A net zero world – role of the insurance industry in supporting the energy transition

International Sustainable Energy Conference – 10 April 2024, Graz

Munich RE

Tobias Grimm, Head Climate Advisory & NatCat Data

Munich Re as an early warner on climate change

50 years of research on climate change impacting our core business

Munich RE

1880
Foundation of Munich Re

1899
First Natural hazard cover (storm, flood)

1973
Munich Re's first publication on climate change

1974
Establishment of Geo Risks Research Department

1978
First edition of „World Map of Natural Hazards"

1989
First (physical) Globe of Natural Hazards

2000
First CD-ROM „World map of Natural Hazards"

2007
Climate change defined as strategic topic for Munich Re

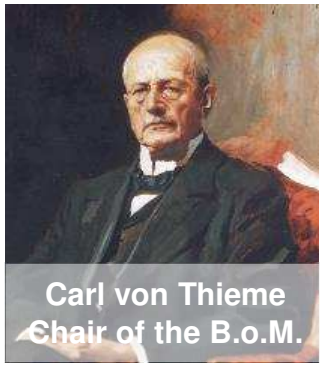
2011
NATHAN Risk Suite

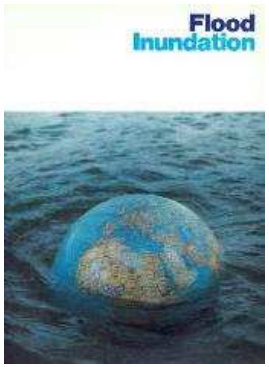
2001 / 2014
MR contributes to IPCC Climate Assessment Report

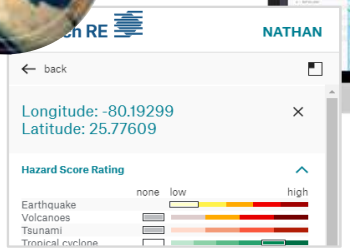
2020
Climate Risk Score (SaaS)

2020
Climate Ambition 2025

2022
Climate expected loss (CEL)





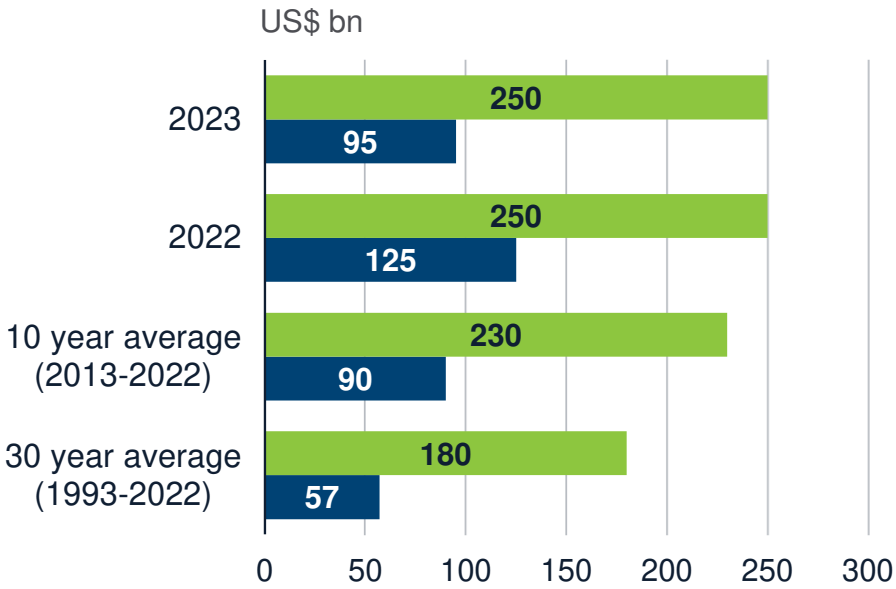


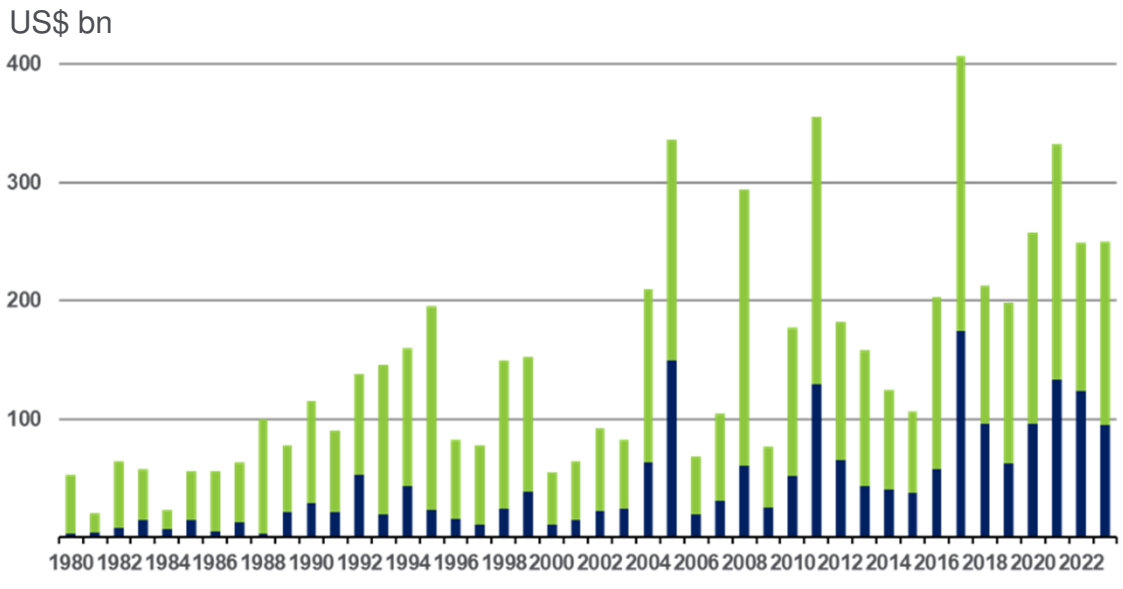
US$ 100bn insured loss years on the rise

Development of annual natural disaster losses worldwide since 1980

Munich RE

2023 in comparison with long-term average and development of natural disaster losses since 1980





Overall losses
(in 2023 values)

Thereof insured losses
(in 2023 values)

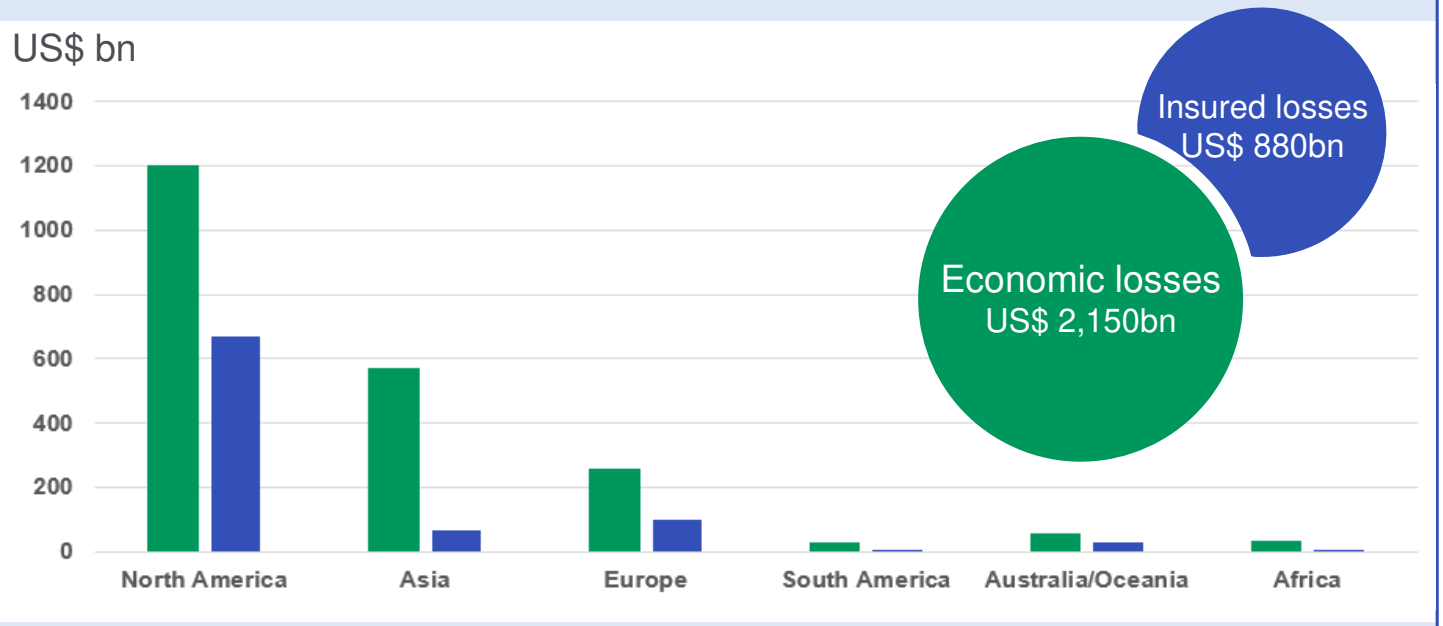
Inflation adjusted via country-specific consumer price index and consideration of exchange rate fluctuations between local currency and US$.

Natural catastrophe protection gap* – big regional differences

Decreasing in industrial countries; unchanged in developing countries

Munich RE

Weather-related natural catastrophe losses by continent 2013 – 2023



Worldwide only about 1/3 of losses are insured (~37% insured)

Three major factors influencing global natural disaster losses

− Fluctuating asset values and accumulation risks through socio-economic shifts

− Increasing intensity and/or frequency of extreme weather events through climate change

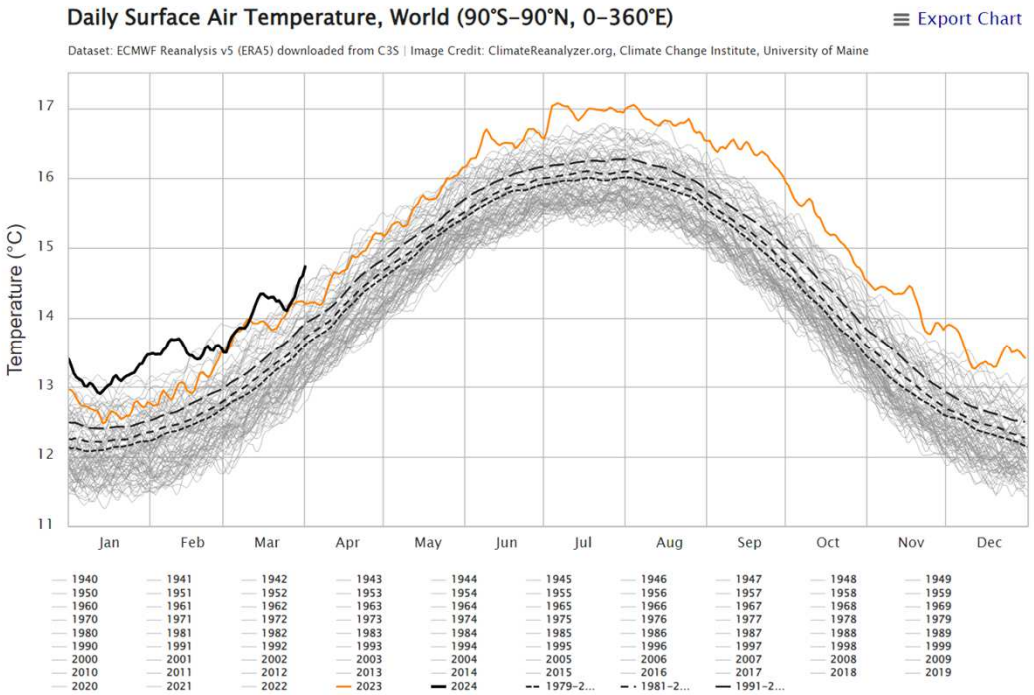
\+ Improving adaptation measures, e.g. improved building safety standards

* Protection gap definition in line with Geneva Association: the broader risk protection gap which describes the difference between total losses and insured losses
Source(s): Munich Re NatCatSERVICE 2024, in 2024 values

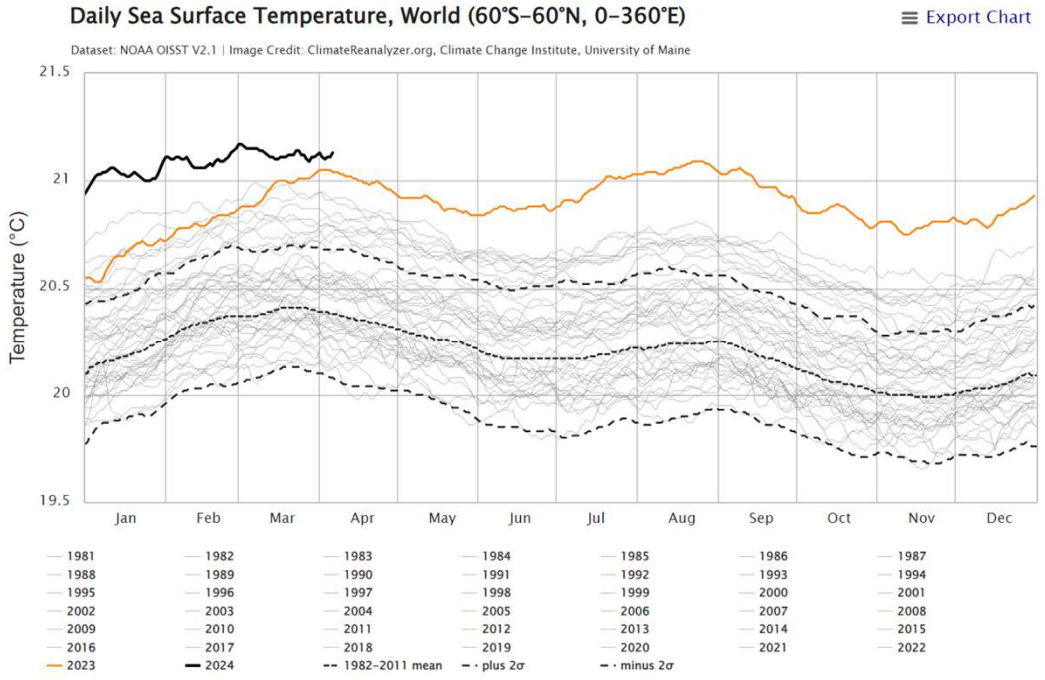
Also 2024 is on a record warming track so far

Munich RE

Daily surface air temperature, world



Daily sea surface temperature, world



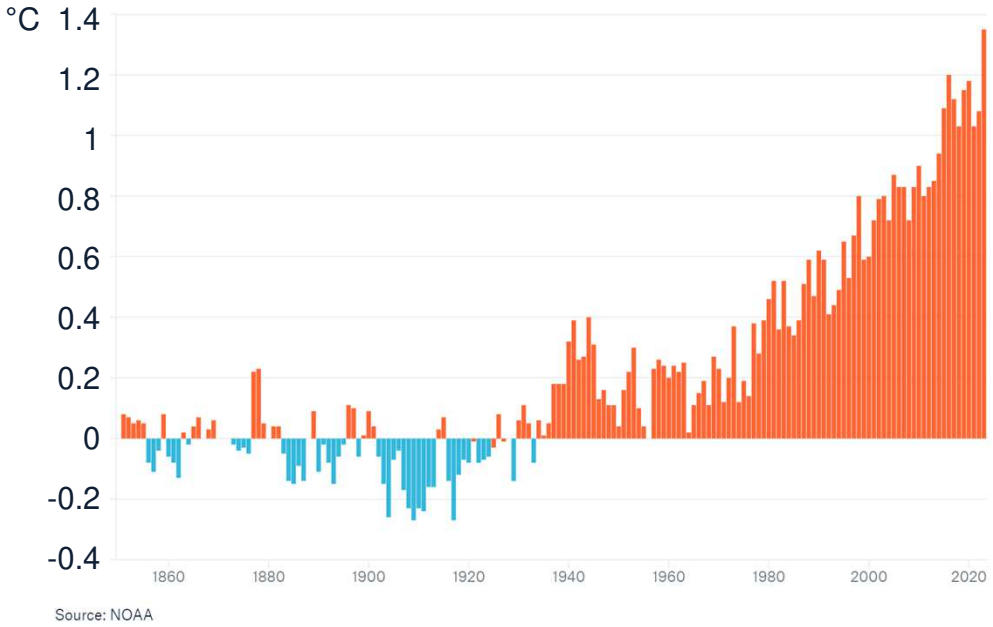
Source: ClimateReanalyzer.org / ECMWF Reanalysis v5 ERA data / C3S, Climate Change Institute, University of Maine

Climate Change = Risk of Change

Small increase in average temperature – large increase in probability of extremes

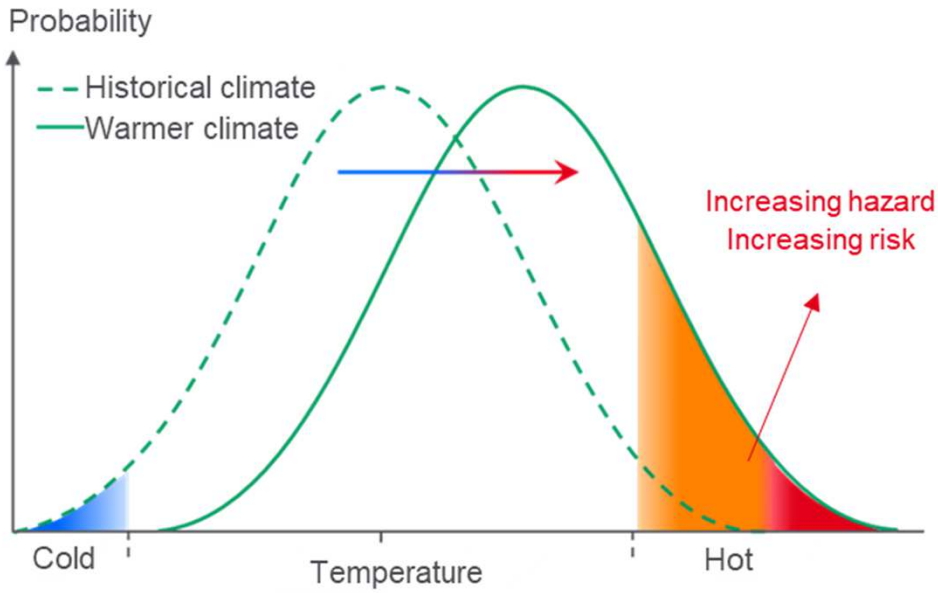
Munich RE

2023: hottest year on record!
Last 10 years warmest on record



Global temperature anomalies* (°C) compared to 1850-1900 average

Increase in the probability of extreme temperatures and new extremes



Increase in global average temperature - change in probabilities

Source(s): Munich Re, based on National Centers for Environmental Information NOAA; IPCC

Understanding physical risks is MR's core competence

Adjustment of probabilistic models necessary to reflect the "risk of change"

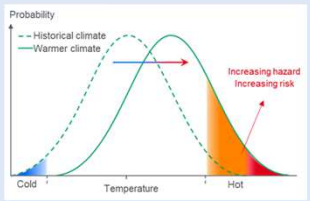
Munich RE

Digital modelling solutions are essential for state-of-the-art risk management practises

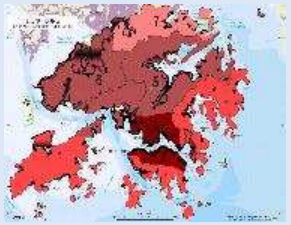
Risk [$] =

hazard
(climate change)
X
exposure
X
vulnerability

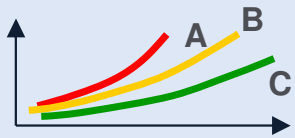
Hazard information

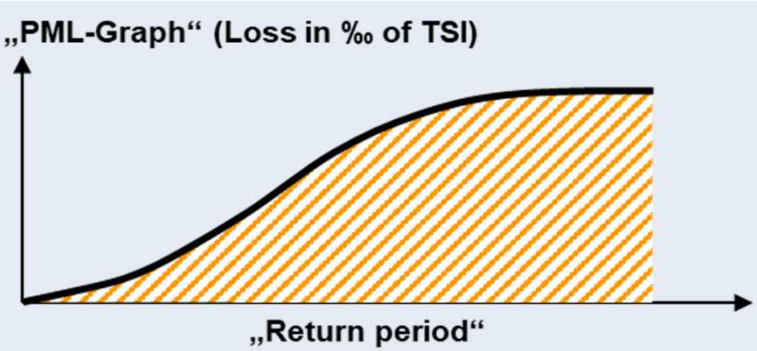


Value distribution



Vulnerability function





Source: Munich Re

Impact of climate change is becoming more evident

Scientific attribution studies show increasing probabilities of extreme weather events

Munich RE

Heavy rain (New Zealand, 2023):
4 times more likely
to happen in the region under today's climate.

Additionally, 30% increase in amount of precipitation

Europe floods (2021):
€46bn in losses
Likelihood of such event has increased

Heavy rain Italy (2023):
Occurrence in this region
not more likely
at this time of the year due to climate change

Wildfires Canada (2023):
Climate change more than doubles likelihood of extreme fire weather conditions

Source(s): Potsdam Institute for Climate Impact Research (PIK) World Weather Attribution (WWA)

Effect of global warming: Global impact on natural hazards

Latest state of science (IPCC): Increase in frequency and/or intensity of natural perils

Munich RE

More frequent temperature extremes

Increase in wildfire hazard

Increase in extreme drought conditions

Sea level rise and increase in storm surge risk

Environments favorable to severe thunderstorms, shifts in tornado activity and severe hail (“Severe Convective Storms”)

Increase in frequency and intensity of heavy rainfall events

More intense tropical cyclones with more rain and higher storm surges

Longer persistence of weather patterns due to slowdown in west-east movement

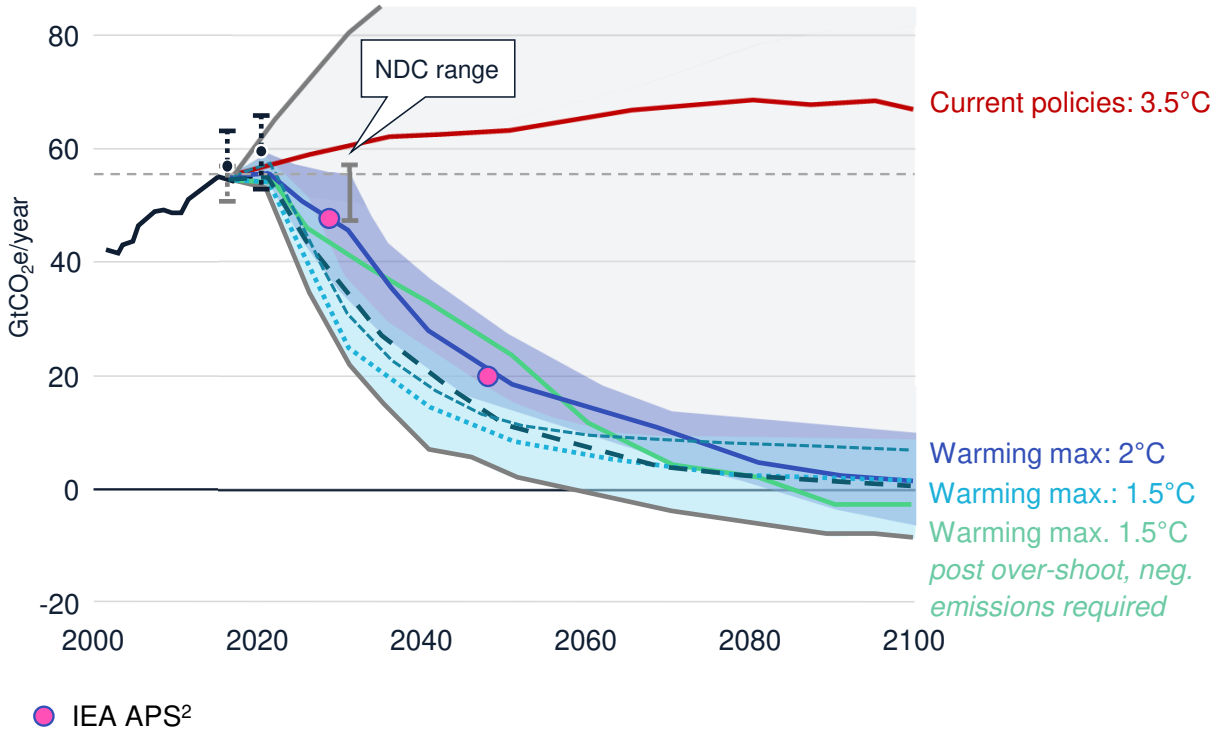
Source(s): Munich Re, based on latest climate science

UN climate target: Limit global warming to max. 1.5° to 2°C

~50% greenhouse gas reduction by 2030 and/or significant negative emissions required

Munich RE

IPCC: Emission scenarios and global warming, end of the 21st century[1]



IEA APS[2]

Assumption: All climate commitments made by governments around the world to date are met in full and on time:

- NDCs and longer-term net zero targets
- National climate laws

IPCC = Intergovernmental Panel on Climate Change

NDC = Nationally Determined Contributions

IEA = International Energy Agency

APS = Announced Pledges Scenario

Source(s):
1) Based on IPCC Assessment Report 6, Working Group III, Mitigation of climate change (02/2022); Munich Re ESP
2) Munich Re, based on IEA 2022, Announced Pledges Scenario (APS), 2.1°C global warming

Munich Re’s strategic elements
Disabling and focus on enabling/business development

Munich RE

DISABLING

Liabilities:
Underwriting guidelines

Assets:
Responsible investment guideline

Own emissions

ENABLING

Know-how and data sharing (SaaS)

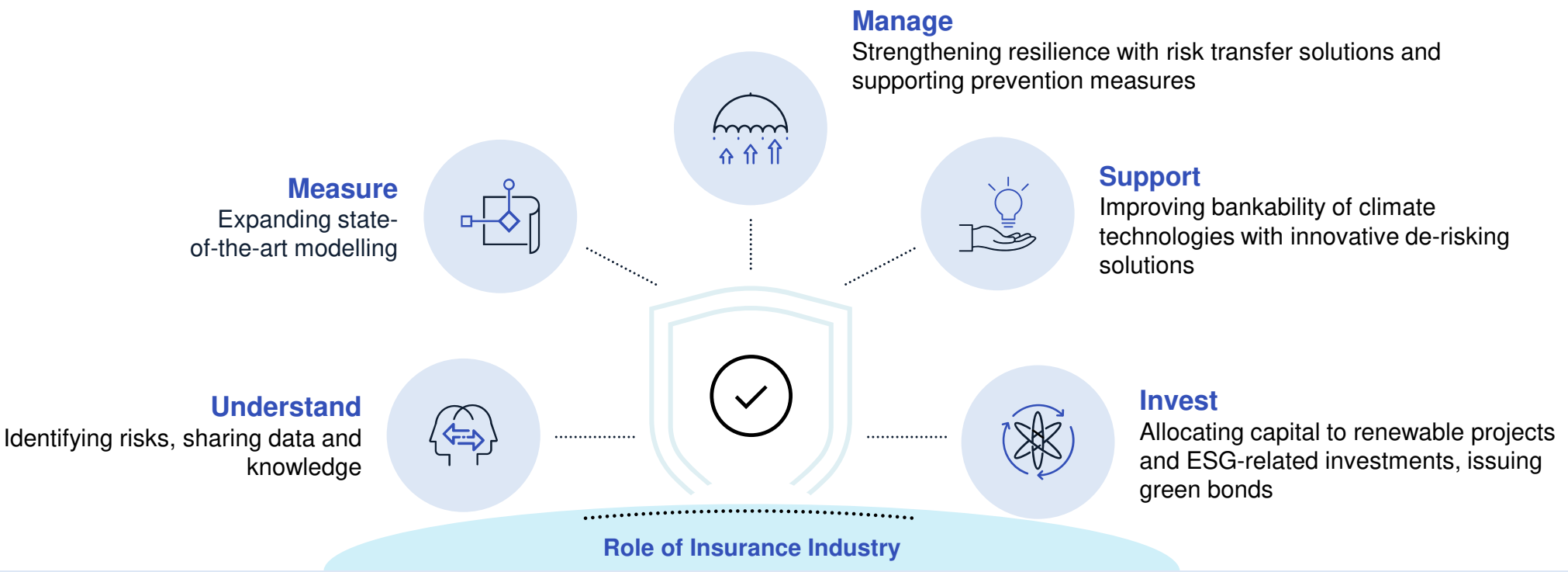
Partnerships and cooperations (PPPs)

Products and services (Green tech / parametric solutions)

What is needed from the insurance industry?

Strong role to play as risk taker and partner to enable the low-carbon transition

Munich RE



Today
Fossil

Transition

Transformation

Future
Renewables
Fossil
CCS

Understand and measure your climate risk

Munich Re Location Intelligence: Current risk situation and future climate impact analysis

Munich RE

Advanced decision making with the comprehensive risk assessment and management solution

Natural Hazards

Current physical risks
(based on historical data and science)

Climate Change

Risk of future climate change
(based on IPCC scenarios)

Climate Financial Impact

Financial impact caused
by natural hazards

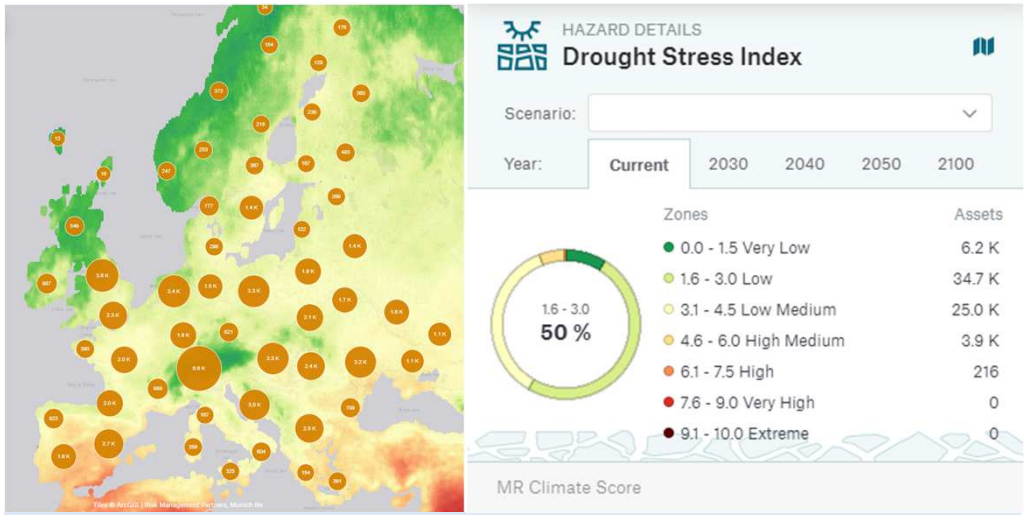
Source / More info: https://www.munichre.com/rmp/en/products/location-risk-intelligence.html

Munich Re climate risk assessment as software-as-a-service

Drought Stress Index: Number of locations in high-risk areas will increase

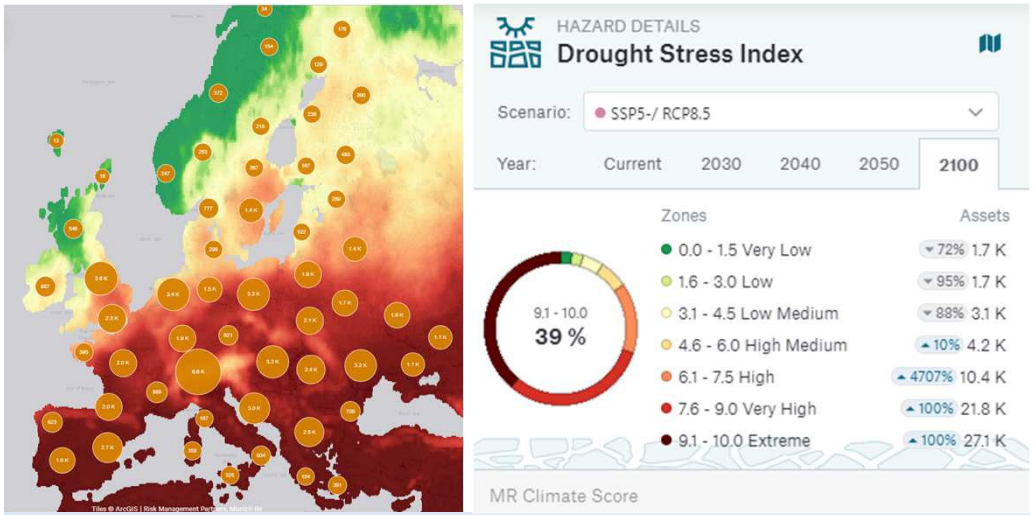
Munich RE

Evaluation of 70,000 portfolio locations today and under a "high emissions scenario" in 2100



Risk assessment today:

50% of the portfolio locations are currently in a low-risk region, only a few locations are under high risk



Risk Assessment 2100:

Under the high emission scenario, 39% of the locations will be in the highest risk class.

Source: Munich Re, Location Risk Intelligence, September 2023

Contact: Sabine von Loeben svonLoeben@munichre.com or Markus Waniek mwaniek@munichre.com

Munich Re Green Tech Solutions

Performance Guarantee Insurance: all established and emerging technologies can be covered

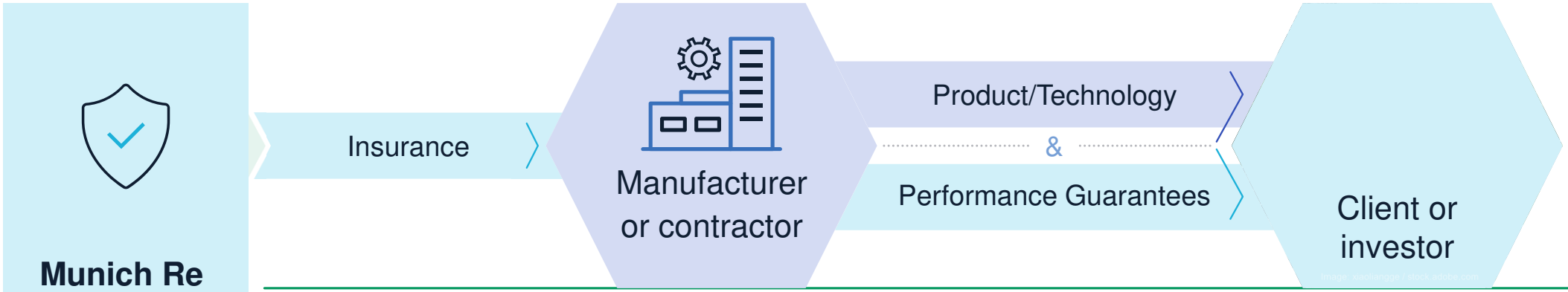
Munich RE

For manufacturers, projects and investors

~ 1400	~ 75 GW	Projects in ~ 90
projects in green tech	insured	countries

Munich Re Green Tech Solutions

Manufacturers' performance guarantees are backed by insurance which builds up trust.



- The manufacturer's product performance is guaranteed
- If it underperforms, the customer or investor receives a pay-out from the manufacturer
- Munich Re reimburses the pay-out

Source(s): Munich Re / Green Tech Solutions

My contact details

Tobias Grimm

Head of Climate Advisory and Natcat Data
Climate Change Solutions

Munich Re

eMail: TGrimm@munichre.com

LinkedIn: https://www.linkedin.com/in/tobias-grimm76/

Thank You!

Tobias Grimm
Head Climate Advisory & NatCat Data

Munich RE

Disclaimer

Munich Re has used its discretion, best judgement and every reasonable effort in compiling the information and components contained in this presentation. It may not be held liable, however, for the completeness, correctness, topicality and technical accuracy of any information contained herein. Munich Re assumes no liability with regard to updating the information or other content provided in this presentation or to adapting this to conform with future events or developments.