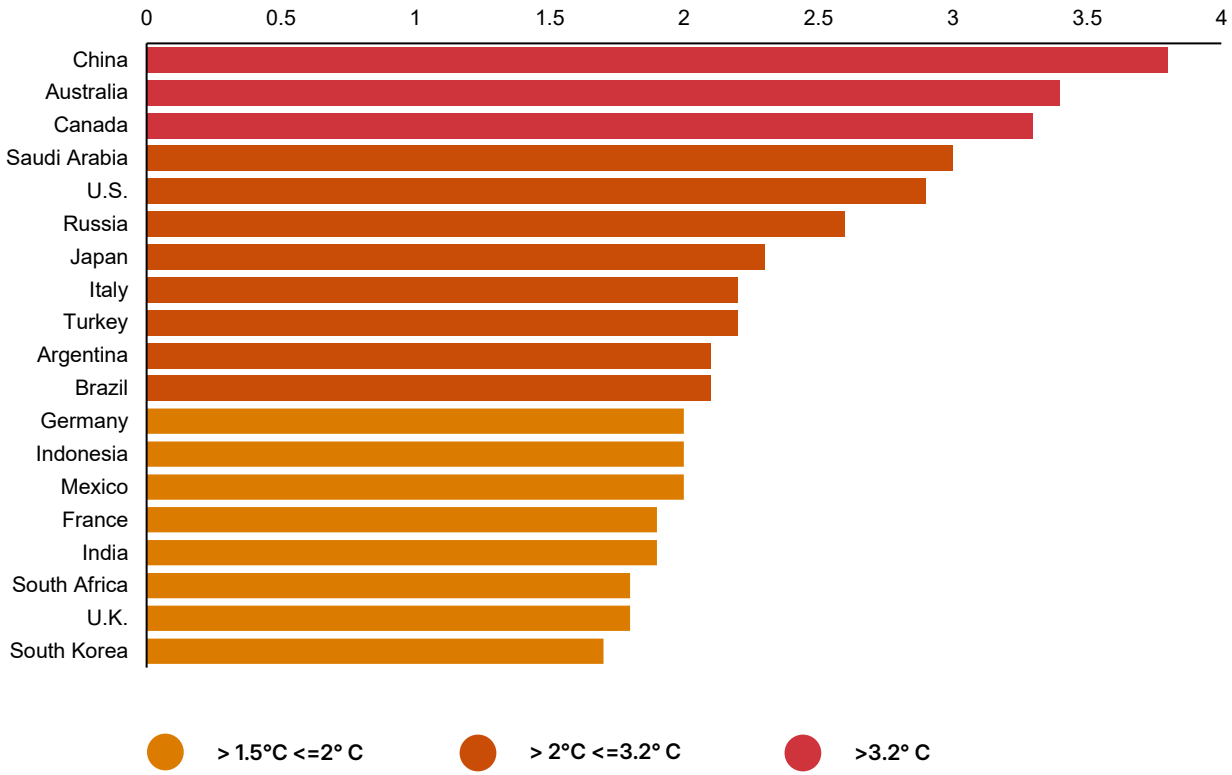
Source: MSCI ESG Research, data as of June 30, 3035. Not index weighted. The dataset used in this estimate comprises roughly 95% of ACWI IMI constituents, as roughly 5% of constituents lack data that would allow us to compute the relevant measures.

Updated

Temperature check: Countries

- Climate progress by members of the Group of 20 nations reflects distinct decarbonization targets, historical emissions, domestic politics and the constraints of carbon budgets.
- The temperature trajectories of G20 countries vary significantly, according to our Sovereign Implied Temperature Rise model, which estimates a global warming value for each country based on the extent to which it exceeds its 1.5°C carbon budget. The model incorporates a fair-share approach, allocating proportionally larger budgets to less-developed countries to account for trade-offs between decarbonization and economic growth.
- The data highlights the importance of decarbonization in some the world's biggest economies, including China and the U.S., the world's biggest emitters, which align with projected warming of 3.8°C and 2.9°C, respectively. Some developed G20 sovereigns, such as Australia and Canada, are also notably misaligned (3.4°C and 3.3°C, respectively) due largely to comparatively more carbon-intensive economies in the context of the carbon budgets allocated.
- Emerging G20 economies, including India, Indonesia and Mexico, face a balancing act. They benefit from larger carbon budgets due to fair-share considerations, but economic growth in these countries increases emissions pressures, placing them near the upper boundary of the 2°C-aligned range.
- National climate targets for 2035, which Paris Agreement signatories are expected to submit to the U.N. by September, may provide transition-focused investors with additional inputs for modeling sovereign-specific transition risks.

Projected temperature alignment of G20 countries (Implied Temperature Rise in °C)



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

Comparing temperature alignment: Companies vs. countries

This edition of our report shows the estimated warming potential of both listed companies and governments based on two variants of our Implied Temperature Rise metric. We explain below why these metrics differ at the country level.

- We compute temperature alignment of companies using MSCI's Implied Temperature Rise model, (which considers a company's emissions across all scopes) against sector-specific pathways for limiting global warming to 1.5°. Based on that data, we estimate the rise 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 in question.

- For sovereigns, we compute temperature alignment using our Sovereign Implied Temperature Rise model, which considers only GHG emissions produced within the country's territory (Scope 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). In line with the recommendations of the Institutional Investors Group on Climate Change and others, we allocate a proportionally larger "fair share" carbon budget to less-industrialized countries to account for trade-offs between decarbonization and economic growth.*

- The differences between the two appear in the table at right. Listed companies based in Saudi Arabia, home to the oil giant Saudi Aramco, have a much higher estimated warming than the country itself because of the emissions from barrels of exported oil — emissions that don't take place domestically. (Those emissions become the Scope 1 emissions of countries that import and burn the oil.) India has a sovereign Implied Temperature Rise 40% lower than the estimated warming of listed companies domiciled in the country. This reflects both a relatively larger carbon budget allocated to emerging economies as well as emissions per capita significantly lower than in more advanced economies.

* 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.

New

Projected temperature alignment of 10 top-emitting countries and the listed companies based them (Implied Temperature Rise in ˚C)

	Sovereign ITR	ITR of domiciled listed companies
China	3.8	3.3
U.S.	2.9	2.7
India	1.9	3.2
Japan	2.3	2.4
South Korea	1.7	2.6
Saudi Arabia	3.0	8.3
Germany	2.0	2.0
U.K.	1.8	2.3
Canada	3.3	2.6
France	1.9	2.4

> 1.5°C <=2° C > 2°C <=3.2° C >3.2° C

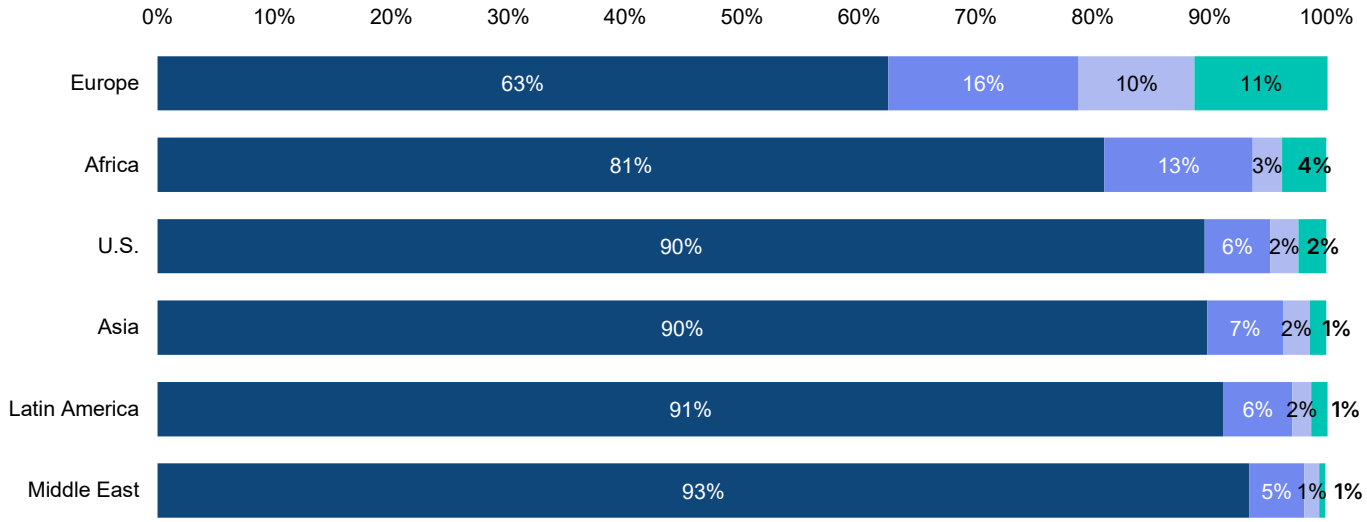
Source: MSCI ESG Research, data as of June 30, 2025.

Assessing alignment with a science-based pathway

Updated

- 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.
- 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 more than one-fifth (21%) of companies in Europe either aligning or aligned to a net-zero pathway, compared with 4.8% and 3.7% of their counterparts in the U.S. and Asia, respectively. No company has yet achieved net-zero based on the NZIF framework.

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



Source: MSCI ESG Research, data as of June 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

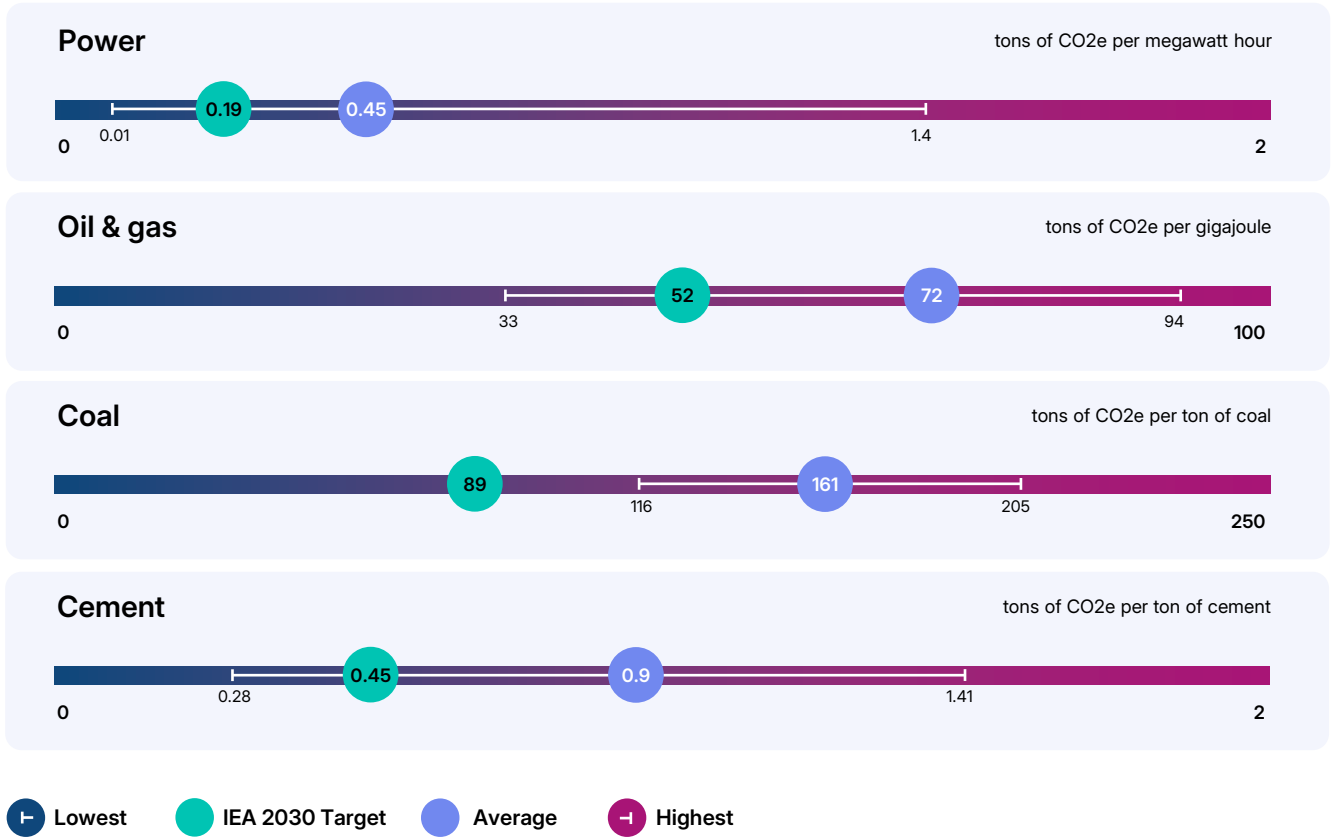
Not aligning	Committed to aligning	Aligning to a net zero pathway	Aligned to a net zero pathway	Achieving net zero
Companies without a commitment to decarbonize in a manner consistent with achieving net-zero emissions.	Companies with a long-term goal of reaching net-zero by 2050.	Companies that are not 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

Updated

Comparing carbon efficiency

- Some financial institutions use production-based emissions intensities to assess how carbon efficient companies within the same industry manage their industrial output. These metrics are calculated by dividing a company's total GHG emissions by its annual physical production — whether measured in megawatt-hours of electricity generated, energy extracted from oil and gas or coal, or tons of cement produced.
- The chart compares the aggregate alignment of companies in four industries (that derive at least 75% of their revenue from that industry to ensure comparability) with the sector-specific 2030 target pathway set by the International Energy Agency (IEA).
- For illustration, we highlight in each industry the lowest, highest, average and IEA target benchmark. The lower the intensity, the more carbon efficient.
- Companies that derive at least 75% of their revenue from their respective industry and whose production intensity aligns most closely with the IEA benchmark as of June 30, 2025, are Huaneng Lancang River Hydropower (power/China), Dana Gas (oil and gas/UAE), Ramaco Resources (coal/U.S.), and Yanbu Cement Company (cement/Saudi Arabia).

Production-based GHG intensities (distance to 2030 target of IEA scenario)



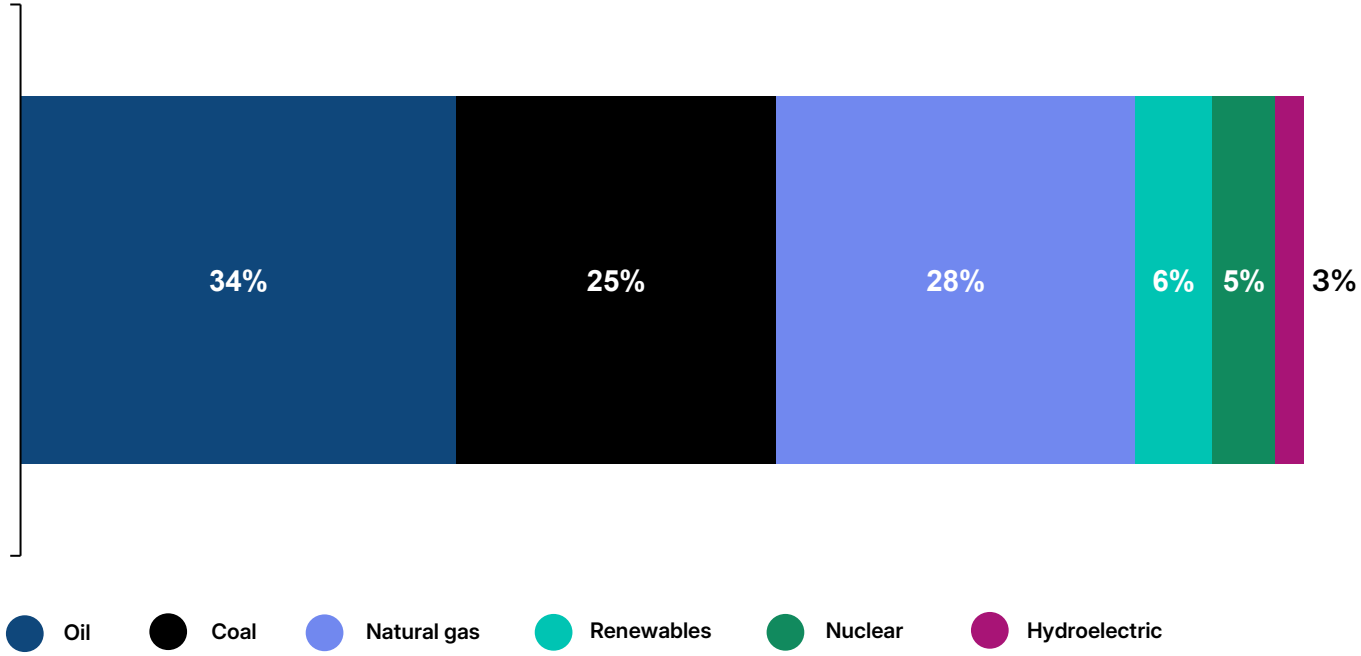
Source: MSCI ESG Research, data as of June 30, 2025.

Updated

Our reliance on fossil fuels

- Fossil fuels — oil, coal and natural gas — account for the largest share (87%) of total energy supply, as of Dec. 31, 2024. The remaining share comes from low-carbon sources, including renewables (solar and wind), nuclear, hydropower, biomass and geothermal energy.
- Although the share of renewables in global energy consumption has increased in recent decades, overall consumption of all forms of primary energy, including carbon-intensive fuels such as oil and gas, has also continued to rise.
- At the same time, energy generation from wind and solar combined grew 16% in 2024 from last year, nearly nine times faster than the growth in total energy demand (+1.8%), while fossil fuel demand rose just over 1%.

Total energy supply by fuel type (%)



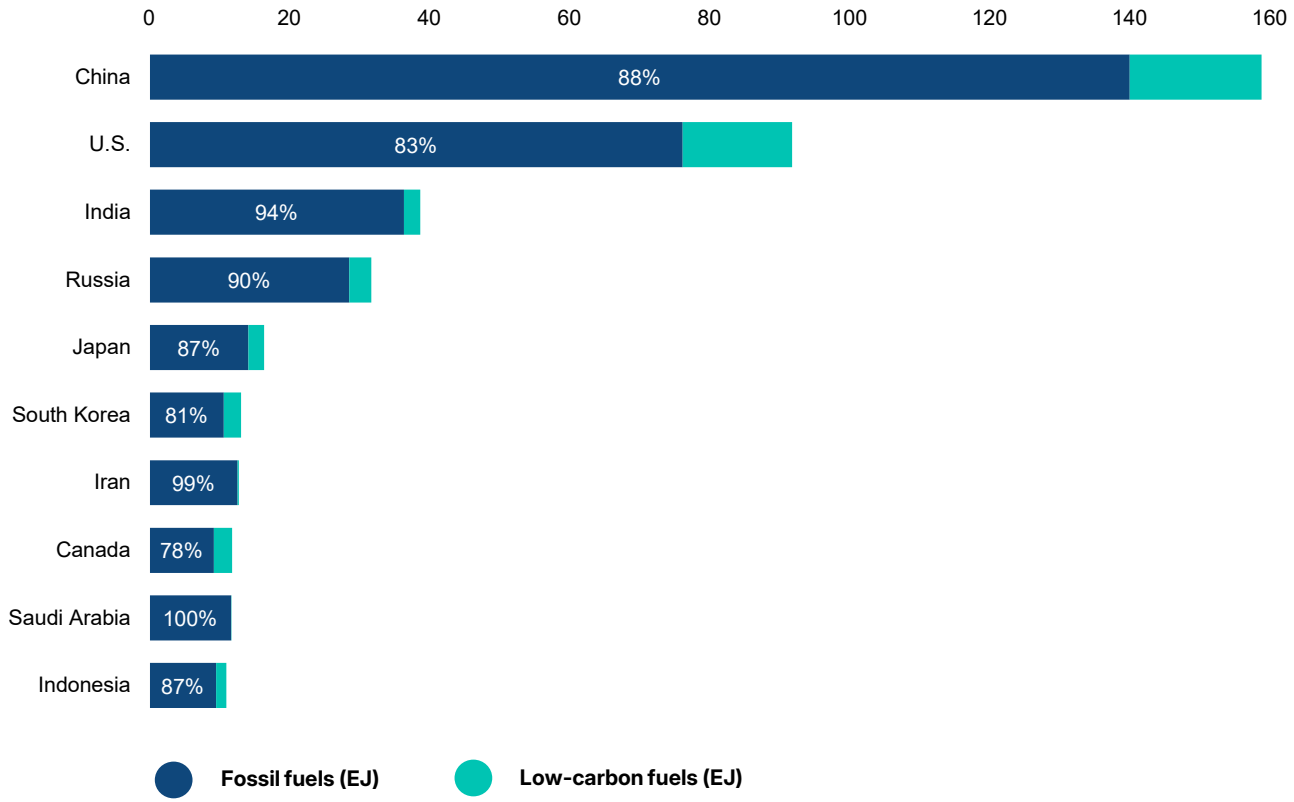
Source: MSCI ESG Research, based on data for 2024 from the Statistical Review of World Energy, The Energy Institute, 2025.

Updated

Comparing countries' appetite for energy

- Total energy supply measures the total amount of energy that a country needs to supply to meet its final end-use demand. The measure reflects the energy that is either produced domestically or imported, minus what is exported or stored.
- Comparing total energy supply conveys the scale of countries' appetite for energy and the role of both fossil fuels (coal, oil and gas) and low-carbon sources of energy (solar, wind, hydroelectric and nuclear) in meeting that demand.
- While fossil fuels satisfy the most energy demand in China, the U.S. and India, the world's three largest GHG emitters, the share varies. Seventeen percent of U.S. energy supply comes from low-carbon fuels (wind, solar, hydropower and nuclear energy), compared with 12% of supply in China and 6% in India.

Top 10 countries by total energy supply (exajoules)



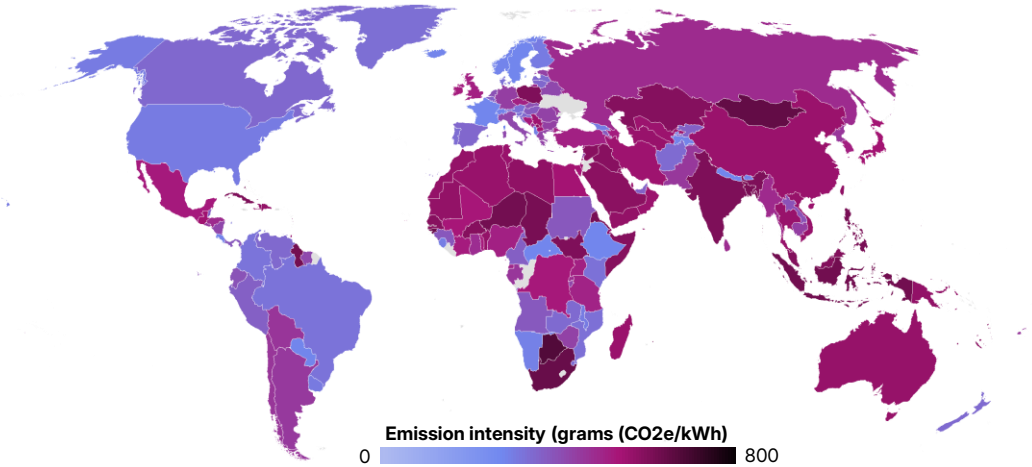
Source: MSCI ESG Research, based on data from the Statistical Review of World Energy, The Energy Institute, 2025. The chart is expressed in exajoules (EJ), a billion billion joules and a common metric used to measure large volumes of energy.

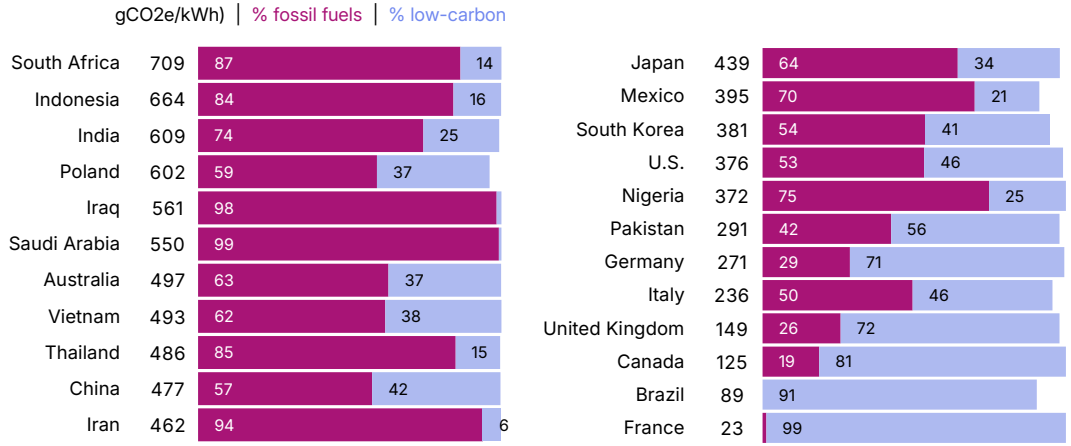
How green is your grid?

- France, Brazil and Canada have the least carbon-intensive electricity in the G20, thanks to widespread deployment of nuclear energy (France) and hydroelectric power (Brazil and Canada), over the 90 days ended June 30, 2025.
- Among the three top-emitting countries, the U.S., at 376 grams of carbon dioxide-equivalent (gCO2e/kWh) has a less carbon-intensive grid than either China (477 gCO2e/kWh) or India (609 gCO2e/kWh) in the latest quarter.
- Note that in spring and summer, countries that can increase their share of electricity generated from solar do so, as reflected in increases in the share of electricity generated from low-carbon sources in Germany, for example, which increased its share of low-carbon power 39% in the current period compared with the 90 days that ended March 31, 2025. In France, by contrast, reliance on nuclear power reduces demand for solar or other forms of low-carbon energy because a heavy influx of solar requires reducing nuclear output from nuclear plants.
- 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 countries that generate the most emissions — China, the U.S. and India — the U.S. has the least carbon-intensive electricity grid, with 46% of electricity generated from low-carbon sources (solar, wind, hydro and nuclear).

Updated

Carbon intensity of electricity, 90-day average (grams CO2e/kWh)





Source: MSCI ESG Research, based on data from Electricity Maps indicating most-recent 90-day average as of June 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. According to Electricity Maps, fossil fuels represent most of such sources.

Key terms

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 (C02e): 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 C02e.

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.

Acknowledgements

The MSCI Sustainability Institute is grateful to the colleagues who contributed analysis to this report:

Umar Ashfaq (energy)

Radhika Biwalkar (regulation)

Theresa Bodner (carbon markets)

Kishan Gangadia (funds)

Julius Lautz (production emissions intensity)

Mathew Lee (energy)

Rumi Mahmood (climate finance)

Helen Marlow (green finance)

Bettina Meyer (nature risk)

Seokhee Moon (data and charts)

Sophia Radis (emissions)

Ramesh Shanbhogue (regulation)

Katie Towey (physical risk)

Hanna Trueb (green revenues)

Kenji Watanabe (targets, disclosures)

Abdulla Zaid (private capital)

William Zimmern (carbon markets)

About the authors

Linda-Eling Lee is Founding Director and Head of the MSCI Sustainability Institute

Tanguy Séné is an Executive Director, MSCI Research and an Institute fellow for transition finance

Sylvain Vanston is an Executive Director, MSCI Research and an Institute fellow for transition finance

Brian Browdie edited the report, **James Wrighton** and **Mariela Martinez** designed it, **Julie Goodman** copy edited it, and **Caitlin Williams** managed the production.

About

About the MSCI Sustainability Institute

We're on a mission to advances knowledge that tackles systemic challenges to create long-term value for global capital markets. We pursue our mission through interdisciplinary research, education and events that equip financial institutions, academic researchers, policymakers and NGOs with the insights they need to drive progress.

For more information and to engage with us, visit msci-institute.com

About MSCI ESG Research Products and Services

MSCI ESG Research products and services are provided by MSCI ESG Research LLC, and are designed to provide in-depth research, ratings and analysis of environmental, social and governance-related business practices to companies worldwide. ESG ratings, data and analysis from MSCI ESG Research LLC. are also used in the construction of the MSCI ESG Indexes. MSCI ESG Research LLC is a Registered Investment Adviser under the Investment Advisers Act of 1940 and a subsidiary of MSCI Inc.

To learn more, please visit www.msci.com

Notice & Disclaimer

This document and all of the information contained in it, including without limitation all text, data, graphs, charts (collectively, the "Information") is the property of MSCI Inc. or its subsidiaries (collectively, "MSCI"), or MSCI's licensors, direct or indirect suppliers or any third party involved in making or compiling any Information (collectively, with MSCI, the "Information Providers") and is provided for informational purposes only. The Information may not be modified, reverse-engineered, reproduced or redisseminated in whole or in part without prior written permission from MSCI. All rights in the Information are reserved by MSCI and/or its Information Providers.

The Information may not be used to create derivative works or to verify or correct other data or information. For example (but without limitation), the Information may not be used to create indexes, databases, risk models, analytics, software, or in connection with the issuing, offering, sponsoring, managing or marketing of any securities, portfolios, financial products or other investment vehicles utilizing or based on, linked to, tracking or otherwise derived from the Information or any other MSCI data, information, products or services.

The user of the Information assumes the entire risk of any use it may make or permit to be made of the Information. NONE OF THE INFORMATION PROVIDERS MAKES ANY EXPRESS OR IMPLIED WARRANTIES OR REPRESENTATIONS WITH RESPECT TO THE INFORMATION (OR THE RESULTS TO BE OBTAINED BY THE USE THEREOF), AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, EACH INFORMATION PROVIDER EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES (INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF ORIGINALITY, ACCURACY, TIMELINESS, NON-INFRINGEMENT, COMPLETENESS, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) WITH RESPECT TO ANY OF THE INFORMATION.

Without limiting any of the foregoing and to the maximum extent permitted by applicable law, in no event shall any Information Provider have any liability regarding any of the Information for any direct, indirect, special, punitive, consequential (including lost profits) or any other damages even if notified of the possibility of such damages. The foregoing shall not exclude or limit any liability that may not by applicable law be excluded or limited, including without limitation (as applicable), any liability for death or personal injury to the extent that such injury results from the negligence or willful default of itself, its servants, agents or sub-contractors.

Information containing any historical information, data or analysis should not be taken as an indication or guarantee of any future performance, analysis, forecast or prediction. Past performance does not guarantee future results.

The Information may include "Signals," defined as quantitative attributes or the product of methods or formulas that describe or are derived from calculations using historical data. Neither these Signals nor any description of historical data are intended to provide investment advice or a recommendation to make (or refrain from making) any investment decision or asset allocation and should not be relied upon as such. Signals are inherently backward-looking because of their use of historical data, and they are not intended to predict the future. The relevance, correlations and accuracy of Signals frequently will change materially.

The Information should not be relied on and is not a substitute for the skill, judgment and experience of the user, its management, employees, advisors and/or clients when making investment and other business decisions. All Information is impersonal and not tailored to the needs of any person, entity or group of persons.

None of the Information constitutes an offer to sell (or a solicitation of an offer to buy), any security, financial product or other investment vehicle or any trading strategy.

It is not possible to invest directly in an index. Exposure to an asset class or trading strategy or other category represented by an index is only available through third party investable instruments (if any) based on that index. MSCI does not issue, sponsor, endorse, market, offer, review or otherwise express any opinion regarding any fund, ETF, derivative or other security, investment, financial product or trading strategy that is based on, linked to or seeks to provide an investment return related to the performance of any MSCI index (collectively, "Index Linked Investments"). MSCI makes no assurance that any Index Linked Investments will accurately track index performance or provide positive investment returns. MSCI Inc. is not an investment adviser or fiduciary and MSCI makes no representation regarding the advisability of investing in any Index Linked Investments.

Index returns do not represent the results of actual trading of investible assets/securities. MSCI maintains and calculates indexes, but does not manage actual assets. The calculation of indexes and index returns may deviate from the stated methodology. Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the index or Index Linked Investments. The imposition of these fees and charges would cause the performance of an Index Linked Investment to be different than the MSCI index performance.

The Information may contain back tested data. Back-tested performance is not actual performance, but is hypothetical. There are frequently material differences between back tested performance results and actual results subsequently achieved by any investment strategy.

Constituents of MSCI equity indexes are listed companies, which are included in or excluded from the indexes according to the application of the relevant index methodologies. Accordingly, constituents in MSCI equity indexes may include MSCI Inc., clients of MSCI or suppliers to MSCI. Inclusion of a security within an MSCI index is not a recommendation by MSCI to buy, sell, or hold such security, nor is it considered to be investment advice.

Data and information produced by various affiliates of MSCI Inc., including MSCI ESG Research LLC and Barra LLC, may be used in calculating certain MSCI indexes. More information can be found in the relevant index methodologies on www.msci.com.

MSCI receives compensation in connection with licensing its indexes to third parties. MSCI Inc.'s revenue includes fees based on assets in Index Linked Investments. Information can be found in MSCI Inc.'s company filings on the Investor Relations section of msci.com.

MSCI ESG Research LLC is a Registered Investment Adviser under the Investment Advisers Act of 1940 and a subsidiary of MSCI Inc. Neither MSCI nor any of its products or services recommends, endorses, approves or otherwise expresses any opinion regarding any issuer, securities, financial products or instruments or trading strategies and MSCI's products or services are not a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such, provided that applicable products or services from MSCI ESG Research may constitute investment advice. MSCI ESG Research materials, including materials utilized in any MSCI ESG Indexes or other products, have not been submitted to, nor received approval from, the United States Securities and Exchange Commission or any other regulatory body. MSCI ESG and climate ratings, research and data are produced by MSCI ESG Research LLC, a subsidiary of MSCI Inc. MSCI ESG Indexes, Analytics and Real Estate are products of MSCI Inc. that utilize information from MSCI ESG Research LLC. MSCI Indexes are administered by MSCI Limited (UK).

Please note that the issuers mentioned in MSCI ESG Research materials sometimes have commercial relationships with MSCI ESG Research and/or MSCI Inc. (collectively, "MSCI") and that these relationships create potential conflicts of interest. In some cases, the issuers or their affiliates purchase research or other products or services from one or more MSCI affiliates. In other cases, MSCI ESG Research rates financial products such as mutual funds or ETFs that are managed by MSCI's clients or their affiliates, or are based on MSCI Inc. Indexes. In addition, constituents in MSCI Inc. equity indexes include companies that subscribe to MSCI products or services. In some cases, MSCI clients pay fees based in whole or part on the assets they manage. MSCI ESG Research has taken a number of steps to mitigate potential conflicts of interest and safeguard the integrity and independence of its research and ratings. More information about these conflict mitigation measures is available in our Form ADV, available at https://adviserinfo.sec.gov/firm/summary/169222.

Any use of or access to products, services or information of MSCI requires a license from MSCI. MSCI, Barra, RiskMetrics, IPD and other MSCI brands and product names are the trademarks, service marks, or registered trademarks of MSCI or its subsidiaries in the United States and other jurisdictions. The Global Industry Classification Standard (GICS) was developed by and is the exclusive property of MSCI and S&P Global Market Intelligence. "Global Industry Classification Standard (GICS)" is a service mark of MSCI and S&P Global Market Intelligence.

MIFID2/MIFIR notice: MSCI ESG Research LLC does not distribute or act as an intermediary for financial instruments or structured deposits, nor does it deal on its own account, provide execution services for others or manage client accounts. No MSCI ESG Research product or service supports, promotes or is intended to support or promote any such activity. MSCI ESG Research is an independent provider of ESG data.

Privacy notice: For information about how MSCI collects and uses personal data, please refer to our Privacy Notice at https://www.msci.com/privacy-pledge.

2025_07_24_v1