Journey to Net Zero: A routemap for transforming travel in Gloucestershire

This document summarises a programme of work that has explored how Gloucestershire can respond to the climate emergency and reduce the impact of transport on climate change. It highlights the main points from a more detailed Transport Decarbonisation Routemap that was developed for Gloucestershire by AtkinsRéalis in 2024.

Transport emissions in Gloucestershire need to reduce – and fast

Addressing global climate change caused by greenhouse gas (GHG) emissions is widely recognised as one of the world's most urgent challenges. GHG emissions need to be rapidly reduced to limit climate change and its far-reaching environmental, social and economic consequences.

Transport GHG emissions are often termed 'carbon' as carbon dioxide accounts for 99% of transport GHGs.

This urgency is reflected in international, national and local emissions reduction commitments. Along with the national government and many other UK authorities, all of Gloucestershire's local authorities declared a Climate Emergency in 2019. Gloucestershire County Council has set targets for emissions from all sources across the county to be net zero by 2045, and has committed to work with partners to deliver an 80% reduction in the county's emissions by 2030, relative to 2005.

The transport sector has an important role in meeting emissions reduction targets. In 2022, transport accounted for 28% of GHG emissions in the UK and 40% of GHG emissions in Gloucestershire.

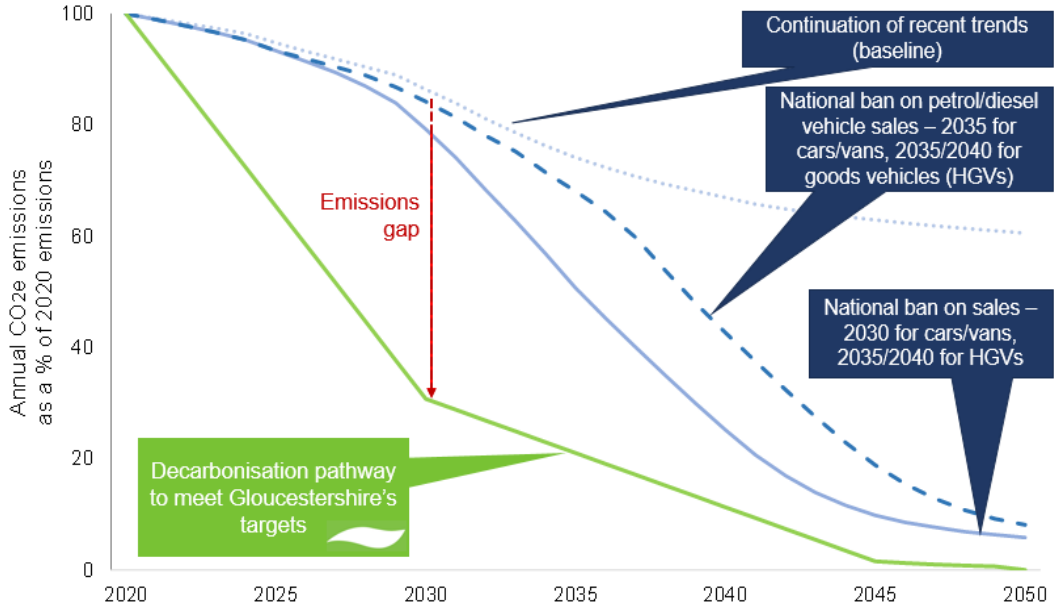
Sources of Gloucestershire's transport emissions

Road traffic generates over 95% of transport emissions in Gloucestershire, with car travel accounting for more than 60%. Freight accounts for most of the remaining emissions, public transport accounts for less than 5%. Trips within, to or from the county account for about 65% of emissions (trips through Gloucestershire account for the rest). County level action is likely to have most impact on car travel within, to or from the county. Freight and through trips are harder to influence at a local level.

The graph below shows Gloucestershire's projected transport emissions in future years (blue lines) based on assumed traffic growth and different views on the uptake of electric vehicles (EVs) and other zero emissions vehicles (ZEVs).

Emissions levels are expected to remain high with a large gap between future emissions and the decarbonisation pathway showing the emissions levels needed to meet Gloucestershire's decarbonisation targets (the green line).

Gloucestershire's transport emissions gap



The emissions gap is illustrated on the graph by the red arrow. It shows that, whilst EVs will play an important role in reducing emissions, they cannot solve the problem alone.

EVs bring their own challenges (including environmental impacts of production and high purchase costs). There are also practical limits to how quickly new EVs can be produced and drivers can replace their vehicles.

Even with the ambitious national action to encourage EV uptake assumed in the lowest blue line (including an early ban on petrol/ diesel vehicle sales), emissions would need to reduce by a further 60% in 2030 to close the gap to the decarbonisation pathway. Each year in which emissions remain above the pathway adds further to the cumulative emissions that drive climate change.

Closing the emissions gap will need new approaches to travel and accessibility, driven by rapid action at the national and local level.

The DfT's Transport Decarbonisation Plan (2021) is the latest summary of planned national action. The Routemap sets out Gloucestershire's proposed action.

A range of approaches to reduce emissions is needed

Transport carbon emissions are a direct result of the number of vehicle kilometres travelled by vehicle type and the average emissions produced by vehicles per kilometre.

This means that any approaches introduced to reduce emissions need to reduce either:

- Vehicle kilometres; or
- Emissions per vehicle kilometre.

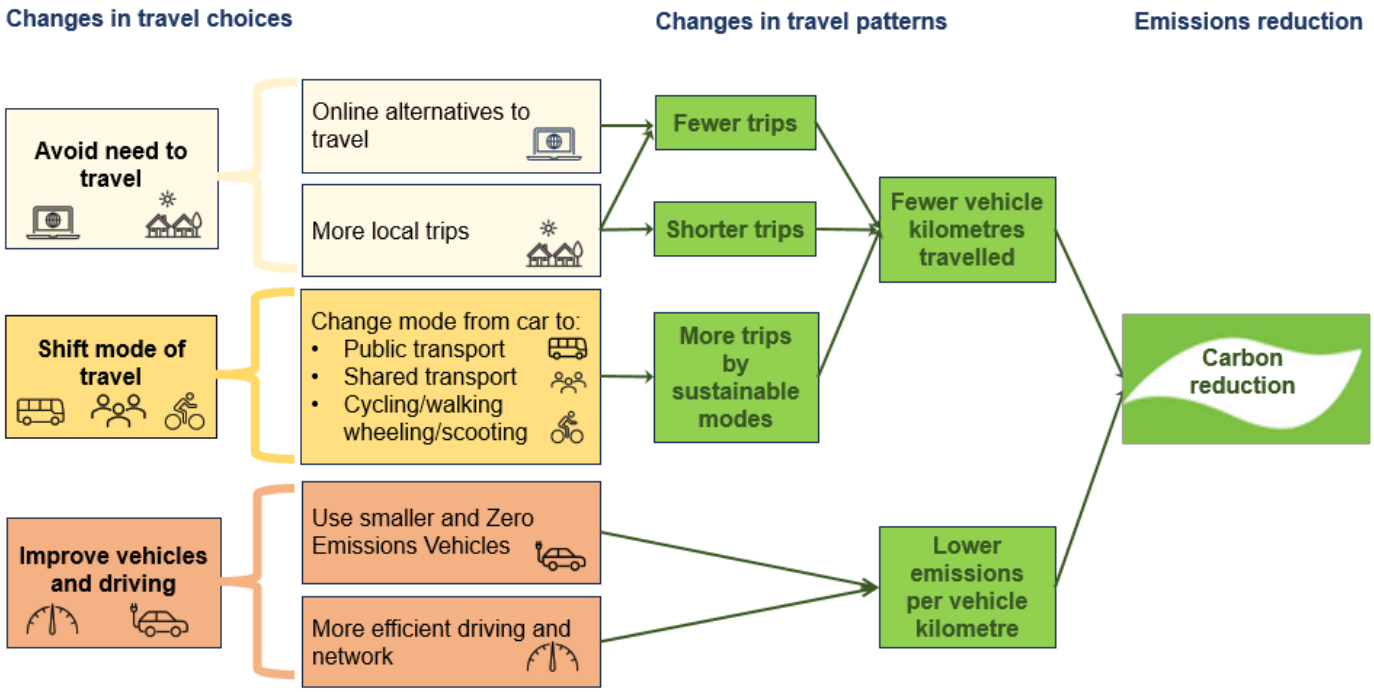
Measures that reduce emissions through these routes are often grouped by three main types of change in people's choices about how they travel and access opportunities and activities. The three types of changes are those that:

- **Avoid the need to travel as much**, by making it possible for people to make fewer and/ or shorter journeys;
- **Shift the mode of travel**, through changes that mean that people choose to use their cars less and travel instead by lower emissions options of public or shared transport, cycling, walking or wheeling; and
- **Improve (or reduce) the emissions produced per kilometre driven** through increasing the efficiency of peoples' driving styles and of the network (e.g. less congested and stop-start travel), use of smaller, more efficient vehicles and use of ZEVs (mainly EVs).

The flow chart below shows that there are five main types of travel choice that can be made across the Avoid, Shift and Improve categories of change. Each one can change travel patterns, reducing vehicle kilometres or emissions per vehicle kilometre and therefore reducing transport emissions, helping to close the emissions gap.

At the county level there is most potential to influence the emissions from car trips to, from and within Gloucestershire. The Routemap therefore focuses on measures to achieve the five changes shown for Gloucestershire-based car trips. However it will be important for the council to collaborate with National Highways, other authorities, businesses and others to encourage similar changes in travel choices for trips through Gloucestershire and freight trips.

Changes in travel choices to reduce transport emissions



To close the emissions gap concerted action will be needed across all three of the Avoid, Shift and Improve categories to deliver all five types of change in travel choice and reduce both car kilometres travelled on Gloucestershire-based trips and emissions per remaining car kilometre.

Different balances of action between the Avoid, Shift and Improve categories could be applied to close the emissions gap for car travel. However, to provide a framework for identifying measures for the Routemap, change, it has been assumed that:

- Half of the gap will be closed by Improve measures to reduce emissions per vehicle kilometre; and
- Half will be closed by a combination of Avoid and Shift measures to reduce the number of vehicle kilometres travelled.

This balance reflects Gloucestershire's rural nature which limits the feasible scale of behaviour change through the Avoid and Shift routes. The Improve proportion is the maximum considered feasible, given the practical limits on EV uptake rates outlined above.

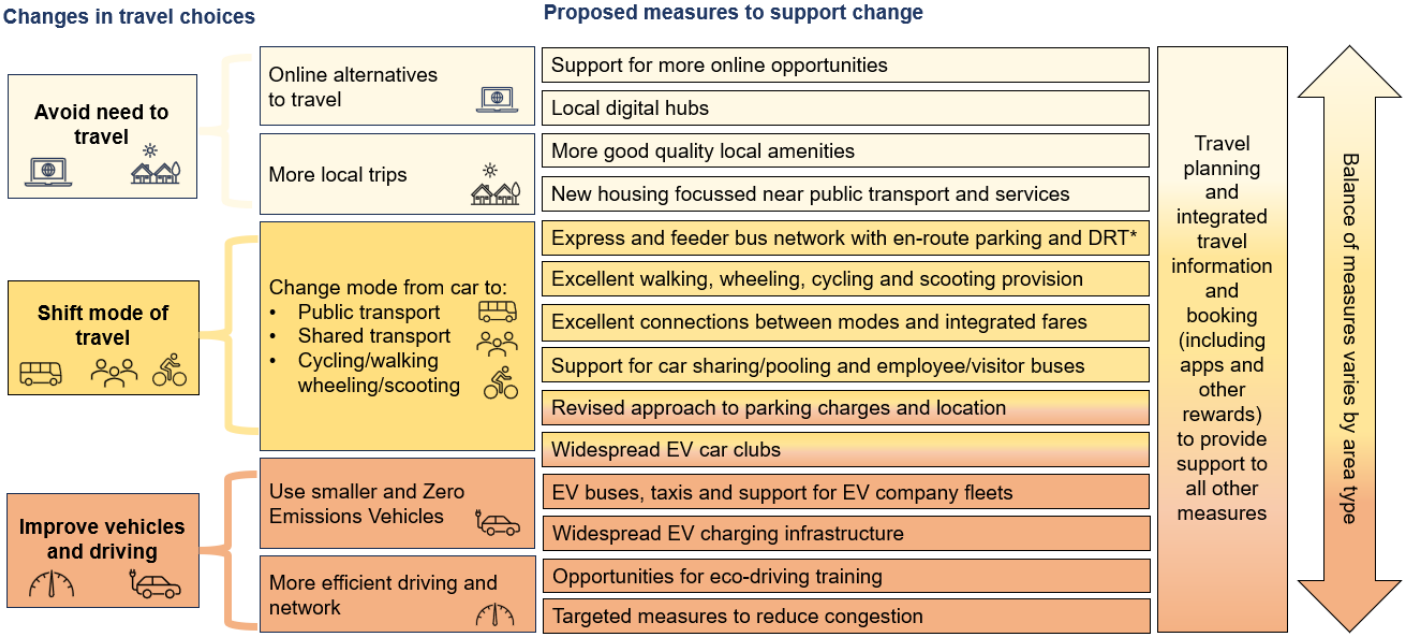
A tailored approach has been developed for Gloucestershire

The Routemap identifies a range of measures that will support the Avoid, Shift and Improve changes needed to close the emissions gap for car travel in Gloucestershire. These have been identified based on an understanding of the patterns of current 'high-emission' travel behaviour and their root causes.

The measures are summarised below, each shown against the changes in travel choices that they will support.

Combined, the wide range of measures have the potential to change travel and accessibility choices and deliver the scale of change in travel patterns required to close the emissions gap for car travel.

Proposed measures to reduce transport emissions in Gloucestershire



* *Demand Responsive Transport (DRT)*

Avoid need to travel

The measures include support for digital activity and local centres, and careful planning and accessible locations for new development. This will give people the option to do more online and locally so that they can make fewer and shorter journeys, avoiding the need to travel so much.

Shift mode of travel

Several of the measures reflect the fact that to encourage mode shift, there will be a need for substantial improvements in sustainable travel options - walking, wheeling, cycling and travel by public and shared transport. For example, they include a network of frequent, reliable and direct express buses between towns, supported by feeder buses and opportunities to drive a short first leg of a journey before parking en-route to join the express buses.

Mobility hubs will provide strong connections between bus, rail, walking, wheeling, cycling and e-scooting options, making it easier to combine several types of travel in one journey. Support for car sharing and pooling, company and visitor bus services and expansion of the Robin Demand Responsive Transport (DRT) system will expand the role of shared transport as an option for many journeys.

Lower and simpler fares and improved information will also make sustainable modes more attractive.

To deliver the scale of change needed, sufficiently quickly, most of the measures will focus on making best use of the existing transport system. This will involve using it more efficiently through changes in services, connections and priority rather than waiting to develop new infrastructure.

The role of new infrastructure

Some of the measures will be supported by new infrastructure, which will be designed carefully to limit the amount of embodied carbon in its construction. However, new infrastructure takes time to deliver and only affects a targeted area of the county, meaning that it can only play a limited role in the scale and pace of travel change needed. The main focus will therefore be on making best use of existing infrastructure through measures that can be implemented more quickly and with wider reach.

The sustainable travel improvements outlined above will provide people with the opportunity and capability to choose to shift mode from car. However, theories on the causes of behaviour change indicate that people also need the motivation to change.

On a daily basis, motivation is often driven by the cost and convenience of travel options and habit. This poses a significant challenge because current approaches to car usage and planning mean that, once people own cars, they are the cheapest and most convenient option for most trips. This makes it difficult to motivate drivers to switch to other modes.

The cycle of car ownership and usage

A complex mix of transport, social and planning factors (including location of jobs, shops and services, social aspirations and lack of alternatives to car for some journeys) mean that most people pay significant initial and yearly costs to own cars. Once those costs are paid, each extra car trip is relatively cheap and convenient, especially if easy parking is given priority over other uses of central space. As a result, there is often little motivation for car owners to use other modes.

This means that changing current travel choices and patterns to reduce car use and emissions will need a wider range of measures to change the balance in cost and convenience between modes and provide the motivation to shift from cars. Improvements in sustainable travel options alone will not be sufficient to achieve the scale of change needed.

Widespread roll-out of car clubs that allow pay per use access to electric cars is an important measure that would help to change the approach to car use, bringing a number of benefits.

Moving to pay per use means that drivers consider all car usage costs on a per trip basis. This is directly comparable with public transport costs, moving away from current high upfront and low per trip car costs. For many people, car club use has the potential to be cheaper per year than owning a car. Car clubs would also provide an accessible option for occasional car use for those unable to afford a car.

Achieving the changes in travel choices required to close the emissions gap will also require a change in the way in which space is prioritised in town centres and on busy roads. More priority will need to be given to supporting reliable public transport journeys, safe and attractive walking, wheeling and cycling journeys, and more attractive spaces where people choose to spend time.

This will mean giving less priority to cars and parking space (apart from essential needs) in prime central areas and reviewing the approach to parking management and charging.

Widespread car clubs use would also support Improve changes by accelerating the uptake of EVs.

EV uptake will also be supported through provision of more charging infrastructure and action to encourage take-up in company and public transport fleets, building on the ongoing electrification of the bus and taxi fleet.

Car clubs as an Improve measure

CoMoUK estimates that, on average, each car club vehicle replaces up to 25 private cars. Each electric club car would therefore replace much more petrol/ diesel mileage than it would as a privately owned vehicle. Car clubs would also support the use of smaller cars by allowing people to hire cars to suit the needs of specific journeys rather than driving a large private car needed occasionally (e.g. for holidays) for all trips.

Improvements in driving efficiency will also play a role in emissions reduction, delivered through encouraging the use of small, efficient cars (for instance through parking management), eco-driving training (such as smoother acceleration) and carefully targeted measures to alleviate congestion (without encouraging extra traffic).

The balance of measures will vary by area type

The scale and pace of emissions reduction needed means that the range of measures introduced above will need to be applied in an integrated way across the county (and ideally with neighbouring authorities).

It will also be important to account for the differing characteristics of the county's area types in identifying the balance of measures for different places.

Differences between area types in terms of the density of population and concentrations of trip destinations are particularly important. They influence the way in which measures such as car clubs need to be implemented and particularly how possible it is to:

- Provide local services of different types. For instance specialist services such as banking hubs are more likely to be viable in larger towns and;
- Develop public, shared and active travel options. Improvements usually depend on enough journeys being made along the same route, or from near a common hub, to support a new services or facilities. These characteristics are usually already reflected in current travel options and car ownership patterns that measures will build upon.

The role of car clubs in different area types

Most existing car clubs have been introduced in larger towns and urban areas where cars can be located within reach of a large population and the car club is one of several travel options. Different approaches can be applied in different area types. For instance, Oxfordshire's recent pilot successfully introduced car clubs in villages and smaller towns. In rural areas there is likely to be a particular role for car clubs replacing second car ownership, with households able to own a small, efficient car and gain affordable access to EVs and larger cars via the club.

For the Routemap, three broad area types have been identified to provide a simple representation of the diversity of areas in Gloucestershire:

- The **core urban area** of Gloucester and Cheltenham and surrounding areas;
- **Market towns** such as Cirencester and Stroud;
- **Rural** villages and surrounding areas.

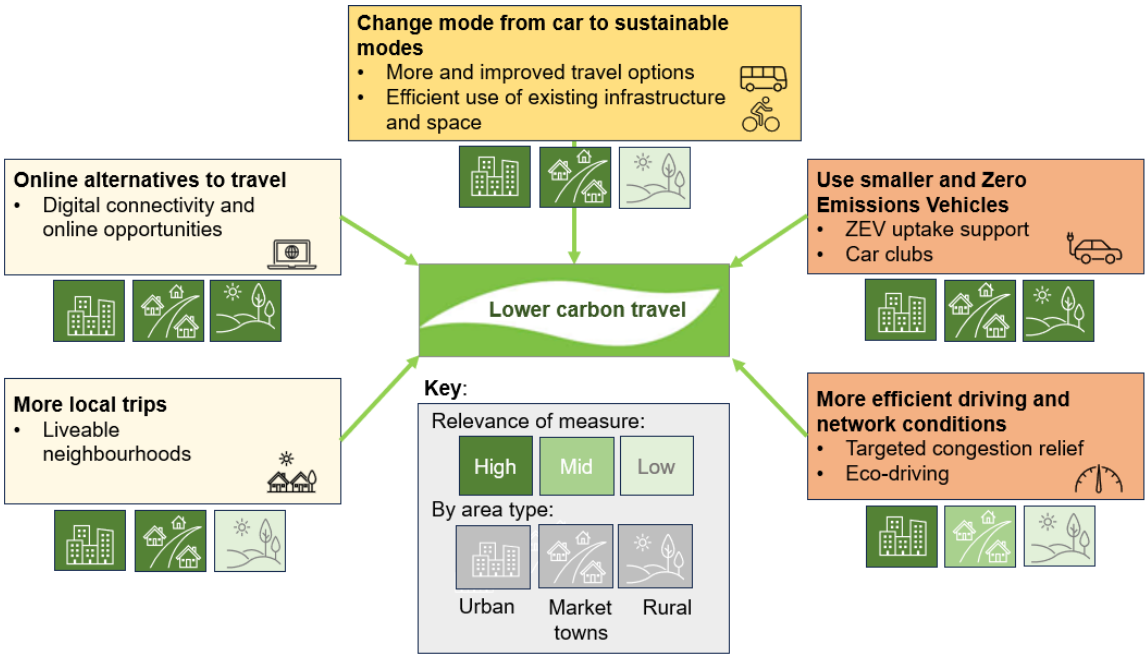
The differences in characteristics between area types mean that the five main changes in travel choices will have differing relevance in reducing emissions in each area type, as illustrated in the figure below.

'Shift' measures to encourage mode shift and 'Avoid' measures to encourage local trips are likely to have greatest impact in the core urban area and market towns. Emissions reductions in more rural areas are likely to rely more on 'Avoid' measures that reduce the need to travel so much through digital activity, and 'Improve' measures encouraging the use of smaller cars and ZEVs and more efficient driving and network.

The Routemap reflects these variations by setting different indicative ambitions for change by area type, relating to each of the five changes in travel choices. The ambitions were developed (using transport modelling and other analysis) to help to understand the scale and intensity of decarbonisation measures needed to close the emissions gap for Gloucestershire-based car travel.

For each area type, the Routemap includes ambition levels for 2030 for online activity, accessibility of local services, provision of good quality cycling and bus facilities and uptake of ride sharing, efficient driving, small vehicles and ZEVs.

Changes in travel choice by area type



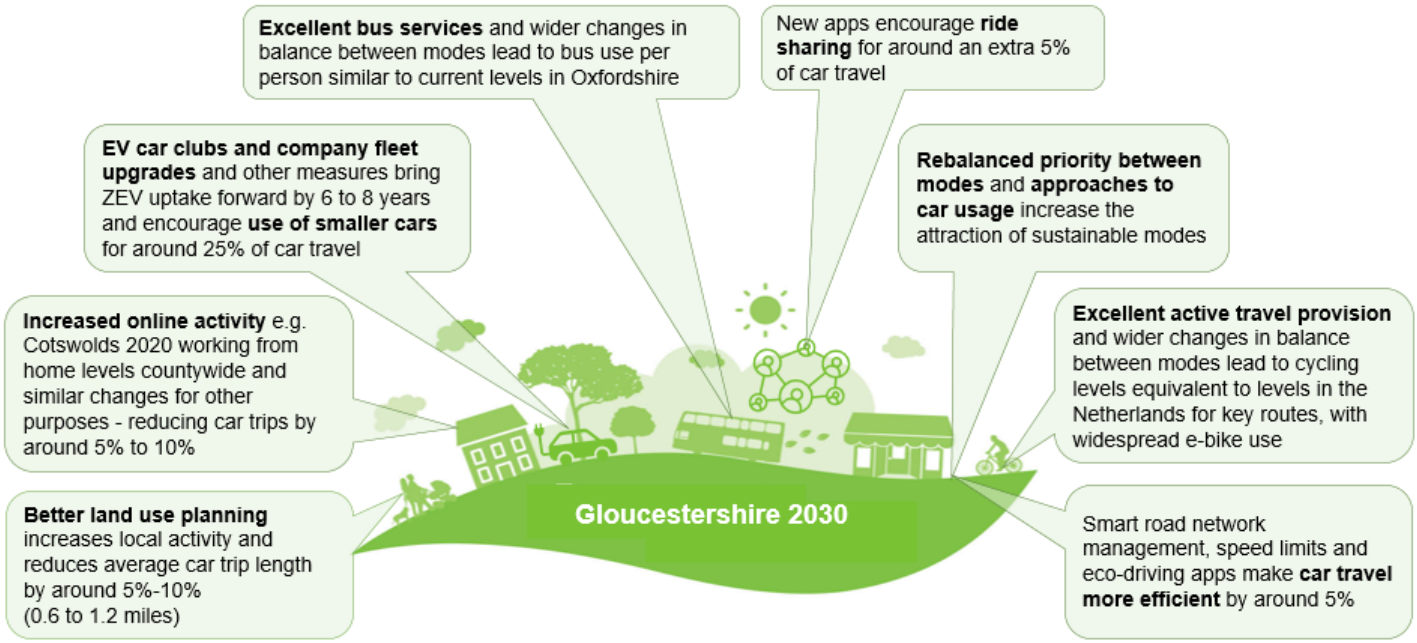
A vision for Gloucestershire in 2030

To achieve the ambitions for change set out in the Routemap, the measures introduced will need to transform the opportunities and choices made relating to travel and other ways of accessing activities in Gloucestershire.

The image below provides a view of the way that travel and accessibility patterns could look in Gloucestershire in 2030 as a result of rapid roll-out of the measures described. Combined, these changes have the potential to close the emissions gap for Gloucestershire-based car travel in 2030.

In the image, the changes are shown as countywide averages for simplicity. As described above, the balance of change will vary between Gloucestershire's different area types, reflecting the differences in their characteristics and the opportunities provided for travel and alternative means of accessing activities.

Travel and accessibility in Gloucestershire in 2030



The image indicates that the measures needed to achieve Gloucestershire's decarbonisation ambitions would bring significant changes in transport and opportunities in towns and villages across the county.

The key changes would include delivery of good quality sustainable travel options, EV car clubs and more online and local services. There would also be reduced traffic and congestion in towns and increased and improved quality space in central areas.

These changes resulting from decarbonisation measures could also bring many wider impacts for residents, businesses and visitors in the county.

Benefits would include improved health and fitness amongst the population, associated with more active travel and improved air quality and reduced noise, as well as safety benefits resulting from fewer traffic collisions.

Accessibility levels and equity of access would also improve as a result of greater availability of affordable travel options, including active travel, public transport and car club use.

The environment, economy and sense of community in towns and villages could also be improved by the reduction in traffic and associated pollution and noise and improvement in public realm and local services, making local centres more attractive for visitors.

The planned decarbonisation measures will be designed and delivered in a way that makes the most of these opportunities to deliver wider benefits and improved places that contribute to all of the objectives set out in Gloucestershire's Local Transport Plan (2023).

Action is needed now

It is clear that rapid action is needed to close the transport emissions gap and follow the decarbonisation pathway to meet Gloucestershire's targets.

The council has an important role to play in showing strong leadership, supporting collaboration and leading on delivering sustainable travel improvements and support for EV uptake.

However, a wide range of change is needed and rapid decarbonisation progress will also need significant action from a range of parties including:

- **District Councils** – leading on planning-related changes such as local service centres and mobility and digital hubs, as well as changes in parking location and management;
- **Transport operators** – particularly bus operators to support extensive service improvements and information provision;
- **Western Gateway, National Highways and national government** – to bring change at a larger scale including influencing freight trips through measures such as roll-out of alternative fuelling infrastructure. Action will also be needed to influence passenger through-trips through rail and coach improvements to encourage long distance public transport use. Other broader areas of action and influence include measures to promote EV uptake and larger scale changes in the way car usage is considered; and
- **Individuals, businesses and other organisations** – through the choices they make in relation to travel and accessing opportunities in Gloucestershire.

Coordinating and collaborating with stakeholders and the public, and building their support, will therefore be a key part of the council's role in reducing emissions.

The pace and scale of change required will bring practical deliverability challenges, although the focus on making better use of existing infrastructure will help by limiting complex planning and construction processes and the associated embodied carbon.

The measures will also require substantial financial support**,** particularly for the frequent bus services. They could also raise some revenue through increased bus patronage and charging for parking. Other funding will also be sought.

The Routemap contains a summary of the steps that the council can take to advance transport decarbonisation as part of Climate Leadership Gloucestershire.

The steps recognise the need to:

- Establish the right **policy framework** for change;
- Make efficient and targeted **investment** to support change and identify suitable funding sources; and
- **Engage** with stakeholders and the public to build understanding and collaborate to support action.

Learn more about Climate Leadership Gloucestershire 2030 here.

Through taking these steps and monitoring their impacts, the council has the potential to build significant momentum and progress towards implementing the measures outlined above to reduce Gloucestershire-based car emissions.

The progress will make an important contribution to meeting the county's decarbonisation targets as well as delivering a range of wider benefits for Gloucestershire's residents, businesses and visitors.