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Cambridge Judge Business School
Cambridge Programme for Sustainability Leadership

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Climate Change:

Action, Trends and Implications for Business

The Intergovernmental Panel on Climate Change (IPCC)
Fifth Assessment Report (AR5)
Working Group 1: The Physical Science
September 2013

Climate Change: Action, Trends and Implications for Business

IPCC Fifth Assessment Report, Working Group 1 (WGI)

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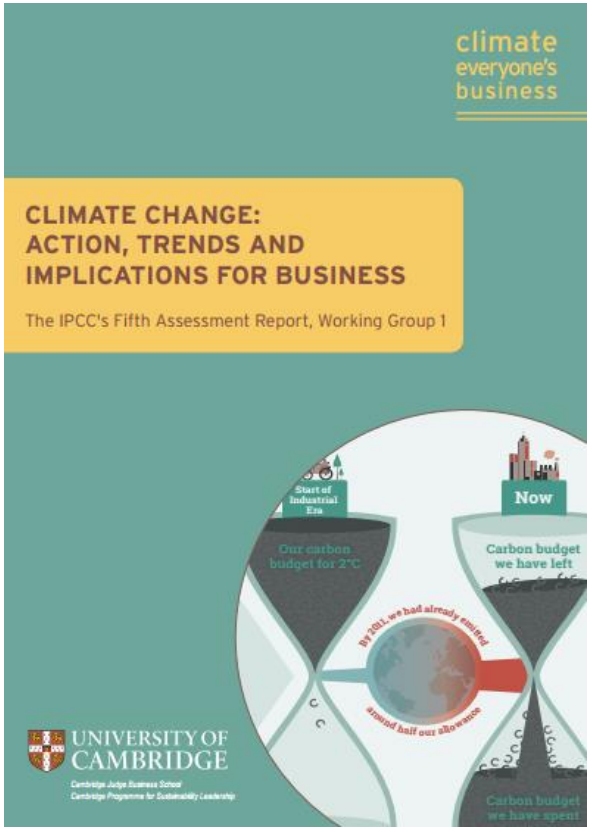
The IPCC's Fifth Assessment Report (AR5)

- The most up-to-date info on climate change
- Comprehensive and relevant analysis

Working Group 1 (WGI)

- Assesses the **physical environment** and observes factors likely driving climate change.
- **Models** different aspects of climate change and **projects changes** by the end of the century.
- **WGII** (economy and population) and **WGIII** (climate change mitigation) reports will be released Q2 2014.



WGI Key Findings: Physical science

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Human activities are **causing a rise in global temperatures** - *particularly from emissions of* CO_2.

- The atmosphere and oceans are warming
- Snow and ice are diminishing
- Sea levels are rising
- Weather patterns are changing
- Oceans are acidifying

It is at least 95% certain that human activities have caused more than half of the temperature increase since the 1950s, through the **burning of fossil fuels and land-use changes such as deforestation**.

At present, there is a *net uptake of energy by the Earth system*, increasing heat energy stored by the Earth. **Over 90% of the excess heat is stored in the ocean**.

WGI Key Findings: Future climate change

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Climate changes are already occurring in all geographical regions.

Impacts by the end of the 21st century may include:

- Global **temperatures 2.6 - 4.8°C higher** than present
- **Sea levels 0.45 - 0.82 m higher** than present
- **Loss of Arctic sea ice** from shrinking and thinning
- Disruption to **weather patterns:**
  - More hot and fewer cold days globally
  - Longer and more frequent heatwaves
  - Dry areas will become drier and wet areas wetter
- Carbon uptake will **increase ocean acidification**

'**Tipping point**' events (causing irreversible change) are possible, though there is little agreement on how likely they are or what the human consequences would be.

Due to historic emissions in the atmosphere, **many changes will continue** for hundreds or thousands of years *even if emissions are cut to zero today*.

WGI Key Findings: Limiting warming

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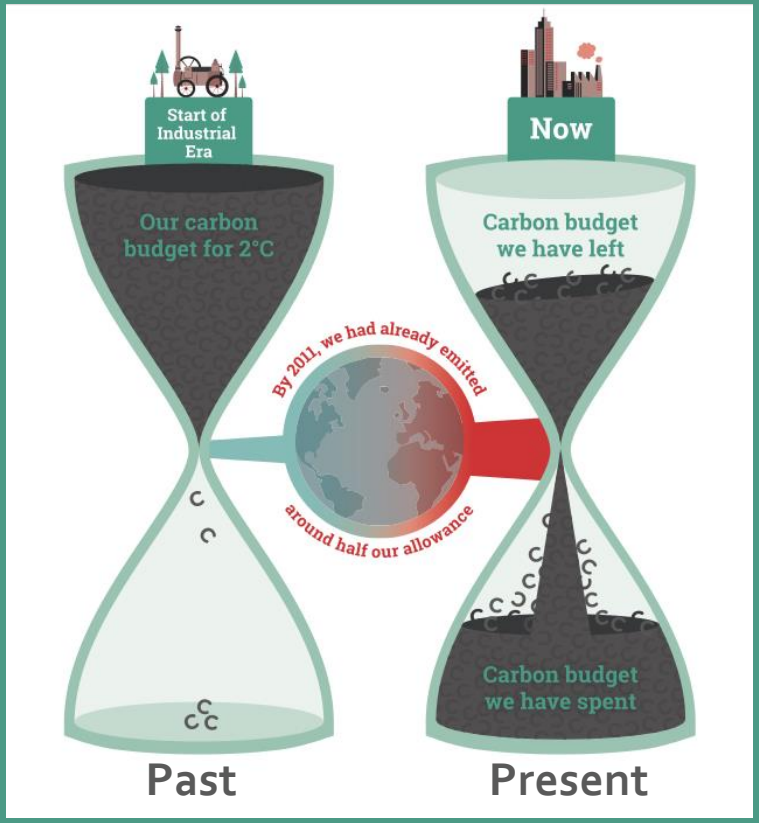
Limiting climate change will require substantial and sustained reductions of greenhouse gas and CO_2 emissions **relative to pre-industrial levels**.

2°C target

Parties to the 2010 UN Framework Convention on Climate Change (UNFCCC) agreed to commit to a **maximum temperature rise of 2°C above pre-industrial levels to prevent the most severe impacts of climate change**, and to consider lowering that maximum to 1.5°C in the near future.

Total cumulative human CO_2 emissions since the industrial era need to be limited.



About **half** *already emitted by 2011*

WGI Representative Concentration Pathways (RCPs)

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Four scenarios project how the climate is likely to change over the 21st century. The RCP number **indicates the strength** of climate change by 2100.*

** These scenarios depend on **future levels** of greenhouse gas emissions. The trajectory of emissions mainly depends on **policy choices made by governments**.*

RCP8.5 assumes a 'business-as-usual' approach. By 2100, atmospheric concentrations of CO_2 are three to four times higher than pre-industrial levels.

RCP6.0 (medium-high) and **RCP4.5** (medium-low) assume some action to control emissions. These are stabilization scenarios. In **RCP4.5**, CO_2 emissions fall below current levels by 2070 and atmospheric concentrations stabilize by the end of the century at about twice those of the pre-industrial period. In **RCP6.0**, CO_2 emissions continue rising until about 2080; concentrations take longer to stabilize and are about 25% higher than for **RCP4.5**.

RCP2.6 assumes 'aggressive' mitigation strategies that cause global greenhouse gas emissions to start decreasing after about a decade and to reach near zero levels around 60 years from now. This scenario is unlikely to exceed a 2°C increase in global mean temperature since pre-industrial times.

What climate change means for business

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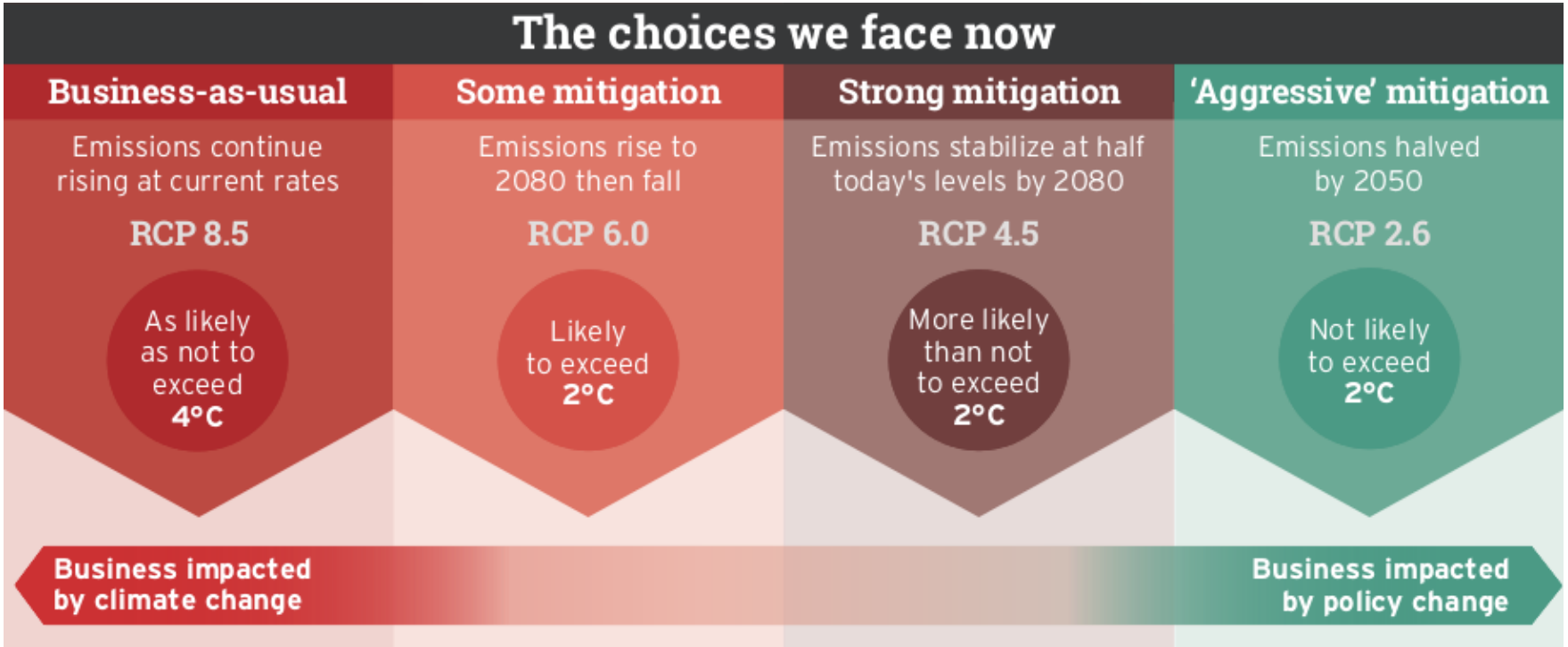

- *Rising temperatures, rising sea levels, changes in rainfall patterns, disappearing glaciers and acidifying seawater* will have **direct impacts on some business sectors**.
- *Government policy changes* will bring different sets of **impacts for business**.
- *Limiting climate change* will require **substantial and sustained reductions of emissions**.

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For more information

Tim Nuthall, Project Director
Joanna Benn, Managing Editor
Email: AR5@europeanclimate.org

www.cpsl.cam.ac.uk/ipcc
www.europeanclimate.org