October 2021

The MSCI Net-Zero Tracker

A quarterly gauge of progress by the world's listed companies toward curbing climate risk

Introduction

The world's listed companies must act now to drive their greenhouse gas emissions to net-zero.

With delegates preparing to gather in Glasgow for the COP26 climate summit, we estimate that emissions of listed companies would cause temperatures to rise by 3 degrees Celsius (3°C) above preindustrial levels. That will not prevent a climate disaster. Nor will it work for investors who aim to cut emissions associated with their investments in half, just nine years from now, and to net-zero in the coming decades.

Investors are monitoring whether companies have credible plans to reduce their carbon footprint and are tracking the alignment of their portfolios with the Paris Agreement, which aims to limit global temperature rise to well below 2 degrees Celsius (2°C), and preferably to no more than 1.5°C.

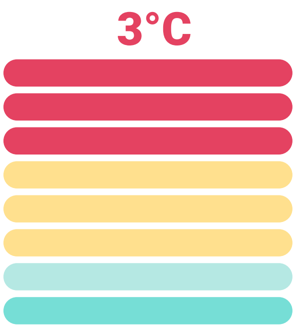
The MSCI Net-Zero Tracker indicates the collective progress of listed companies toward global climate goals.[1] It offers an objective gauge of companies' contribution to total carbon emissions and their progress toward a net-zero economy.

This edition of the Net-Zero Tracker looks at the temperature rise of listed companies based on their projected emissions and counts down the time remaining to reach net-zero. It shows the companies with the largest carbon footprints, shines a light on corporate leaders and laggards in disclosure, and highlights companies whose decarbonization targets are notable for their alignment with global goals.

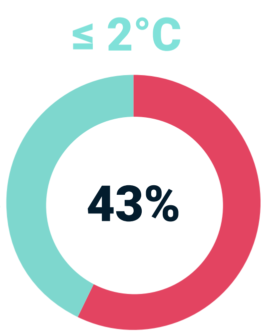
The Net-Zero Tracker underscores the need for climate-related financial disclosures with quantitative measurement based on internationally agreed standards. It also emphasizes the need for action — at the COP26 climate talks and beyond — so that investors can assess companies' resilience to a changing world.

1 Represented by the MSCI All Country World Investable Market Index (ACWI IMI), which includes large-, mid- and small-cap traded listed companies across 23 developed-market and 27 emerging-market countries. With 9,226 constituents, the index covers approximately 99% of the global equity investment opportunity set. As of September 30, 2021.

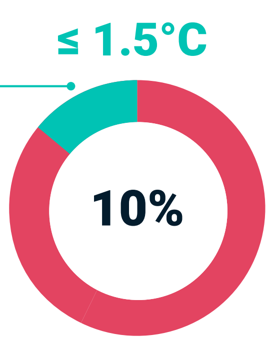
Key findings



The estimated rise in average temperatures above pre-industrial levels based on projected carbon emissions of the world's listed companies.



Less than half (43%) of listed companies align with the goal of limiting temperature increase to below 2°C.



Less than 10% of listed companies align with the goal of limiting temperature increase to below 1.5°C.

Sounding the alarm

The lion's share of listed companies are sharply misaligned with the goal of preventing the worst effects of a warming planet.

- Listed companies are on track to cause average temperatures to rise by nearly 3°C above preindustrial levels.
- Less than half (43%) of listed companies align with a 2°C temperature rise, which falls short of the Paris Agreement goal of keeping warming well below 2°C, preferably to no more than 1.5°C, above pre-industrial levels.
- Less than 10% of listed companies align with a 1.5°C temperature rise, which science tells us offers the best chance of averting a climate disaster.
- A majority of listed companies (57%) do not align with any globally agreed temperature target.
- Listed companies across all regions are misaligned with global climate goals.

Every sector has a climate problem

While the energy, materials and utilities sectors account for the bulk of global corporate emissions, there are high emitters in every sector. Even in typically low-emissions industries like health care, some companies' emissions are aligned with temperatures that are much too high.

A shrinking window

We estimate listed companies will burn through their share of the global carbon budget for keeping temperature rise below 1.5°C by November 2026, based on their emissions as of the end of August. That is five months less than remained in May and reflects the surge in emissions as economies rebound from the pandemic.[2]

Listed companies' annual estimated emissions were 11.1 billion tons (gigatons) of direct (Scope 1) greenhouse gases at the end of August, up from 10.9 gigatons at the end of May.[3] The only way to buy more time is to cut net emissions faster.

Future editions of the MSCI Net-Zero Tracker will highlight both the aggregate share of MSCI All Country World Investable Market Index (MSCI ACWI IMI) constituents that have set net-zero targets and the targets' thoroughness.*

2 The calculation reflects listed companies' share of the global budget, which is the total amount of greenhouse gas that humans can put into the atmosphere without undermining the Paris Agreement goal of keeping warming well below 2°C. See the MSCI Net-Zero Tracker (July 2021), available at https://www.msci.com/documents/1296102/26195050/MSCI-Net-Zero-Tracker.pdf

3 As of September 8, 2021

* The MSCI Net-Zero Tracker is a summary report. Please contact us for details about any of the information covered.

Taking the temperature of listed companies

Listed companies' emissions trajectories versus their carbon budget can be translated into an implied temperature rise metric showing the warming scenario they align with across all emissions scopes.[4] Depending on their commitments, listed companies with similar emissions today could be on very different paths for the future.

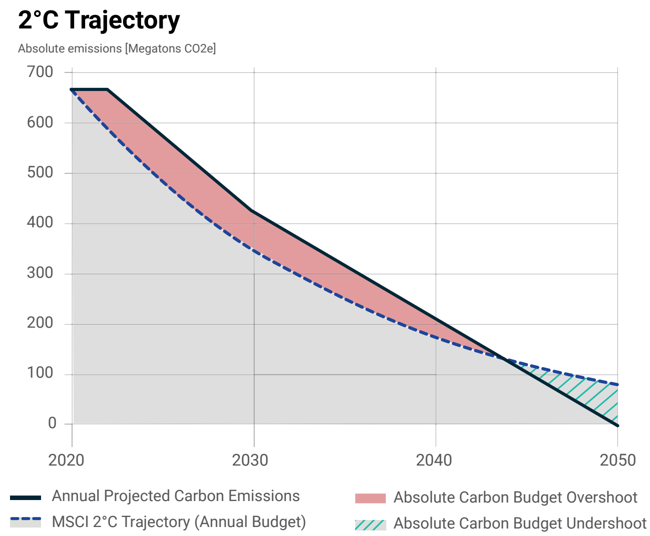
Take the oil giants Royal Dutch Shell and Exxon Mobil, for example. Both emit hundreds of millions of tons of carbon every year. But their future pathways look very different. Shell has set a target that addresses its carbon footprint across all emissions scopes with the goal of reaching net-zero in less than 30 years, which aligns with a temperature rise of 2.1°C. Exxon, on the other hand, has yet to set a net-zero target and is on a path for warming of over 4°C.

A tale of two oil giants

ROYAL DUTCH SHELL PLC

IMPLIED TEMPERATURE RISE 2.1°C

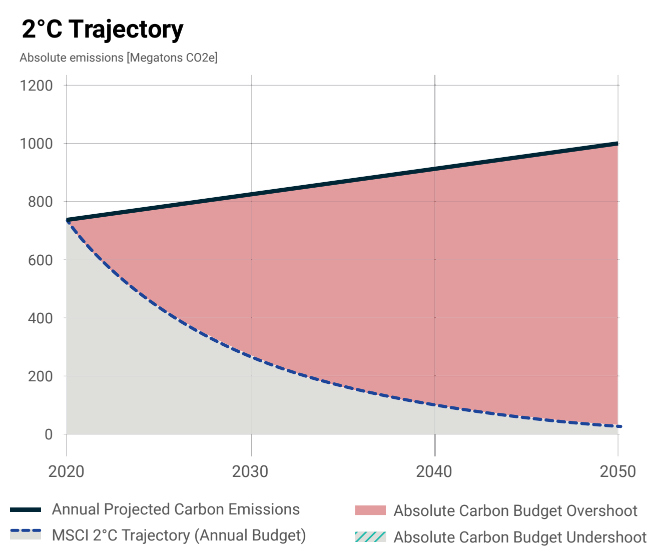
LAGGING	MISALIGNED	2°C ALIGNED



EXXON MOBIL CORPORATION

IMPLIED TEMPERATURE RISE over 4°C

LAGGING	MISALIGNED	2°C ALIGNED

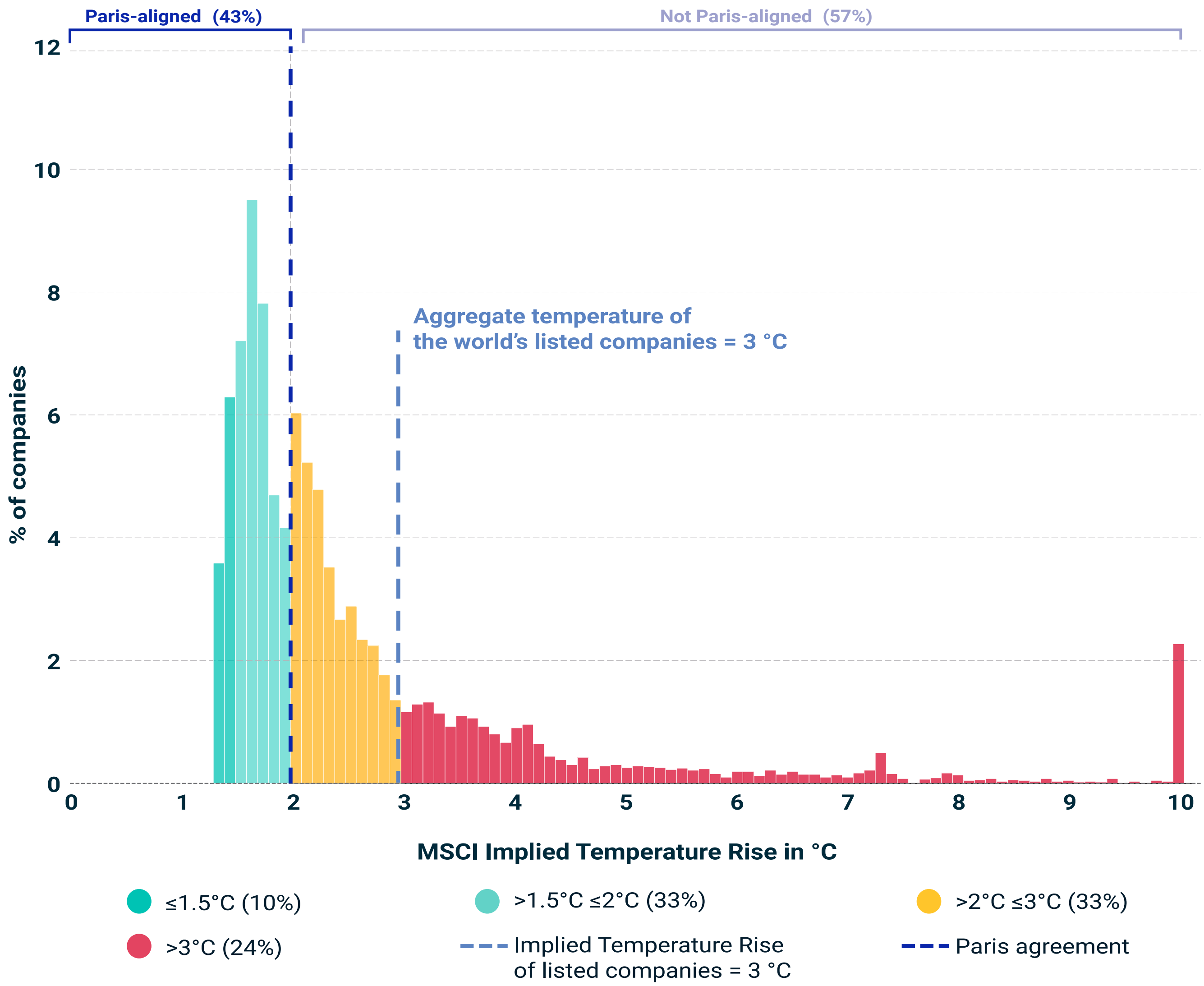


4 MSCI measures the remaining emissions budget for each company within the MSCI ACWI IMI and calculates an implied temperature rise that considers the company's Scope 1, 2 and 3 emissions together with any emissions-reduction targets. For more on how MSCI calculates implied temperature rise visit https://www.msci.com/our-solutions/climate-investing/net-zero-solutions/implied-temperature-rise.

Companies remain far **from the global goal**

Listed companies are putting carbon into the atmosphere at a rate that would make the planet nearly 3°C warmer. Less than half are on track to keep warming below 2°C, and only 10% are aligned with 1.5°C.

Listed companies are on track to make the world 3°C warmer



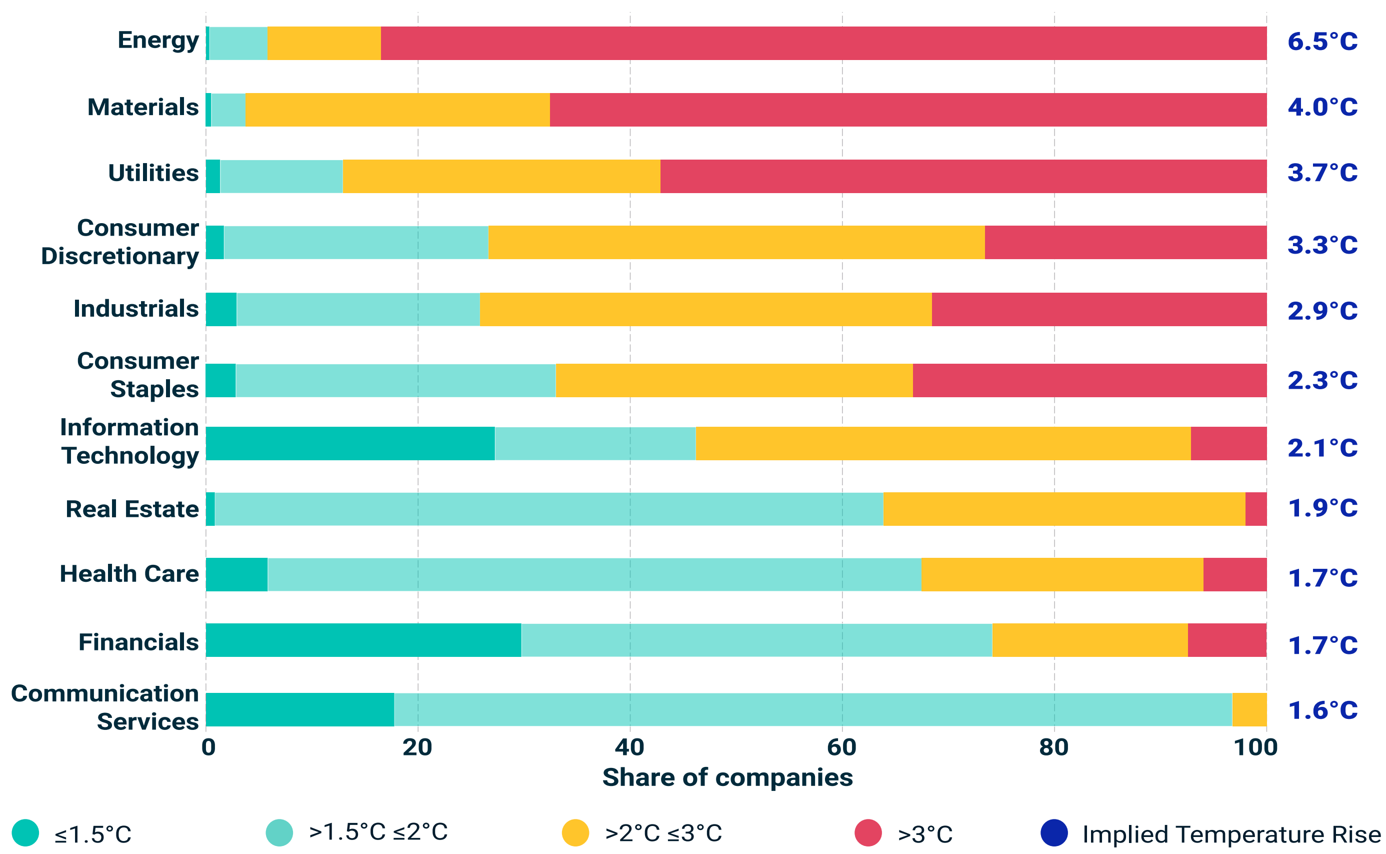
As of August 31, 2021

No sector is immune

Some sectors are running hotter than others — the energy, materials and utilities sectors emit more and may be harder to decarbonize than sectors such as health care, financials and communication services. But there are high-emitting companies in every sector.

Implied temperature rise by GICS® sector

The outliers, even in low-emitting sectors, consume a disproportionate share of their industry's remaining budget. In short, such listed companies are heavily spending other companies' emissions. For the economy to reach net-zero emissions in less than 30 years, every company on track to exceed globally agreed thresholds will have to decarbonize.

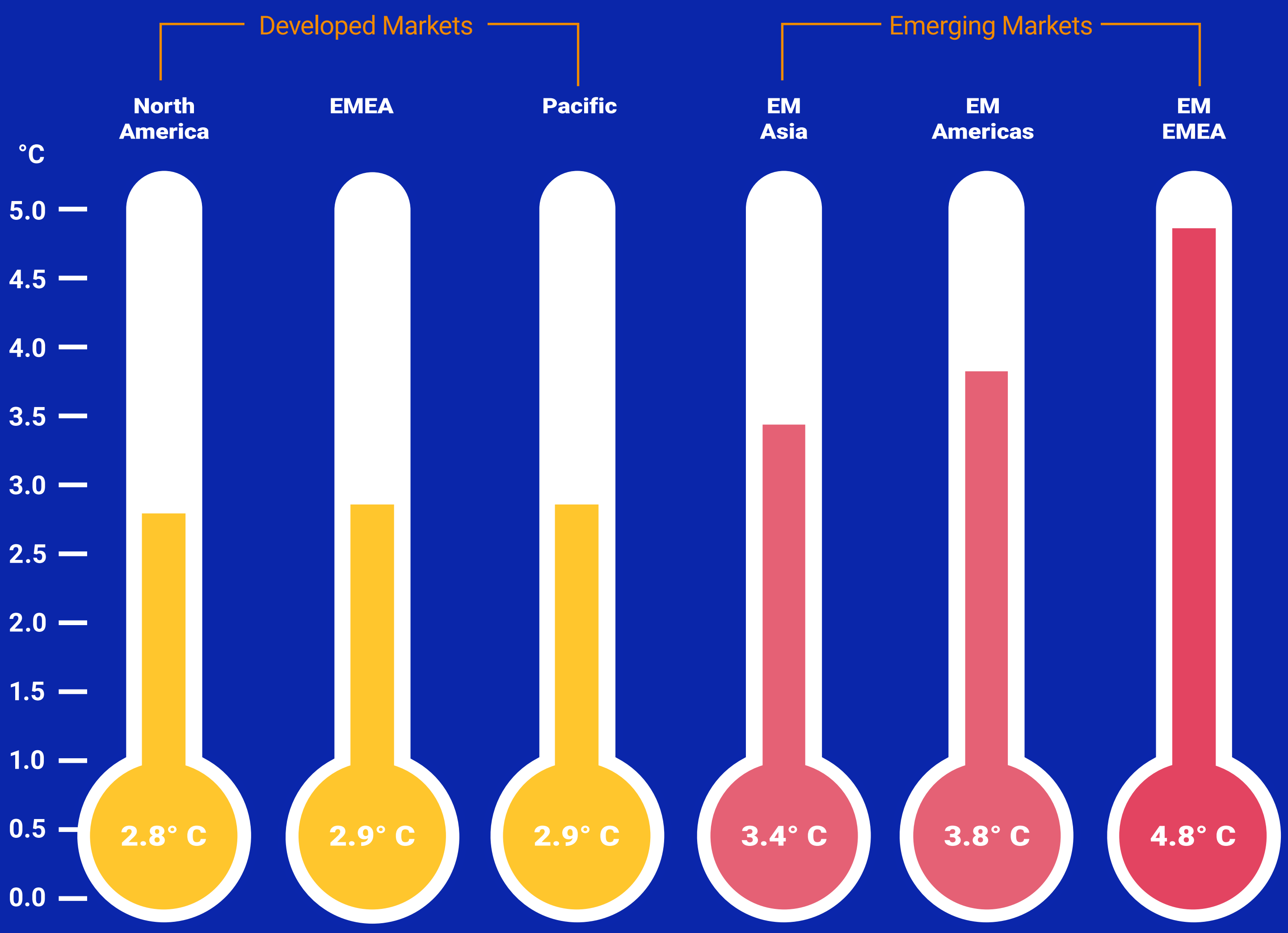


As of August 31, 2021

Taking corporate temperatures by region

Listed companies in every region are emitting too much. Though companies in developed economies are projected to become more carbon efficient than those in emerging economies, no region yet aligns with the Paris Agreement target. And because every company's emissions warm the same atmosphere, carbon intensity is a global problem.

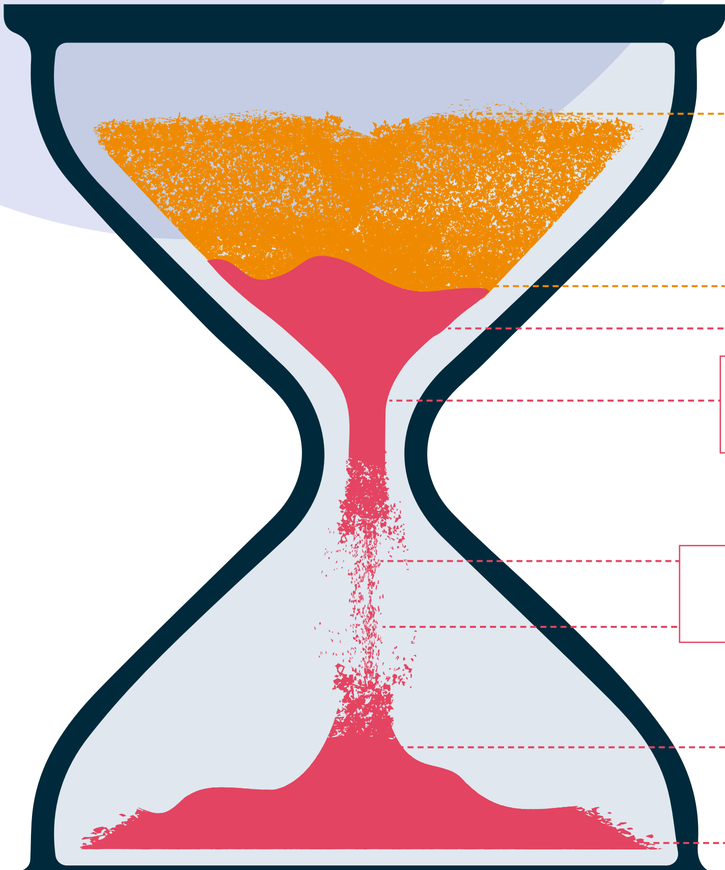
Implied temperature rise of listed companies by region



As of August 31, 2021

For the definition of developed- and emerging-market regions, see **https://www.msci.com/our-solutions/indexes/market-classification**

We're running out of time to reach net-zero emissions



The window for reducing corporate emissions is shrinking. The world's listed companies will deplete their share of the global emissions budget for keeping temperature rise to 1.5°C by November 2026, based on their current greenhouse gas output.[5]

There is still room for a course correction, but it will demand a pivot without precedent. Listed companies need to cut their carbon intensity by 10% each year on average between now and 2050 to align with a 1.5°C rise in temperature. But from 2016 to 2020, less than a quarter of the world's listed companies managed that feat.[6]

Time remaining until listed companies deplete the emissions budget for keeping global temperature rise below **1.5°C**

Time remaining until listed companies deplete the emissions budget for keeping global temperature rise below **2°C**

5 The hourglass shows annual total Scope 1 emissions of MSCI ACWI IMI constituents (not index-weighted) based on listed companies' reported emissions data and MSCI estimates, up to 2020. Emissions for 2020 that companies haven't yet reported and 2021 figures are based solely on MSCI estimates, given a lag in company reporting. The remaining future emissions budget to achieve a 1.5°C and 2°C warming scenario are calculated based on bottom-up estimates (sum of remaining emissions budget of all MSCI ACWI IMI constituents) as of August 31, 2021.

6 See "Net-Zero Alignment, Objectives and Strategic Approaches for Investors," MSCI ESG Research, September 20, 2021 at https://www.msci.com/www/research-paper/net-zero-alignment-objectives/02752495446

Global and MSCI ACWI IMI Scope 1 emissions

Corporate greenhouse gas emissions are heading in the wrong direction. We estimate that direct (Scope 1) emissions of the world's listed companies will rise 6.7% this year as global economic activity continues to return to pre-pandemic levels.

Listed company emissions are forecast to account for about a fifth (19%) of this year's total global carbon budget of 58 gigatons, which measures the total amount of greenhouse gas that can be put into the atmosphere and still limit warming to 1.5°C.

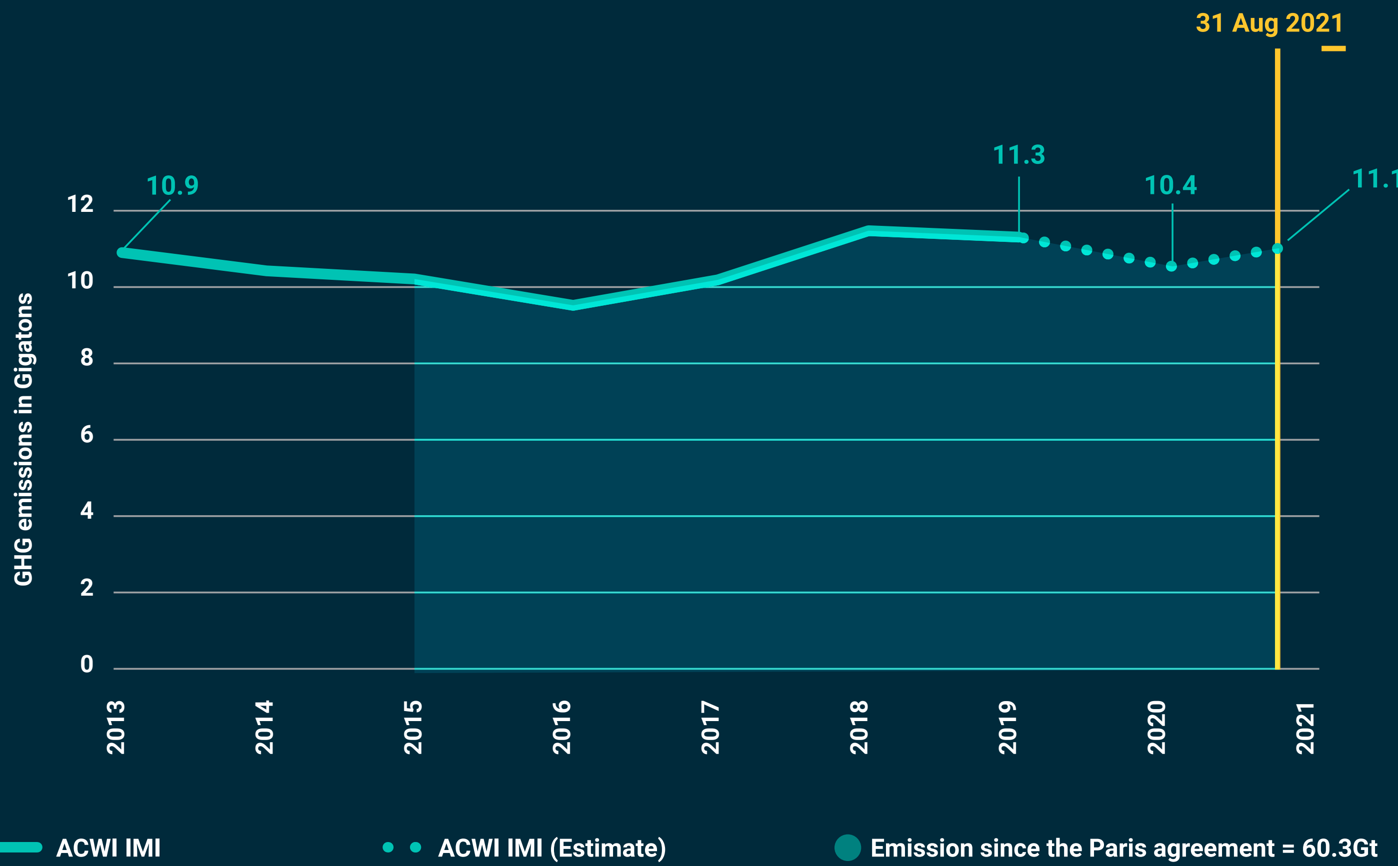
The table below shows the total MSCI ACWI IMI Scope 1 greenhouse gas emissions (sum for all constituents without index weighting) and total global emissions, as of August 31, 2021.

Historical greenhouse gas emissions [Gt C02e]	2013	2014	2015	2016	2017	2018	2019	2020	2021 forecast
Global*	51.2	51.7	51.8	51.9	53.5	55.3	59.1	55.3	58.0
MSCI ACWI IMI**	10.9	10.4	10.2	9.6	10.2	11.4	11.3	10.4	11.1

* Global emissions through the end of 2019 are based on annual UN Environment Programme reports. Global emissions forecasts for 2020 and 2021 are estimates based on changes in emissions as reported by Carbon Monitor (carbonmonitor.org).

** ACWI IMI emissions for 2019 as reported by companies or estimated by MSCI where not reported. Emissions for 2020 are based on company emissions data where available. Where unavailable, MSCI ESG Research estimates emissions based on the company's sales figures. MSCI estimates changes in emissions for 2021 based on changes in emissions as reported by Carbon Monitor.

Scope 1 greenhouse gas emissions of listed companies



Emissions reflect the addition of China to the MSCI ACWI IMI starting in 2018

The top 10 listed companies with the largest carbon footprints

The table below shows the 10 largest emitters in the MSCI ACWI IMI based on total greenhouse gas emissions in the 12 months that ended August 31, 2021. It also shows the contribution of each of those companies' emissions to the total emissions of listed companies, as well as differences in transparency. Among companies with the largest carbon footprints, two – Gazprom and Royal Dutch Shell – report their emissions fully. Two others on the list – Saudi Arabian Oil Company and Coal India – report less than all of their direct (Scope 1) emissions.

Issuer	Country	Scope 1 emissions [tons of CO2e]	Scope 2 emissions [tons of CO2e]	Scope 3 emissions [tons of CO2e]	Total carbon emissions [tons of CO2e]*	Sum of reported emissions vs MSCI estimated total emissions [%]**	Ratio of total company emissions (reported/ estimated) vs ACWI IMI total emissions****
Saudi Arabian Oil Company	Saudi Arabia	141,353,354	12,882,544	2,066,786,386	2,221,022,284	Estimated only***	3.5%
GAZPROM PAO	Russia	210,300,000	11,730,000	1,142,501,400	1,300,530,000	94%	2.0%
COAL INDIA LTD	India	14,548,847	1,528,528	997,562,628	1,013,640,003	Estimated only***	1.6%
NK ROSNEFT' PAO	Russia	59,400,000	21,800,000	868,025,787	949,225,787	34%	1.5%
PetroChina Company Limited	China	132,170,000	41,910,000	660,197,527	834,277,527	21%	1.3%
EXXON MOBIL CORPORATION	U.S.	105,000,000	7,000,000	627,200,392	739,200,392	88%	1.2%
China Shenhua Energy Company Limited	China	126,680,000	8,220,000	529,127,420	664,027,420	20%	1.0%
ROYAL DUTCH SHELL PLC	Netherlands	63,000,000	9,000,000	585,031,708	657,031,708	98%	1.0%
BP P.L.C.	U.K.	41,300,000	4,200,000	592,909,079	638,409,079	58%	1.0%
Daimler AG	Germany	1,027,000	1,035,000	559,009,237	561,071,237	19%	0.9%

* Sum of reported or estimated Scope 1 and 2 emissions plus Scope 3 emissions estimates.

** If a company does not report its Scope 1 and 2 carbon emissions data, MSCI estimates each scope separately based on either the company's previously reported emissions data or, if none, the carbon emissions intensity of the company's production or industry segments. We estimate Scope 3 emissions for all companies in our coverage based on 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 LLC

*** Comparison between reported and estimated emissions does not apply because the company reports only some of its Scope 1 emissions. Hence, MSCI uses estimates alone to calculate the company's total emissions.

****Because companies' share their value chain with multiple other companies, double counting is unavoidable when estimating Scope 2 and 3 emissions. The comparison here, on average, cancels this double counting by comparing each listed company's share of total emissions to ACWI IMI total emissions.

Shining a light on disclosure: leaders and laggards

What gets measured gets managed. Investors need emissions disclosures to assess the resilience of every company to climate change. Disclosure helps investors assess the carbon intensity of companies, to model climate-related financial risk and its possible impact on the performance of portfolios and to allocate capital accordingly.

Public companies with improved emissions reporting

The table below shows the 15 largest listed companies by market capitalization in the MSCI ACWI IMI that reported additional scopes or categories of greenhouse gas emissions in the 12 months that ended August 31, 2021. As it happens, the companies below also are now reporting substantially all their emissions across all emissions scopes.

Issuer	Country	Total reported emissions [tons CO2e]	Total estimated emissions [tons CO2e]	Sum of reported emissions vs MSCI estimated total emissions [%]*
Deutsche Telekom AG	Germany	18,931,684	16,696,169	113%
HESS CORPORATION	U.S.	56,800,000	52,462,488	108%
DAIWA HOUSE INDUSTRY CO.,LTD.	Japan	11,395,844	11,204,577	102%
A.P. MOELLER - MAERSK A/S	Denmark	53,224,000	52,442,814	101%
TOYOTA INDUSTRIES CORPORATION	Japan	48,455,818	48,341,263	100%
NANYA TECHNOLOGY CORPORATION	Taiwan	1,381,014	1,391,165	99%
Mitsui Chemicals, Inc.	Japan	16,752,064	16,954,596	99%
EIZO Corporation	Japan	381,275	388,531	98%
CNX RESOURCES CORPORATION	U.S.	29,960,000	30,631,427	98%
GREIF, INC.	U.S.	5,693,100	5,821,259	98%
Yadea Group Holdings Ltd	China	23,809	24,351	98%
Clariant AG	China	4,990,000	5,137,893	97%
SERCO GROUP PLC	U.K.	1,170,133	1,206,768	97%
COVANTA HOLDING CORPORATION	U.S.	4,857,554	5,020,894	97%
GAZPROM PAO	Russia	1,300,530,000	1,384,973,494	94%

* If a company does not report its Scope 1 and 2 carbon emissions data, MSCI estimates each scope separately based on either the company's previously reported emissions data or, if none, the carbon emissions intensity of the company's production or industry segments. We estimate Scope 3 emissions for all companies in our coverage based on 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 LLC

The largest emitters that have not disclosed their greenhouse gas emissions

The table below shows the 10 largest emitters based on MSCI's estimates of emissions across all emissions scopes that have not reported any of their greenhouse gas emissions as of August 31, 2021.[7]

Issuer	Country	Emissions reference year (note capitalization)	GICS® sector	Total estimated emissions [tons CO2e]
Shaanxi Coal Industry Company Limited	China	2019	Energy	200,839,903
BERKSHIRE HATHAWAY INC.*	U.S.	2020	Financials	146,814,617
China State Construction Engineering Corporation Limited	China	2020	Industrials	93,669,496
Shanxi Coking Coal Energy Group Co., Ltd.	China	2019	Energy	82,534,966
PBF ENERGY INC.	U.S.	2020	Energy	75,332,910
Shanxi Lu'an Environmental Energy Dev. Co., Ltd	China	2020	Energy	73,857,910
CHINA AVIATION OIL (SINGAPORE) CORPORATION LTD	China	2020	Energy	64,153,719
Dongfang Electric Corporation Limited	China	2020	Industrials	57,586,774
HUAYU Automotive Systems Company Limited	China	2020	Cons. Discretionary	53,289,015
MASTEC, INC.	U.S.	2020	Industrials	41,013,329

* Berkshire Hathaway Inc., a holding company, has not reported carbon emissions as of August 31, 2021. At least three of its subsidiaries — Berkshire Hathaway Energy, MidAmerican Energy Company, and Burlington Northern Santa Fe (BNSF) — have reported emissions separately. The holding company, however, has not reported its emissions in the aggregate.

7 MSCI reported incorrectly in July that Coal India and Surgutneftegas PAO had not reported any of their emissions as of May 31, 2021. Coal India reported its Scope 1 and 2 emissions, which totaled 5 megatons of CO2, in April 2021. Surgutneftegaz PAO reported its Scope 1 and 2 emissions for its oil and gas production business, which totaled 2 megatons of CO2 in June 2020 and 1 megaton of CO2 in June 2021, respectively.

Public companies with the most thorough emissions-reduction targets

Not all decarbonization targets are worthy of the task. While corporate climate leaders aim to achieve net-zero emissions across their entire carbon footprint, some companies start with targets that address only a fraction.

The table below show the 10 companies in the MSCI ACWI IMI that have published the most thorough corporate decarbonization targets in the 12 months that ended August 31, 2021.

We assessed thoroughness according to three criteria: comprehensiveness (the table below comprises targets that address a company's total emissions), the change in emissions (% of tons of CO2e) targeted each year and the implied temperature rise that would result.[8]

Issuer	Country	Latest target announcement date	Annual total emissions (tons of CO2e)	Projected normalized change in emissions per year [%]	Comprehensiveness of target [%]	Implied temperature rise (°C)
J Sainsbury PLC	U.K.	2020	31,718,705	-3.23	100	1.3
H & M Hennes & Mauritz AB	Sweden	2018	17,387,525	-3.23	100	1.3
GlaxoSmithKline PLC	U.K.	2019	17,425,188	-3.23	100	1.3
Electricite de France SA	France	2020	135,300,000	-3.23	100	1.6
BT GROUP PLC	U.K.	2020	3,428,510	-3.84	100	1.3
Shionogi & Co., Ltd.	Japan	2020	141,675	-3.23	100	1.3
Astrazeneca PLC	U.K.	2020	7,803,145	-8.69	100	1.3
MORGAN SINDALL GROUP PLC	U.K.	2020	3,969	-3.2	100	1.3
Koninklijke BAM Groep N.V.	Netherlands	2020	3,642,859	-3.07	100	1.3
ROYAL DUTCH SHELL PLC	Netherlands	2020	657,031,708	-3.23	100	2.1

8 MSCI measures comprehensiveness as the percentage of Scope 1, 2 and 3 emissions covered by the company's targets. MSCI standardizes companies' projected emissions to show them as the amount to be reduced annually.

Conclusion

The world's companies are running out of time to slow the worst of climate change. We estimate that emissions of listed companies would make the world roughly 3°C warmer.

Fifty-seven percent of listed companies have yet to align with the goal of keeping global warming well below 2°C, preferably to no more than 1.5°C, above preindustrial levels, as called for by the Paris Agreement. Even low-emissions sectors include companies with high emissions. Such companies are putting carbon into the atmosphere in amounts that far exceed their fair share of the emissions budget that remains for keeping temperature rise within the globally agreed threshold.

Corporate carbon emissions, meanwhile, are ticking back up as the global economy starts to recover from the pandemic. The window for keeping average temperature rise to 1.5°C narrowed by five months between May and August.

Gaps also remain in companies' disclosure of their carbon emissions. Some companies are broadening their emissions reporting and setting decarbonization targets that align with global goals. Others have yet to disclose their emissions at all.

Investors need climate disclosures with measurable data to assess the resilience of companies to both the physical risks of climate change and the risks of transitioning to a net-zero economy. Companies must do more to drive down and disclose emissions. The time to act is slipping away.

Glossary

Comprehensiveness (of emission reporting or target setting): Percentage of listed companies' Scope 1, 2 and 3 emissions covered by emissions reporting or target setting.

Carbon dioxide equivalent (C02e): Greenhouse gas emissions with the same global warming potential as one metric ton of carbon.

Emissions intensity: Greenhouse gas emissions in CO2-equivalent tons per million USD of company sales.

Implied Temperature Rise: A measure that converts a company's current and projected greenhouse gas emissions across all emissions scopes (based on the company's track record and stated reduction targets) to an estimated rise in global temperatures by comparing those emissions with the global carbon for keeping warming well below 2°C.

Megaton [Mt]: One million tons (of emissions).

GICS®: The the global industry classification standard jointly developed by MSCI Inc. and S&P Global Market Intelligence.

Gigaton [Gt]: One billion tons (of emissions).

MSCI ACWI Investable Market Index (IMI): Captures listed large-, mid- and small-cap companies across developed- and emerging-market countries. With 9,226 constituents (as of Sept. 20, 2021), this index covers approximately 99% of the global equity investment opportunity set.

Remaining emissions budget: A company's remaining future emissions budget in tons of C02e to stay within a 1.5°C or 2°C warming scenario. (Please contact esgclientservice@msci.com for full methodology.)

Scope 1 emissions: Listed companies' direct greenhouse gas emissions in tons of C02 equivalent (C02e).

Scope 2 emissions: Listed companies' greenhouse gas emissions from electricity use in tons of C02 equivalent (C02e).

Scope 3 emissions: Listed companies' indirect greenhouse gas emissions in tons of CO2 equivalent (CO2e) from upstream supply chain and emissions inherent in products and services (downstream). Scope 3 covers 15 categories of upstream and downstream emissions as defined by the Greenhouse Gas Protocol.

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