



# Bus and Coach: The route to net zero in Wales



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 [wpieconomics.com](http://wpieconomics.com)

 [matthew@wpieconomics.com](mailto:matthew@wpieconomics.com)

 [@wpi\\_economics](https://twitter.com/wpi_economics)

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## About the authors



### Matthew Oakley – Director

Matthew founded WPI Economics in 2015. He is a respected economist and policy analyst, having spent well over a decade working in and around policy making in Westminster. He has previously been Chief Economist at Which?, and Head of Economics and Social Policy at Policy Exchange. He began his career as an Economic Advisor at the Treasury, predominantly working on microeconomic analysis and modelling issues around tax and welfare reform. He holds an MSc in Economics from UCL.



### James Edgar – Chief Economist

James has fifteen years of experience working as an economist at the forefront of policy making. Prior to joining WPI, James was Head of Policy for Digital and Regulation at the consumer champion Which?. Before this he worked for a decade at the Department for Transport, including as the Head of Road Economics after establishing the successful multi-disciplinary team and has experience of local transport, freight, rail and environmental issues. James holds an MSc in Economics from UCL.



### André Novas – Consultant

André is an economist and political scientist, and holds a MA in International Political Economy from King's College London. Before joining WPI, André worked as an International Consultant in an innovation consultancy firm, specialising in the fields of regional development and international cooperation, particularly in Latin America, Spain and Portugal. André speaks Galician and Spanish (his mother languages), and is fluent in English and Portuguese, having lived in Portugal and Brazil during his year abroad.

## About the Confederation of Passenger Transport

We help a dynamic bus and coach industry to provide better journeys for all, creating greener communities and delivering economic growth.

We do this by representing around 900 members from across the industry be they large or small, bus or coach, operator or supplier. We use our influence to campaign for a supportive policy environment, give our members practical advice and support to run their businesses safely, compliantly, and efficiently and bring the industry together to share ideas and best practice. We are ambitious to make things better for passengers, inclusive in seeking out different perspectives and we are always there when our members need us.

## About this report

The Confederation of Passenger Transport, the trade body for the bus and coach industry, commissioned WPI Economics to analyse the role that switching car journeys to bus and coach journeys (“modal shift”) may have in achieving the country’s Net Zero emissions goal. Our first report for this project, *The Decarbonisation Dividend*, demonstrated that modal shift from car to bus and coach is necessary to support the UK’s Net Zero objectives. The report also demonstrated the scale of modal shift that is needed, and the benefits that would be associated with it. This report, focused on Wales and accompanied by equivalent reports for Scotland and England,, summarises the result of the second stage of the project, assessing the different policy options available to produce the scale of modal shift that the previous report identified as necessary to decarbonise the transport sector.

# Executive Summary

This report analyses the role that switching car journeys to bus and coach journeys (“modal shift”) may have in achieving the country’s Net Zero emissions goal. It presents the main results of the second stage of the project, which was based on two complementary streams of work:

1. Engaging with operators, campaigners, civil society and policy professionals in six roundtables organised by the Confederation of Passenger Transport and chaired by the Social Market Foundation; and
2. Desk research to review existing analysis of modal shift policies and modelling of various policy options and impacts.

The focus here is on the results for Wales. Further reports highlight results for England and Scotland. Methodological details are explained in the accompanying Methodology report.

## Modal shift: necessary, desirable and possible

The first report of this project established that modal shift was necessary for the UK to meet its Net Zero obligations.

The shift is possible based on the existing evidence, and desirable because of the significant benefits that come from it. We estimated that across Great Britain the modal shift required would amount to only two more trips by bus per person per month (26 per year). However, this would need to be delivered against the backdrop of a trend of an 11% decline in bus patronage per decade over the last four decades. From that relatively low base, in order to support the country’s Net Zero ambitions, the scale of increase in patronage driven by modal shift would amount to an 82% increase in bus journeys across Great Britain by 2050 (a 25% increase per decade up to 2050).

In this context, it is clear that while this is achievable, piecemeal interventions will not deliver the scale of change required. Instead, an ambitious strategy will be needed. This will need to provide certainty and leadership, and establish a shared set of goals under which different levels of administration can work together.

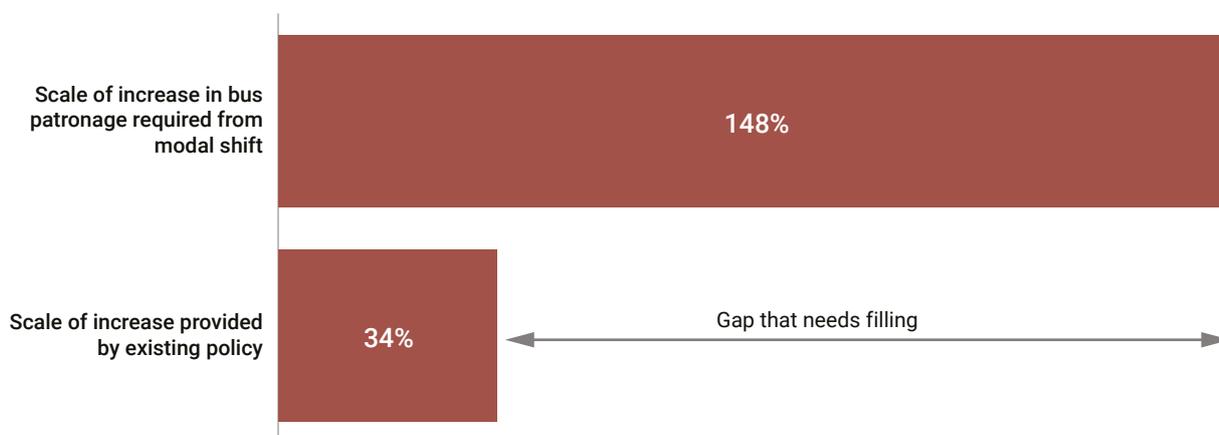
## Why further policy action is needed

This report follows on from the first and shows how a range of different measures could lead to modal shift. We believe that the options in this paper could go a long way to achieving the scale of change needed as long as they are suitably targeted and tailored for the specific circumstances of different areas, and are supported by policies across the wider transport system.

Before turning to different policy options, it is first important to demonstrate why the current (much needed and welcome) investment in bus and coach is not going to be enough. Focusing on existing funding commitments, with reasonable assumptions about their continuation until 2050, we estimate that a total investment of £540m would deliver almost 115m extra bus journeys across Wales. Of these, almost 35m can be attributed to modal shift (i.e., the journeys would have otherwise been travelled by car).

This means that the increase in bus patronage resulting directly from modal shift represents around a 34% increase on the 2018/19 baseline. **This means the current policy trajectory would deliver just over one fifth of the total modal shift estimated to be necessary in our previous report.**

Figure 1: The gap between modal shift needed and what is achieved with existing policy in Wales



Source: WPI Economics

So how can the remaining 114% increase in patronage be achieved? One obvious way of delivering significant modal shift would be to increase the relative cost of motoring; thereby making bus journeys more attractive. However, the scale of increase in the cost of motoring required to close the gap is prohibitively large. In fact, we estimate that, if this gap was to be closed with widespread rises to the cost of motoring, the real cost of motoring in Wales would have to increase by 4.5% per year above CPI until 2050. In tangible terms, this means that the costs of motoring in 2050 would be 227% higher in real terms than they are today.

**Without further interventions and investment in bus and coach, the cost of motoring would need to rise by 227% by 2050 in order to drive the scale of modal shift needed to support Net Zero.**

Increases in the cost of motoring of this scale are clearly not a viable option. The likely result would be significant economic damage and a transition that is unlikely to be “just”. This would make the approach politically unpalatable.

Another alternative would be to make buses free at the point of use. Again, this could be a significant part of driving the modal shift required. In fact, we estimate that free-at-the-point of use bus journeys would deliver 7m fewer car journeys, and a total increase in bus journeys of 35m.

However, this would only represent 11% of the necessary modal shift. It would also provide significant financial benefits to existing bus users (rather than just incentivising existing car users to switch), meaning that this approach comes with a very significant financial cost.

We estimate that the total cost of this policy would amount to almost £4bn up to 2050, or nearly £150m per year. This demonstrates that subsidising fares at this level is not a viable option, given the significant cost and its relatively modest impact on modal shift.

These two examples make it clear that **further policy interventions to achieve modal shift need to be developed and delivered in a way that is politically feasible, economically efficient, affordable and socially fair.**

## Delivering the necessary modal shift with a policy package

In thinking about what such policy interventions might look like, a major insight from our research and from a wide range of stakeholders, is the need for a modal shift strategy to be implemented through **policy packages**. **Four key types of interventions are:**



**1.**  
**Increasing the attractiveness of the bus network**



**2.**  
**Making buses cheaper**



**3.**  
**Discouraging the use of cars**



**4. Behavioural interventions to influence consumer choices**

The key finding is that relying on just one or two of these options would be unlikely to deliver the scale and type of policy change needed. Instead, a full range of these policies will need to be combined. Given the significant difference in circumstances across the UK, and with different passengers having different needs, it is clear that the appropriate combination of these policies will vary between locations. This report has a deliberately national scope, meaning that it does not intend to serve as a defined recipe for policy-makers across Wales to follow. Instead, it aims to offer a flexible framework through which to think about the transformation in our transport systems that might be required to achieve modal shift, as well as evidence about the extent to which different types of interventions might contribute to make them a reality.

## The potential impacts of a range of modal shift policies

We analyse (i) increasing the attractiveness of the bus network; (ii) options to both make buses cheaper, and; (iii) options to make motoring less attractive. We model different scenarios within each of these interventions. These scenarios should be viewed as representing either different levels of ambition or differing levels of success of a specific measure. With the latter, greater levels of success would be likely with accompanying behaviour-change interventions, though this is not modelled explicitly.

The table below provides a summary of the results from this analysis in Wales. It shows that:

- **More ambitious investment in bus services and infrastructure**, amounting to £68m a year to 2050 (or around £1.8bn cumulatively), would deliver almost 400m additional annual bus journeys, of which over **115m journeys annually would have previously been travelled by car**.
- A salary sacrifice scheme (“Bus Bonus”) for commuters **would reduce car** usage by almost 2m journeys and lead to an increase in bus journeys of 3m. We believe this scheme would need to be introduced on a UK-wide basis, as it is part of employment policy that is not a devolved power.

- A £2 fare cap for single journeys costing over £850m by 2050, would deliver over 12m additional bus journeys, of which almost **4m journeys would have been previously been travelled by car.**
- A **congestion charge in urban local authorities** around Wales would lead to **0.5m fewer car journeys**, if applied only to urban centres, and 5m fewer car journeys if applied more comprehensively to the entire area of urban local authorities.

Table 1: Selected results from modelling of policy options in Wales

Policy area	Scenario	Total increase in bus journeys (yearly)	Increase in journeys from modal shift	Increase in journeys from modal shift (%)	Annual cost (2021 £ values)
<b>Increasing attractiveness of bus network</b>	Ambitious investment	391m	117m	116%	£68m
	Bus bonus	-	3m	2.8%	£3m
<b>Making bus cheaper</b>	£2 fare cap for single journeys	12m	4m	3.6%	£32m
	Low scenario	-	0.5m	0.5%	-£93m
<b>Discouraging the use of cars</b>	High scenario	-	5m	4.9%	-£927m

Source: WPI Economics

Notes: Cost refers to cost to the Welsh Treasury – negative values represent revenue.

As highlighted above, these policies have the potential to deliver results that go beyond those highlighted above if:

- They are accompanied by behavioural change interventions;
- They are designed in the context of local transport plans; and
- They are focused on attracting drivers.

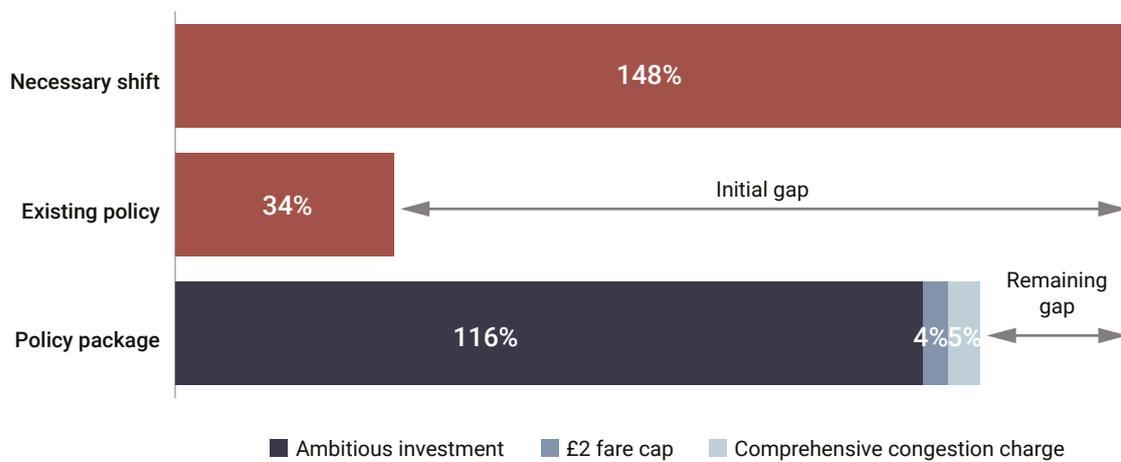


## What a package could deliver

As outlined above, packages of these options will need to vary between different localities, be combined with behaviour-change policies and reflect the needs of different types of users. Wider reforms to the transport system will also need to support this package. However, what this shows is that meaningful levels of modal shift can be achieved with the right policy interventions.

For example, combining increased investment in bus services with a £2 fare cap and congestion charging in urban local authorities **could deliver more than four fifths of the modal shift needed to support the delivery of Net Zero.**

Figure 2: Impact of example package of policies on modal shift in Wales



Source: WPI Economics

It is also important to consider that this would be achieved without generalised increases in the cost of motoring, which would be concentrated on congested urban conurbations, and in a context of improved bus networks that would reduce the need to drive in these places. Additionally, this package does not include wider changes to our planning system that could liberate urban and rural communities from car dependency (by ensuring, for instance, that housing and infrastructure is designed for active and public transport mobility as the default option, rather than private transport options as the norm), which if implemented would contribute to closing the remaining gap and help deliver modal shift quickly and cheaply

As a result, with no other changes to wider transport systems, the rise in the general cost of motoring needed to achieve the modal shift required to support Net Zero would be just 46% by 2050 – one fifth of the level it would have been under the current policy trajectory.

The example package would also be delivered with a net revenue gain to the UK. Under the most ambitious congestion charging option, the **net revenue from the package would amount to around £17bn per year on average across Great Britain, over £800m of which would derive from Wales.** This could be invested in further modal shift polices, other environmental interventions or, in the context of declining tax bases in other places (e.g., Fuel Duty), provide a much needed boost to the public finances. Depending on the policy options chosen, this would also benefit Welsh Government finances through the Barnett formula or directly through taxation if the charge was devolved or administered by local authorities.

## The benefits that this could bring

As highlighted in our previous report, this modal shift would also bring significant benefits. The example package modelled here would bring:

Large environmental benefits, including:



**A reduction in emissions of 0.8 million tons of CO<sub>2</sub>**

equivalent to the total transport emissions in **Caerphilly in 2019;**



**Air quality benefits worth almost £1.5m**

enough to pay the wages of almost **43 nurses** for one year.



Socioeconomic benefits **worth almost £2.2bn** from changes in travel patterns resulting from this policy package – **equivalent to the total GDP of Powys in 2019.**



Positive impacts on local labour markets (from expanding the bus network and increasing service frequency), which could result in almost **1,400 additional people in employment, contributing more than £250m to Wales's GDP and almost £60m in tax receipts.**



## Driving modal shift forward

This report confirms that modal shift is necessary and desirable and, most importantly, it shows how, by working together, we can make the required change a reality. The combination of our own research and modelling, and insights drawn from the roundtables and stakeholder engagement show that the policy design for modal shift will rely on five key considerations.



Modal shift cannot be piecemeal - ambitious strategy is necessary to achieve the scale of change required



Modal shift policy needs to be fully integrated with broader measures to reduce the use of private cars



Modal shift policy needs to be based on a firm financial footing



Transport demand is segmented, and ambitions for modal shift should be highest in urban locations



Modal shift requires a holistic package of interventions that make bus and coach the most convenient transport options

# Introduction

## About the report

This report analyses the role that switching car journeys to bus and coach journeys (“modal shift”) may have in achieving the country’s Net Zero emissions goal. The project has had two main stages:

**STAGE 1:** Researching the **benefits associated with modal shift**, with a particular focus on decarbonisation and the transition to Net Zero, accounting for a wider set of positive impacts; and

**STAGE 2:** **Assessing the different policy options available** to produce the scale of modal shift that is necessary to achieve the benefits outlined in the previous stage.

This report, focused on Wales, summarises the results of the second stage of the project, and is accompanied by equivalent reports focused on England and Scotland.

## Scope of analysis

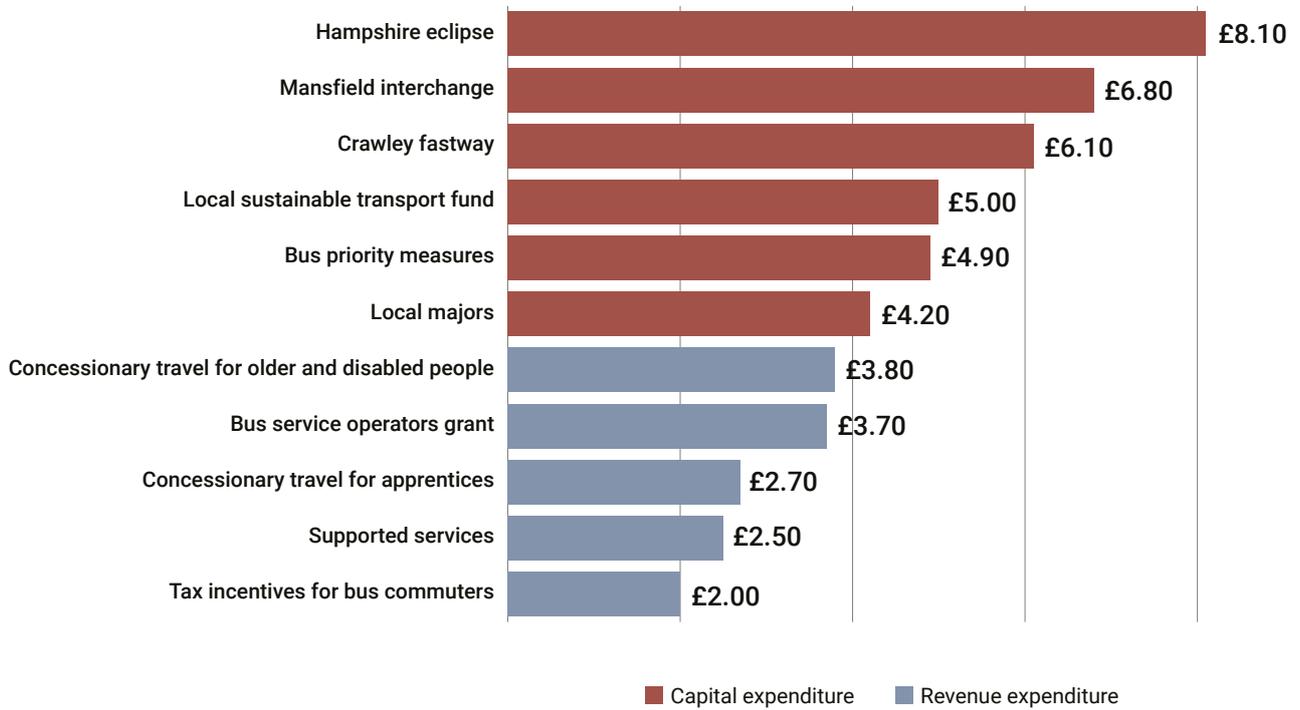
Decarbonising the transport sector and delivering the necessary modal shift will require a variety of policies that are targeted and tailored to the places and communities across the country. With a national scope, this report therefore does not intend to serve as a strict recipe for policy-makers to follow across the country. Instead, it aims to offer a flexible framework through which to think about the transformations in our transport systems that might be required to achieve modal shift, as well as evidence about the extent to which different types of interventions might contribute to the shift.

It is hoped that this report can help policy-makers at various levels of administration, operators and community organisers work together to plan for and deliver the modal shift that is necessary to decarbonise our transport systems and meet our Net Zero commitments. By modelling the contributions of different interventions, the report aims to demonstrate that while the scale of modal shift needed presents a real challenge, achieving it is possible. It also serves as an evidence base for policy and funding discussions, both at the national and local level.

When analysing the benefits coming from delivering modal shift, we model two different types of benefits: environmental and socio-economic benefits on the demand-side, and the contributions to employment and economic growth resulting from expansion of bus supply. We do not model the benefits of the policies that would accrue to existing users, or to users shifting from other forms of transport.

This means that our estimates of the benefits should not be regarded as a full cost-benefit analysis aimed at demonstrating the overall value for money of different interventions supporting bus services and infrastructure. This has been amply evidenced elsewhere (Figure 3), with results making a strong case for further investment in bus services and infrastructure.

Figure 3: Benefit cost ratios for capital and revenue expenditure in local bus services



Source: KPMG (2017)<sup>1</sup>

It is also important to note that all of the approaches modelled within this report could be delivered through a range of different governance models for the industry. As such, this report does not contribute to the ongoing discussion about current and future governance models within the bus industry. A range of other reports covers this ground. The results presented here should be viewed as representing what would need to happen regardless of the future governance model.



## Current policy will not be enough

Since the Welsh Government declared a climate emergency in 2019, there has been a concerted shift towards policies supporting the decarbonisation of the nation that culminated in the publication of Net Zero Wales in June 2022, Wales's second carbon budget. Net Zero Wales called for reductions in emissions from passenger transport by 22% by 2025 (from 2019) and 98% by 2050. This is further supplemented by the Welsh Government's transport strategy *Llwybr Newydd* which set a target of having 45% of journey made by sustainable transport means by 2040. In fact, the Welsh government aims to reduce car travel by 10% by 2030 as part of its Climate Change plan, while increasing the proportion of trips made by public transport and active travel to 39%.<sup>2</sup>

Bus funding is complex and there may be other sources of funding involved in supporting these ambitions and increasing bus usage. Focusing on the 2021 budget, the Welsh Government has committed to invest £80m per year until 2050, of which £60m are aimed for Zero Emission Buses (ZEBs) and £20m as capital funding for bus infrastructure.<sup>3</sup> This contrasts with the case of England outside London, where the funding underpinning the National Bus Strategy is being delivered through Bus Service Improvement Plans (BSIPs), as local authorities are required to design a strategy to increase sustainable transport, which they can use to apply for both operational and capital funding. In fact, excluding the 20% directed at zero emission buses, CPT has estimated that more than 50% has been applied for to invest in bus infrastructure, almost 25% to support bus services, and the remaining 25% for intervening in fares and ticketing reform, marketing and other initiatives.

To model the contribution that current policy trajectory would make to modal shift, and how this would compare to our previous estimations of the shift that is necessary to support Welsh Government's transport decarbonisation targets, we assume:

- Current yearly £20m investment commitment (excluding funding for ZEBs) is maintained until 2050;
- This investment is delivered through a package of a similar composition to English BSIPs.

Table 2 shows the contribution that the current policy trajectory in Wales would make to modal shift, following the methodology explained in our Methodology report.

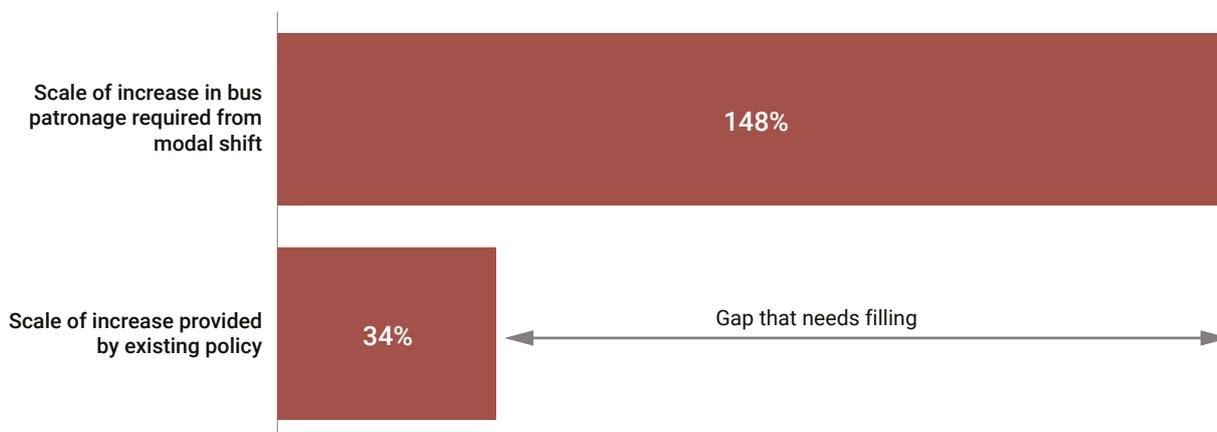
Table 2: Analysis of the impacts of expected current investment in bus

Cost	Increase in journeys	Increase in journeys from modal shift	% increase in journeys from modal shift	Remaining increase in journeys from modal shift needed
£540m	115m	34m	34%	114%

Source: WPI Economics modelling

- In Wales, a **total baseline investment of £540m** would more than double bus patronage (more than 115m additional bus journeys). Of those, almost 35m journeys would have previously been travelled by car, representing a 34% increase in bus patronage deriving directly from modal shift. This would deliver **one fifth of the modal shift necessary to support the country's transition to Net Zero**.

Figure 4: Modal shift required and delivered by existing commitments in Wales (% increase on 2018/19 levels)



Source: WPI Economics modelling.

### Can the gap be closed by making motoring more expensive?

With such a large gap to fill, without further investment or policy interventions, the necessary modal shift could only be achieved as a result of significant, generalised increases in the cost of motoring.

We estimate that in order to close the gap between the modal shift under the current policy trajectory and that which is necessary to support the delivery of Net Zero, **the real cost of motoring in Wales would have to increase by 4.5% per year (above CPI) until 2050**. In more tangible terms, this would mean the real cost of motoring increasing by 227% between now and 2050.

**Without further interventions and investment in bus and coach, the real cost of motoring would need to rise by 227% by 2050 in order to drive the scale of modal shift needed to support Net Zero.**

This scale of the increase in the cost of motoring is undeliverable for a number of reasons. It would likely lead to significant economic damage to the economy and would impact most on those most reliant on car journeys and least able to switch mode. Each of these impacts would likely hit those on lowest incomes hardest, meaning that it would lead to a transition to Net Zero that is not equitable and would be politically unpalatable.

### What about making buses free at the point of use?

Another way to consider delivering on modal shift would be to make **bus services that are free at the point of use**. This approach could obviously provide a significant contribution to the modal shift required. However, given the costs involved, the contribution is surprisingly low.

We estimate that free-at-the-point of use bus journeys would deliver 7m fewer car journeys, and a total increase in bus journeys of 35m.

Whilst a significant contribution, this would only represent 11% of the modal shift required to support Net Zero. It would also provide significant financial benefits to existing bus users (rather than just incentivising existing car users to switch), meaning that this approach comes with a very significant financial cost.

We estimate that the total cost of this policy would amount to almost £4bn up to 2050, or nearly £150m per year. This demonstrates that subsidising fares at this level is not a viable option, given the significant cost and its relatively modest impact on modal shift.

Overall, this means that **better policy interventions are needed to achieve modal shift in a way that is politically feasible, economically efficient, affordable and socially fair.**



CHAPTER 3

# Designing and delivering policies for modal shift

The previous section demonstrated the need to invest more in bus and coach and to develop interventions that could support a significant level of modal shift. The rest of this report considers what these interventions might look like, and the potential impacts that they could have.

Our approach to the assessment of modal shift policies was informed by our engagement with operators, campaigners, civil society and policy professionals in six roundtables organised by the Confederation of Passenger Transport and chaired by the Social Market Foundation. Through these roundtables, we learnt about successful policy interventions and the challenges operators and local authorities face on the ground. We discussed the advantages and disadvantages of different interventions, and we also heard about the ways in which this research could be most useful. The next section summarises the key lessons learnt from the roundtables, providing the rationale for the policy analysis performed.

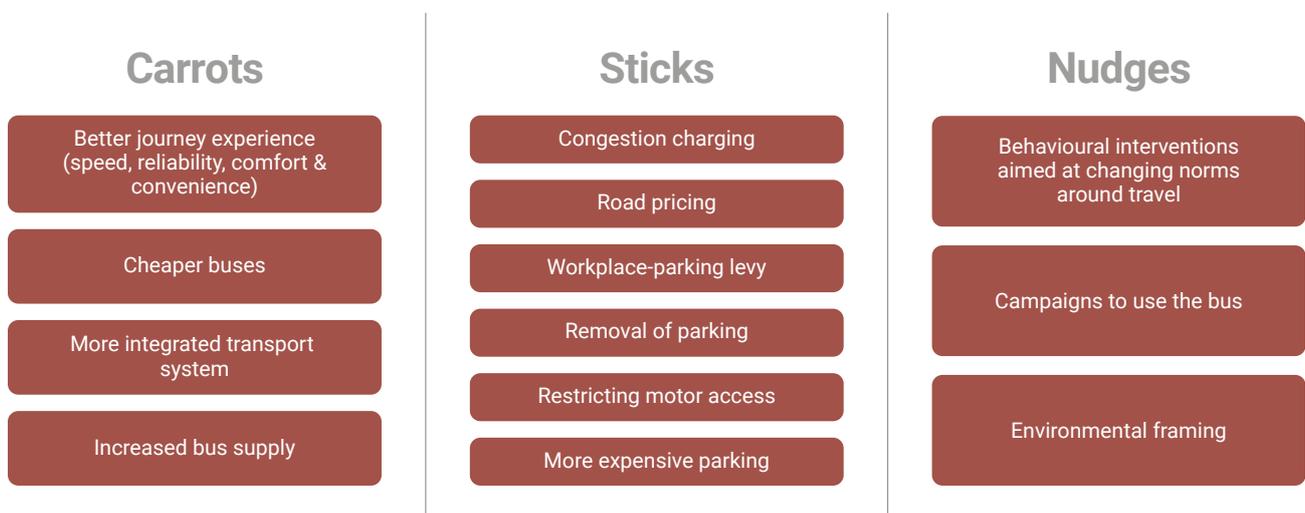
## Key lessons from the roundtables

### There are plenty of options for achieving modal shift

The starting point for our analysis was to compile a list of policies that could contribute to modal shift, and classify them according to different criteria, such as the policy lever they rely on and what the target and expected contribution of the intervention would be (see Annex). Based on the latter, we identified policies that could be considered “carrots”, which would contribute to modal shift primarily by making bus more attractive, either by making it a cheaper option, improving the overall journey experience, increasing supply or better integrating bus services among themselves and with other modes of transport. On the opposite side, we identified a set of policies that could be considered “sticks”. These would lead to modal shift by discouraging the use of the car, through either restricting car mobility or making it more expensive. Finally, there are “nudges”, behavioural policies that aim to influence peoples’ decision-making so that, facing a given set of incentives for bus usage, they are more likely to choose buses.

Naturally, a given policy may contribute to modal shift in more than one way and even constitute a carrot and a stick at the same time: bus priority measures, for instance, by granting exclusive access to a part of the road to buses, simultaneously improve the bus journey experience and restrict car mobility.

Figure 5: Classification of policies according to their contribution to modal shift



Source: WPI Economics

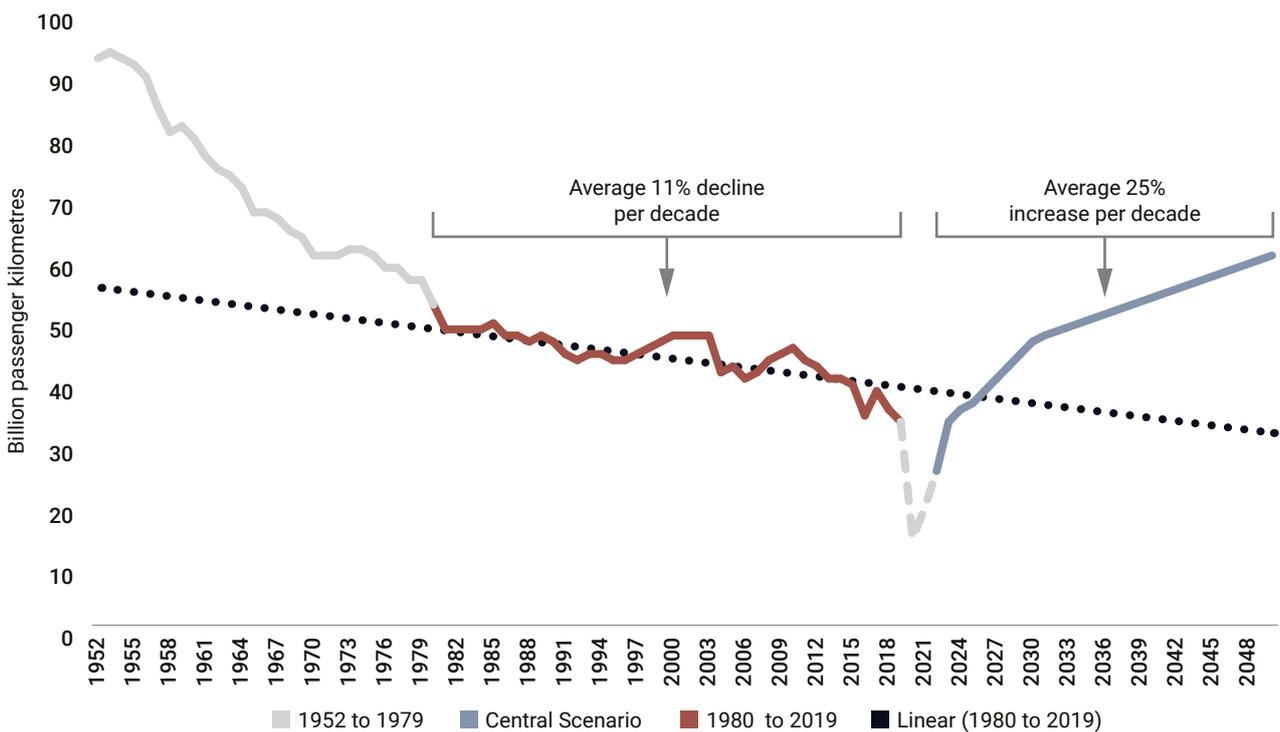
### Modal shift policy cannot be piecemeal – an ambitious strategy is necessary to achieve the scale of change required

The first report, *Decarbonisation Dividend*, established that modal shift was necessary for the UK to meet its Net Zero obligations. That modal shift is possible based on the existing evidence, and desirable because of the significant benefits that come from it.

We estimated that the modal shift required would amount to only two more trips by bus per person per month (26 per year). However, this would need to be delivered against the backdrop of a trend of an 11% decline in bus patronage per decade over the last four decades (Figure 6). From that relatively low base, in order to support the country’s Net Zero ambitions, the scale of increase in patronage driven by modal shift would amount to an 80% increase in bus journeys across Great Britain by 2050 (a 25% increase per decade up to 2050).

In this context, it is clear that while this is achievable, piecemeal interventions will not deliver the scale of change required. Instead, an ambitious strategy will be needed. The strategy will have to provide certainty and leadership, and establish a shared set of goals under which different levels of administration can work together. To ensure its successful implementation, such strategy should ensure local authorities have the necessary capabilities to plan and deliver the different interventions needed.

Figure 6: Historical and modelled bus patronage in Great Britain.



Source: WPI Economics (2022).<sup>4</sup>

### Modal shift policy needs to be fully integrated with broader measures to reduce the use of private cars

A priority for any modal shift strategy should be to ensure consistency between modal shift ambitions, other transport policies and other policy areas, in particular in regards to reducing car-dependency. This is needed as the current approach relies too heavily on forecasting increases in traffic and catering for them, lacks the needed integration of sustainable mobility aspirations within urban planning and, as a result, means that old and new infrastructure continue to lock in car dependency. In turn, this generates induced demand for cars, as our built environment is generally designed in a way that makes it the most convenient mode of transport.

This creates a context that structurally favours car mobility, pulling in the opposite direction to stated commitments to mobility systems centred around public and active transport, hence constituting a crucial barrier to modal shift. While the policies analysed as part of this report comprise more specific interventions in our transport systems, it is important to acknowledge that the success of a modal shift strategy relies on these broader changes in the way in which transport policy and urban planning may reduce car dependency.

On the other hand, this also means that fundamental changes in transport and urban planning can be leveraged by the bus and coach industry to increase patronage and accelerate modal shift. In fact, policies seeking to achieve modal shift from cars onto buses and coaches are just one part of a wider range of interventions to reduce the need to travel overall, increase active travel, boost shared transport and encourage modal shift to all public transport modes; which, crucially, reinforce each other. In more practical terms, this means that a more integrated transport system is a key condition for achieving a sizable modal shift, particularly when taking a 'whole journey' approach that considers how the "first and last mile" are travelled: an adequate bus network can help reduce car trips to train stations (or enable train journeys altogether for those without access to a car), and safer, more attractive infrastructure for active travel maximises the effective reach of the bus network.

### **Modal shift policy needs to be based on a firm financial footing**

To achieve a sustained modal shift of the scale that is required, the strategy to deliver it must be sustainable in the long-term and result in continued investment in the quality of services. This has implications not only for the amount of funding that is required, but also the way in which investment funding is delivered. To provide the long-term certainty that will help deliver the modal shift strategy, the revenue source needs to be dependable, which could be achieved through a combination of financially viable services and stable long-term government funding (local or national).

Adopting an approach like this would mean reducing the use of short-term funding commitments contingent on the state of public finances and short-term political goals. It would suggest a reduction in the current reliance on competitive forms of funding. The bidding processes required for this put a strain on local authorities' already stretched resources, do not offer long-term certainty and can lead to local authorities bidding for what they believe will be successful, rather than what their area actually needs. It can also result in an uneven distribution of funding, whereby those local authorities with the most resources are better positioned to invest the time and resources needed to succeed in their bids, and those which need the funding most struggle to put together competitive applications.

### **Transport demand is segmented, and ambitions for modal shift should be highest in urban locations**

Even though participants in our roundtables agreed that an ambitious and coherent strategy was needed, they also highlighted that different policies might be more effective in different segments of the market. Participants in the roundtables highlighted segmentation across the following axes:

- **People:** Different passengers might respond to different types of (dis)incentives - fare reductions might attract a younger cohort, whereas older people, already enjoying concessionary travel, might value improvements in bus services comfort, safety and reliability.
- **Journeys:** Different aspects of travelling might be more relevant in different types of journey - reliability and journey time are crucial factors for commuters, whereas leisure trips are more sensitive to costs.<sup>5</sup>
- **Places:** Barriers to bus usage vary in different places: journey times are more problematic in urban contexts suffering from congestion,<sup>6</sup> whereas in rural areas the reach and frequency of bus services pose bigger challenges.<sup>7</sup>

The distinction between rural and urban places is particularly important from the perspective of modal shift policies, which should be more ambitious in the latter. This is the case not only because the levels of human and economic agglomeration make it easier to provide public transport alternatives to the car. But also, as our previous report demonstrated, this means that bus loads tend to be higher in urban than in rural contexts, which is a crucial determinant of the carbon savings derived from modal shift.

However, this does not mean that modal shift strategy should just ignore towns and rural hinterlands. Rather, it highlights the need to deliver the improvements in the bus networks that might be needed to make buses more attractive in these areas in a targeted way, and in combination with other measures (such as integration with other non-car options and innovative use of new technology to support options such as demand responsive transport, where appropriate) to ensure maximum bus loads.

### **Modal shift requires a holistic package of interventions that make buses the most convenient transport option**

Participants in our roundtables agreed that the main deciding factor when travellers choose between different modes is convenience, which is, in turn, affected by a wide range of variables: the relative price of one mode compared to others, the comfort of the journey, the availability and quality of the network, and the integration with other modes that may be needed in your journey. Convenience is thus affected by both carrot and stick policies, and hence a combination of different types of intervention is needed to tilt the balance in favour of buses and coaches over private modes of transport, such as cars. Therefore, a holistic policy package combining different types of interventions, all contributing to make buses and coaches more convenient so that they are the natural choice of travellers for an increasing number of journeys, was the preferred approach in the roundtable.

More generally, a package of interventions may be preferred for the following reasons:

- **Effectiveness:** Existing evidence finds that the most effective interventions incorporate multiple measures and policy instruments, often combining carrots and sticks; for example without increased public transport provision, measures to discourage the use of car tend to lead to reduced travel overall or people paying more for the same car journeys.<sup>8</sup>
- **Legitimacy:** Interventions aimed at discouraging people from using their cars are more likely to be politically viable and accepted by the public if combined with other measures that increase the available range of travel options via public transport. In fact, public opinion research finds that "...motorists are hesitant to support policies that would make cars less attractive if considered in isolation, despite backing the principle of action from local authorities to help motorists switch".<sup>9</sup>
- **Legislation:** Can be used to help ensure that policies are delivered in a way that builds effectiveness and legitimacy. For example, interventions that aim to discourage car usage by introducing charges for parking or accessing certain areas often have legislation attached that require revenue to be ringfenced to fund improvements in public transport provision.<sup>10</sup> This has been the case, for instance, of Nottingham's Workplace Parking Levy, whose revenue was ringfenced as funding for the city's tram system.<sup>11</sup>



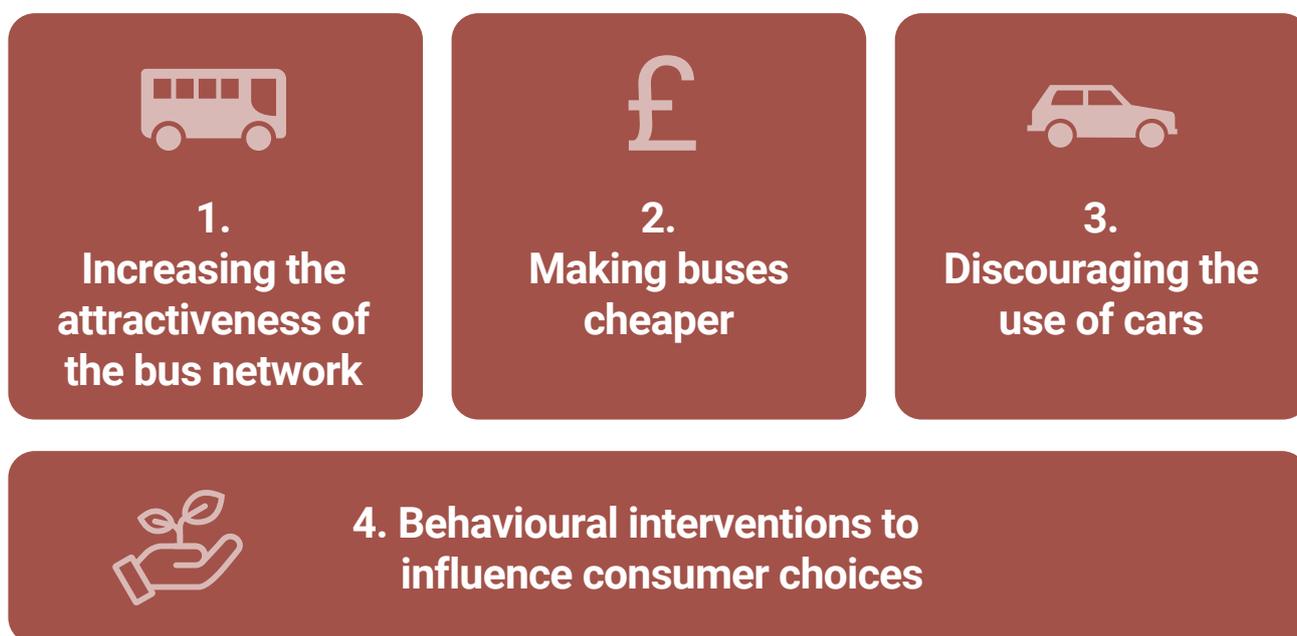
CHAPTER 4

# Delivering modal shift through a combination of policy interventions

## Our approach: a stylised policy package of complementary interventions

The findings from the roundtables provide a clear set of themes for how we can think about achieving modal shift. In particular, they highlight the importance of delivering a package of complementary interventions. Through the course of the project we have considered four key intermediate policy goals that any such package should aim to achieve (Figure 7).

Figure 7: Different types of modal shift policies



Source: WPI Economics.

This provides a framework for policy discussions about modal shift, illustrating the range of policies that are needed. Our key conclusion is that relying on just one or two of these options would be unlikely to deliver the scale and type of policy package needed. Instead, a full range of these policies will need to be combined. Given the significant variation in circumstances across the UK, and with different passengers having different needs, it is also clear that the appropriate combination of these policies will vary across locations. This report has a deliberately national scope, meaning that it does not intend to serve as a defined recipe for policy-makers across Wales to follow. Instead, it aims to offer a flexible framework through which to think about the transformations in our transport systems that might be required to achieve modal shift, as well as evidence about the extent to which different types of interventions might contribute to this.

We analyse three of these goals as part of our policy package: increasing the attractiveness of the bus network, making buses cheaper and making cars less attractive. We model different scenarios within each of these types of interventions. These scenarios should be viewed as representing either different levels of ambition or differing levels of success of a specific measure. With the latter, greater levels of success would be likely with framing and behaviourally-informed communication aimed at influencing people’s choices, though this is not modelled explicitly.

Table 4, below, summarises the different policy interventions that have been modelled. These policy interventions are developed in the next section, with further technical details and assumptions underpinning our modelling available in the accompanying methodological report.

Table 4: Policy interventions modelled

Layer	Scenario
<b>Increasing attractiveness of bus network</b>	Ambitious investment
	£1.8bn, based on the same level of per capita investment (£584) as in England outside London.
<b>Making bus cheaper</b>	Bus bonus
	Salary sacrifice scheme with a value of up to £800.
	£2 fare cap for single journeys
	Long-term version of the £2 fare cap announced in England for the first quarter of 2023.
<b>Discouraging the use of car</b>	Low scenario
	Congestion charge for urban centres (affecting 7.5% of local traffic).
	High scenario
	Comprehensive charging zone (affecting 75% of local traffic).

Source: WPI Economics

As highlighted above, with accompanying behaviour-change interventions, policies designed to deliver in the context of local transport plans and focused on attracting drivers have the potential to deliver results in terms of modal shift that go beyond those suggested below.

## More ambitious investment to make buses more attractive

In England outside London, awarded funding through BSIPs reaches only one third of eligible local authorities, covering only a small part of the funding required to deliver all investment applied for, which CPT has estimated to amount to £10bn.<sup>12</sup> This provides a basis to analyse how a more ambitious level of investment would contribute to modal shift. Excluding the 20% dedicated to ZEBs, this represents £584 investment per capita, which in Wales would amount to almost **£1.8bn cumulative investment by 2050**.

In addition to bus priority measures, other bus infrastructure, improvements to in-vehicle services and marketing campaigns to influence consumer choices, a share of this more ambitious investment would be aimed at increasing bus supply (expanding the network and increasing bus frequencies). We model that this would lead to **£217m invested in expanding bus supply in Wales**, increasing bus km by 196% by 2050.

Overall, across Wales, **more ambitious investment in bus infrastructure and services would lead to almost a five-fold increase in bus patronage (387% increase) by 2050**, leading to 390m additional annual bus journeys compared to 2018/19 levels.

Of these, **over 115m journeys annually would have previously been travelled by car**, representing an increase in bus patronage from modal shift of 116%.

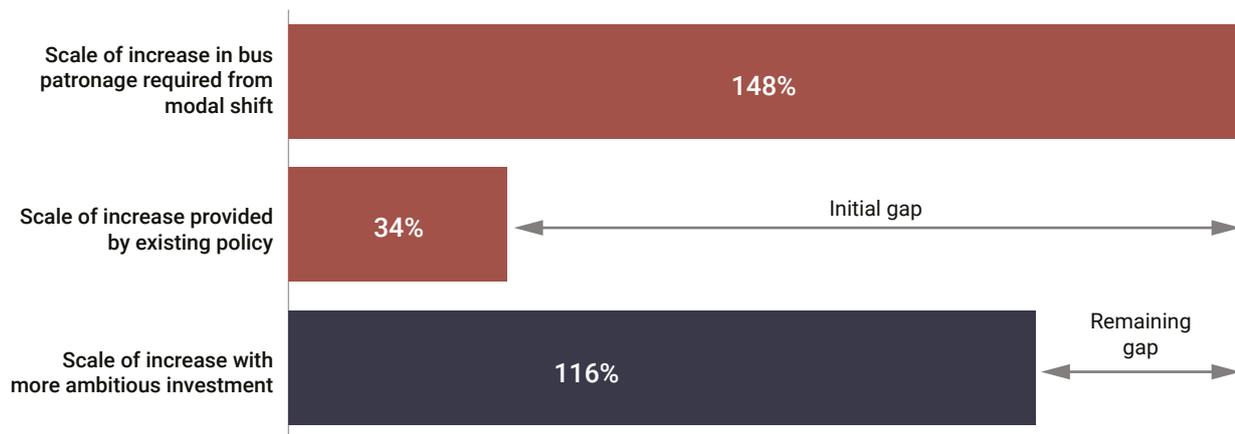
In total, this means that increased investment in bus would deliver over three quarters of the total 148% increase in passenger from modal shift needed to support net zero.

Table 5: Cost and impact of more ambitious investment in Welsh buses

Cost (cumulative)	Increase in journeys (annual)	Increase in journeys from modal shift	Increase in journeys from modal shift (%)	Remaining increase in journeys needed from modal shift
£1.8bn	391m	117m	116%	32%

Source: WPI Economics

Figure 8: Increase in bus patronage from ambitious investment in Wales (% 2018/19 levels)



Source: WPI Economics

## Making buses cheaper

We model three measures of different scope and ambition to illustrate the range of policies that could contribute to making buses cheaper, and estimate the potential contribution to modal shift of this type of intervention.

The more targeted measure we model is a version of Greener Journey’s “**Bus bonus**” proposal: a **salary sacrifice scheme** whereby employers can purchase their employees a voucher that can be used to purchase “stored travel rights” such as travelcard or pay as you go credit **up to the value of £800**. We believe this scheme would need to be introduced on a UK-wide basis, as it is part of employment policy which is not a devolved power.

Inspired by the Department for Transport’s recent announcement in England, we model the contribution that a **£2 cap on single fares** would make to modal shift, with two key differences in relation to the policy adopted by DfT: we assume this would be a **long-term cap**, and as a result we assume that all tickets, not only single fares, respond to the cap. Figure 9 and Table 6 below summarise the estimate the cost and contribution to modal shift from each policy.

We estimate that:

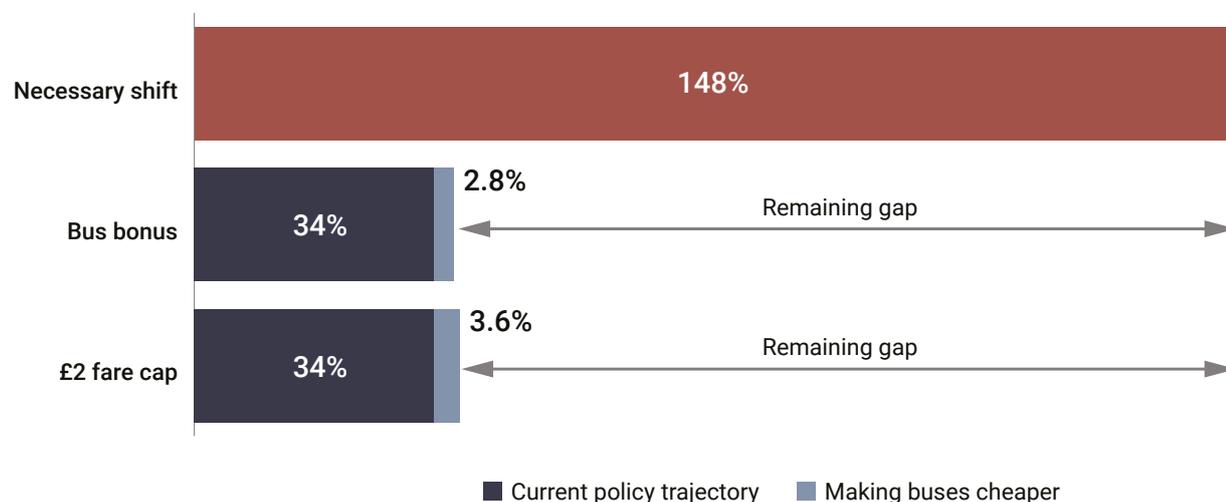
- **A Bus Bonus salary sacrifice scheme for commuters would reduce car usage by almost 2m journeys and lead to an increase in bus journeys of 3m**, at a cumulative cost of £118m by 2050. Costs are significant compared to the scale of change because existing bus users would also benefit. If a way of targeting onto existing car users could be developed, the cost of this policy would fall.
- **A £2 cap on single fares would lead to 12m more bus journeys across Wales**, at a cost of over £850m by 2050. This comes at a significantly higher cost than the Bus Bonus option, as it supports a much larger share of existing bus demand.

Table 6: Cost and impact of example policies to make bus cheaper

	Cost	Increase in journeys	Increase in journeys from modal shift	Increase in journeys from modal shift (%)	Remaining increase in journeys needed from modal shift *
<b>Bus bonus</b>	£118m	-	3m	2.8%	110%
<b>£2 cap on single fares</b>	£2.3bn	12m	4m	3.6%	111%

Source: WPI Economics. \*Gap calculated by adding the effect of each measure to the current policy trajectory.

Figure 9: Increase in bus patronage from interventions to make buses cheaper in Wales (% 2018/19 levels)



Source: WPI Economics

### Discouraging the use of cars

In estimating the potential contribution to modal shift of policies aimed at making cars less attractive, we **focus on urban environments**. More particularly, we focus on those local authorities in Wales classified as Cities or Large Towns by the House of Commons Library – a full list of these local authorities is available in the Annex.<sup>13</sup> For each of these local authorities, we model two scenarios representing two different levels of ambition:

- Our “low” scenario models a **congestion charge** which, based on the experience of London, we assume to cover **7.5% of motor traffic**; and
- Our high scenario models a **comprehensive charging zone**, in the localities, but now covering **75% of local traffic**.

In both cases, we model a relatively simple £7 daily charge to enter the congestion zone. Our analysis of the changes in car and bus usage that would result from these policies is based on the experience of the congestion-charging zone introduced in London in 2003, as explained in further detail in our Methodology report.

We estimate that a congestion charging zone focused on urban centres would:

- Switch more than 0.5m car journeys onto buses in affected areas, delivering a modal shift that would increase bus patronage by 0.5% across Wales.

- A more comprehensive charging zone, in contrast, **would switch 5m journeys onto buses in affected areas, delivering a modal shift that would increase bus patronage by 4.9% across Wales.**

With a **daily payment of £7** (an approximation to the 2022 value of the £5 charge introduced in London in 2003), we estimate that up to 2050 this policy would raise **tax revenue by:**

- A yearly average of more than £93m in the case of a congestion charge focused on urban centres.
- **£927m on average per year** under a more comprehensive congestion charge.

The charge revenue in our high scenario is significant. As highlighted in other parts of the report, this would provide an opportunity to consider how that revenue might be ring-fenced into investment into bus or other parts of the transport system. The implication is that the revenue from the charge would more than cover the costs of any other policies to invest in, or subsidise, bus. Depending on the policy options chosen, this would also benefit Welsh Government finances through the Barnett formula or directly through taxation if the charge was devolved or administered by local authorities.

**... the revenue from the charge would more than cover the costs of any other policies to invest in, or subsidise, bus. This could be used to contribute to other Net Zero policies, or provide general funds to the Exchequer.**



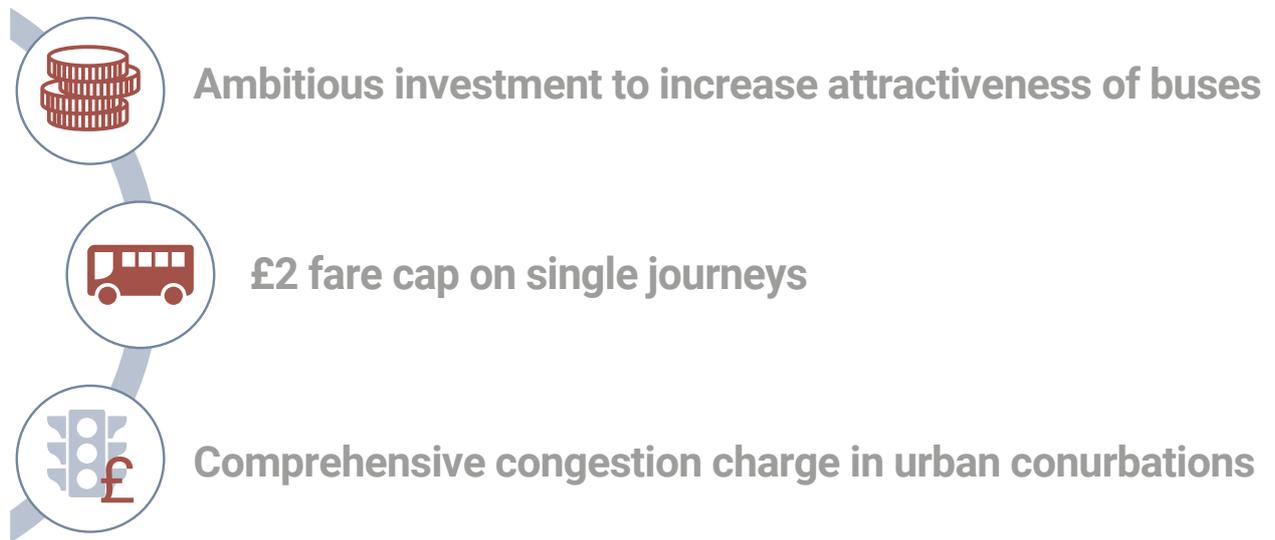
CHAPTER 5

# Policy packages to deliver modal shift

As outlined above, policy packages will need to vary between different localities, be combined with behaviour-change policies and reflect the needs of different types of users. Wider reforms to the transport system will also be needed to support these packages. However, what this shows is that meaningful levels of modal shift can be achieved with the right policy interventions.

For example, we have considered the potential overall impact of combining increased investment in bus services with a £2 fare cap and congestion charging in urban local authorities. This is just one example of the likely contribution to modal shift that can be expected from each type of policy change across Wales, to serve as a reference point for local decision-makers.

Figure 10: composition of example modal shift policy package



Source: WPI Economics.

**Such a package could achieve a 125% increase in bus patronage from modal shift, delivering more than four fifths of the modal shift estimated as necessary to support the delivery of the country’s Net Zero ambitions.**

Table 7: Cost and impact of an example policy package for modal shift in Wales

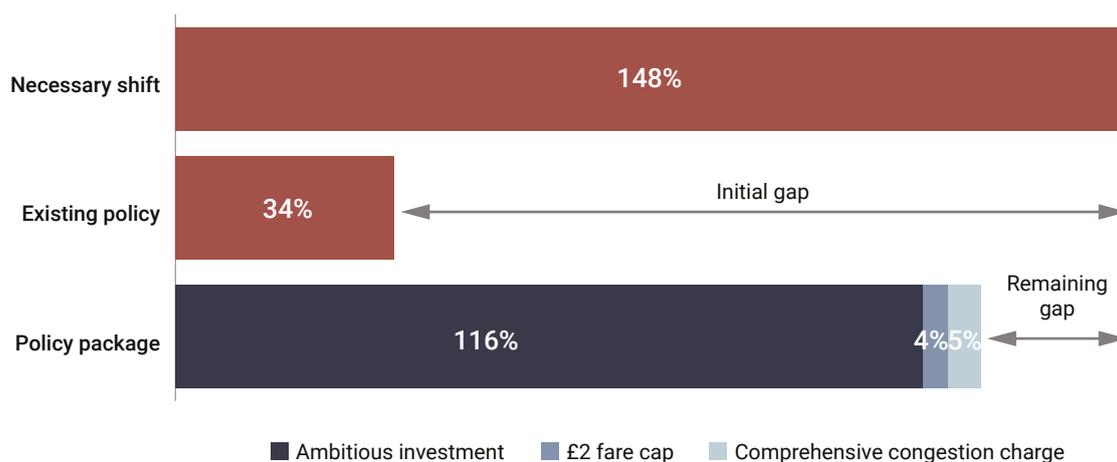
Cost	Increase in journeys	Increase in journeys from modal shift	Increase in journeys from modal shift (%)	Remaining increase in journeys needed from modal shift
£2.7bn	408m	126m	125%	23%

Source: WPI Economics

Perhaps most importantly, it is critical to take into consideration that this would be achieved without generalised increases in the cost of motoring. Such increases would be concentrated on urban conurbations, and in a context of improved bus networks that would reduce the need to drive in these places. As a result, with no other changes to wider transport systems, the rise in the general cost of motoring needed to achieve the modal shift required to support Net Zero would be just 46% by 2050 – one fifth of the level that would be necessary under current policy trajectory.

Additionally, this package does not include wider changes to our planning system that liberate urban and rural communities from car dependency (by ensuring, for instance, that housing and infrastructure is designed for active and public transport mobility as the default option, rather than private transport options as the norm), which if implemented would contribute to closing the remaining gap and help deliver modal shift quickly and cheaply. Again, it is worth noting that well-designed policies accompanied by behaviour-change approaches or targeted at car users would also likely be more effective than the results we present below.

Figure 11: comparison of necessary modal shift with the contribution of modelled policy package in Wales (as increase relative to 2018/19 levels)



Source: WPI Economics modelling

Table 8: shows how the costs of each part of this package are spread between the Welsh Treasury and road users in congested urban areas.

Table 8: Costs of each element of example policy package

	Yearly cost – Welsh Treasury	Yearly costs - motorists in urban areas
<b>More ambitions bus investment</b>	£68m	-
<b>£2 cap on single bus fares</b>	£32m	-
<b>Comprehensive congestion charge</b>	-	£927m
<b>Total</b>	<b>£100m</b>	<b>£927m</b>

Source: WPI Economics

Overall, the example package would also be delivered with a net gain in tax revenue. Under the most ambitious congestion charging option, the net revenue from the package would amount to over £800m on average per year up to 2050. This could be invested in further modal shift polices, other environmental interventions or, in the context of declining tax bases in other places (e.g. Fuel Duty), provide a much needed boost to public finances. Depending on the policy options chosen, this would also benefit Welsh Government finances through the Barnett formula or directly through taxation if the charge was devolved or administered by local authorities.

CHAPTER 6

# The benefits of delivering modal shift

We model two different types of benefits: the benefits that derive from shifting car journeys onto buses (demand-side benefits); and the economic benefits that come from the increase in bus supply as part of our policy package (supply-side benefits).

Focusing on change to transport demand, delivering modal shift through the policy package outlined in the previous section would bring about environmental and socio-economic benefits (see Annex for a disaggregated analysis of each policy).

Cumulative environmental benefits by 2050 include **carbon savings of 0.8 million tonnes of CO<sub>2</sub> in Wales as a whole, equivalent to the total transport emissions in Caerphilly in 2019**. They also include improvements to air quality worth **£1.5m – enough to pay the wages of almost 43 NHS nurses for a year**, with cumulative savings in emissions of more than 300 tonnes of NO<sub>x</sub> and six tonnes of PM<sub>10</sub> by 2050.



**Cumulative environmental benefits by 2050 include carbon savings of 0.8 million tonnes of CO<sub>2</sub> in Wales as a whole**

equivalent to the total transport emissions in **Caerphilly in 2019**



The shift in transport demand from cars onto buses also has socio-economic benefits, derived from improved health outcomes (including reduced road accidents and noise and increased physical activity) and the reduction in congestion that results from taking cars off the road. In Wales, cumulative health benefits are estimated to exceed £720m by 2050, and benefits derived from reduced congestion would amount to over £1.4bn by the same date. The combined value of health and congestion benefits would be equivalent to the GDP of Powys in 2019.<sup>14</sup>

**The combined value of health and congestion benefits would be equivalent to the GDP of Powys in 2019.**



In addition to these demand-side benefits, by investing in increasing bus supply, which would almost treble by 2050 in relation to pre-pandemic levels, our policy package would also have a positive effect on local labour markets, by improving connectivity between people and jobs.

Following the methodology designed by the Institute for Transport Studies, as explained in more detail in our Methodology report, we estimate our investment package would lead to an increase in employment of almost **1,400, contributing more than £250m to Wales’s GDP and £60m in taxes**, which would benefit the Welsh Treasury through higher income tax receipts.



**1,400 additional people in employment, contributing more than £250m to Wales’s GDP and almost £60m in tax receipts.**



It is important to note these figures relate exclusively to the improvement in labour market connectivity resulting from increasing bus supply and reducing bus waiting times, and therefore do not include the employment this would create directly (by hiring more bus drivers, for instance). They also do not include the positive contribution such expansion of

the bus network would have on productivity: analysis by the Centre for Cities has found that inadequate public transport provision, which reduces the “effective size” of British cities (outside London), particularly at rush hour, explains a significant part of the productivity gap with their European counterparts, costing the UK economy more than £23bn per year.<sup>15</sup>

Figure 12: Labour market benefits from improvements to bus network



**1,400**  
additional  
employment



**£250** million  
increased  
economic output



**£60** million  
increased tax  
revenue

Source: WPI Economics modelling



# Conclusion

The first report of the project demonstrated that modal shift was both necessary to decarbonise the transport sector and desirable for its multiple benefits. This second report not only demonstrates that modal shift is possible, but also aims to contribute to making modal shift a reality. The table below summarises the analysis of a set of potential interventions.

Table 9: Selected results from modelling of policy options

Policy area	Scenario	Total increase in bus journeys	Increase in journeys from modal shift	Increase in journeys from modal shift (%)	Annual cost (2021 £ values)
<b>Increasing attractiveness of bus network</b>	Ambitious investment	391m	117m	116%	£68m
<b>Making bus cheaper</b>	Bus bonus	-	3m	2.8%	£3m
	£2 fare cap for single journeys	12m	4m	3.6%	£32m
<b>Discouraging the use of car</b>	Low scenario	-	0.5m	0.5%	-£93m
	High scenario	-	5m	4.9%	-£927m

Source: WPI Economics

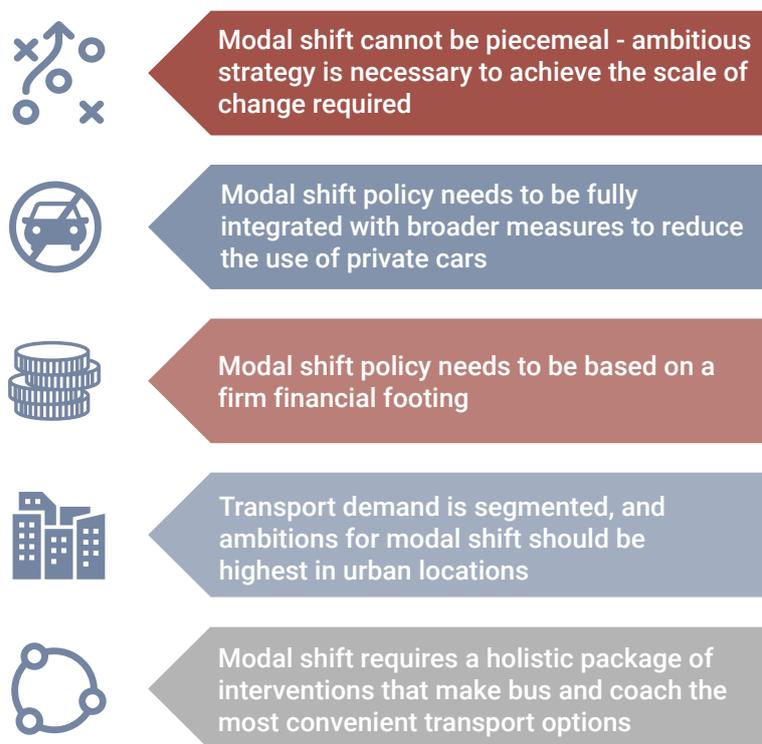
Focusing on the case of Wales, this report has estimated that a policy package combining ambitious investment in bus services and infrastructure, a £2 cap on single fares, and a congestion charge in urban local authorities would **deliver over four fifths of the necessary modal shift**, whilst raising significant revenue for the Welsh Treasury between 2023 and 2050.

In addition to its environmental benefits, **saving 0.8 million tons of CO<sub>2</sub>**, 300 tons of NO<sub>x</sub> and six tons of PM<sub>10</sub>, the changes in travel patterns resulting from this policy package also generate **socio-economic benefits worth almost £2.2bn**. By expanding the bus network and increasing service frequency, our policy package would also have a positive effect on local labour markets, which we quantify as almost **1,400 additional people in employment, contributing more than £250m to Wales's GDP and £60m in tax receipts**.

As previously explained, this does not constitute a recommended policy package, since different interventions are likely to be most effective in different places; and other factors beyond contributions to modal shift (such as value for money or distributional implications) must also be taken into consideration. Rather, this is simply provided as an estimation of the likely contribution to modal shift that can be expected to come from each type of policy across Wales. This in itself provides valuable evidence base to inform debates and decision-making at both local and national level about how to harness buses and coaches to decarbonise transport.

This report also contributes to making modal shift a reality in another way. The key lessons extracted from our six roundtables are also important considerations for transport officers and policy makers to bear in mind when planning, designing and delivering modal shift policies, and constitute this report's policy recommendations (Figure 13).

Figure 13: Policy recommendations



Source: WPI Economics.

More specifically, a major insight from our research is the need for a modal shift strategy implemented through policy packages, which we have argued need to combine four different types of interventions:

- Investment in bus services and infrastructure to increase the attractiveness of the bus network;
- Measures to make buses cheaper;
- Measures to make cars less attractive; and
- Environmental framing to all these policies to influence consumer choices.

We hope this work can stimulate a national conversation about the role of buses and coaches in decarbonising transport and the wider Net Zero agenda, and offer a shared language for governments, local authorities, operators and campaigners to work together and deliver the transformations in our transportation systems that are necessary to deliver modal shift, unlocking a myriad of other benefits at the same time.

# Annex 1: Policy longlist

Policy name	Policy description	Policy lever	Intervention target	Contribution
<b>Improved on-board experience</b>	Including improved comfort, provision for disabled people, on-board services including wi-fi etc.	Operational funding	In-vehicle services	Better bus experience
<b>Improved bus infrastructure</b>	Including bus stops, raised kerbs, shelters etc.	Operational funding	Bus infrastructure	Better bus experience
<b>Increasing public subsidy to cut fares</b>	A proportional cut to tariffs of 10%, 20% or 50%, funded with an increase in operational funding.	Operational funding	Bus fares	Cheaper buses
<b>Subsidised flat fares</b>	A flat-fare package funded via public subsidy, such as 1EUR per day tickets in Vienna, or the £2 cap to single fares announced by DfT.	Operational funding	Bus fares	Cheaper buses
<b>Making bus transport / public transport free</b>	Totally free-at-the-point-of-access local buses.	Operational funding	Bus fares	Cheaper buses
<b>Salary sacrifice bus vouchers</b>	Policy that allows employers to provide their employees with tax-free vouchers to help pay for the cost of commuting to work by bus.	Taxation	Bus fares	Cheaper buses
<b>Enhance Community Transport</b>	Range of potential policies aimed at increasing provision of community transport / decreasing cost.	Capital and operational funding	Bus network	Higher propensity to use buses
<b>Campaigns to use the bus</b>	Behavioural campaigns promoting the usage of the bus among car drivers and users.	Behavioural	People's decision-making	Higher propensity to use buses
<b>Improving knowledge of bus information</b>	Measures to increase provision of information on services, including through app provision.	Behavioural	People's decision making	Higher propensity to use buses
<b>Improved coach stations</b>	Improving the location of coach stations and / or the provisions at coach station.	Capital and operational funding	Coach network	Higher propensity to use coaches
<b>Coordinated timetables</b>	Coordinated timetables for bus/coach-bus/coach connections and bus/coach connections with all other modes of public transport.	Regulation	Public transport integration	Integrated transport system
<b>Improved public transport interchanges</b>	Improving the quality of public transport interchanges, aiming to reduce interchange times and improve information provision and amenity.	Capital funding	Bus infrastructure	Integrated transport system
<b>Improved integrated ticketing</b>	Ticketing that allows travellers to pay for all legs of a journey on different public transport modes.	Regulation and funding	Bus fares	Integrated transport system

Policy name	Policy description	Policy lever	Intervention target	Contribution
<b>Rural community hubs</b>	Interchanges for rural / Demand Responsive Transport / Taxis and PHVs community-based transport services and mainstream bus services.	Capital and operational funding	Bus infrastructure and network	Integrated transport system
<b>Demand responsive transport</b>	Range of policies aimed at increasing the provision of demand responsive transport, or reducing the cost.	Capital and operational funding	Bus network	More bus supply
<b>Increased frequency of bus service</b>	Increasing the frequency of existing services by 10%/20%/50%.	Operational funding	Bus network	More bus supply
<b>Bus Rapid Transit infrastructure</b>	Bus transport systems designed to have substantially quicker and more reliable bus journey times through provision of, for example, roadways dedicated to buses.	Capital funding	Bus infrastructure	More bus supply and better bus experience
<b>Simple, known services ("turn up and go" network)</b>	Reducing / eliminating the need to look at timetables through predictable, frequent services with simple service patterns.	Operational funding	Bus network	More bus supply and better bus experience
<b>Set minimum network standards</b>	More ambitious transformation of the network, setting minimum frequency standards for existing services and adding new services for areas currently not serviced by local buses.	Operational funding	Bus network	More bus supply and better bus experience
<b>Park and ride services</b>	Increasing provision of park and ride services - can also be combined with zero emission fleet investment.	Capital and operational funding	Bus infrastructure and network	More bus supply and better bus experience
<b>Door-to-door school buses</b>	Provision of bespoke services for transport to school designed to call at or near pupils doors (with much wider eligibility than current free bus provision).	Operational funding	Bus network	More bus supply and better bus experience
<b>Increased fuel duty</b>	Increases in real terms values of fuel duty.	Taxation	Cost of monitoring	More expensive car journeys
<b>Eco levy</b>	A road-user charge but with explicit objective to cut greenhouse gas emissions, to benefit from behavioural framing.	Taxation	Cost of monitoring	More expensive car journeys
<b>Road user charging</b>	Tax / charges based on road usage, rather than on fuel usage.	Taxation	Cost of monitoring	More expensive car journeys (targeted)
<b>Increased car parking charges</b>	Real terms increase in car average car parking charges.	Regulation	Road usage	More expensive car usage

Policy name	Policy description	Policy lever	Intervention target	Contribution
<b>Mixed-use developments</b>	Reforms to planning policy to further encourage mixed residential, commercial and business district development to reflect new travel patterns and desires post-pandemic.	Regulation	Travel demand	Reducing car dependency
<b>Shared commuting schemes</b>	Employees living close to each other rideshare to and from work using a self-drive minibus that is partly sponsored by the employer.	Regulation	Road usage	Reducing car dependency
<b>Congestion zones - urban</b>	Replicating London's congestion charge model to the city centres of other major cities in Great Britain.	Regulation	Cost of monitoring and road usage	Restricting cars' mobility and/or more expensive car journeys
<b>Congestion zones - tourist hotspots</b>	Congestion zones at tourist hotspots to disincentive journeys to these places.	Regulation	Cost of monitoring and road usage	Restricting cars' mobility and/or more expensive car journeys
<b>Reduced options to park</b>	Policies that reduce provision of car parking spaces.	Regulation	Road usage	Restricting cars' mobility
<b>Workplace parking levies</b>	Charge on employers and education organisations for the number of parking places they provide that are regularly used by employees, students or others.	Taxation	Cost of monitoring	Restricting cars' mobility
<b>Restrictions on car use in urban areas by banning odd / even number plates alternately</b>	Policies that allow residents to drive their cars into urban areas only every other day.	Regulation	Road usage	Restricting cars' mobility
<b>Bus priority measures</b>	Including bus lanes, bus-only routes, traffic signal priority measures etc.	Regulation and capital funding	Road usage	Restricting cars' mobility and better bus experience

# Annex 2: Full results

## Impact on modal shift:

Increase attractiveness of buses		Cheaper buses			More expensive cars	
Baseline	Alternative scenario	Bus bonus	Fare cap	Free buses	CC - Low	CC - High
34%	116%	2.8%	3.6%	11%	0.5%	4.9%

## Benefits:

		Environmental benefits			Socio-economic benefits			
		Decarb. CO <sub>2</sub> (million kg)	Air quality		Health (million £)			Congestion
			Nox (tonnes)	PM10 (tonnes)	Lifestyle	Road accidents	Noise	
<b>Increase att. buses</b>	Baseline	208	84	2	72	124	2	393
	Ambitious	709	288	6	244	424	7	1,340
<b>Cheaper buses</b>	Bus bonus	17	7	0.1	6	10	0.2	32
	Fare cap	22	9	0.2	8	13	0.2	42
	Free buses	64	26	1	22	38	1	121
<b>Make cars less att.</b>	CC - Low	3	1	0.02	1	2	0.03	6
	CC - High	30	12	0.2	10	18	0.3	57

## Cost:

Total cumulative costs 2023/2050 (million £, 2021 prices)						
Increase attractiveness of buses		Cheaper buses			More expensive cars	
Baseline	Alternative scenario	Bus bonus	Fare cap	Free buses	CC - Low	CC - High
£540	£1,842	£84	£852	£3,986	-£2,503	-£25,028

Average annual 2023/2050 (million £, 2021 prices)						
Increase attractiveness of buses		Cheaper buses			More expensive cars	
Baseline	Alternative scenario	Bus bonus	Fare cap	Free buses	CC - Low	CC - High
£20	£68	£4	£32	£148	-£93	-£927

# Annex 3: Local authorities classified as Urban

Local Authority
Wrexham
Swansea
Cardiff
Newport

# Endnotes

- 1 [The-true-value-of-local-bus-services-June-2017.pdf](#) (greenertransportsolutions.com)
- 2 Welsh Government (2021) Net Zero Wales – Carbon budget 2 (2021-25), 42949 Second All Wales Low Carbon Delivery Plan (2021-2025) (gov.wales)
- 3 <https://www.gov.wales/sites/default/files/publications/2021-12/infrastructure-finance-plan-2021-1.pdf>
- 4 <https://www.cpt-uk.org/media/fc0bzccy/decarbonisation-dividend-report.pdf>
- 5 Bus fare and journey time elasticities and diversion factors for all modes: A rapid evidence assessment | RAND
- 6 Professor David Begg for Greener Journeys (2016) The Impact of Congestion on Bus Passengers <https://greenertransportsolutions.com/wp-content/uploads/2016/06/Prof-David-Begg-The-Impact-of-Congestion-on-Bus-Passengers-Digital-FINAL.pdf>
- 7 CPRE (2021) Every village, every hour – a comprehensive bus network for rural England, available [https://www.cpre.org.uk/wp-content/uploads/2021/03/CPRE\\_Every-village-every-hour\\_report.pdf](https://www.cpre.org.uk/wp-content/uploads/2021/03/CPRE_Every-village-every-hour_report.pdf)
- 8 <https://doi.org/10.1016/j.cstp.2022.02.001>
- 9 [https://www.stagecoachgroup.com/~/\\_media/Files/S/Stagecoach-Group/Attachments/media/publication-policy-documents/modal-shift-report.pdf](https://www.stagecoachgroup.com/~/_media/Files/S/Stagecoach-Group/Attachments/media/publication-policy-documents/modal-shift-report.pdf)
- 10 <https://doi.org/10.1016/j.cstp.2022.02.001>
- 11 WPI Economics, (2022) Combined authorities: Financial freedoms and fiscal devolution | Local Government Association.
- 12 DfT announces bus grants for 31 local transport authorities (transportextra.com)
- 13 London is also classified as a city, but since it already has a congestion charge it is excluded from the analysis.
- 14 <https://www.ons.gov.uk/economy/grossdomesticproductgdp/datasets/regionalgrossdomesticproductlocalauthorities>
- 15 <https://www.centreforcities.org/wp-content/uploads/2021/11/Measuring-Up-Comparing-Public-Transport-in-the-UK-and-Europes-Biggest-Cities.pdf>



WPI Economics Limited

11 Tufton Street  
London  
SW1P 3QB

@WPI\_Economics

**[wpieconomics.com](http://wpieconomics.com)**

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