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Investor case study on scenario use in practice

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Modelling climate change scenarios into investments

Understand Climate Scenarios Design, Purpose + Time Horizon

RCP, SSP, IAM, Narratives, …

Define Investment Use Case and Goal

Regulation/ Reporting
Stress Testing
Alignment Analysis
…

Select Climate Scenarios and Data + Tools for Portfolio Analysis

Portfolio Measurement

Carbon Value-at-Risk
Implied Temperature Rise
Heat Maps

Discuss Results and Investment Actions

RCP = Representative Concentration Pathway. RCPs are a variety of future climate scenarios up until 2100, based on greenhouse gas concentrations.
SSP = Shared Socioeconomic Pathway. For example, vulnerabilities caused by the physical risks associated with climate change.
IMA = Integrated Assessment Model. depict the complex dynamics between macro-economy, agriculture/land use, energy, water and climate

Climate change scenario analysis combines top-down and bottom-up views

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Scenarios

Pathway and Impact Scenarios

- IEA , IPCC
- NGFS, BoE, …
- NatCat models
- …

Variables

Macroeconomic Impact Modelling

- Integrated Assessment Models
- Translate into
  - region
  - sector
- Time horizon adjustment
  - short-term
  - mid-/ long-term
- Emissions allowances prices
- …

Loss / Gain Effects

- GDP-levels
- Climate transition costs + profit pools
- Physical climate adaptation costs + profit pools
- …

Assessment

Issuer and asset class analysis

- Sovereigns
  - climate risk exposure
  - fiscal strength
  - credit risk / spread
  - ….
- Corporate EQT/ Credit
  - business alignment
  - stock price risk
  - credit risk / spread
  - …
- Alternatives
  - project risk

Portfolio Analytics

- Heat Maps
- Carbon VaR
  - Equities, Credit FI
  - Sovereign Bonds
  - Private Markets
- Paris-alignment Analyses:
  - C02e-flightpath
  - Implied Temperature Rise (ITR)
- Qualitative investment strategy assessment
- …

Top Down Input

Bottom Up Input

IEA = International Energz Agency
IPCC = Intergovernmental Panel Climate Change
NGFS = Network for Greening the Financial System
NatCat models = physically model natural catastrophes based on characteristics such as intensity, location or frequency

Case Study: Bridging short term and long-term perspective

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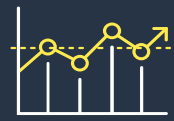
Climate Transition Corporate Score (CTC)

Transition Capabilities

- Multidimensional, sector-specific scoring of a corporate's climate transition plans, past and current decarbonisation actions along
- Emissions Management & Governance
- Capital Allocation
- Climate Solutions
- Fossil Revenue Dependency

Net-Zero Pathway Alignment



- Estimate of the global average temperature rise if the global economy were to experience a corporate carbon budget over-/undershoot
- Build on open-source, sector- and region-specific pathways (NGFS*)
- Fixed carbon-budget baseline and rollover
- Target credibility-adjusted projected emissions
- Aligned with GFANZ-recommendations**

Short-term measurement of a corporate's transition plans, past and current actions + **Long-term estimate of a corporate's alignment to science-based net-zero scenario pathway**

* NGFS = Network for Greening the Financial System
** GFANZ = Glasgow Financial Alliance for Net Zero

Case study: Climate Transition Corporate Score

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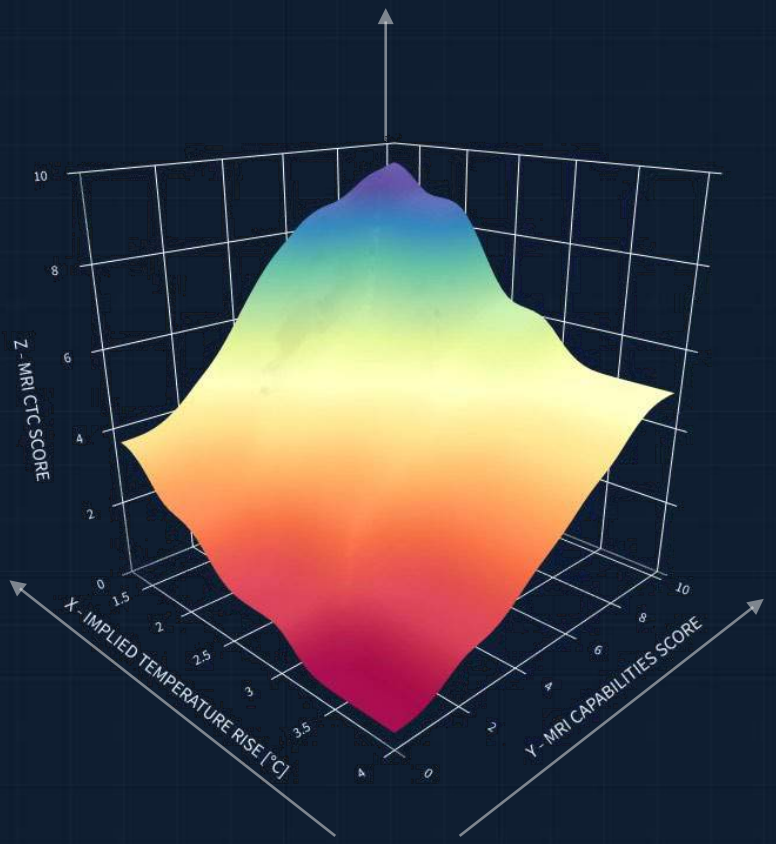
Aggregated Munich Re Investment Partners Climate Transition Corporate (CTC) Score [0 = Worst;10 = Best]

- Score 10 requires an estimated, full net-zero pathway alignment including strong evidence of decarbonisation capabilities
- Score 10 suggests a strong overweight to portfolio construction; Score 0 a strong underweight respectively
- An estimated net-zero alignment without evidence of capabilities will not lead to an overweight, and vice versa “action-gap”

Long Term Dimension
Implied Temperature Rise Contribution
[1.3°C,10°C]

- Carbon-budget
  - Sector- and regional-specific
  - Science-based (NGFS)
  - Fixed baseline
- Budget Over/Undershoot by considering
  - Current Emissions
  - Target-credibility adjusted projected cumulative emissions
    - Short-term target availability
    - Target verification
    - Track-record
    - Current target alignment



Short/Mid-term Dimension
Corporate Transition Capabilities Score
[0,10]

GICS-specific & rules-based combination of:

1. Core Emission Management & Governance
   - Combines a qualitative view on the management of own emissions, value-chain emissions, sector-specific emissions (e.g. through financing)
2. Capital Allocation
   - Combines power-related capex, EU Taxonomy-aligned Capex and a qualitative view on corporate opportunities
3. Climate Solutions
   - Assesses the exposure to climate impact revenues incl. EU Taxonomy-aligned revenues
4. Fossil Revenue Dependency
   - Assesses the dependency on thermal coal, oil and gas revenues incl. recent trend

Case Study: Portfolio stock weighting driven by CTC

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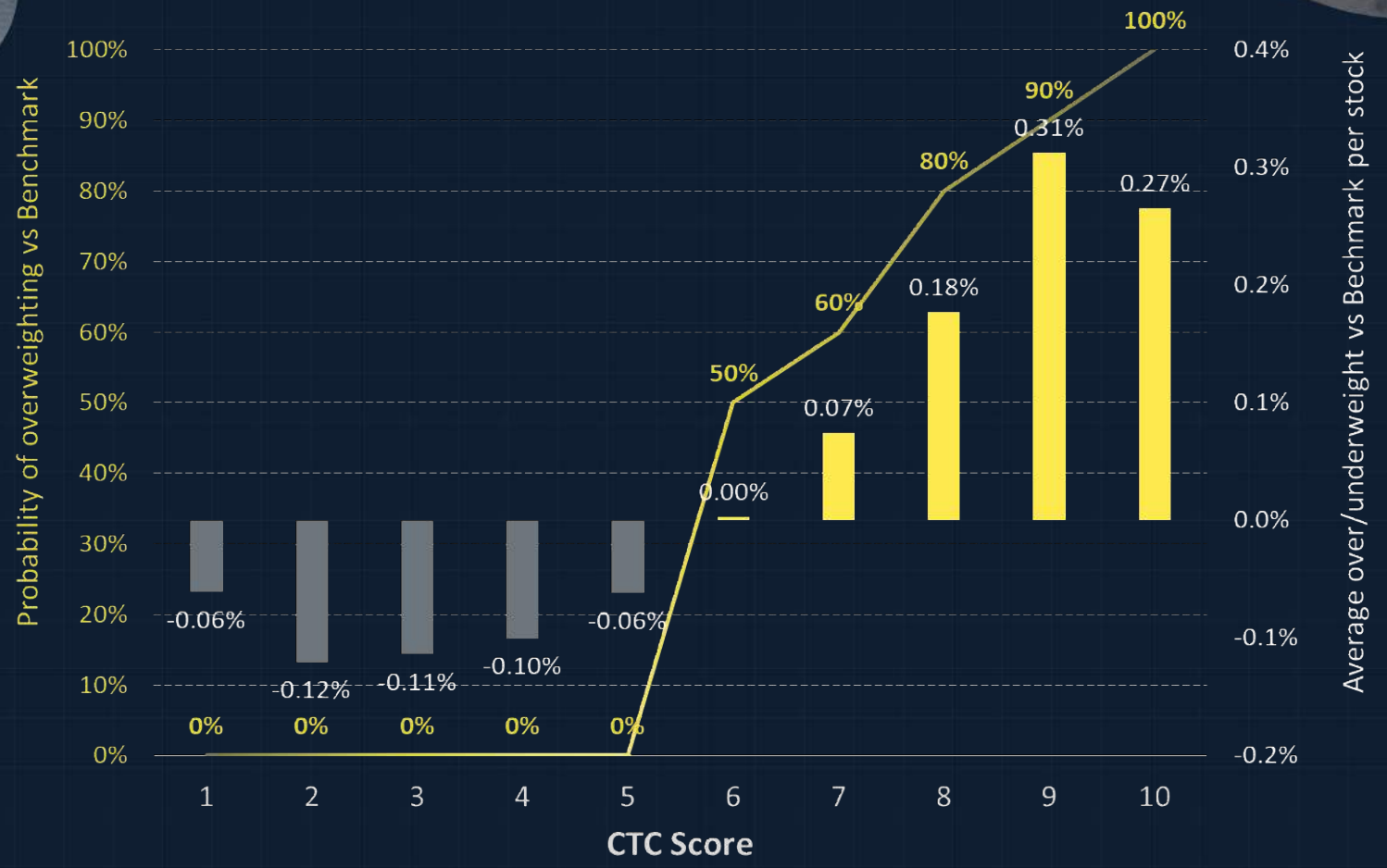
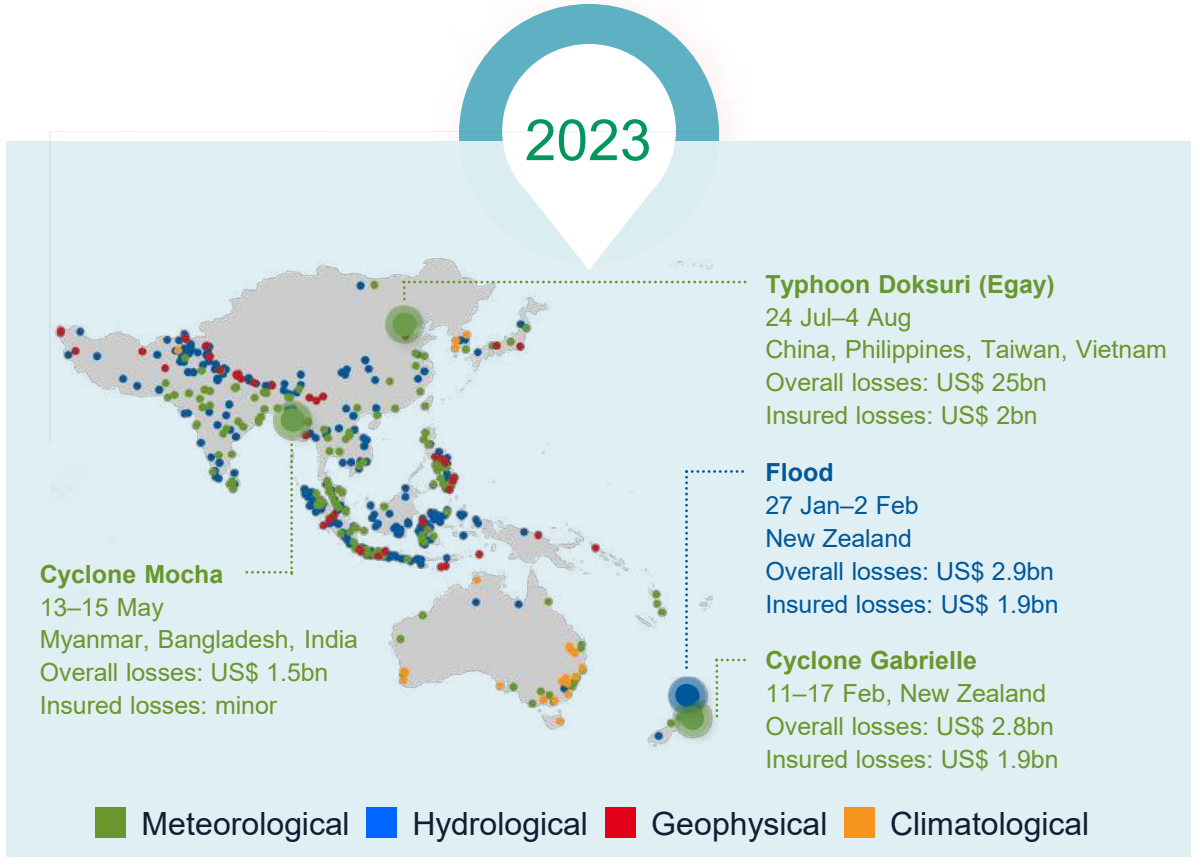
Link between probability of stock under-/overweight and CTC Score



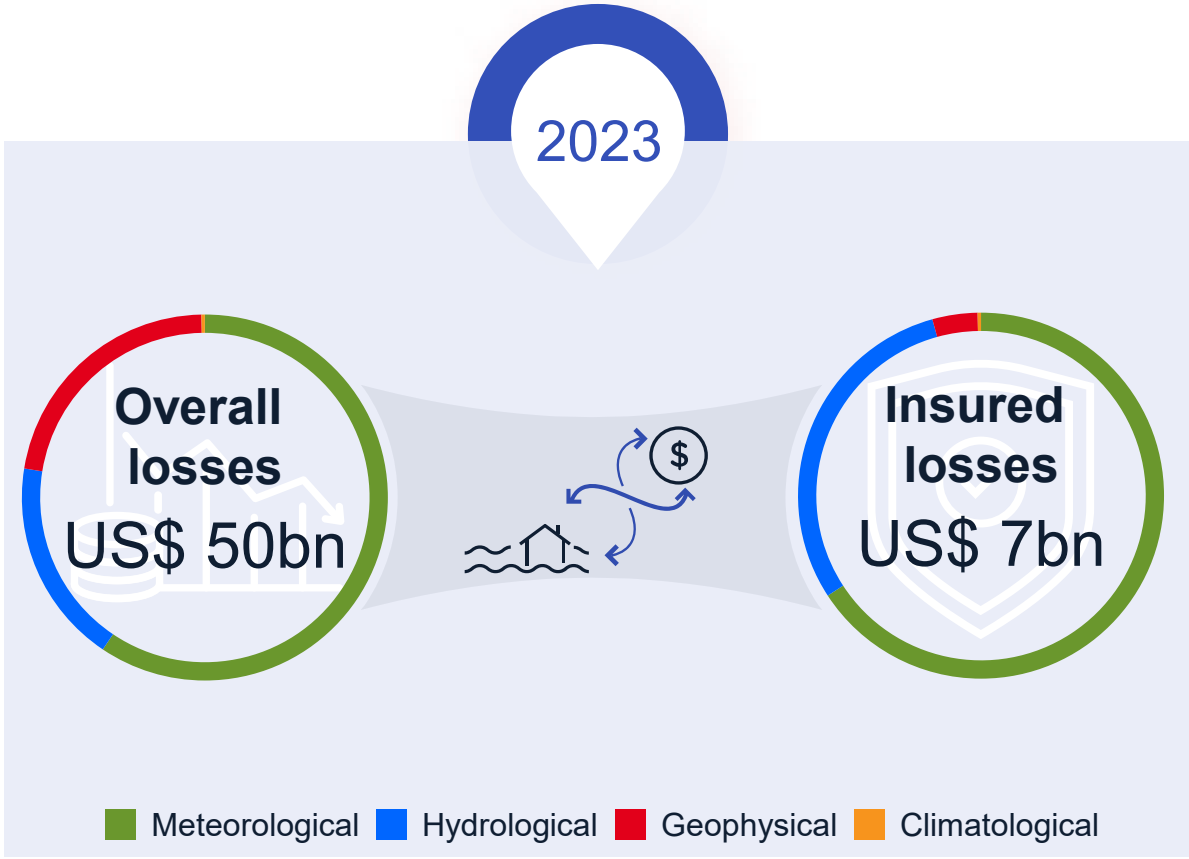
- The higher the CTC score, the higher the probability of the stock to be overweighted vs benchmark
- To achieve tracking-error control, the average position size of overweight and underweight stocks is limited
- The approach results in systematic, active share decisions that comply with the Climate Transition and risk targets

Case Study: how natural disasters and climate change affect your business

Master the insurance gaps for investors in Asia



Nat cat loss events in Asia & Pacific



Loss overview for Asia & Pacific

Source: Munich Re, NatCatSERVICE, as of January 2024

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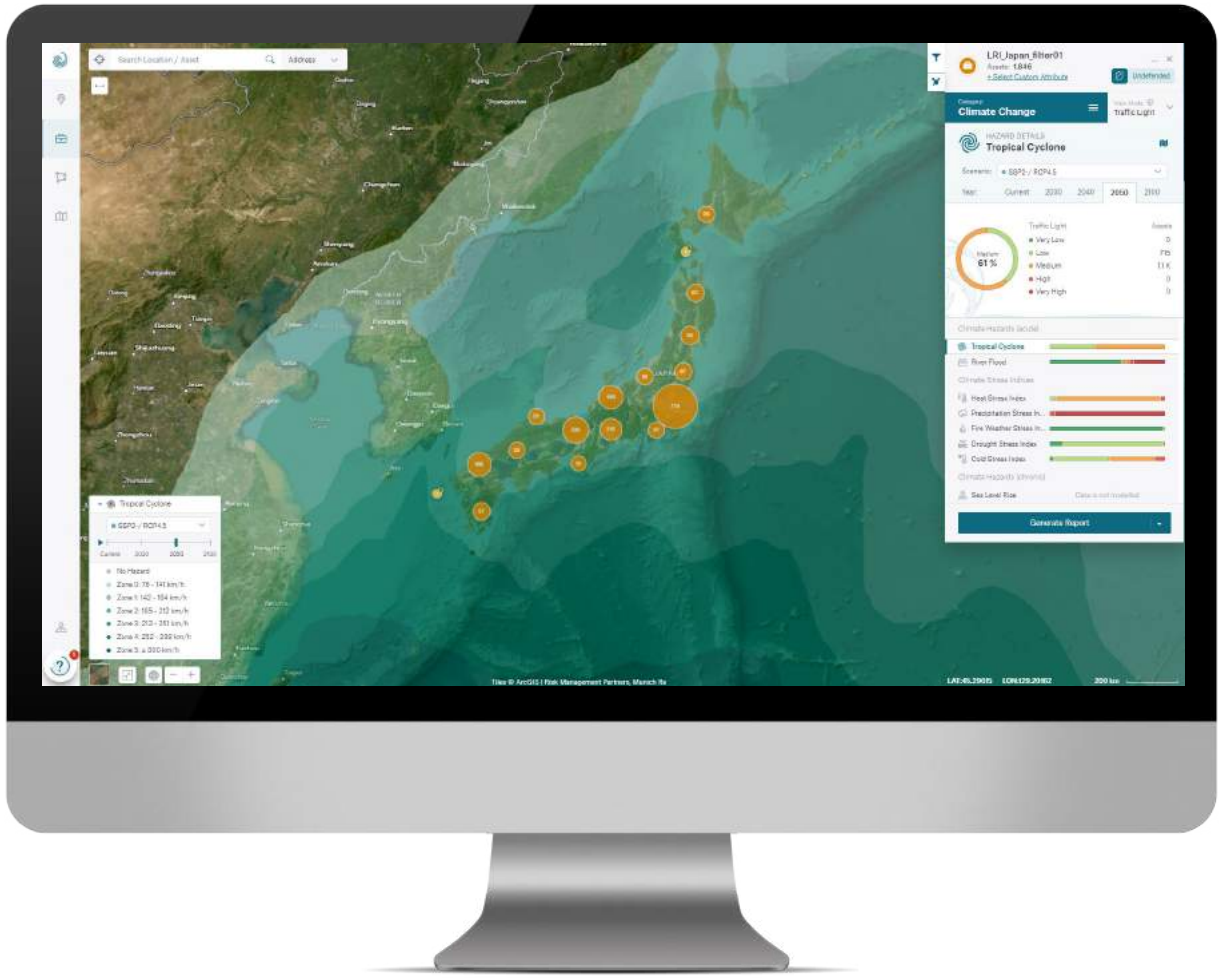
Munich Re's Location Risk Intelligence is the modular SaaS solution that enables you to **understand, measure and manage** risks from natural hazards and climate change around the world.



Case Study: Quantifying exposure to physical climate risk

Climate Hazard Scores & Financial Impact Metrics for targeted mitigation

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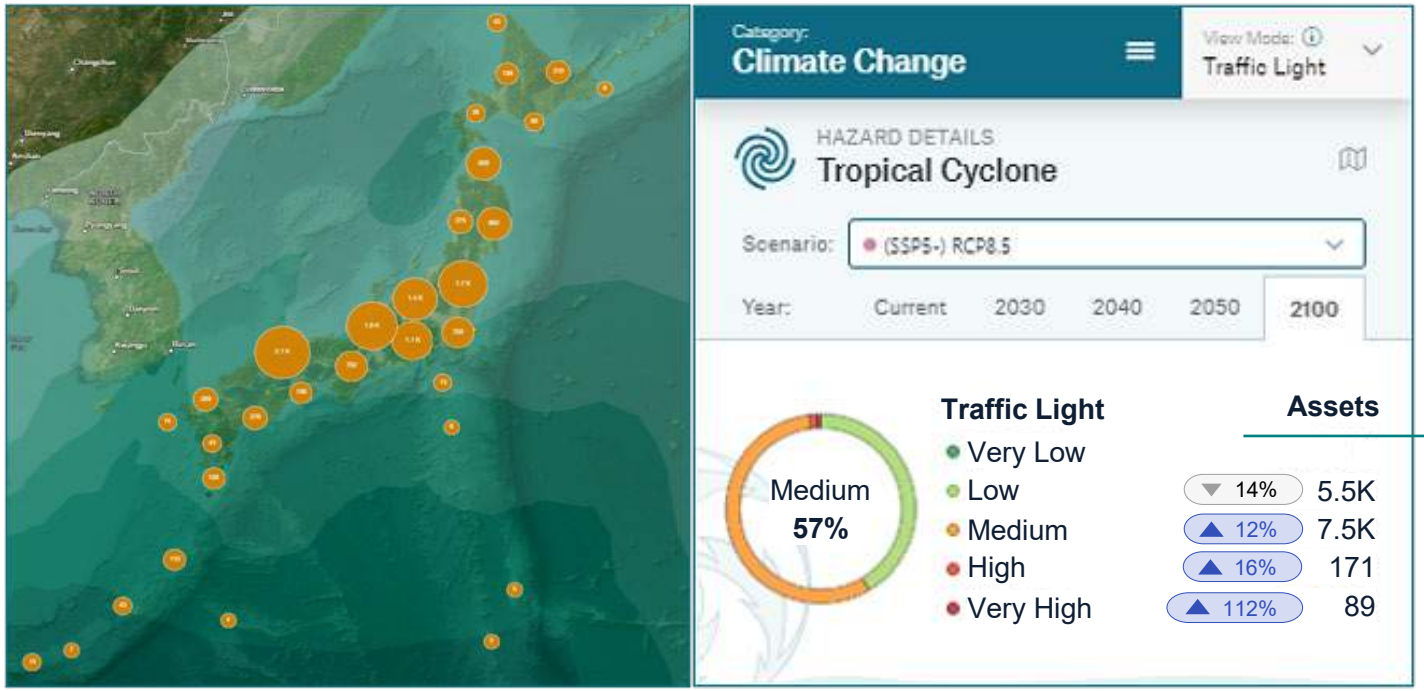

Materiality assessment

Mapped by hazard zones

Climate scenario assessment

Asset value	Allocated Capital	CEL*	Capital at risk
5,000	3,000	2%	60
10,500	6.400	7%	448
500	250	15%	38
50	35	50%	18

* Climate Expected Loss

1 Cluster exposure by risk zone

- Measure exposure, preferably using a look-through approach
- Cluster by the RMP hazard zones

2 Assess CC impact on portfolio

Quantify change migration of assets within Climate Hazard Zones at address & portfolio level for various climate scenarios

3 Actively manage CC exposure

- Finance adaptation measures to increase portfolio resilience
- Rebalance portfolio exposure in line with risk appetite and expected diversification benefits

Take Aways: Bringing Climate Scenario Analysis Alive

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Set agenda and priority from the top: educate importance of climate scenario modelling

- Trustee Board / Investment Committee
- CIO(s)
- Chief Risk Officer/ Actuary
- …

Exchange with peers or look into peer studies and disclosures for Carbon VaR and Climate Scenario analysis

- For example, BaFin survey insurance climate scenario application
- Asset owner annual TCFD and/ or sustainability risk reports

Create test pilots and focused use cases

- Asset class / specific portfolio(s): Listed Equities, Credit FI, Private Markets
- Approve budget: FTE, climate data and portfolio analytics tool
- Build multi-discipline teams: allocate subject matter expert / champion – Asset Class CIO/Portfolio Manager, SAA specialist, Risk Manager, Head ESG/ ESG Experts, ….

Repeat and learn + **Put into investment decision-making**

Member of the Executive Board

Steffen has 24 years of experience in the investment management industry, thereof 14 years with a focus on sustainable investing.

Steffen joined Munich Re Investment Partners in March 2021. As member of the Executive Board, he is responsible for Research and Products. Additionally, he is a member of the Munich Re AG ESG Investment Committee.

Prior to Munich Re Investment Partners, Steffen was Global Head of ESG for a global investment management firm. As member of the Expert Group Sustainable Finance, he was advising the EU on listed equity climate benchmark standards.

In recent years, Steffen has published several studies on climate integration in strategic asset allocation, equity, fixed income and alternative strategies including carbon as an asset class.

Investment Partners is a specialized investment boutique that delivers market driven solutions for climate committed institutional asset owner. Our objective is to create lasting financial and environmental value, capitalizing the vast climate know-how of Munich Re and its experts.

Dr. Steffen Hörter

Member of the Executive Board

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