

Climate Change - The Heat is On

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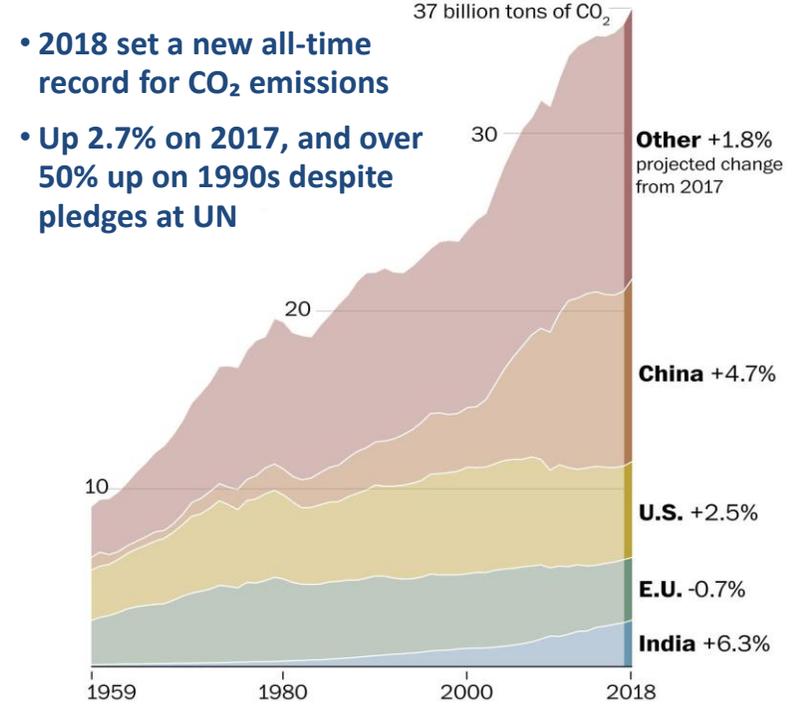
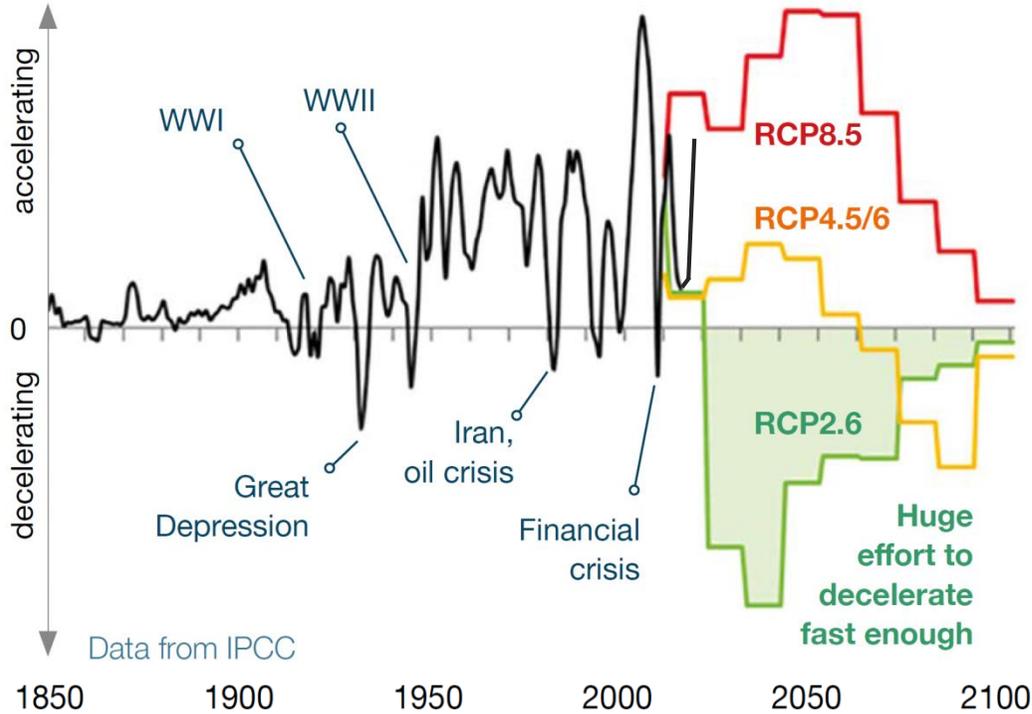
Based on the work of the
CRO Forum Emerging Risk Initiative



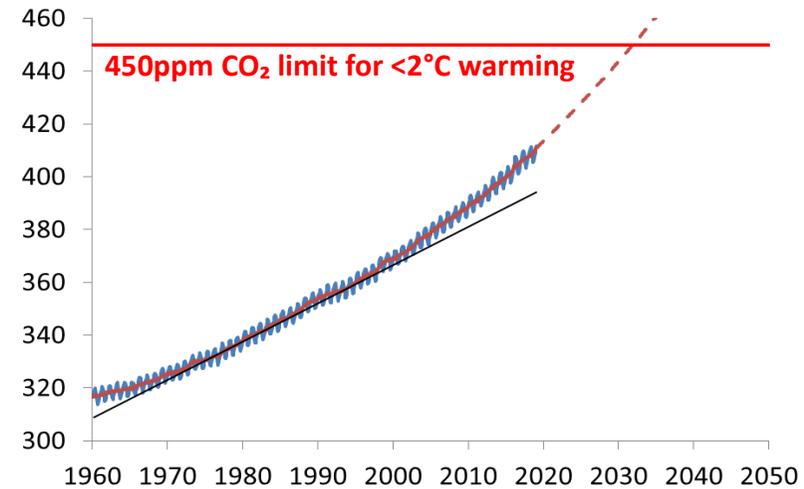
Climate Change – the challenge ahead

- 450ppm limit for CO₂ (for <2°C warming) looks unlikely
- Lifetime emissions of existing kit already exceed the 2°C budget
- Efforts of a generation have not yet ‘moved the dial’
- Profound cuts to emissions defy current economical models
- They mean major changes to energy, industry, freight, heating etc, sustained and extended every year through 2020 to 2070
- Relying on tech (large negative emissions) is simply not credible

Rate of acceleration of CO₂ emissions over time



Atmospheric CO₂ ppm concentration (NOAA.gov)

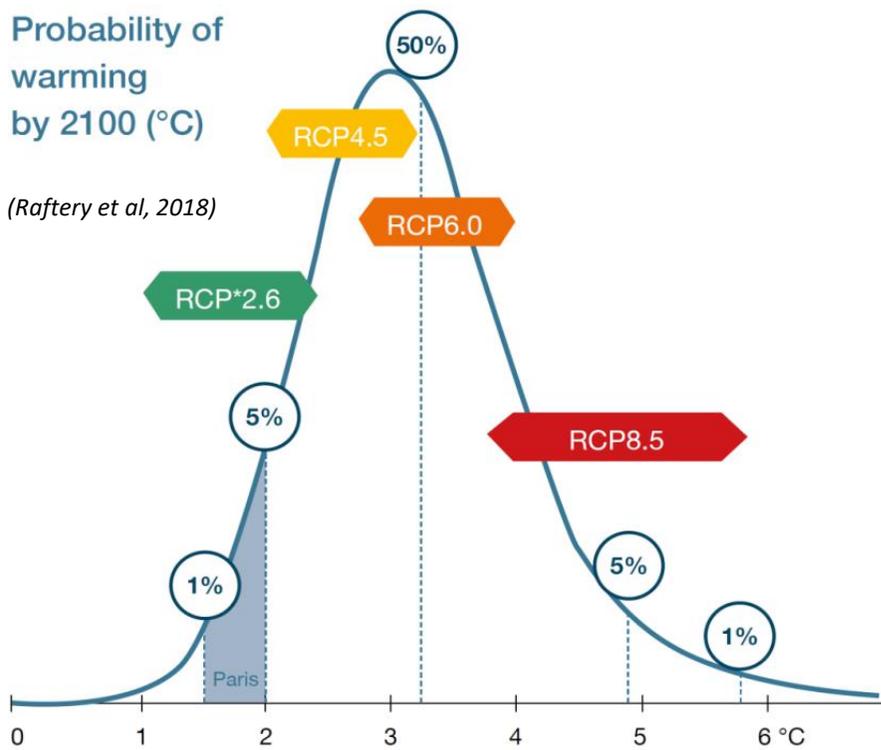


Society remains unclear on the implications

- Research indicates that 3-4°C warming is most likely, passing irreversible tipping points
- Most people don't yet realise how bad the risk is
- There is a risk of >5°C warming which would be catastrophic for all humanity, maybe existential
- This seems taboo or psychologically challenging

Probability of warming by 2100 (°C)

(Raftery et al, 2018)



Environmental Potential Impacts Human

Indicative findings from selected research

Temperature (°C)	Environmental Potential Impacts	Human
6°C		End of civilisation?
5°C	Mass extinction of >95% of species Global food productivity collapses	General social breakdown: survival
4°C	Majority of agricultural land lost Coasts eroded, flooded, aquifers saline Widespread drought US, Africa, Med, India Biosphere switches to net emitter of CO ₂	Conflict / war: resource competition Many deaths from weather disasters Global GDP materially reduced
3°C	Loss of majority of Amazon rainforest c.20% loss of crop productivity End of coral and base of marine food webs	Repeated famines, mass migration Infectious diseases spread
2°C	Committed to full ice-cap melt (sea-level eventually up +100ft/31m @2m/century)	Widespread hunger and water stress Significant food and water stress
1°C	Ice lost: S.Asia dry-season river flow - 70% Happening now: worse floods, wildfires, windstorms, droughts, heatwaves. 70% loss of insect biomass in 30 years	Rising tensions over resources
0°C		

Physical vs Transition Risk

Physical Risk Scenarios – evolve gradually

- The physical path for next 10-20 years is already set
- This is due to lags in the system, whatever we do now
- Physical trends are strongest for water risks, i.e.
 - intense downpours (including tropical storms)
 - river flooding
 - droughts (and associated wildfires)
- Data on physical risk trends is surprisingly hard to find: some extremes are getting worse at 2-3% per annum

Transition Risk Scenarios – could be non-linear

- Transition may be **orderly** (e.g. Energy Transition Commission)
 - driven by market forces
 - supported by incremental policy shifts
 - gradual increases in carbon pricing
- Or it may be **disorderly**, and step-change at any time
 - Triggered by strong shifts in social attitude (see below)
 - Potentially public protests and social unrest
 - Political upheaval, new governments
 - New economic paradigm, disrupted financial markets

A recent research area: socio-economic tipping-points

Possible triggers for a rapid shift in social attitude

- Shocking **human tragedy** from weather catastrophes that are solidly linked to climate change
- **Religious leaders** galvanise strong sense of moral duty for urgent climate action
- International **media hit** (TV series, social media) convincingly shows the horrors of a 4°C world
- **Eco-activism** gains public support. Social pressure not to waste, consume prolifically, fly frivolously etc
- **Charismatic political leaders** who champion climate action and social wellbeing over GDP growth

Transition priorities to reduce consumption

- \$100/tonne carbon price; end fossil fuel subsidies
- Decarbonise electricity and retire coal and gas plants
- Electric cars, buses, trucks, trains
- Denser urban living; promote mass transit
- Decarbonise ships and aviation
- Electric heating (not oil/gas boilers); better insulation
- Reduce food waste at all stages; veganism
- Re-use construction materials; design to repair
- Huge scale CCS or forestation (currently unproven at scale)

Implications for Insured perils

Warming is on track to reach 1.5-2°C in the next 2-3 decades. Effects are likely to include:

- More and stronger **heatwaves**, affecting people, livestock, infrastructure, productivity
- **Drought years** much more likely, especially in SW USA, Mediterranean and Southern Africa:
 - **Wildfires** expand area and extend season. US area has already doubled
- Downpour and river **flood damage** will double
- Tropical storm **deluge** becomes more common (up to 1000mm as with Harvey and Florence)
- **Wind**: slightly fewer cyclones, but more powerful, and expanding away from equator
- **Sea-level** rise threatens \$11tn of coastal property
- Geographic range of **diseases** will expand, such as malaria, yellow fever, Lyme disease

Multipliers:

- Evidence is emerging that extreme weather patterns may become more **prolonged**.
- Climate drag on global economy may mean less resources are available to mitigate and adapt.

Warming by 2100

Physical impacts



Sea-Level Rise (cm)



Coastal assets to defend (\$tn)



Chance of ice-free Arctic summer



Tropical cyclones: Fewer (#cat 1-5)
Stronger (# cat 4-5)
Wetter (total rain)



Frequency of extreme rainfall



Increase in wildfire extent



People facing extreme heatwaves



Land area hospitable to malaria

<2 °C

1.5 °C

2 °C

0.3-0.6 m

0.4-0.8 m

\$10.2tn

\$11.7tn

1 in 30

1 in 6

-1%

-6%

+24%*

+16%

+6%

+12%

+17%

+36%

x1.4

x1.6

x22

x27

+12%

+18%

Implications for Insurers

Changing Risks for Insurers

- **Many perils will deteriorate:**
 - Flood, wildfire; extended range of infectious disease
- **Changing extremes**, e.g. prolonged weather anomalies
 - Jet-stream disruption e.g. polar vortex, storm 'conveyor belts'
 - Extreme El Niño and La Niña
 - Atmospheric river landfall (esp. on west coasts)
- **Possible correlations** between wide-spread phenomena
- **Demand reduction** as a result of economic damage
- **Diversification** options could be impacted
- Growing flood risk for some **Property assets**



Insurability and **affordability** will be of increasing concern with **exposure management**, **loss prevention** and **adaptation** being key to the response:

Responses need to be well designed, proportionate and responsible

- Weather and **exposure data**, modelling and underwriting will become ever more important
- Any **risk pools** need to be well designed, not to foster the wrong risks or unwise development
- Continue to invest in **hazard models** to inform civic and infrastructure planning, and adaptation measures
- Continue to advise on **standards, building codes**, government policy and other preventative measures

Economic Factors Impacting Insurers

- Changing exposure from **investment portfolios**
- **Stranding of assets**
 - Transition Risks could make assets redundant
- **Opportunities from new products / asset classes**
 - Transition Risk could generate new opportunities
- **Demand reduction** as a result of economic damage
 - Societal trends may impact certain industries
 - In the more extreme physical scenarios economic turmoil could reduce economic activity
- **Increasing political interventions**



Options for the Insurance Sector

Corporate Activities

Low Carbon Corporate Footprint

- Reducing companies impact on environment

Planning Ahead

- Sustain the real economy by planning ahead for resilience with governments, industry and society
- Sustaining capital strength

Improved Disclosure

- Task Force on Climate-related Financial Disclosures (TCFD)
- Disclosure of financial and strategic risks
- Carbon footprinting

Investing Wisely

- Apply ESG frameworks to investment
- Reducing investment in carbon heavy activities
- Long-term investment in green finance and infrastructure
- Investing in new green technologies

Active Investor Actions

- Using investor rights to influence other companies



Insurance Activities

Maintain Insurability and Managing Portfolios

- Protect against physical perils
- Research to deepen understanding of climate change risks
- Apply ESG frameworks to underwriting
- Underwriting effectively
- Portfolio management, avoiding certain risks
- Developing new products
- Develop modelling capabilities

Support Prevention and Adaptation

- Risk management advice: mitigation, resilience, adaptation
- Influencing building regulations and government policies

Data Insights and Driver for Societal Changes

- Public campaigns to share data and shift behaviour
- Influencing societies understanding and perception of risk
- Working with government and public bodies

Sustainable Sourcing

- Reduce carbon intensity of claims supply chain

Any Questions?

Thank You

