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Bus and Coach: The route to net zero in Scotland 0

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# About WPI Economics

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# 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 over 100 members in Scotland from across the industry be they large or small, bus or coach, operator or supplier. Across the UK we have over 900 members. 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 (CPT), 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 Scotland and accompanied by equivalent reports for England and Wales, 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 UK'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 Scotland. Further reports highlight results for England and for Wales. Methodological details are explained in the accompanying Methodology report.

## Modal shift: necessary, desirable and possible

The <u>Decarbonisation dividend</u>, 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 Scotland, emissions reduction targets to reduce transport carbon emissions by 75% by 2030 and reach net zero by 2045 were introduced by the <u>Climate Change (Emissions Reduction Targets) (Scotland) Act 2019</u>, which amended the <u>Climate Change (Scotland) Act 2009</u>.

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 £1bn over the next 27 years would deliver over 200m extra bus journeys across Scotland. Of these, 65m 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 17% increase on the 2018/19 baseline. This means the current policy trajectory would deliver just one fifth of the total modal shift estimated to be necessary in Scotland in our previous report.

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



#### Source: WPI Economics

So how can the remaining 67% 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 would have to increase by 3.2% per year above CPI until 2050. In tangible terms, this means that the cost of motoring in Scotland in 2050 would be 133% higher in real terms than it is today.

Without further interventions and investment in bus and coach, the cost of motoring in Scotland would need to rise by 133% 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 a free-at-the-point of use bus service in Scotland would deliver 22m fewer car journeys, and a total increase in bus journeys of over 130m.

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 in Scotland would amount to around £13bn up to 2050, or over £480m 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:** 



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 Scotland 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 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 Scotland. It shows that:

- More ambitious investment in bus services and infrastructure, amounting to around £118m per year to 2050 (or around £3.2bn cumulatively), would deliver almost 680m additional annual bus journeys, of which over 200m journeys annually would previously have been made by car.
- A salary sacrifice scheme ("Bus Bonus") for commuters would reduce car usage by almost 3m journeys and lead to an increase in bus journeys of almost 5m. 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.

- A £2 fare cap for single journeys costing around £2.1bn by 2050, would deliver over 30m additional bus journeys, of which almost 10m journeys would have been previously been made by car.
- A congestion charge in urban local authorities around Scotland, in turn, would lead to 1.5m fewer car journeys, if applied only to urban centres, and 15m 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 Scotland

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)
Increasing attractiveness of bus network	Ambitious investment	678m	203m	30%	£128m
Making bus cheaper	Bus bonus	-	4.7m	1.3%	£13m (UK)
	£2 fare cap for single journeys	32m	9.5m	2.5%	£78m
Discouraging the	Low scenario	-	1.5m	0.4%	-£112m
use of cars	High scenario	-	15m	4%	-£1.1bn

Source: WPI Economics

Notes: Cost refers to cost to the Exchequer - negative values represent revenue.

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 car drivers.



## What a package could deliver

As outlined above, packages of these options will need to vary between different localities, be combined with behaviourchange policies and reflect the needs of different types of users. Wider reforms to the transport system will also need to support them. 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 achieve almost three quarters of the modal shift needed to support the delivery of Net Zero**.



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

#### 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 areas, 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 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 more rapidly.

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 45% by 2050 – one third 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 Exchequer. 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 £900m of which would derive from Scotland**. Depending on the policy options chosen, this would also benefit Scottish Government finances through the Barnett formula.

## 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 significant environmental benefits, including:



A reduction in emissions of 1.1 million tons of CO<sub>2</sub>

equivalent to the carbon emissions in the city of **Aberdeen in 2019**;

Air quality benefits enough to pay the wages of almost £800,000 almost 22 nurses for one year.





Socioeconomic benefits **worth £3.4bn** from changes in travel patterns resulting from this policy package, **equivalent to the total GDP of Dundee in 2019.** 



Positive impacts on local labour markets (from expanding the bus network and increasing service frequency), which could result in almost 3,000 additional people in employment, contributing more than £180m to Scotland's GDP and almost £40m in tax receipts.



## Driving modal shift forward

This report confirms that modal shift is necessary, desirable and, most importantly, it shows how, by bringing different elements 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.



# CHAPTER 1 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 summarises the results of the second stage of the project.

## 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 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 in every location. 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 be 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 in previous research (Figure 3), with results making a strong case for further investment in bus services and infrastructure.

#### Hampshire eclipse £8.10 Mansfield interchange £6.80 £6.10 Crawley fastway Local sustainable transport fund £5.00 Bus priority measures £4.90 Local majors £4.20 £3.80 Concessionary travel for older and disabled people £3.70 Bus service operators grant Concessionary travel for apprentices £2.70 Supported services £2.50 Tax incentives for bus commuters £2.00 Capital expenditure Revenue expenditure

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

#### Source: KPMG (2017)1

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 cover this ground. The results presented here should be viewed as representing what would need to happen regardless of the future governance model.



## CHAPTER

# Current policy will not be enough

The Scottish Government has an ambitious target to reduce car kilometres by 20% by 2030.<sup>2</sup> In this context, the Scottish Government's National Transport Strategy 2 (NTS 2) aims to achieve the necessary and generational change in behaviour and attitude towards transport choices, moving people from their car to sustainable transport options.<sup>3</sup> Achieving these aims will require significant increases in bus usage, as outlined in our previous report.

The Scottish Government launched free bus travel for under 22-year-olds at the beginning of 2022, with approximately half of eligible young people signed up to the scheme by September 2022.<sup>4</sup> In terms of capital funding, the Scottish Government has committed £500m for local authorities, in partnership with bus operators, to invest in priority infrastructure through the Bus Partnership Fund.<sup>5</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 estimates of the shift that is necessary to support Scottish Government's transport decarbonisation targets, we assume:

- · Current funding commitments of the Bus Partnership Fund (£500m) are invested twice 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 would make to modal shift, following the logic outlined in the accompanying Methodology report.

#### Table 2: Analysis of the impacts of expected current investment in buses in Scotland

Cost	Increase in journeys	Increase in journeys from modal shift	% increase in journeys from modal shift	Remaining increase in journeys from modal shift needed
£1bn	213m	64m	17%	67%

Source: WPI Economics modelling

In Scotland, a total baseline investment of £1bn would lead to a 57% increase in bus patronage (more than 210m additional bus journeys). Of those, almost 64m journeys would have previously been travelled by car, representing a 17% 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 the Scottish Government's existing commitments (% 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 Scotland would have to increase by 3.2% per year (above CPI) until 2050. In more tangible terms, this would mean the **real cost of motoring across Scotland increasing by 133% between now and 2050**.

# Without further interventions and investment in bus and coach, the real cost of motoring in Scotland would need to rise by 133% 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 damage to the economy and would impact 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 service in Scotland would deliver 22m fewer car journeys, and a total increase in bus journeys of over 130m.

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 £13bn up to 2050, or over £480m per year. This demonstrates that subsidising fares at this level is not a viable option, given the significant cost and the 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 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 people's 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*,<sup>6</sup> 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)

#### 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 direction opposite 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 broader changes in the way in which transport policy and urban planning may reduce car dependency. Recent initiatives from the Scottish Government, such as the Strategic Transport Projects Review 2, aiming to prioritise sustainable transport projects,<sup>7</sup> and the impending introduction of the National Planning Framework 4, which will allow authorities to embed the Sustainable Travel and Investment Hierarchies into their Local Plans and decision making,<sup>8</sup> showing that this necessary change in our approach to transport and urban planning is already underway.

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>9</sup>
- Places: Barriers to bus usage vary among different types of places: journey times are more problematic in urban contexts suffering from congestion,<sup>10</sup> whereas in rural areas the reach and frequency of bus services pose bigger challenges.<sup>11</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 prices 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-type 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>12</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>13</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>14</sup> This has been the case, for instance, with Nottingham's Workplace Parking Levy, whose revenue was ringfenced as funding for the city's tram system.<sup>15</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 Scotland 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 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		
Increasing attractiveness of bus network	Ambitious investment	£3.2bn, based on same level of per capita investment (£584) as in England outside London.		
	Bus bonus	Salary sacrifice scheme with a value of up to £800.		
Making bus cheaper	£2 fare cap for single journeys	Long-term version of the £2 fare cap announced in England for the first quarter of 2023.		
	Low scenario	Congestion charge for urban centres (affecting 7.5% of local traffic).		
Discouraging the use of car	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>16</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 Scotland would amount to almost **£3.2bn 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 **£146m invested in increasing bus supply in Scotland**, increasing bus km by 55% by 2050.

Overall, across Scotland, more ambitious investment in bus infrastructure and services would almost treble (181% increase) bus patronage by 2050, leading to 680m additional annual bus journeys compared to 2018/19 levels.

Of these, **over 200m journeys annually would have previously been travelled by car**, representing an increase in bus patronage from modal shift of 54%.

In total, this means that increased investment in bus infrastructure and services would deliver nearly two thirds of the total 84% increase in passenger from modal shift needed to support net zero.

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
£3.2bn	678m	203m	54%	30%

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

Source: WPI Economics

Figure 8: Increase in bus patronage from ambitious investment in Scotland (% 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 a form of salary sacrifice.

Inspired by the Department for Transport's recent announcement in England of a £2 fare cap scheme on single tickets, we model the contribution that a similar £2 cap 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 3m journeys and lead to an increase in bus journeys of almost 5m, at a cost of £350m. Costs are significant compared to the scale of change because existing bus users would also benefit. If a way of targeting on existing car users could be developed, the cost of this policy would fall.
- A £2 cap on single fares would lead to 32m more bus journeys across Scotland, at a cost of £2.1bn. This comes at a significantly higher cost than the Bus Bonus option, as it supports a much larger share of existing bus demand.

	Cost	Increase in journeys	Increase in journeys from modal shift	Increase in journeys from modal shift (%)	Remaining increase in journeys needed from modal shift *
Bus bonus	£350m	-	4.7m	1.3%	66%
£2 cap on single fares	£2.1bn	32m	9.5m	2.5%	65%

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

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 Scotland (% 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 classified as Cities or Large Towns by the House of Commons Library – a full list of these local authorities is available in the Annex. 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 10% of motor traffic; and
- Our high scenario models a comprehensive charging zone, in the localities, but now covering 100% 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 1.5m car journeys onto buses in affected areas, delivering a modal shift that would increase bus patronage by 0.4% across Scotland.

• A more comprehensive charging zone, in contrast, would switch more than 15m journeys onto buses in affected areas, delivering a modal shift that would increase bus patronage by 4% across Scotland.

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 **public sector revenue by**:

- A yearly average of £112m in the case of a congestion charge focused on urban centres:
- £1.1bn on average per year under a more comprehensive congestion charge.

This means that the revenue from the charge would be greater than the costs of policies to invest in, or subsidise, bus. As such, this would provide an opportunity to consider how transport authorities and the Scottish Government could work together to deliver on their shared objectives of net zero and modal shift. How this works in practice will depend on how the scheme is legislated for. For example, existing legislation could be used by transport authorities to raise and retain funds locally, and this would automatically be ring-fenced for transport-related activity. Channeling at least some of this money into supporting the delivery of net zero through modal shift would be an obvious choice.

...the revenue from the charge would more than cover the costs of any other policies to invest in, or subsidise, bus. We hope that transport authorities and the Scottish Government could work together to use this money in a way that delivers on their shared objectives of delivering on net zero and modal shift.



# 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 need 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 Scotland, 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 61% increase in bus patronage from modal shift, delivering almost three quarters of the modal shift estimated as necessary to support the delivery of Scotland's Net Zero ambitions.

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

Cost	Increase in journeys	Increase in journeys from modal shift	Increase in journeys from modal shift (%)	Remaining increase in journeys needed from modal shift
£5.3bn	725m	228m	61%	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 areas, 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 across Scotland to achieve the modal shift required to support Net Zero would be just 45% by 2050 – one third 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 (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 Exchequer and road users in congested urban areas.

#### Table 8: Costs of each element of example policy package

	Yearly cost (Scotland)	Yearly costs - motorists in urban areas (Scotland)
More ambitious bus investment	£118m	-
£2 cap on single bus fares	£78m	-
Comprehensive congestion charge	-	£1.1bn
Total	£200m	£1.1bn

Source: WPI Economics

Overall, the example package would also be delivered with a net financial surplus. Under the most ambitious congestion charging option, the financial **surplus from the package would amount to around £17bn per year on average across Great Britain, over £900m of which would derive from Scotland**. Under existing legislation, this could could be invested in further modal shift polices, or transport schemes.

# 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 1.1 million tonnes of CO2 across Scotland, equivalent to the carbon emissions in the city of Aberdeen in 2019. They also include improvements to air quality worth almost £800,000 – enough to pay the wages of almost 22 NHS nurses for one year – with cumulative savings in emissions of more than 120 tonnes of NOx and 6 tonnes of PM10 by 2050.



Cumulative environmental benefits by 2050 include carbon savings of 1.1 million tonnes of CO<sub>2</sub> across Scotland

#### equivalent to the carbon emissions in the city of Aberdeen in 2019

# Air quality benefits worth almost £800,000

enough to pay the wages of almost **22** NHS nurses for one year.



The shift in transport demand from cars onto buses also has socio-economic benefits, derived from improved health outcomes (including reduced road accidents, noise and increased physical activity) and the reduction in congestion that results from taking cars off the road. In Scotland, **cumulative health benefits are estimated to be £1.1bn** by 2050, and **benefits derived from reduced congestion would amount to almost £2.3bn** by the same date. **The combined value of health and congestion benefits would be just below Dundee's GDP in 2019** (£3.6bn).<sup>17</sup>

The combined value of health and congestion benefits would be just below Dundee's GDP in 2019

In addition to these demand-side benefits, by investing in increasing bus supply, which would increase by over 50% 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 of over 3,000 additional people in employment, **contributing more than £180m to Scotland's GDP and £40m 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.18

Figure 12: Labour market benefits from improvements to bus network











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 in Scotland

Policy area	Scenario	Total increase in bus journeys	Increase in journeys from modal shift	Increase in journeys from modal shift (%)	Annual cost (2021 £ values)
Increasing attractiveness of bus network	Ambitious investment	678m	203m	30%	£128m
Making buc	Bus bonus	-	4.7m	1.3%	£13m
Making bus cheaper	£2 fare cap for single journeys	32m	9.5m	2.5%	£78m
Discouraging the	Low scenario	-	1.5m	0.4%	-£112m
use of car	High scenario	-	15m	4%	-£1.1bn

#### Source: WPI Economics

Focusing on the case of Scotland, 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 three quarters of the necessary modal shift**, whilst raising significant revenue for the Exchequer between 2023 and 2050.

In addition to its environmental benefits, **saving 1.1 million tonnes of CO2**, 120 tonnes of NOx and 6 tonnes of PM10, the changes in travel patterns resulting from this policy package also generate **socio-economic benefits worth £3.4bn**. 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 in over **3,000 additional people in employment, contributing more than £180m to Scotland's GDP and £40m in tax receipts.** 



# **3,000 additional people in employment, contributing more** than £180m to Scotland's GDP and £40m 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. 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 Scotland. This in itself provides a 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 desirable; 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. By doing so, it can offer a shared language for government, 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
Improved on- board experience	Including improved comfort, on-board services including wi-fi, provision for disabled people etc	Operational funding	In-vehicle services	Better bus experience
Improved bus infrastructure	Including bus stops, raised kerbs, shelters etc	Operational funding	Bus infrastructure	Better bus experience
Increasing public subsidy to cut fares	A proportional cut to tariffs of 10%, 20% or 50%, funded with an increase in operational funding	Operational funding	Bus fares	Cheaper buses
Subsidised flat fares	A flat fare package funded via public subsidy, such as 1eu per day tickets in Vienna, or the £2 cap to single fares announced by DfT	Operational funding	Bus fares	Cheaper buses
Making bus transport / public transport free	Totally free-at-the-point-of-access local buses	Operational funding	Bus fares	Cheaper buses
Salary sacrifice bus vouchers	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
Enhance Community Transport	Range of potential policies aimed at increasing provision of community transport / decreasing cost	Capital and operational funding	Bus network	Higher propensity to use buses
Campaigns to use the bus	Behavioural campaigns promoting the usage of the bus among car drivers and users	Behavioural	People's decision- making	Higher propensity to use buses
Improving knowledge of bus information	Measures to increase provision of information on services, including through app provision	Behavioural	People's decision making	Higher propensity to use buses
Improved coach stations	Improving the location of coach stations and / or the provisions at coach station	Capital and operational funding	Coach network	Higher propensity to use coaches
Coordinated timetables	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
Improved public transport interchanges	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
Improved integrated ticketing	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
Rural community hubs	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
Demand responsive transport	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
Increased frequency of bus service	Increasing the frequency of existing services by 10%/20%/50%	Operational funding	Bus network	More bus supply
Bus Rapid Transit infrastructure	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
Simple, known services ("turn up and go" network)	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
Set minimum network standards	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
Park and ride services	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
Door-to-door school buses	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
Increased fuel duty	Increases in real terms values of fuel duty	Taxation	Cost of monitoring	More expensive car journeys
Eco levy	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
Road user charging	Tax / charges based on road usage, rather than on fuel usage	Taxation	Cost of monitoring	More expensive car journeys (targeted)
Increased car parking charges	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
Mixed-use developments	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
Shared commuting schemes	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
Congestion zones - urban	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
Congestion zones - tourist hotspots	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
Reduced options to park	Policies that reduce provision of car parking spaces	Taxation	Cost of monitoring	Restricting cars' mobility
Workplace parking levies	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
Restrictions on car use in urban areas by banning odd / even number plates alternately	Policies that allow residents to drive their cars into urban areas only every other day	Regulation	Road usage	Restricting cars' mobility
Bus priority measures	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
17%	54%	1.3%	2.5%	11%	0.4%	4%

## **Benefits:**

		Environmental benefits			Socio-economic benefits			
		Decarb. Air quality		Health (million £)				
		CO <sub>2</sub> (million kg)	Nox (tonnes)	PM10 (tonnes)	Lifestyle	Road accidents	Noise	Congestion
Increase	Baseline	314	34	2	115	200	4	634
att. buses	Ambitious	1002	110	6	368	639	11	2022
Cheaper buses	Bus bonus	23	3	0.13	9	15	0.3	47
	Fare cap	47	5	0.27	17	30	0.5	94
	Free buses	194	21	1	71	124	2	392
Make cars less att.	CC - Low	7	1	0.04	3	5	0.1	15
	CC - High	74	8	0.43	27	48	0.9	150

## 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	
£1,000	£3,191	£350	£2,114	£12,994	-£3,031	-£30,305	

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
£37	£118	£13	£78	£481	-£115	-£1,147

# Annex 3: Local authorities classified as Urban

Local Authority	
Aberdeen City	
City of Edinburgh	
Renfrewshire	
Dundee City	
Glasgow City	

# Endnotes

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