

ROLE OF SPATIAL PLANNING AND PLACE-BASED SOLUTIONS

# Net Zero Transport

Reducing surface transport  
emissions by 80% by 2030.  
A pathway to net zero by  
2050.

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# 1.0 Introduction to study



# Participants

Research carried out 2020-21 by **LDA Design**, **Vectos** and **City Science**

Part-sponsored by the **RTPI** North East region, and supported by the Transport Planning Society and Chartered Institution of Highways and Transportation

**40 cross-sector stakeholders** contributed expertise representing urban design, transport planning, local authorities, transport operators and shared mobility service providers

LDĀDESIGN

**vectos.**

  
**CITY SCIENCE**  
endless possibilities

 **RTPI**  
Royal Town Planning Institute



# Objective

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Explore how towns and cities can achieve an **80% reduction in surface transport** emissions by **2030**, as part of a pathway to net zero by 2050

Combine advanced **carbon modelling** with stakeholder workshops to test the impact of forty carbon reduction **interventions** in four 'place' typologies:

- unicentric city
- polycentric conurbation
- regeneration town
- growing county

Devise emissions **reduction pathway** and vision for each typology to demonstrate the contribution of **spatial planning** and **place-based solutions** to **transport decarbonisation**



# Rationale

Paris Agreement 2015:

*'Keep global temperature rise this century well below 2 degrees Celsius above pre-industrial levels, aim for 1.5 degrees'*

UN Emissions Gap report states 7.6% drop needed every year until 2030 to stay on track

UK surface transport largest emitting sector

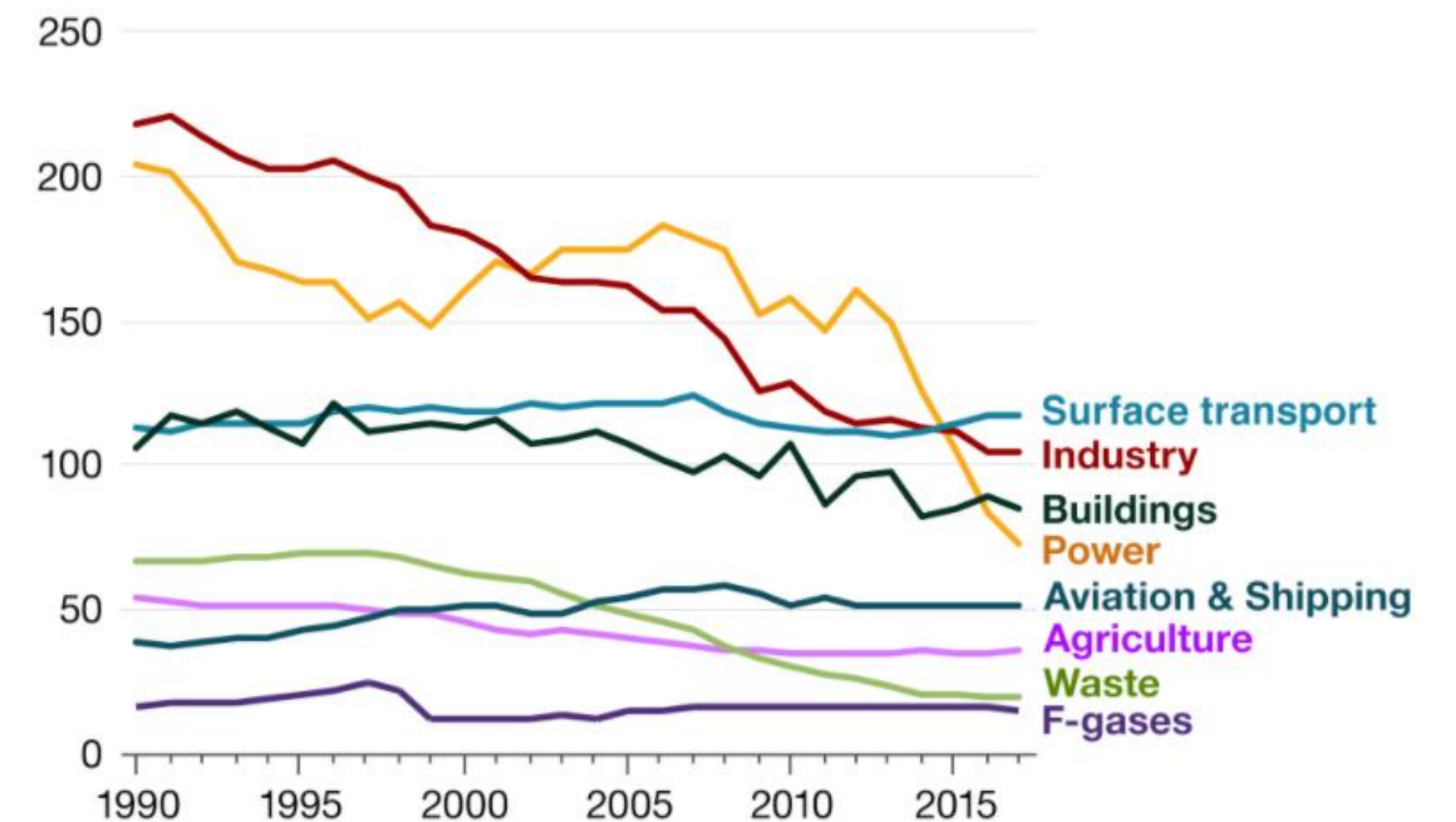
In June 2019 UK parliament set legal net zero emissions target by 2050

DfT Transport Decarbonisation Plan due in 2021

COP26 in November 2021



Annual emissions, million tonnes of CO2 equivalent



Source: Climate Change Committee/BEIS (2019)

BBC

SUVs market share UK  
2008: 6%    2019: 25%

# COVID Impact on UK emissions

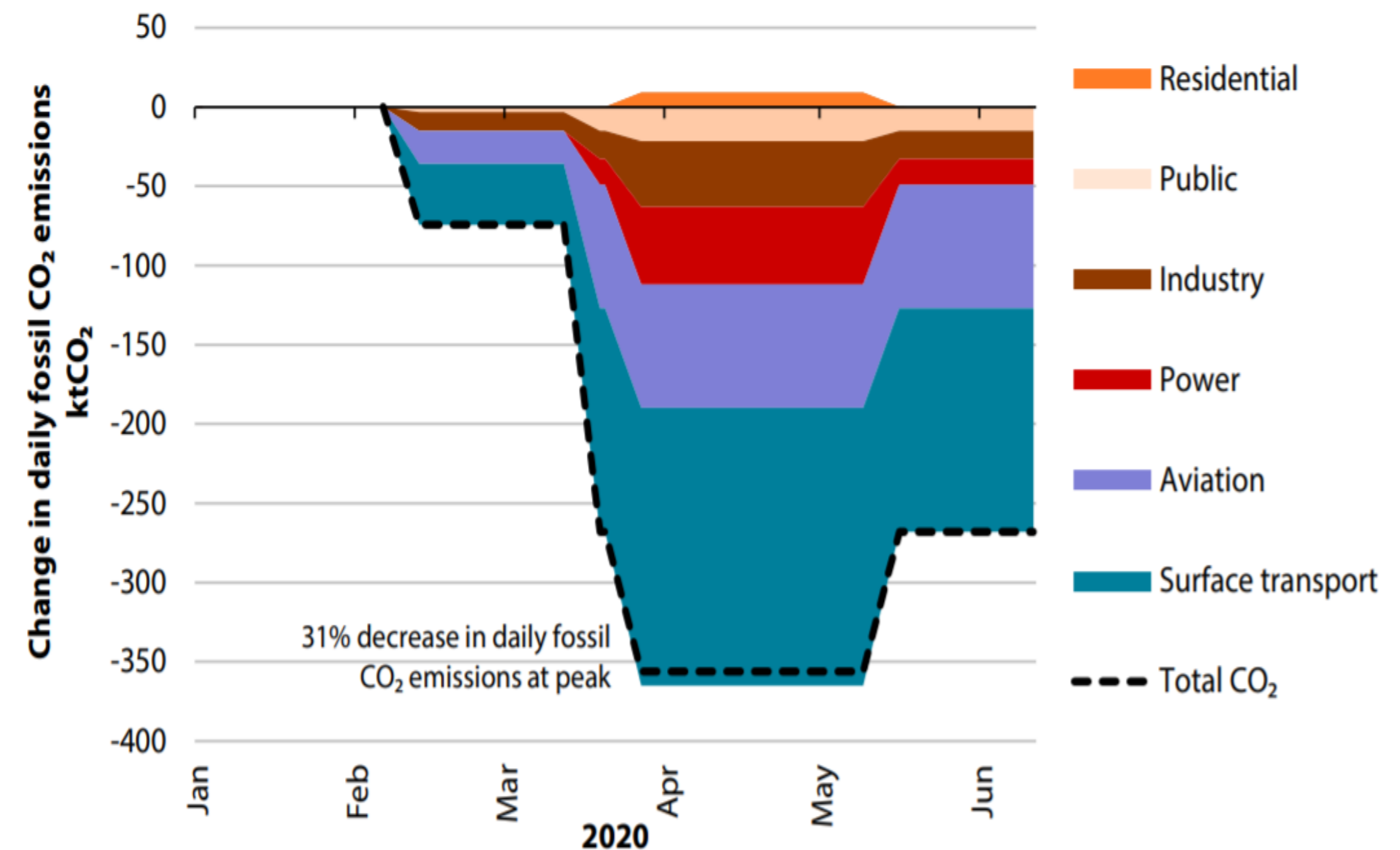
31% decline during April 2020 with largest fall in surface transport

Subsequently rebounded leading to annual 2020 reduction of 7%

## UN's Emissions Gap Report 2019:

*'Global emissions must fall by 7.6% every year from now until 2030 to stay within the Paris 1.5C ceiling on temperature rises'*

This suggests we need to see scale of change in behaviour seen in 2020, every year until 2030 to stay on track



COVID Impact on UK emissions by sector



# 2.0 The study

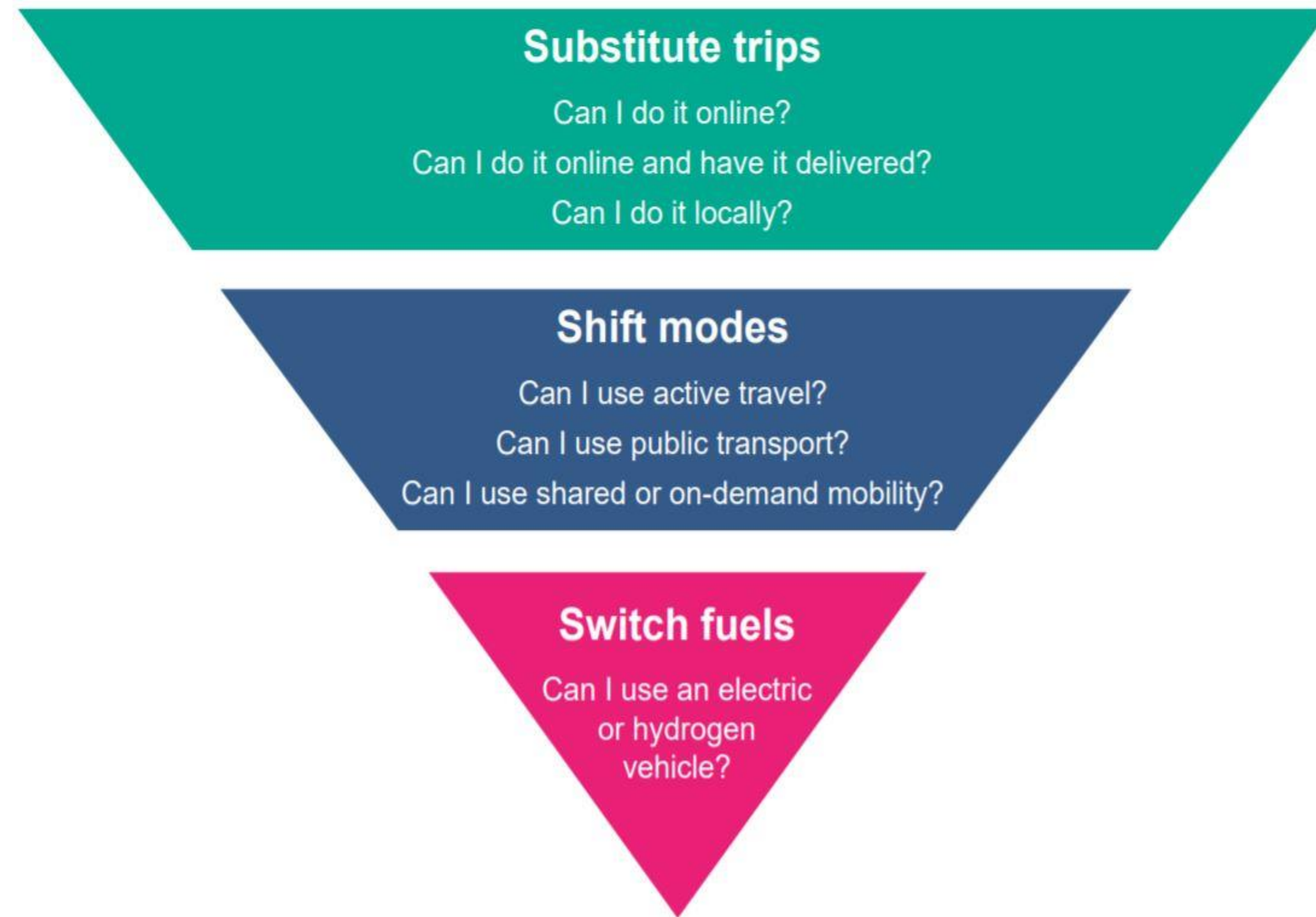


# Sustainable Accessibility and Mobility (SAM) Framework

Place-based approach can realise swiftest reductions in emissions whilst creating better places and healthier, happier, more resilient communities. This is captured in the SAM Framework

Guides planners and urban designers to prioritise interventions in the most effective way

1. **Substitute Trips:** Replace the need to travel beyond your community
2. **Shift Modes:** For longer trips, use active, public and shared forms of transport
3. **Switch Fuels:** For any trips that must be made by car, ensure the vehicle is zero emission



Sustainable Accessibility and Mobility (SAM) Framework

DESIGN COMMUNITIES WHICH ALLOW TRIPS TO BE  
SUBSTITUTED, SHIFTED or SWITCHED

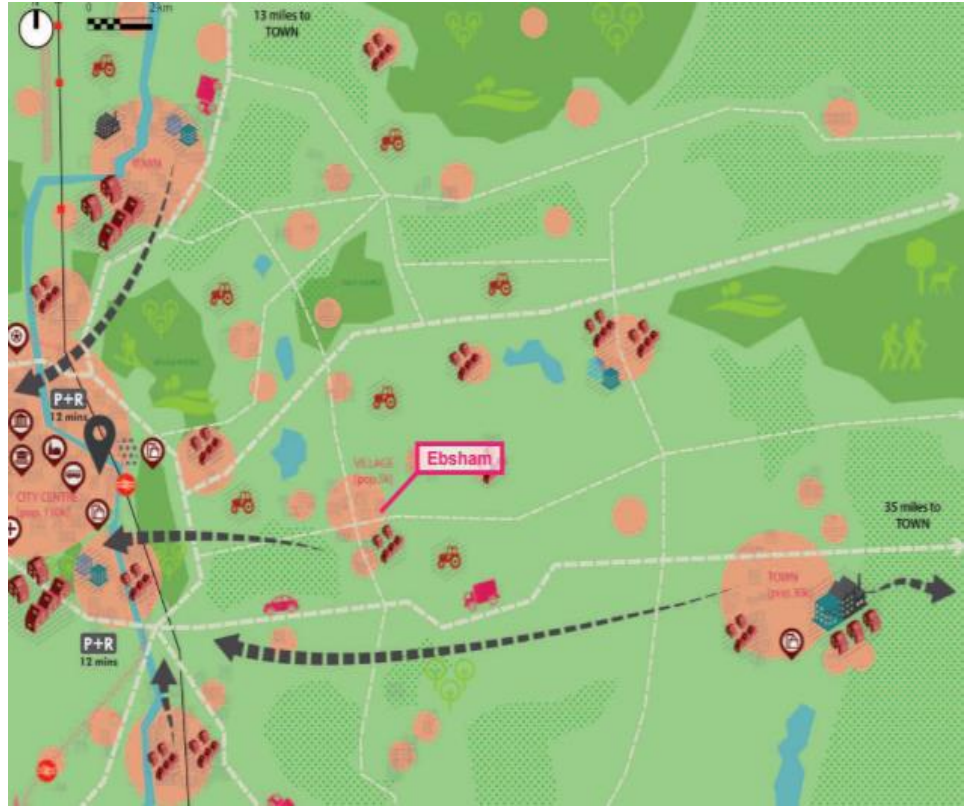
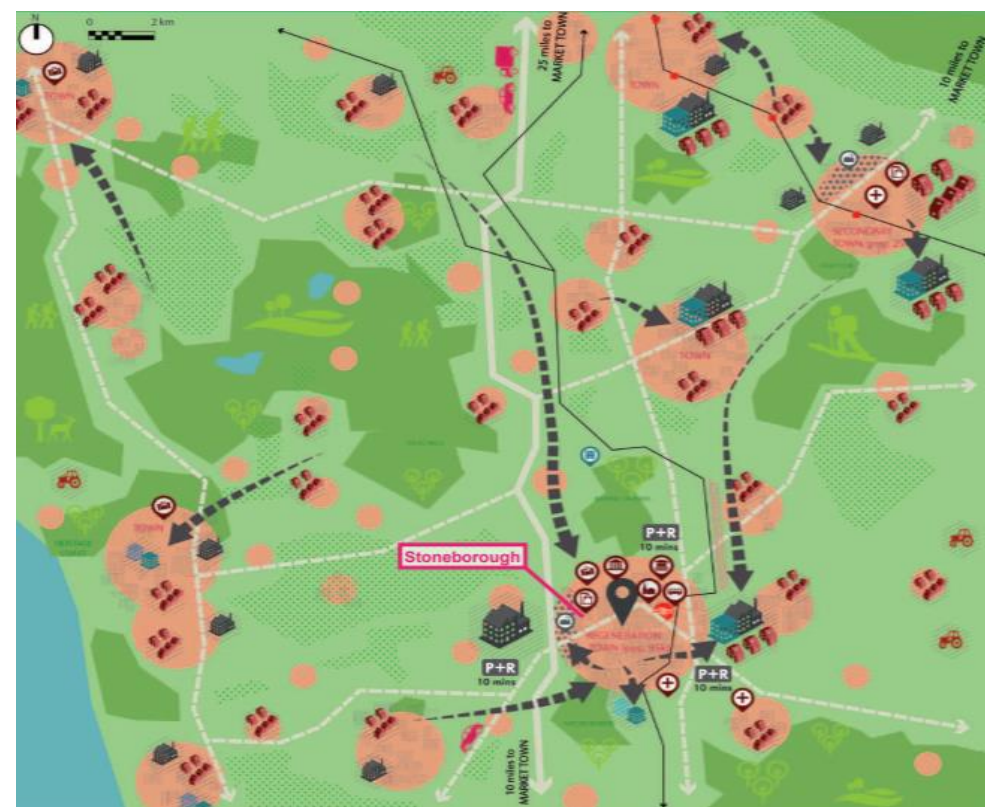
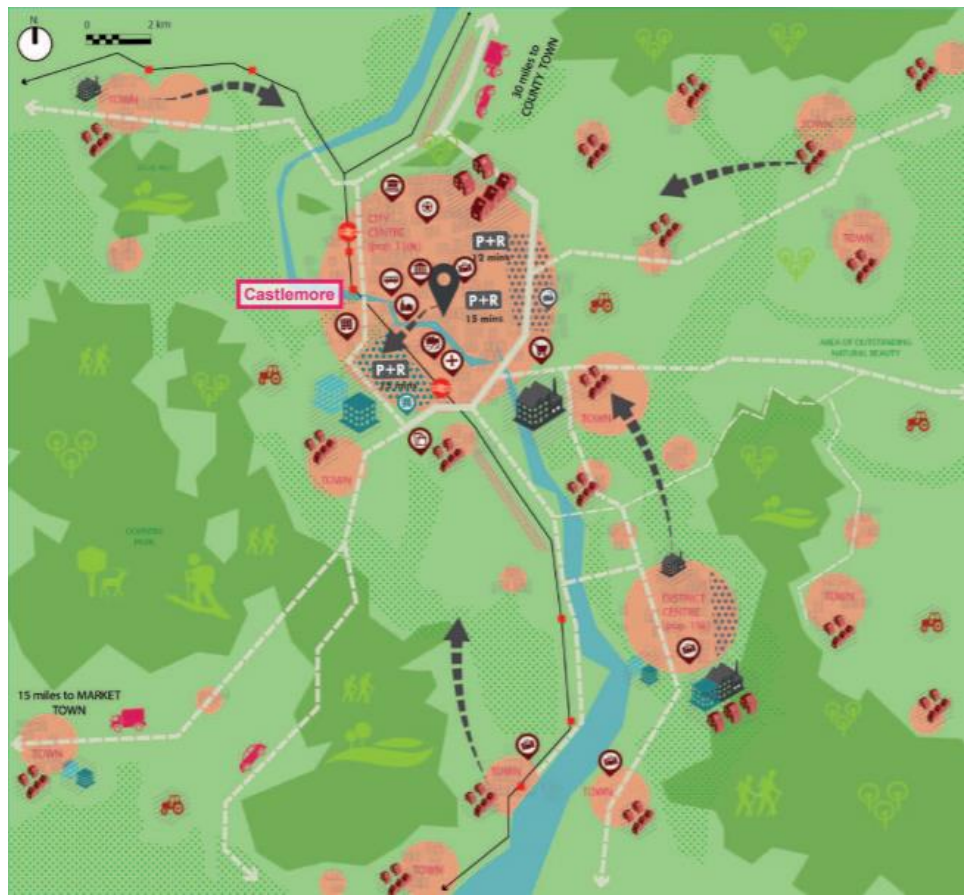
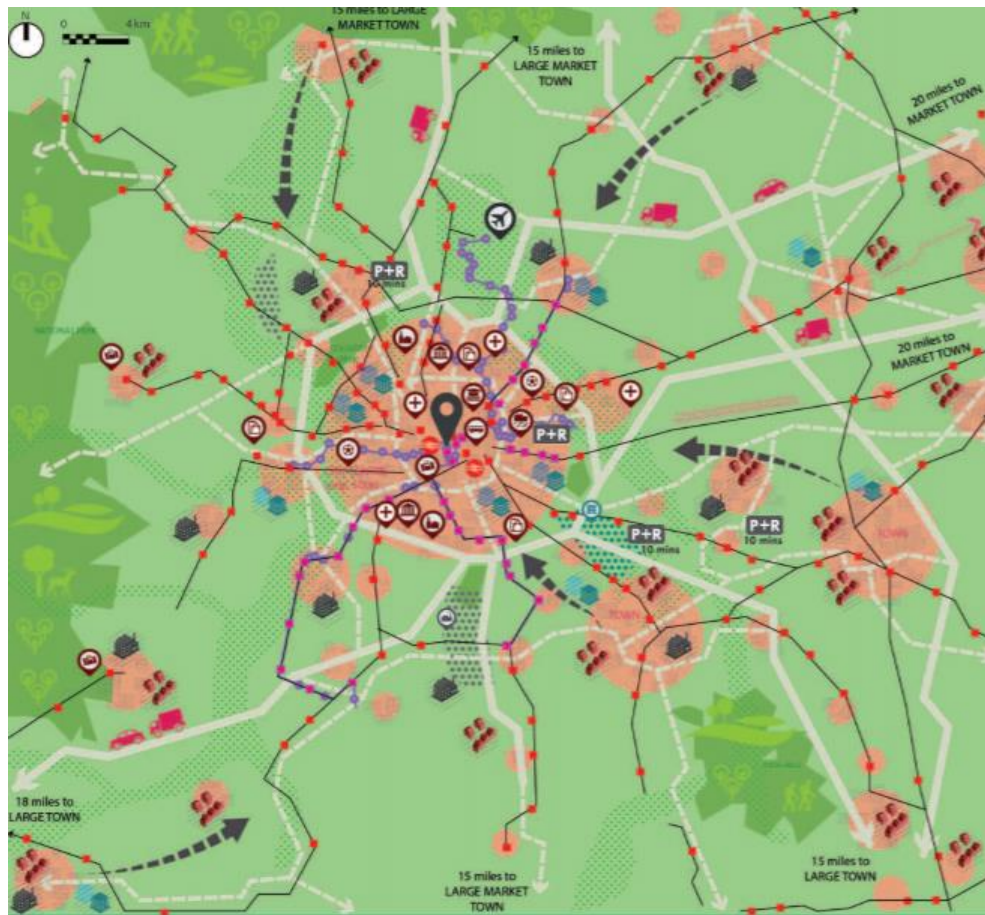


Substitute trips	Shift modes	Switch fuels
<b>Active travel infrastructure</b>	<b>Shared mobility</b>	<b>Electric vehicle (EV) charging infrastructure</b>
Cycling infrastructure - genuine connected network	Bike share	EV charging (residential) + vehicle to grid technology
Walking infrastructure - genuine connected network	eBike share	EV charging (stations / shops / work / mobility hubs)
Logistics infrastructure	Car share (club)	Hydrogen fuel cell charging (stations / shops / work)
Micro-consolidation - cargo bike / electric vehicle last mile delivery	Electric vehicle car share (club)	
Flexible pick up / drop off points for home deliveries	Mobility hubs - integrated network	
<b>Land use planning</b>	<b>Modern public transport</b>	<b>Conversion of fleets</b>
Co-working spaces (local, in new developments / disused shops)	Demand Responsive Transport & Rideshare	Convert commercial delivery and servicing fleets to EVs
Mixed use developments meeting a greater range of local needs	Bus Rapid Transport	Convert municipal delivery and servicing fleets to EVs
Recreation space embedded in neighbourhoods	Bus priority traffic lights	Convert public transport fleets to EVs
Local amenities within short walk and cycle (15-minute neighbourhood)	Automated vehicle shuttles - last mile connectivity	
<b>IT infrastructure</b>	Mobility as a Service - integrated public transport, on-demand and shared mobility services	<b>Fiscal measures</b>
Home working (superfast broadband and house design to allow for work space)		Grants to trade in petrol / diesel for EVs
Remote study and 'blended learning' for further and higher education	<b>Street design &amp; access restrictions</b>	<b>Access restrictions</b>
Digital public services (e.g. GP online)	Low Traffic Neighbourhoods - active travel priority	Low emission zones - Clean Air Zones
	Car free zones	
	Street space reallocation from car to active and public transport	
	20mph zones	
	Controlled parking zones	
	Congestion charging zones	
	<b>Fiscal measures</b>	
	Workplace Parking Levy	
	Fuel tax	



# Creating Place Typologies

Four ‘place typologies’ defined to make the theoretical aspects of the research real and to provide a focus for stakeholder discussions



- 4 Place Typologies
- Wotton City-Region: a polycentric conurbation*
- Castlemore: a regional unicentric city*
- Stoneborough: a regeneration town*
- Ebsham: a village in the county of Monteshire*



# Testing carbon reduction interventions

This research used a carbon disaggregation model based on the UK territorial emissions table for local authorities, published by BEIS

- Allocated emissions to the four typologies examined in the study
- Trip purpose and mode share data drawn from the NTS, Census and regional road traffic data from DfT
- Model utilises origin-destination trip patterns to establish behaviour and emissions across all purposes and modes
- Carbon reduction impact of the 40 interventions was modelled based on academic and best practice evidence

Full details on carbon modelling provided in the Methodological Appendix.

## Sources of open data

National Travel Survey

Census

Good Practice Studies

Manufacturer stated emissions

## Data provided

Number of trips

Average trip length

Mode share

Emissions factor

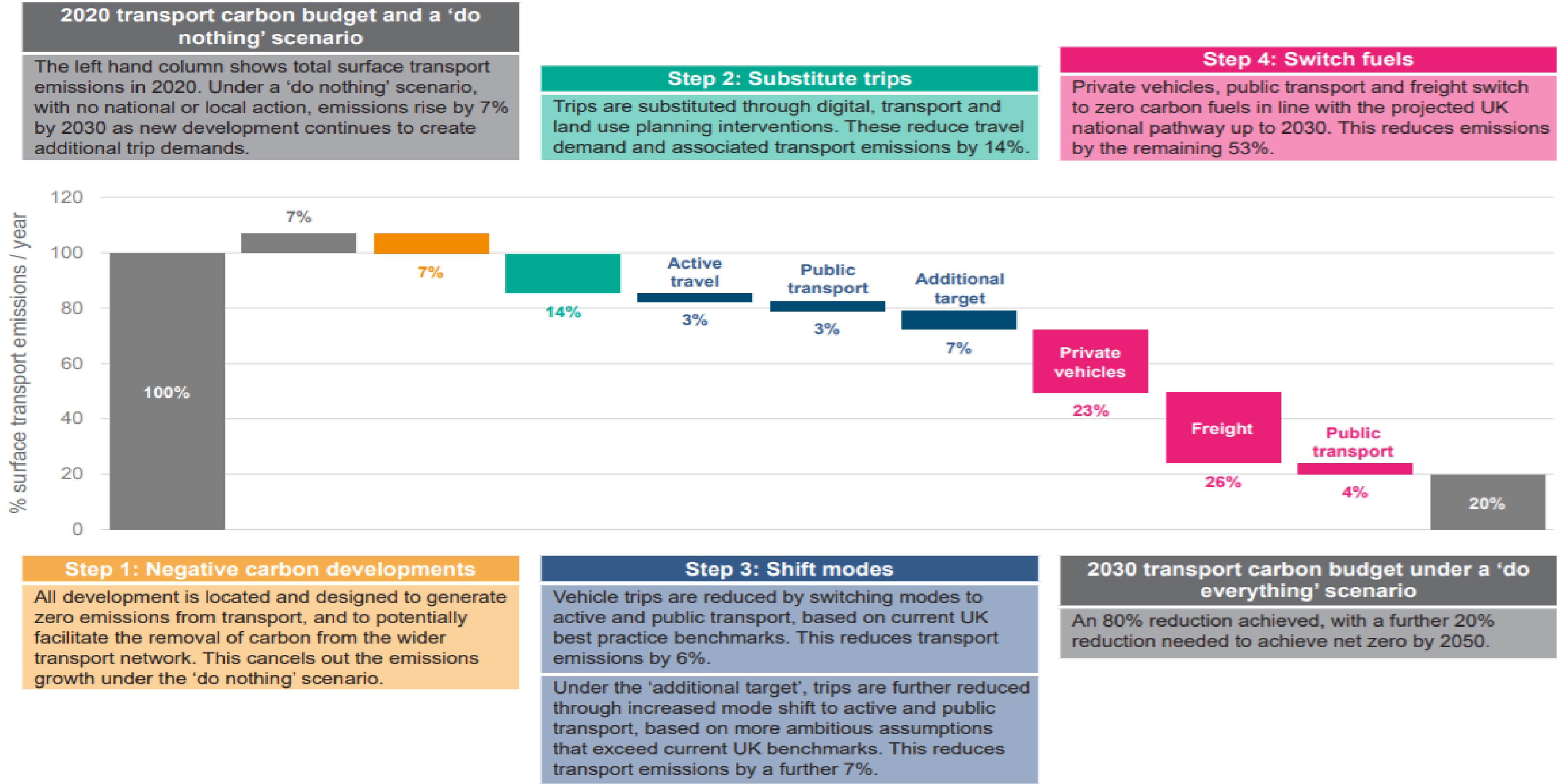
➔ Carbon emissions



# 3.0 Pathways to Net Zero Transport



# Building the 80% Carbon Reduction Pathway to 2030



An 80% carbon reduction pathway for 2020 to 2030 (average across the four place typologies)



# Conclusions



# Conclusions

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Switch to cleaner fuels only accounts for half of required reductions

Comprehensive package of **place-based interventions** needed to reduce transport emissions: the “do everything” approach:

- net zero or carbon negative new developments & growth zones
- measures to reduce the overall need to travel
- shifting trips to active, public and shared transport
- switching to zero emission vehicles and fuels

At a scale and pace which significantly exceeds current best practice

*“ Based on existing UK best practice achievements to reduce trips and shift modes, no combination of priority interventions will achieve the required 80% reduction in surface transport emissions by 2030 “*

*“Need more ambition in scale and innovation in terms of:*

- *Pursue all three SAM Level Interventions “Do everything” approach*
- *Integrated approach to transport and land use planning which puts carbon reduction first. “*



# MORE Project

Redesign layout and function of urban corridors to better reflect needs of travellers, residents and businesses

Respond to new mobility trends

Tools for cities to redesign streets and measure impact on corridor performance

TEN-T Workshop – Fostering modal shift for passenger journeys. 13 December 2021. Online. Register [www.roadspace.eu](http://www.roadspace.eu)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 769276.



## Net Zero Transport Report

<https://vectos.co.uk/england-likely-to-miss-2050-net-zero-targets/>

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# Thank you



# 3.0 Pathways to Net Zero Transport







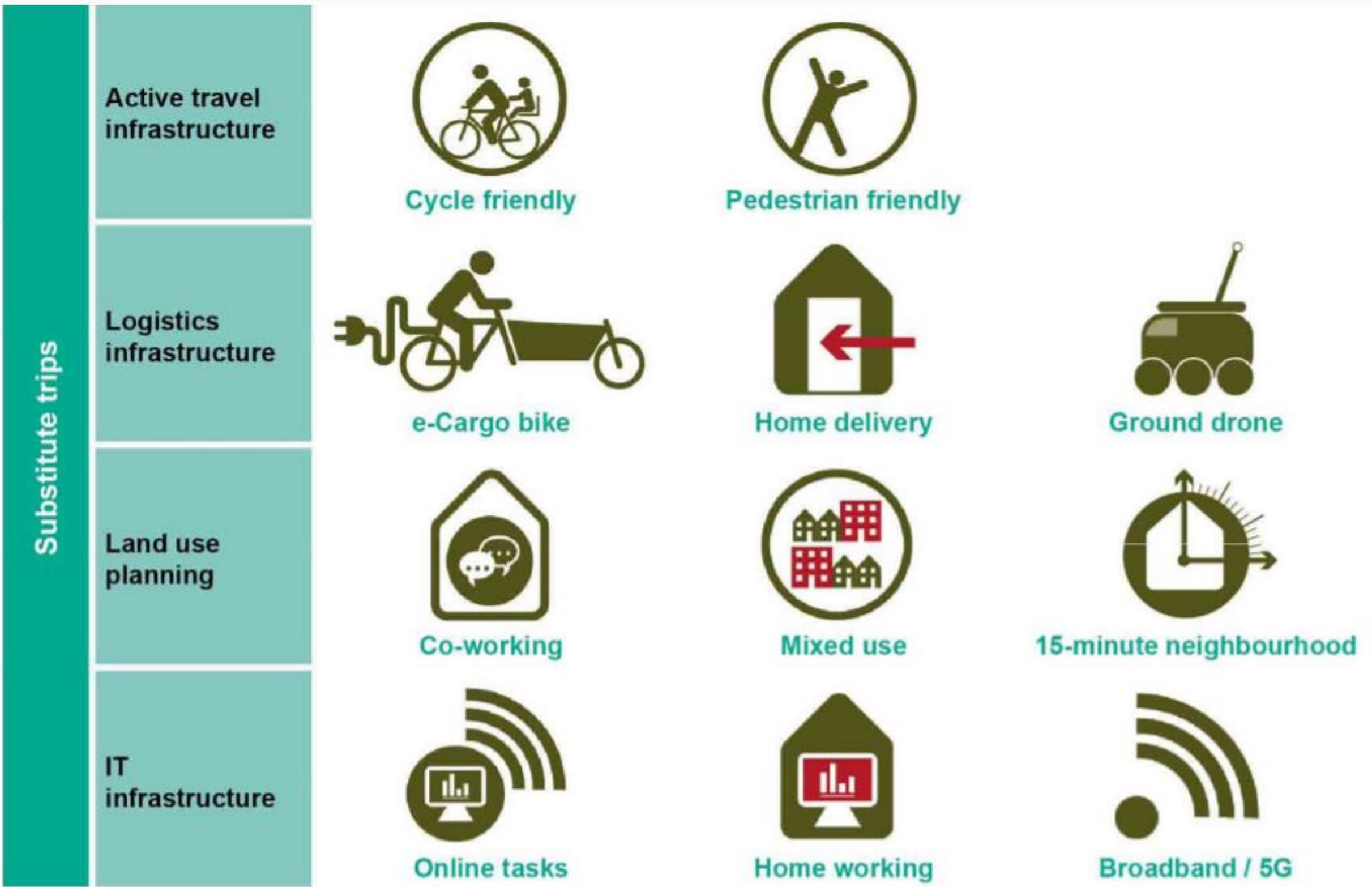
# 3.2 Carbon Reduction Pathway Step 2: Substitute trips

Maximise the potential to reduce travel demand by making use of home-working and digital service delivery

Improve access to local services and activities through the 15-minute neighbourhoods

The principles of local living and greater home-working must be applied in all new development and through area-based renewal and regeneration of existing places.

Based on the potential impacts assumed, the modelling shows that demand reduction could **reduce carbon emissions by around 14% in each typology.**





# 3.3 Carbon Reduction Pathway Step 3: Shift modes

Maximise mode shift to walking, cycling, public and shared transport going beyond the UK’s existing ‘best practice’ benchmarks

For example, to achieve the current UK ‘best practice’ benchmarks for the Wotton City-Region, the mode share for walking and cycling must increase by 10% for short journeys and 6% for longer journeys, while the mode share for public transport must increase by 24% for short journeys and 14% for longer journeys. In this typology, these changes **reduce carbon emissions by 13%.**





# 3.4 Carbon Reduction Pathway Step 4: Switch Fuels

Residual emissions are addressed through roll out of zero emission fuels for public transport fleets, logistics and private vehicles. **Reduce carbon emissions by 45% to 55%**

Implementation of this pathway would need to be tailored to local circumstances in order to meet community needs and maximise placemaking benefits.





# DISCUSSION #1 – in order to decarbonise transport...:

Should we prioritise ‘**Substituting trips**’ **interventions** (reduce need to travel)

- 15 min neighbourhoods, local living, online shopping, work from home, co-working space, consolidated deliveries

## Pros vs Cons



# DISCUSSION #2 – in order to decarbonise transport...:

Should cities spend more resources on:

## ‘Shifting modes’

- shared mobility, hubs, car free zones, parking restrictions

or

## ‘Switching fuels’

- EV fleets + charging infrastructure