Cabot Institute

The Paris Agreement – where are we now?
New evidence, a new call for action

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What happened in Paris?

- December 2015 – world leaders met at the 21st United Nations Framework Convention on Climate Change
- Agreed to keep mean global temperature rise to below 2 °C, and pursue efforts to limit warming to < 1.5 °C
3 years on…

- Direct response to government request in Paris - Intergovernmental Panel on Climate Change Special Report on Global Warming of 1.5 °C
- What are the impacts of limiting warming to 1.5 °C (and compared to 2 °C)? What is required to achieve this?

91 authors, 40 countries, 6000 references
Bristol researchers involved in IPCC

Prof. Tony Payne
Dr Jo House
Prof. Dani Schmidt
Prof. Andy Ridgwell
Prof. Dan Lunt
Prof. Jon Bamber
Dr Dann Mitchell
Prof. Pierre Friedlingstein

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Tonight

- The Paris Agreement: Where are we now?
- **Why** does limiting to 1.5°C matter?
- **What** will the world look like?
- **How** do we achieve this?
Future climate change

Dr Dann Mitchell

@ClimateDann

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Why did we write this report?

Science  Environmental  Human
Global Mean Temperature

- Observed monthly global mean surface temperature
- Estimated anthropogenic warming to date and likely range

Temperature ranges:
- 0 °C
- 1 °C
- 1.5 °C
- 2 °C

Time periods:
- 1960
- 2000
- 2040
- 2080
Who cares about the global mean?
Regional temperatures at 1.5°C

Current

Almost every year

Every 2 years

Every 5 years

Temperature Increase

1 °C 2 °C 3 °C
How can the global temperature impact us locally?

1. Heating up the atmosphere
   - It expands

2. Stretching storm systems
   - More intense

3. More intense storms
   - Last longer
Just how complex is this problem?
Thank You

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What might a 1.5C world be like?

Tony Payne
School of Geographical Sciences

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Who am I?
Main areas of expertise in Greenland and Antarctic ice sheets, and future sea level rise

Lead Author on Sea level chapter 5th Assessment Report of the IPCC (2013)

Lead Author on Impacts chapter of 1.5C Special Report

Approval session of Summary for Policy Makers, Korea October 2018

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How important is the extra 0.5 °C?

Sea level

At 2100, around 10cm less in a 1.5C world compared to 2.0C (~20%)

Roughly 10 million fewer people exposed to risk
How important is the extra 0.5 °C?

Sea level

Melting Greenland and Antarctic ice sheets could raise by many meters over 100s-1000s years

Existential threat to many small island states and coastal cities

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How important is the extra 0.5 °C?
Extremes of weather

Number and severity of days increase far more than mean

Reduced food availability in the Sahel, southern Africa and the Mediterranean

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How important is the extra 0.5 °C?

Sea ice and the Arctic

Chance of a sea-ice free Summer increases from one per century (1.5C) to one per decade (2.0C)

Arctic ecosystems (tundra, permafrost) at particularly high risk of degradation
How important is the extra 0.5 °C?
Coral reefs and the oceans

Coral reefs all but disappear at 2.0C, 10-30% survive at 1.5C

Ocean warming, increased acidity and declining oxygen levels affect biodiversity and fisheries.

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How important is the extra 0.5 °C?

Summary

Limiting warming to 1.5°C substantially reduces ecosystem and biodiversity loss, as well as impacts on health, water and food security ...

how to achieve it?

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How can we achieve a 1.5 degree world?

Dr Jo House
Cabot Co-Chair: Environmental Change
The Solutions – key messages

• There is lots that can be done and is being done, **but we need to ramp it up**
• Some is already affordable and could save you money
• It has other co-benefits so we might want to do it anyway
• 196 countries signed up to Paris Agreement
• Country pledges “Nationally Determined Contributions”

- Well below 2 °C
- Pursue efforts 1.5 °C
- Balance of emissions & removals
What do we need to do?

Main Greenhouse Gasses:
- Carbon dioxide
- Methane
- Nitrous oxide

We can only put 750 GtCO$_2$ into the atmosphere to limit warming to 1.5 degrees – around 15 years or current emissions.

Emissions GtCO$_2$ per year = a billion tonnes of carbon dioxide per year
How do we get to 1.5 degrees?

There are multiple different pathways that can limit warming to 1.5 ºC.
What can we do with energy and industrial emissions?

Reduce

Replace

Remove

- Biomass
- Carbon capture
- Geological storage

Energy saving

SWITCH IT OFF
UNPLUG IT
SAVE POWER

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What else can we do on the land?

- Protect
- Enhance
- Reduce

Tree planting 'can reduce flooding'

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Where have we got to so far?

Climate pledges so far will limit global warming .... but not enough.

(Climate Action Tracker)

Forests expected to provide a quarter of pledged mitigation by 2030.

(Grassi, et.al. 2017)
What is the UK government doing ... and not doing?

80% reduction in UK greenhouse gas emissions for 2050 compared to levels in 1990.
What about Bristol?

**Target:** Reduce carbon dioxide emissions 80% by 2050 compared to 2005

**So Far:** reduced energy use by almost 20% and carbon dioxide emissions by almost 18% between 2005 and 2013

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The Solutions – key messages

• There is lots that can be done and is being done, but we need to ramp it up
• Some is already affordable and could save money
• It has other co-benefits so we might want to do it anyway

How can we make it happen?

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How Can We Achieve a 1.5 Degree World?

Dr Alix Dietzel
Lecturer in Global Ethics
@alixdietzel

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My Research

Climate change justice – ethics, fairness, responsibility, human rights.

Climate change policy analysis – states, sub-state actors, individuals.

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The Global Political Response: The UNFCCC (Kyoto Protocol, Paris Agreement)
The Global Political Response: Sub-State Actors (Corporations, NGOs, Cities)
Who is Responsible for Acting on Climate Change?
What Should Individuals Do?

- Upgrade light bulbs
- Hang dry clothes
- Recycle
- Wash clothes in cold water
- Replace typical car with hybrid
- Eat a plant-based diet
- Switch electric car to car free
- Buy green energy
- Avoid one transatlantic flight
- Live car free
- Have one fewer child

Annual climate savings (CO₂e)
What Should Individuals Do?
Thank You

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Q&A

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Prof Tony Payne - @BristolGlac
Dr Jo House - @drjohouse
Dr Alix Dietzel - @alixdietzel

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