Climate Value-at-Risk

SCENARIO ANALYSIS FROM MSCI

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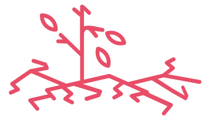
Climate change –
a key risk for institutional investors

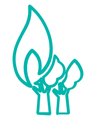
Climate change may pose a systemic risk to the financial sector, whilst also producing new investment opportunities. Managing these risks and capturing new opportunities can be crucial to protecting investment and optimizing performance while at the same time reaching sustainability and climate goals such as achieving a Net-Zero target.

Climate-related financial impacts

In July 2021, two days of extreme rainfall over western Germany resulted in ~**EUR 1.3 billion** in damages for a German rail company.[1]



One major Taiwanese chipmaker reportedly increased its budget for water sourcing in 2021 up to **~USD 26.8 million** in the face of severe drought conditions.[2]



One US utility estimated the cost of mitigating wildfire risks to their business would be **USD 11.7 billion** for 2019-2022.[3]

Focus on
climate change

MSCI ESG Research has worked with institutional investors for more than 20 years to enable them to incorporate climate change considerations in their investment process by providing an extensive view of climate change risks and opportunities across multiple dimensions: emissions data, fossil fuel exposure, and clean technology exposure.

Our climate change solutions are designed to support investors seeking to achieve a range of objectives, including measuring and reporting on climate risk exposure, implementing low carbon and fossil fuel-free strategies, and factoring climate change research into their risk management processes.

1 "German Railway: Floods Caused $1.5 billion Damage to Network." *Associated Press*, Jul. 23, 2021. https://apnews.com/article/europe-floods-0637d4aaaa9469595b9df8c98b488a2d#:~:text=At%20least%20180%20people%20died,overall%20death%20toll%20to%20211

2 https://udn.com/news/story/7240/5474061

3 PG&E 2020 CDP questionnaire: https://www.pgecorp.com/corp_responsibility/reports/2020/assets/PG&E_Corporation_-_ _CDP_Climate_Change_Questionnaire_2020.pdf

MSCI ESG Research's

Climate Value-at-Risk

Climate Value-at-Risk (Climate VaR) is designed to provide a forward-looking and return-based valuation assessment to measure climate related risks and opportunities in an investment portfolio. The fully quantitative model offers deep insights into how climate change could affect company valuations.

How Climate VaR can help you to prepare your institution

Investment managers

Actionable insights to evaluate climate-related risks and opportunities. Identify potential alpha factors in low carbon technology innovation. They can create new investment products with forward-looking scenario based data.

Asset owners

Identification of long-term, climate-related impacts for asset allocation, external manager evaluation and regulatory disclosure.

Banks

Calculations to identify optimal low carbon investment projects within a loan book or credit portfolio. Access our quantitative model to help establish a process to protect credit portfolios and establish a disclosure framework.

Insurance companies

Deep outlooks into the future physical impacts of climate change and how these changes could affect insurance premiums and underwriting.

Your tool to uncover

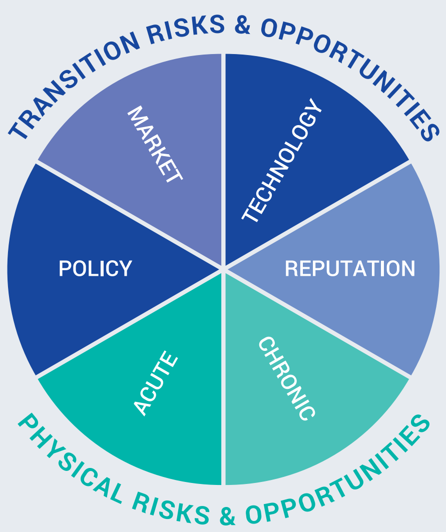
climate risks and opportunities

Companies are affected by climate change in different ways. Extreme weather could damage assets at a company facility or the introduction of new climate change policies could require technological change and incur costs to reduce emissions, or reduce demand for products. All climate change impacts can be translated into a balance sheet impact with the Climate Value-at-Risk model. By calculating the financial risks from climate change per security and per scenario, MSCI ESG Research provides a framework that is designed to help investors identify and understand these risks and take necessary action for portfolio performance optimization, risk management and regulatory reporting purposes.

Modeling approach

TCFD alignment

The G20 Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) released recommendations in June 2017 and updated in 2021, which highlighted the importance of using scenario analysis to assess climate change related impacts within the financial sector.
It calls for the assessment of both the risk and opportunity side of transition and physical climate change impacts. It creates a reporting framework that allows institutions to prepare themselves for upcoming regulations. Many investors have yet to implement scenario analysis but this is an essential aspect of the TCFD Recommendations.



Security-specific

modeling results

Coverage across asset classes

MSCI ESG Research's climate change risk and opportunity calculations cover more than 10,000 companies, assessing all of their associated equities and corporate bonds as part of the analysis.

MSCI ESG Research's Climate VaR financial metric helps investors to better assess potential future costs and/or profits relating to their portfolio's exposure to future climate change impacts. MSCI ESG Research supports clients when they want to understand company and portfolio wide risk exposure, and what that might mean towards the current valuation of security holdings. Climate VaR provides a stressed market valuation of a security in relation to aggregated transition and physical cost and profit projections until the end of the century.

MSCI Climate VaR covers more than 10,000 companies, assessing all of their associated equities and corporate bonds, 9000+ sovereign bonds and for more than 1 million private real estate assets.

MSCI Scenario Analysis available	Coverage	Policy risk	Technology Opportunities	Physical risk & opportunities
Listed Equity & Corporate bonds	12,500 entities directly covered; 19,000 with inheritance Including 100% of ACWI IMI and 95% of BBG Barclays Global Agg - Corporate	✓	✓	✓
Sovereign Bonds	46 markets and +9k securities	✓		
Commercial Real Estate	1 million real assets	✓		✓
Private Equity & Debt	On demand Forthcoming by year end 2022	✓	✓	✓

Physical risks and opportunities

The physical scenarios evaluate the impact and financial risk relating to a comprehensive set of extreme weather hazards including extreme heat and cold, heavy snowfall and precipitation, wind gusts, tropical cyclones and coastal flooding/sea level rise. Our data sources and assessment methods have been established with input from the renowned Potsdam Institute for Climate Impact Research (PIK). MSCI ESG Research utilises a global facility database to accurately assess the impact of physical risks on company assets such as warehouses, factories and offices.

Financial impact modeling

Climate VaR provides insights into the potential climate-stressed market valuation of investment portfolios and downside risks. MSCI ESG Research's financial modeling approach translates climate-related costs into valuation impacts on companies and their publicly tradable securities. In this way, the Climate VaR framework is designed to help investors to understand the potential climate-related downside risk and/or upside opportunity in their investment portfolios.

Transition risks and opportunities

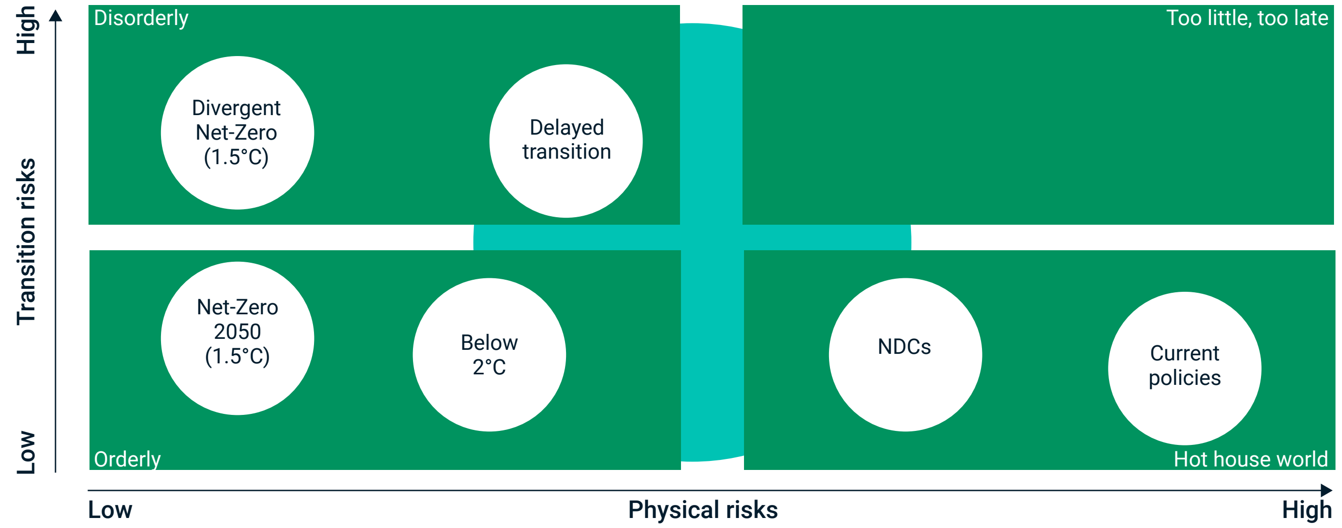
The policy scenarios aggregate future policy costs based on an end of the century time horizon. By overlaying climate policy outlooks and future emission reduction price estimates onto company data, MSCI ESG Research's model provides insights into how current and forthcoming climate policies may affect companies.

With the expansion of MSCI ESG Research's new Scope 3 emissions estimation data, the model now includes the integration of policy risk from electricity use (scope 2) and from value chain GHG emissions (Scope 3), alongside policy risk from direct GHG emissions (Scope 1). In this way, the Climate VaR framework is designed to help investors to understand the potential climate-related downside risk and/or upside opportunity in their investment portfolios.

The technology scenarios identify current green revenues as well as the low carbon patents held by companies, calculate the relative quality score of each patent over time and forecast green revenues and profits of corporations based on their low carbon innovative capacities.

We align the transition and physical risk scenarios with key frameworks including those recommended by the IPCC and NGFS. The NGFS (Network for Greening the Financial System) gathers 114 central bank and prudential regulator members[4] and recommended scenarios commonly adopted in the market, now considered as market standard for modeling the financial impact of climate scenarios.

NGFS scenarios framework

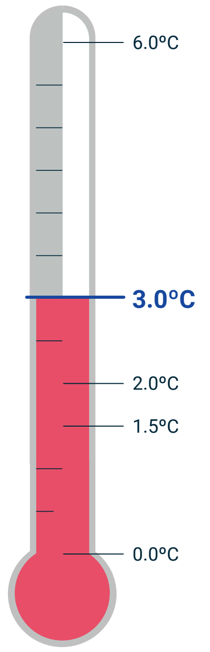


Positioning of scenarios is approximate based on an assessment of physical and transitio risks out to 2100.

How aligned is your portfolio with the Paris Climate Target?

Implied Temperature Rise from MSCI ESG Research is another forward-looking metric designed to show the temperature alignment of companies, portfolios, funds and indexes with global climate targets.

To learn more about Implied Temperature Rise visit **msci.com/implied-temperature-rise**



Climate Value-at-Risk

Schedule a demo today at msci.com/climate-var

4 As of April 2022, https://www.ngfs.net/sites/default/files/media/2021/08/27/ngfs_climate_scenarios_phase2_june2021.pdf

About MSCI Inc.

MSCI is a leading provider of critical decision support tools and services for the global investment community. With over 50 years of expertise in research, data and technology, we power better investment decisions by enabling clients to understand and analyze key drivers of risk and return and confidently build more effective portfolios. We create industry-leading research-enhanced solutions that clients use to gain insight into and improve transparency across the investment process.

To learn more, please visit **www.msci.com.**

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