

Great Britain's mixed progress in decarbonising neighbourhoods and the implications for net-zero.

ECEEE 2026

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Dr Malcolm Morgan

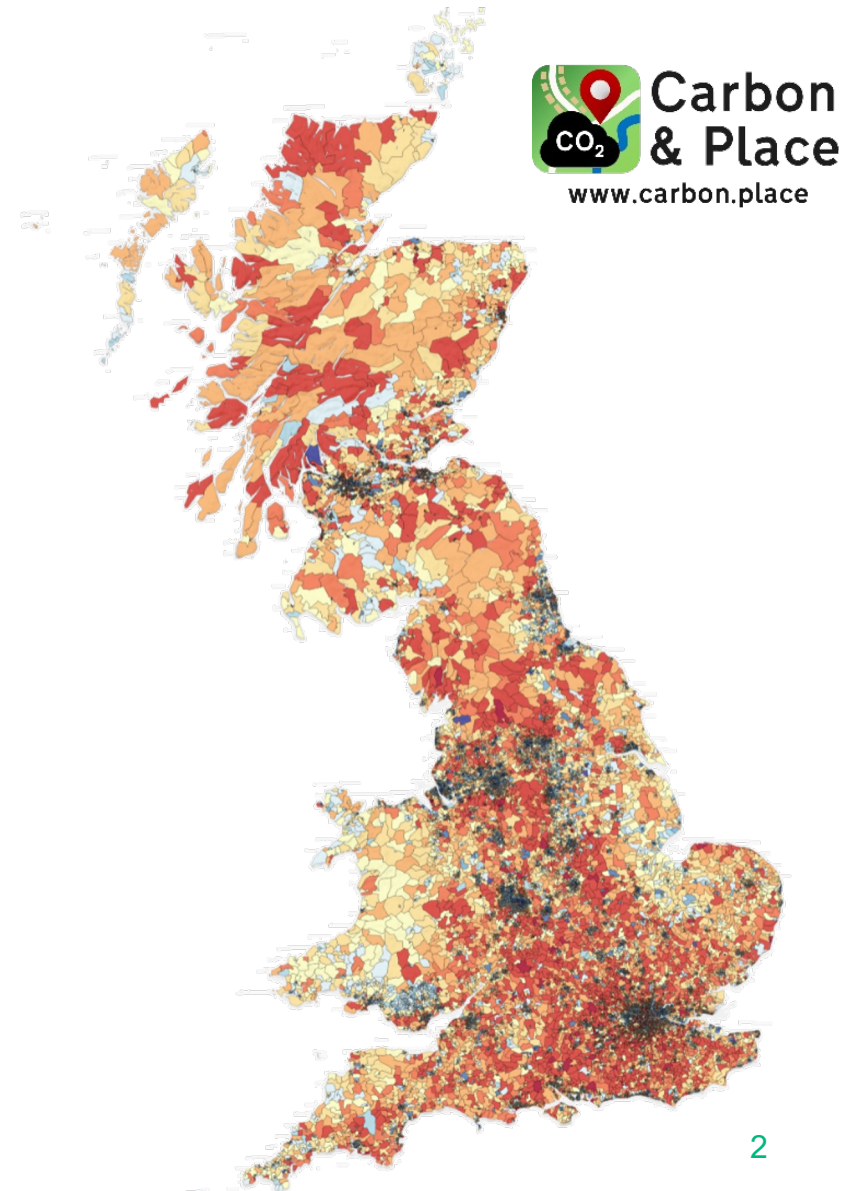
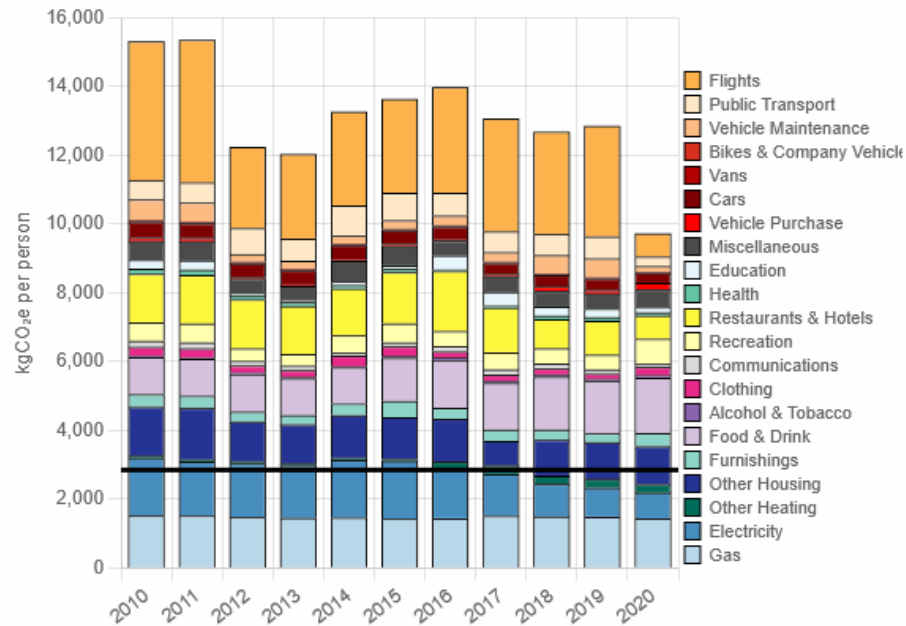
Senior Research Fellow in Transport and Spatial Analysis

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A bit of background

- Carbon & Place www.carbon.place
 - Research project
 - Free webtools for communities and policymakers
 - Understanding local consumption-based carbon footprints



Why

Decarbonisation is increasingly delivered locally

- Insulation
- Heat Pumps
- Electric Vehicles
- Public Transport

Local characteristics create unique

- Challenges /opportunities
- Needs

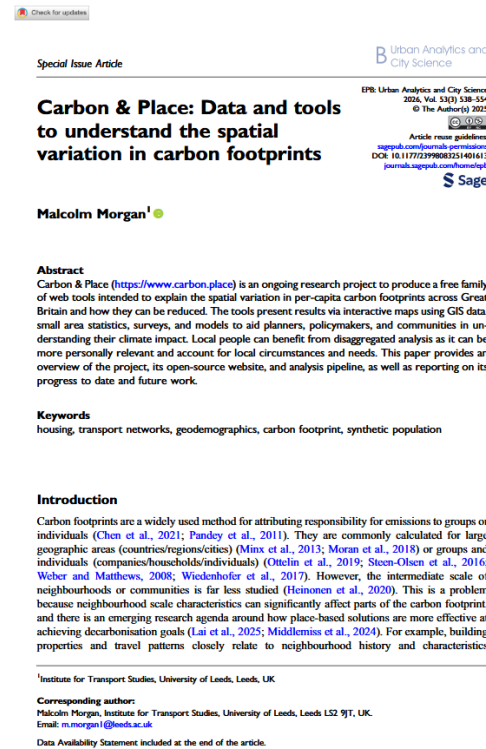
Local data enables better decision making

Raises awareness of significant spatial inequality

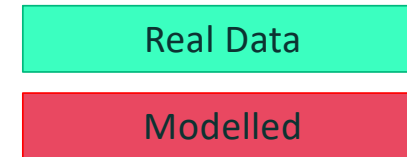
- About 8x difference in Carbon Footprints

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&



How



Aggregate Data
(e.g. Census)



Living Costs and
Food Survey

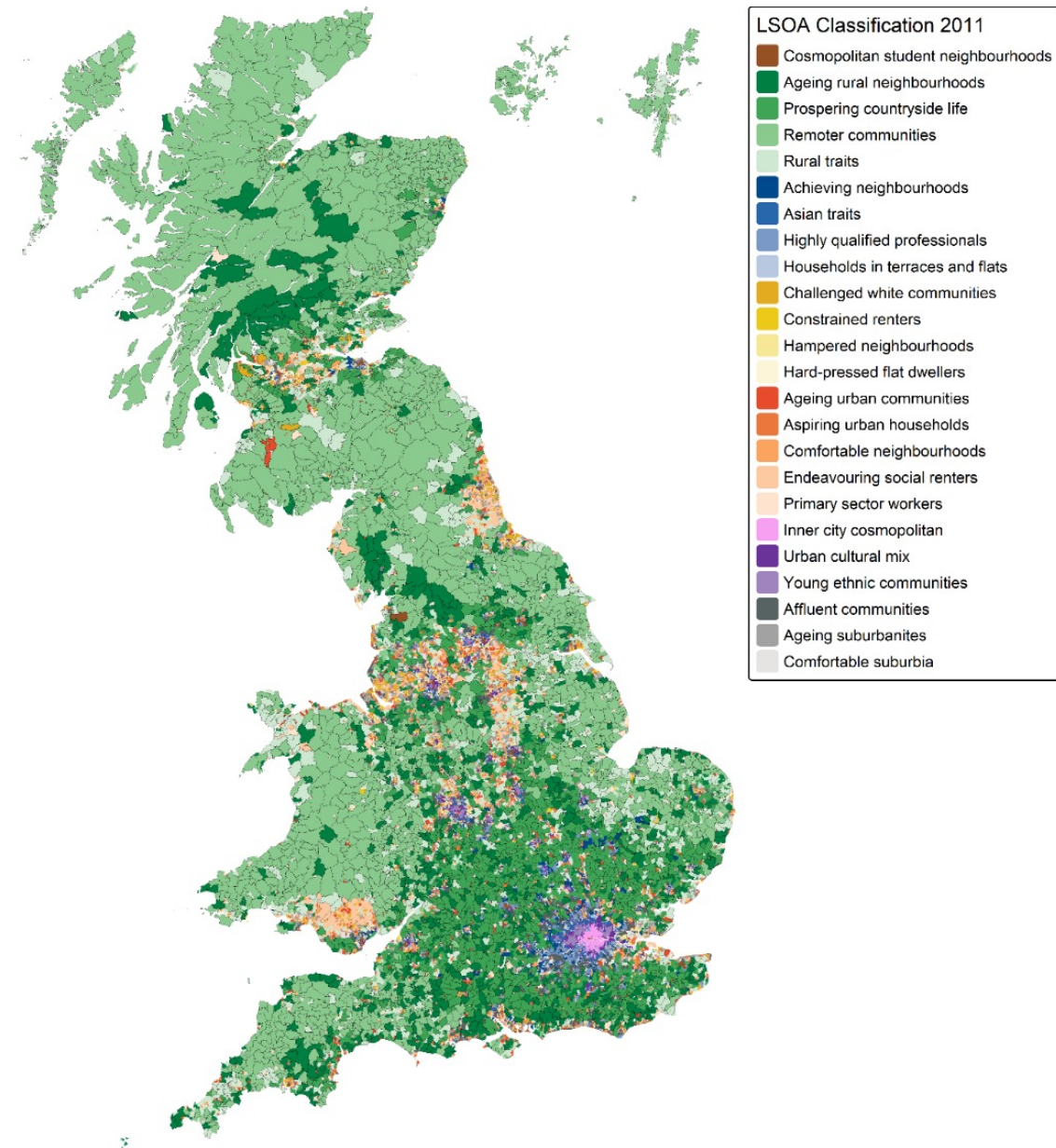


Neighbourhood
Spending data

Morgan, M. (2025). Carbon & Place: Data and tools to understand the spatial variation in carbon footprints. *Environment and Planning B: Urban Analytics and City Science*, 0(0). <https://doi.org/10.1177/23998083251401613>

A 13-year history of neighbourhood carbon footprints

- 2010 – 2022
- 43,064 areas across Great Britain (England, Scotland, Wales)
~1,500 – 3,000 people per area
- First look at the results
 - Summarised for 24 types of area



Prospering Countryside Life



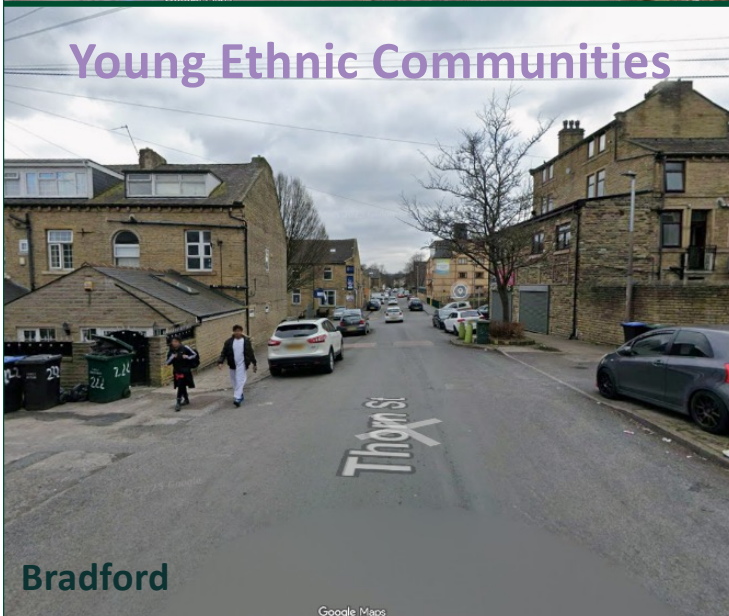
Challenged White Communities



Inner City Cosmopolitan



Young Ethnic Communities



Affluent Communities



Endeavouring Social Renters

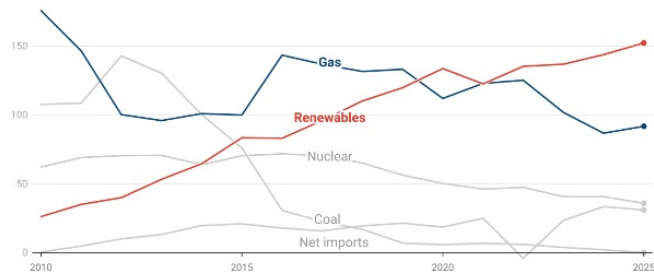


Electricity

Real Data

- Falling emissions due to grid decarbonisation

UK renewables enjoy record year in 2025 – but gas power still rises
Annual electricity supply by source, terawatt-hours (TWh)

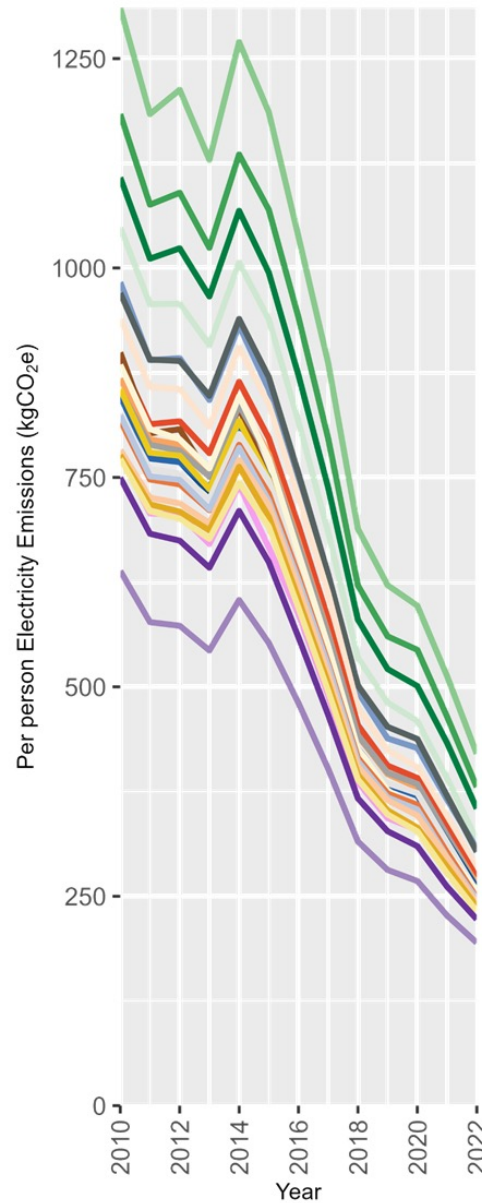


Source: Carbon Brief analysis of data from NESO and DESNZ

CarbonBrief
Centre for Climate

<https://www.carbonbrief.org/analysis-uk-renewables-enjoy-record-year-in-2025-but-gas-power-still-rises/>

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Area classification

- Remoter communities
- Prospering countryside life
- Ageing rural neighbourhoods
- Rural traits
- Highly qualified professionals
- Affluent communities
- Primary sector workers
- Ageing urban communities
- Cosmopolitan student neighbourhoods
- Comfortable neighbourhoods
- Ageing suburbanites
- Achieving neighbourhoods
- Asian traits
- Constrained renters
- Comfortable suburbia
- Hard-pressed flat dwellers
- Inner city cosmopolitan
- Aspiring urban households
- Households in terraces and flats
- Endeavouring social renters
- Challenged white communities
- Hampered neighbourhoods
- Urban cultural mix
- Young ethnic communities

% change in electricity emissions 2010-2022

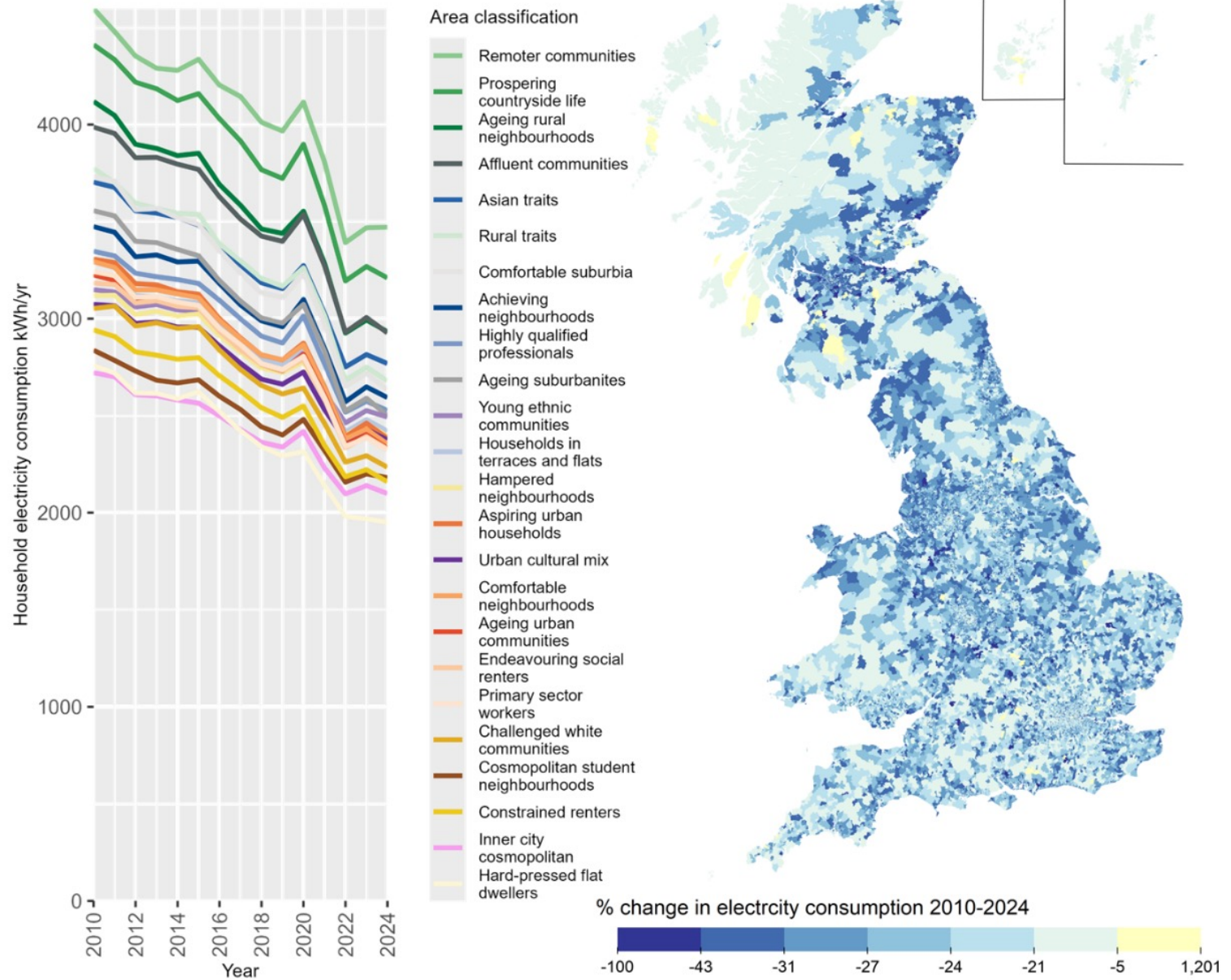


Electricity 2

Real Data

- Energy vs Emissions
- Switch from per person to per household
- Change in rank order
- COVID and Ukraine crisis

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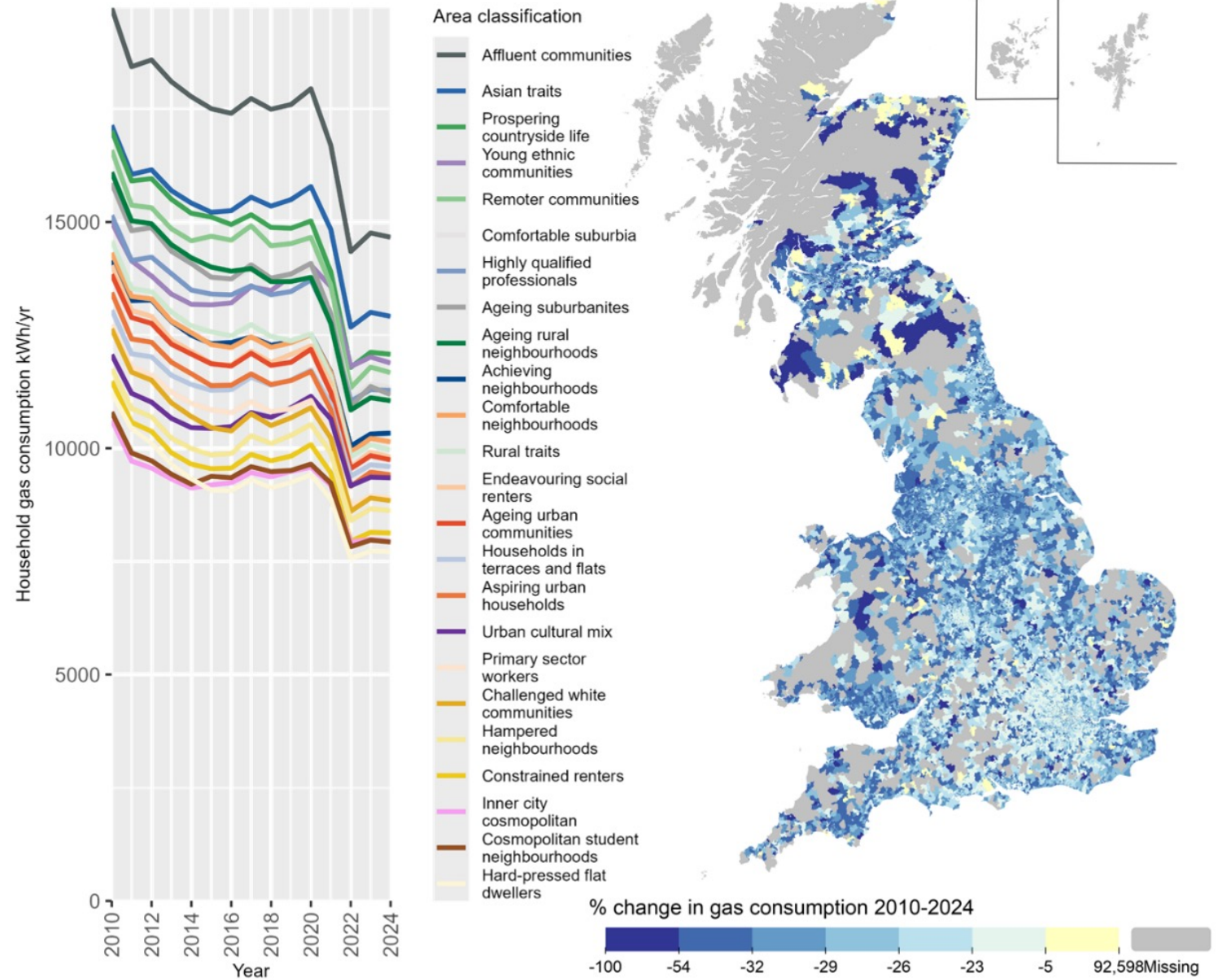


Gas

Real Data

- Energy
- Limited progress 2012-2020
- Ukraine Crisis had marked effect
- Rise in energy poverty?

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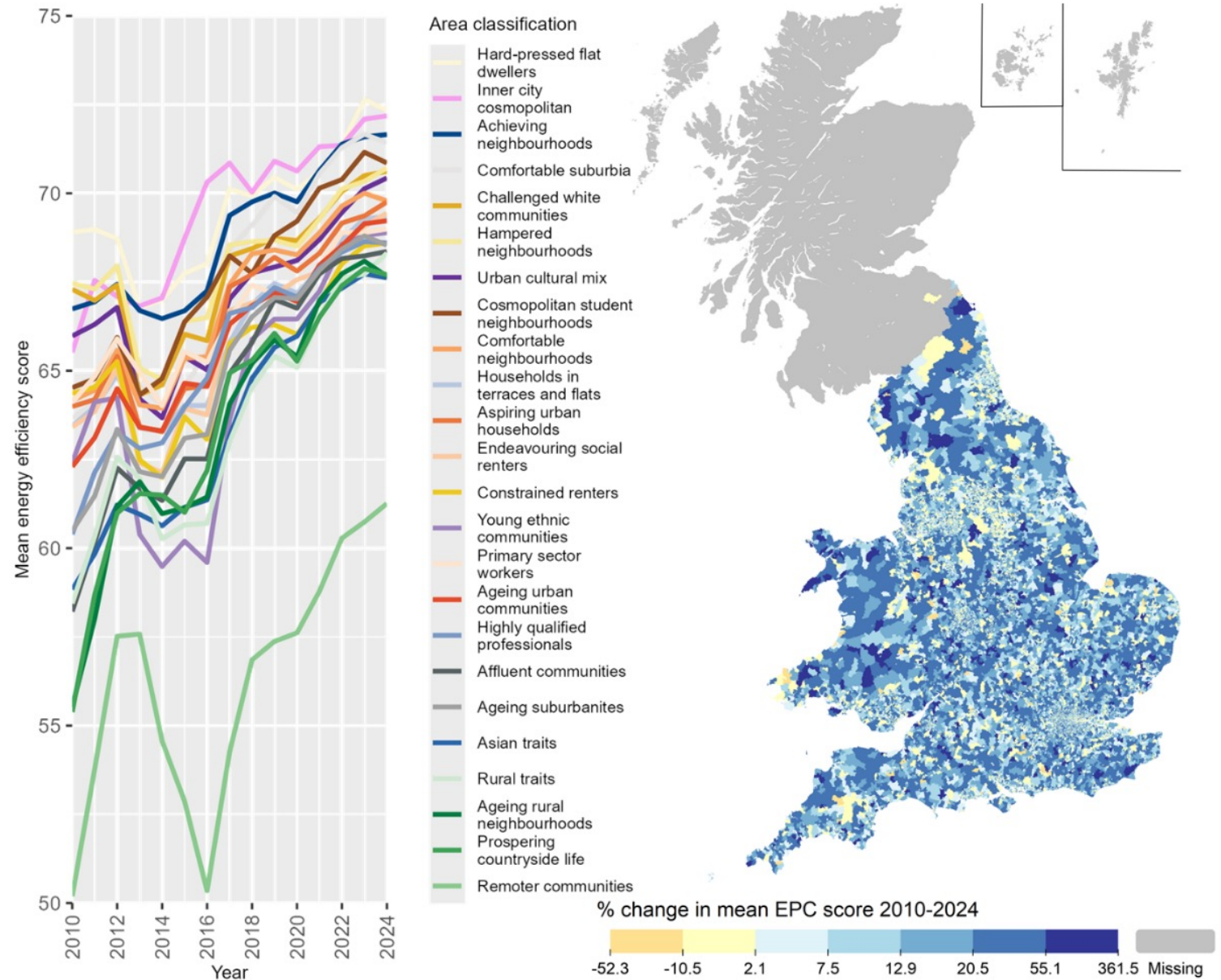


Building Energy Efficiency

Real Data

- SAP score out of ~100
- Poor correlation with energy consumption, but indication of retrofit activity
- Scotland data missing pre-2018

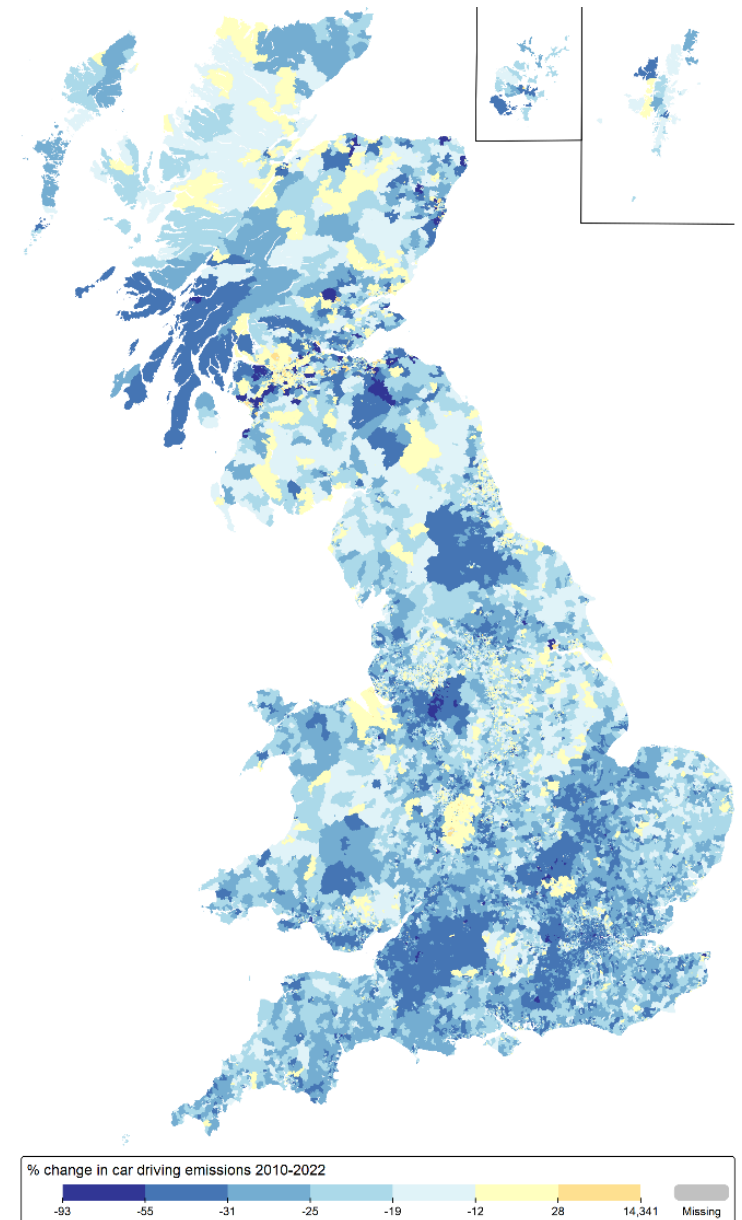
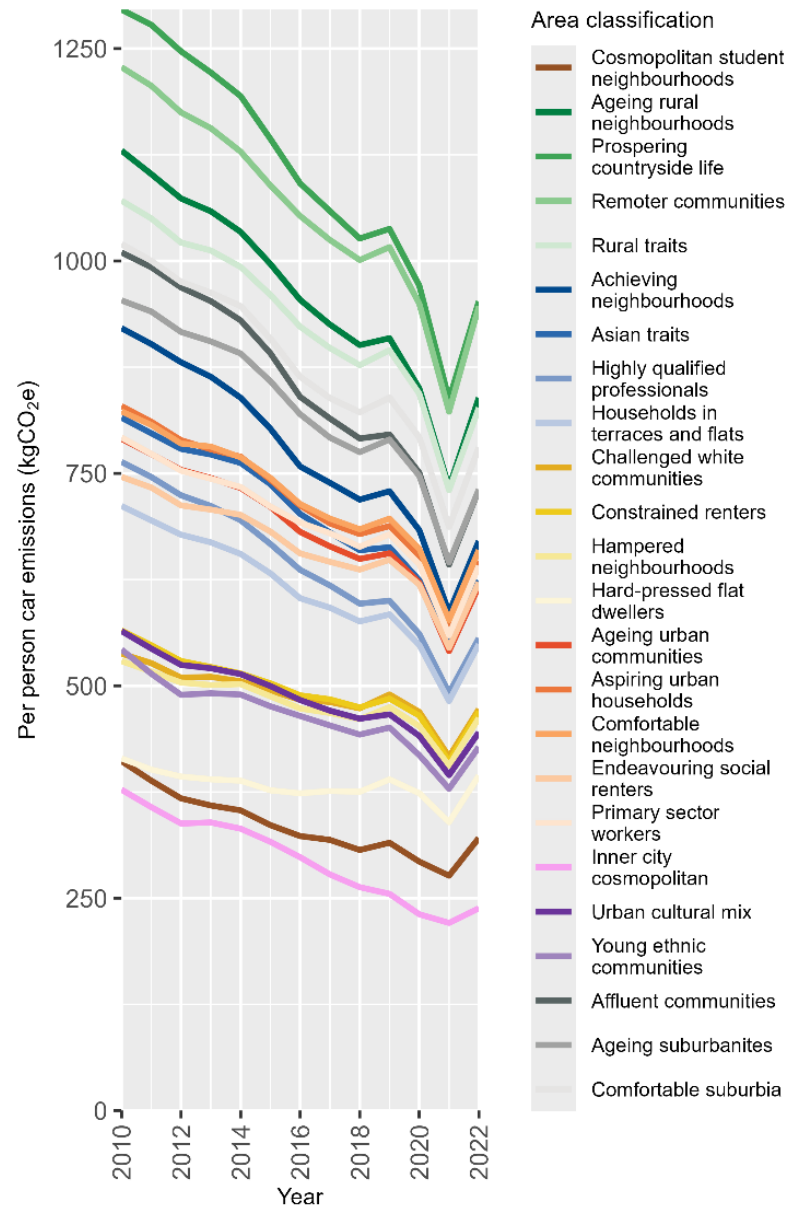
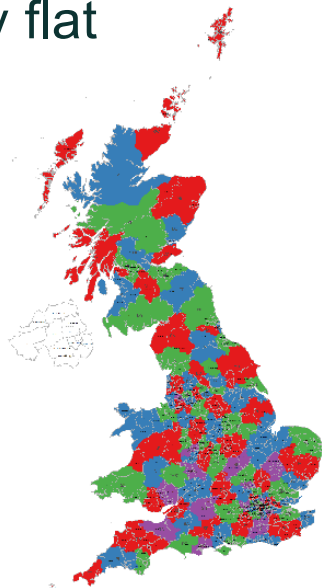
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Car Emissions

Partially Modelled

- Less small-scale data
- Total mileage largely flat

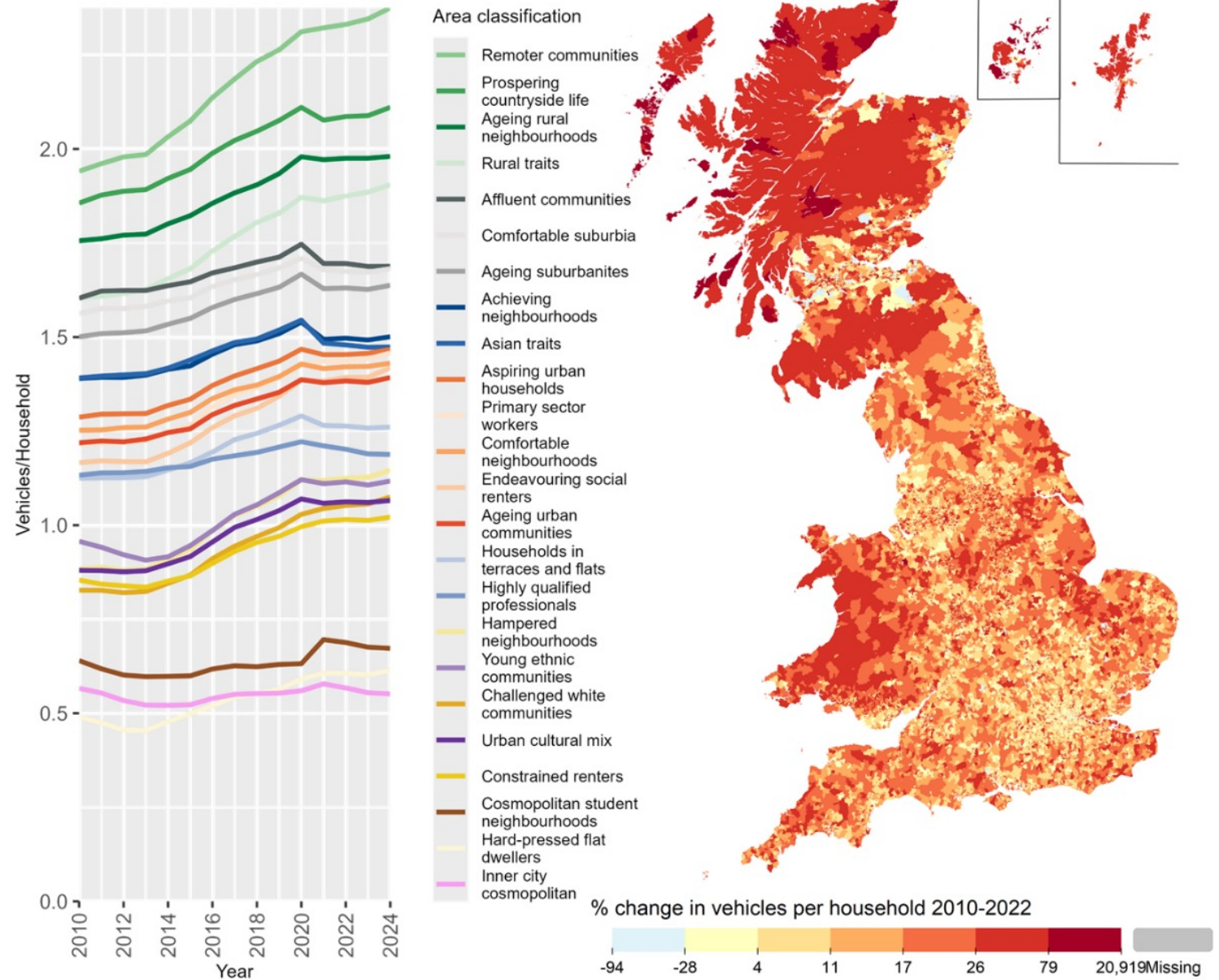


Vehicle Ownership

Real Data

- Significant rise in some areas, especially in rural and poor-urban areas

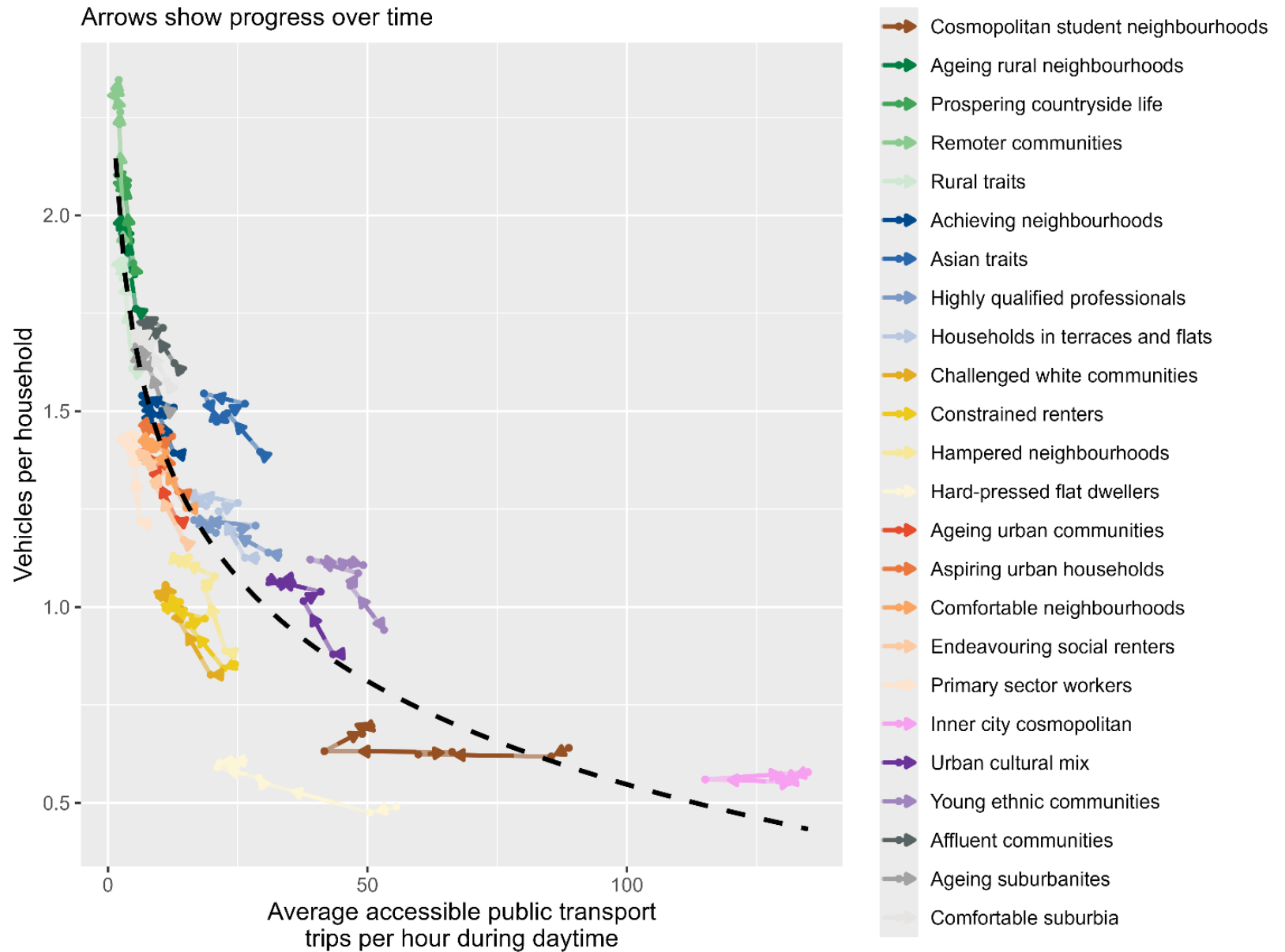
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Private vs Public Transport

Real Data

- 2010-2022 progress over time
- Going in the wrong direction (up & left)

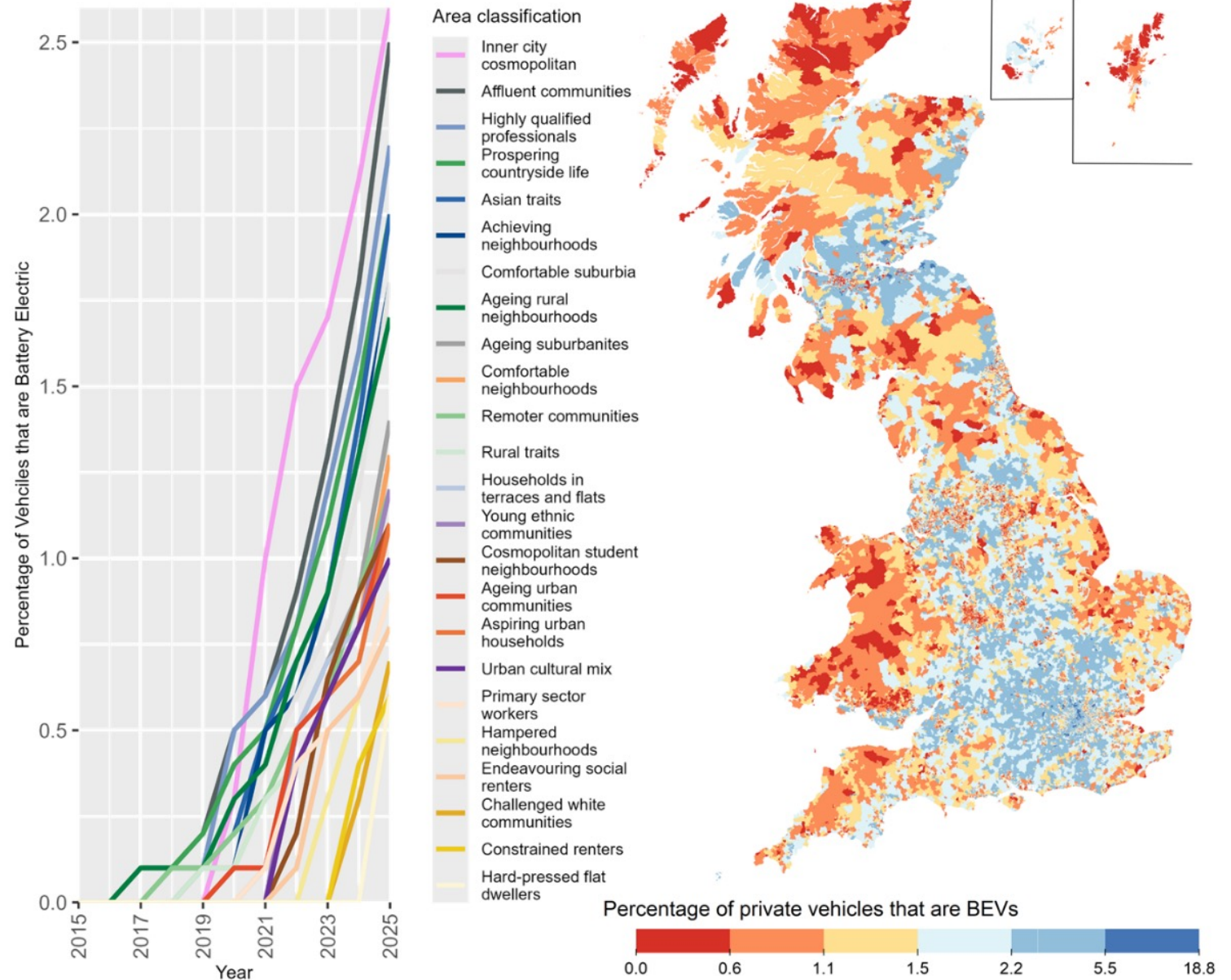


BEV Adoption

Real Data

- Adoption is highly concentrated in some areas
- High income + off street parking
- Or high income + limited range anxiety?

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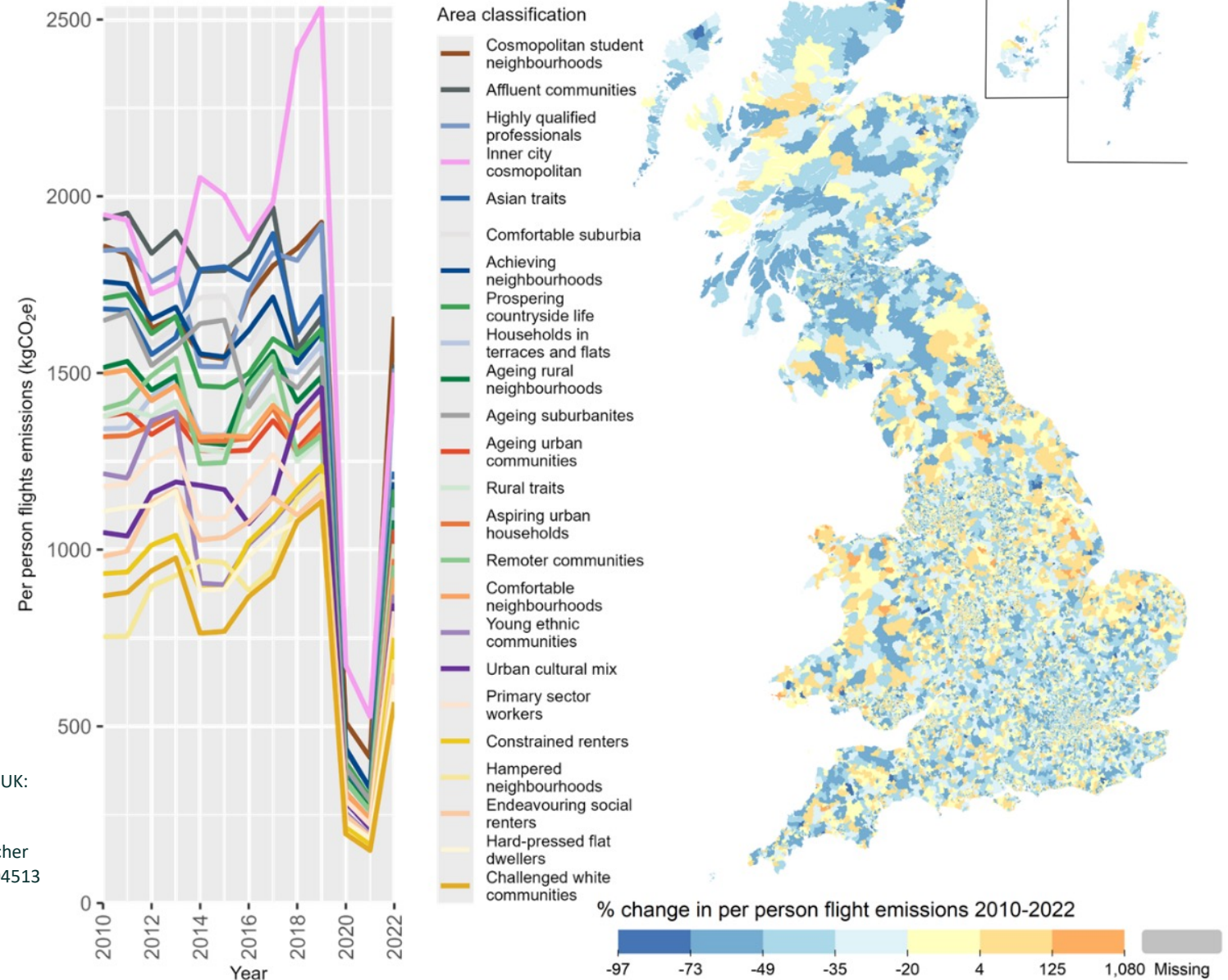
Flights

Modelled

- Londoners, Wealthy, Urbanites, and migrants fly more
- Covid Effect
- CO₂/km falling slower than total km rising
- Can't distribute for flight distance

Büchs, M., Mattioli, G., 2021. Trends in air travel inequality in the UK: From the few to the many? Travel Behav. Soc. 25, 92–101.
<https://doi.org/10.1016/j.tbs.2021.05.008>
 Can rail reduce British aviation emissions? Transportation Researcher Part D: Transport and Environment Volume 138, January 2025, 104513
<https://doi.org/10.1016/j.trd.2024.104513>

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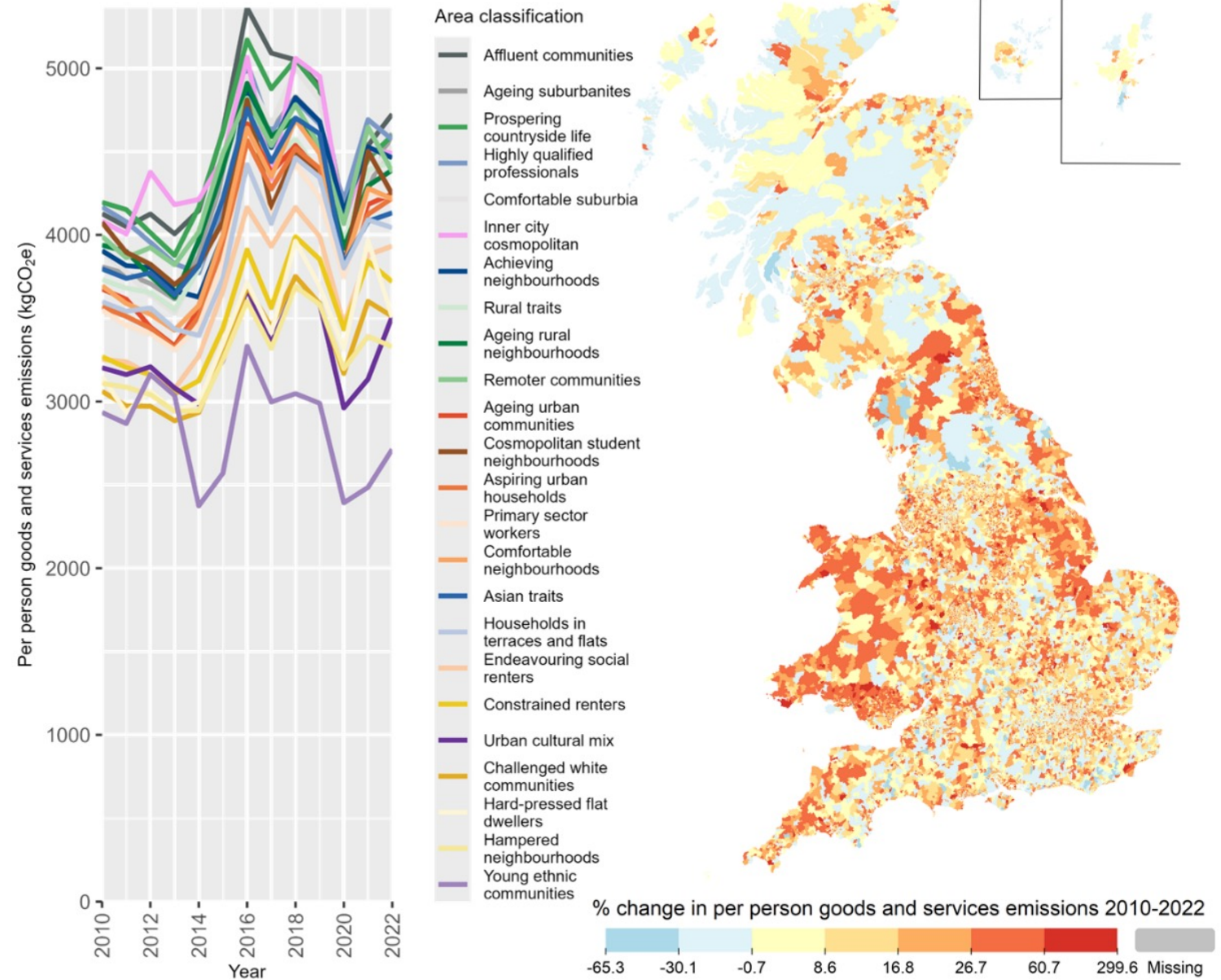


Goods Services

Modelled

- Importing more emissions from abroad (China)
- 43% 351 MtCO₂/year (2010)
- 55% 404 MtCO₂/year (2022)

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Conclusions

- Much of the historical progress has been supply side led
- Progress is real, but next stage is fragile
- Various factors at play
 - Rich – Poor
 - Rural – Urban
 - Household Size
- Best/worst cluster depends on which part of footprint you are looking at
- Limited evidence of regional / local policy impacts
- Surface Transport, Aviation, and Goods/Services are growing in importance
- Exporting emissions is not decarbonisation

Questions

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