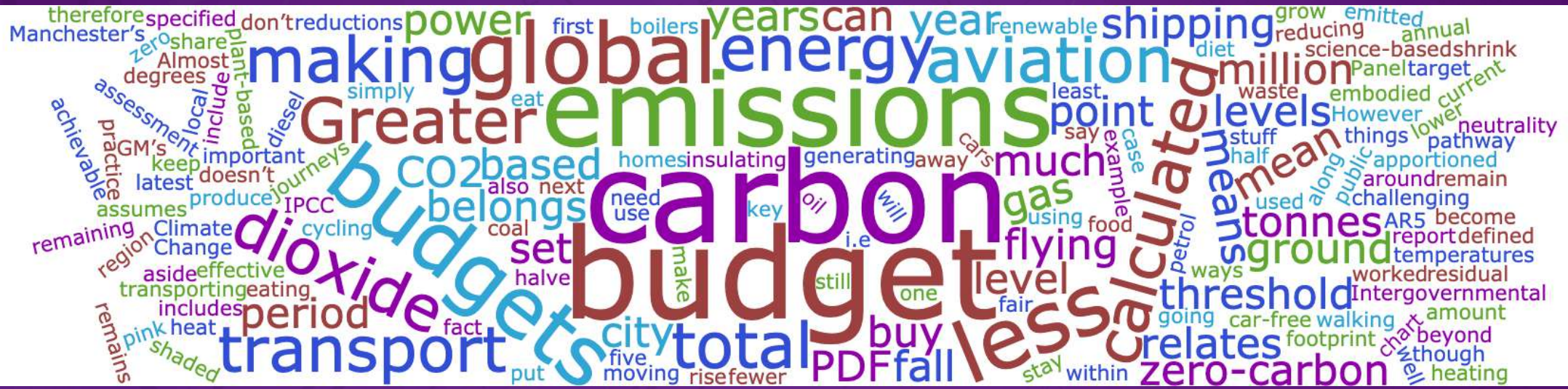


Carbon Jargon Buster Workshop

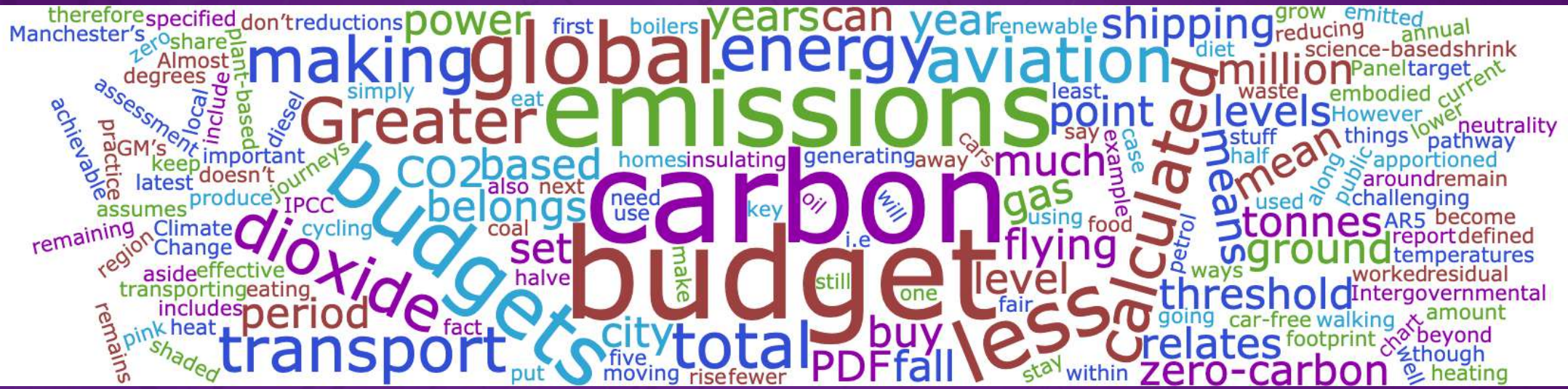
GMCAN , Green Drinks Manchester & Dr Joe Blakey (The University Of Manchester)

Session Outline

1. Welcome (Tudor and Mark)
2. What do you want out of this session? (All)
3. Carbon Footprints (Joe)
4. Carbon Budgets (Joe)
5. Breakout discussions (All)
6. Plenary (All)

10 minutes

- Introduce yourself to someone new
- Consider:
  - What would you like out of the session?
  - What carbon jargon do you want busting?

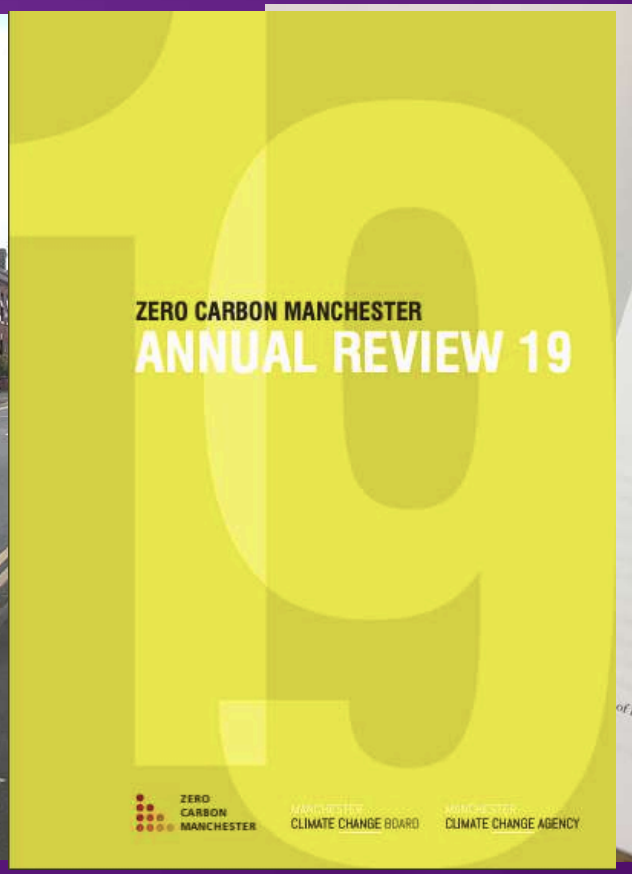


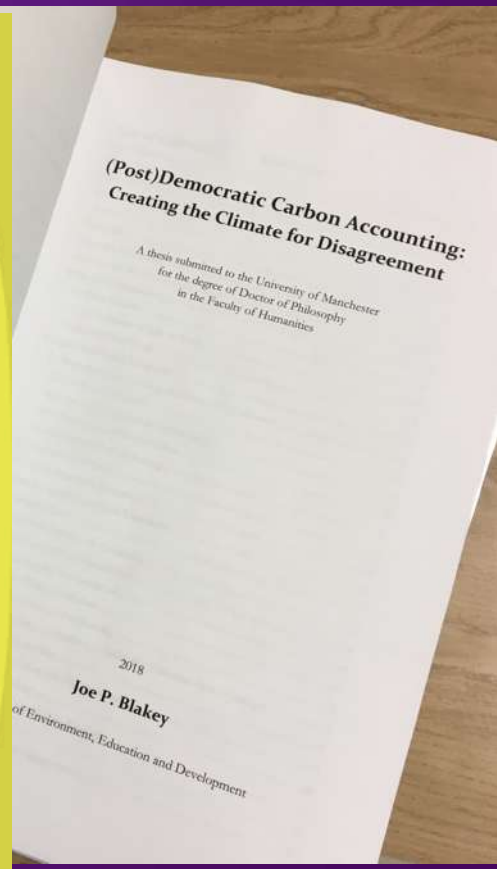
Carbon Jargon Buster Workshop

Dr Joe Blakey (The University Of Manchester)

Email: Joe.Blakey@Manchester.ac.uk Twitter: @joeblakey

Who am I? Why am I here?





Two main arguments

PART 1 – Carbon Footprint

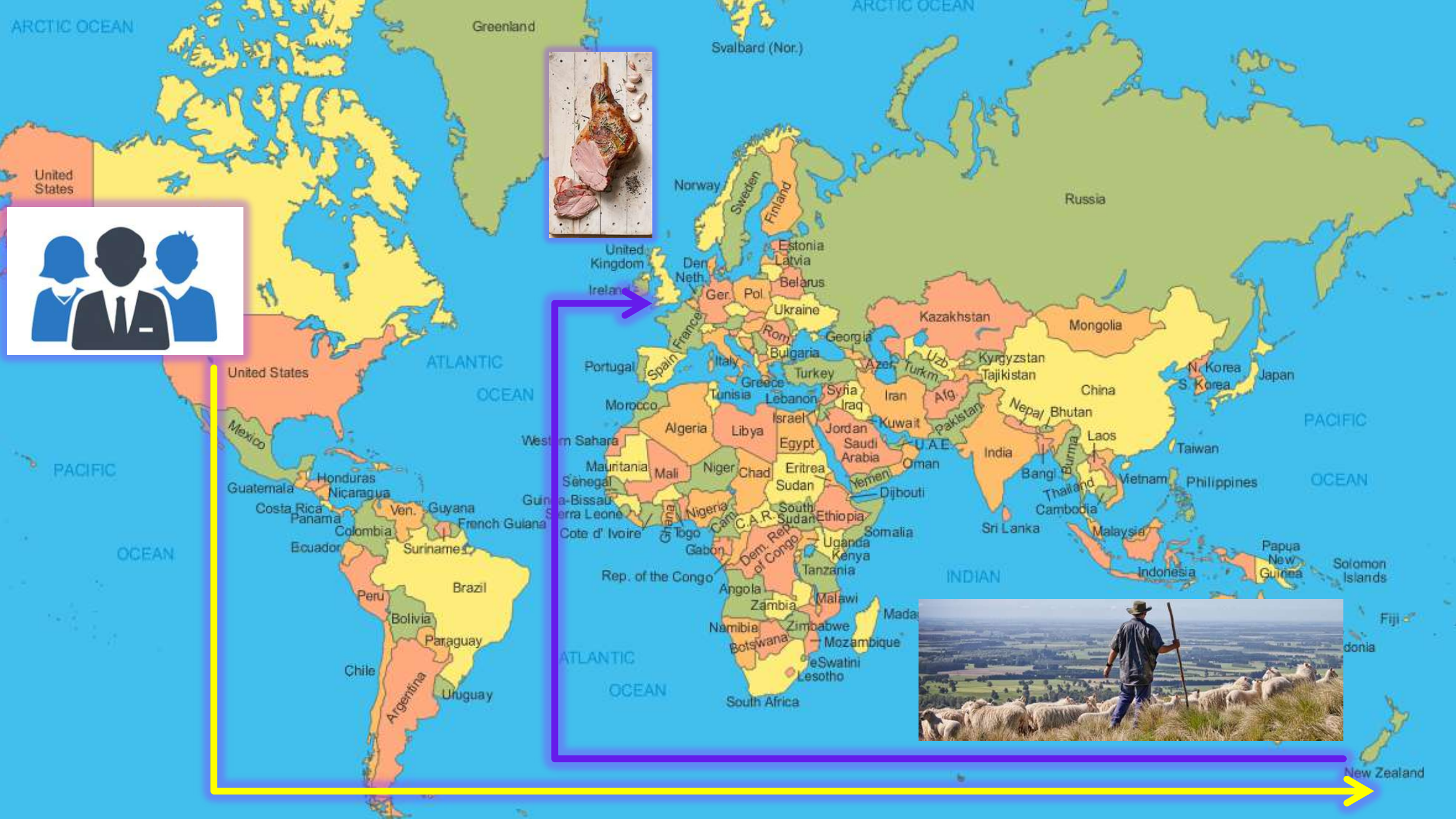
There is no one right way of taking stock of our carbon footprint - **A footprint doesn't look like a boot!**

PART 2 – Carbon Budgets

We need to **focus on year-on-year emissions** rather than just target dates.

Carbon Footprints

A (CARBON) FOOTPRINT DOES NOT LOOK LIKE A BOOT


ARCTIC OCEAN
Greenland
Svalbard (Nor.)
United States
Norway
Sweden
Finland
Russia
United Kingdom
Estonia
Latvia
Belarus
Ireland
Den.
Neth.
Ger.
Pol.
Ukraine
Kazakhstan
Mongolia
France
Rom.
Georgia
Spain
Portugal
Italy
Bulgaria
Turkey
Azer.
Turkm.
Uzb.
Kyrgyzstan
Tajikistan
China
N. Korea
S. Korea
Japan
Greece
Tunisia
Lebanon
Syria
Iraq
Iran
Afg.
Pakistan
Nepal
Bhutan
India
Morocco
Algeria
Libya
Israel
Jordan
Kuwait
Egypt
Saudi Arabia
U.A.E.
Oman
Laos
Taiwan
Vietnam
Philippines
Bangl.
Burma
Thailand
Cambodia
Malaysia
Sri Lanka
Western Sahara
Mauritania
Mali
Niger
Chad
Eritrea
Yemen
Djibouti
Sudan
Senegal
Guinea-Bissau
Sierra Leone
Cote d' Ivoire
Ghana
Togo
Nigeria
Cam.
C.A.R.
South Sudan
Ethiopia
Somalia
Uganda
Kenya
Tanzania
Gabon
Dem. Rep. of Congo
Rep. of the Congo
Angola
Zambia
Malawi
Namibia
Zimbabwe
Mozambique
Botswana
eSwatini
Lesotho
South Africa
Mexico
Honduras
Nicaragua
Guatemala
Costa Rica
Panama
Ven.
Guyana
French Guiana
Colombia
Ecuador
Suriname
Brazil
Peru
Bolivia
Paraguay
Chile
Argentina
Uruguay
Indonesia
Papua New Guinea
Solomon Islands
Fiji
New Zealand
ATLANTIC OCEAN
PACIFIC OCEAN
INDIAN OCEAN

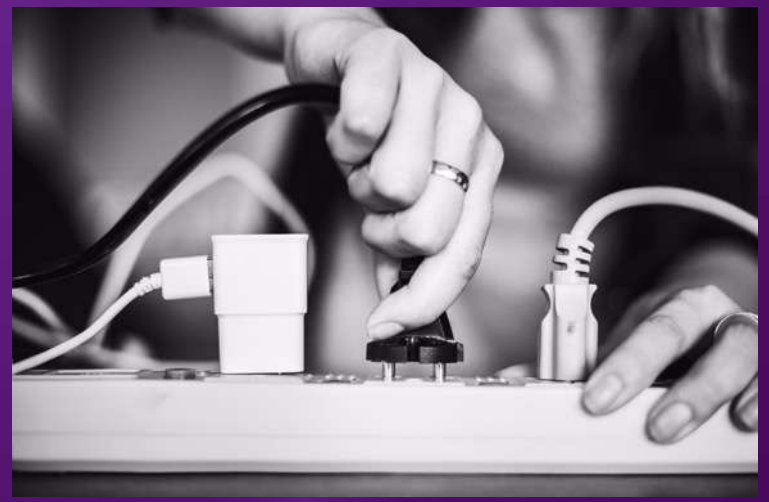
How can we **disentangle** global trade, travel, consumption and investment?

What is a Carbon Footprint?

- NASA remarks that "carbon is the backbone of life on Earth. We are made of carbon, we eat carbon, and our civilisations – our homes, our means of transport – are built on carbon". Even our bodies are 18.5% carbon.
- 'Carbon' is usually used as a shorthand for carbon dioxide and other greenhouse gases collectively considered.
- Carbon is emitted at various points within the production, transportation , consumption and disposal of goods.
- Our actions and impacts do not respect political boundaries.

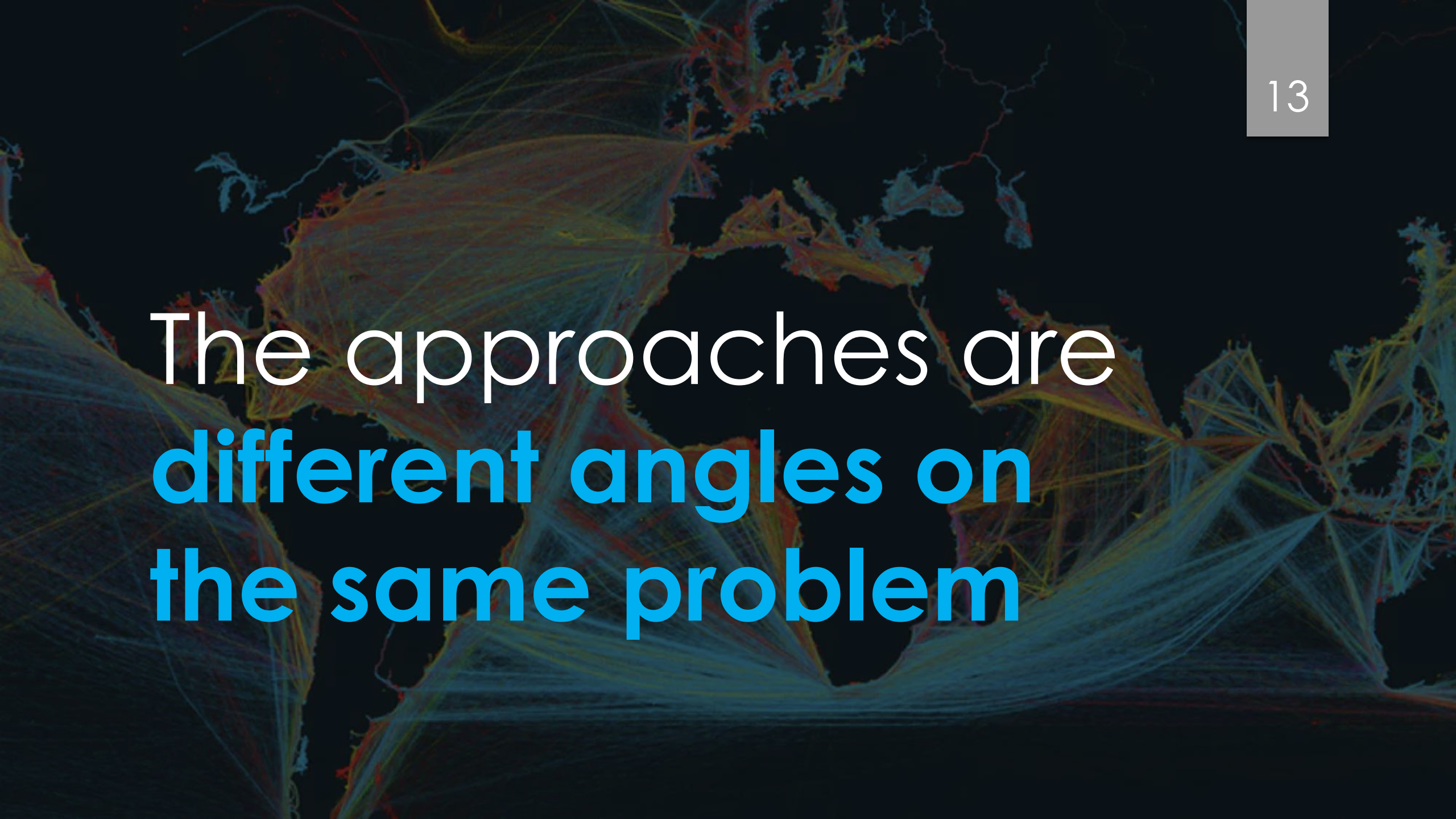
The Standard: A 'Territorial-Based' Approach

- The IPCC first developed *The IPCC Guidelines for National Greenhouse Gas Inventories* in 1995, and updated them with the *Revised 1996 Guidelines for National Greenhouse Gas Inventories* in 1996 (IPCC 1996).
- Their approach counts those "**emissions and removals taking place within national territory and off-shore areas over which a country has jurisdiction**" and those associated with **energy consumption** (IPCC 2006: 4).



But there are alternatives…

- **Consumption-based approach**
  - Those emissions embodied in the things we consume (Includes imports, deducts exports).
- **Income-based approach**
  - For a given product, all emissions generated further on in the supply chain are considered until it is delivered or meets its final demand.

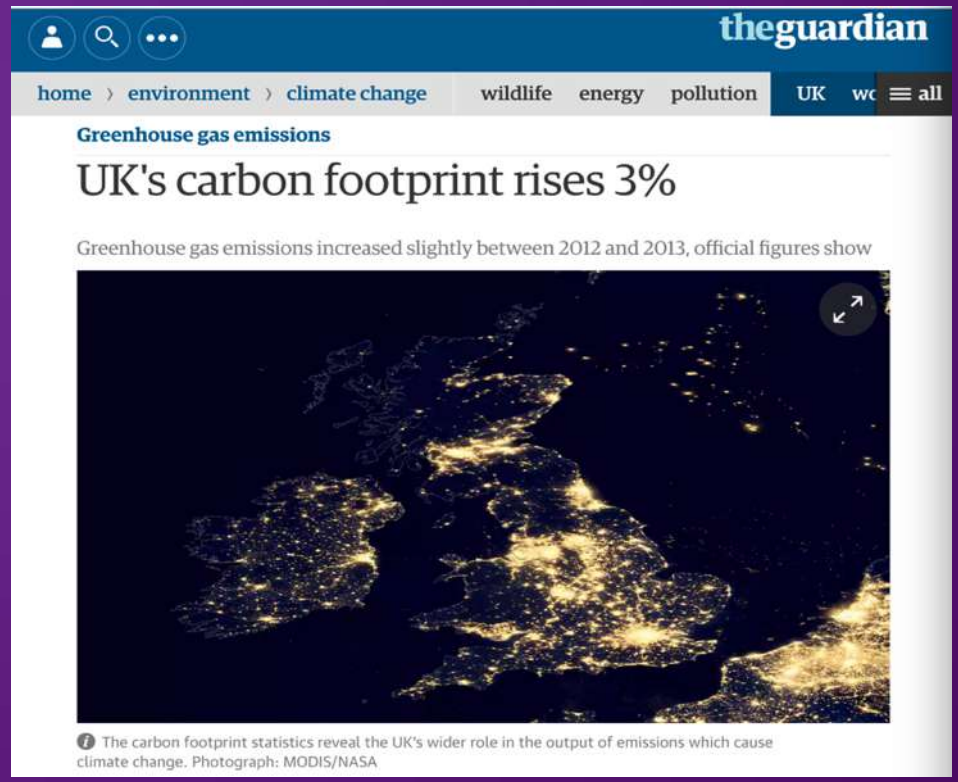


The approaches are **different angles on the same problem**

But they paint **very different pictures**

Eg. UK Carbon Accounting

Production-based



Consumption-based

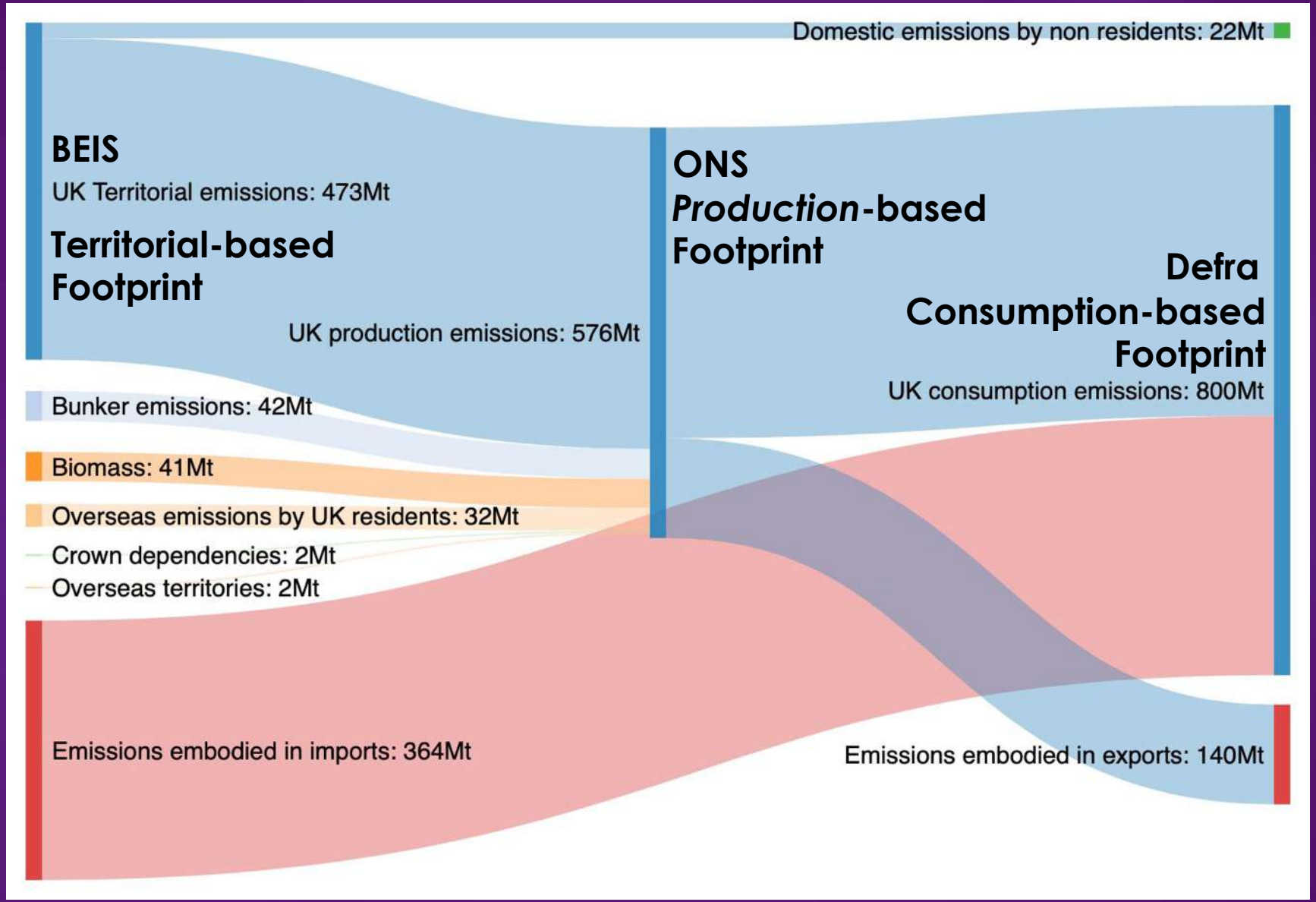
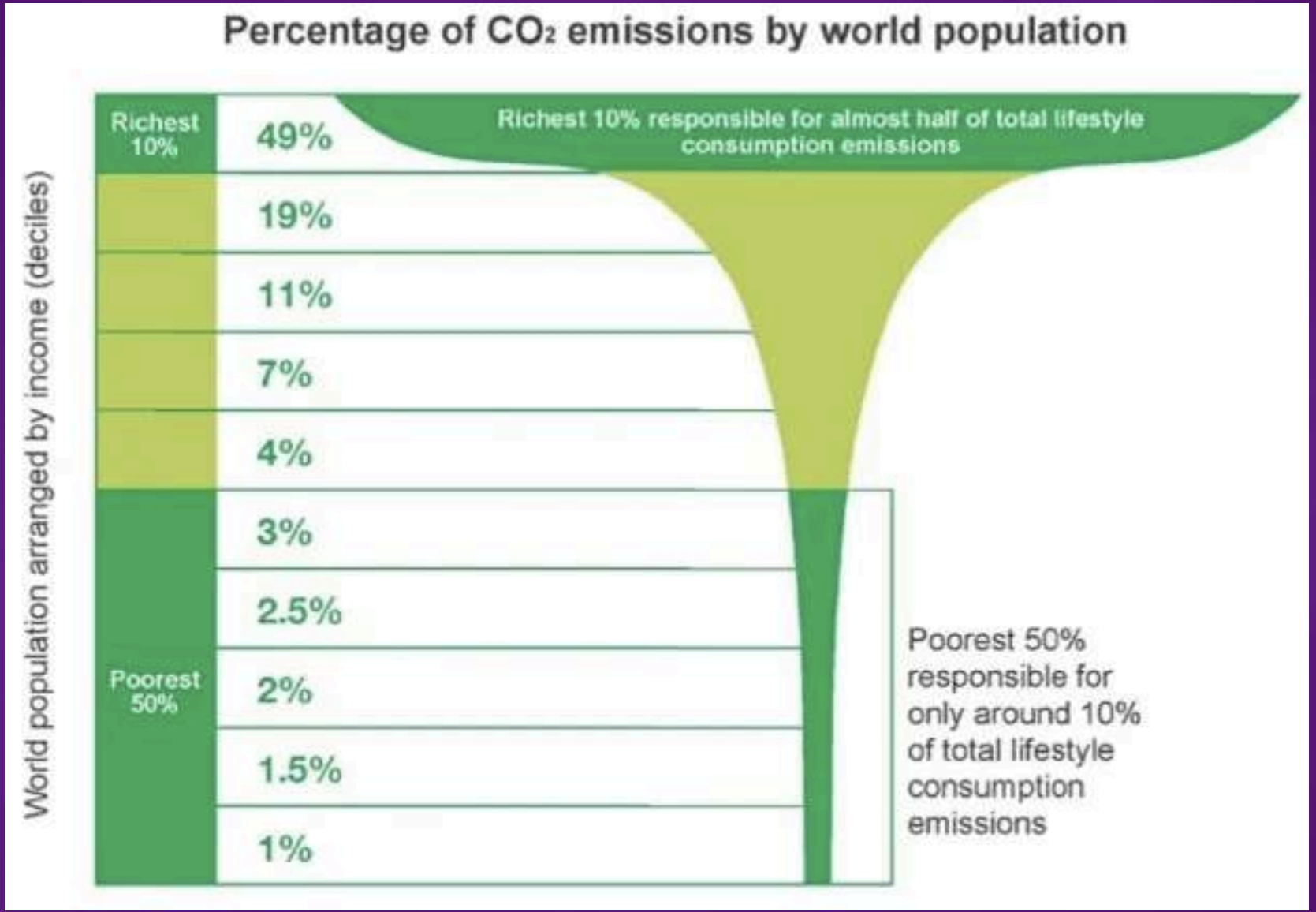


Image by Dr Anne Owen, Source https://twitter.com/dr_anneowen/status/1143137229231087616?s=20

Note: Bunker emissions include IPCC memo items International Aviation and International Shipping



Source: Oxfam / https://www.theguardian.com/environment/2015/dec/02/worlds-richest-10-produce-half-of-global-carbon-emissions-says-oxfam

What about Cities?

http://bit.ly/2pqxR7Y

http://bit.ly/2FyvtGo

1.97 MtCO2 in 2018

- City-level accountants like **to talk in scopes** to capture in-direct electricity usage (scope 2) along with direct emissions (scope 1).

Manchester's Scope 1 & 2 emissions 2018

Manchester's scope 1 and 2 carbon emissions are made up of 40% from the business sector (industrial and commercial), with 31% from transportation and 29% from domestic energy use. Between 2017 and 2018, domestic emissions are projected to have fallen by 8%, transport emissions by 5% and business emissions by 3%.

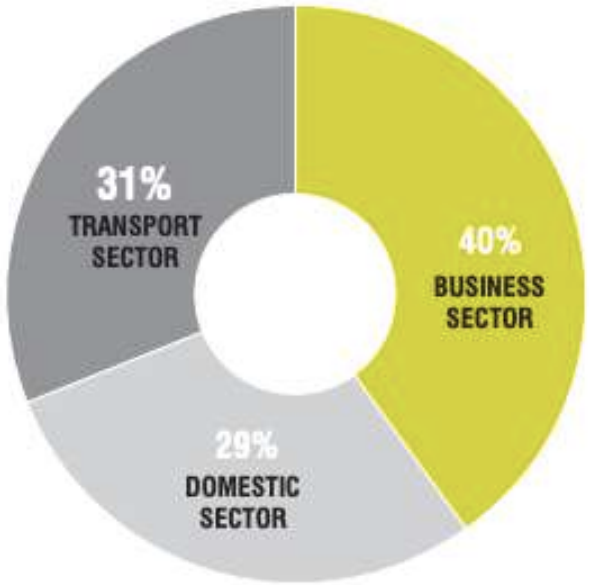
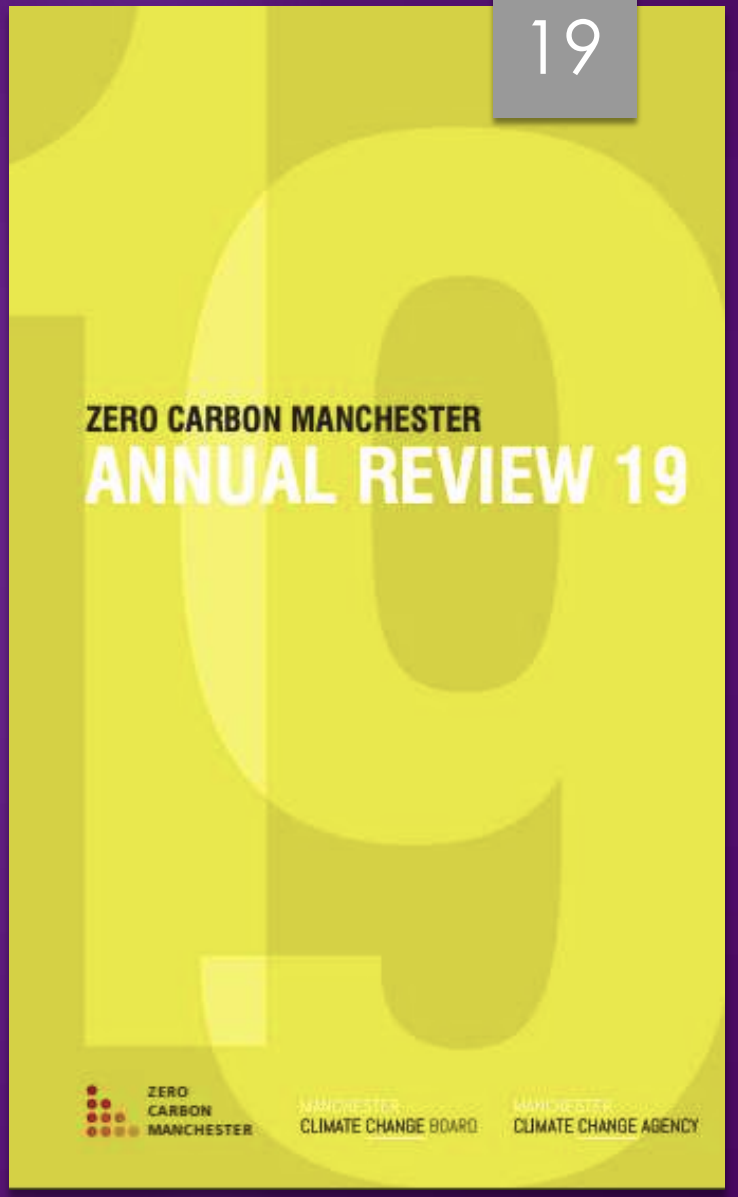


Figure 2:
Manchester's direct emissions by sector in 2018 (estimated)



Source: http://manchesterclimate.com/sites/default/files/ZeroCarbon_AR_19_1.pdf

Our understanding of (Greater) Manchester's role in consumption is now quite old (2008)…

But proportions probably look quite similar today…

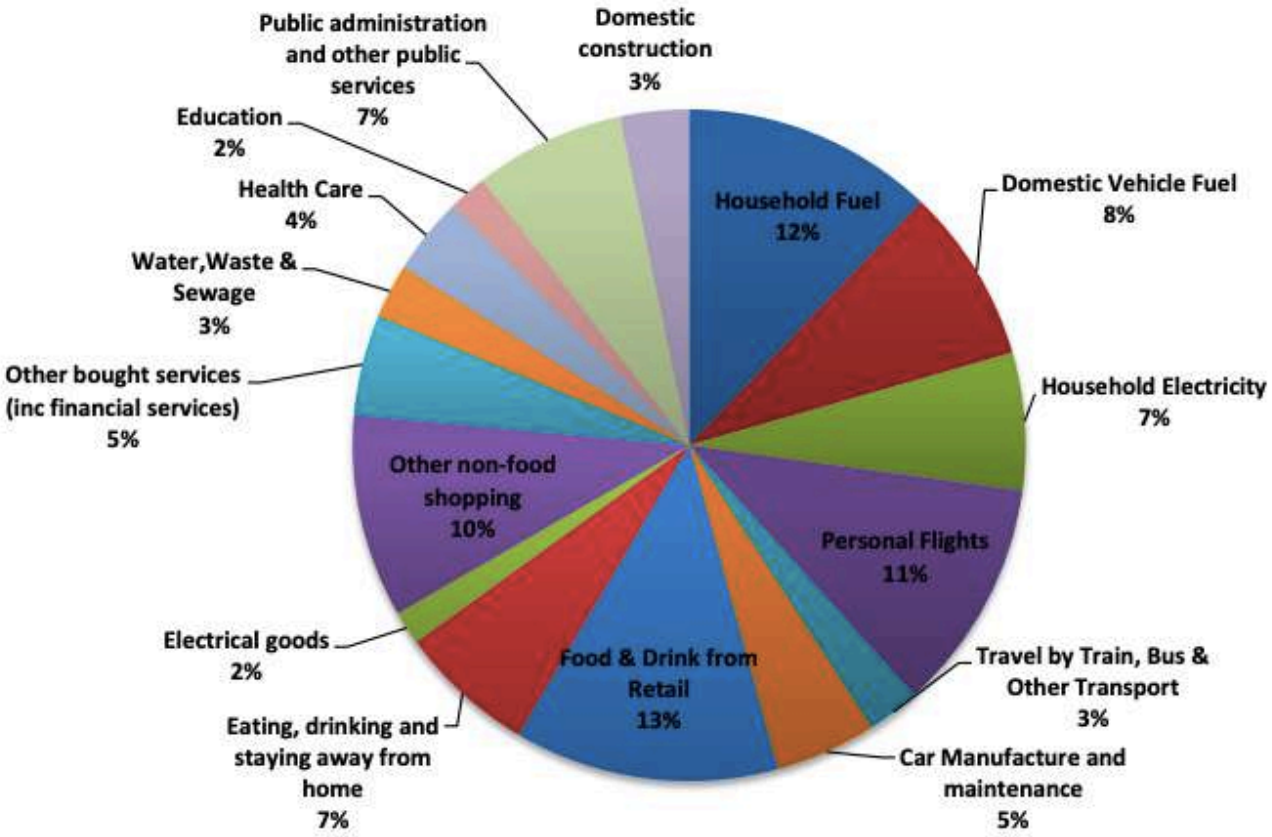


Figure 1: The greenhouse gas footprint of Greater Manchester residents broken down by consumption category (total 41.2 million tonnes CO_2e).

Manchester's consumption-based footprint was ~11.5 MtCO2 (**3.5x greater than its scope 1 and 2 footprint in 2008** (~3.25MtCO2)).

GM was ~41.2MtCO2

Source: http://media.ontheplatform.org.uk/sites/default/files/gm_footprint_final_110817.pdf

See also, Foodprints report http://www.3keel.com/wp-content/uploads/reports/ESTA%20FoodPrint%20GM%20Final.pdf

Why no update?

- Required trade data is not released on a local-authority level by the government.
- Therefore, slightly more creative carbon accounting is required – such as downsampling or modelling.
- This creates a ‘fuzzy’ picture.
- As such, we’re currently not very good at distinguishing what (Greater) Manchester does against other cities year-on-year.
- Nonetheless, **it is worthwhile taking an impression every now and to paint a fuller picture of successes, failures and opportunities for action**. This would be useful soon.

Aviation Emissions

Should Manchester take a share – or do we measure these emissions separately?

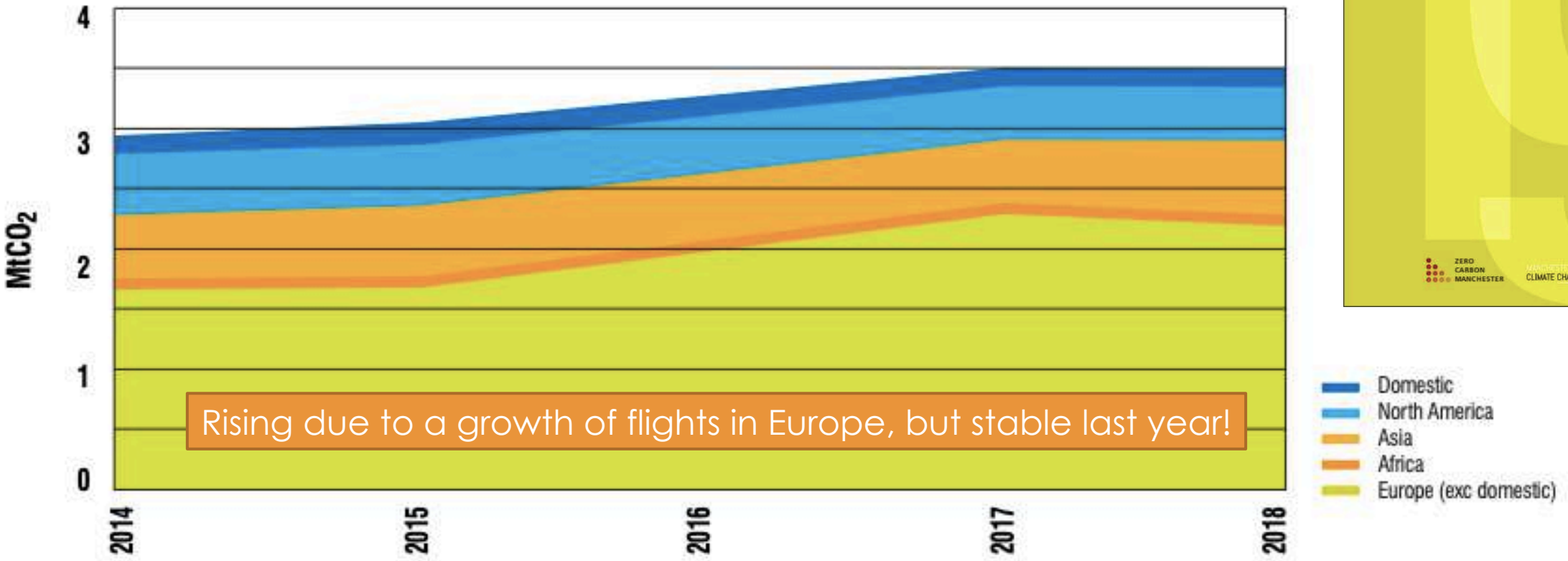


Figure 5: Total emissions from departing flights from Manchester Airport 2014-18 ($MtCO_2$)

Income-based approaches?

A Footprint ≠ A Boot

- No one approach is correct or the best (although some are easier to count)
- **Our footprint doesn't look like a boot:** it gives an impression of what our carbon impact (our 'boot') is, but it can't tell us everything about it. **Different ways of foot printing tell us different things about the problem.**

Carbon Budgets

MOVING FROM TARGET YEARS TO YEAR-ON-YEAR EMISSIONS

Carbon Budget

- Carbon budgets are are based upon the fact that **warming can be approximated by the total level of CO_2 emissions released within a given period.**
- As carbon hangs around in the atmosphere, it is **the total amount of carbon released in a period that dictates warming**. Many models are based upon 2100 as an end year.
- The budgeting part of them suggests we plan the amount of carbon we emit in the coming years. **A bit like a carbon diet plan.**

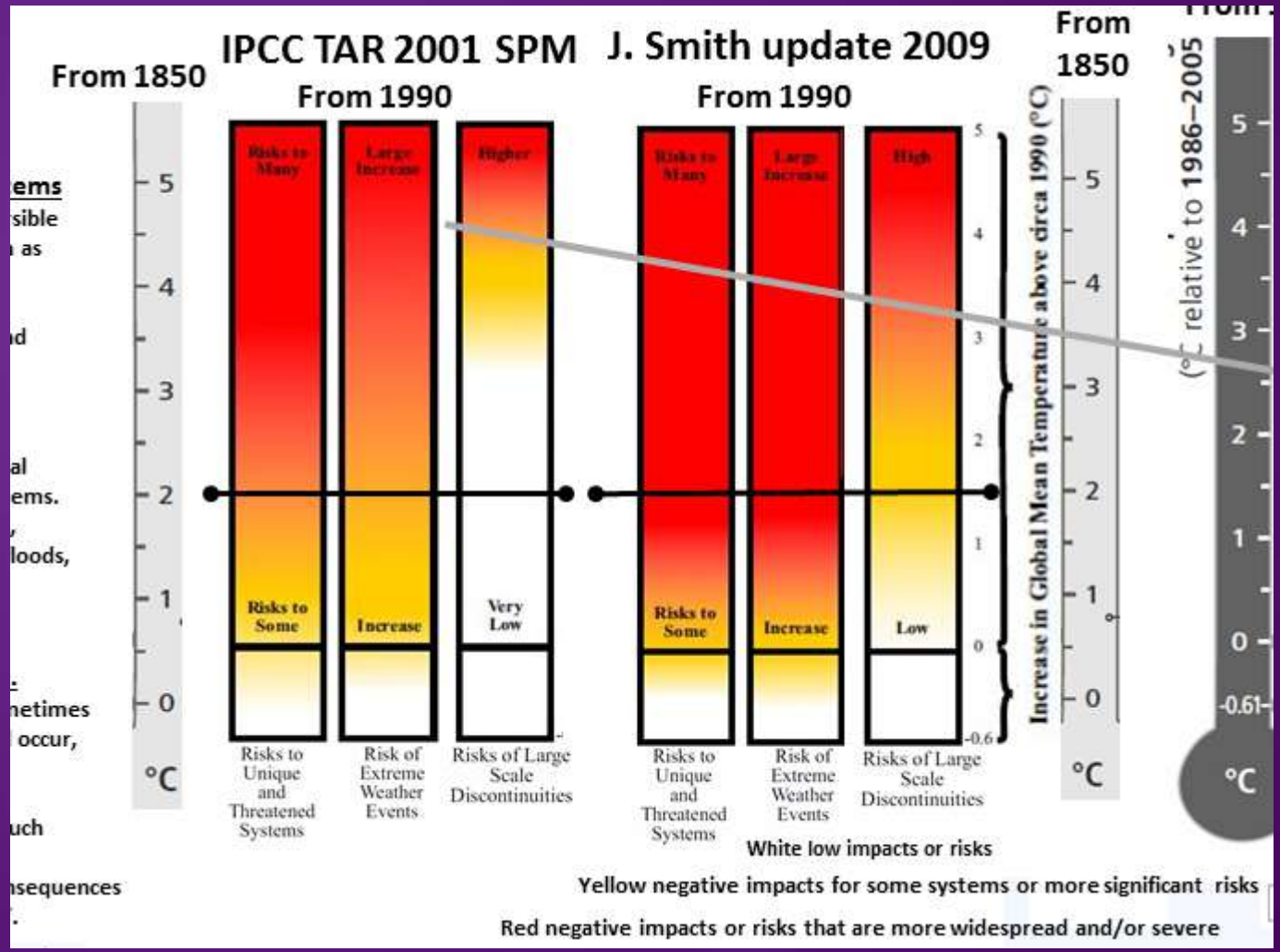
We have X amount of carbon left, how do we use it wisely?

2 degrees warming against pre-industrial levels

- Until the Paris Agreement (2015), 2 degrees temperature rise against preindustrial levels (<1850) was widely seen as the boundary between safe and dangerous.
- Has its roots in the work of economist William Nordhaus who did some initial speculating on what would constitute a dangerous temperature rise.
  - "the process of setting standards used in this section is deeply unsatisfactory, both from an empirical point of view and from a theoretical point of view […] **the standards set here [are …] rough guesses**" (Nordhaus, 1975, p. 24).
- Enshrined in the **Cancun Agreement (2010), parities must "hold the increase in global average temperature below 2°C above pre-industrial levels"** (UNFCCC, 2000, p. 3)

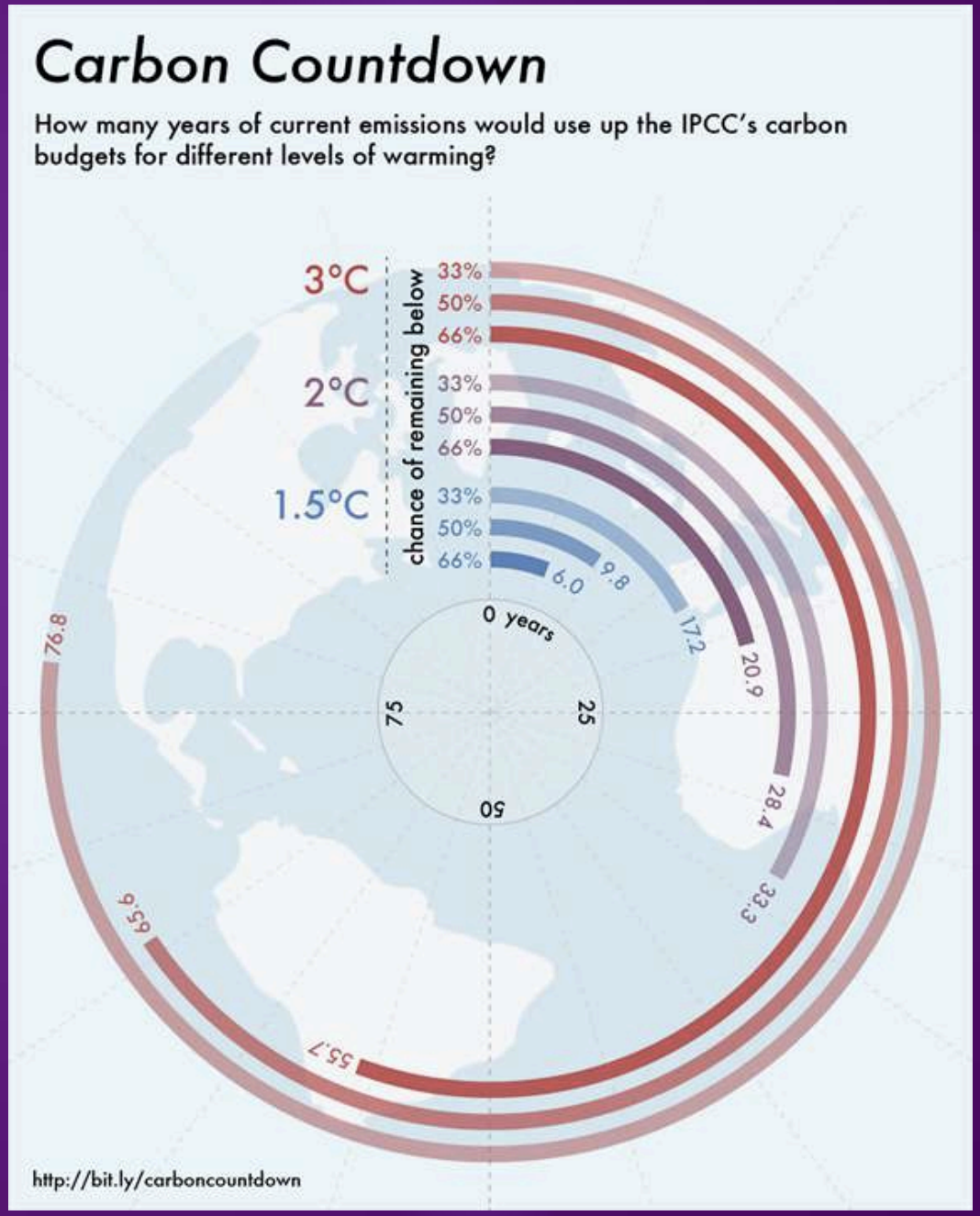
1.5 degrees warming against pre-industrial levels

- The dangers of any temperature increase have been revised upwards (Smith et al., 2009).
- Paris Agreement - pursue "efforts to limit the temperature increase to 1.5°C above pre-industrial levels" (UNFCCC, 201).

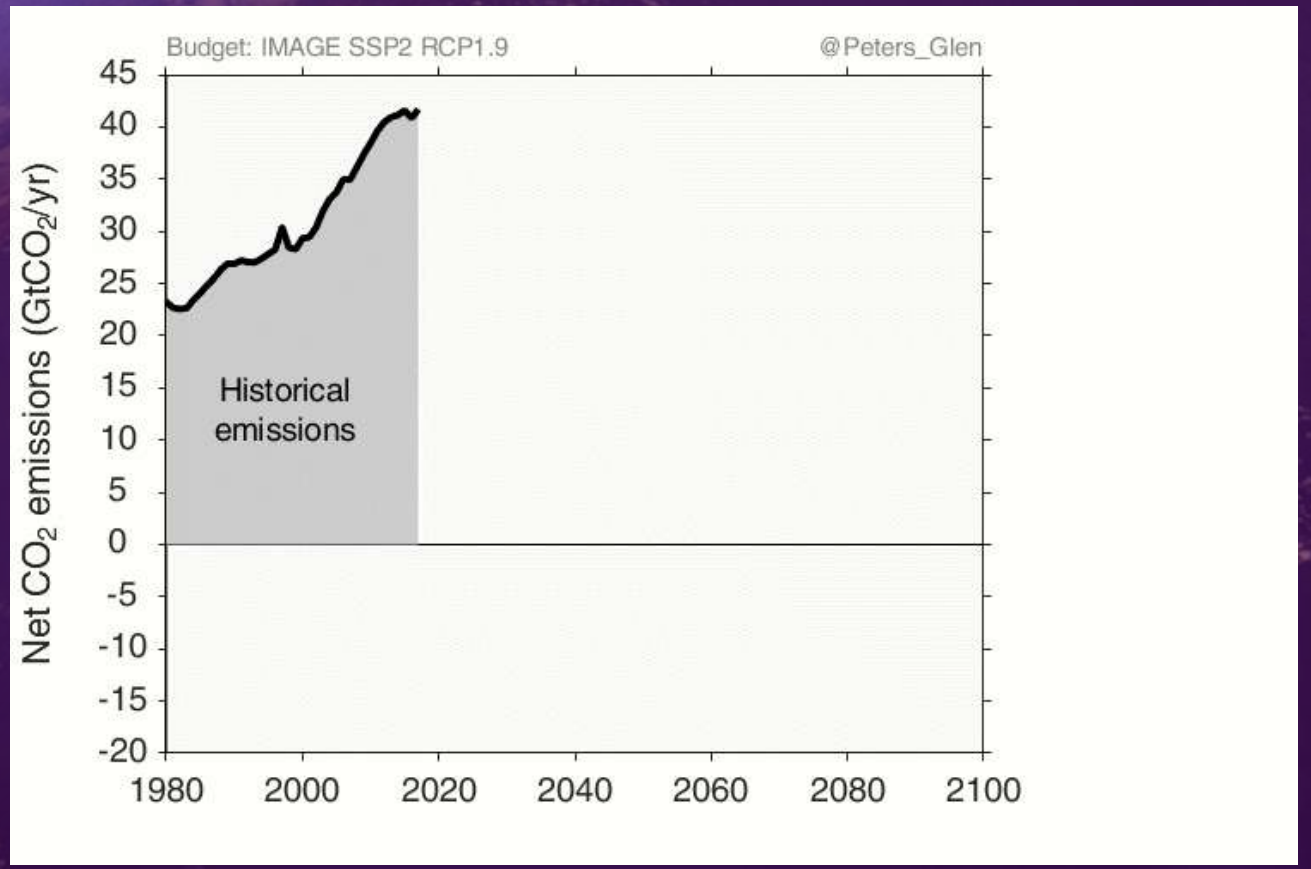


Carbon Budget

- The **Special Report** on **Global Warming of 1.5 °C** (**SR15**) suggests a budget for a 66% of avoiding 1.5C of 420GtCO2 – or which **would be used up in 2028 if current emission levels continued.**
- These numbers are:
  A. **Widely disputed, many think they are overly optimistic** (some believe we have blown the chance of 1.5 degrees already).
  B. **Based on unproven 'negative emissions technologies'** (sucking carbon out of the atmosphere) being invented and deployed at a significant scale.

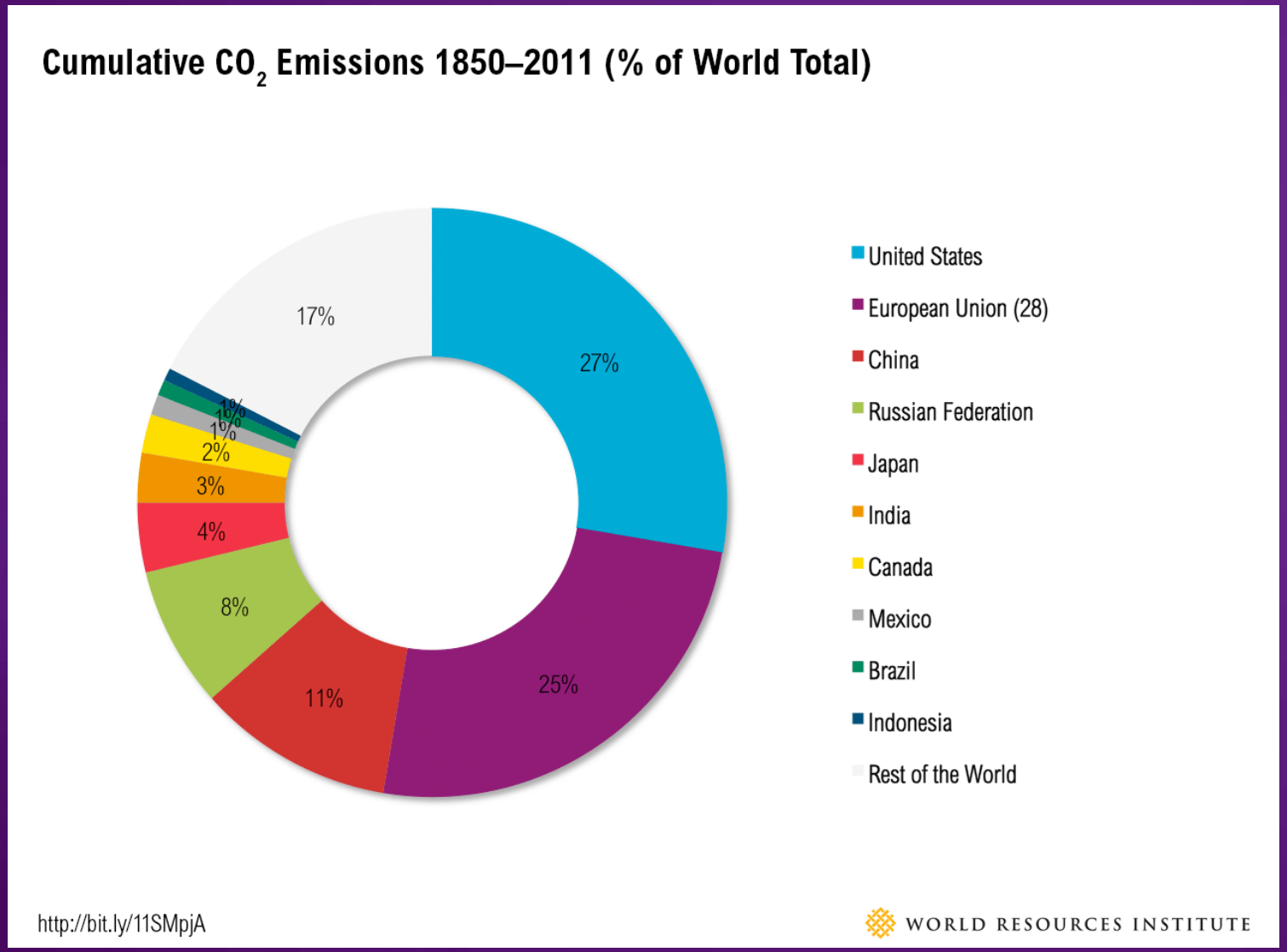


What does a global 1.5°C budget look like?



How do we divide up this planetary budget?

Historical Emissions



"The highly constrained emission-space now remaining for a 2–3◦C rise in global mean surface temperature leaves little option but to explicitly **neglect the responsibility of historical emissions in developing pragmatic twenty-first century emission profiles**"

(Anderson and Bows, 2009, p. 29)

Budgets are typically underpinned by territorial based approaches. Policy instruments reflect this (Tozer & Klenk, 2018:8)

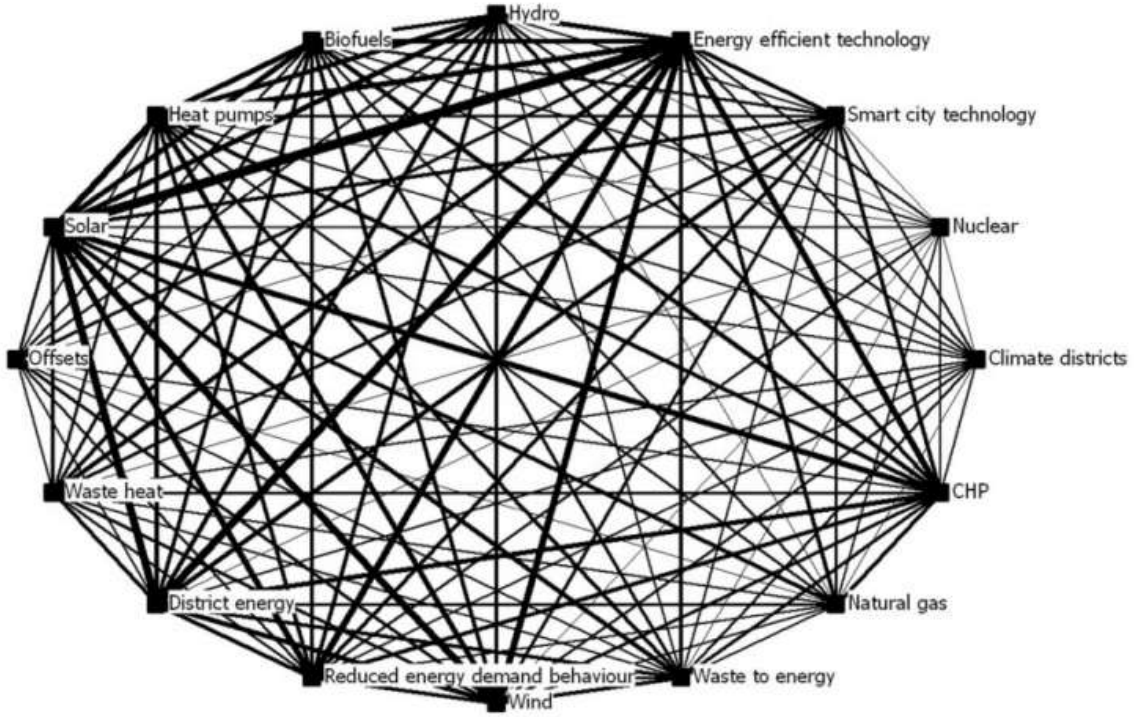
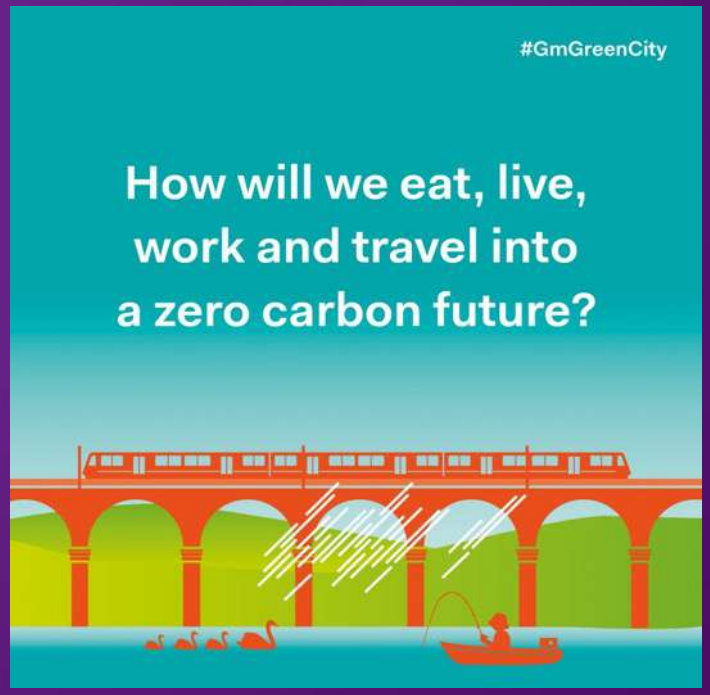


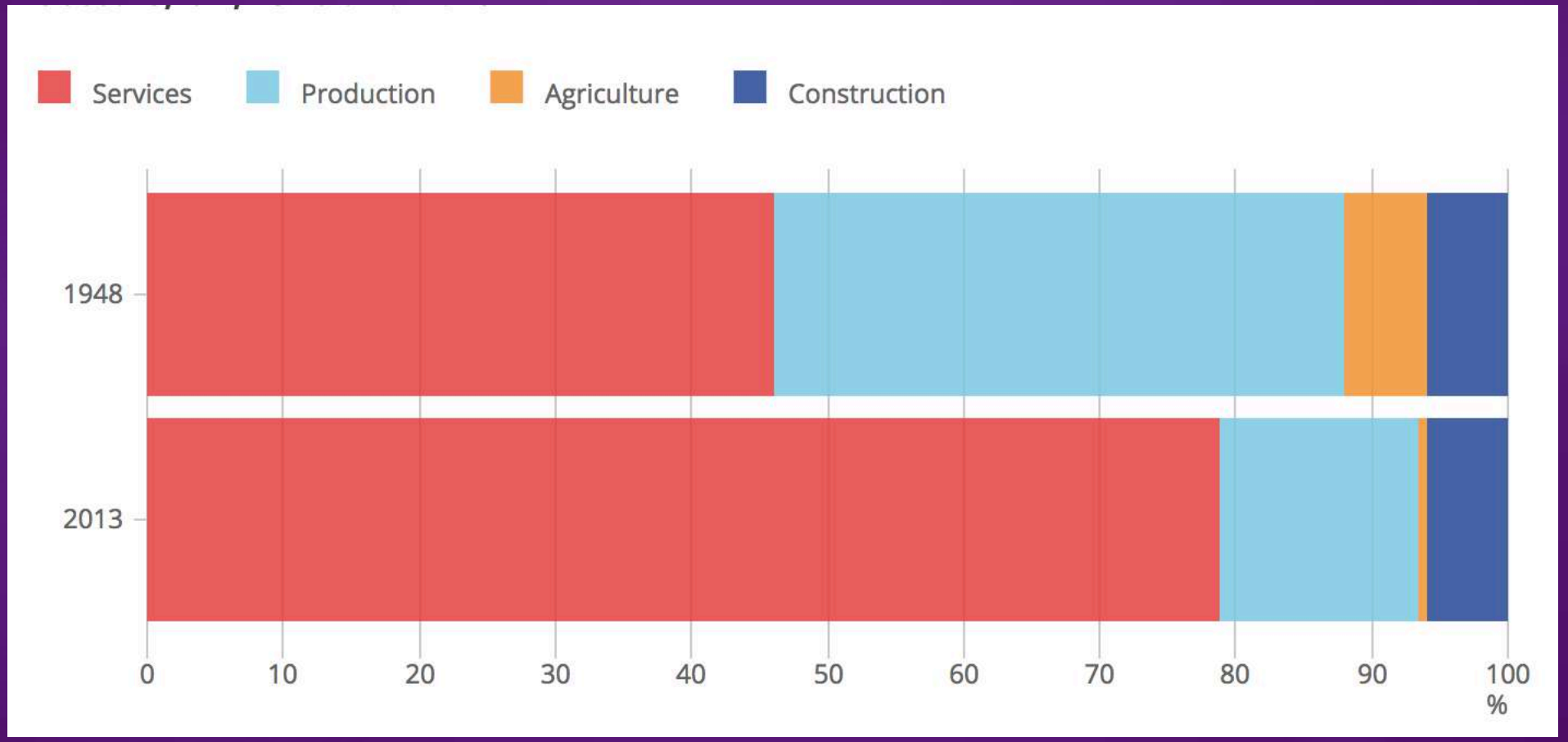
Figure 1. Visualization of the objects targeted in climate governance policy documents of the founding Carbon Neutral Cities Alliance members. The nodes represent the urban objects that will be increased to achieve carbon neutrality, where ties show that they co-occur in our sample of texts and the line weights show the relative frequency of co-occurrence.

Can we ever really be ‘zero carbon’?

- GM and Manchester’s budgets include an ambition to go zero-carbon or carbon neutral by 2038.
- The issue is ‘Zero carbon’ often doesn’t state its parameters!! Given the IPCC standard, it most often refers to emissions relating to energy and in-boundary emissions.
- If so it will not consider those emissions associated with:
  - Consuming things from beyond boundary
  - Investments beyond boundary
  - Transport beyond boundary
  - Waste disposed of beyond boundary
- This matters as what we measure tends to be what we manage.



UK GDP, 1948 vs. 2013



Should we go net-zero sooner?

The focus on net-zero dates arguably distracts us from the question of our 'budget' …

(Greater) Manchester's budget

- The Tyndall Centre have said that Manchester is only allowed to emit **15 million tonnes of CO2 (directly, or from our energy consumption) between 2018-2100 to play our 'fair' part in keeping temperature increases below 2 degrees against pre-industrial levels.**
- **We used around 2 million tonnes of this last year alone.**
- A similar picture can be seen at a Greater Manchester level too, where there is **a budget of 71 million tonnes of CO2 (directly, or from our energy consumption)** that it must not exceed between 2018-2100.
- Neither rely on negative emissions technologies, but take aim at 2 degrees rather than 1.5.
- Both set 2038 as the zero-carbon date…

The Tyndall Centre's Proposed Budget

The bit emitted here is the really crucial part, not just the 'zero' date

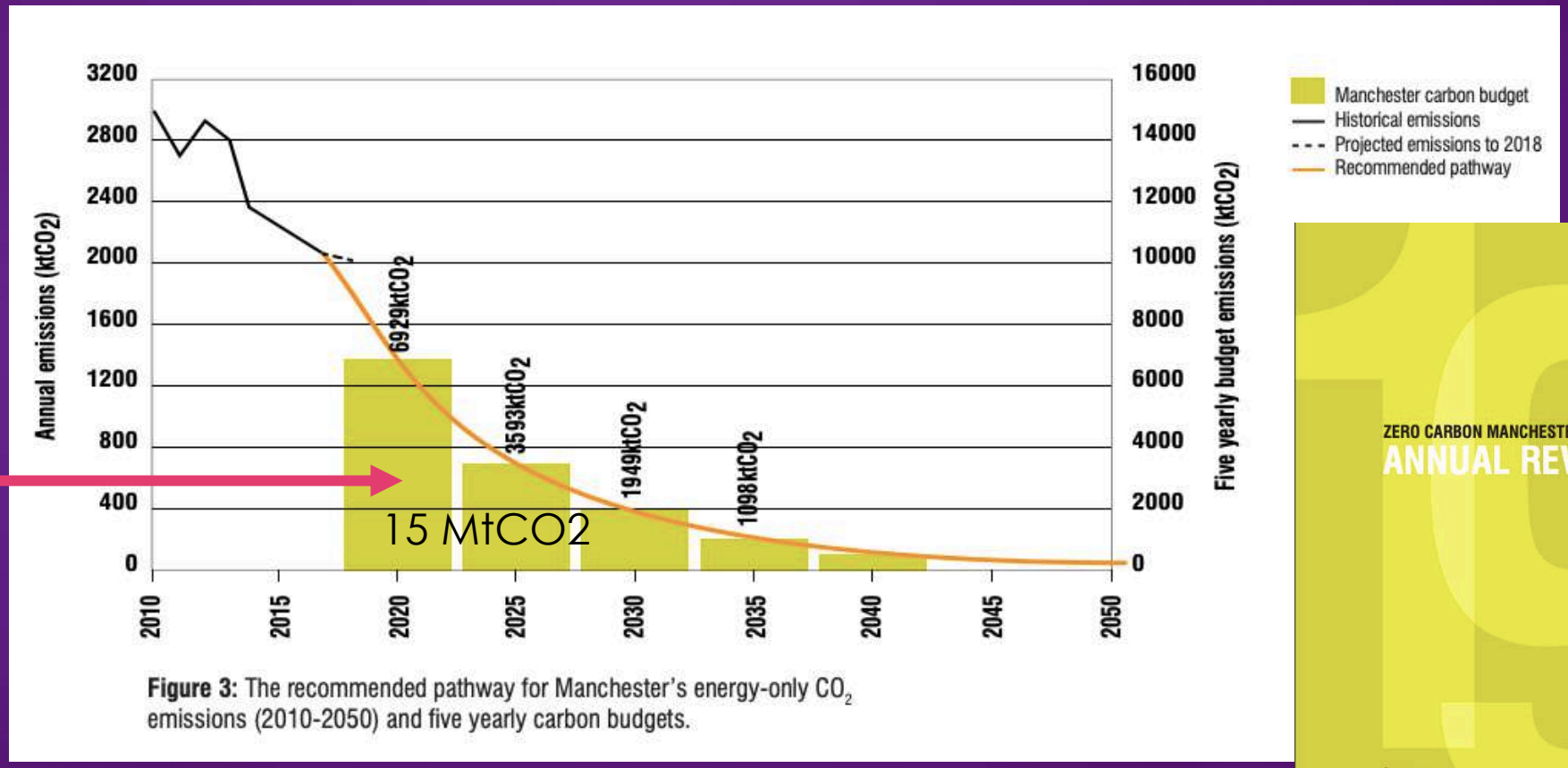


Figure 3: The recommended pathway for Manchester's energy-only CO_2 emissions (2010-2050) and five yearly carbon budgets.

Thinking in tonnes: The historical precedent to do so

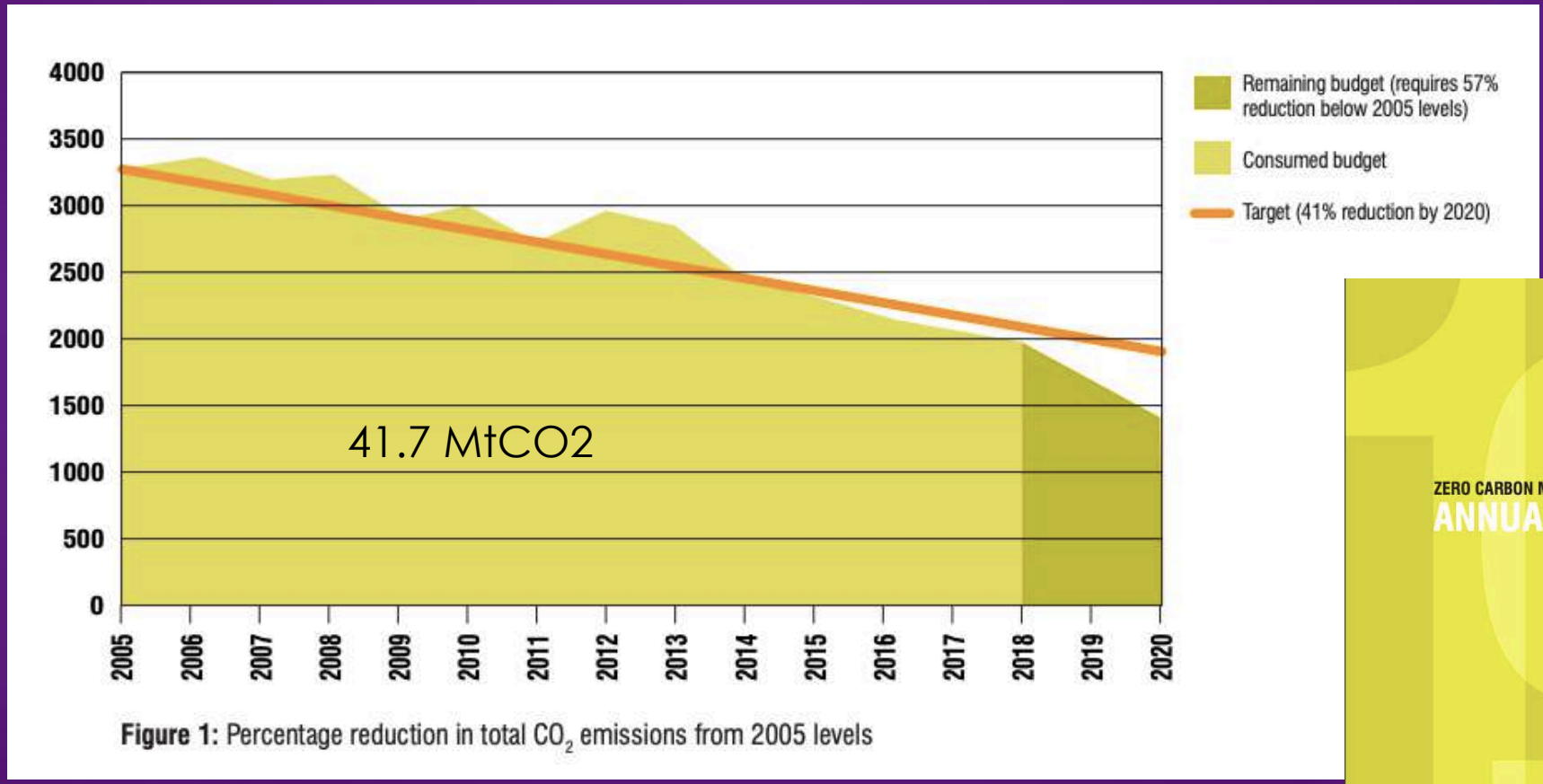
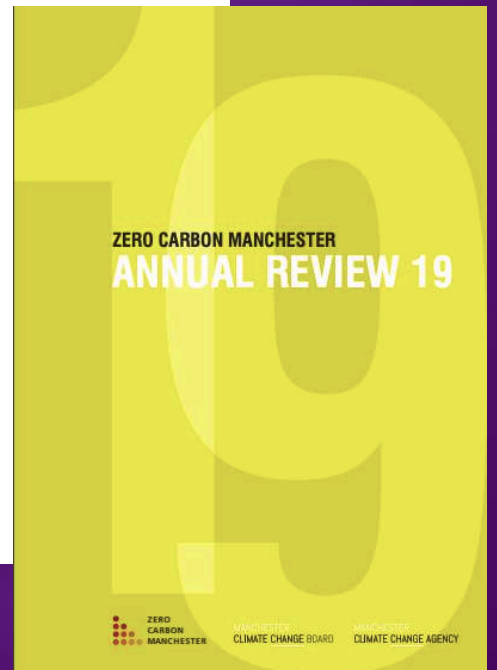


Figure 1: Percentage reduction in total CO_2 emissions from 2005 levels



Thinking in tonnes: A hypothetical for Manchester

2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
2	2	2	2	2	1.8	1.6	1.4	1.2	1	0.8	0.5	0

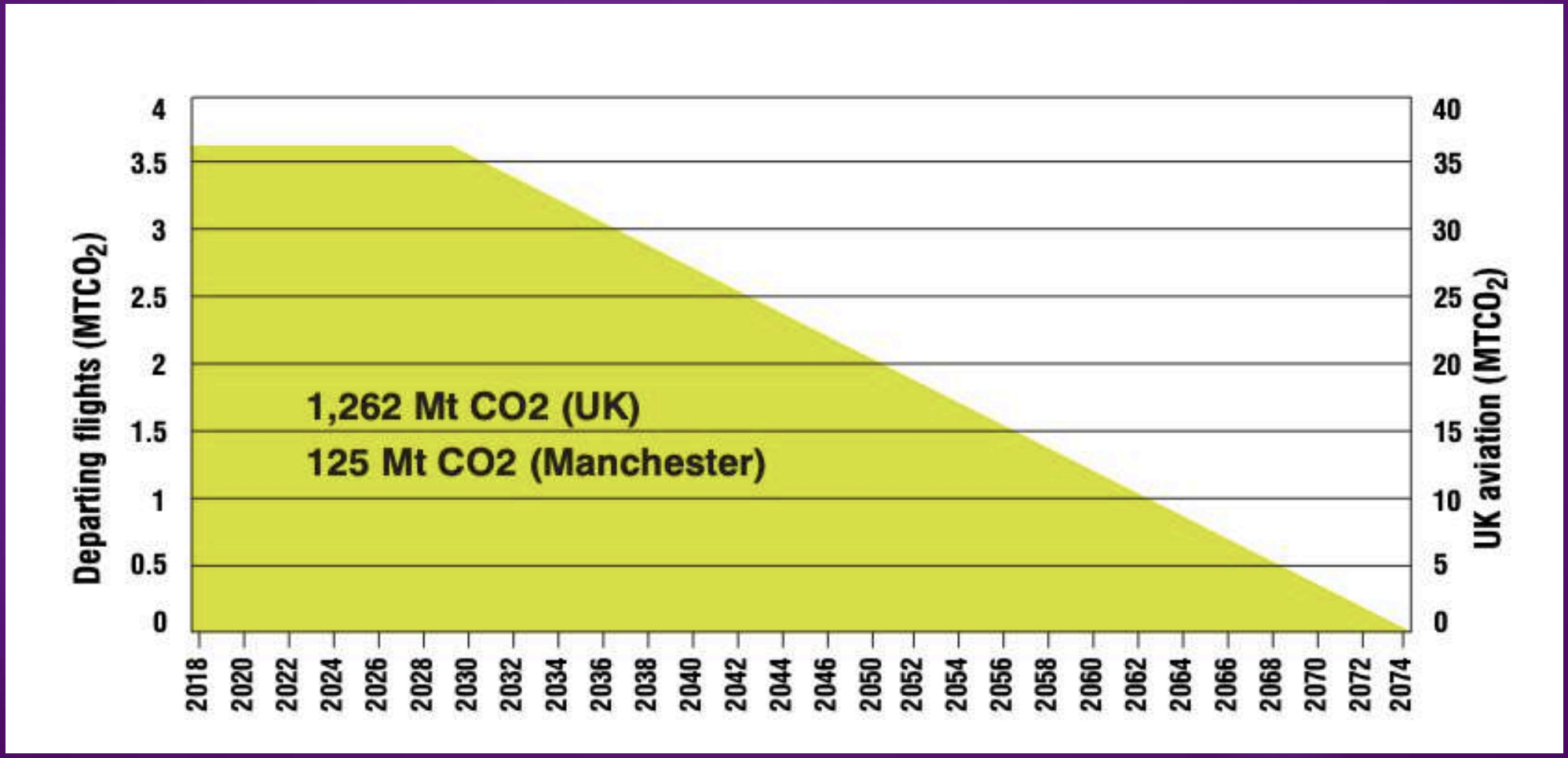
There's currently lots of pressure to go zero-carbon sooner than 2038 (the current plan). This request alone may not stop us going over budget (contributing to more warming than going zero-carbon in 2038 and staying within 15 MtCO2).

We have 15 MtCO2 – we can spend them when we want between now and 2100.

Add the years up … = 18.3 MtCO2 (3.3MtCO2 over budget).

Focus is better spent on a) **the city's overall carbon budget (should it be less?)** and b) **year-on-year reductions.**

Externalities Matter Too



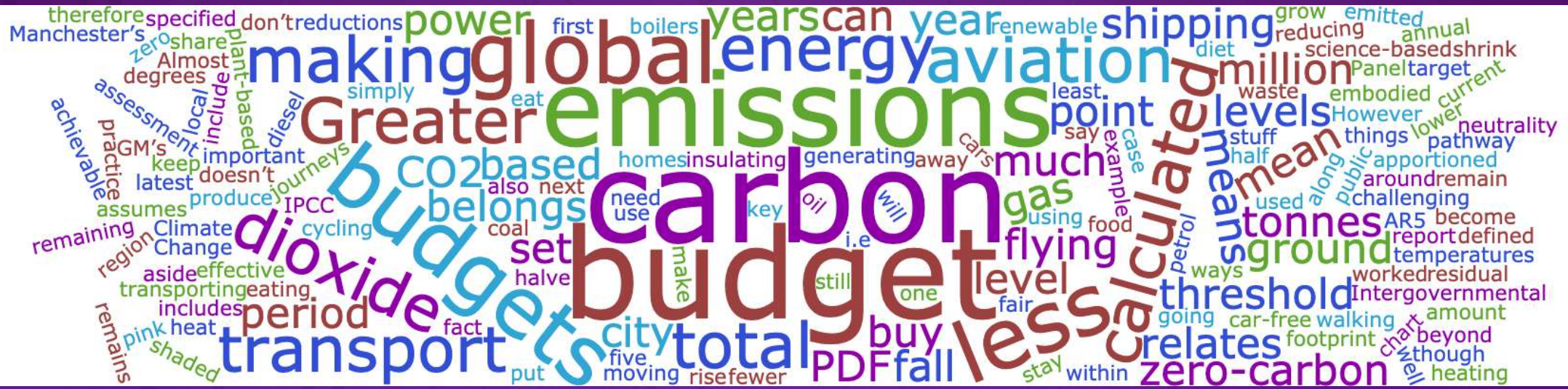
Externalities Matter Too

- There are assumptions built in to (Greater) Manchester's carbon budget about what happens beyond the border of our city.
- We play a role in shaping these too…
- **Action on aviation, shipping, investment, consumption and travel beyond the city is vital if the budget is to hold…**

- **We have to get a handle on these other levers of change and act on them in a meaningful way as they are just as important.**

Conclusion

- Our carbon footprint is a way of taking stock of our emissions responsibility. As many people have a hand in the production of emissions across the planet there is no ‘correct’ way of measuring them. (A footprint does not look like a boot).
- We typically measure ‘direct’ emissions (and those from energy use at a city level).
- Carbon budgets are an attempt to plan what carbon we use when, to limit the buildup of carbon in the atmosphere over multiple years. A carbon diet plan of sorts…
- We need to **focus on year-on-year emissions** rather than just target dates.
- We also ought to focus on the other levers we can pull in reducing global emissions beyond our direct emissions (consumption, investment, travel).



Carbon Jargon Buster Workshop

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Breakout Session

- What next for Greater Manchester?
- What next for organisations?
- What next for activists?

Plenary