



Department
for Transport

Clearing the Air! A consideration of the practical challenges of decarbonising a cities transport



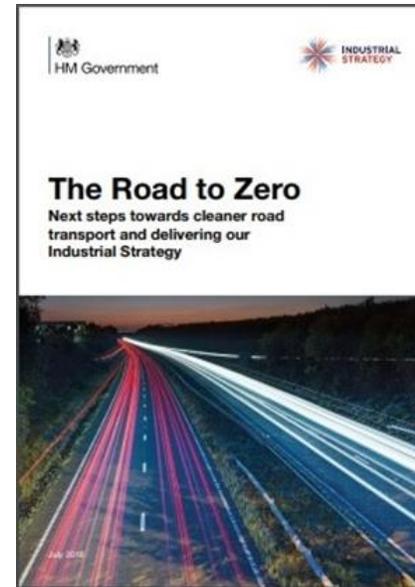
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There are a number of factors driving action on energy in DfT

Road to Zero Strategy

- ▶ Published July 2018. Sets out how Government will support the transition to zero emission vehicles
- ▶ Ensure the UK is well placed to capitalise on new economic opportunities and drive down emissions from conventional vehicles.
- ▶ Considers GHG and air quality in parallel for the first time
- ▶ Brings together a range of policy initiatives into a single strategy that provided certainty to consumers and industry about Government's position and priorities.

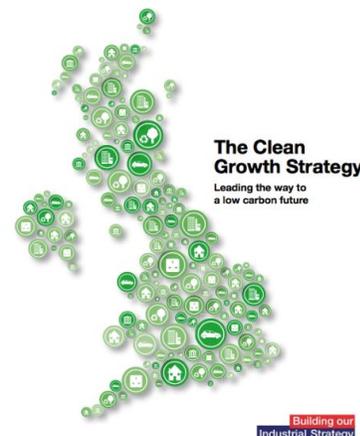


Strategic priorities are to:

- By **2050** almost every car and van to be zero emission
- By **2040** to end the sale of new conventional cars and vans
- By **2030** at least 50%, and as many as 70%, of new car sales and up to 40% of new van sales to be ULEV
- By **2025** to review progress, seeking to maintain the UK's leadership position and meet our ambitions.

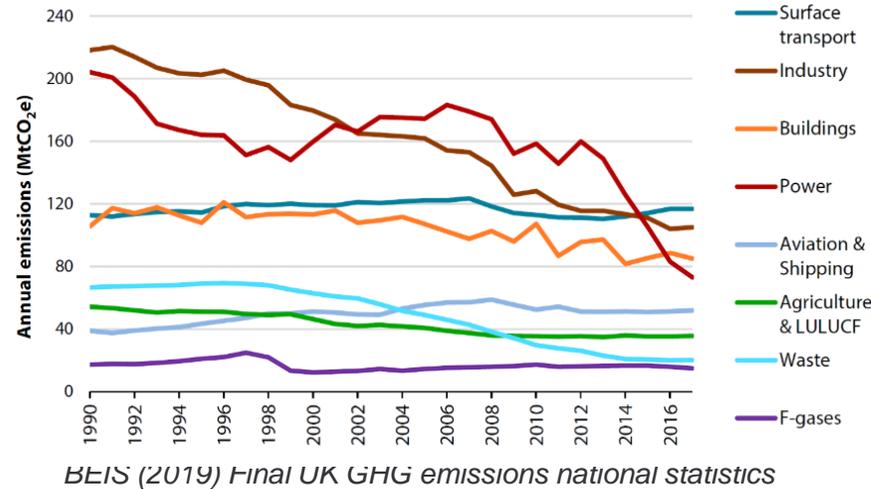
Clean Growth Plan

- ▶ Published October 2017.
- ▶ Primarily road-focused.
- ▶ Also provided funding to reduce the CO₂ from domestic shipping and aviation.



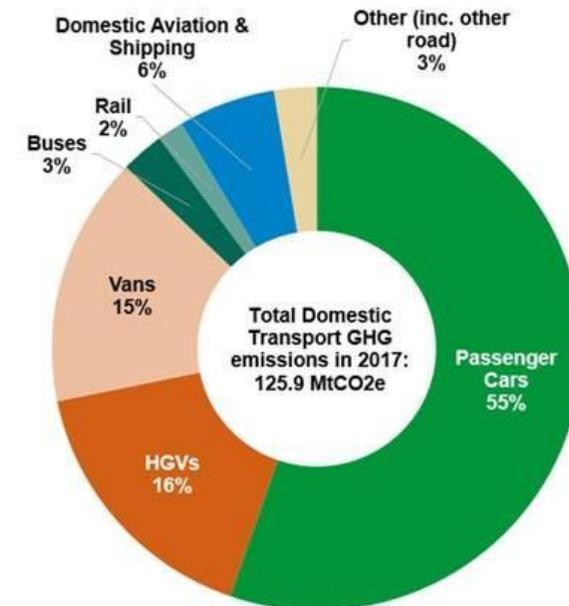
Clean Air Strategy

- ▶ Published 2019.
- ▶ Sets out the actions required across government and society to improve air quality.
- ▶ Includes how we will:
 - ▶ protect health
 - ▶ protect the environment
 - ▶ secure clean growth & innovation
 - ▶ reduce emissions from transport, homes, farming and industry



- ▶ Transport is the largest emitting sector, accounting for **33%** of the UK's 2018 greenhouse gas emissions.
- ▶ Whilst other sectors have reduced emissions dramatically since 1990, transport has only fallen 3%.
- ▶ Transport emissions had **risen three years in a row before levelling in 2017** at their highest level since 2009 – before falling 3% in 2018.

- ▶ Cars, vans and trucks are the most significant sources, accounting for 86% of domestic transport emissions in 2017.
- ▶ Road transport emissions have increased by 3% since 1990. Improvements in the fuel efficiency of these vehicles have only partially offset the emissions generated by increased traffic volumes. Van traffic has doubled, car traffic has increased by 22% and HGV traffic by 10%.
- ▶ International aviation and shipping (currently excluded from UK carbon budgets) add a further 35Mt and 8Mt respectively.





Against this backdrop the global political context has changed, accelerating plans for emission reductions in the UK...

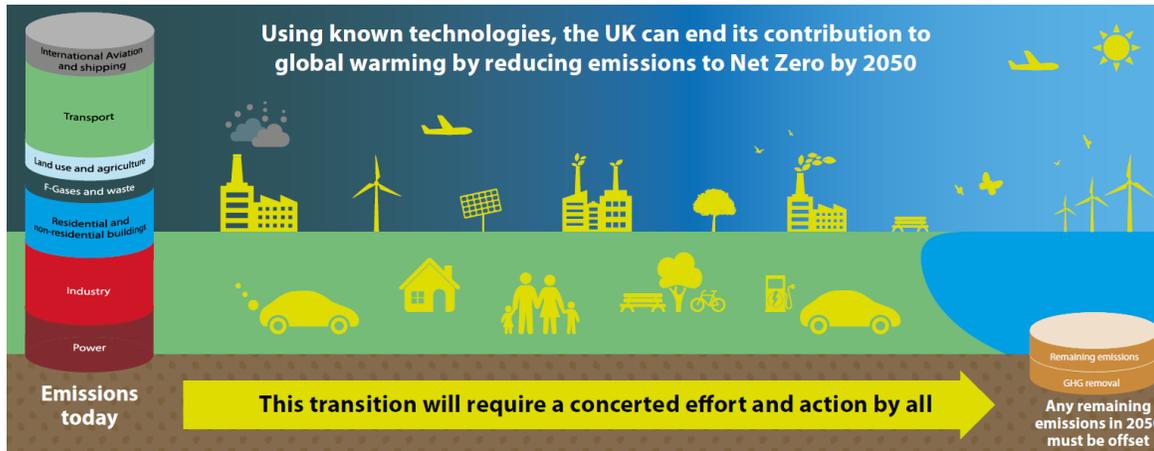


Following the UK Committee on Climate Change advice, the Prime Minister has committed to reaching net zero emissions by **2050**

Theresa May announces legal commitment to end UK's global warming contributions by 2050

PM introduces legislation enacting target of net-zero greenhouse gas emissions by 2050

Ashley Cowburn Political Correspondent | @ashcowburn | Tuesday 11 June 2019 22:36 | 17 comments





Significant challenges in decarbonisation are in the public eye

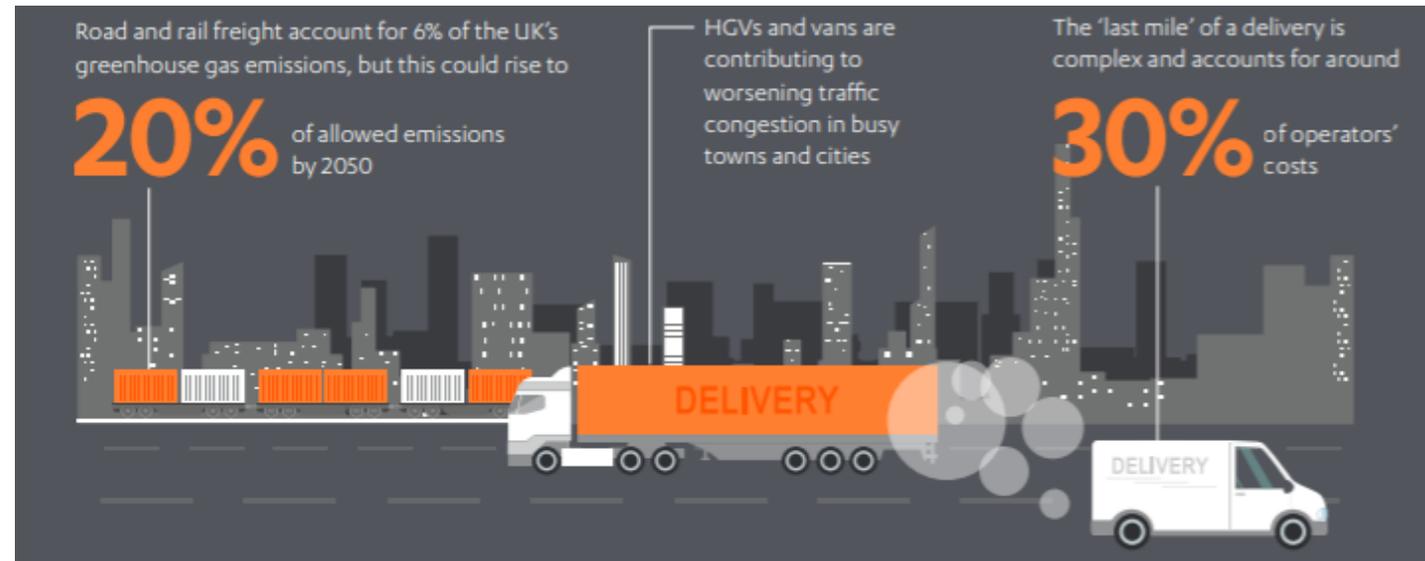
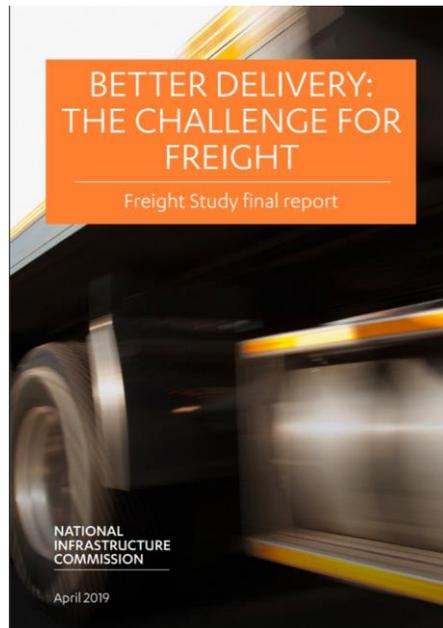
- The CCC made the following top level recommendations:

Extensive Electrification	<ul style="list-style-type: none">• Particularly of transport and heating, supported by a major expansion of low-carbon power generation.• A likely doubling of electricity demand, with all power produced from low-carbon sources (compared to 50% today).
Bioenergy	<ul style="list-style-type: none">• Increasing domestic bioenergy resource is needed to feed into (BE)CCS with some hydrogen production.• Use of conversion technologies for hydrogen and biofuels (for aviation and maritime)
Development of Hydrogen Economy	<ul style="list-style-type: none">• For HGVs and ships, and for electricity and heating in peak periods.• By 2050, a new low-carbon industry is needed with UK hydrogen production capacity of comparable size to the UK's current fleet of gas-fired power stations.





National Infrastructure Commission published: *Better Delivery: the Challenge for Freight*, April 2019





NIC (National Infrastructure Commission): Recommendations

Key finding: with the adoption of new technologies and the recognition of freight's needs in the planning system, it is possible to decarbonise road and rail freight by 2050 and manage its contribution to congestion.

The 3 recommendations are:

1

Decarbonisation of road and rail freight by 2050

Tackling environmental impacts by committing to decarbonising road & rail freight by 2050

2

Better land use planning for freight

Managing freight's contribution to congestion through better planning

3

A new partnership for freight

Establish a new Freight Leadership Council, bring together government and industry for accelerated progress on long term issues

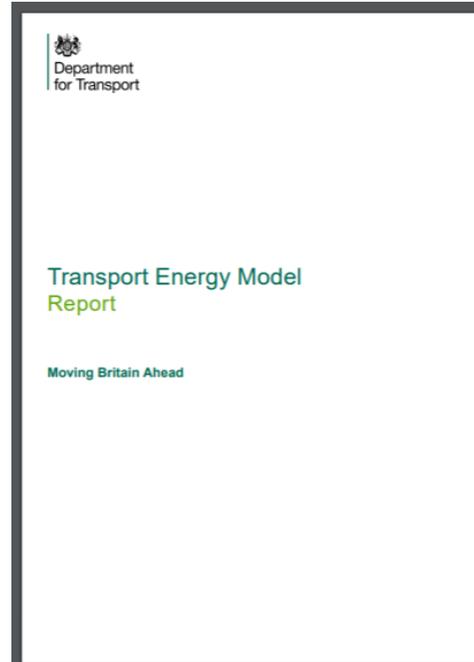
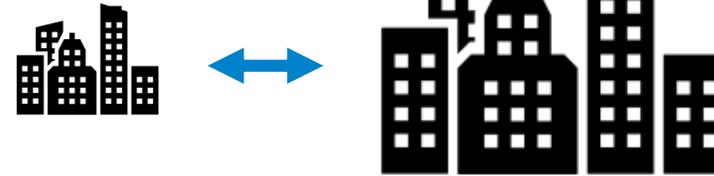




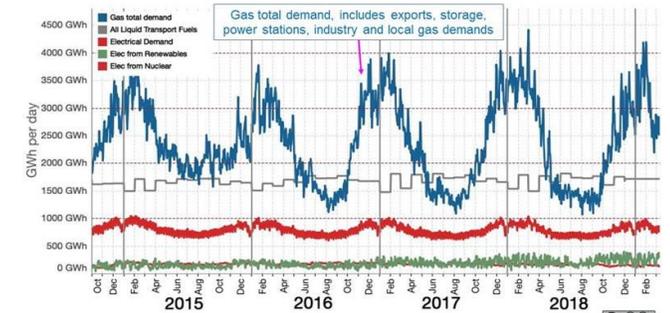
Decarbonisation is not just about the modes..... What about the Energy System

Lots of sources of uncertainty:

- Urbanisation or de-urbanisation
- For much of rail, electrification is an effective method of decarbonisation. But electrification has its limits:
- There will always be some parts of rail which are difficult to decarbonise
- Transport's draw on the grid, especially during peak times
- World battery manufacture is struggling to meet demand.
- DfT published a report: Transport Energy Models (2018) which looks at alternative and synthetic fuels



Great Britain's Energy Vectors – in GWh per day

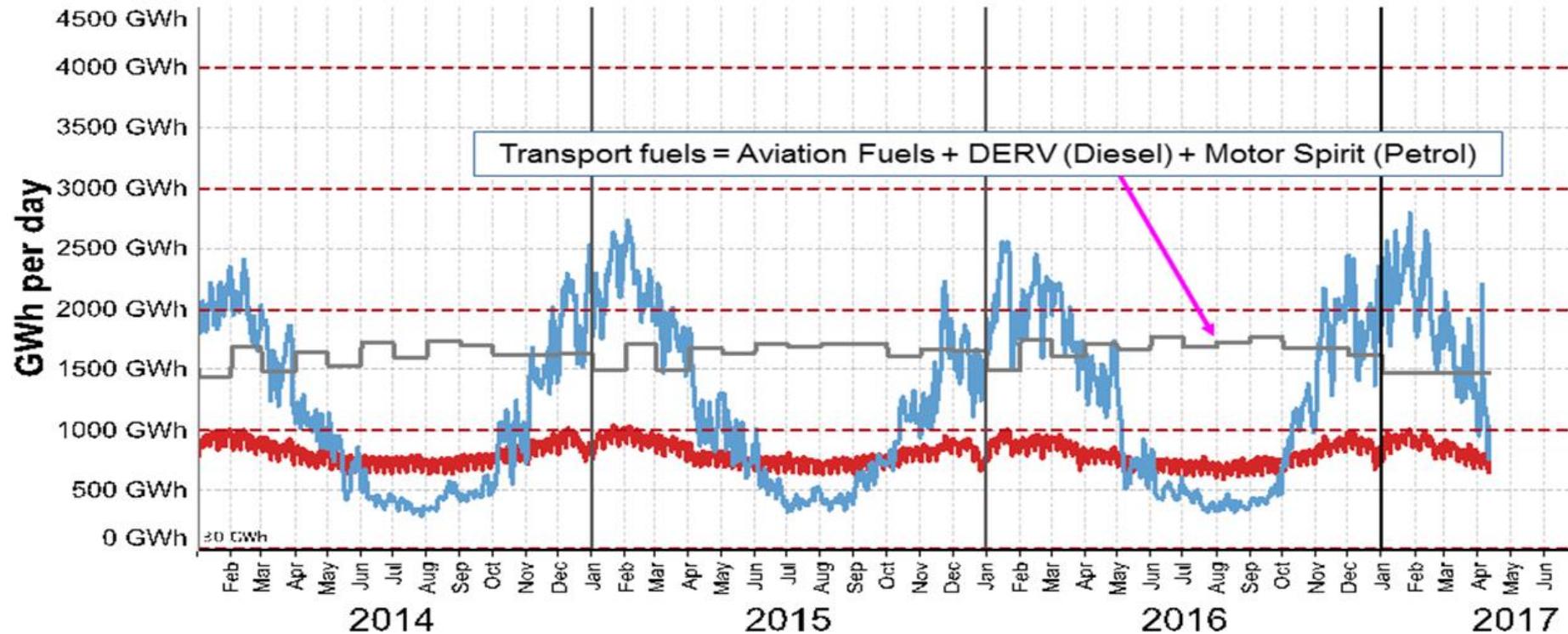


UNIVERSITY OF BIRMINGHAM | BIRMINGHAM ENERGY INSTITUTE
 Underlying data are from National Grid, Elexon and BEIS
 Figure created by Dr Grant Wilson: l.a.g.wilson@bham.ac.uk
<https://www.researchgate.net/project/multi-vector-energy-analysis>





Great Britain's Energy Vectors – in GWh per day



Data are from National Grid, Elexon and BEIS. Charts are licensed under an Attribution-NoDerivatives 4.0 International license based on the paper <http://bit.ly/saeddiagram> by Dr Grant Wilson





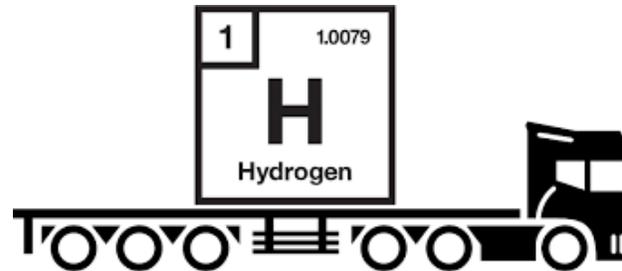
CCC's Net Zero Technical Report makes 555 mentions of "Hydrogen" plus further ambitions in transport:

- HGVs transitioning to zero emission options including hydrogen and electrification throughout the 2030s.
- A more ambitious programme of rail electrification and the roll-out of hydrogen trains.
- The roll-out of electric and hydrogen buses and coaches could reach 100% market share by 2040 with accelerated take-up in the next two decades.

H₂ Production



Distribution



Wider Demand





Modal Hydrogen Opportunities



- Commuter rail services and gaps in electrification are good opportunities
- Hydrogen is less suited for freight or high speed rail due to storage volume requirements



- Road freight is a relatively small proportion of transport emissions, but is difficult to decarbonise by other means.



- The back-to-depot duty cycle of buses make them amenable to hydrogen powertrains

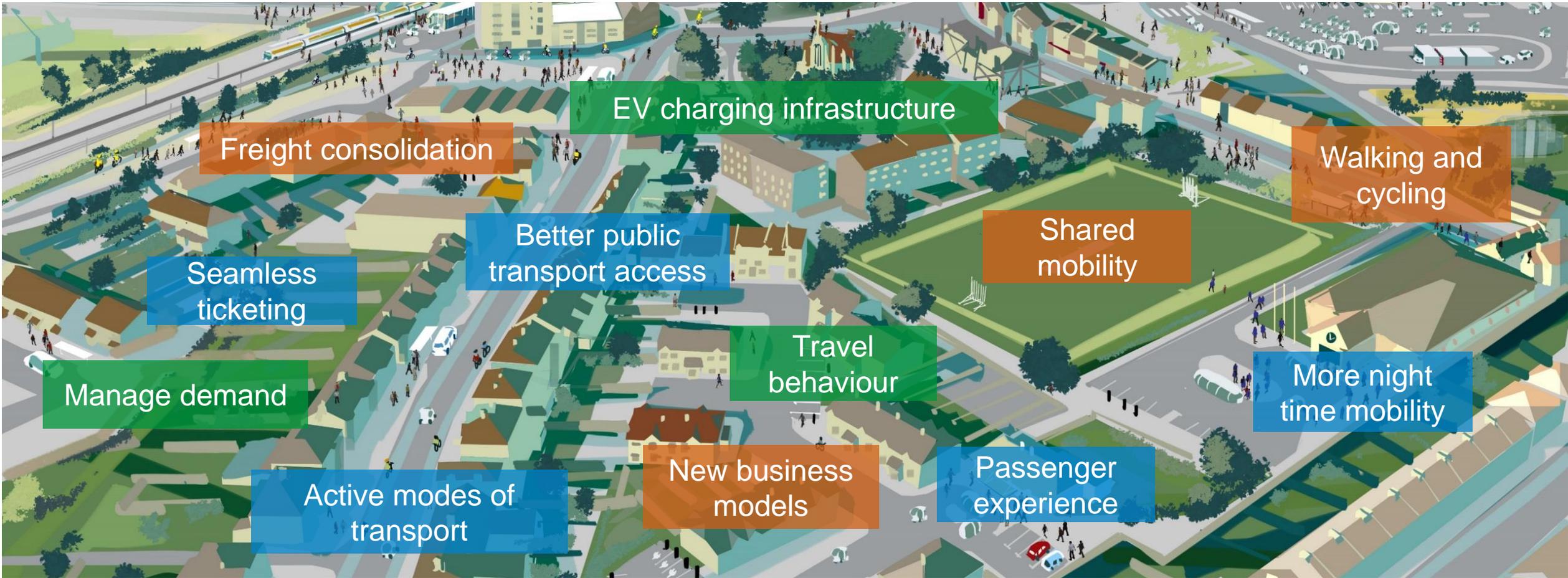


- Maritime presents big opportunity, but can be a difficult place to innovate due to its fragmented nature and long life cycles. Hydrogen and ammonia could be very beneficial here.





There are other ways to reduce emissions.....





... And the Future of Urban Mobility Strategy promotes sustainable travel for short journeys, zero emission services and consolidation of freight

In facilitating innovation in urban mobility for freight, passengers and services, the Government's approach will be underpinned as far as possible by the following Principles:



1. New modes of transport and new mobility services must be safe and secure by design.
2. The benefits of innovation in mobility must be available to all parts of the UK and all segments of society.
3. Walking, cycling and active travel must remain the best options for short urban journeys.
4. Mass transit must remain fundamental to an efficient transport system.
5. New mobility services must lead the transition to zero emissions.
6. Mobility innovation must help to reduce congestion through more efficient use of limited road space, for example through sharing rides, increasing occupancy or consolidating freight.
7. The marketplace for mobility must be open to stimulate innovation and give the best deal for consumers.
8. New mobility services must be designed to operate as part of an integrated transport system combining public, private and multiple modes for transport users.
9. Data from new mobility services must be shared to improve choice and the operation of the transport system.

Regulatory review: The review will explore regulations around new types of vehicles including e-scooters and e-cargo bike trailers, how sharing data can improve services by reducing congestion, and how journey planning and payment can be made simpler.





- ▶ It is not just about considering what decarbonised energy vector we choose for our transport modes in cities
- ▶ Need to be sure the energy system and energy vectors that are to be used can be produced and delivered at scale for transport use
- ▶ Also need to ensure whatever energy vectors are used are genuinely decarbonised and also won't deliver another '**diesel gate**' sometime in the future
- ▶ But technology and change of energy/fuels are only a part of the solution – we have to start a fundamental rethink how we deliver transport and how much we need to travel
- ▶ To meet our objectives transport and travel will look very different in the future
- ▶ Collectively we must have a vision to take this challenge forward at pace





..... And remember Greta will be watching us

