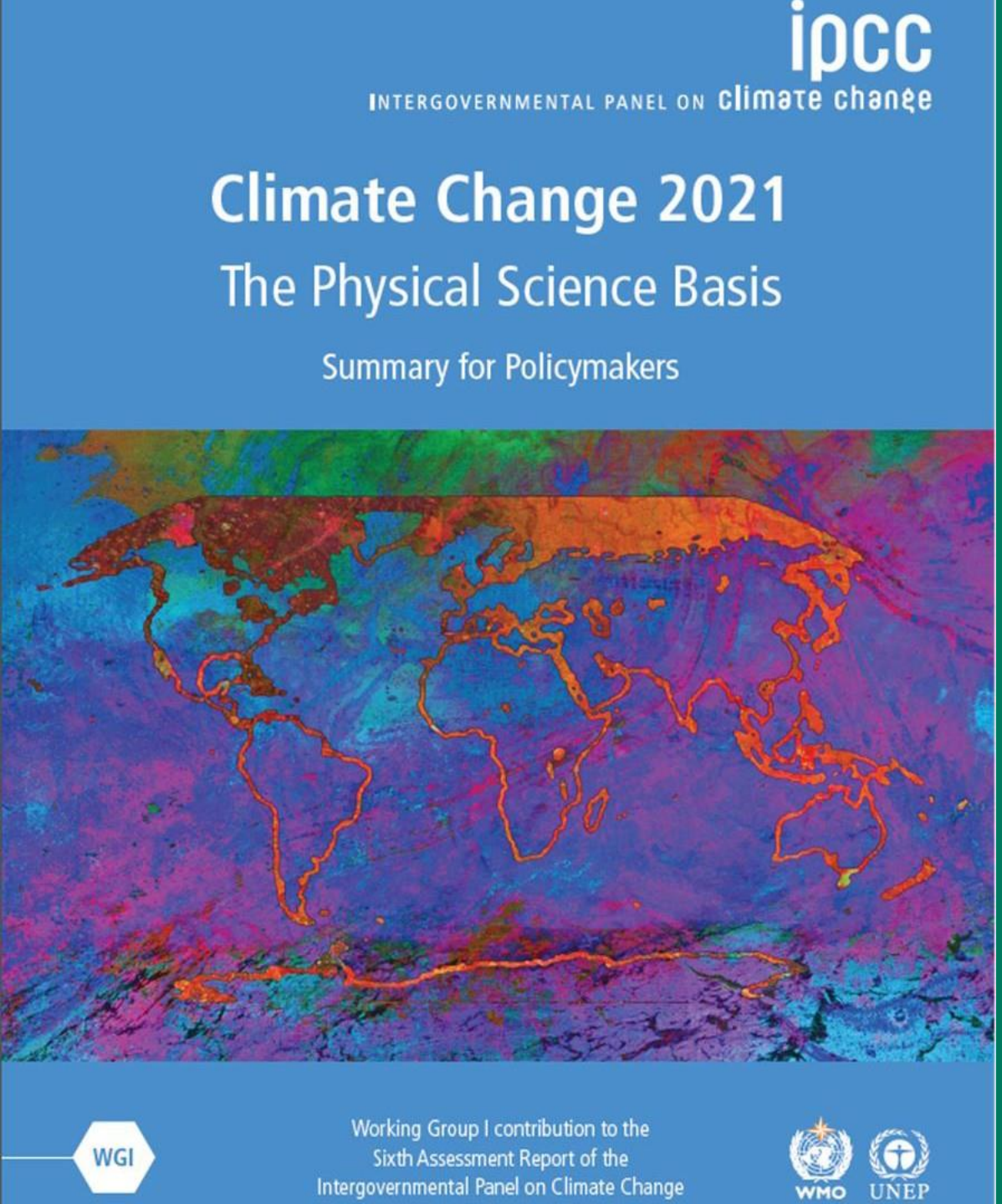
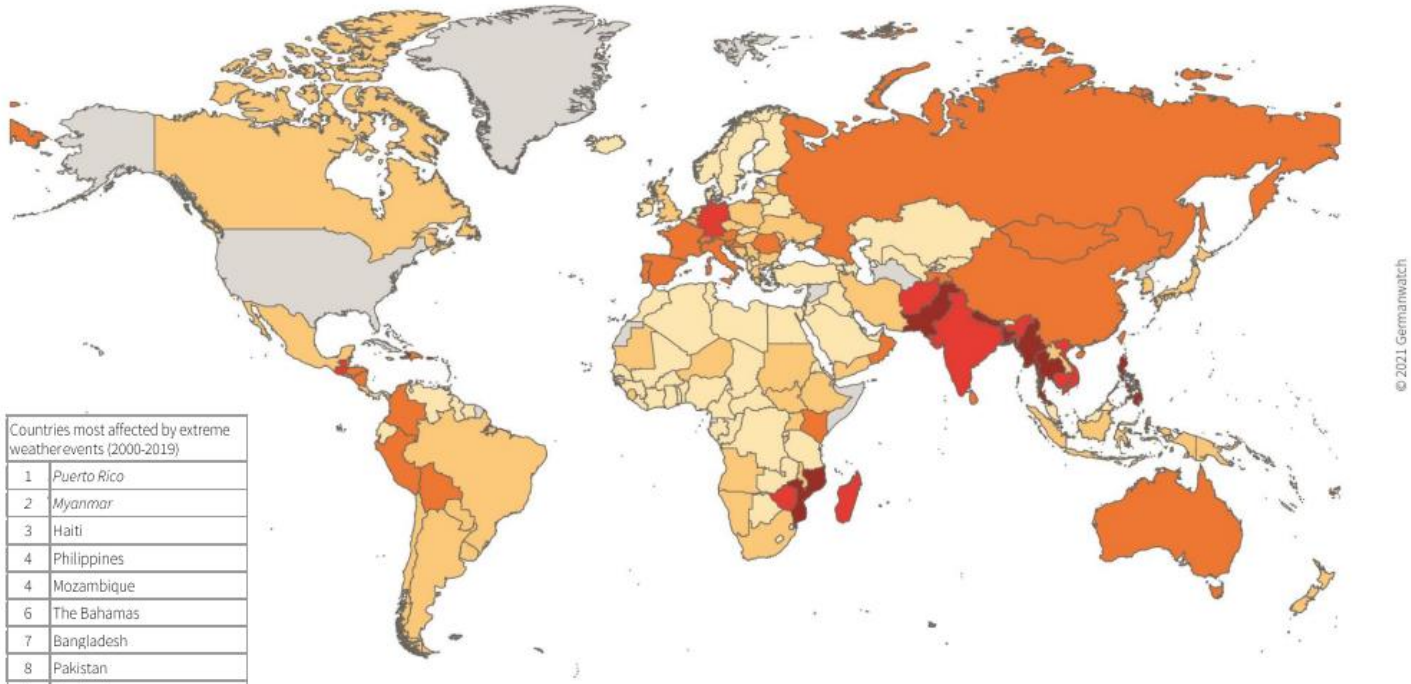


IPCC Assessment Report 6 (AR6)

Thailand is ranked under Top 10 countries most affected by extreme weather events 2000-2019, Germanwatch, 2021

Figure 1: World Map of the Global Climate Risk Index 2000 – 2019

Source: Germanwatch and Munich Re NatCatSERVICE



Countries most affected by extreme weather events (2000-2019)	
1	*Puerto Rico*
2	*Myanmar*
3	Haiti
4	Philippines
4	Mozambique
6	The Bahamas
7	Bangladesh
8	Pakistan
9	Thailand
10	Nepal

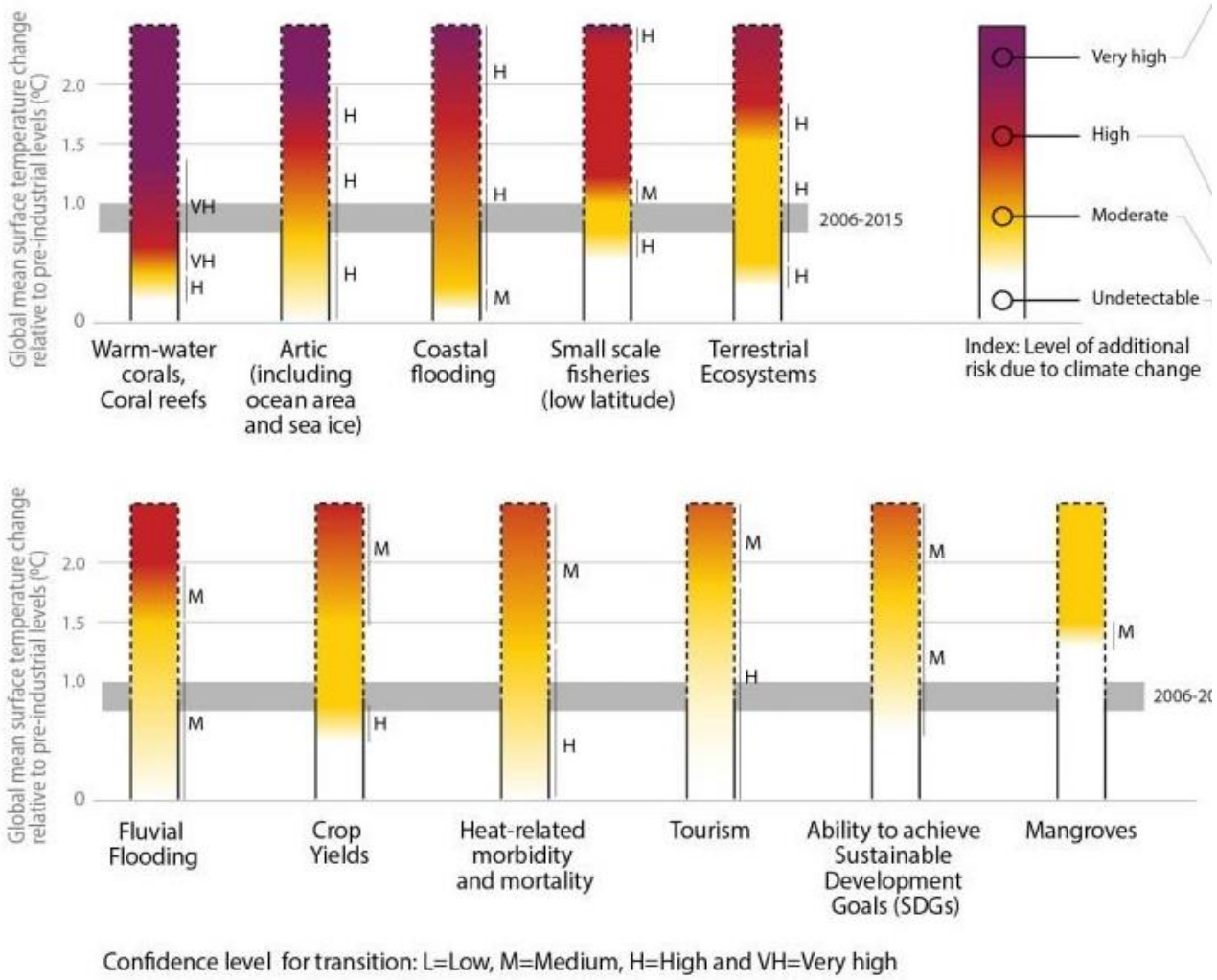
Italics: Countries where more than 90% of the losses or deaths occurred in one year or event

Climate Risk Index: Ranking 2000 - 2019

1 - 10 | 11 - 20 | 21 - 50 | 51 - 100 | >100 | No data

Why 1.5-2 °C?

Projected climate impacts by 2100 under 1.5 and 2 °C scenarios

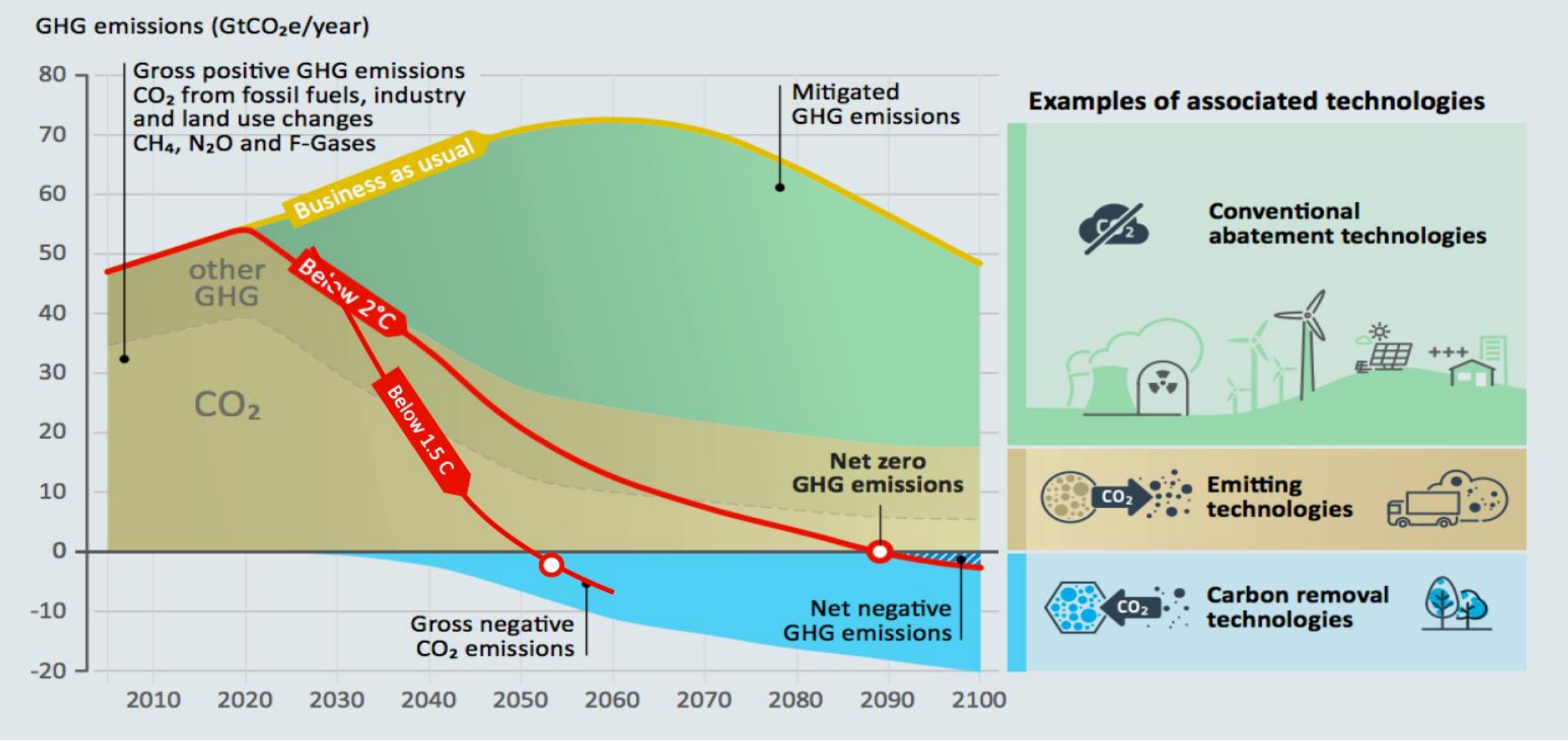


1.5-2 °C temperature rise from pre-industrial time is considered **a critical warming level** still allowing most of ecosystems, society and economy to adapt to climate change and avoid irreversible and catastrophic implications.

However, even at 1.5-2 °C warming, there will be unavoidable negative climate impacts.

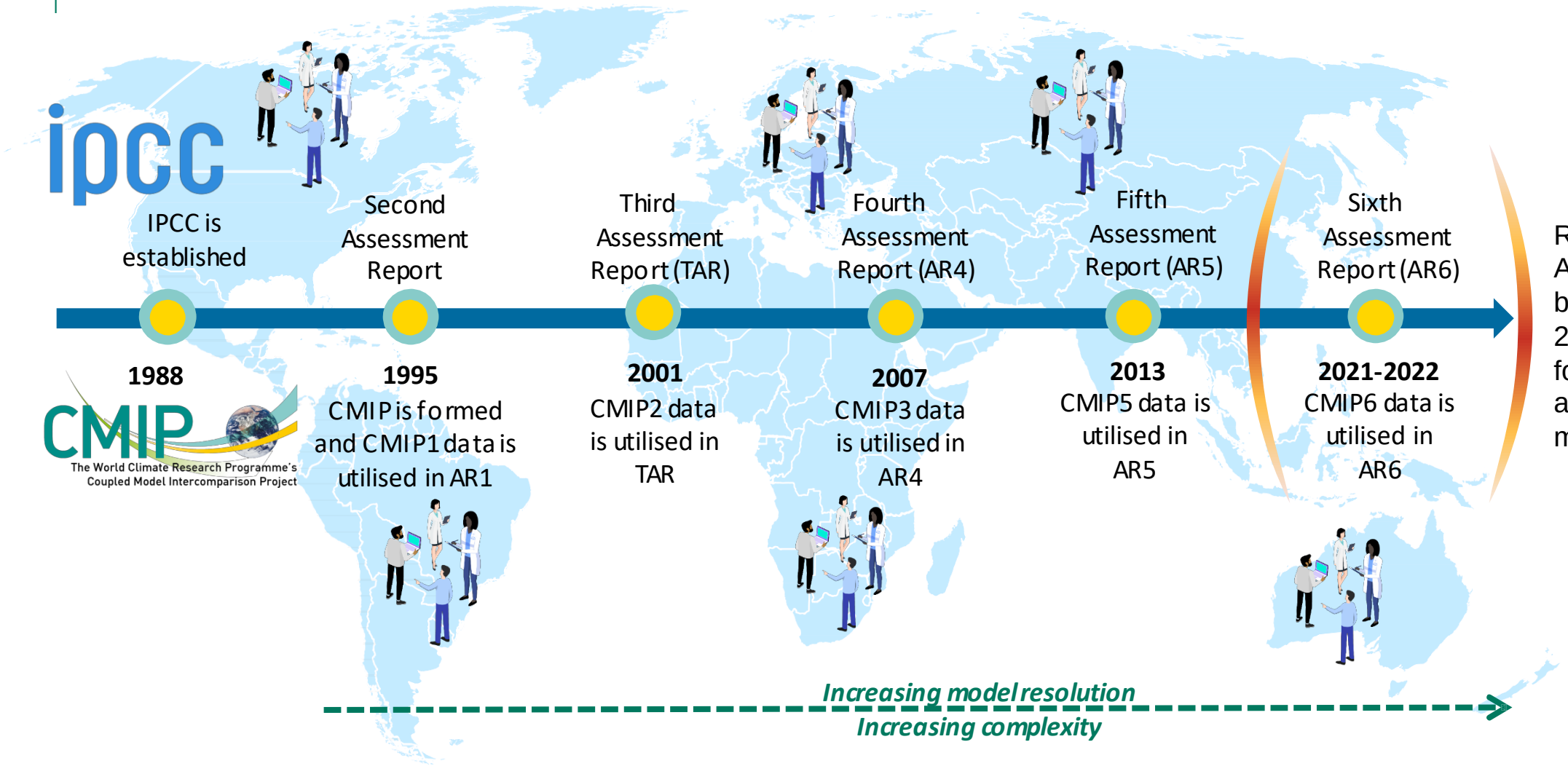
Source: IPCC: Special 1.5°C Report, 2018

Net Zero Emissions Pathway



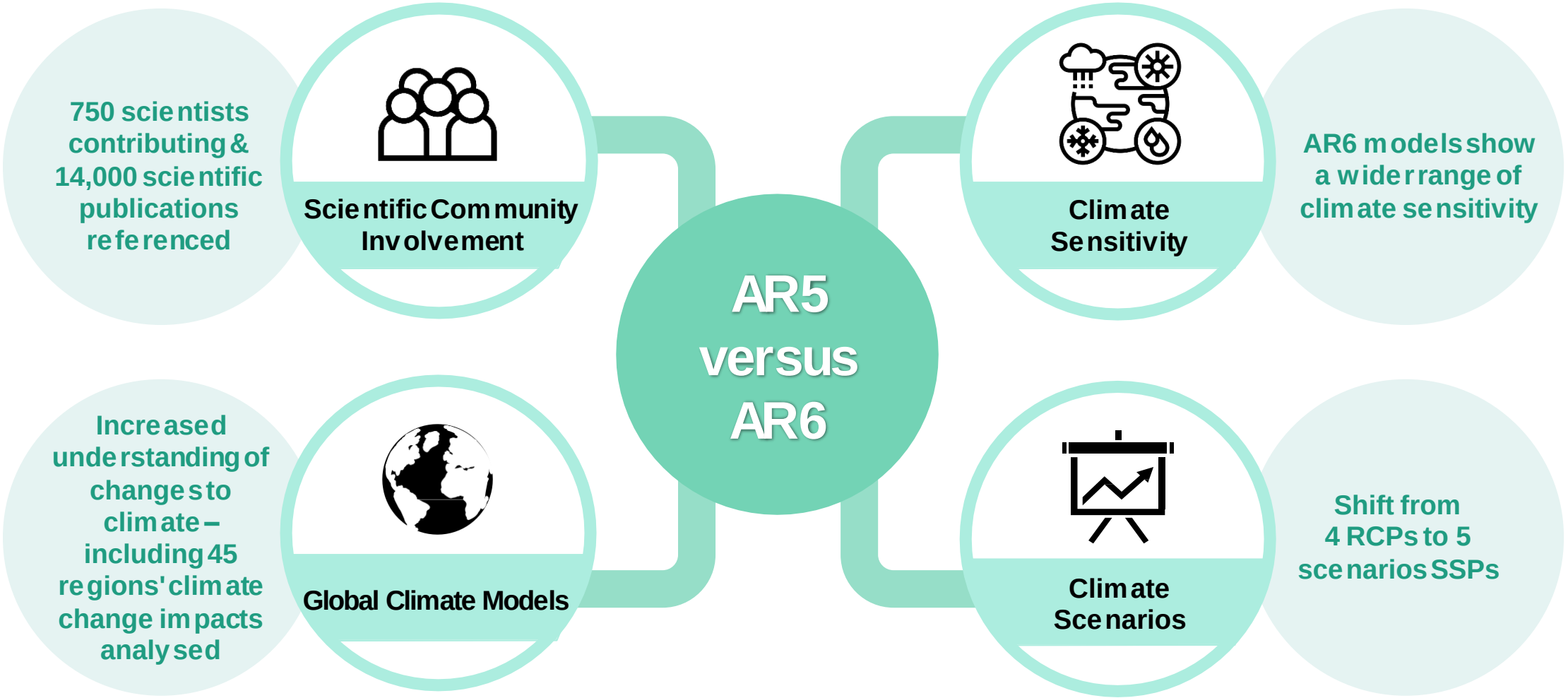
Source: UNEP (2017)

The IPCC is the UN's Authority on Climate Science



Remaining 2x AR6 reports will be released in 2022 – these will focus on climate adaptation and mitigation

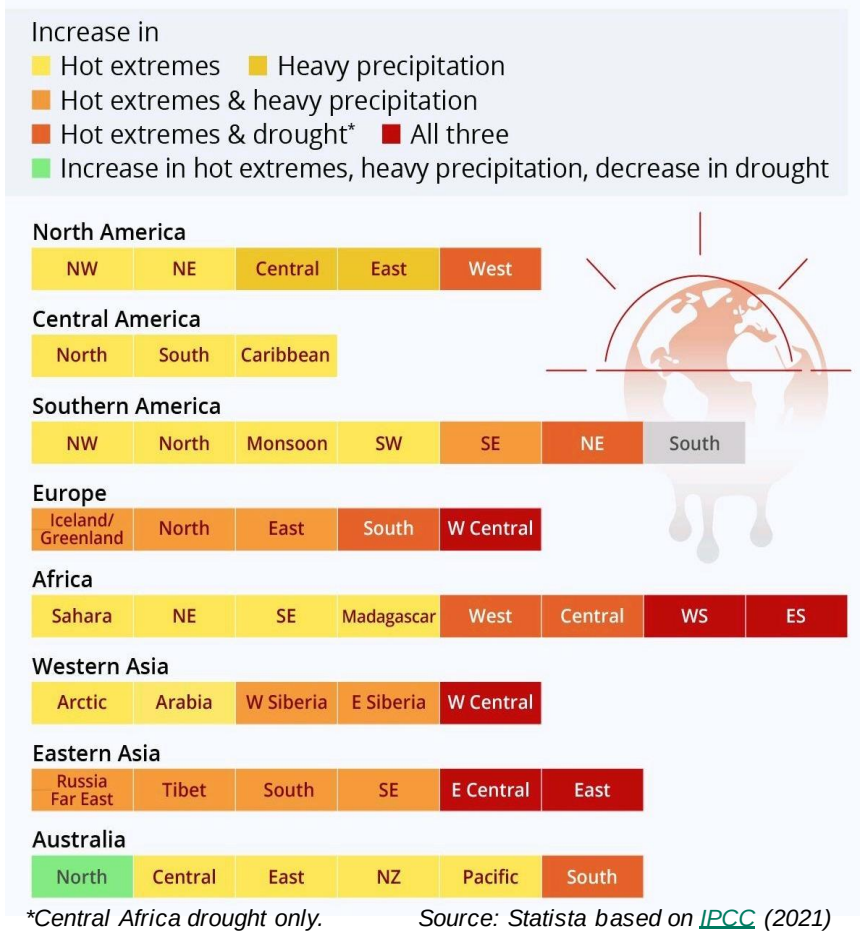
AR6 is the Most Comprehensive Review of Climate Science Ever



General Conclusions – IPCC AR6

The International Panel on Climate Change (IPCC) - **UN body for assessing the science related to climate change.** The panel consists of **195 member countries and the reports are ratified by all of them.** The IPCC Reports play a crucial role in underpinning discussions at the UN Climate Summits **(incl. COP26)**

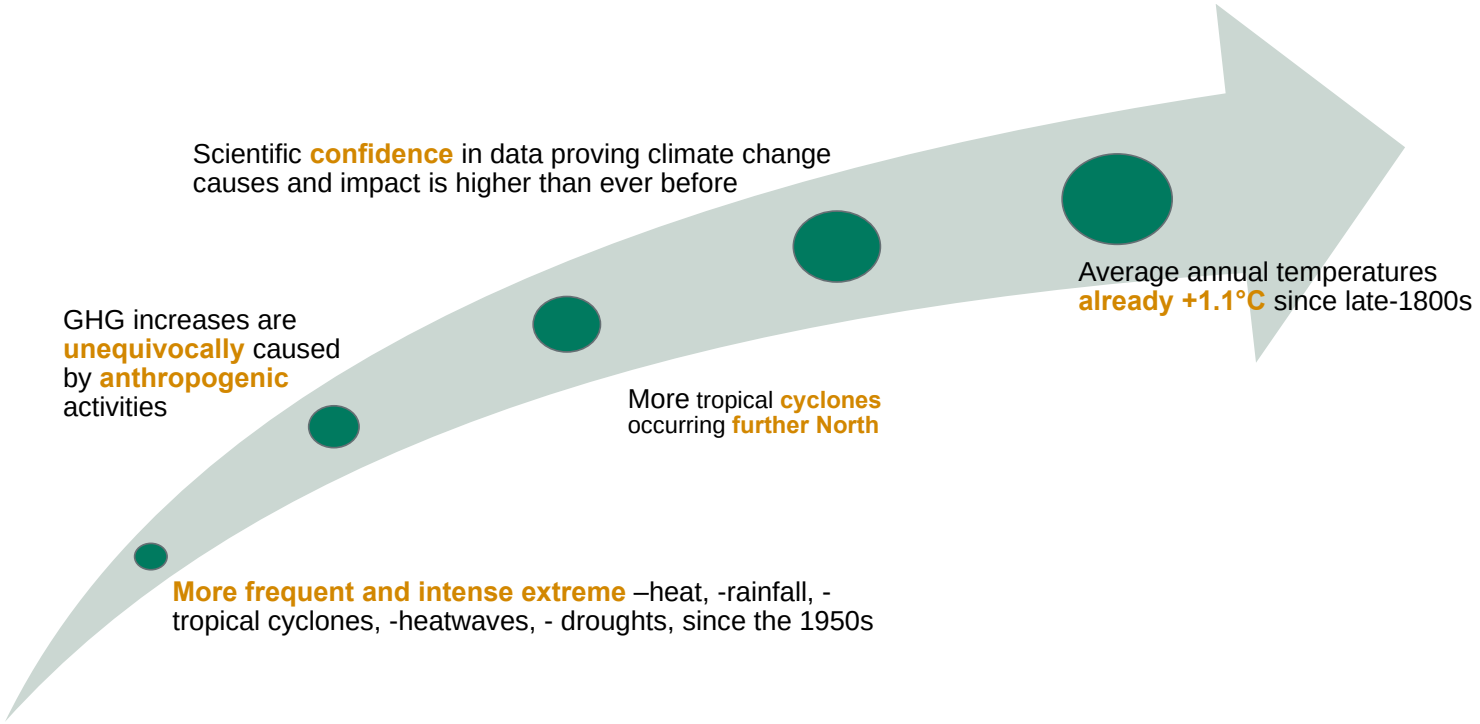
Climate Change patterns observed with scientific consensus (1950 – 2021)



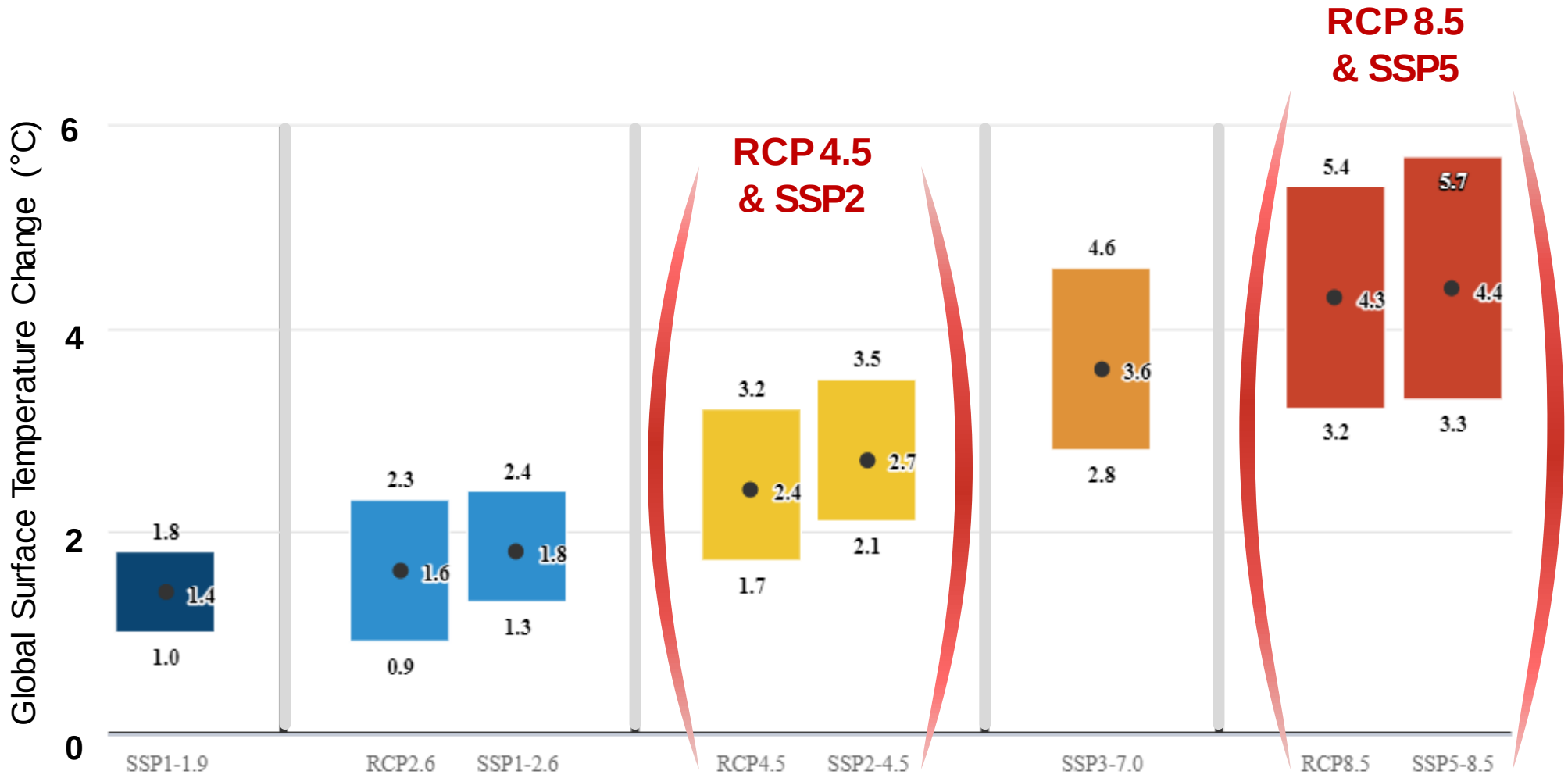
*Central Africa drought only. Source: Statista based on IPCC (2021)

In the past 70 years, **Western Europe, Central Asia, and Eastern Asia have faced the greatest climate change impacts** of heat, precipitation, and drought.

The UNFCCC's climate scenarios show **that only low or very low emissions pathways** will be able to keep global warming **below 2°C** and aligned with the Paris Agreement.



New Climate Scenarios: The Representative Concentration Pathways (RCPs) become the Shared Socio-economic Pathways (SSPs)



New Climate Scenarios

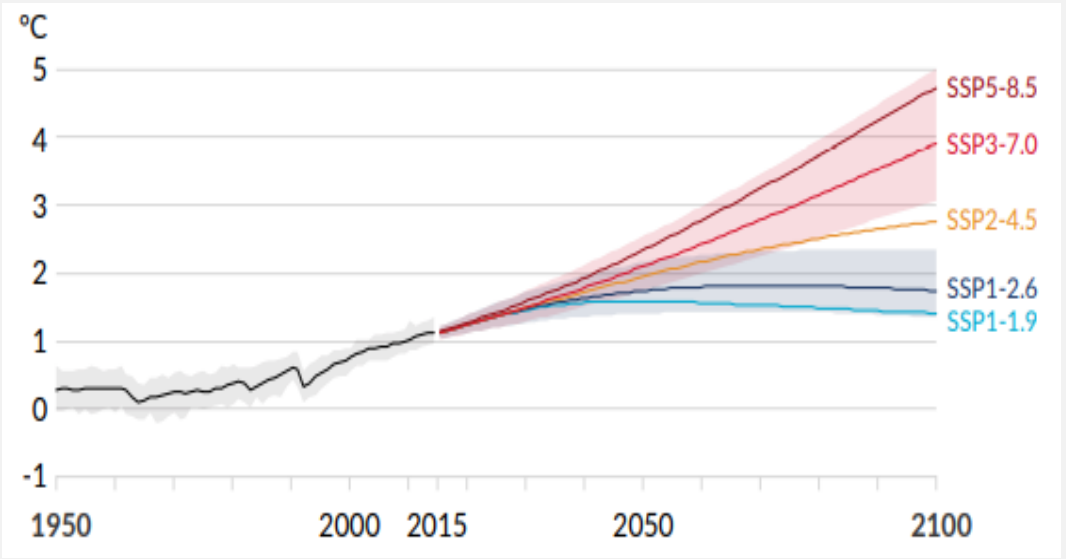
IPCC introduced five new climate scenarios with varying temperature futures

SSP1-1.9	**Very low emissions**; net-zero around mid-century; sustainability focused socio-economic development Near term warming of 1.5˚C; warming reverses, dropping back to **1.4˚C by end of century**
SSP1-2.6	**Low emissions**; net-zero in second half of century; sustainability focused socio-economic development Near term warming of 1.5˚C; warming continues but stays below 2˚C and hits **1.8˚C by end of century**
SSP2-4.5	**Intermediate emissions**; only some countries achieve net-zero emissions by mid-century; middle-of-the road socio-economic development path Near term warming of 1.5˚C; warming hits 2˚C by mid-century and reaches **2.7˚C by end of century**
SSP3-7.0	**High emissions**; no-additional-climate-policy reference scenario; higher cooling from land use changes and aerosols Near term warming of 1.5˚C; warming of 2˚1C by mid-century and **3.6˚C by end of century**
SSP5-8.5	**Very high emissions**; abundant exploitation of fossil fuel resources; resource and energy intensive socio-economic development Near term warming of 1.5˚C; warming of 2˚4C by mid-century and **4.4˚C by end of century**

Under All Scenarios, 'Earth will hit 1.5°C within 20 years (2040)'

5 SSPs 'Shared Socioeconomic Pathways'

Global surface temperature change (baseline 1850-1900)



Source: IPCC (2021)

Ambitious Action (SSP1-1.9)

Action today to limit temperature rise to 1.6 °C by mid-century and reduce to 1.4 °C by 2100

Near-term	Mid-term	Long-term
1.5 °C	1.6 °C	1.4 °C

High-carbon pathway (SSP5-8.5)

Limited co-ordinates action leading to temperature rise of 2.4 °C by mid century and reach 4.4 °C by 2100

Near-term	Mid-term	Long-term
1.5 °C	2.4 °C	4.4 °C

‘More intense heat waves and extreme weather phenomena’

Future extreme temperature events under global warming levels

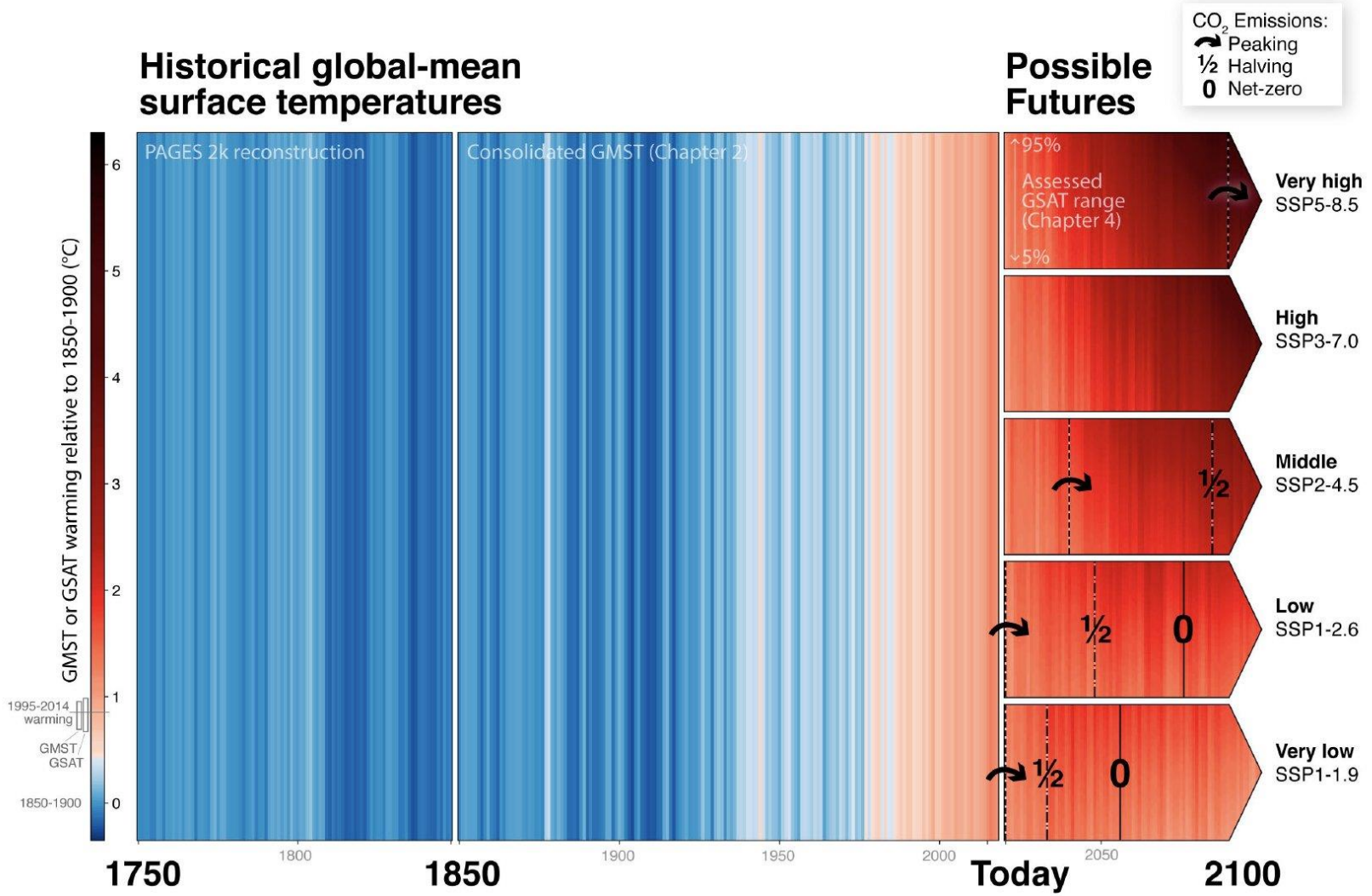
1.5 °C	2 °C	4 °C
4.1 times more likely to occur	**5.6 times** more likely to occur	**9.4 times** more likely to occur
1.9 °C hotter events	**2.6 °C** hotter events	**5.1 °C** hotter events

Future heavy precipitation levels under global warming levels

1.5 °C	2 °C	4 °C
1.5 times more likely to occur	**1.7 times** more likely to occur	**2.7 times** more likely to occur
10.5 % wetter events	**14.0 %** wetter events	**30.2 %** wetter events

Source: IPCC (2021)

Some scenarios show if and when we may achieve Net Zero



Net Zero likely unachievable

Net Zero possible, but lots of uncertainty

Science Based Targets

SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

- Formed by CDP, UN Global Compact, WRI, and WWF
- Science-based targets provide companies with a clearly-defined path to reduce emissions in line with the Paris Agreement goals.
- Targets are considered 'science-based' if they are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement – limiting global warming to well-below 2°C above pre-industrial levels and pursuing efforts to limit warming to 1.5°C.
- The IPCC AR6 **states that if global emissions can be cut in half by 2030 and reach net zero by 2050, then we can halt and possibly reverse the rise in temperatures.**

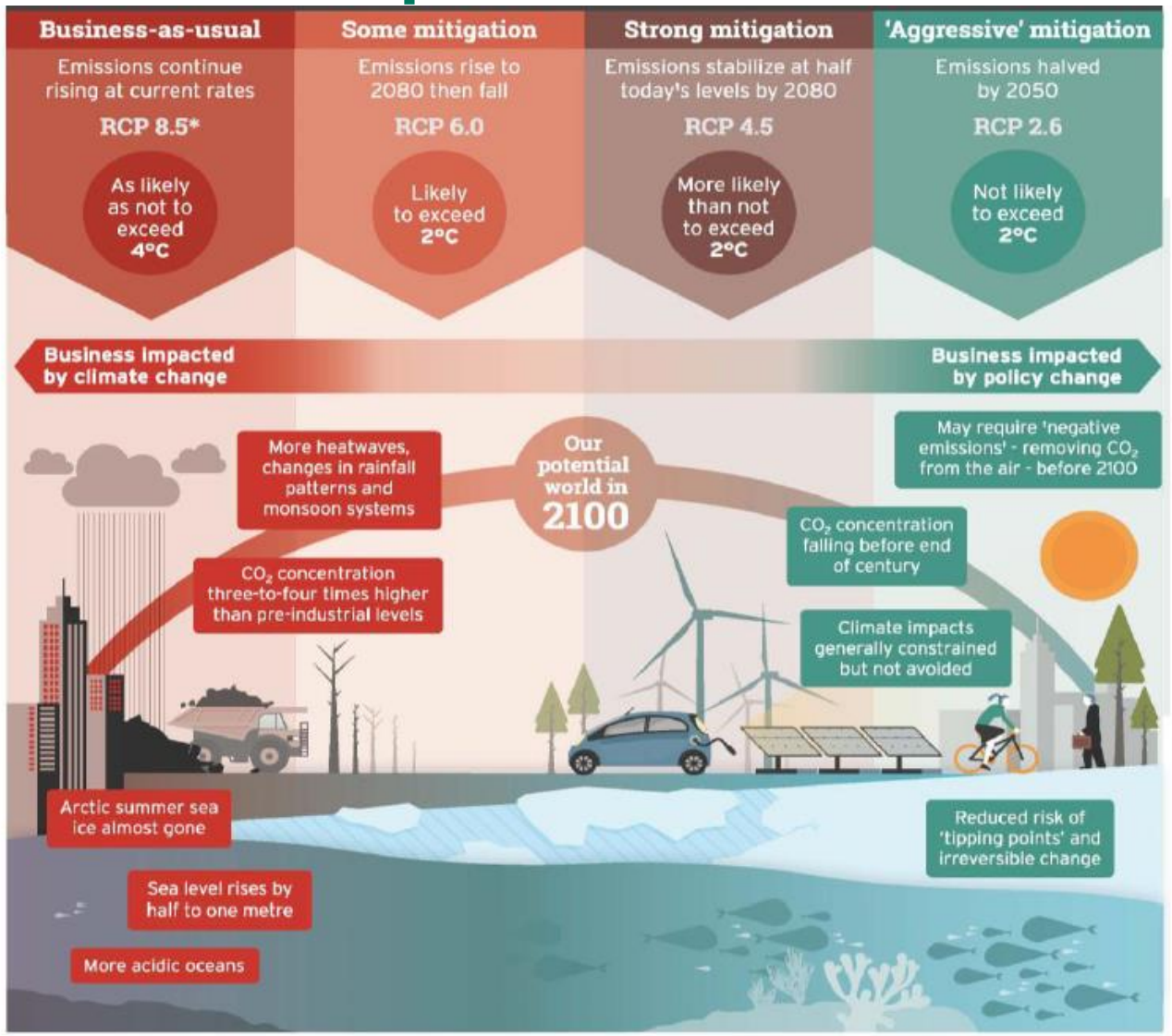
Source: SBTi: as of 20 October 2021

FFI STARBOARD SCG SIAM CEMENT GROUP C.P. GROUP NRF Schlumberger HALLIBURTON ERM CLARIANT Nestlé Good food, Good life TATA TATA POWER enagas

Source: SBTi: https://sciencebasedtargets.org/companies-taking-action?sector=Oil%20and%20Gas#table

Climate risks affect companies' financial stability

Physical climate risks arise from the increased frequency and severity of climate- and weather-related events that damage infrastructure, property, disrupt trade and put at risk human health and even lives.



Transition risks arise from adjustment to a low carbon economy.

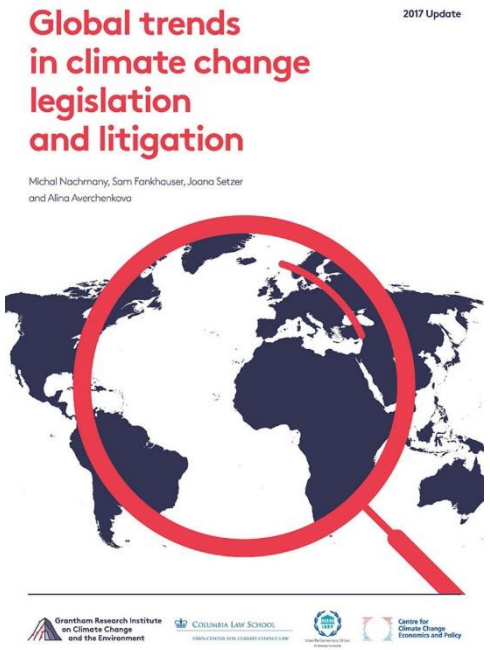
Sudden re-pricing of RISK can cause financial instability

RCP	Forcing	Temperature	Emission Trend
1.9	1.9 W/m2	~1.5 °C	Very Strongly Declining Emissions
2.6	2.6 W/m2	~2.0 °C	Strongly Declining Emissions
4.5	4.5 W/m2	~2.4 °C	Slowly Declining Emissions
6.0	6.0 W/m2	~2.8 °C	Stabilising Emissions
8.5	8.5 W/m2	~4.3 °C	Rising Emissions

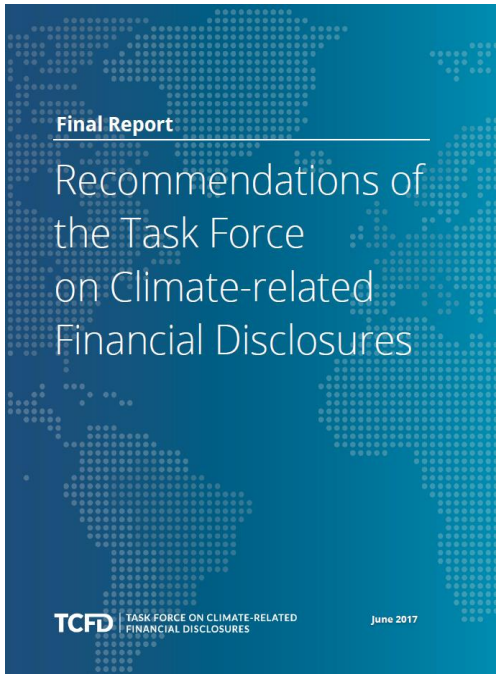
RCP: Representative Concentration Pathways
Source: based on IPCC.

There are four key emerging drivers for assessing climate risks to business

Market & Technology Shifts



Compliance, Liability & Operational Efficiency



Reputation & Stakeholders

Physical Impacts

Range of climate risks including, but not limited to, the following… (example vaccination company)

Market & Technology Shifts

- Increasing costs to implement lower emission technologies
- Increasing costs of sourcing raw materials
- Increasing energy and feedstock costs
- Supply chain cost increases

Reputation & Stakeholders

- Stakeholder expectations
- Risks from business interruption
- Increasing requirements/ expectations for disclosure of potentially proprietary information
- Access to capital constraints

Compliance, Legal Liability & Operational Efficiency

- Legislative uncertainty, e.g. EU EED
- Carbon regulation compliance costs
- Policies relating to: HFC propellants restriction
- Increasing supply chain regulation
- Consumer preferences shifting to sustainable products

Physical Impacts

- Increasing frequency and intensity of climate events leading to greater losses at operational sites, particularly manufacturing and other key operations
- Issues through the supply chain, including delivery of key raw products

Range of climate opportunities including, but not limited to, the following… (example vaccination company)

Market & Technology Shifts

- Increasing demand for current and new medicines and products, e.g. vaccines
- Increasing demand for products that reduce GHG emissions
- Opportunity to reduce energy consumption and associated costs
- Adoption of renewable energy technologies & infrastructure

Reputation &Stakeholders

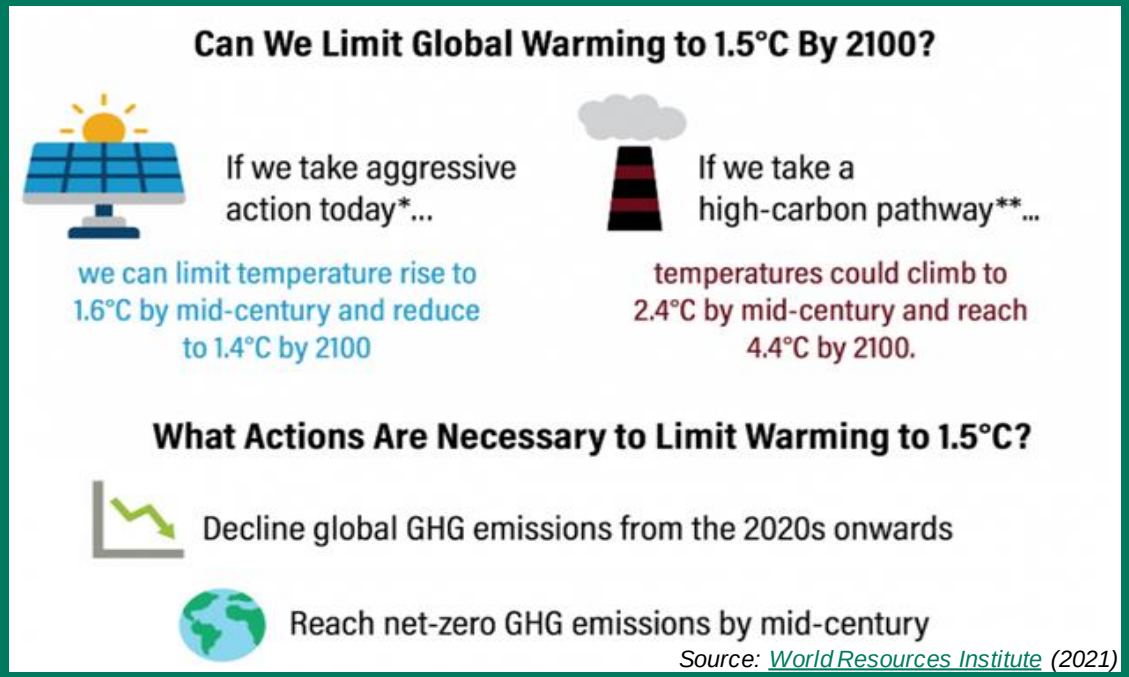
- Stronger brand recognition for leadership in responsible business
- Stronger supply chain positioning due to brand
- Attracting the top talent due to corporate positioning on sustainability/ climate change positioning
- Access to capital, i.e. green finance

Compliance, Legal Liability & Operational Efficiency

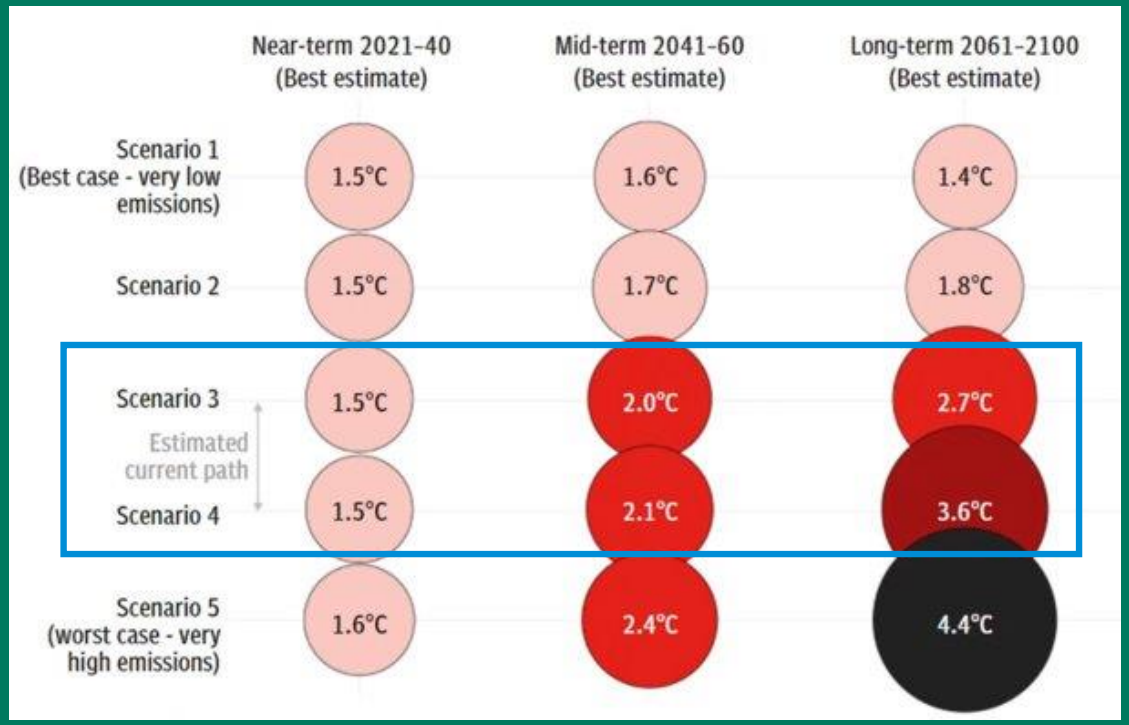
- Carbon regulations make investment in emissions reduction technology lower cost
- Policy/ financial incentives to invest in energy saving projects
- Potential tax breaks from, e.g. ISO 50001 certified plant
- Potential revenue from ETS when emissions below cap

Physical Impacts

- Changes in physical climate leading to an increase in demand for products
- Reductions in frequency and intensity of physical climate events, leading to lower incidences of physical climate events
- More resilient supply chain



Source: World Resources Institute (2021)



Business Implications

AR6: Implications for Companies

Are we entering a new era?

Policy Implications of AR6

Key policy issue governments will need to address:

Carbon Budget (50% chance of staying below 1.5°C) = 500 Gigatonnes of CO2eq
= 12.5 to 15 years of continued current annual industrial emissions

Carbon Capture is a viable technology to reduce temperatures, but not a silver bullet.	Greater policy support for CCUS
Methane emissions are high-impact, low-life. Immediate cuts in Methane will drive GHG emissions reductions faster than cuts in CO_2.	Greater regulation around Methane emissions, e.g. reducing flaring
Pledges of Paris Agreement signatories are insufficient and will need to be ratcheted, in updated Nationally Determined Contributions.	More ambitious net zero/ low-carbon national policies – fossil-based targeted
Need international governance of emissions trading, COP26 may herald this.	International agreement on emissions trading – carbon trading scheme
IPCC datasets & tools will help governments be better aware of climate risks they face.	Better informed policy making

Note: AR6 Summary for Policymakers was authored by governmental representatives. Member states using the summary to bolster positions they intend to take at November's COP26.

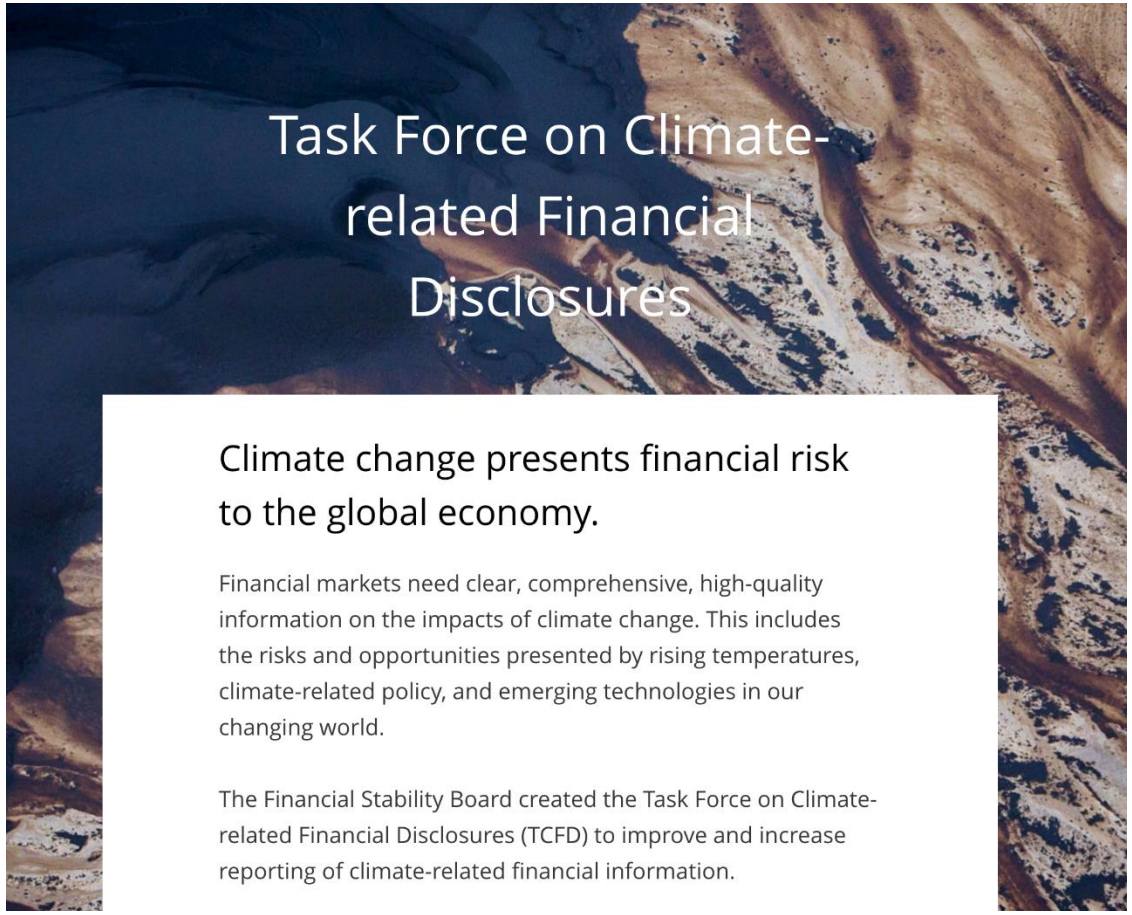
What are corporates doing/should be doing?

The physical and transitions risks from climate change are a material financial risk (and source of opportunities).

Investors, shareholders and the public want to see disclosure on the value at risk using frameworks such as the TCFD in many jurisdictions this is now mandatory.

There are 6 essential steps.

1) Measure the carbon/GHG footprint.
2) Set a net zero goal with clear interim targets.
3) Reduce energy use.
4) Switch to low carbon energy.
5) Pursue carbon removal solutions.
6) Conduct scenario analyses to determine value at risk.



ERM LCET Services

Key Messages

AR6 is a **landmark** study warning the world on changing climate

New reports on adaptation and mitigation coming in 2022

Human influence is unequivocally the main driver of many elements of climate change

Global temperature projected to reach **1.5°C** under all scenarios already by 2040 causing **increased climate extremes**

Revised **climate projections** mean companies need to reassess risks

COP26 expects countries to increase climate ambitions (NDCs) and shift global economy to a **Net Zero pathway**

Integrate new scenarios and global/ Thailand climate ambitions into **business strategy**

Sustainable Financial Mechanisms

The evaluation and disclosure of Climate-related Risks and Opportunities is quickly becoming standard practice

Mandatory reporting of climate-related risks

HKEx tightened ESG reporting guidelines for listed issuers to include mandatory climate related risk disclosure from 1 July 2020. extending to asset manager, pension funds, insurance companies by 2025..

Revision of EU Non-Financial Reporting Directive – Alignment to TCFD included in 2019 non-mandatory guidance. Revision of NFRD due Q1 2021

FCA Proposals to enhance climate-related disclosures by listed issuers. Consultation on mandatory reporting for UK pension schemes by the end of 2022.

Federal Government conducting test to define and pursue a Canadian approach to implementing TCFD

U.S. Securities and Exchange Commission (SEC) – market regulator to review public companies' climate risk disclosures and update guidance

French government considering mandatory reporting of TCFD

Japan government considering mandatory reporting of TCFD and held first corporate summit on climate-risk reporting in 2019

BANK OF ENGLAND
PRUDENTIAL REGULATION AUTHORITY

Supervisory Statement 3/19 15th April 2019

NGFS
Central Banks and Supervisors Network for Greening the Financial System

89 members including central banks from US, Canada, England, Germany, France, Japan and China warned financial risks of climate change: **"system-wide and potentially irreversible if not addressed"**

The Task Force for Climate Related Financial Disclosure (TCFD) Provides a Framework for Disclosing On Climate-related Risks and Opportunities

"The TCFD will develop voluntary, consistent climate-related financial risk disclosures **for use by companies in providing information to investors, lenders, insurers, and other stakeholders.**

The work and recommendations of the Task Force **will help firms understand what financial markets want from disclosure in order to measure and respond to climate change risks, and encourage firms to align their disclosures with investors' needs."**

TCFD | TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

Governance
The organization's governance around climate-related risks and opportunities

Strategy
The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning

Risk Management
The processes used by the organization to identify, assess, and manage climate-related risks

Metrics and Targets
The metrics and targets used to assess and manage relevant climate-related risks and opportunities

- TCFD ***not*** a tool to become 'Paris-compliant'
- TCFD is a framework to uncover & understand climate-related risk & opportunity
- **Considers different scenarios: base case AND low CO_2**
- Develop strategy to manage climate-related risk
- Communicate risks, opportunities, strategies to stakeholders

Why Climate Risks Assessment is Important for business?

How business can benefit from TCFD-aligned climate risks assessment?

demonstrate climate leadership and **alignment with the best international climate reporting practice** to stakeholders

reduce investment risks and **seize new opportunities** by investing into sectors that may benefit from low carbon economy transition thus **supporting and accelerating** this transition.

show readiness of business to respond to climate challenges in a timely manner and significant progress and achievements to date

meet the increasing requirements for climate-related financial disclosures by investors and regulators.

Sustainability Linked Loan

Five core components in SLLs Principles

- Selection of KPIs
- Calibration of SPTs
- Loan characteristics
- Reporting
- Verification

Sustainability linked loans incentivize the corporate borrower to improve their ESG performance through the achievement of predetermined ESG performance objectives

KPI Examples

Environmental	Social	Governance
• Energy efficiency • GHG emissions • Waste disposal • Renewable energy • Water consumption • Sustainable sourcing • Circular economy • Sustainable farm & food • Biodiversity • Global ESG rating	• Human rights • Community relations • Affordable housing • Data security • Employee health and safety • Employee engagement, diversity & inclusion	• Business ethics • Building strong corporate governance & transparency

Benefits of SLLs for companies

- Access to discounted loan rates
- Improve overall sustainability performance
- Demonstrate sustainability commitments
- Flexibility to use the funds for general corporate purposes
- Deepen relationships and interactions with banks
- Drive internal alignment across the business
- Leverage third party ESG ratings as additional assessment of sustainability

Q & A

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The business of sustainability

ERM