



The role of climate scenarios in building strategic planning

Agenda

1. Climate risk: exposure, assessment, strategy
2. Climate risk transmission channels
3. Climate scenario analysis
4. Potential applications
5. Deloitte's Approach to CSA

Climate risk effects on business finance and strategy

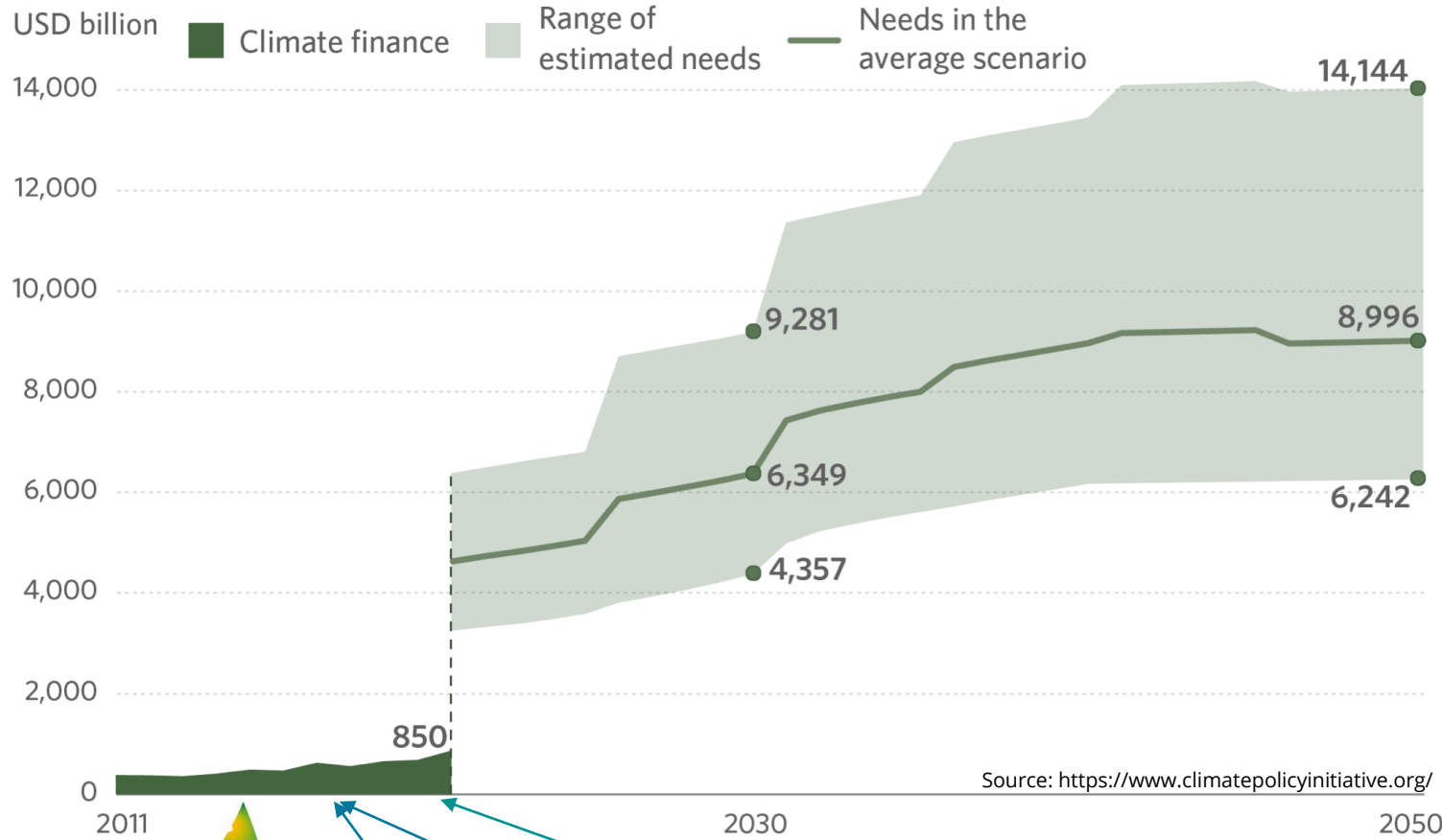
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- **At least USD 4.3 trillion in annual finance flows or a 20% year-on-year increase by 2030 is required** to avoid the worst impacts of climate change.
- Despite the seemingly dramatic scale of the funding gap, it represents less than 5% of global GDP.³
- Moreover, **this increase would not be based solely on new, additional sources of finance.**
- Aligning finance with a 1.5C path would demand to cut the financing of high emissions activities and some resources to be reallocated to climate finance.



Final Report
Recommendations of the Task Force on Climate-related Financial Disclosures

Technical Supplement
The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities

NGFS Climate Scenarios
for central banks and supervisors
June 2021

From exposure to assessment ... and strategy

Metrics

Scope 1

direct greenhouse gas emissions from sources owned or controlled by an organization

Scope 2

indirect emissions coming from electricity, steam, heat, and cooling consumption

Scope 3

all indirect emissions that occur in the value chain of the reporting company, including both upstream and downstream emissions

Assessment

- How the increase in carbon price in going to affect my costs?
- How the increase in energy prices is going to affect my costs
- How much revenues are going to shrink if I don't make the value chain greener?

Business, finance, strategy

- What's my emission reduction plan?
- How much it costs to finance it?
- What's my energy mix shift plan
- How much it costs to finance it?
- How do I change the value chain to avoid market share lossess?

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What is climate risk? – transition risk

Type of risk	Transmission channels	Economic and financial impacts
Policy & Legal	Increase in the price of greenhouse gas emissions	Increment in purchasing costs of permits
Market	Change in customer behavior	Reduction in the demand for goods and services
	<ul style="list-style-type: none"> • Uncertainty of market signals • Increasing costs of raw materials 	<ul style="list-style-type: none"> • Increased production costs due to changes in input prices (e.g., energy, water) and production requirements (e.g., waste treatment) • Abrupt and unexpected changes in energy costs • Asset revaluation (e.g., fossil fuel reserves, land valuations, stock valuations)
Reputational	Changes in consumer preferences	<ul style="list-style-type: none"> • Decrease of market shares for companies with high carbon footprint along the value chain • Reduction in revenues due to decreased demand for goods/services
Technology	Replacement of existing products and services with low-emission options	Asset revaluation
	Transition costs to low-emission technologies	Increasing investments for GHG emissions reduction

Source: TCFD, 2017

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What is climate risk? – physical risk

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Type of risk	Transmission channels	Economic and financial impacts
Acute	Increased frequency and severity of extreme events such as cyclones and floods	<ul style="list-style-type: none"> Reduction in revenues caused by: <ul style="list-style-type: none"> a reduction in production capacity (e.g., transportation difficulties, supply chain disruptions) higher costs caused by negative impacts on the workforce (e.g., health, safety, absenteeism) Depreciation and early disposal of existing assets (for example, damage to property and assets in "high risk" locations)
Chronic	Temperature rise (heat and drought)	Reduced revenues due to decreased sales and production
	Sea-level rise	<ul style="list-style-type: none"> GDP loss in the tourism sector

Source: TCFD, 2017

Climate risk uncertainty and scenario analysis

*«For many organizations, the most significant effects of climate change are **likely to emerge over the medium to longer term**, but their precise timing and magnitude are **uncertain**.*

*This uncertainty presents challenges for individual organizations in **understanding the potential effects of climate change on their businesses, strategies, and financial performance**.*»

TCFD, 2017

*The Use of Scenario Analysis in Disclosure of
Climate-Related Risks and Opportunities*

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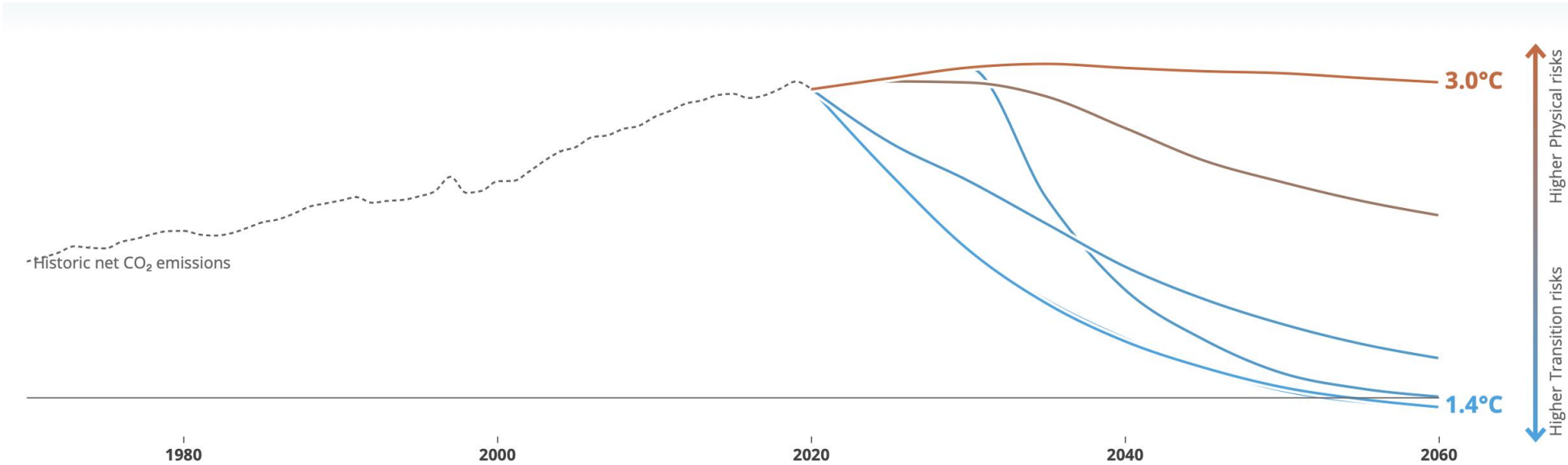
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Which Scenarios

Scenarios should

- [...]
- Be scientifically grounded - consistent with future expectations of policy advisors and with expected climate change impacts
- Provide a clear narrative
- Consider both physical and transition risks
- [...]



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Climate risk transmission channels

Climate scenario analysis

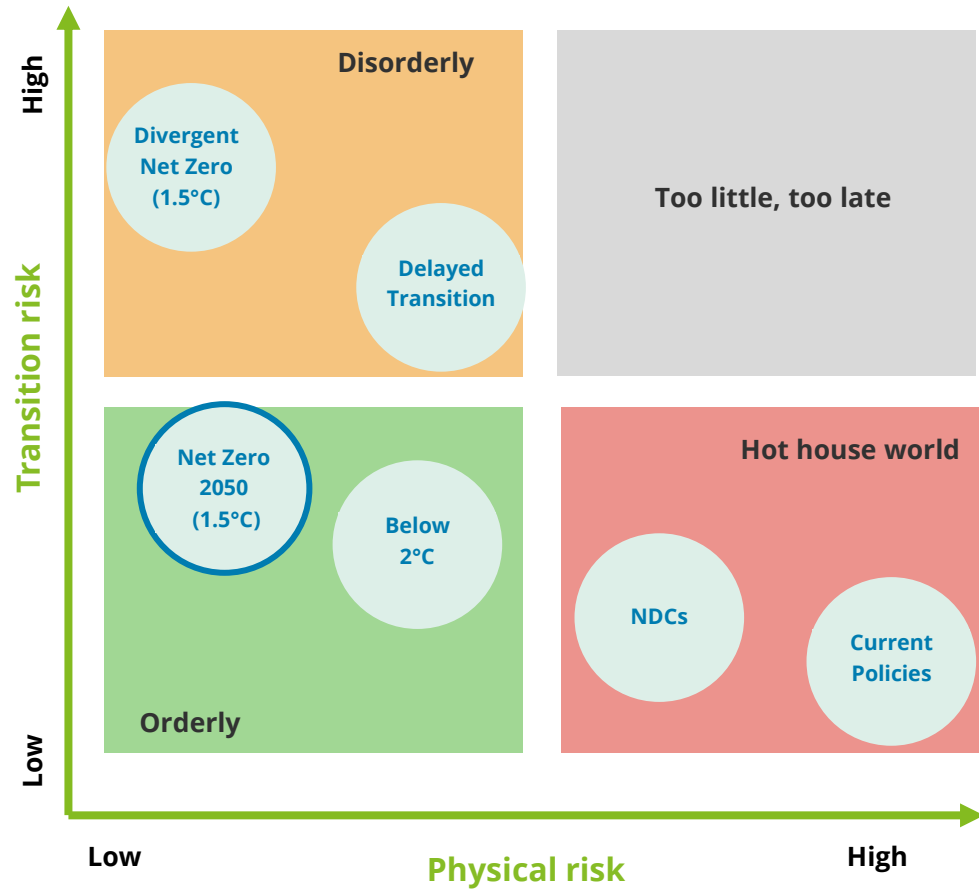
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Climate risk exposure

Net Zero 2050 is an ambitious scenario that limits global warming to 1.5 °C through stringent climate policies and innovation, reaching net zero CO₂ emissions around 2050.

Some jurisdictions such as the US, EU and Japan reach net zero for all greenhouse gases by this point.



<https://www.ngfs.net/ngfs-scenarios-portal/>

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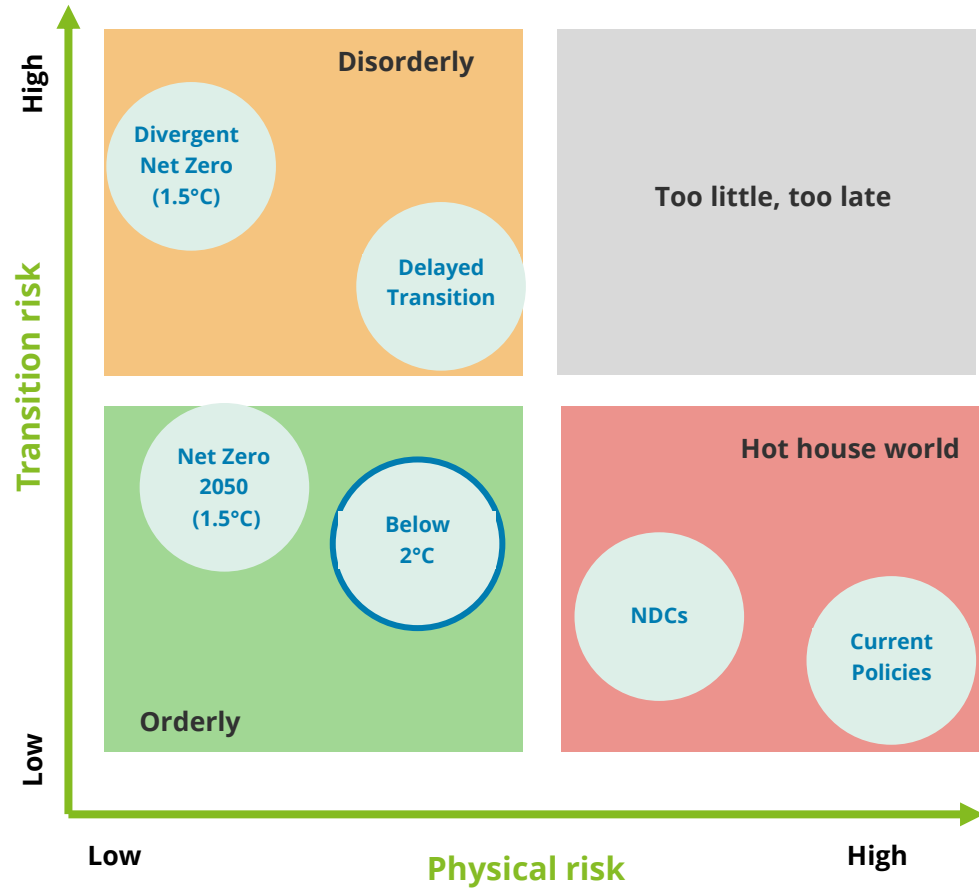
Climate risk exposure

Below 2 °C gradually increases the stringency of climate policies, giving a 67 % chance of limiting global warming to below 2 °C.

This scenario assumes that climate policies are introduced immediately and become gradually more stringent though not as high as in Net Zero 2050.

CDR is deployment is relatively low.

Net-zero CO₂ emissions are achieved after 2070. Physical and transition risks are both relatively low.



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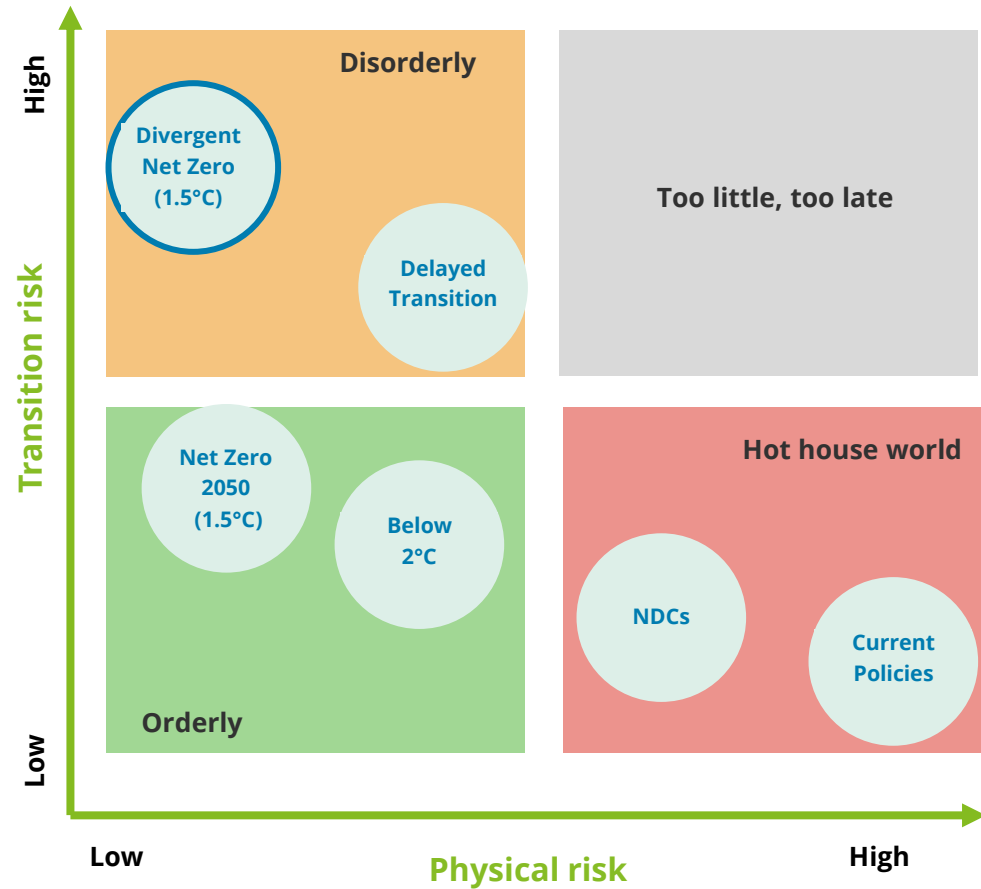
Climate risk exposure

Divergent Net Zero reaches net-zero by 2050 but with higher costs due to divergent policies introduced across sectors and a quicker phase out of fossil fuels.

Compared to NZ50, climate policies are more stringent in the transportation and buildings sectors. The failure to coordinate policy stringency across sectors results in a high burden on consumers, while decarbonisation of energy supply and industry is less stringent.

The availability of CDR technologies is assumed to be lower than in NZ50. Emissions are in line with limiting global warming to below 1.5 °C by the end of the century, **with no or low overshoot** of 1.5 °C in earlier years.

This leads to considerably higher transition risks than than NZ50 but overall the lowest physical risks of the 6 NGFS scenarios.



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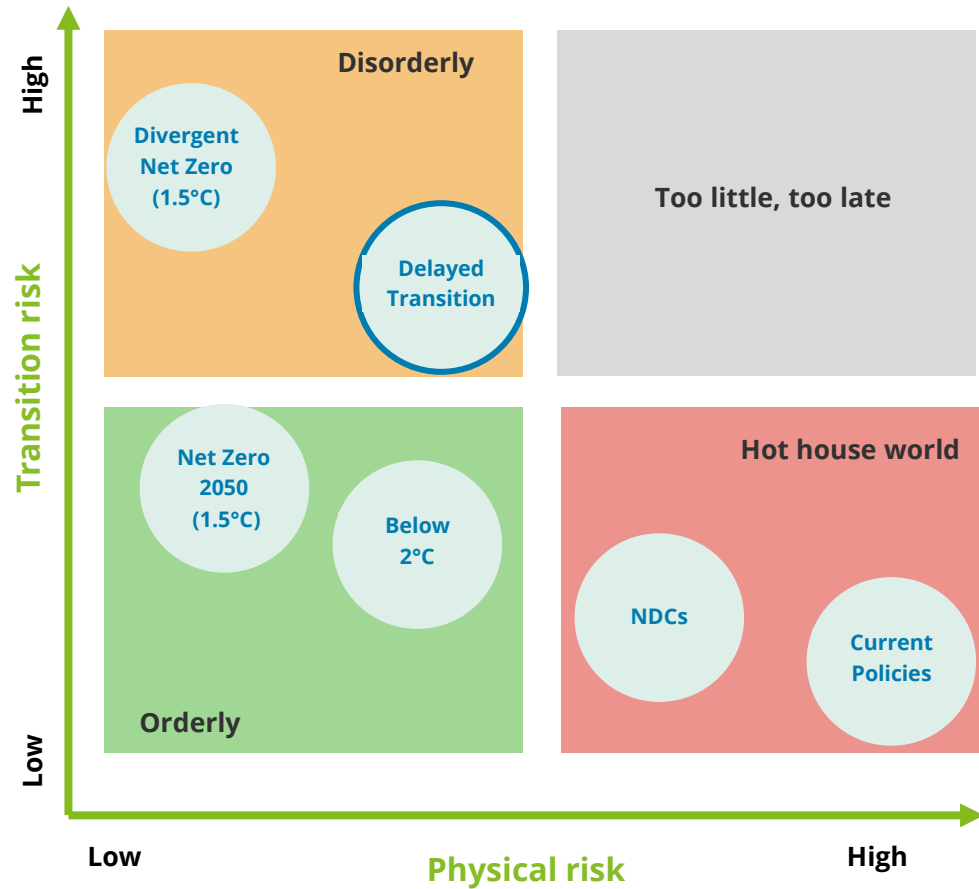
Climate risk exposure

Delayed Transition assumes global annual emissions do not decrease until 2030. Strong policies are then needed to limit warming to below 2 °C. Negative emissions are limited.

The level of action differs across countries and regions based on currently implemented policies, leading to a “fossil recovery” out of the economic crisis brought about by COVID-19.

The availability of CDR technologies is assumed to be low pushing carbon prices higher than in Net Zero 2050. As a result, emissions exceed the carbon budget temporarily and decline more rapidly than in Well-below 2 °C after 2030 to limit global warming to below 2 °C.

This leads to both higher transition and physical risks than the Net Zero 2050 and Below 2 °C scenarios.



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Climate risk exposure

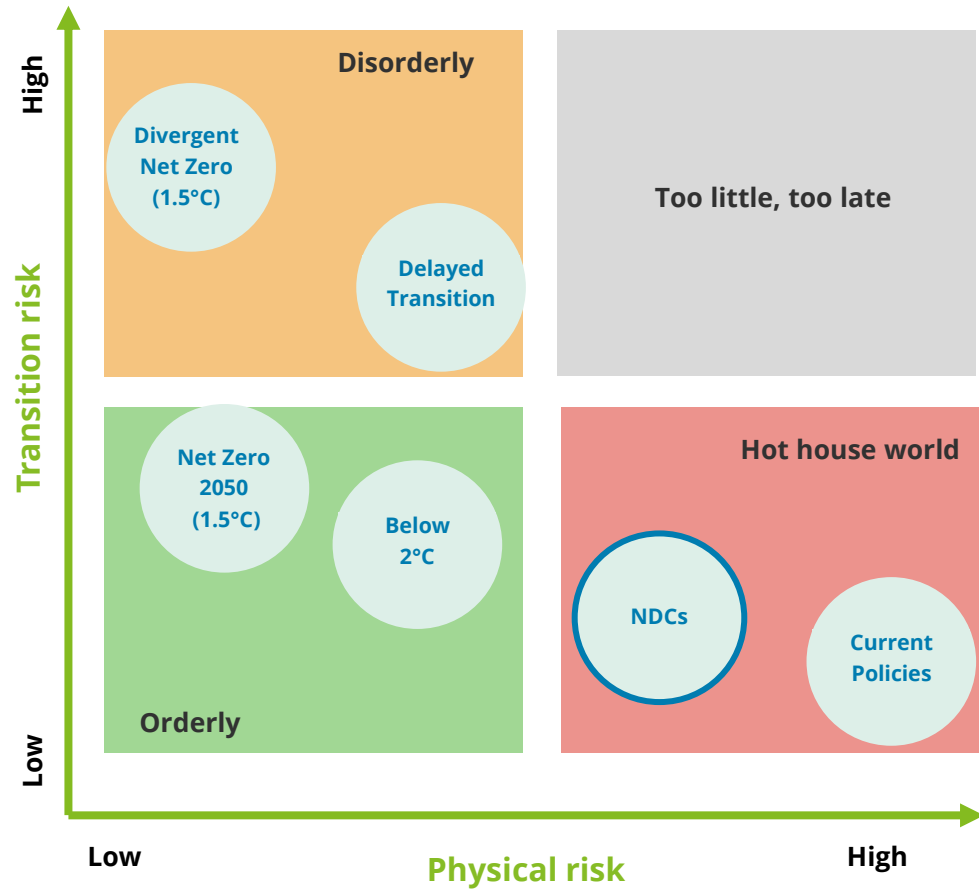
Nationally Determined Contributions (NDCs)

includes all pledged policies even if not yet implemented.

This scenario assumes that the moderate and heterogeneous climate ambition reflected in the conditional NDCs at the beginning of 2021 continues over the 21st century (low transition risks).

Emissions decline but lead nonetheless to 2.6 °C of warming associated with moderate to severe physical risks.

Transition risks are relatively low.



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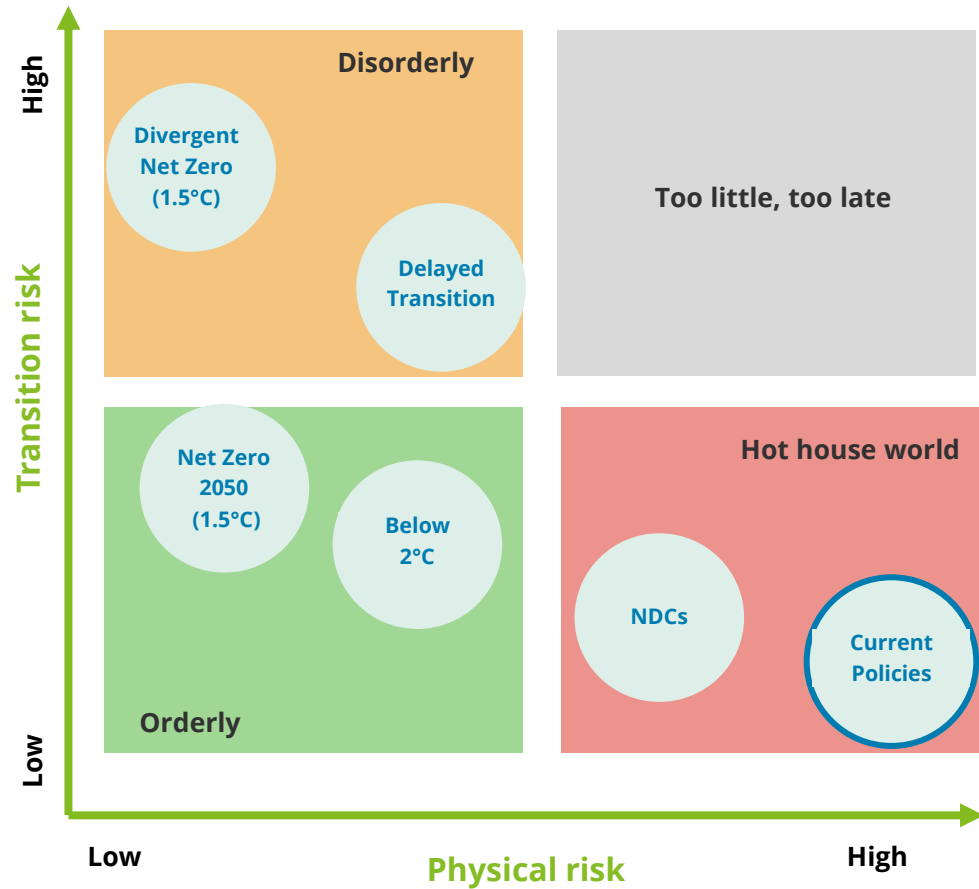
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Climate risk exposure

Current Policies assumes that only currently implemented policies are preserved, leading to high physical risks.

Emissions grow until 2080 leading to about 3 °C of warming and severe physical risks. This includes irreversible changes like higher sea level rise.

This scenario can help central banks and supervisors consider the long-term physical risks to the economy and financial system if we continue on our current path to a “hot house world”.



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The bulk of a Climate Scenario Analysis

Inputs

- Value of assets & geolocation
- Revenues
- Opex
- Capex
- Debt
- +
- Decarb strategy
- Energy efficiency plan
- Asset relocation plan

Projections and climate shocks

A statistical model projects one or more KPI based on historical data and using the relationship with scenario data (GDP, Inflation, Unemployment, macroeconomic trends)

Year	Estimate	Projection
2010	99	
2012	100	
2014	101	
2016	102	
2018	103	
2020	103	103
2022		104
2024		105
2026		106
2028		107
2030		107
2032		107
2034		107
2036		107
2038		107
2040		107
2042		106
2044		105
2046		104
2048		103
2050		102

— Estimate Projection

- Transition scenario data is used to shock projections
 - Carbon price
 - Energy Price
 - Decarbonisation
- Goecoded location of assets is used in combination with Climate Damage Functions to estimate
 - Change in hazard level
 - Expected Annual Damage

Outcome

% difference across scenarios in (take current policies as base scenario and compare alternative scenarios)

- **Gross Margin = Revenues - Opex**
- **Returns on Asset**
- **Investments**
- **EBIT**
- **Debt**
- **Leverage**
- **Probability of default**

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Who can use it

WHO

WHY

Non-financial companies

- 1. Disclosure:** TCFD compliant climate disclosure based on scenario analysis
- 2. Financial strategy:** Assess the costs and benefits of different decarbonisation strategies in future scenarios
- 3. Management:** Measure and assess the climate risk of suppliers and clients to understand and manage indirect impacts

Banks and financial institutions

- 1. Counterparty climate risk assessment**
 1. Climate stress test
 2. Climate risk integration into credit models
 3. Portfolio climate risk assessment

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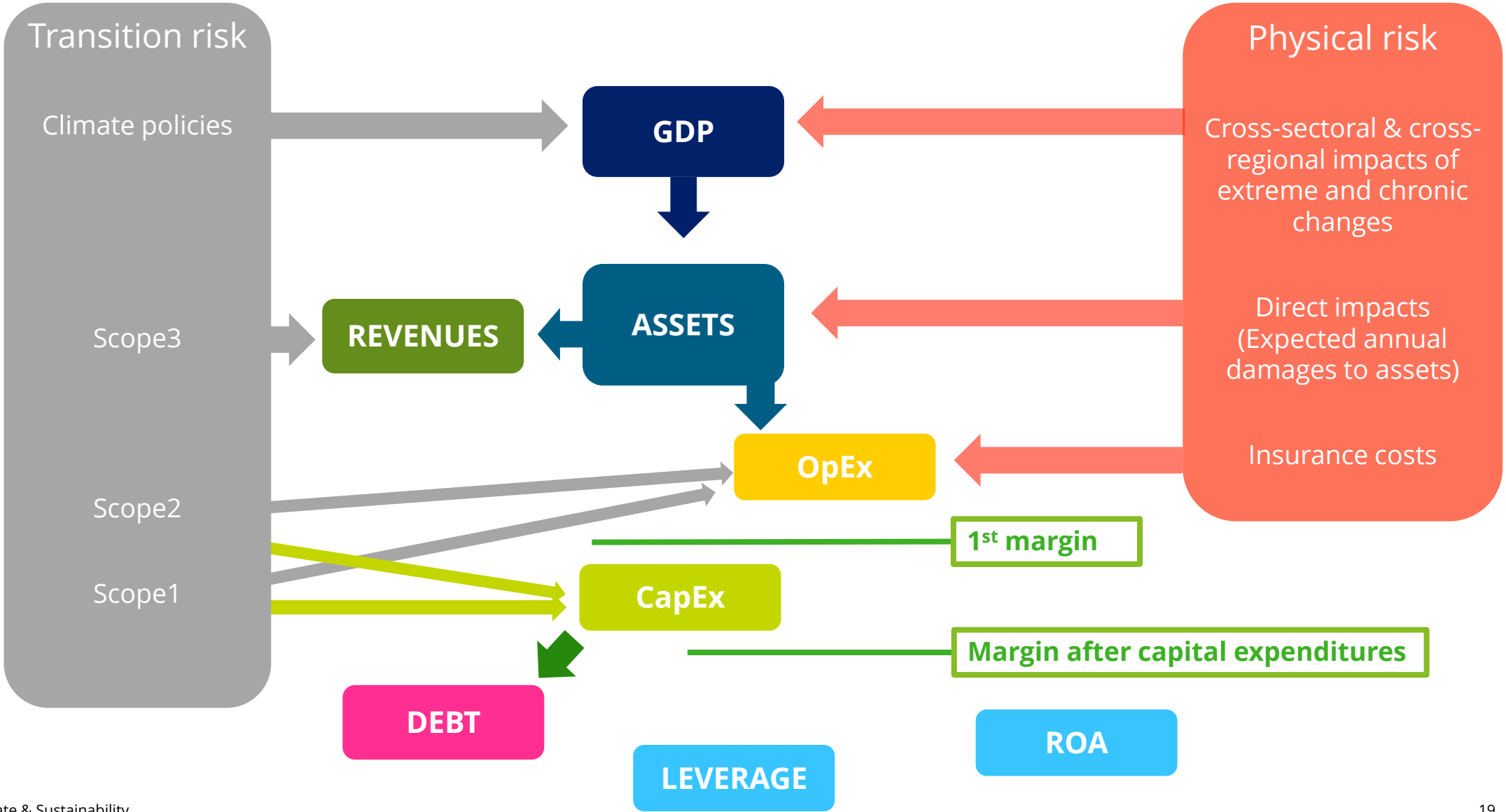
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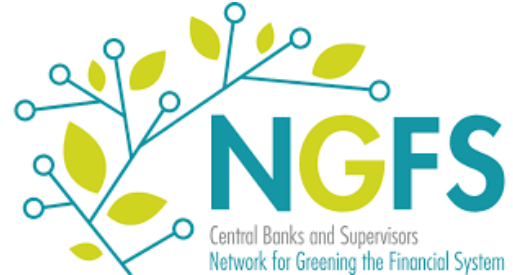
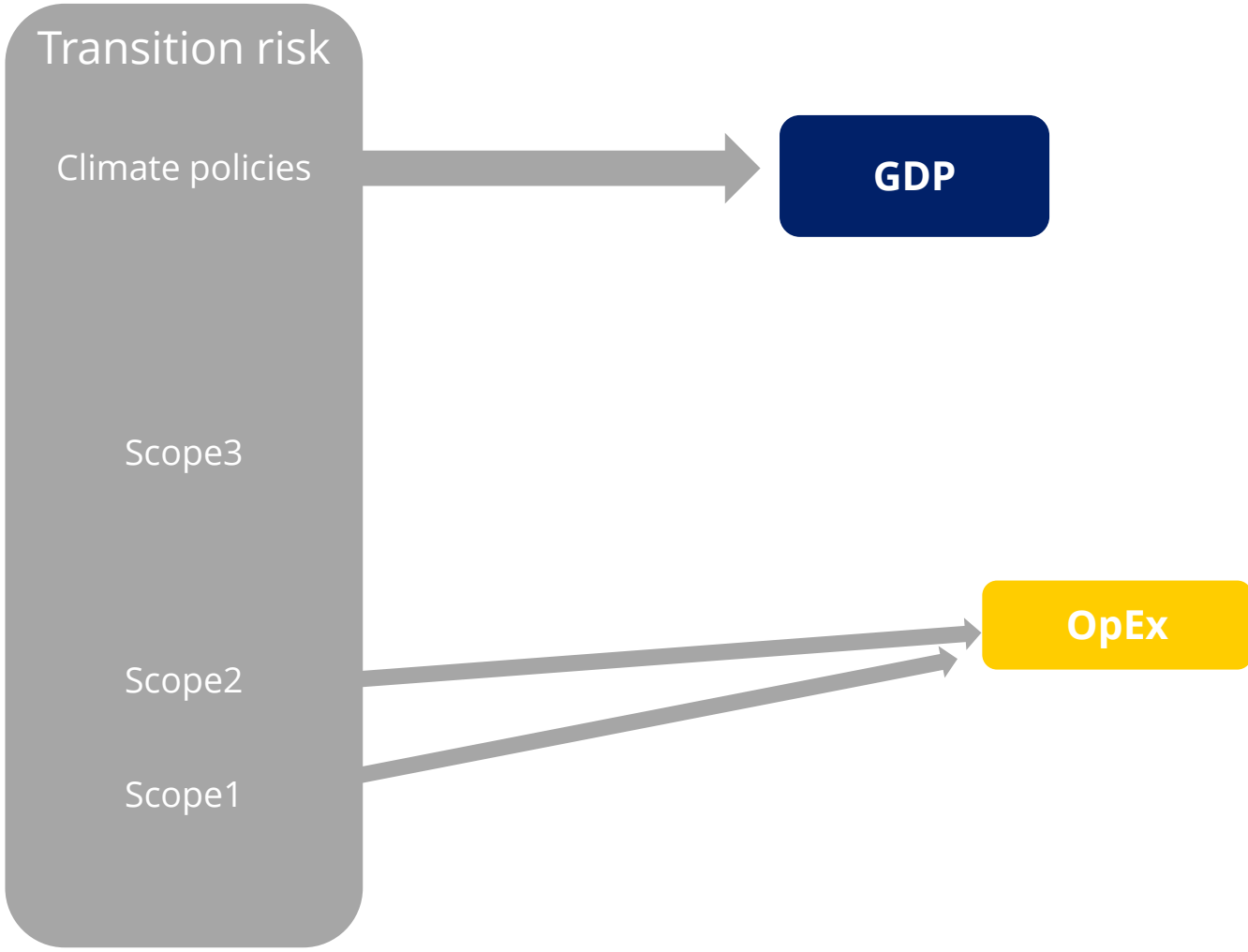
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The overall picture



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Climate policies



Climate risk: exposure, assessment, strategy

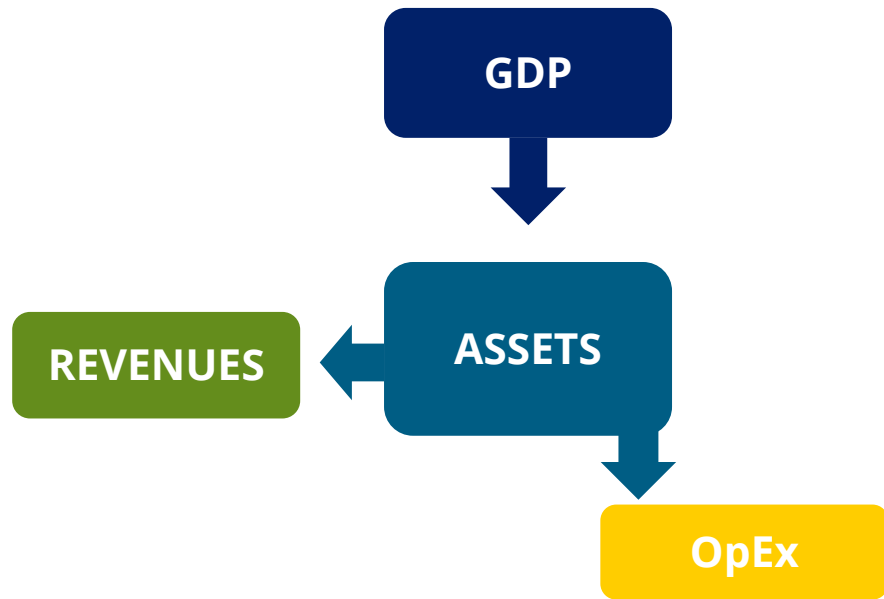
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Climate policies: transmission channels



Climate risk stress test
 SSM stress test 2022



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Consumers behaviour and market risk

Transition risk

Climate policies

Scope3

Scope2

Scope1

REVENUES

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Article

An empirical approach to integrating climate reputation risk in long-term scenario analysis

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Abstract: We propose an empirical approach to estimate the impact of climate transition risk on corporate revenues that specifically accounts for reputation risk. We employ the information on disclosed Scope 3 emissions to proxy companies' carbon footprint along the value chain. A threshold regression is employed to identify the emission level above which reputation risk impacts revenues, and we link this impact to a climate policy stringency indicator. We estimate the threshold regression on a sample of companies within the European Union (EU), and estimate the threshold at around the 70th percentile of the Scope 3 emissions' distribution. We find that companies with Scope 3 emissions beyond the threshold experienced substantially lower revenue growth as climate policies have become more stringent, compared to other companies.

Keywords: climate reputation risk; scenario analysis; Scope 3 emissions

Chronic changes and extreme events



GDP

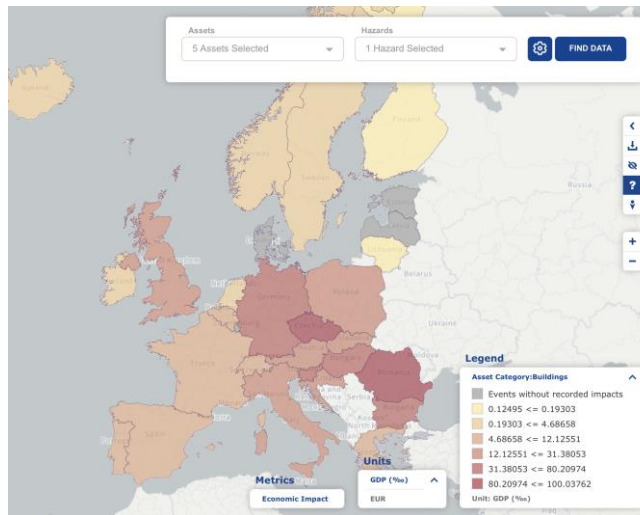
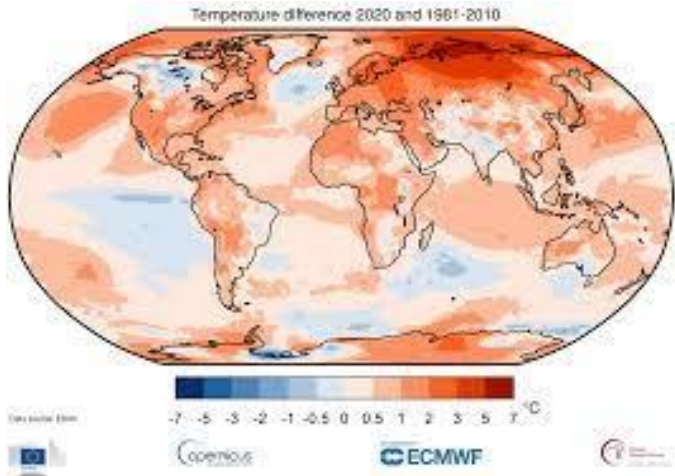
ASSETS

Physical risk

Cross-sectoral & cross-regional impacts of extreme and chronic changes

Direct impacts (Expected annual damages to assets)

Insurance costs



DRMKC - Risk Data Hub

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