Challenges of addressing the climate and environmental emergencies for the GTWS community

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Key messages from IPCC AR6

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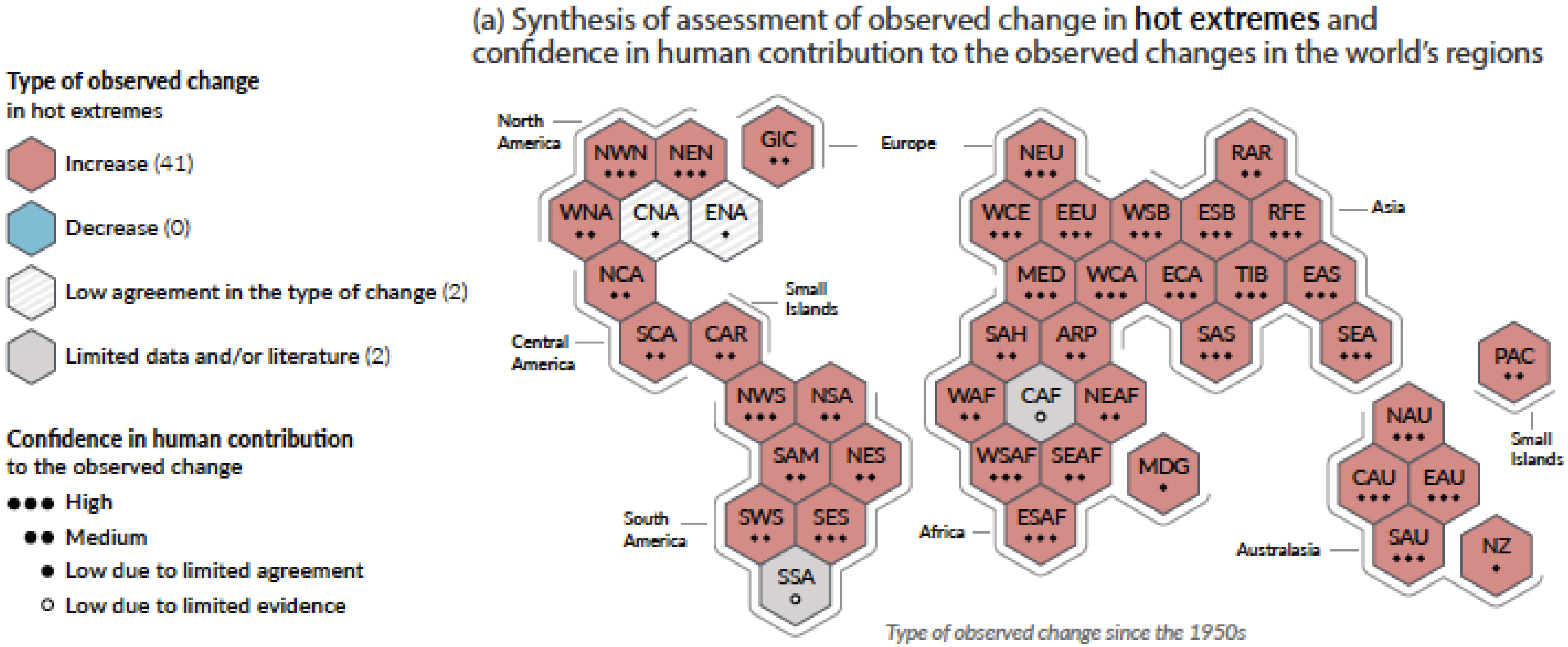
Achieving **net-zero** will help stabilise the climate, but **limiting cumulative emissions** is needed to stop further warming.

IPCC (2021) Summary for Policy Makers (SPM).

IPCC, (2021)

Climate change is already affecting every inhabited region across the globe, with human influence contributing to many observed changes in weather and climate extremes



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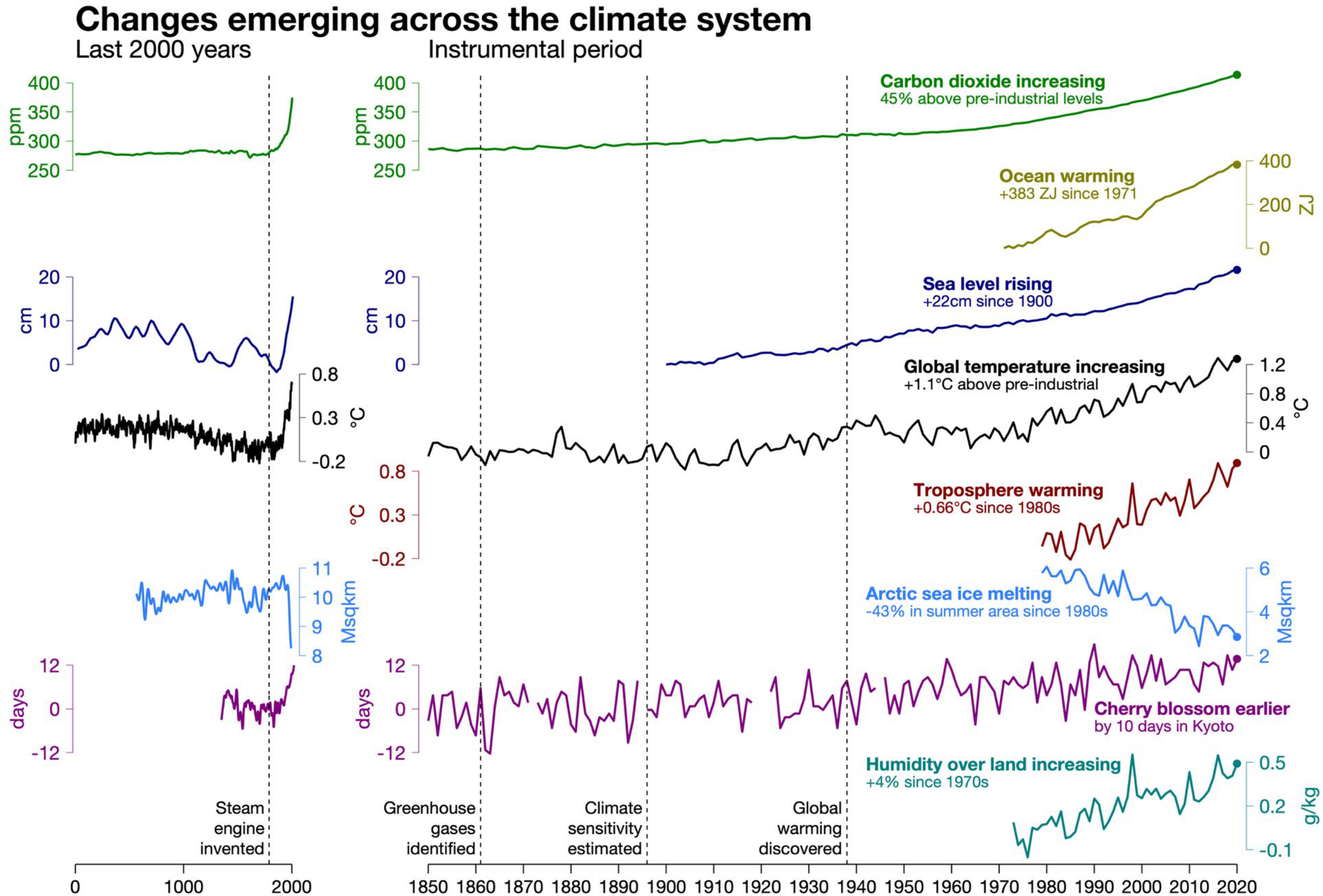

Ed Hawkins
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The climate is changing.

IPCC, (2021)

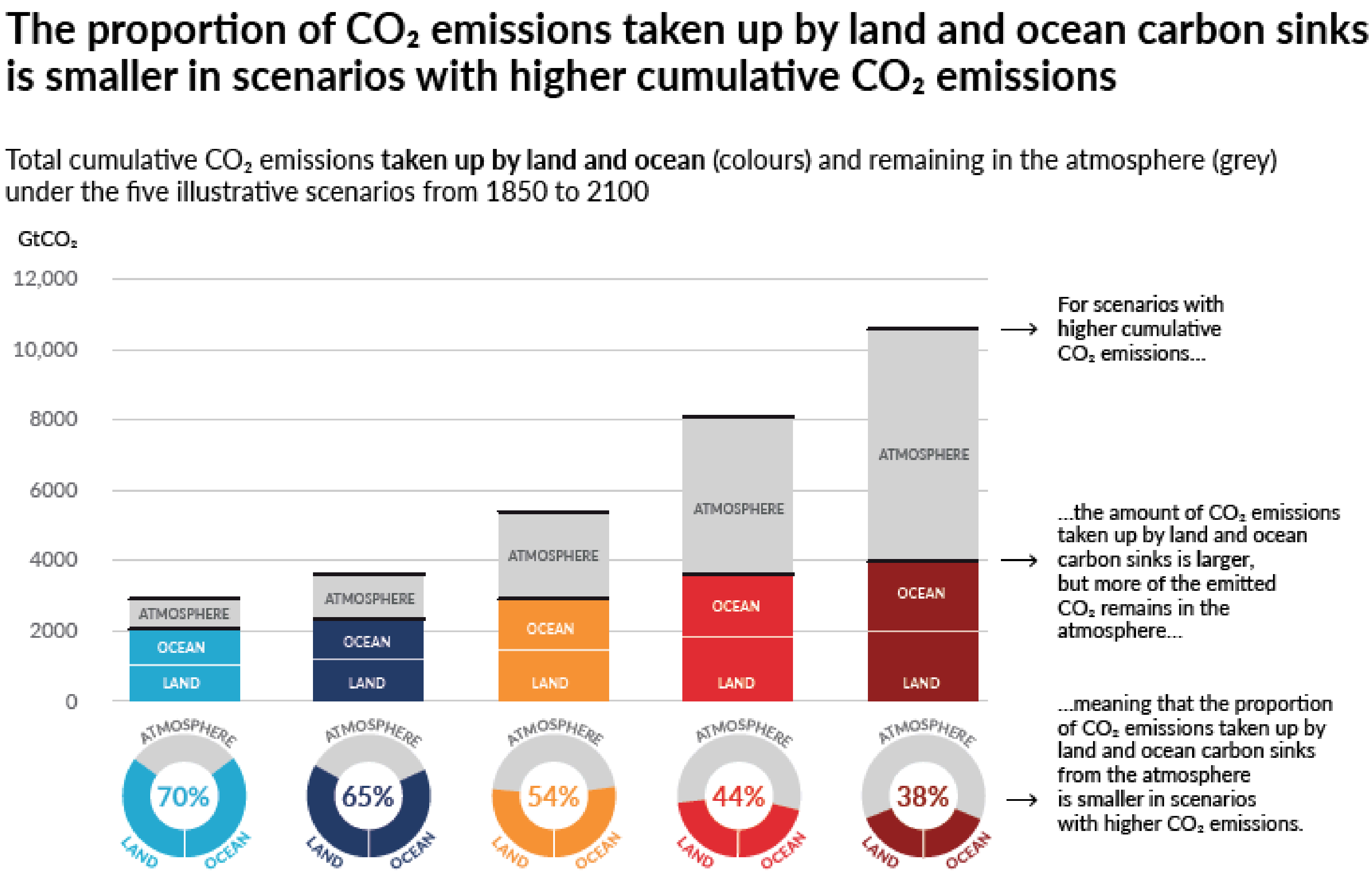

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Table SPM.1 | Changes in global surface temperature, which are assessed based on multiple lines of evidence, for selected 20-year time periods and the five illustrative emissions scenarios considered. Temperature differences relative to the average global surface temperature of the period 1850–1900 are reported in °C. This includes the revised assessment of observed historical warming for the AR5 reference period 1986–2005, which in AR6 is higher by 0.08 [–0.01 to +0.12] °C than in AR5 (see footnote 10). Changes relative to the recent reference period 1995–2014 may be calculated approximately by subtracting 0.85°C, the best estimate of the observed warming from 1850–1900 to 1995–2014.
{Cross-Chapter Box 2.3, 4.3, 4.4, Cross-Section Box TS.1}

	Near term, 2021–2040		Mid-term, 2041–2060		Long term, 2081–2100	
Scenario	Best estimate (°C)	*Very likely* range (°C)	Best estimate (°C)	*Very likely* range (°C)	Best estimate (°C)	*Very likely* range (°C)
SSP1-1.9	1.5	1.2 to 1.7	1.6	1.2 to 2.0	1.4	1.0 to 1.8
SSP1-2.6	1.5	1.2 to 1.8	1.7	1.3 to 2.2	1.8	1.3 to 2.4
SSP2-4.5	1.5	1.2 to 1.8	2.0	1.6 to 2.5	2.7	2.1 to 3.5
SSP3-7.0	1.5	1.2 to 1.8	2.1	1.7 to 2.6	3.6	2.8 to 4.6
SSP5-8.5	1.6	1.3 to 1.9	2.4	1.9 to 3.0	4.4	3.3 to 5.7

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All scenarios show that warming of 1.5°C is likely to happen within 18 years and appears unavoidable; warming may be as high as 1.9°C.

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"the Paris Agreement target of limiting warming to 1.5°C will not be enough to save most coral reefs" (Dixon *et al.,* 2022).

Search
The Guardian
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Sustainability: award winner and runners-up

The University of Exeter's environment and climate emergency working group aimed to take steps that were lasting, practical and based on evidence

The University of Exeter declared a climate emergency in 2019

Remaining carbon budgets

Table SPM.2 | Estimates of historical carbon dioxide (CO_2) emissions and remaining carbon budgets. Estimated remaining carbon budgets are calculated from the beginning of 2020 and extend until global net zero CO_2 emissions are reached. They refer to CO_2 emissions, while accounting for the global warming effect of non-CO_2 emissions. Global warming in this table refers to human-induced global surface temperature increase, which excludes the impact of natural variability on global temperatures in individual years.
{Table 3.1, 5.5.1, 5.5.2, Box 5.2, Table 5.1, Table 5.7, Table 5.8, Table TS.3}

Global Warming Between 1850–1900 and 2010–2019 (°C)	Historical Cumulative CO_2 Emissions from 1850 to 2019 ($GtCO_2$)
1.07 (0.8–1.3; likely range)	2390 (± 240; likely range)

Approximate global warming relative to 1850–1900 until temperature limit (°C)[a]	Additional global warming relative to 2010–2019 until temperature limit (°C)	Estimated remaining carbon budgets from the beginning of 2020 ($GtCO_2$) *Likelihood of limiting global warming to temperature limit*[b]					Variations in reductions in non-CO_2 emissions[c]
		17%	*33%*	*50%*	*67%*	*83%*	
1.5	0.43	900	650	500	400	300	Higher or lower reductions in accompanying non-CO_2 emissions can increase or decrease the values on the left by 220 $GtCO_2$ or more
1.7	0.63	1450	1050	850	700	550	
2.0	0.93	2300	1700	1350	1150	900	

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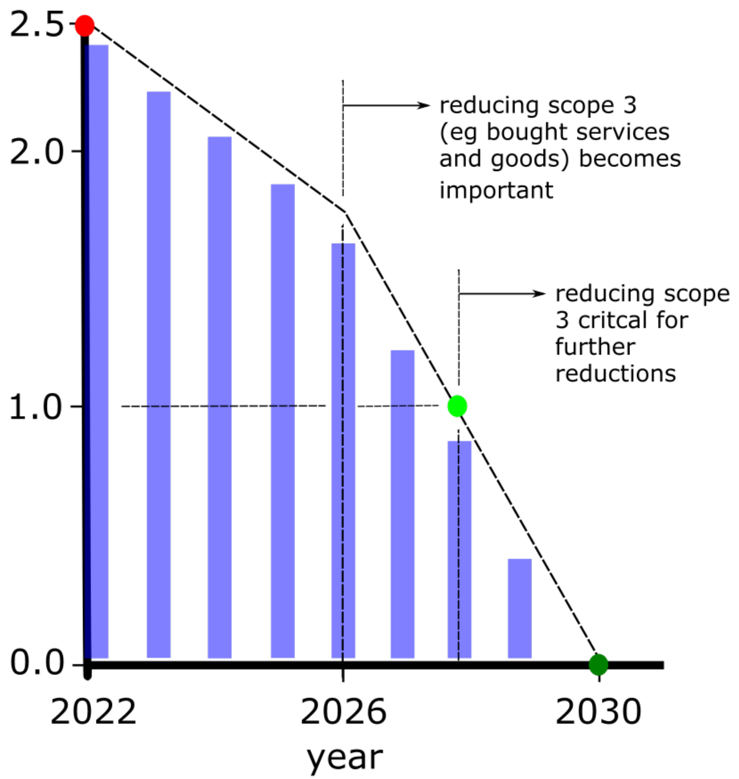
This table allows us to put the University of Exeter emissions reductions and plans for net-zero into context of global temperatures and IPCC findings.

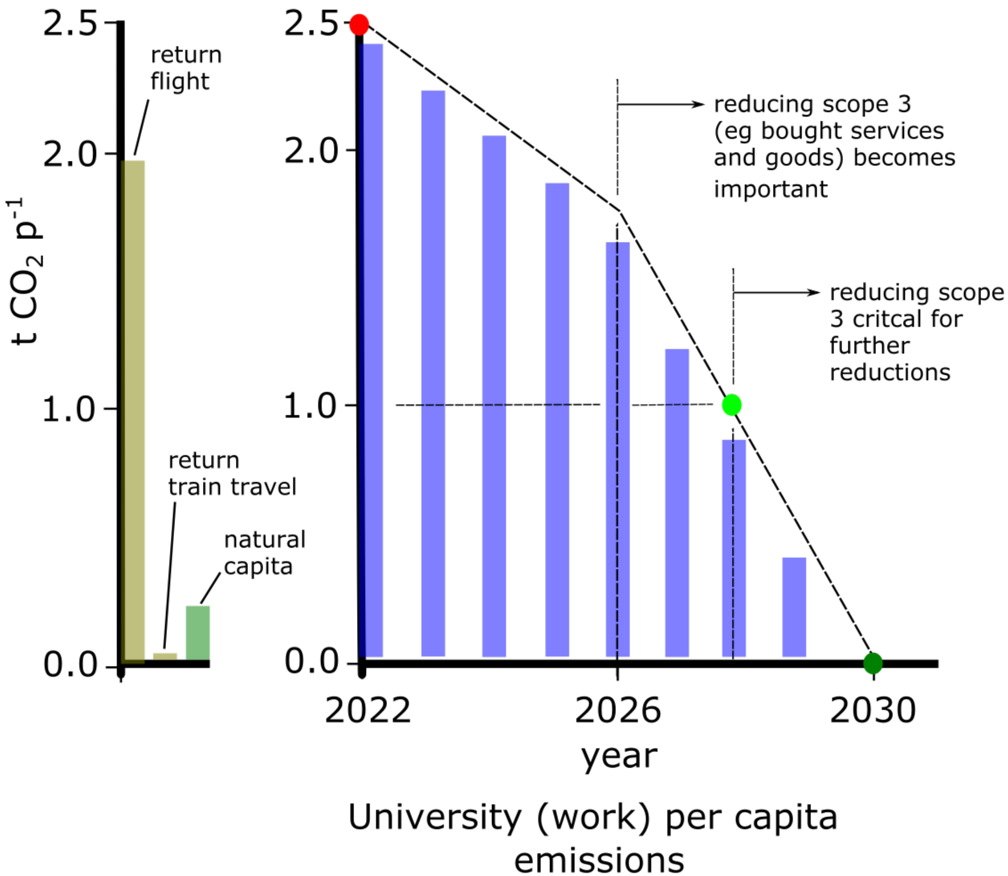
Net-zero aim for 2030



University (work) per capita emissions

Shutler, (in-draft)

Net-zero aim for 2030



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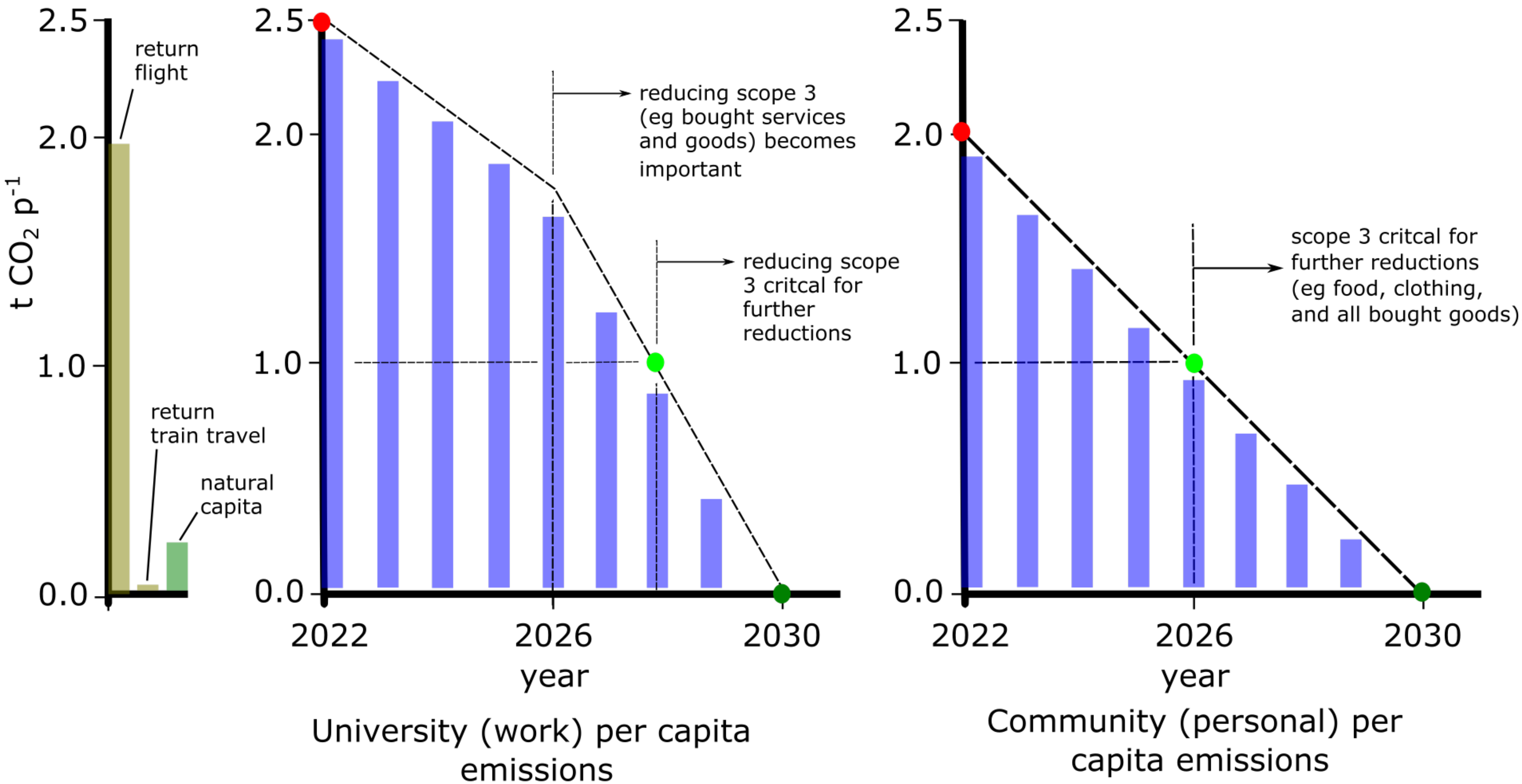
Net-zero aim for 2030



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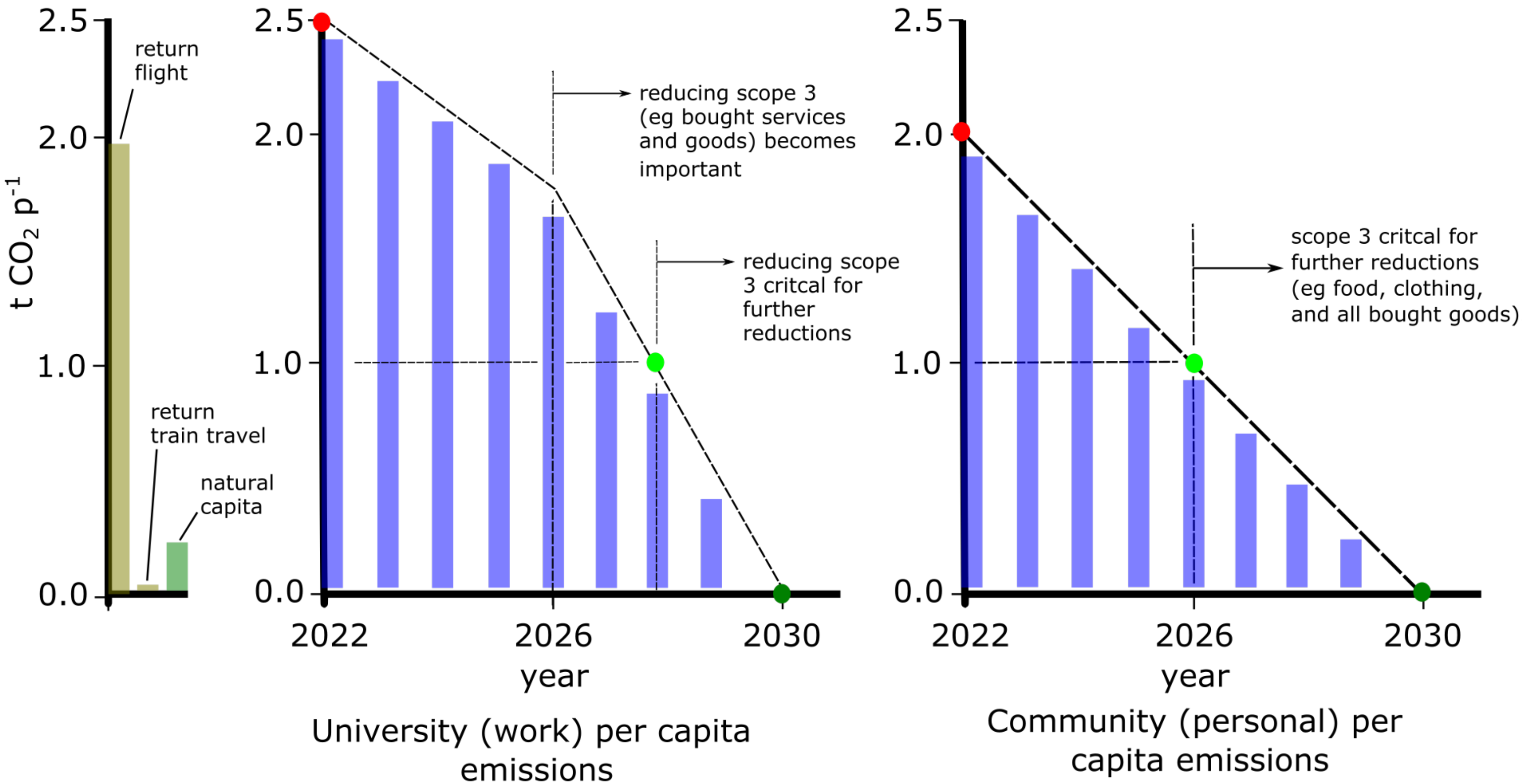

Based on current university emissions, the university of Exeter aim of net-zero by 2030 appears aligned with stabilising climate and limiting warming to 1.5°C.

But,

1. it will not limit warming to 1.5°C if offsetting is used (fails on minimising cumulative emissions).
2. Assumes community are already considering their personal choices.
3. Assumes tha**t** the university community will reduce emissions over the same period.

Should the GTWS community agree a set of evidence-based principles?

1. Avoid offsetting

- Offsetting does not minimise cumulative emissions, so:
  - Will not limit warming.
  - Ocean acidification rates will likely continue.

- Focus instead on pushing emissions as low as possible, as quickly as possible.

Shutler JD (2020). Offsetting is a dangerous smokescreen for inaction. *Frontiers in Ecology and the Environment*, 18(9), 486-486

Baldwin, M. P., Lenton, T. M., (2020) Solving the climate crisis: lessons from ozone depletion and COVID-19, *Global Sustainability*, 3 (e29), doi: 10.1017/sus.2020.25

2. Emissions monitoring and action

For the university of Exeter, in 2018:

16% energy

21% travel

61% procurement

Osborne, J., Hogget, R., Fraser, S., *et al* (2019) University of Exeter: Environment & Climate Emergency Working Group White Paper, *University of Exeter*, published 11 November 2019

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Baseline monitoring within institutions to identify where to focus effort, with action quickly following.

Include monitoring emissions within projects and programmes?

3. Community choices

Consider our own personal choices to minimise emissions.

Energise our local communities, focussing pressure on policy makers to drive wider social and policy change.

Talk about the challenge and our community action to everyone!

Katharine Hayhoe
https://www.ted.com/talks/katharine_hayhoe_the_most_important_thing_you_can_do_to_fight_climate_change_talk_about_it?language=en

4. Reconsider travel

- large-scale decarbonisation of the aircraft industry is needed.
- Actively resist the temptation to return to high-emissions travel.

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- Envisage new approaches for research fieldwork and conferences, to reduce travel, and encourage new models for fostering collaboration with overseas scientists.

DeSilvey, CO, Shutler, JD, Scourse, J, Leyshon K, (2022) Global adaptations: rethinking academic travel in the face of covid-19 and climate change, https://youtu.be/fGS_VkKZqGY

5. Online platforms

- Enable reduction in travel emissions, but these are not emission free.
- Data centers have high energy usage and significant water requirements.

Shehabi A., Smith, S.J., Horner, N., Azevedo, I., Brown, R., Koomey, J., Masanet, E., Sartor, D., Herrlin, M., Lintner, W. 2016. United States Data Center Energy Usage Report. Lawrence Berkeley National Laboratory, Berkeley, California. LBNL-1005775, https://eta-publications.lbl.gov/sites/default/files/lbnl-1005775_v2.pdf

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- Minimise cloud data storage and online platform use (and purge unwanted data).
- Choose providers who minimise water usage and maximise use of renewable energy.

6. Food

- Choose ecologically and climate friendly food options.

eg. Poore and Nemecek (2018) Reducing food's environmental impacts through producers and consumers, *Science*, 360 (6392), doi: 10.1126/science.aaq0216

7. Laboratories

- LEAF - actions that lab users can take to reduce waste, energy, plastics and water in the lab.

https://www.ucl.ac.uk/sustainable/staff/labs/take-part-leaf

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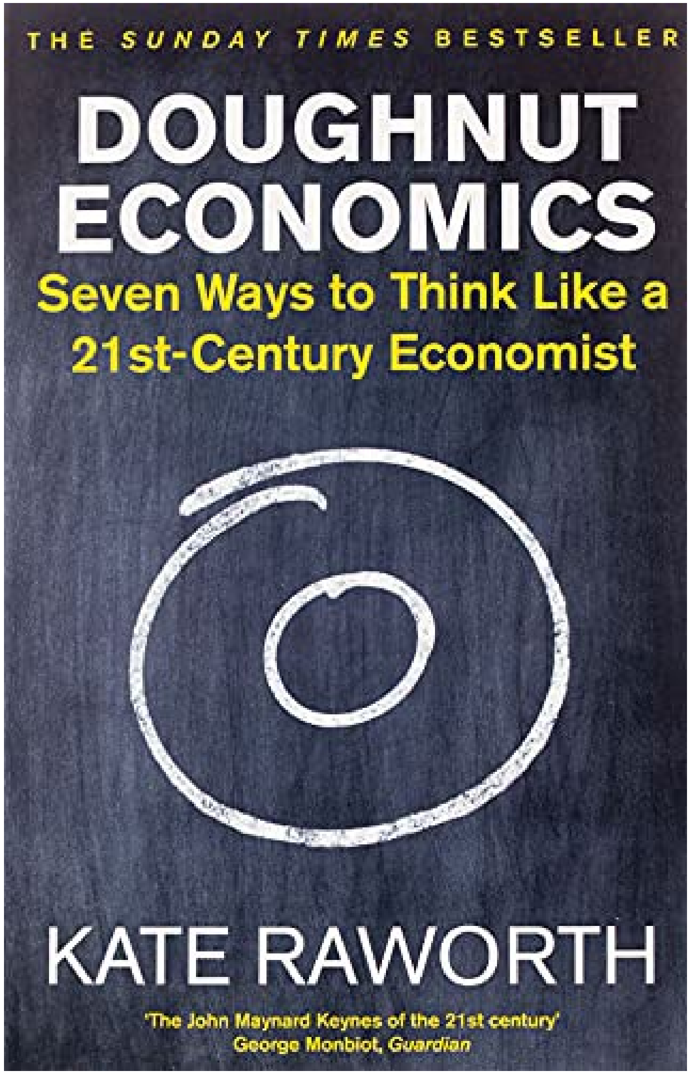
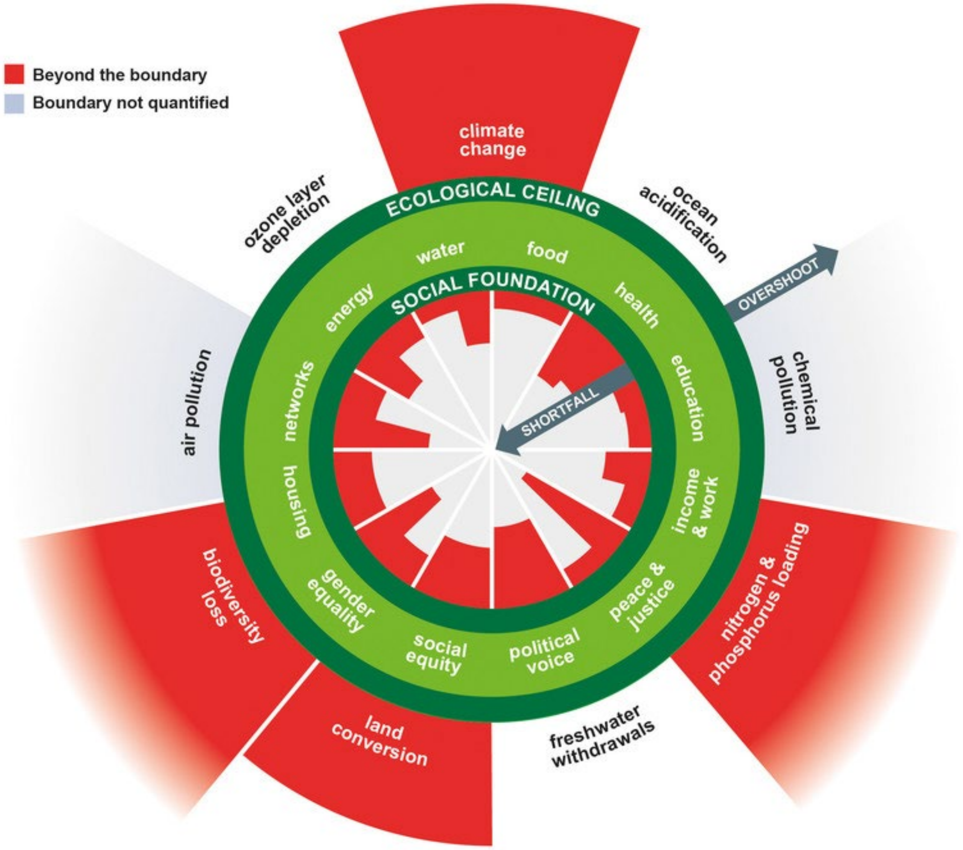
Biggest challenge due to scope 3 emissions, so buying less could be very important

1. Reduce the need, or desire, to buy more.
2. If possible, avoid single use items.
3. Expand re-use of existing data and observations – like Christa said!
4. Expand cultures of:
   - re-use, mending and repair.
   - loaning and sharing of equipment.
5. Consider 'environmental and human cost' within proposal design.

   eg Raworth, (2012) Doughnut economics





Making the UN SDGs, environment and people the focus for decision making, rather than GDP or profit.