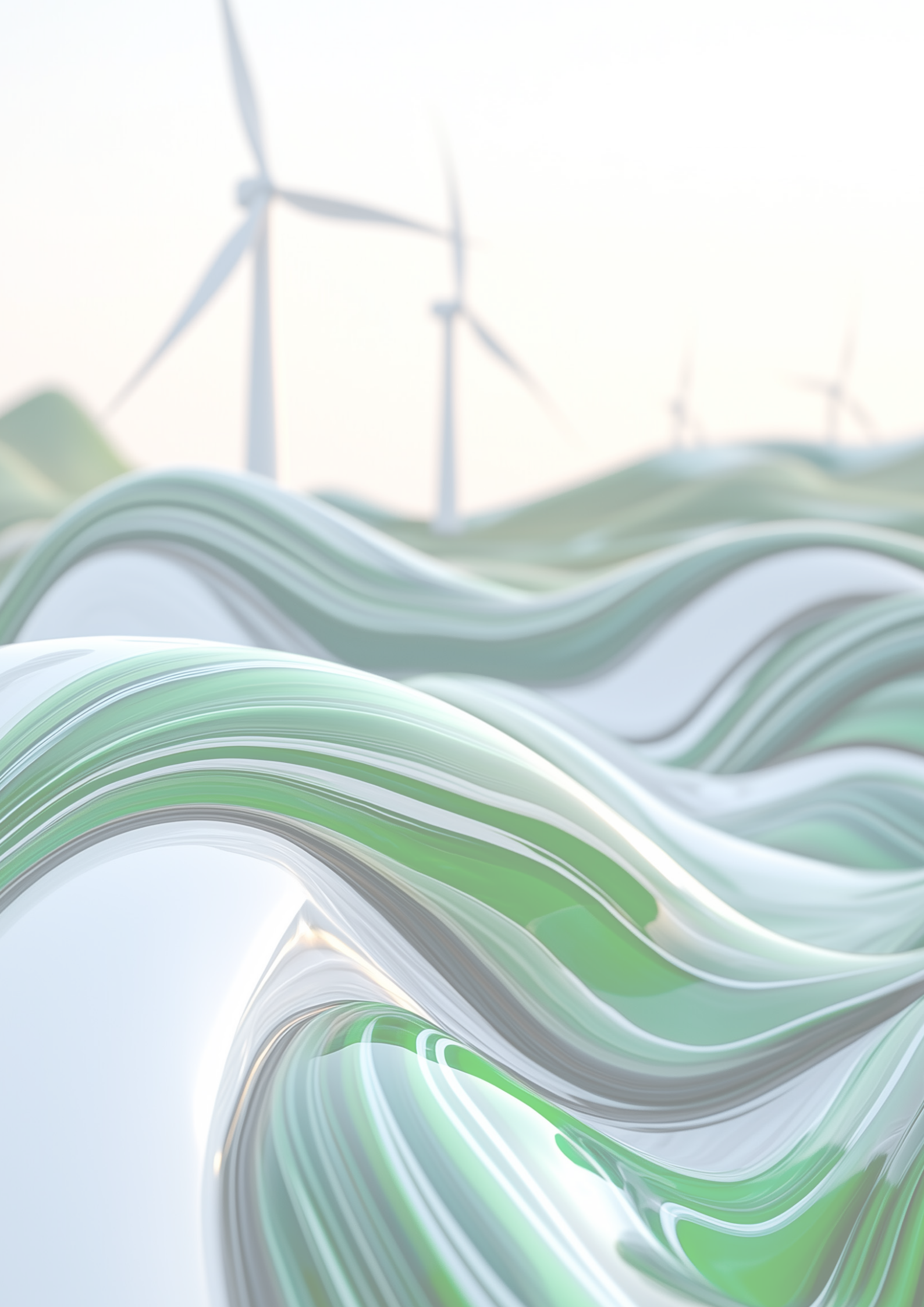




Report  
**Climate risk assessment –  
European insurance companies**

A top-down analysis with Ortec Finance  
Climate Scenarios

November 2024





# Contents

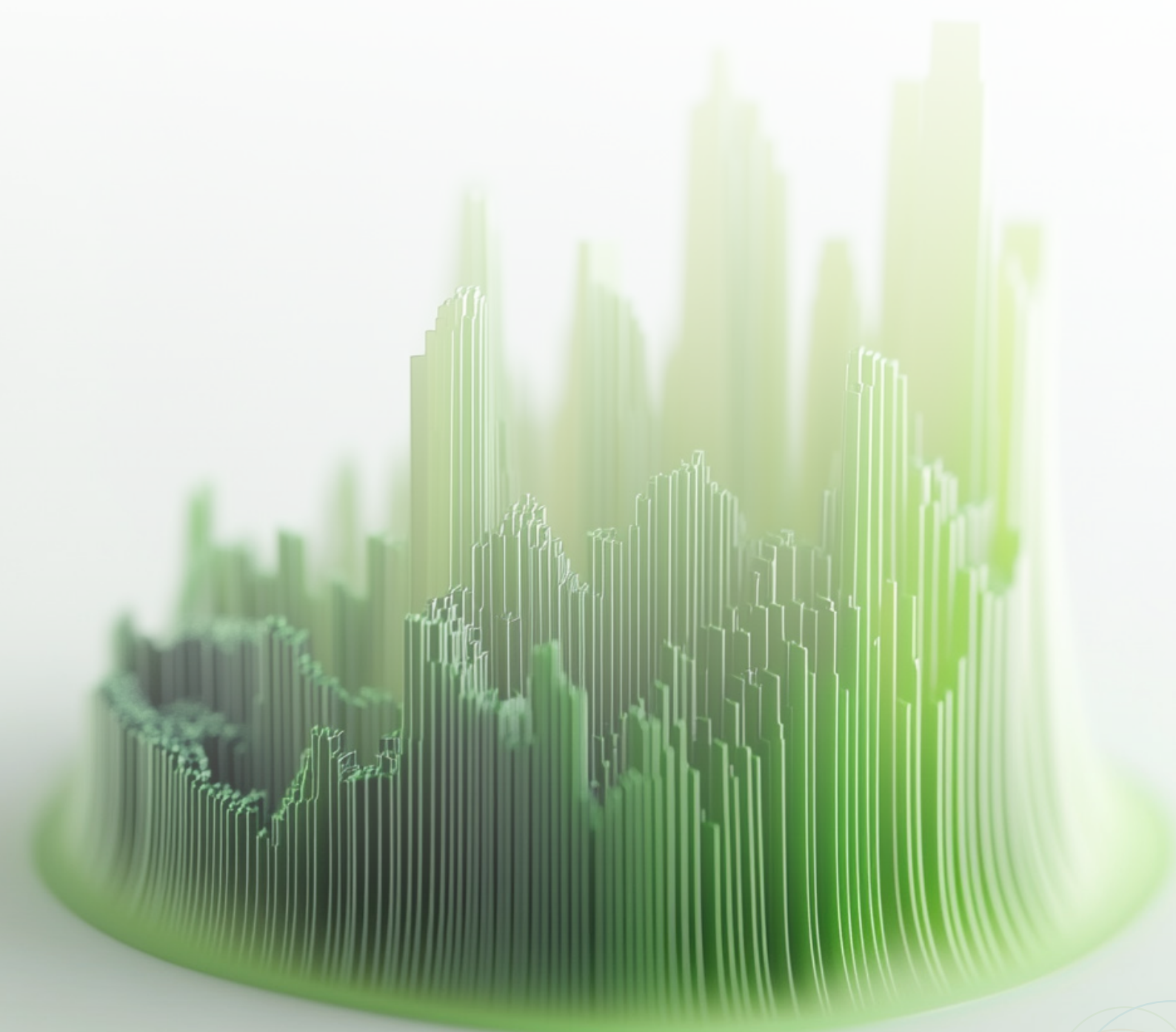
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# Summary

This report provides a climate risk analysis of a reference European insurer's portfolio by quantifying the annual, cumulative and cumulative annualized impacts at asset class level under the 2024 Ortec Finance Climate Scenarios. Ortec Finance is a leading climate scenario analysis provider, that specifically develops climate scenarios designed to realistically assess a financial institution's portfolio risk exposure to climate change under a range of plausible climate futures.





# Key findings

Transition risk is the most significant and imminent climate risk facing European insurance companies over the next 5 years, accentuated by the potential for a disorderly transition, which would have profound implications for investment portfolios.

In the long term, physical risks are expected to have the greatest negative impact on European insurers' investment portfolios, especially as financial markets begin to price-in the effects of climate change.

The greatest harm to a European insurer's investment portfolio is likely to arise from either: 1) drastic and uncoordinated policy changes aimed at driving a low-carbon transition in the short-term, or 2) failing to undertake the transition to a low-carbon economy in the long-term.



# Introduction/Purpose

Climate change is a complex financial risk. How climate change unfolds, across the variations in temperatures and weather patterns; as well as how the global community shifts towards a low-carbon economy as a result of associated policies and technologies will have a profound impact on the economy, influencing GDP growth, inflation and ultimately, financial markets.

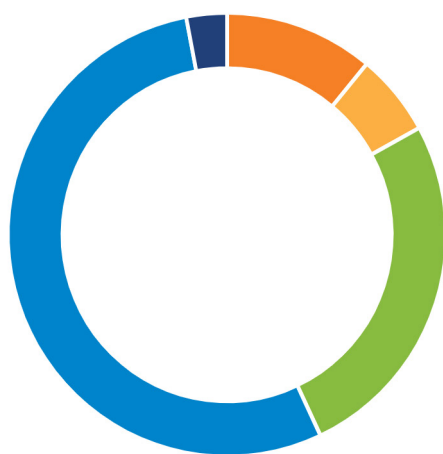
Unlike traditional investment risks, climate change-related risks are characterized by fundamental uncertainty and a lack of historical data. European insurance companies, as key asset owners, recognize that climate change poses a significant financial threat. To address this, a growing number of insurance companies worldwide employ climate scenario analysis—a forward-thinking top-down approach that simulates quantified economic and financial impacts of the different asset classes within their investment portfolio across different future scenarios. By doing so, European insurance companies are taking action to understand the unique risks, identify opportunities, and navigate unforeseen challenges.



# Methodology and approach

Ortec Finance’s analysis is based on a reference portfolio that represents the average allocation of a European insurance company. This allocation is derived from the EIOPA (European Insurance and Occupational Pensions Authority) Reference Portfolios, with data released in March 2023. EIOPA is a highly respected regulatory authority within the European Union, known for its comprehensive and reliable data on pension funds and insurance sectors. The reference portfolios are carefully constructed to reflect the typical asset allocations of European insurance companies, which tend to be stable over time. Therefore, the March 2023 data remains a representative and trustworthy benchmark for current analysis.


**The portfolio allocation breakdown is as follows:**



■ Alternatives ■ Cash ■ Equity ■ Fixed income ■ Real estate

Portfolio Allocation	
Asset type	Allocation (%)
Alternatives	11%
Cash	6%
Equity	26%
Fixed income	54%
Real estate	3%





Ortec Finance has utilized a top-down approach to quantify the impact on asset class returns within each portfolio, relative to a baseline with 2°C to 3 °C degrees warming by 2100 under its annually updated proprietary climate scenarios. The scenarios explore a range of different temperature outcomes by 2100 that simulate a successful low carbon transition, disorderly and failed transitions, summarized below. Further details of each scenario can be found in the appendix.

**Net-Zero**  
⬆ 1.5°C

Explores the risks and opportunities of an **optimistic, ambitious but orderly transition** to net-zero by 2050. (NZ)

**Net-Zero  
Financial Crisis**  
⬆ 1.5°C

Explores a **disorderly and financially disruptive transition**. (NZFC)

**Net-Zero  
Financial  
Crisis  
Stress**

Explores the impact of a **very severe market overreaction** to accelerated low-carbon policies under a disorderly and financially disruptive transition. (NZFC STRESS)

**Delayed  
Net-Zero**  
⬆ 2.0°C

Explores **increased policy action and technological developments**, that drive a transition which reduces severe physical risk impacts. (DNZ)

**Limited  
Action**  
⬆ 2.6°C

Explores a **limited transition**, with high exposure to physical risk. (LA)

**High  
Warming**  
⬆ 3.7°C

Explores the risks of a **failed transition** leading to very severe physical risks. (HW)

**High  
Warming  
Stress**

Explores a 'worst-case' **complete economy and societal system collapse** under a failed transition, focusing on extreme tail risks and severe physical damages. (HW STRESS)



Ortec Finance's climate scenario modeling framework, in partnership with Cambridge Econometrics assesses the economic and asset class impacts of climate change by incorporating a wide range of systemic climate risk drivers, across three key categories.



**Transition risk** – The impact of incoming or implemented low-carbon regulatory and fiscal policies, technology uptake, energy demand and emissions at country and sector levels analyzed by Cambridge Econometrics' E3ME macroeconomic model



**Physical risk** - GDP impacts arising from rising temperatures, extreme weather event occurrences, direct insured and uninsured losses, urbanization rates and changes to labor and agricultural productivity due to longer term weather changes.



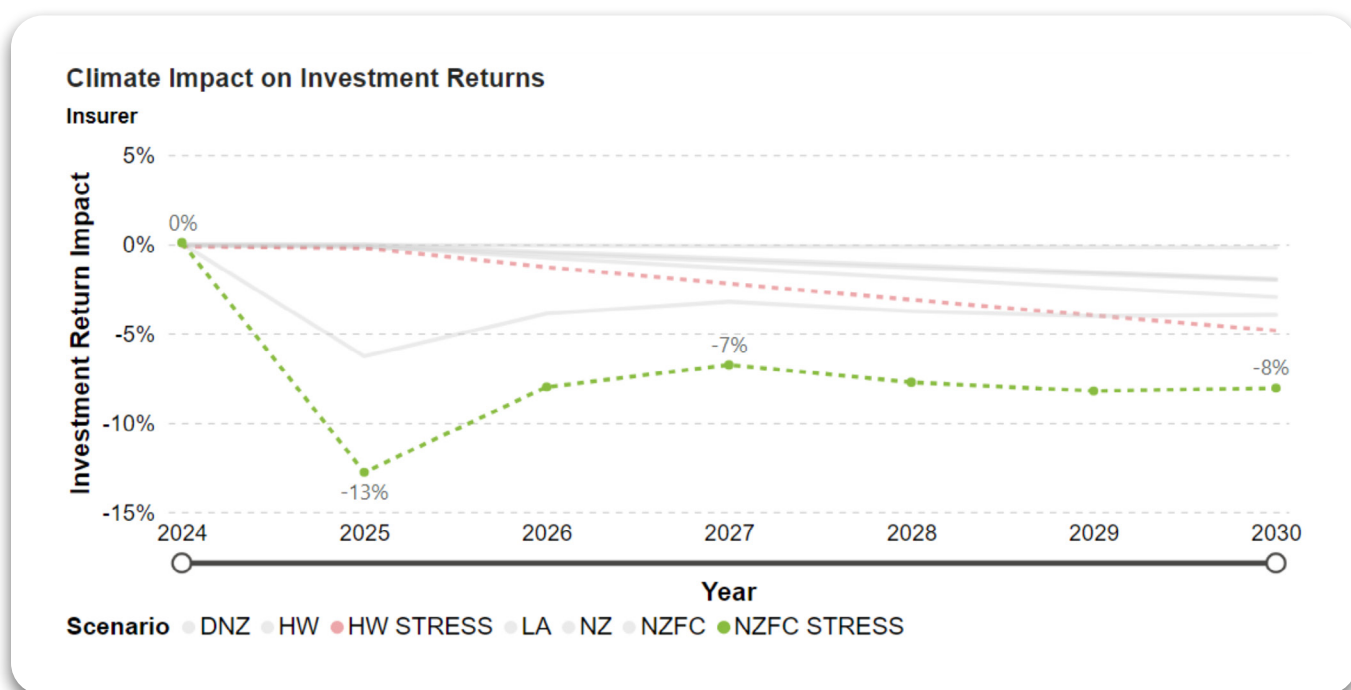
**Market risk** – The pricing-in of impacts on asset valuations arising from transition and physical risks, asset performance, and financial market responses, including stranded assets, potential market overreactions and sentiment shocks

The impacts on individual asset classes are generated by Ortec Finance's Economic Scenario Generator based upon Ortec Finance's proprietary stochastic financial model.

# Observations and insights

Disruptive climate policies could significantly reduce investment returns (-13%) in the short term for the average European insurance company, potentially increasing pressure on premium levels and payouts to policyholders.

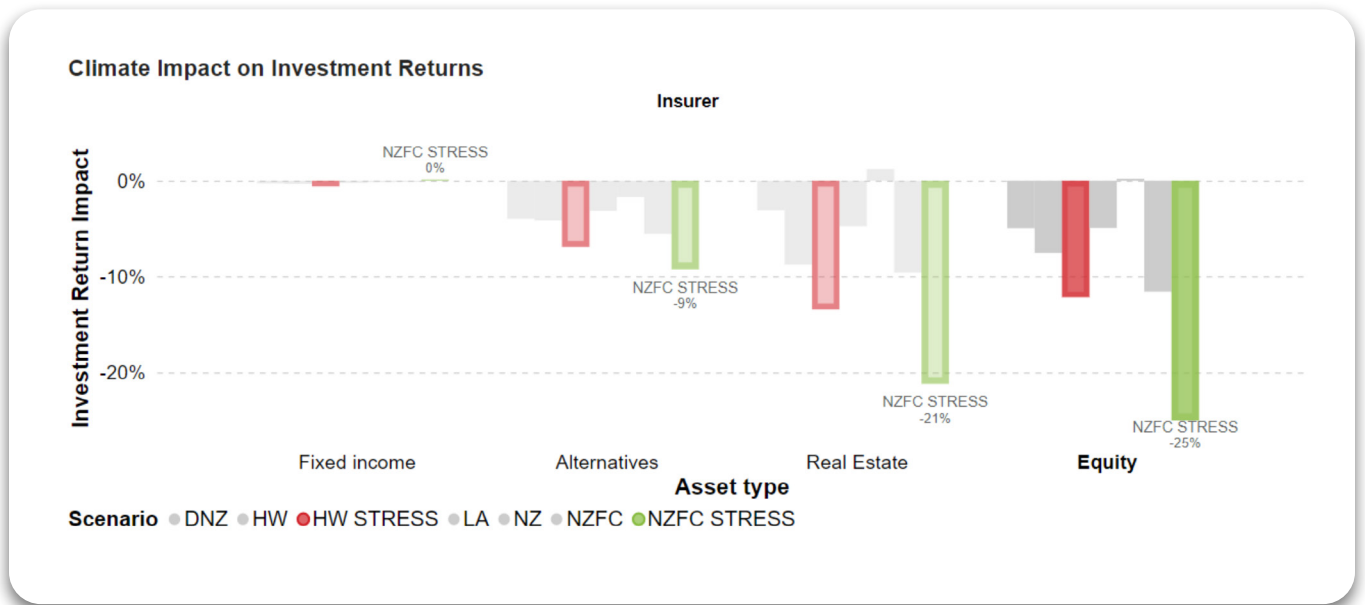
Transition risks are expected to be the dominant climate risk driver compared to physical risks during the 2025–2030 period. Additional low-carbon policies, revised NDCs (Nationally Defined Contributions), and net-zero target reviews by global investor alliance groups may accelerate the stranding of fossil fuel assets, potentially triggering market overreactions and widespread disruption. Under the most extreme outcomes of a disorderly transition, this could result in 13% reduction in investment performance<sup>1</sup> in the near future, followed by a moderate pace of recovery.



<sup>1</sup>Climate impact figures represent deviations from future expected losses in the base case (baseline) if the climate change unfolds as depicted by the climate scenario.  $\frac{\Pi(1+r_{climate})}{\Pi(1+r_{baseline})} - 1$

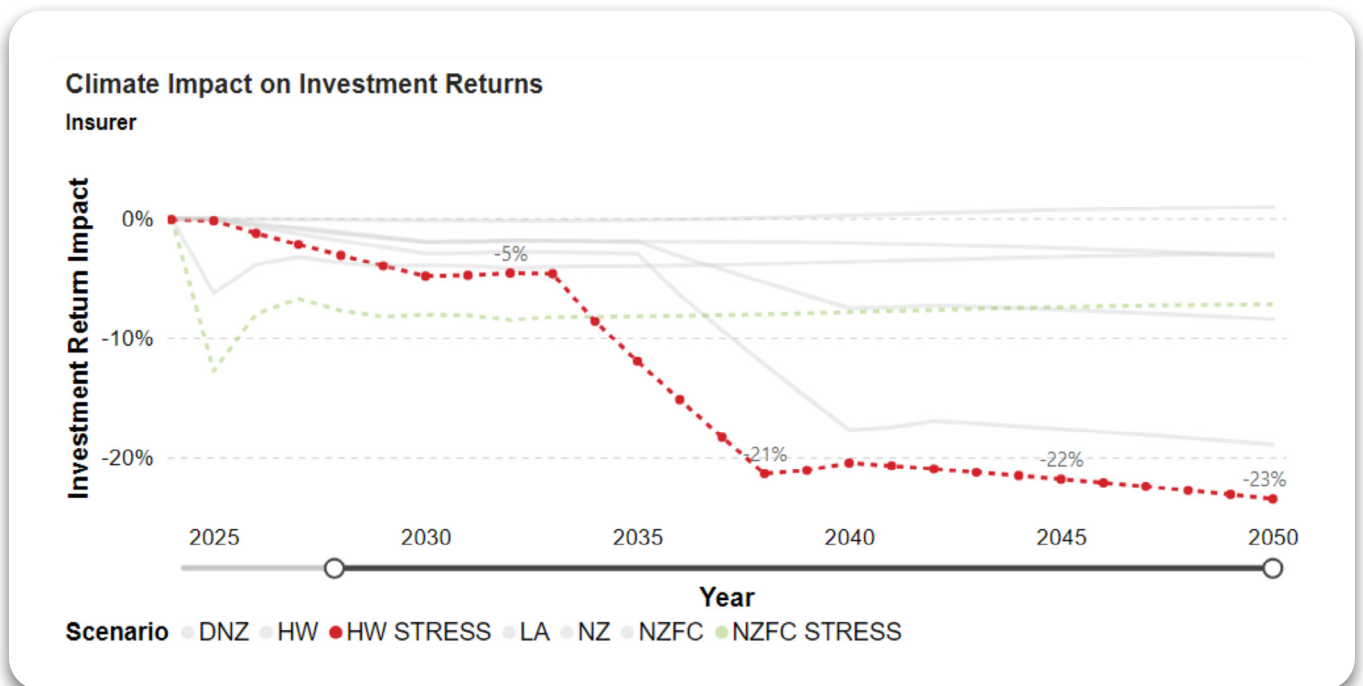
**A disruptive transition would have the greatest short-term impact on the equity investment performance (-25%) of European insurers.**

Equities will be most vulnerable to transition climate risks in the near term. Market overreactions and sentiment shocks from a mass sell-off of carbon-intensive assets could trigger liquidity challenges and abrupt price fluctuations as markets adjust asset valuations. Asset classes such as fixed income, which are less driven by market valuations and thus less exposed to market uncertainties, will be more resilient. In contrast, real estate and alternative assets are comparatively more exposed to the effects of decarbonization initiatives.



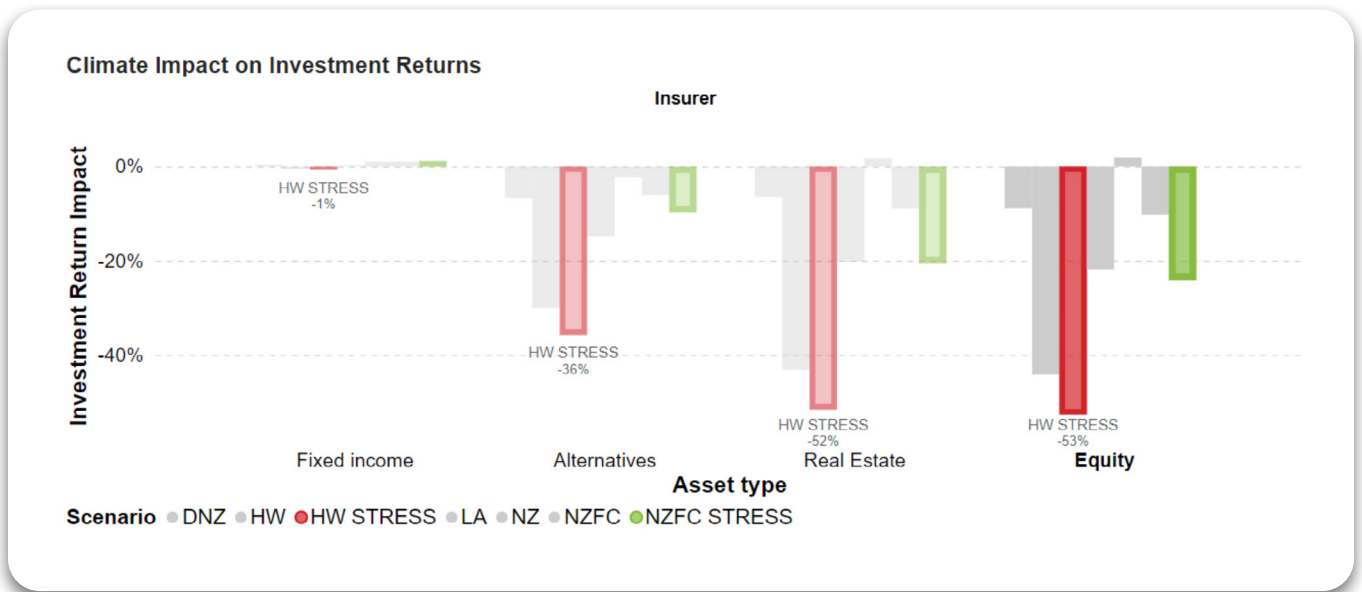
**Unaddressed climate change could severely impact European insurers, with investment returns dropping by up to 23% by 2050.**

Rising carbon emissions in the absence of any further decarbonization efforts will directly increase physical risk levels, leading to significant financial impacts materializing by the mid-2030s. In a worst-case scenario, the average European insurer's investment returns could experience a 5% lower return within less than a decade, quadrupling to 21% within six years and worsening further to 23% by 2050. These declining returns could negatively affect the financial stability of the insurance industry, reduce future shareholder dividends, and increase uncertainty regarding the insurer's ability to meet claim payouts for its clients.



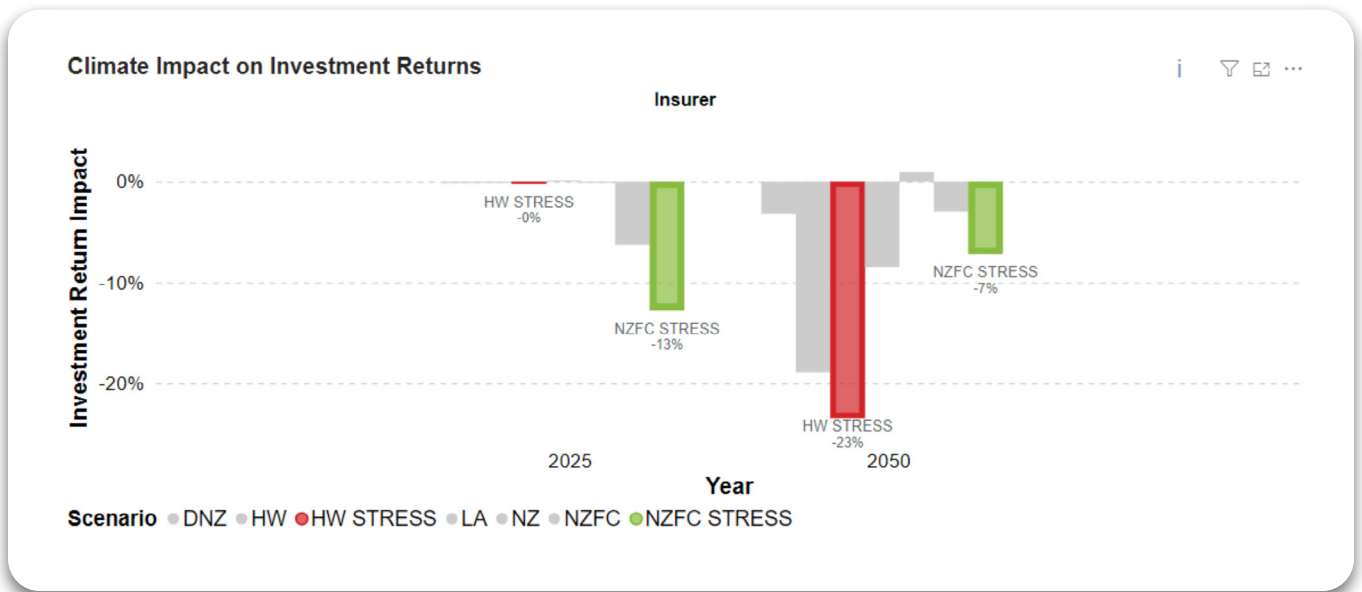
Severe physical risks could cut real estate and equity portfolio returns by more than half by 2050, potentially leading to significant financial strain on insurers highly exposed to these assets and increasing pressure on their ability to meet future obligations.

Further rising temperatures, leading to an increase in extreme weather events and affecting agricultural, labor and industrial productivity, will have a profound and widespread impact on economies, collectively reducing asset performance across all asset classes. Under this scenario, both real estate and equities, which together comprise almost 30% of a typical European insurer’s portfolio, could yield less than half of the expected returns.



**European insurers may face significant repercussions in the absence of low carbon policy action and overall emission reductions.**

While short-term cumulative returns for an average European insurer due to low-carbon policies and decarbonization activities could decline by 13%, this reduction is less than half of the potential decline of up to 23% in a scenario where active decarbonization does not occur in the near future. Losses are likely unavoidable in all scenarios, but the extent of these losses will depend on the time horizon in which they occur.





# Recommendations

The investment returns of the European insurance industry stand to benefit most from a harmonious and inclusive transition to a low-carbon economy, both in the short and long term. A well-managed transition can mitigate risks and capitalize on new opportunities in sustainable investments, driving stable returns for the industry.

European insurance companies should start to proactively undertake comprehensive climate risk assessments. These assessments are essential to understanding the resilience and sensitivity of their portfolios to climate risks and would help the industry to evaluate how different scenarios of carbon emission reduction and climate policy changes could impact their investments, identifying areas of vulnerability and resilience.

In the near future, the manner in which the world transitions to lower carbon emissions will likely have a significant impact on European insurers' portfolio performance. Companies that are prepared for rapid shifts in market dynamics, policy changes, and consumer preferences will be better positioned to maintain strong financial performance, especially in the event of a disruptive transition.

For long-term investments, which are a hallmark of the insurance industry, it is crucial to identify climate-sensitive hotspots within their portfolios. This involves recognizing sectors and assets at risk from physical climate impacts, such as extreme weather events and rising sea levels. By pinpointing these vulnerabilities, insurers can adjust their investment strategies and increase resilience in the face of increasing climate risks.

Overall, the ability to adapt to and anticipate climate-related risks will be a key differentiator for European insurance companies in achieving robust, sustainable growth in the coming decades. This proactive approach will help them manage their fiduciary responsibilities and contribute to broader societal goals of achieving a low-carbon economy.



# Conclusion

While not a forecasting tool, the potential financial and economic implications on a European insurance company under these different futures can help financial institutions understand how different climate-related outcomes could manifest and impact their investment portfolios. The array of risks and opportunities associated with these specific plausible climate futures, can be utilized alongside traditional risk analysis outcomes to help informed strategic asset allocation decisions, stress-test a portfolio's resilience which can then be translated into more robust and resilient investment strategies.





# About Ortec Finance

Ortec Finance is a leading provider of technology and solutions for risk and return management. It is Ortec Finance's purpose to enable people to manage the complexity of investment decision making.

This is accomplished via the delivery of leading technologies and solutions for investment decision making to financial institutions around the world. Ortec Finance's strength lies in an effective combination of advanced models, innovative technology, and in-depth market knowledge. This combination of skills and expertise supports investment professionals in achieving a better risk-return ratio and thus better results.

Headquartered in Rotterdam, The Netherlands, Ortec Finance has offices in Amsterdam, London, Toronto, Zurich, Melbourne, New York and Singapore. Ortec Finance helps 600+ clients manage €14 trillion assets under management.

[www.ortecfinance.com](http://www.ortecfinance.com)

## About Ortec Finance's climate scenario analysis solution - ClimateMAPS



**CLIMATE**  
MAPS


ClimateMAPS - Ortec Finance's award-winning climate scenario analysis solution, offered in exclusive partnership with Cambridge Econometrics, enables financial institutions to quantify their portfolio's climate risk exposure and identify opportunities relative to a baseline with 2°C to 3 °C degrees warming. With global coverage of over 600+ economic and financial variables, ClimateMAPS provides comprehensive insights to help financial institutions translate the impact of climate change on investments.



# Appendix

## Ortec Finance Climate Scenarios 2024

### Net-Zero



**Net-Zero**  
↑ 1.5°C


In Ortec Finance's '**Net-Zero**' climate scenario, global CO2 emissions reach net-zero by 2050, and global average temperatures stabilize at **1.5°C** above pre-industrial levels by 2100. A highly ambitious set of policies aimed at reducing emissions are introduced. These policies include global carbon pricing and energy taxation, a phase-out of coal and fossil fuel technologies, energy efficiency regulations, and subsidies for renewable energy, electric vehicles, afforestation and reforestation.

New power generation technologies, including hydrogen and carbon capture and storage (CCS) are assumed to be viable and there is significant adoption of afforestation and reforestation activities to offset hard-to-abate emissions.

The world experiences comparably low impacts from extreme weather events and gradual warming as the world adapts to the effects of climate change.

The financial market implications arising from transition and physical risks are **not materially disruptive**. This scenario explores the risks and opportunities of an **optimistic, ambitious but orderly transition** to net-zero by 2050.

### Net-Zero Financial Crisis



**Net-Zero  
Financial Crisis**  
↑ 1.5°C

In Ortec Finance's '**Net-Zero Financial Crisis**' climate scenario, global CO2 emissions reach net-zero by 2050, and global average temperatures stabilize at **1.5°C** above pre-industrial levels by 2100. A highly ambitious set of policies aimed at reducing emissions are introduced. These policies include global carbon pricing and energy taxation, a phase-out of coal and fossil fuel technologies, energy efficiency regulations, and subsidies for renewable energy, electric vehicles, afforestation and reforestation.

New power generation technologies, including hydrogen and carbon capture and storage (CCS) are assumed to be viable and there is significant adoption of afforestation and reforestation activities to offset hard-to-abate emissions.

The world experiences comparably low impacts from extreme weather events and gradual warming as the world adapts to the effects of climate change.

There are disruptive effects in financial markets as **climate risks are abruptly priced-in in 2025**, triggered by the submission of new Nationally Determined Contributions (NDCs), leading to a confidence shock to the financial system that year. In 2025, investors who committed to net-zero targets by 2050 evaluate their decarbonization trajectory which results in the need for sudden portfolio adjustments. Divestments from assets related to carbon-intensive economic activities ('stranded assets') causes an abrupt revaluation and subsequent knock-on financial effects.


This scenario explores a **disorderly and financially disruptive transition**.



Net-Zero  
Financial  
Crisis  
Stress

An **additional stress version** of this scenario explores the impact of a more severe sentiment shock triggered by the over-reaction from financial markets in response to a low-carbon policy acceleration.

### Delayed Net-Zero



Delayed  
Net-Zero  
@ 2.0°C

In Ortec Finance's '**Delayed Net-Zero**' climate scenario, a highly ambitious set of policies aimed at reducing emissions are introduced. These include global carbon pricing and energy taxation, a phase-out of coal and fossil fuel technologies, energy efficiency regulations, and subsidies for renewable energy and electric vehicles. These policies are not implemented on the scale that is required to reach net-zero emissions by 2050. This scenario results in emissions trending towards net-zero after 2050 and global average temperatures stabilizing at **2°C** above pre-industrial levels by 2100.

This scenario reflects rapid power generation technology developments, with considerable progress in the development of carbon capture and storage (CCS) technologies.

The world is faced with moderate impacts from extreme weather events and temperature change. **Financial market disruption arising from transition risks occur during the late 2020s.**

This scenario explores increased policy action and technological developments, that drive a transition which reduces severe physical risk impacts.

### Limited Action



Limited  
Action  
@ 2.6°C

In Ortec Finance's '**Limited Action**' climate scenario, global average temperatures are 1.8°C warmer than pre-industrial levels by 2050 and **2.6°C** warmer by 2100. Policymakers take moderate steps to address climate change but commitments and Nationally Determined Contributions (NDCs) made under the Paris Agreement are not fully met and adjusted for credibility. Only existing carbon markets continue, including the EU Emissions Trading System (ETS), with an assumed moderate increase in the carbon price. Regulation and taxation of fossil fuel-based technologies is limited.

There is progressive adoption of low-carbon technologies, such as electric vehicles, driven by factors including cost reduction and efficiency improvements.

This scenario reflects high risks from extreme weather events and high temperatures. These risks have **material financial market implications in the 2020s and 2030s**, due to lower expected performance.

This scenario explores a **limited transition**, with high exposure to physical risk.

## High Warming



In Ortec Finance's '**High Warming**' climate scenario, the global average temperature is around 2°C warmer than pre-industrial levels by 2050 and **3.7°C** warmer by 2100. No new low-carbon policies are enacted and some existing ones are scaled back. Multiple climate tipping points are reached and many countries suffer from extreme drought and water shortages. The higher average temperatures affect human health and damage crop yields, driving a reduction in labor and agricultural productivity. In addition, infrastructure damage from extreme weather events leads to direct losses and indirect effects to the economy via supply chain disruption.

The triggering of multiple climate tipping points drives an exponential increase in extreme weather events. The lost productivity and extreme weather events **have large financial market implications in the 2020s and 2030s**, due to lower expected performance.

This scenario explores the risks of a **failed transition** leading to very severe physical risks.



An **additional stress version** of this scenario explores a system collapse with extreme heat stress and climate tipping points driving a worst-case outcome, with complete collapse of the economy and society by 2100.

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