

## REQUEST UNDER THE ENVIRONMENTAL INFORMATION (SCOTLAND) REGULATIONS 2004 (EIRs)

### ANNEX A

#### “Correspondence between Transport Scotland and AECOM regarding the study.”

Exchanges between officials and AECOM are in the context of the published TDM report and therefore, final version is as per the [publication](#). Exchanges relate to the modelled hypothetical options within the research.

An exception under regulation 11(2) of the EIRs (personal information) applies to some the information requested because it is personal data of a third party and disclosing it would contravene the data protection principles in Article 5(1) of the General Data Protection Regulation and in section 34(1) of the Data Protection Act 2018. This exception is not subject to the 'public interest test', so we are not required to consider if the public interest in disclosing the information outweighs the public interest in applying the exception.

#### Extracts of correspondence:

##### 23/06/2022 TDM Options Study: draft Inception Report

[redacted]

Please find attached the draft Inception Report for your consideration. This forms the first deliverable of this Study. Please let me have your comments so we can finalise.

We will now start detailed planning for Work Package 2. As detailed in the contract I've attached the report as a Word document. Is that your preferred format for the tech notes, going forward, or would you like to switch to something else, such as PDFs?

Regards

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**29/6/22**

Hi [redacted]

Please find attached the finalised Inception Report for the TDM Options Study.

Regards

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Subject: [EXTERNAL] RE: TDM Options Study: draft Inception Report

Hi [redacted]

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Attaching the Inception Report with our comments – nothing major, just a few clarifications in the text. The one substantive addition is a line on ‘unintended consequences’, which we touched on at the meeting – i.e. consideration of potential impacts on other modes of certain measures (e.g. people selling their cars and buying LGVs if the a DM intervention applied only to cars). I think that was already implicit but thought worthwhile making it explicit. We wondered whether it might be worth ‘workshopping’ unintended consequences as part of the project – but can discuss that at our catch-up. I also added a suggestion from [redacted] about appraisal against both TPOs and STAG criteria.

Hope that all makes sense. Looking forward to speaking next week.

[redacted]

Attachment for the above email chain is a procurement document proposing scope and structure of the report, personnel introductions.

## **NEW CHAIN**

### **16/8/2022 RE: TDM Options Study: WP2 interim tech note**

Morning [redacted]

Attaching the draft with our collated comments, with thanks. One stylistic/‘pedantic’ point I’ve been asked to pass on – when it comes to the final report, could footnotes come after punctuation please, for ease of reading?

Best wishes, [redacted]

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Subject: TDM Options Study: WP2 interim tech note

[redacted]

Please find attached the draft interim technical note for your consideration. Please let me have your comments so we can finalise, and also feed changes into the preparation of the WP2 tech note.

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Regards

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Draft/incomplete technical note supplied by AECOM was attached to this chain, copied below:

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# 1. Introduction, Structure & Approach

## 1.1 Introduction

AECOM has been commissioned by Transport Scotland to conduct a study into options for demand management schemes to disincentivise private car use in Scotland, and to provide advice and recommendations. This will include an assessment of the impacts on different groups of people, as well as the wider impacts on the environment and the economy.

The headline objective of this study is to support the Scottish Government commitment **to reduce car kilometres travelled in Scotland by 20% by 2030**, identified as a key target in the 2020 Update to Climate Change Plan<sup>1</sup> and delivered in line with the corresponding route map<sup>2</sup>. The target is defined relative to 2019 levels and covers all types of car, including zero emission vehicles. The route map sets out various actions including reducing the need to travel, living well locally, switching modes, and combining trips or sharing journeys. However, only by taking a combined approach which includes measures to reduce demand for transport can Scotland's climate targets be met<sup>3</sup>.

## 1.2 Structure and Approach

This technical note follows on from the first phase of the literature search and review, and details some of the key problems, opportunities and constraints which have emerged around implementing Travel Demand Management (TDM) measures in both the UK and internationally. It is structured into the following sections:

- Section 10 - Policy Context  
Review of current policy in areas such as transport, climate, revenue generation and equalities to understand strategic objectives related to TDM in Scotland and associated issues.
- Section 11 - Problems, Opportunities & Constraints  
Problems, Opportunities and Constraints have been identified from a literature review, discussions with stakeholders and data analysis.
- Section 12 - Transport Planning Objectives

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<sup>1</sup> Scottish Government, Update to the Climate Change Plan 2018-2032: Securing a Green Recovery on a Path to Net Zero, 2020, <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2020/12/securing-green-recovery-path-net-zero/update-climate-change-plan-2018-2032/documents/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero/govscot%3Adocument/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero.pdf>

<sup>2</sup> Transport Scotland, Reducing car use for a healthier, fairer and greener Scotland: A route map to achieve a 20 per cent reduction in car kilometres by 2030, 2022, <https://www.transport.gov.scot/media/50872/a-route-map-to-achieve-a-20-per-cent-reduction-in-car-kms-by2030.pdf>

<sup>3</sup> Element Energy, Decarbonising the Scottish Transport Sector: Final Report for Transport Scotland, 2021, <https://www.transport.gov.scot/media/50354/decarbonising-the-scottish-transport-sector-summary-report-september-2021.pdf>

A series of Transport Planning Objective (TPOs) have been generated based on the identified problems, opportunities, and constraints, and checked for alignment with policy. These objectives have been developed in line with the SMART principles: Specific, Measurable, Achievable, Relevant, and Timebound.

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## 2. Policy Context

### 2.1.1 A route map to achieve a 20 per cent reduction in car kilometres by 2030<sup>2</sup>

A key policy of the Scottish Government and the primary objective of this TDM options study is to achieve a 20% reduction in car kilometres travelled. The route map sets out how this can be achieved through both transport and non-transport related policies. The route map makes clear its aim is not to eliminate all car use, recognising the needs of disabled people or those in rural locations with less access to sustainable transport options.

It presents four key behavioural considerations people will be required to consider:

- Reduce your need to travel.
- Choose local destinations.
- Switch to walking, wheeling, cycling or public transport where possible.
- Combine a trip or share a journey.

The route map also lists a number of additional benefits to reducing car use, including reducing inequalities, given the inequity of car reliance by reallocating space to streets and public spaces, delivering inclusive economic growth, given the reduction in congestion, and improving health and wellbeing through increased physical activity and better air quality.

Within the route map there is recognition it focuses on “incentivising desirable behaviour” and states this “is unlikely to be sufficient” to meet the target as long as car use remains attractive. Car use will remain an attractive option if the strong individual benefits are not counteracted for the user by dis-benefits including environmental and health which are currently externalised.

It also recognises that current motoring taxation arrangements are a “significant barrier to the decarbonisation of the transport sector” and revenues are falling as the transition to lower emission and more fuel-efficient vehicles continues.

### 2.1.2 Climate Change Plan (Update)<sup>1</sup>

The Climate Change Plan sets out Scotland’s domestic plans to ensure Scotland continues to be leaders and collaborators in global action to tackle climate change. This was first published in 2018 and was updated in 2020 to reflect new targets to end Scotland’s contribution to climate change by 2045.

The update recognises the disruptive impact of COVID-19 and the need for a “Green Recovery” which consists of investment from both public and private sector, job creation and reskilling, adaptation and resilience, and a place-based approach to the recovery. Additionally of relevance is the

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recommendation by the Committee on Climate Change that positive behaviours observed during the pandemic should be embedded and taken forward as part of the Green Recovery. These behaviours include the increase in active travel rates and remote working, resulting in fewer unsustainable journeys taking place.

Within the transport chapter there is a recognition that advances in green vehicles are not enough to meet the targets and states “it is self-evident that managing transport demand and embedding behaviour change will be of vital importance”.

The plan also asks the UK Government to strengthen incentives to purchase cleaner vehicles as well as work together to review current fuel duty and vehicle excise duty (VED) arrangements.

### 2.1.3 National Transport Strategy (NTS2) and Delivery Plan<sup>4 5</sup>

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NTS2 is the Scottish Government strategy for the country’s transport system for the next 20 years. It sets the vision of a sustainable, inclusive, safe, and accessible transport system which could deliver a healthier, fairer and more prosperous Scotland. There are four main priorities which support that vision including reducing inequalities, taking climate action, helping deliver inclusive economic growth and improving health and wellbeing.

Demand management is directly referred to in NTS2 under the climate action priority. The policy within this priority states that infrastructure will not be built to cater for unconstrained increases in traffic volume. The document also discusses disruptive technologies such as electric and autonomous vehicles (AVs) and the additional demand these are likely to cause and how this demand needs to be managed. The document also emphasises the role transport must play in achieving the national net-zero by 2045 target, stating that “not taking steps of effectively managed demand for car use is no longer an option”. Air quality improvements are also highlighted in the policy, suggesting that we need to look beyond low emissions zones (LEZs) in Scotland’s four largest cities and consider further measures such as workplace parking levies and a mode shift to active travel.

In terms the difference in transport needs of urban and rural areas, the strategy “accepts that car ownership is not a luxury but a necessity for many living and working in rural areas” and states a “realistic and staged approach to the use of vehicles in rural areas” will be taken.

For opportunities, the policy mentions the “changing needs of young people, who often choose ‘usership’ over ownership”. The document also discusses supporting technological advances and efficiencies to increase the uptake of electric vehicles (EVs).

NTS2 also introduces two overarching hierarchies: the Sustainable Travel Hierarchy, which promotes the use of more sustainable modes, and the Sustainable Investment Hierarchy, which promotes sustainable investment decision making. A TDM scheme for private cars would align with both hierarchies by reducing the attractiveness of private cars (which are the lowest priority in the Sustainable Travel Hierarchy) and by reducing the need to travel unsustainably by making car less attractive relative to other more sustainable modes (which is the highest priority on the Sustainable Investment Hierarchy).

### 2.1.4 Strategic Transport Projects Review 2 (STPR2)<sup>6</sup>

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<sup>4</sup> Transport Scotland, NTS2, 2020, <https://www.transport.gov.scot/media/47052/national-transport-strategy.pdf>

<sup>5</sup> Transport Scotland, NTS2 Delivery Plan 2020-2022, 2020, <https://www.transport.gov.scot/media/48839/nts-delivery-plan-2020-2022.pdf>

<sup>6</sup> Transport Scotland, STPR2, Draft Technical Report, 2022, <https://www.transport.gov.scot/media/50946/draft-technical-report-january-2022-stpr2.pdf>

This is the Scottish Governments second review of Strategic Transport Projects, which will inform transport investment in Scotland over the next 20 years. It is currently published in draft, and outlines 45 recommendations under the six key themes of:

- Improving Active Travel Infrastructure.
- Influencing Travel Choices and Behaviours.
- Enhancing Access to Affordable Public Transport.
- Decarbonising Transport.
- Increasing Safety and Resilience on the Strategic Transport Network.
- Strengthening Strategic Connections.

Together, these recommendations represent the full range of interventions that have the potential to deliver the change to the transport system necessary achieve the NTS2 vision. The performance of STPR2 recommendations have been assessed against both 'high' and 'low' traffic growth scenarios, with the 'low' scenario assuming the presence of demand management measures. The draft National Appraisal Summary table<sup>7</sup> suggests that the reduction in vehicle kilometres due to the proposed interventions is only 2% in the 'high' scenario and 3% in the 'low' scenario, suggesting that the interventions alone are unlikely to meet the 20 per cent reduction target, and demand management will be required.

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### 2.1.5 Strategic Road Safety Plan Scotland's Road Safety Framework to 2030<sup>8</sup>

The Scottish Governments Road Safety Framework to 2030 establishes a vision for Scotland to have the best road safety performance in the world by 2030. The document states that a possible way to encourage safe road use is to reduce car-based traffic and "inspiring people to walk, wheel and cycle or use public transport rather than their own vehicles". Furthermore, safety is presented as a barrier for many to reduce car use and take up active travel. Demand management would therefore support delivery of the Road Safety Framework and enable safe road use.

### 2.1.6 Scottish Trunk Road Network Asset Management Strategy<sup>9</sup>

This Asset Management Strategy sets out how Asset Management Policy will be delivered through enhancements to procedures and practices. It establishes a vision where trunk road users are provided with up-to-date reliable information to increase user satisfaction, provides consistent, predicable, and reliable journeys for all, maintains the condition of trunk roads, and improves the safety of the trunk road network. The Trunk Road Network Asset Management Policy has further aims for improved integration for journeys, which consist of one or more modes of transport, by considering how the network interfaces with local roads and other transport modes. Demand management could have profound implications for asset management by both reducing wear on road infrastructure and, potentially, by creating an additional revenue stream.

### 2.1.7 Infrastructure Investment Plan<sup>9</sup>

This strategy, published in 2021, sets out priorities for investment and a long-term strategy for development of public infrastructure in Scotland. The plan is set out into three themes including enabling the transition to net zero, driving inclusive economic growth and building resilient and sustainable places. It sets out a range of investments in decarbonising transport including active and public transport investment. The infrastructure

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<sup>7</sup> Transport Scotland, STPR2, Draft National Appraisal Summary Table, <https://www.transport.gov.scot/media/50939/detailed-appraisalsummary-table-national-draft-technical-report-stpr2.pdf>

<sup>8</sup> Transport Scotland, Scotland's Road Safety Framework to 2030: Together Making Scotland's Roads Safer, 2021, <https://www.transport.gov.scot/media/49893/scotlands-road-safety-framework-to-2030.pdf> <sup>9</sup> Transport Scotland, Scottish Trunk Road Network Asset Management Strategy, 2018, <https://www.transport.gov.scot/media/43925/sct10188149681.pdf>

<sup>9</sup> Scottish Government, A National Mission With Local Impact: Infrastructure Investment Plan for Scotland 2021-22 to 2025-26, 2021, <https://www.gov.scot/publications/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/documents/>

investment plan provides a funding pathway for the delivery of STPR2 recommendations and the NTS2 vision. As with STPR2 recommendations, demand management will influence how successful this investment is in creating a change in transport behaviour and achieving the priorities of NTS2.

### 2.1.8 National Planning Framework 4 (NPF4)<sup>10</sup>

The fourth National Planning Framework is the long-term spatial strategy for the development of Scotland. It states places in Scotland should be planned to be sustainable, liveable, productive, and distinctive. Measures to support local living will reduce the need to travel unsustainably and the policy states “the transport system as a whole will need to be planned to support a shift to more sustainable transport while maintaining access to markets and facilities”. Key to successful demand management is reducing the need to travel by providing local access to goods and services and through digital connectivity.

### 2.1.9 Scotland’s National Strategy for Economic Transformation<sup>11</sup>

This strategy sets out a vision for a wellbeing economy where society thrives and delivers prosperity for all of Scotland’s people and places. There are six policy programmes contained within the strategy, including “A Fairer and More Equal Society” which includes measures to remove barriers to employment. The strategy highlights regional disparity in economic performance, with rural and island areas facing particular challenges around labour supply, poor access to infrastructure, and housing. However, the strategy also highlights the opportunity for Scotland’s transition to net-zero to bring about positive employment, revenue, and community benefits. The issues identified in the strategy are mirrored by those identified within 11.1.3 of this note. The interaction of these issues with demand management measures will be determined by how they are implemented.

### 2.1.10 Programme for Government (2021-2022)<sup>12</sup>

The Programme for Government (PfG) details how manifesto commitments across six long-term priorities will be translated into action. The 2021-2022 PfG contains specific actions in relation long term-priority 3: ‘A Net-Zero Nation: ending Scotland’s contribution to climate change, restoring nature and enhancing our climate resilience, in a just and fair way’. For transport, specific commitments under this priority are to bring about a green transport revolution by reducing car kilometres by 20% by 2030. Demand management is the mechanism by which such a reduction will be met.

### 2.1.11 Scottish Government Framework for Taxation<sup>13</sup>

This document sets out the principles and strategic objectives that underpin the approach to taxation in Scotland. The objectives of tax are to generate stable revenues, support a wellbeing economy, deliver national outcomes, and respond to societal and economic shifts. All tax should adhere to the six principles of taxation:

- Proportionality - levied in proportion with ability to pay reflecting income and wealth.
- Efficiency - balance revenue prospects against unintended behavioural responses (for example reducing working hours to reduce your tax bill).
- Certainty – Knowledge of liability to pay, amount to pay and when to pay by – allowing confident investment.
- Convenience – simple, clear, and straightforward policy and collected at a convenient time.
- Engagement – open and transparent about policy, consulting widely.
- Effectiveness – taxes raise the expected revenue and achieve intended aims. Minimising tax avoidance.

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<sup>10</sup> Scottish Government, Scotland 2045: Our Fourth National Planning Framework Draft, 2021,

<https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/documents/>

<sup>11</sup> Scottish Government, Delivering Economic Prosperity: Scotland’s National Strategy for Economic Transformation, 2022,

<https://www.gov.scot/publications/scotlands-national-strategy-economic-transformation/documents/>

<sup>12</sup> Scottish Government, A Fairer, Greener Scotland: Programme for Government 2021-22, 2021,

<https://www.gov.scot/publications/fairergreener-scotland-programme-government-2021-22/documents/>

<sup>13</sup> Scottish Government, Framework for Tax, 2021, <https://www.gov.scot/publications/framework-tax-2021/documents/>

Any demand management measures proposed around fiscal measures, will be required to adhere to the principles of taxation and to support a fair tax system in Scotland.

### 2.1.12 Equality Act<sup>14</sup>

The Equality Act 2010 legally protects people from discrimination both in the workplace and in wider society. It ensures that individuals with the following nine protected characteristics are not indirectly or directly discriminated against:

- **Age:** This refers to persons defined by either a particular age or a range of ages.
- **Disability:** A disabled person is someone who has a physical or mental impairment (lasting more than a year) that has a substantial adverse effect on their ability to carry out normal day-to-day activities.
- **Gender Reassignment:** This refers to a person who is proposing to undergo, is undergoing, or has undergone a process for the purpose of reassigning their gender identity.
- **Marriage and Civil Partnership:** Marriage can be between a man and a woman or between two people of the same sex. Civil partners must not be treated less favourably than married couples.
- **Pregnancy and Maternity:** Pregnancy is the condition of being pregnant and expecting a baby. Maternity refers to the period after the birth. In the non-work context, protection against maternity discrimination is for 26 weeks after giving birth.
- **Race:** Under the Equality Act 2010 race includes colour, nationality (including citizenship) and ethnic or national origins.
- **Religion or Belief:** Religion means any religion and a reference to religion includes a reference to a lack of religion. Belief means any religious or philosophical belief and a reference to belief includes a reference to a lack of belief.
- **Sex:** This refers to a man or to a woman, or to a group of people of the same sex.
- **Sexual Orientation:** this means a person's sexual orientation towards persons of the same sex, persons of the opposite sex, or persons of either sex.

Within the legislation discrimination is defined in four different types: direct, indirect, harassment and victimisation. Indirect discrimination will likely be the largest consideration for this study as any proposed measures will need to be assessed to ensure they do not adversely disadvantage certain protected characteristic groups. The way in which demand management measures are implemented will potentially have differential impacts upon certain protected characteristic groups according to variations in how they each \_\_\_\_\_ access transport. Careful consideration of how transport is experienced by different groups is therefore needed in order to propose measures which do not inadvertently impact on certain groups.

### 2.1.13 Fairer Scotland Duty<sup>15</sup>

The Fairer Scotland Duty came into force in April 2018 and places a legal responsibility on particular public bodies to actively consider how they can actively reduce inequalities of outcome caused by socio-economic disadvantage throughout strategic decision making.

Socio-economic disadvantage is defined as living on a low income compared to others in Scotland, with little or no accumulated wealth. This leads to material deprivation and restricted access to goods and services. Inequalities of outcome are measurable differences between those experiencing socio-economic disadvantage and those not in areas such as health, education, employment, and connectivity.

Public bodies are encouraged to publish a written record of their decision-making process to demonstrate compliance with the duty. Demand management measures proposed will not only need to ensure that there is no detriment to any social class but that their implementation contributes towards the achievement of a fairer society. Demand management measures proposed must therefore consider the differential impacts across socio-economic groups and the opportunities for advancement of equality among those groups.

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<sup>14</sup> UK Government, Equality Act 2010: Guidance, 2015, <https://www.gov.uk/guidance/equality-act-2010-guidance>

<sup>15</sup> Scottish Government, The Fairer Scotland Duty Guidance for Public Bodies, 2021, <https://www.gov.scot/publications/fairer-scotlandduty-guidance-public-bodies/documents/>

### 2.1.14 Islands Act<sup>16</sup>

This act makes provisions for a National Islands Plan and mandates an island communities impact assessment for any policy, strategy or service which is likely to have an effect on island communities which is significantly different from its effect on other communities.

The National Island Plan<sup>18</sup> published in 2019 recognises that island communities face many different transport challenges when carrying out their daily lives compared to those living on the mainland with the cost of transport much higher relative to income compared to the rest of Scotland. Proposals for demand management must therefore consider the differing needs of those in island communities.

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## 3. Problems, Opportunities & Constraints

### 3.1 Problems

Problems relating to demand management have been generated from a literature review, discussions with stakeholders, and data analysis. The problems have been grouped under three key themes:

- High and Increasing Demand for Car Travel.
- Decreasing Revenue from Fuel Duty and VED.
- Transport Inequality.

#### 3.1.1 High and Increasing Demand for Car Travel

The total vehicle kilometres travelled on Scottish Roads has been increasing consistently year on year to 2019, as shown in Figure 11.1.

### 3.2 Structure and Approach

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<sup>16</sup> Legislation.gov.uk, Acts of the Scottish Parliament, Islands (Scotland) Act 2018, <https://www.legislation.gov.uk/asp/2018/12/enacted> <sup>18</sup> Scottish Government, The National Plan for Scotland's Islands, 2019, <https://www.gov.scot/publications/national-plan-scotlandislands/documents/>

This technical note follows on from the first phase of the literature search and review, and details some of the key problems, opportunities and constraints which have emerged around implementing Travel Demand Management (TDM) measures in both the UK and internationally. It is structured into the following sections:

- Section 10 - Policy Context  
Review of current policy in areas such as transport, climate, revenue generation and equalities to understand strategic objectives related to TDM in Scotland and associated issues.
- Section 11 - Problems, Opportunities & Constraints  
Problems, Opportunities and Constraints have been identified from a literature review, discussions with stakeholders and data analysis.
- Section 12 - Transport Planning Objectives  
A series of Transport Planning Objective (TPOs) have been generated based on the identified problems, opportunities, and constraints, and checked for alignment with policy. These objectives have been developed in line with the SMART principles: Specific, Measurable, Achievable, Relevant, and Timebound.

## 4. Policy Context

### 4.1.1 A route map to achieve a 20 per cent reduction in car kilometres by 2030<sup>2</sup>

A key policy of the Scottish Government and the primary objective of this TDM options study is to achieve a 20% reduction in car kilometres travelled. The route map sets out how this can be achieved through both transport and non-transport related policies. The route map makes clear its aim is not to eliminate all car use, recognising the needs of disabled people or those in rural locations with less access to sustainable transport options.

It presents four key behavioural considerations people will be required to consider:

- Reduce your need to travel.
- Choose local destinations.
- Switch to walking, wheeling, cycling or public transport where possible.
- Combine a trip or share a journey.

The route map also lists a number of additional benefits to reducing car use, including reducing inequalities, given the inequity of car reliance by reallocating space to streets and public spaces, delivering inclusive economic growth, given the reduction in congestion, and improving health and wellbeing through increased physical activity and better air quality.

Within the route map there is recognition it focuses on “incentivising desirable behaviour” and states this “is unlikely to be sufficient” to meet the target as long as car use remains attractive. Car use will remain an attractive option if the strong individual benefits are not counteracted for the user by dis-benefits including environmental and health which are currently externalised.

It also recognises that current motoring taxation arrangements are a “significant barrier to the decarbonisation of the transport sector” and revenues are falling as the transition to lower emission and more fuel-efficient vehicles continues.

### 4.1.2 Climate Change Plan (Update)<sup>1</sup>

The Climate Change Plan sets out Scotland’s domestic plans to ensure Scotland continues to be leaders and collaborators in global action to tackle climate change. This was first published in 2018 and was updated in 2020 to reflect new targets to end Scotland’s contribution to climate change by 2045.

The update recognises the disruptive impact of COVID-19 and the need for a “Green Recovery” which consists of investment from both public and private sector, job creation and reskilling, adaptation and resilience, and a place-based approach to the recovery. Additionally of relevance is the recommendation by the Committee on Climate Change that positive behaviours observed during the pandemic should be embedded and taken forward as part of the Green Recovery. These behaviours

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include the increase in active travel rates and remote working, resulting in fewer unsustainable journeys taking place.

Within the transport chapter there is a recognition that advances in green vehicles are not enough to meet the targets and states “it is self-evident that managing transport demand and embedding behaviour change will be of vital importance”.

The plan also asks the UK Government to strengthen incentives to purchase cleaner vehicles as well as work together to review current fuel duty and vehicle excise duty (VED) arrangements.

### 4.1.3 National Transport Strategy (NTS2) and Delivery Plan<sup>1 2</sup>

NTS2 is the Scottish Government strategy for the country’s transport system for the next 20 years. It sets the vision of a sustainable, inclusive, safe, and accessible transport system which could deliver a healthier, fairer and more prosperous Scotland. There are four main priorities which support that vision including reducing inequalities, taking climate action, helping deliver inclusive economic growth and improving health and wellbeing.

Demand management is directly referred to in NTS2 under the climate action priority. The policy within this priority states that infrastructure will not be built to cater for unconstrained increases in traffic volume. The document also discusses disruptive technologies such as electric and autonomous vehicles (AVs) and the additional demand these are likely to cause and how this demand needs to be managed. The document also emphasises the role transport must play in achieving the national net-zero by 2045 target, stating that “not taking steps of effectively managed demand for car use is no longer an option”. Air quality improvements are also highlighted in the policy, suggesting that we need to look beyond low emissions zones (LEZs) in Scotland’s four largest cities and consider further measures such as workplace parking levies and a mode shift to active travel.

In terms the difference in transport needs of urban and rural areas, the strategy “accepts that car ownership is not a luxury but a necessity for many living and working in rural areas” and states a “realistic and staged approach to the use of vehicles in rural areas” will be taken.

For opportunities, the policy mentions the “changing needs of young people, who often choose ‘usership’ over ownership”. The document also discusses supporting technological advances and efficiencies to increase the uptake of electric vehicles (EVs).

NTS2 also introduces two overarching hierarchies: the Sustainable Travel Hierarchy, which promotes the use of more sustainable modes, and the Sustainable Investment Hierarchy, which promotes sustainable investment decision making. A TDM scheme for private cars would align with both hierarchies by reducing the attractiveness of private cars (which are the lowest priority in the Sustainable Travel Hierarchy) and by reducing the need to travel unsustainably by making car less attractive relative to other more sustainable modes (which is the highest priority on the Sustainable Investment Hierarchy).

### 4.1.4 Strategic Transport Projects Review 2 (STPR2)<sup>3</sup>

This is the Scottish Governments second review of Strategic Transport Projects, which will inform transport investment in Scotland over the next 20 years. It is currently published in draft, and outlines 45 recommendations under the six key themes of:

- Improving Active Travel Infrastructure.
- Influencing Travel Choices and Behaviours.
- Enhancing Access to Affordable Public Transport.
- Decarbonising Transport.
- Increasing Safety and Resilience on the Strategic Transport Network.
- Strengthening Strategic Connections.

Together, these recommendations represent the full range of interventions that have the potential to deliver the change to the transport system necessary achieve the NTS2 vision. The performance of STPR2

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recommendations have been assessed against both 'high' and 'low' traffic growth scenarios, with the 'low' scenario assuming the presence of demand management measures. The draft National Appraisal Summary table<sup>4</sup> suggests that the reduction in vehicle kilometres due to the proposed interventions is only 2% in the 'high' scenario and 3% in the 'low' scenario, suggesting that the interventions alone are unlikely to meet the 20 per cent reduction target, and demand management will be required.

#### 4.1.5 Strategic Road Safety Plan Scotland's Road Safety Framework to 2030<sup>5</sup>

The Scottish Government's Road Safety Framework to 2030 establishes a vision for Scotland to have the best road safety performance in the world by 2030. The document states that a possible way to encourage safe road use is to reduce car-based traffic and "inspiring people to walk, wheel and cycle or use public transport rather than their own vehicles". Furthermore, safety is presented as a barrier for many to reduce car use and take up active travel. Demand management would therefore support delivery of the Road Safety Framework and enable safe road use.

#### 4.1.6 Scottish Trunk Road Network Asset Management Strategy<sup>6</sup>

This Asset Management Strategy sets out how Asset Management Policy will be delivered through enhancements to procedures and practices. It establishes a vision where trunk road users are provided with up-to-date reliable information to increase user satisfaction, provides consistent, predictable, and reliable journeys for all, maintains the condition of trunk roads, and improves the safety of the trunk road network. The Trunk Road Network Asset Management Policy has further aims for improved integration for journeys, which consist of one or more modes of transport, by considering how the network interfaces with local roads and other transport modes. Demand management could have profound implications for asset management by both reducing wear on road infrastructure and, potentially, by creating an additional revenue stream.

#### 4.1.7 Infrastructure Investment Plan<sup>7</sup>

This strategy, published in 2021, sets out priorities for investment and a long-term strategy for development of public infrastructure in Scotland. The plan is set out into three themes including enabling the transition to net zero, driving inclusive economic growth and building resilient and sustainable places. It sets out a range of investments in decarbonising transport including active and public transport investment. The infrastructure investment plan provides a funding pathway for the delivery of STPR2 recommendations and the NTS2 vision. As with STPR2 recommendations, demand management will influence how successful this investment is in creating a change in transport behaviour and achieving the priorities of NTS2.

#### 4.1.8 National Planning Framework 4 (NPF4)<sup>8</sup>

The fourth National Planning Framework is the long-term spatial strategy for the development of Scotland. It states places in Scotland should be planned to be sustainable, liveable, productive, and distinctive. Measures to support local living will reduce the need to travel unsustainably and the policy states "the transport system as a whole will need to be planned to support a shift to more sustainable transport while maintaining access to markets and facilities". Key to successful demand management is reducing the need to travel by providing local access to goods and services and through digital connectivity.

#### 4.1.9 Scotland's National Strategy for Economic Transformation<sup>9</sup>

This strategy sets out a vision for a wellbeing economy where society thrives and delivers prosperity for all of Scotland's people and places. There are six policy programmes contained within the strategy, including "A Fairer and More Equal Society" which includes measures to remove barriers to employment. The strategy highlights regional disparity in economic performance, with rural and island areas facing particular challenges around labour supply, poor access to infrastructure, and housing. However, the strategy also highlights the opportunity for Scotland's transition to net-zero to bring about positive employment, revenue, and community benefits. The issues identified in the strategy are mirrored by those identified within 11.1.3 of this note. The interaction of these issues with demand management measures will be determined by how they are implemented.

#### 4.1.10 Programme for Government (2021-2022)<sup>10</sup>

The Programme for Government (PfG) details how manifesto commitments across six long-term priorities will be translated into action. The 2021-2022 PfG contains specific actions in relation long

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term-priority 3: 'A Net-Zero Nation: ending Scotland's contribution to climate change, restoring nature and enhancing our climate resilience, in a just and fair way'. For transport, specific commitments under this priority are to bring about a green transport revolution by reducing car kilometres by 20% by 2030. Demand management is the mechanism by which such a reduction will be met.

#### 4.1.11 Scottish Government Framework for Taxation<sup>11</sup>

This document sets out the principles and strategic objectives that underpin the approach to taxation in Scotland. The objectives of tax are to generate stable revenues, support a wellbeing economy, deliver national outcomes, and respond to societal and economic shifts. All tax should adhere to the six principles of taxation:

- Proportionality - levied in proportion with ability to pay reflecting income and wealth.
- Efficiency - balance revenue prospects against unintended behavioural responses (for example reducing working hours to reduce your tax bill).
- Certainty – Knowledge of liability to pay, amount to pay and when to pay by – allowing confident investment.
- Convenience – simple, clear, and straightforward policy and collected at a convenient time.
- Engagement – open and transparent about policy, consulting widely.
- Effectiveness – taxes raise the expected revenue and achieve intended aims. Minimising tax avoidance.

Any demand management measures proposed around fiscal measures, will be required to adhere to the principles of taxation and to support a fair tax system in Scotland.

#### 4.1.12 Equality Act<sup>12</sup>

The Equality Act 2010 legally protects people from discrimination both in the workplace and in wider society. It ensures that individuals with the following nine protected characteristics are not indirectly or directly discriminated against:

- **Age:** This refers to persons defined by either a particular age or a range of ages.
- **Disability:** A disabled person is someone who has a physical or mental impairment (lasting more than a year) that has a substantial adverse effect on their ability to carry out normal day-to-day activities.
- **Gender Reassignment:** This refers to a person who is proposing to undergo, is undergoing, or has undergone a process for the purpose of reassigning their gender identity.
- **Marriage and Civil Partnership:** Marriage can be between a man and a woman or between two people of the same sex. Civil partners must not be treated less favourably than married couples.
- **Pregnancy and Maternity:** Pregnancy is the condition of being pregnant and expecting a baby. Maternity refers to the period after the birth. In the non-work context, protection against maternity discrimination is for 26 weeks after giving birth.
- **Race:** Under the Equality Act 2010 race includes colour, nationality (including citizenship) and ethnic or national origins.
- **Religion or Belief:** Religion means any religion and a reference to religion includes a reference to a lack of religion. Belief means any religious or philosophical belief and a reference to belief includes a reference to a lack of belief.
- **Sex:** This refers to a man or to a woman, or to a group of people of the same sex.
- **Sexual Orientation:** this means a person's sexual orientation towards persons of the same sex, persons of the opposite sex, or persons of either sex.

Within the legislation discrimination is defined in four different types: direct, indirect, harassment and victimisation. Indirect discrimination will likely be the largest consideration for this study as any proposed measures will need to be assessed to ensure they do not adversely disadvantage certain protected characteristic groups. The way in which demand management measures are implemented will potentially have differential impacts upon certain protected characteristic groups according to variations in how they each access transport. Careful consideration of how transport is experienced by different groups is therefore needed in order to propose measures which do not inadvertently impact on certain groups.

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#### 4.1.13 Fairer Scotland Duty<sup>13</sup>

The Fairer Scotland Duty came into force in April 2018 and places a legal responsibility on particular public bodies to actively consider how they can actively reduce inequalities of outcome caused by socio-economic disadvantage throughout strategic decision making.

Socio-economic disadvantage is defined as living on a low income compared to others in Scotland, with little or no accumulated wealth. This leads to material deprivation and restricted access to goods and services. Inequalities of outcome are measurable differences between those experiencing socio-economic disadvantage and those not in areas such as health, education, employment, and connectivity.

Public bodies are encouraged to publish a written record of their decision-making process to demonstrate compliance with the duty. Demand management measures proposed will not only need to ensure that there is no detriment to any social class but that their implementation contributes towards the achievement of a fairer society. Demand management measures proposed must therefore consider the differential impacts across socio-economic groups and the opportunities for advancement of equality among those groups.

#### 4.1.14 Islands Act<sup>14</sup>

This act makes provisions for a National Islands Plan and mandates an island communities impact assessment for any policy, strategy or service which is likely to have an effect on island communities which is significantly different from its effect on other communities.

The National Island Plan<sup>15</sup> published in 2019 recognises that island communities face many different transport challenges when carrying out their daily lives compared to those living on the mainland with the cost of transport much higher relative to income compared to the rest of Scotland. Proposals for demand management must therefore consider the differing needs of those in island communities.

## 5. Problems, Opportunities & Constraints

### 5.1 Problems

Problems relating to demand management have been generated from a literature review, discussions with stakeholders, and data analysis. The problems have been grouped under three key themes:

- High and Increasing Demand for Car Travel.
- Decreasing Revenue from Fuel Duty and VED.
- Transport Inequality.

#### 5.1.1 High and Increasing Demand for Car Travel

The total vehicle kilometres travelled on Scottish Roads has been increasing consistently year on year to 2019, as shown in Figure 11.1.

This technical note follows on from the first phase of the literature search and review, and details some of the key problems, opportunities and constraints which have emerged around implementing Travel Demand Management (TDM) measures in both the UK and internationally. It is structured into the following sections:

- Section 10 - Policy Context  
Review of current policy in areas such as transport, climate, revenue generation and equalities to understand strategic objectives related to TDM in Scotland and associated issues.
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Problems, Opportunities and Constraints have been identified from a literature review, discussions with stakeholders and data analysis.
- Section 12 - Transport Planning Objectives  
A series of Transport Planning Objective (TPOs) have been generated based on the identified problems, opportunities, and constraints, and checked for alignment with policy. These objectives have been developed in line with the SMART principles: Specific, Measurable, Achievable, Relevant, and Timebound.

## 6. Policy Context

### 6.1.1 A route map to achieve a 20 per cent reduction in car kilometres by 2030<sup>2</sup>

A key policy of the Scottish Government and the primary objective of this TDM options study is to achieve a 20% reduction in car kilometres travelled. The route map sets out how this can be achieved through both transport and non-transport related policies. The route map makes clear its aim is not to eliminate all car use, recognising the needs of disabled people or those in rural locations with less access to sustainable transport options.

It presents four key behavioural considerations people will be required to consider:

- Reduce your need to travel.
- Choose local destinations.
- Switch to walking, wheeling, cycling or public transport where possible.
- Combine a trip or share a journey.

The route map also lists a number of additional benefits to reducing car use, including reducing inequalities, given the inequity of car reliance by reallocating space to streets and public spaces, delivering inclusive economic growth, given the reduction in congestion, and improving health and wellbeing through increased physical activity and better air quality.

Within the route map there is recognition it focuses on “incentivising desirable behaviour” and states this “is unlikely to be sufficient” to meet the target as long as car use remains attractive. Car use will remain an attractive option if the strong individual benefits are not counteracted for the user by dis-benefits including environmental and health which are currently externalised.

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It also recognises that current motoring taxation arrangements are a “significant barrier to the decarbonisation of the transport sector” and revenues are falling as the transition to lower emission and more fuel-efficient vehicles continues.

### 6.1.2 Climate Change Plan (Update)<sup>1</sup>

The Climate Change Plan sets out Scotland’s domestic plans to ensure Scotland continues to be leaders and collaborators in global action to tackle climate change. This was first published in 2018 and was updated in 2020 to reflect new targets to end Scotland’s contribution to climate change by 2045.

The update recognises the disruptive impact of COVID-19 and the need for a “Green Recovery” which consists of investment from both public and private sector, job creation and reskilling, adaptation and resilience, and a place-based approach to the recovery. Additionally of relevance is the recommendation by the Committee on Climate Change that positive behaviours observed during the pandemic should be embedded and taken forward as part of the Green Recovery. These behaviours include the increase in active travel rates and remote working, resulting in fewer unsustainable journeys taking place.

Within the transport chapter there is a recognition that advances in green vehicles are not enough to meet the targets and states “it is self-evident that managing transport demand and embedding behaviour change will be of vital importance”.

The plan also asks the UK Government to strengthen incentives to purchase cleaner vehicles as well as work together to review current fuel duty and vehicle excise duty (VED) arrangements.

### 6.1.3 National Transport Strategy (NTS2) and Delivery Plan<sup>17 18</sup>

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NTS2 is the Scottish Government strategy for the country’s transport system for the next 20 years. It sets the vision of a sustainable, inclusive, safe, and accessible transport system which could deliver a healthier, fairer and more prosperous Scotland. There are four main priorities which support that vision including reducing inequalities, taking climate action, helping deliver inclusive economic growth and improving health and wellbeing.

Demand management is directly referred to in NTS2 under the climate action priority. The policy within this priority states that infrastructure will not be built to cater for unconstrained increases in traffic volume. The document also discusses disruptive technologies such as electric and autonomous vehicles (AVs) and the additional demand these are likely to cause and how this demand needs to be managed. The document also emphasises the role transport must play in achieving the national net-zero by 2045 target, stating that “not taking steps of effectively managed demand for car use is no longer an option”. Air quality improvements are also highlighted in the policy, suggesting that we need to look beyond low emissions zones (LEZs) in Scotland’s four largest cities and consider further measures such as workplace parking levies and a mode shift to active travel.

In terms the difference in transport needs of urban and rural areas, the strategy “accepts that car ownership is not a luxury but a necessity for many living and working in rural areas” and states a “realistic and staged approach to the use of vehicles in rural areas” will be taken.

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<sup>17</sup> Transport Scotland, NTS2, 2020, <https://www.transport.gov.scot/media/47052/national-transport-strategy.pdf>

<sup>18</sup> Transport Scotland, NTS2 Delivery Plan 2020-2022, 2020, <https://www.transport.gov.scot/media/48839/nts-delivery-plan-2020-2022.pdf>

For opportunities, the policy mentions the “changing needs of young people, who often choose ‘usership’ over ownership”. The document also discusses supporting technological advances and efficiencies to increase the uptake of electric vehicles (EVs).

NTS2 also introduces two overarching hierarchies: the Sustainable Travel Hierarchy, which promotes the use of more sustainable modes, and the Sustainable Investment Hierarchy, which promotes sustainable investment decision making. A TDM scheme for private cars would align with both hierarchies by reducing the attractiveness of private cars (which are the lowest priority in the Sustainable Travel Hierarchy) and by reducing the need to travel unsustainably by making car less attractive relative to other more sustainable modes (which is the highest priority on the Sustainable Investment Hierarchy).

#### 6.1.4 Strategic Transport Projects Review 2 (STPR2)<sup>19</sup>

This is the Scottish Governments second review of Strategic Transport Projects, which will inform transport investment in Scotland over the next 20 years. It is currently published in draft, and outlines 45 recommendations under the six key themes of:

- Improving Active Travel Infrastructure.
- Influencing Travel Choices and Behaviours.
- Enhancing Access to Affordable Public Transport.
- Decarbonising Transport.
- Increasing Safety and Resilience on the Strategic Transport Network.
- Strengthening Strategic Connections.

Together, these recommendations represent the full range of interventions that have the potential to deliver the change to the transport system necessary achieve the NTS2 vision. The performance of STPR2 recommendations have been assessed against both ‘high’ and ‘low’ traffic growth scenarios, with the ‘low’ scenario assuming the presence of demand management measures. The draft National Appraisal Summary table<sup>20</sup> suggests that the reduction in vehicle kilometres due to the proposed interventions is only 2% in the ‘high’ scenario and 3% in the ‘low’ scenario, suggesting that the interventions alone are unlikely to meet the 20 per cent reduction target, and demand management will be required.

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#### 6.1.5 Strategic Road Safety Plan Scotland’s Road Safety Framework to 2030<sup>21</sup>

The Scottish Governments Road Safety Framework to 2030 establishes a vision for Scotland to have the best road safety performance in the world by 2030. The document states that a possible way to encourage safe road use is to reduce car-based traffic and “inspiring people to walk, wheel and cycle or use public transport rather than their own vehicles”. Furthermore, safety is presented as a barrier for many to reduce car use and take up active travel. Demand management would therefore support delivery of the Road Safety Framework and enable safe road use.

#### 6.1.6 Scottish Trunk Road Network Asset Management Strategy<sup>24</sup>

This Asset Management Strategy sets out how Asset Management Policy will be delivered through enhancements to procedures and practices. It establishes a vision where trunk road users are provided with up-to-date reliable information to increase user satisfaction, provides consistent, predicable, and

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<sup>19</sup> Transport Scotland, STPR2, Draft Technical Report, 2022, <https://www.transport.gov.scot/media/50946/draft-technical-report-january-2022-stpr2.pdf>

<sup>20</sup> Transport Scotland, STPR2, Draft National Appraisal Summary Table, <https://www.transport.gov.scot/media/50939/detailed-appraisal-summary-table-national-draft-technical-report-stpr2.pdf>

<sup>21</sup> Transport Scotland, Scotland’s Road Safety Framework to 2030: Together Making Scotland’s Roads Safer, 2021, <https://www.transport.gov.scot/media/49893/scotlands-road-safety-framework-to-2030.pdf> <sup>24</sup> Transport Scotland, Scottish Trunk Road Network Asset Management Strategy, 2018, <https://www.transport.gov.scot/media/43925/sct10188149681.pdf>

reliable journeys for all, maintains the condition of trunk roads, and improves the safety of the trunk road network. The Trunk Road Network Asset Management Policy has further aims for improved integration for journeys, which consist of one or more modes of transport, by considering how the network interfaces with local roads and other transport modes. Demand management could have profound implications for asset management by both reducing wear on road infrastructure and, potentially, by creating an additional revenue stream.

### 6.1.7 Infrastructure Investment Plan<sup>22</sup>

This strategy, published in 2021, sets out priorities for investment and a long-term strategy for development of public infrastructure in Scotland. The plan is set out into three themes including enabling the transition to net zero, driving inclusive economic growth and building resilient and sustainable places. It sets out a range of investments in decarbonising transport including active and public transport investment. The infrastructure investment plan provides a funding pathway for the delivery of STPR2 recommendations and the NTS2 vision. As with STPR2 recommendations, demand management will influence how successful this investment is in creating a change in transport behaviour and achieving the priorities of NTS2.

### 6.1.8 National Planning Framework 4 (NPF4)<sup>23</sup>

The fourth National Planning Framework is the long-term spatial strategy for the development of Scotland. It states places in Scotland should be planned to be sustainable, liveable, productive, and distinctive. Measures to support local living will reduce the need to travel unsustainably and the policy states “the transport system as a whole will need to be planned to support a shift to more sustainable transport while maintaining access to markets and facilities”. Key to successful demand management is reducing the need to travel by providing local access to goods and services and through digital connectivity.

### 6.1.9 Scotland’s National Strategy for Economic Transformation<sup>24</sup>

This strategy sets out a vision for a wellbeing economy where society thrives and delivers prosperity for all of Scotland’s people and places. There are six policy programmes contained within the strategy, including “A Fairer and More Equal Society” which includes measures to remove barriers to employment. The strategy highlights regional disparity in economic performance, with rural and island areas facing particular challenges around labour supply, poor access to infrastructure, and housing. However, the strategy also highlights the opportunity for Scotland’s transition to net-zero to bring about positive employment, revenue, and community benefits. The issues identified in the strategy are mirrored by those identified within 11.1.3 of this note. The interaction of these issues with demand management measures will be determined by how they are implemented.

### 6.1.10 Programme for Government (2021-2022)<sup>25</sup>

The Programme for Government (PfG) details how manifesto commitments across six long-term priorities will be translated into action. The 2021-2022 PfG contains specific actions in relation long term-priority 3: ‘A Net-Zero Nation: ending Scotland’s contribution to climate change, restoring nature and enhancing our climate resilience, in a just and fair way’. For transport, specific commitments under this priority are to bring about a green transport revolution by reducing car kilometres by 20% by 2030. Demand management is the mechanism by which such a reduction will be met.

### 6.1.11 Scottish Government Framework for Taxation<sup>26</sup>

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<sup>22</sup> Scottish Government, A National Mission With Local Impact: Infrastructure Investment Plan for Scotland 2021-22 to 2025-26, 2021, <https://www.gov.scot/publications/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/documents/>

<sup>23</sup> Scottish Government, Scotland 2045: Our Fourth National Planning Framework Draft, 2021, <https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/documents/>

<sup>24</sup> Scottish Government, Delivering Economic Prosperity: Scotland’s National Strategy for Economic Transformation, 2022, <https://www.gov.scot/publications/scotlands-national-strategy-economic-transformation/documents/>

<sup>25</sup> Scottish Government, A Fairer, Greener Scotland: Programme for Government 2021-22, 2021, <https://www.gov.scot/publications/fairergreener-scotland-programme-government-2021-22/documents/>

<sup>26</sup> Scottish Government, Framework for Tax, 2021, <https://www.gov.scot/publications/framework-tax-2021/documents/>

This document sets out the principles and strategic objectives that underpin the approach to taxation in Scotland. The objectives of tax are to generate stable revenues, support a wellbeing economy, deliver national outcomes, and respond to societal and economic shifts. All tax should adhere to the six principles of taxation:

- Proportionality - levied in proportion with ability to pay reflecting income and wealth.
- Efficiency - balance revenue prospects against unintended behavioural responses (for example reducing working hours to reduce your tax bill).
- Certainty – Knowledge of liability to pay, amount to pay and when to pay by – allowing confident investment.
- Convenience – simple, clear, and straightforward policy and collected at a convenient time.
- Engagement – open and transparent about policy, consulting widely.
- Effectiveness – taxes raise the expected revenue and achieve intended aims. Minimising tax avoidance.

Any demand management measures proposed around fiscal measures, will be required to adhere to the principles of taxation and to support a fair tax system in Scotland.

### 6.1.12 Equality Act<sup>27</sup>

The Equality Act 2010 legally protects people from discrimination both in the workplace and in wider society. It ensures that individuals with the following nine protected characteristics are not indirectly or directly discriminated against:

- **Age:** This refers to persons defined by either a particular age or a range of ages.
- **Disability:** A disabled person is someone who has a physical or mental impairment (lasting more than a year) that has a substantial adverse effect on their ability to carry out normal day-to-day activities.
- **Gender Reassignment:** This refers to a person who is proposing to undergo, is undergoing, or has undergone a process for the purpose of reassigning their gender identity.
- **Marriage and Civil Partnership:** Marriage can be between a man and a woman or between two people of the same sex. Civil partners must not be treated less favourably than married couples.
- **Pregnancy and Maternity:** Pregnancy is the condition of being pregnant and expecting a baby. Maternity refers to the period after the birth. In the non-work context, protection against maternity discrimination is for 26 weeks after giving birth.
- **Race:** Under the Equality Act 2010 race includes colour, nationality (including citizenship) and ethnic or national origins.
- **Religion or Belief:** Religion means any religion and a reference to religion includes a reference to a lack of religion. Belief means any religious or philosophical belief and a reference to belief includes a reference to a lack of belief.
- **Sex:** This refers to a man or to a woman, or to a group of people of the same sex.
- **Sexual Orientation:** this means a person's sexual orientation towards persons of the same sex, persons of the opposite sex, or persons of either sex.

Within the legislation discrimination is defined in four different types: direct, indirect, harassment and victimisation. Indirect discrimination will likely be the largest consideration for this study as any proposed measures will need to be assessed to ensure they do not adversely disadvantage certain protected characteristic groups. The way in which demand management measures are implemented will potentially have differential impacts upon certain protected characteristic groups according to variations in how they each \_\_\_\_\_ access transport. Careful consideration of how transport is experienced by different groups is therefore needed in order to propose measures which do not inadvertently impact on certain groups.

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<sup>27</sup> UK Government, Equality Act 2010: Guidance, 2015, <https://www.gov.uk/guidance/equality-act-2010-guidance>

### 6.1.13 Fairer Scotland Duty<sup>28</sup>

The Fairer Scotland Duty came into force in April 2018 and places a legal responsibility on particular public bodies to actively consider how they can actively reduce inequalities of outcome caused by socio-economic disadvantage throughout strategic decision making.

Socio-economic disadvantage is defined as living on a low income compared to others in Scotland, with little or no accumulated wealth. This leads to material deprivation and restricted access to goods and services. Inequalities of outcome are measurable differences between those experiencing socio-economic disadvantage and those not in areas such as health, education, employment, and connectivity.

Public bodies are encouraged to publish a written record of their decision-making process to demonstrate compliance with the duty. Demand management measures proposed will not only need to ensure that there is no detriment to any social class but that their implementation contributes towards the achievement of a fairer society. Demand management measures proposed must therefore consider the differential impacts across socio-economic groups and the opportunities for advancement of equality among those groups.

### 6.1.14 Islands Act<sup>29</sup>

This act makes provisions for a National Islands Plan and mandates an island communities impact assessment for any policy, strategy or service which is likely to have an effect on island communities which is significantly different from its effect on other communities.

The National Island Plan<sup>33</sup> published in 2019 recognises that island communities face many different transport challenges when carrying out their daily lives compared to those living on the mainland with the cost of transport much higher relative to income compared to the rest of Scotland. Proposals for demand management must therefore consider the differing needs of those in island communities.

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<sup>28</sup> Scottish Government, The Fairer Scotland Duty Guidance for Public Bodies, 2021, <https://www.gov.scot/publications/fairer-scotlandduty-guidance-public-bodies/documents/>

<sup>29</sup> Legislation.gov.uk, Acts of the Scottish Parliament, Islands (Scotland) Act 2018, <https://www.legislation.gov.uk/asp/2018/12/enacted> <sup>33</sup> Scottish Government, The National Plan for Scotland's Islands, 2019, <https://www.gov.scot/publications/national-plan-scotlandsislands/documents/>



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## 7. Problems, Opportunities & Constraints

### 7.1 Problems

Problems relating to demand management have been generated from a literature review, discussions with stakeholders, and data analysis. The problems have been grouped under three key themes:

- High and Increasing Demand for Car Travel.
- Decreasing Revenue from Fuel Duty and VED.
- Transport Inequality.

#### 7.1.1 High and Increasing Demand for Car Travel

The total vehicle kilometres travelled on Scottish Roads has been increasing consistently year on year to 2019, as shown in Figure 11.1.

- Section 10 - Policy Context  
Review of current policy in areas such as transport, climate, revenue generation and equalities to understand strategic objectives related to TDM in Scotland and associated issues.
- Section 11 - Problems, Opportunities & Constraints  
Problems, Opportunities and Constraints have been identified from a literature review, discussions with stakeholders and data analysis.
- Section 12 - Transport Planning Objectives  
A series of Transport Planning Objective (TPOs) have been generated based on the identified problems, opportunities, and constraints, and checked for alignment with policy. These objectives have been developed in line with the SMART principles: Specific, Measurable, Achievable, Relevant, and Timebound.

## 8. Policy Context

### 8.1.1 A route map to achieve a 20 per cent reduction in car kilometres by 2030<sup>2</sup>

A key policy of the Scottish Government and the primary objective of this TDM options study is to achieve a 20% reduction in car kilometres travelled. The route map sets out how this can be achieved through both transport and non-transport related policies. The route map makes clear its aim is not to eliminate all car use, recognising the needs of disabled people or those in rural locations with less access to sustainable transport options.

It presents four key behavioural considerations people will be required to consider:

- Reduce your need to travel.
- Choose local destinations.
- Switch to walking, wheeling, cycling or public transport where possible.
- Combine a trip or share a journey.

The route map also lists a number of additional benefits to reducing car use, including reducing inequalities, given the inequity of car reliance by reallocating space to streets and public spaces, delivering inclusive economic growth, given the reduction in congestion, and improving health and wellbeing through increased physical activity and better air quality.

Within the route map there is recognition it focuses on “incentivising desirable behaviour” and states this “is unlikely to be sufficient” to meet the target as long as car use remains attractive. Car use will remain an attractive option if the strong individual benefits are not counteracted for the user by dis-benefits including environmental and health which are currently externalised.

It also recognises that current motoring taxation arrangements are a “significant barrier to the decarbonisation of the transport sector” and revenues are falling as the transition to lower emission and more fuel-efficient vehicles continues.

### 8.1.2 Climate Change Plan (Update)<sup>1</sup>

The Climate Change Plan sets out Scotland’s domestic plans to ensure Scotland continues to be leaders and collaborators in global action to tackle climate change. This was first published in 2018 and was updated in 2020 to reflect new targets to end Scotland’s contribution to climate change by 2045.

The update recognises the disruptive impact of COVID-19 and the need for a “Green Recovery” which consists of investment from both public and private sector, job creation and reskilling, adaptation and resilience, and a place-based approach to the recovery. Additionally of relevance is the recommendation by the Committee on Climate Change that positive behaviours observed during the pandemic should be embedded and taken forward as part of the Green Recovery. These behaviours include the increase in active travel rates and remote working, resulting in fewer unsustainable journeys taking place.

Within the transport chapter there is a recognition that advances in green vehicles are not enough to meet the targets and states “it is self-evident that managing transport demand and embedding behaviour change will be of vital importance”.

The plan also asks the UK Government to strengthen incentives to purchase cleaner vehicles as well as work together to review current fuel duty and vehicle excise duty (VED) arrangements.

### 8.1.3 National Transport Strategy (NTS2) and Delivery Plan<sup>16 17</sup>

NTS2 is the Scottish Government strategy for the country’s transport system for the next 20 years. It sets the vision of a sustainable, inclusive, safe, and accessible transport system which could deliver a healthier, fairer and more prosperous Scotland. There are four main priorities which support that vision including reducing inequalities, taking climate action, helping deliver inclusive economic growth and improving health and wellbeing.

Demand management is directly referred to in NTS2 under the climate action priority. The policy within this priority states that infrastructure will not be built to cater for unconstrained increases in traffic volume. The document also discusses disruptive technologies such as electric and autonomous vehicles (AVs) and the additional demand these are likely to cause and how this demand needs to be managed. The document also emphasises the role transport must play in achieving the national net-zero by 2045 target, stating that “not taking steps of effectively managed demand for car use is no longer an option”. Air quality improvements are also highlighted in the policy, suggesting that we need to look beyond low emissions zones (LEZs) in Scotland’s four largest cities and consider further measures such as workplace parking levies and a mode shift to active travel.

In terms the difference in transport needs of urban and rural areas, the strategy “accepts that car ownership is not a luxury but a necessity for many living and working in rural areas” and states a “realistic and staged approach to the use of vehicles in rural areas” will be taken.

For opportunities, the policy mentions the “changing needs of young people, who often choose ‘usership’ over ownership”. The document also discusses supporting technological advances and efficiencies to increase the uptake of electric vehicles (EVs).

NTS2 also introduces two overarching hierarchies: the Sustainable Travel Hierarchy, which promotes the use of more sustainable modes, and the Sustainable Investment Hierarchy, which promotes sustainable investment decision making. A TDM scheme for private cars would align with both hierarchies by reducing the attractiveness of private cars (which are the lowest priority in the Sustainable Travel Hierarchy) and by reducing the need to travel unsustainably by making car less attractive relative to other more sustainable modes (which is the highest priority on the Sustainable Investment Hierarchy).

#### 8.1.4 Strategic Transport Projects Review 2 (STPR2)<sup>18</sup>

This is the Scottish Governments second review of Strategic Transport Projects, which will inform transport investment in Scotland over the next 20 years. It is currently published in draft, and outlines 45 recommendations under the six key themes of:

- Improving Active Travel Infrastructure.
- Influencing Travel Choices and Behaviours.
- Enhancing Access to Affordable Public Transport.
- Decarbonising Transport.
- Increasing Safety and Resilience on the Strategic Transport Network.
- Strengthening Strategic Connections.

Together, these recommendations represent the full range of interventions that have the potential to deliver the change to the transport system necessary achieve the NTS2 vision. The performance of STPR2 recommendations have been assessed against both ‘high’ and ‘low’ traffic growth scenarios, with the ‘low’ scenario assuming the presence of demand management measures. The draft National Appraisal Summary table<sup>19</sup> suggests that the reduction in vehicle kilometres due to the proposed interventions is only 2% in the ‘high’ scenario and 3% in the ‘low’ scenario, suggesting that the interventions alone are unlikely to meet the 20 per cent reduction target, and demand management will be required.

#### 8.1.5 Strategic Road Safety Plan Scotland’s Road Safety Framework to 2030<sup>20</sup>

The Scottish Governments Road Safety Framework to 2030 establishes a vision for Scotland to have the best road safety performance in the world by 2030. The document states that a possible way to encourage safe road use is to reduce car-based traffic and “inspiring people to walk, wheel and cycle or use public transport rather than their own vehicles”. Furthermore, safety is presented as a barrier for many to reduce car use and take up active travel. Demand management would therefore support delivery of the Road Safety Framework and enable safe road use.

#### 8.1.6 Scottish Trunk Road Network Asset Management Strategy<sup>21</sup>

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This Asset Management Strategy sets out how Asset Management Policy will be delivered through enhancements to procedures and practices. It establishes a vision where trunk road users are provided with up-to-date reliable information to increase user satisfaction, provides consistent, predictable, and reliable journeys for all, maintains the condition of trunk roads, and improves the safety of the trunk road network. The Trunk Road Network Asset Management Policy has further aims for improved integration for journeys, which consist of one or more modes of transport, by considering how the network interfaces with local roads and other transport modes. Demand management could have profound implications for asset management by both reducing wear on road infrastructure and, potentially, by creating an additional revenue stream.

### 8.1.7 Infrastructure Investment Plan<sup>22</sup>

This strategy, published in 2021, sets out priorities for investment and a long-term strategy for development of public infrastructure in Scotland. The plan is set out into three themes including enabling the transition to net zero, driving inclusive economic growth and building resilient and sustainable places. It sets out a range of investments in decarbonising transport including active and public transport investment. The infrastructure investment plan provides a funding pathway for the delivery of STPR2 recommendations and the NTS2 vision. As with STPR2 recommendations, demand management will influence how successful this investment is in creating a change in transport behaviour and achieving the priorities of NTS2.

### 8.1.8 National Planning Framework 4 (NPF4)<sup>23</sup>

The fourth National Planning Framework is the long-term spatial strategy for the development of Scotland. It states places in Scotland should be planned to be sustainable, liveable, productive, and distinctive. Measures to support local living will reduce the need to travel unsustainably and the policy states “the transport system as a whole will need to be planned to support a shift to more sustainable transport while maintaining access to markets and facilities”. Key to successful demand management is reducing the need to travel by providing local access to goods and services and through digital connectivity.

### 8.1.9 Scotland’s National Strategy for Economic Transformation<sup>24</sup>

This strategy sets out a vision for a wellbeing economy where society thrives and delivers prosperity for all of Scotland’s people and places. There are six policy programmes contained within the strategy, including “A Fairer and More Equal Society” which includes measures to remove barriers to employment. The strategy highlights regional disparity in economic performance, with rural and island areas facing particular challenges around labour supply, poor access to infrastructure, and housing. However, the strategy also highlights the opportunity for Scotland’s transition to net-zero to bring about positive employment, revenue, and community benefits. The issues identified in the strategy are mirrored by those identified within 11.1.3 of this note. The interaction of these issues with demand management measures will be determined by how they are implemented.

### 8.1.10 Programme for Government (2021-2022)<sup>25</sup>

The Programme for Government (PfG) details how manifesto commitments across six long-term priorities will be translated into action. The 2021-2022 PfG contains specific actions in relation long term-priority 3: ‘A Net-Zero Nation: ending Scotland’s contribution to climate change, restoring nature and enhancing our climate resilience, in a just and fair way’. For transport, specific commitments under this priority are to bring about a green transport revolution by reducing car kilometres by 20% by 2030. Demand management is the mechanism by which such a reduction will be met.

### 8.1.11 Scottish Government Framework for Taxation<sup>26</sup>

This document sets out the principles and strategic objectives that underpin the approach to taxation in Scotland. The objectives of tax are to generate stable revenues, support a wellbeing economy, deliver national outcomes, and respond to societal and economic shifts. All tax should adhere to the six principles of taxation:

- Proportionality - levied in proportion with ability to pay reflecting income and wealth.
- Efficiency - balance revenue prospects against unintended behavioural responses (for example reducing working hours to reduce your tax bill).

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- Certainty – Knowledge of liability to pay, amount to pay and when to pay by – allowing confident investment.
- Convenience – simple, clear, and straightforward policy and collected at a convenient time.
- Engagement – open and transparent about policy, consulting widely.
- Effectiveness – taxes raise the expected revenue and achieve intended aims. Minimising tax avoidance.

Any demand management measures proposed around fiscal measures, will be required to adhere to the principles of taxation and to support a fair tax system in Scotland.

### 8.1.12 Equality Act<sup>27</sup>

The Equality Act 2010 legally protects people from discrimination both in the workplace and in wider society. It ensures that individuals with the following nine protected characteristics are not indirectly or directly discriminated against:

- **Age:** This refers to persons defined by either a particular age or a range of ages.
- **Disability:** A disabled person is someone who has a physical or mental impairment (lasting more than a year) that has a substantial adverse effect on their ability to carry out normal day-to-day activities.
- **Gender Reassignment:** This refers to a person who is proposing to undergo, is undergoing, or has undergone a process for the purpose of reassigning their gender identity.
- **Marriage and Civil Partnership:** Marriage can be between a man and a woman or between two people of the same sex. Civil partners must not be treated less favourably than married couples.
- **Pregnancy and Maternity:** Pregnancy is the condition of being pregnant and expecting a baby. Maternity refers to the period after the birth. In the non-work context, protection against maternity discrimination is for 26 weeks after giving birth.
- **Race:** Under the Equality Act 2010 race includes colour, nationality (including citizenship) and ethnic or national origins.
- **Religion or Belief:** Religion means any religion and a reference to religion includes a reference to a lack of religion. Belief means any religious or philosophical belief and a reference to belief includes a reference to a lack of belief.
- **Sex:** This refers to a man or to a woman, or to a group of people of the same sex.
- **Sexual Orientation:** this means a person's sexual orientation towards persons of the same sex, persons of the opposite sex, or persons of either sex.

Within the legislation discrimination is defined in four different types: direct, indirect, harassment and victimisation. Indirect discrimination will likely be the largest consideration for this study as any proposed measures will need to be assessed to ensure they do not adversely disadvantage certain protected characteristic groups. The way in which demand management measures are implemented will potentially have differential impacts upon certain protected characteristic groups according to variations in how they each access transport. Careful consideration of how transport is experienced by different groups is therefore needed in order to propose measures which do not inadvertently impact on certain groups.

### 8.1.13 Fairer Scotland Duty<sup>28</sup>

The Fairer Scotland Duty came into force in April 2018 and places a legal responsibility on particular public bodies to actively consider how they can actively reduce inequalities of outcome caused by socio-economic disadvantage throughout strategic decision making.

Socio-economic disadvantage is defined as living on a low income compared to others in Scotland, with little or no accumulated wealth. This leads to material deprivation and restricted access to goods and services. Inequalities of outcome are measurable differences between those experiencing socio-economic disadvantage and those not in areas such as health, education, employment, and connectivity.

Public bodies are encouraged to publish a written record of their decision-making process to demonstrate compliance with the duty. Demand management measures proposed will not only need to ensure that there is no detriment to any social class but that their implementation contributes towards the achievement of a fairer

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society. Demand management measures proposed must therefore consider the differential impacts across socio-economic groups and the opportunities for advancement of equality among those groups.

#### 8.1.14 Islands Act<sup>29</sup>

This act makes provisions for a National Islands Plan and mandates an island communities impact assessment for any policy, strategy or service which is likely to have an effect on island communities which is significantly different from its effect on other communities.

The National Island Plan<sup>30</sup> published in 2019 recognises that island communities face many different transport challenges when carrying out their daily lives compared to those living on the mainland with the cost of transport much higher relative to income compared to the rest of Scotland. Proposals for demand management must therefore consider the differing needs of those in island communities.

## 9. Problems, Opportunities & Constraints

### 9.1 Problems

Problems relating to demand management have been generated from a literature review, discussions with stakeholders, and data analysis. The problems have been grouped under three key themes:

- High and Increasing Demand for Car Travel.
- Decreasing Revenue from Fuel Duty and VED.
- Transport Inequality.

#### 9.1.1 High and Increasing Demand for Car Travel

The total vehicle kilometres travelled on Scottish Roads has been increasing consistently year on year to 2019, as shown in Figure 11.1.

Review of current policy in areas such as transport, climate, revenue generation and equalities to understand strategic objectives related to TDM in Scotland and associated issues.

- Section 11 - Problems, Opportunities & Constraints

Problems, Opportunities and Constraints have been identified from a literature review, discussions with stakeholders and data analysis.

- Section 12 - Transport Planning Objectives

A series of Transport Planning Objective (TPOs) have been generated based on the identified problems, opportunities, and constraints, and checked for alignment with policy. These objectives have been developed in line with the SMART principles: Specific, Measurable, Achievable, Relevant, and Timebound.

## 10. Policy Context

### 10.1.1 A route map to achieve a 20 per cent reduction in car kilometres by 2030<sup>2</sup>

A key policy of the Scottish Government and the primary objective of this TDM options study is to achieve a 20% reduction in car kilometres travelled. The route map sets out how this can be achieved through both transport and non-transport related policies. The route map makes clear its aim is not to eliminate all car use, recognising the needs of disabled people or those in rural locations with less access to sustainable transport options.

It presents four key behavioural considerations people will be required to consider:

- Reduce your need to travel.
- Choose local destinations.
- Switch to walking, wheeling, cycling or public transport where possible.
- Combine a trip or share a journey.

The route map also lists a number of additional benefits to reducing car use, including reducing inequalities, given the inequity of car reliance by reallocating space to streets and public spaces, delivering inclusive economic growth, given the reduction in congestion, and improving health and wellbeing through increased physical activity and better air quality.

Within the route map there is recognition it focuses on “incentivising desirable behaviour” and states this “is unlikely to be sufficient” to meet the target as long as car use remains attractive. Car use will remain an attractive option if the strong individual benefits are not counteracted for the user by dis-benefits including environmental and health which are currently externalised.

It also recognises that current motoring taxation arrangements are a “significant barrier to the decarbonisation of the transport sector” and revenues are falling as the transition to lower emission and more fuel-efficient vehicles continues.

### 10.1.2 Climate Change Plan (Update)<sup>1</sup>

The Climate Change Plan sets out Scotland’s domestic plans to ensure Scotland continues to be leaders and collaborators in global action to tackle climate change. This was first published in 2018 and was updated in 2020 to reflect new targets to end Scotland’s contribution to climate change by 2045.

The update recognises the disruptive impact of COVID-19 and the need for a “Green Recovery” which consists of investment from both public and private sector, job creation and reskilling, adaptation and resilience, and a place-based approach to the recovery. Additionally of relevance is the recommendation by the Committee on Climate Change that positive behaviours observed during the pandemic should be embedded and taken forward as part of the Green Recovery. These behaviours include the increase in active travel rates and remote working, resulting in fewer unsustainable journeys taking place.

Within the transport chapter there is a recognition that advances in green vehicles are not enough to meet the targets and states “it is self-evident that managing transport demand and embedding behaviour change will be of vital importance”.

The plan also asks the UK Government to strengthen incentives to purchase cleaner vehicles as well as work together to review current fuel duty and vehicle excise duty (VED) arrangements.



### 10.1.3 National Transport Strategy (NTS2) and Delivery Plan<sup>30 31</sup>

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NTS2 is the Scottish Government strategy for the country's transport system for the next 20 years. It sets the vision of a sustainable, inclusive, safe, and accessible transport system which could deliver a healthier, fairer and more prosperous Scotland. There are four main priorities which support that vision including reducing inequalities, taking climate action, helping deliver inclusive economic growth and improving health and wellbeing.

Demand management is directly referred to in NTS2 under the climate action priority. The policy within this priority states that infrastructure will not be built to cater for unconstrained increases in traffic volume. The document also discusses disruptive technologies such as electric and autonomous vehicles (AVs) and the additional demand these are likely to cause and how this demand needs to be managed. The document also emphasises the role transport must play in achieving the national net-zero by 2045 target, stating that "not taking steps of effectively managed demand for car use is no longer an option". Air quality improvements are also highlighted in the policy, suggesting that we need to look beyond low emissions zones (LEZs) in Scotland's four largest cities and consider further measures such as workplace parking levies and a mode shift to active travel.

In terms the difference in transport needs of urban and rural areas, the strategy "accepts that car ownership is not a luxury but a necessity for many living and working in rural areas" and states a "realistic and staged approach to the use of vehicles in rural areas" will be taken.

For opportunities, the policy mentions the "changing needs of young people, who often choose 'usership' over ownership". The document also discusses supporting technological advances and efficiencies to increase the uptake of electric vehicles (EVs).

NTS2 also introduces two overarching hierarchies: the Sustainable Travel Hierarchy, which promotes the use of more sustainable modes, and the Sustainable Investment Hierarchy, which promotes sustainable investment decision making. A TDM scheme for private cars would align with both hierarchies by reducing the attractiveness of private cars (which are the lowest priority in the Sustainable Travel Hierarchy) and by reducing the need to travel unsustainably by making car less attractive relative to other more sustainable modes (which is the highest priority on the Sustainable Investment Hierarchy).

### 10.1.4 Strategic Transport Projects Review 2 (STPR2)<sup>32</sup>

This is the Scottish Governments second review of Strategic Transport Projects, which will inform transport investment in Scotland over the next 20 years. It is currently published in draft, and outlines 45 recommendations under the six key themes of:

- Improving Active Travel Infrastructure.
- Influencing Travel Choices and Behaviours.
- Enhancing Access to Affordable Public Transport.
- Decarbonising Transport.
- Increasing Safety and Resilience on the Strategic Transport Network.

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<sup>30</sup> Transport Scotland, NTS2, 2020, <https://www.transport.gov.scot/media/47052/national-transport-strategy.pdf>

<sup>31</sup> Transport Scotland, NTS2 Delivery Plan 2020-2022, 2020, <https://www.transport.gov.scot/media/48839/nts-delivery-plan-2020-2022.pdf>

<sup>32</sup> Transport Scotland, STPR2, Draft Technical Report, 2022, <https://www.transport.gov.scot/media/50946/draft-technical-report-january-2022-stpr2.pdf>

- Strengthening Strategic Connections.

Together, these recommendations represent the full range of interventions that have the potential to deliver the change to the transport system necessary to achieve the NTS2 vision. The performance of STPR2 recommendations have been assessed against both 'high' and 'low' traffic growth scenarios, with the 'low' scenario assuming the presence of demand management measures. The draft National Appraisal Summary table<sup>33</sup> suggests that the reduction in vehicle kilometres due to the proposed interventions is only 2% in the 'high' scenario and 3% in the 'low' scenario, suggesting that the interventions alone are unlikely to meet the 20 per cent reduction target, and demand management will be required.

### 10.1.5 Strategic Road Safety Plan Scotland's Road Safety Framework to 2030<sup>34</sup>

The Scottish Government's Road Safety Framework to 2030 establishes a vision for Scotland to have the best road safety performance in the world by 2030. The document states that a possible way to encourage safe road use is to reduce car-based traffic and "inspiring people to walk, wheel and cycle or use public transport rather than their own vehicles". Furthermore, safety is presented as a barrier for many to reduce car use and take up active travel. Demand management would therefore support delivery of the Road Safety Framework and enable safe road use.

### 10.1.6 Scottish Trunk Road Network Asset Management Strategy<sup>39</sup>

This Asset Management Strategy sets out how Asset Management Policy will be delivered through enhancements to procedures and practices. It establishes a vision where trunk road users are provided with up-to-date reliable information to increase user satisfaction, provides consistent, predictable, and reliable journeys for all, maintains the condition of trunk roads, and improves the safety of the trunk road network. The Trunk Road Network Asset Management Policy has further aims for improved integration for journeys, which consist of one or more modes of transport, by considering how the network interfaces with local roads and other transport modes. Demand management could have profound implications for asset management by both reducing wear on road infrastructure and, potentially, by creating an additional revenue stream.

### 10.1.7 Infrastructure Investment Plan<sup>35</sup>

This strategy, published in 2021, sets out priorities for investment and a long-term strategy for development of public infrastructure in Scotland. The plan is set out into three themes including enabling the transition to net zero, driving inclusive economic growth and building resilient and sustainable places. It sets out a range of investments in decarbonising transport including active and public transport investment. The infrastructure investment plan provides a funding pathway for the delivery of STPR2 recommendations and the NTS2 vision. As with STPR2 recommendations, demand management will influence how successful this investment is in creating a change in transport behaviour and achieving the priorities of NTS2.

### 10.1.8 National Planning Framework 4 (NPF4)<sup>36</sup>

The fourth National Planning Framework is the long-term spatial strategy for the development of Scotland. It states places in Scotland should be planned to be sustainable, liveable, productive, and distinctive. Measures to support local living will reduce the need to travel unsustainably and the policy states "the transport system as a whole will need to be planned to support a shift to more sustainable transport while maintaining access to

<sup>33</sup> Transport Scotland, STPR2, Draft National Appraisal Summary Table, <https://www.transport.gov.scot/media/50939/detailed-appraisal-summary-table-national-draft-technical-report-stpr2.pdf>

<sup>34</sup> Transport Scotland, Scotland's Road Safety Framework to 2030: Together Making Scotland's Roads Safer, 2021, <https://www.transport.gov.scot/media/49893/scotlands-road-safety-framework-to-2030.pdf> <sup>39</sup> Transport Scotland, Scottish Trunk Road Network Asset Management Strategy, 2018, <https://www.transport.gov.scot/media/43925/sct10188149681.pdf>

<sup>35</sup> Scottish Government, A National Mission With Local Impact: Infrastructure Investment Plan for Scotland 2021-22 to 2025-26, 2021, <https://www.gov.scot/publications/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/documents/>

<sup>36</sup> Scottish Government, Scotland 2045: Our Fourth National Planning Framework Draft, 2021, <https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/documents/>

markets and facilities”. Key to successful demand management is reducing the need to travel by providing local access to goods and services and through digital connectivity.

### 10.1.9 Scotland’s National Strategy for Economic Transformation<sup>37</sup>

This strategy sets out a vision for a wellbeing economy where society thrives and delivers prosperity for all of Scotland’s people and places. There are six policy programmes contained within the strategy, including “A Fairer and More Equal Society” which includes measures to remove barriers to employment. The strategy highlights regional disparity in economic performance, with rural and island areas facing particular challenges around labour supply, poor access to infrastructure, and housing. However, the strategy also highlights the opportunity for Scotland’s transition to net-zero to bring about positive employment, revenue, and community benefits. The issues identified in the strategy are mirrored by those identified within 11.1.3 of this note. The interaction of these issues with demand management measures will be determined by how they are implemented.

### 10.1.10 Programme for Government (2021-2022)<sup>38</sup>

The Programme for Government (PfG) details how manifesto commitments across six long-term priorities will be translated into action. The 2021-2022 PfG contains specific actions in relation long term-priority 3: ‘A Net-Zero Nation: ending Scotland’s contribution to climate change, restoring nature and enhancing our climate resilience, in a just and fair way’. For transport, specific commitments under this priority are to bring about a green transport revolution by reducing car kilometres by 20% by 2030. Demand management is the mechanism by which such a reduction will be met.

### 10.1.11 Scottish Government Framework for Taxation<sup>39</sup>

This document sets out the principles and strategic objectives that underpin the approach to taxation in Scotland. The objectives of tax are to generate stable revenues, support a wellbeing economy, deliver national outcomes, and respond to societal and economic shifts. All tax should adhere to the six principles of taxation:

- Proportionality - levied in proportion with ability to pay reflecting income and wealth.
- Efficiency - balance revenue prospects against unintended behavioural responses (for example reducing working hours to reduce your tax bill).
- Certainty – Knowledge of liability to pay, amount to pay and when to pay by – allowing confident investment.
- Convenience – simple, clear, and straightforward policy and collected at a convenient time.
- Engagement – open and transparent about policy, consulting widely.
- Effectiveness – taxes raise the expected revenue and achieve intended aims. Minimising tax avoidance.

Any demand management measures proposed around fiscal measures, will be required to adhere to the principles of taxation and to support a fair tax system in Scotland.

### 10.1.12 Equality Act<sup>40</sup>

The Equality Act 2010 legally protects people from discrimination both in the workplace and in wider society. It ensures that individuals with the following nine protected characteristics are not indirectly or directly discriminated against:

- **Age:** This refers to persons defined by either a particular age or a range of ages.

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<sup>37</sup> Scottish Government, Delivering Economic Prosperity: Scotland’s National Strategy for Economic Transformation, 2022, <https://www.gov.scot/publications/scotlands-national-strategy-economic-transformation/documents/>

<sup>38</sup> Scottish Government, A Fairer, Greener Scotland: Programme for Government 2021-22, 2021, <https://www.gov.scot/publications/fairergreener-scotland-programme-government-2021-22/documents/>

<sup>39</sup> Scottish Government, Framework for Tax, 2021, <https://www.gov.scot/publications/framework-tax-2021/documents/>

<sup>40</sup> UK Government, Equality Act 2010: Guidance, 2015, <https://www.gov.uk/guidance/equality-act-2010-guidance>

- **Disability:** A disabled person is someone who has a physical or mental impairment (lasting more than a year) that has a substantial adverse effect on their ability to carry out normal day-to-day activities.
- **Gender Reassignment:** This refers to a person who is proposing to undergo, is undergoing, or has undergone a process for the purpose of reassigning their gender identity.
- **Marriage and Civil Partnership:** Marriage can be between a man and a woman or between two people of the same sex. Civil partners must not be treated less favourably than married couples.
- **Pregnancy and Maternity:** Pregnancy is the condition of being pregnant and expecting a baby. Maternity refers to the period after the birth. In the non-work context, protection against maternity discrimination is for 26 weeks after giving birth.
- **Race:** Under the Equality Act 2010 race includes colour, nationality (including citizenship) and ethnic or national origins.
- **Religion or Belief:** Religion means any religion and a reference to religion includes a reference to a lack of religion. Belief means any religious or philosophical belief and a reference to belief includes a reference to a lack of belief.
- **Sex:** This refers to a man or to a woman, or to a group of people of the same sex.
- **Sexual Orientation:** this means a person's sexual orientation towards persons of the same sex, persons of the opposite sex, or persons of either sex.

Within the legislation discrimination is defined in four different types: direct, indirect, harassment and victimisation. Indirect discrimination will likely be the largest consideration for this study as any proposed measures will need to be assessed to ensure they do not adversely disadvantage certain protected characteristic groups. The way in which demand management measures are implemented will potentially have differential impacts upon certain protected characteristic groups according to variations in how they each \_\_\_\_\_ access transport. Careful consideration of how transport is experienced by different groups is therefore needed in order to propose measures which do not inadvertently impact on certain groups.

### 10.1.13 Fairer Scotland Duty<sup>41</sup>

The Fairer Scotland Duty came into force in April 2018 and places a legal responsibility on particular public bodies to actively consider how they can actively reduce inequalities of outcome caused by socio-economic disadvantage throughout strategic decision making.

Socio-economic disadvantage is defined as living on a low income compared to others in Scotland, with little or no accumulated wealth. This leads to material deprivation and restricted access to goods and services. Inequalities of outcome are measurable differences between those experiencing socio-economic disadvantage and those not in areas such as health, education, employment, and connectivity.

Public bodies are encouraged to publish a written record of their decision-making process to demonstrate compliance with the duty. Demand management measures proposed will not only need to ensure that there is no detriment to any social class but that their implementation contributes towards the achievement of a fairer society. Demand management measures proposed must therefore consider the differential impacts across socio-economic groups and the opportunities for advancement of equality among those groups.

### 10.1.14 Islands Act<sup>42</sup>

This act makes provisions for a National Islands Plan and mandates an island communities impact assessment for any policy, strategy or service which is likely to have an effect on island communities which is significantly different from its effect on other communities.

The National Island Plan<sup>48</sup> published in 2019 recognises that island communities face many different transport challenges when carrying out their daily lives compared to those living on the mainland with the cost of

<sup>41</sup> Scottish Government, The Fairer Scotland Duty Guidance for Public Bodies, 2021, <https://www.gov.scot/publications/fairer-scotlandduty-guidance-public-bodies/documents/>

<sup>42</sup> Legislation.gov.uk, Acts of the Scottish Parliament, Islands (Scotland) Act 2018, <https://www.legislation.gov.uk/asp/2018/12/enacted> <sup>48</sup> Scottish Government, The National Plan for Scotland's Islands, 2019, <https://www.gov.scot/publications/national-plan-scotlandsislands/documents/>

transport much higher relative to income compared to the rest of Scotland. Proposals for demand management must therefore consider the differing needs of those in island communities.

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## 11. Problems, Opportunities & Constraints

### 11.1 Problems

Problems relating to demand management have been generated from a literature review, discussions with stakeholders, and data analysis. The problems have been grouped under three key themes:

- High and Increasing Demand for Car Travel.
- Decreasing Revenue from Fuel Duty and VED.
- Transport Inequality.

#### 11.1.1 High and Increasing Demand for Car Travel

The total vehicle kilometres travelled on Scottish Roads has been increasing consistently year on year to 2019, as shown in Figure 11.1.

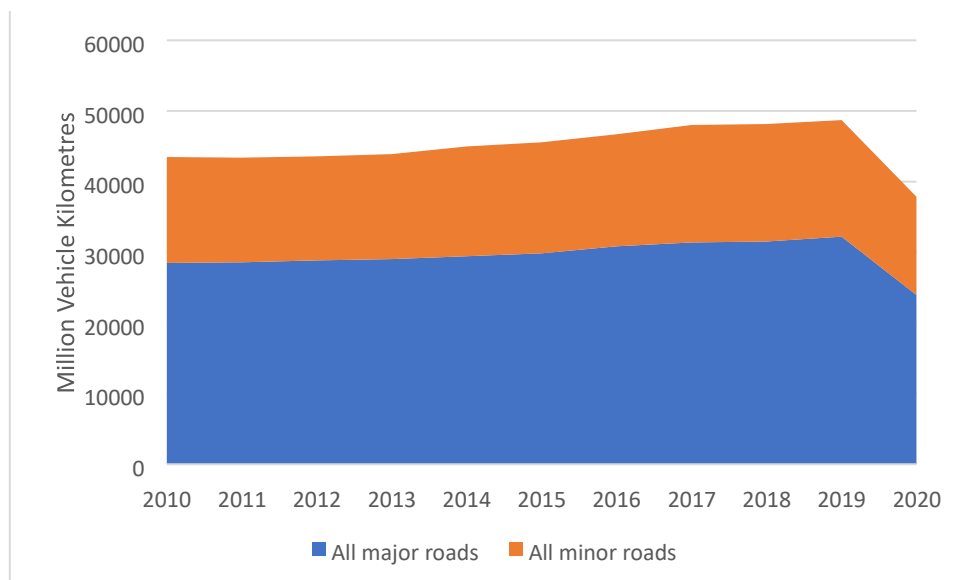


Figure 11.1: Road Traffic In Scotland<sup>43</sup>

A reduction of 22% was observed between 2019 to 2020, corresponding to the COVID-19 pandemic. This suggests that almost pandemic-level demand management will be required to meet the 20% reduction target (although the role of modal shift is also acknowledged, and it is noted that public transport usage was actively discouraged during the pandemic).

Although there is not yet data available for 2021, the reduction observed during the pandemic is not expected to be sustained. Evidence points to a quick bounce back to pre-COVID levels of road traffic, recovering at a much faster rate than public transport<sup>44</sup>.

The increase in road traffic between 2009 and 2019 has also been disproportionately higher than the population increase over the same period (the number of car kilometres driven in Scotland increased by seven per cent, despite the population only increasing by around 4.5 per cent)<sup>2</sup>.

Figure 11.2 shows that almost two thirds of car kilometres travelled come from trips within the longest distance quintile (defined as journeys with a distance over 19.62km). This suggests that addressing shortdistance car journeys alone is unlikely to be sufficient in meeting the net zero targets.

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<sup>43</sup> Transport Scotland, Scottish Transport Statistics Table 5.1, 2021, <https://www.transport.gov.scot/publication/scottish-transportstatistics-2021/>

<sup>44</sup> Transport Scotland, COVID-19: Scotland's transport and travel trends during the first six months of the pandemic, 2021, <https://www.transport.gov.scot/publication/covid-19-scotland-s-transport-and-travel-trends-during-the-first-six-months-of-thepandemic/>

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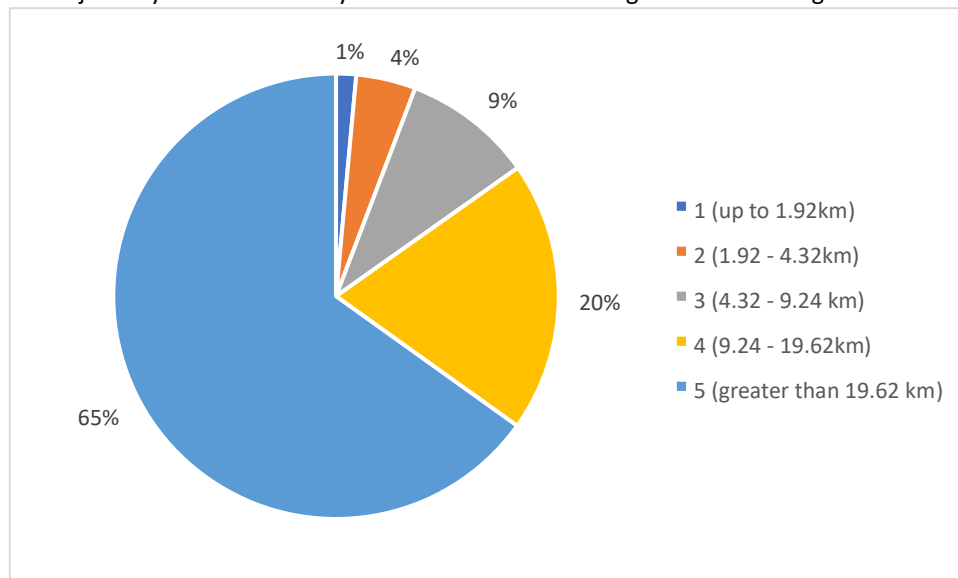


Figure 11.2: Total Car Kilometres by Quintile of Journey Distance<sup>46</sup>

Figure 11.1 demonstrates that 56% of journeys are under 5 miles, but this makes up only 12% of the total distance travelled. Meanwhile only 4% of journeys are over 35 miles, but this makes up 28% of the total distance travelled.

<sup>45</sup> Transport Scotland, COVID-19: Scotland's transport and travel trends during the first six months of the pandemic, 2021, <https://www.transport.gov.scot/publication/covid-19-scotland-s-transport-and-travel-trends-during-the-first-six-months-of-thepandemic/>

<sup>46</sup> Scottish Household Survey – Additional Processing by , 2022

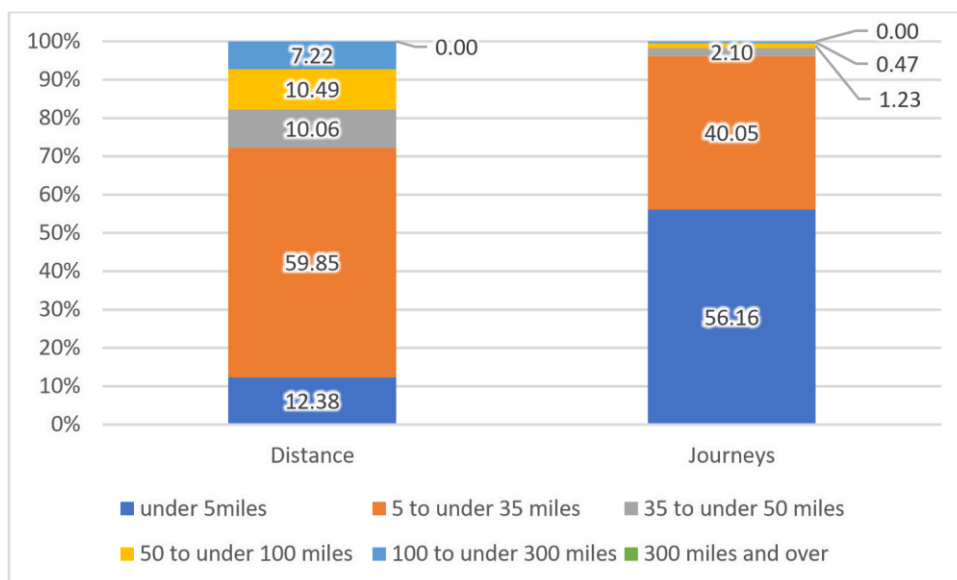


Figure 11.3: Percentage of Journeys by Distance Travelled vs Percentage of Total Miles vs Distance Travelled<sup>52</sup>

### Carbon Emissions

In May 2019, the Scottish Government declared a Global Climate Emergency<sup>47</sup> and in October 2019, the Climate Change (Emissions Reduction Targets) (Scotland) Act<sup>48</sup> was passed, committing to net-zero greenhouse gas emissions by 2045.

Transport is the biggest emitting sector of the UK economy<sup>49</sup>. While all other sectors saw a reduction in emissions between 1990 and 2008, the transport sector, which accounted for 22% of total Scottish emissions (not including international aviation and shipping) was 7% higher<sup>50</sup>. Average CO<sub>2</sub> emissions per mile have been decreasing in recent years, but due to the increase in travelled miles, the overall CO<sub>2</sub> emissions from transport have remained flat<sup>51</sup>. Progress to improve efficiency of new vehicles has been largely offset by their increased use, and the tendency to larger vehicles<sup>55</sup>.

Cars remain a huge contributor to road transport carbon emissions.

While a shift to EVs has the potential to reduce direct emissions from fuel, there is no such thing as a zero emissions car. The manufacture and disposal of batteries, vehicles, electricity generation and civil engineering must also decarbonise. In order to reduce total emissions related to transport we need to shift to a more intensive use of a smaller fleet of vehicles and to encourage behaviour change. The 2030 ban on sales of new petrol and diesel cars alone will not bring about the necessary reductions in emissions. Progress to improve efficiency of new vehicles has been largely offset by their increased use, and the tendency to larger vehicles<sup>55</sup>.

The Scottish Government commissioned work to model the policy scenarios needed to achieve the emissions reductions necessary from the transport sector to meet the net-zero by 2045 target<sup>3</sup>. Four policy scenarios (PS) were modelled:

<sup>47</sup> Scottish Government, The Global Climate Emergency - Scotland's Response: Climate Change Secretary Roseanna Cunningham's statement, 2019, <https://www.gov.scot/publications/global-climate-emergency-scotlands-response-climate-change-secretary-roseannacunninghams-statement/>

<sup>48</sup> Scottish Government, Climate Change (Emissions Reduction Targets) (Scotland) Act, 2019, <https://www.legislation.gov.uk/asp/2019/15/enacted>

<sup>49</sup> Professor David Begg & Claire Haigh, Re-charging Britain's Road Policy, 2021, <https://greenertransportsolutions.com/publication/recharging-britains-roads-policy/>

<sup>50</sup> Reform Scotland, Pay-as-you-drive: the road to a better future, 2013, <https://reformscotland.com/2013/10/pay-as-you-drive-the-road-to-a-better-future/>

<sup>51</sup> Miles Better: A distance-based charge to replace Fuel Duty and VED, collected by insurers – Wolfson Economics Prize Submission, 2017, <https://policyexchange.org.uk/wp-content/uploads/2017/07/Gergely-Raccuja-Miles-Better-Revised-Submission.pdf>



- **PS0** – Business as usual (demand following Department for Transport (DfT) projections).
- **PS1** – Rapid decarbonisation of passenger and freight vehicle stock (demand also follows DfT projections).
- **PS2** – Rapid decarbonisation of passenger and freight vehicle stock *plus* reduction in vehicle kilometres through modal shift to public and active transport.
- **PS3** – Rapid decarbonisation of passenger and freight vehicle stock *plus* reduction in vehicle kilometres through modal shift to public and active transport *plus* reduced demand through trip shortening and trip avoidance.

PS3 was the only scenario which was able to achieve the target<sup>3</sup>. This work further recommended that efforts to reduce vehicle kilometres were focussed around high mileage users, initially, such as taxis, private hire, and company car fleets.

### *Effect of Congestion on Journey Times and Productivity*

According to Scottish Household Survey data collected between 2018 and 2020, 12.6% of car drivers' journeys were delayed by traffic congestion and 7.5% were delayed by 10 minutes or more<sup>52</sup>.

Inefficient use of the road system contributes to congestion, including low vehicle occupancy and usage clustering in the peaks<sup>53</sup>.

Recently petrol duty has not been successful in discouraging travel and has done little to reduce congestion on our roads<sup>56</sup>, and little progress has been made in meeting the Scottish Government's National Indicator to reduce the proportion of driver journeys delayed due to traffic congestion<sup>56</sup>. Fuel duty has been frozen in nominal terms since 2011-12<sup>60</sup>, and is therefore declining in real terms.

Congestion is only expected to worsen as the cheaper total cost of ownership of EVs (historically electricity has been less expensive, and EVs have no fuel duty and VAT is only 5%) will, logically, lead to more driving, with the average UK driver in 2040 forecast to spend an extra nine hours a year in traffic compared with current congestion levels<sup>54</sup>. The estimated cost of congestion is growing<sup>57</sup> with increased costs for business through extra freight delivery costs and reduced economic productivity through travel time delays<sup>59</sup>.

A congested road network will also inconvenience bus users and depress bus usage, because journeys will become longer and less predictable<sup>55,61</sup>. This has potential implications for bus patronage and the sustainability of bus, which in turn could further exacerbate traffic levels and congestion if people have fewer alternatives to private car.

### *Air Quality*

Another consequence of congestion is increased vehicle emissions<sup>59</sup>. Air pollution is a major problem in the UK, with diesel and petrol vehicles making a significant contribution to this through harmful emissions<sup>59</sup>. Concerns about air quality demonstrate the needs for changes in how, what and where we drive<sup>57</sup>.

Historically the road tax system was skewed in favour of diesel vehicles, which emit less CO<sub>2</sub>/km than their petrol equivalents, and hence are more fuel efficient from a carbon perspective. This led to a high uptake of diesel vehicles, particularly in the light commercial vehicle sector. Unfortunately, diesel engines produce increased particulate and NO<sub>x</sub> emissions that are directly harmful to people's health and therefore have a high

<sup>52</sup> Transport Scotland, Scottish Transport Statistics Table 5.8, 2021, <https://www.transport.gov.scot/publication/scottish-transportstatistics-2021/>

<sup>53</sup> Clearways, Solving congestion by rewarding people for changing their driving habits – Wolfson Economics Prize Submission, 2017, <https://policyexchange.org.uk/wp-content/uploads/2017/07/Clearways-Changing-Habits-Revised-Submission-Full-1.pdf> <sup>60</sup> Office for Budget Responsibility, Fuel Duties, <https://obr.uk/forecasts-in-depth/tax-by-tax-spend-by-spend/fuel-duties/>

<sup>54</sup> House of Commons Transport Committee, Road pricing Fourth Report of Session 2021–22, <https://publications.parliament.uk/pa/cm5802/cmselect/cmtrans/789/report.html>

<sup>55</sup> Begg (2016) The Impact of Congestion on Bus Passengers. Available at: <https://greenertransportsolutions.com/wpcontent/uploads/2016/06/Prof-David-Begg-The-Impact-of-Congestion-on-Bus-Passengers-Digital-FINAL.pdf>

public health externality cost<sup>57</sup>. Despite a general downward trend in emission of pollutants, this decrease has been slower for road transport<sup>56</sup>.

Though a transition to EVs and alternative fuels is likely to result in improvements in air quality, a large proportion of particulate matter from vehicle use does not arise from exhaust emissions. These ‘non-exhaust emissions’ come from brake, tyre and road wear and from the re-suspension of particles from the road surface by the physical effects of running traffic. These emissions are estimated to exceed the particulate emissions from the exhaust pipe<sup>57</sup>.

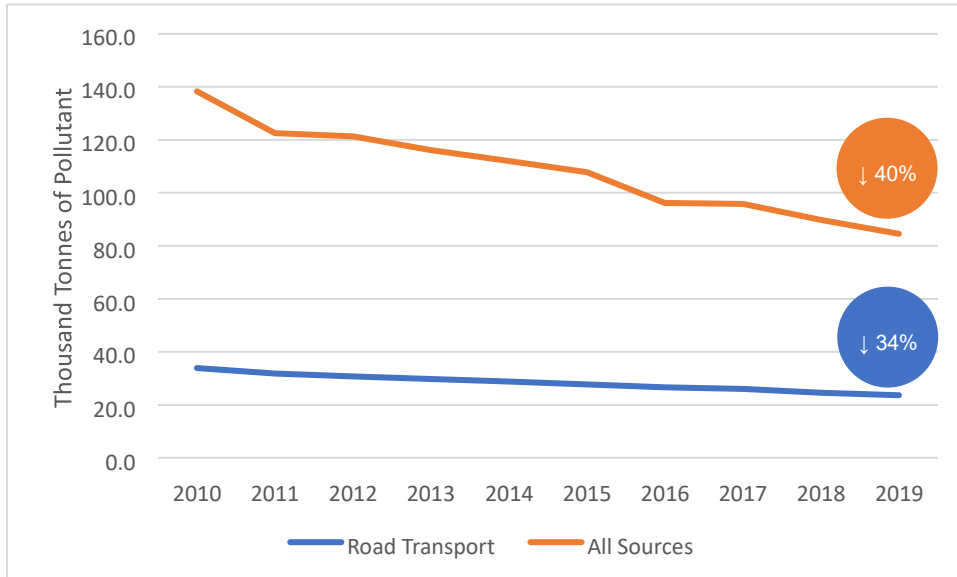


Figure 11.4: NOx Emissions in Scotland<sup>65</sup>

<sup>56</sup> Transport Scotland, Scottish Transport Statistics Table 13.1a, 2021, <https://www.transport.gov.scot/publication/scottish-transportstatistics-2021/>

<sup>57</sup> Air Quality Expert Group report to the Department for Environment, Food and Rural Affairs; Scottish Government; Welsh Government; and Department of the Environment in Northern Ireland (2029) Non-Exhaust Emissions from Road Traffic [https://ukair.defra.gov.uk/assets/documents/reports/cat09/1907101151\\_20190709\\_Non\\_Exhaust\\_Emissions\\_typeset\\_Final.pdf](https://ukair.defra.gov.uk/assets/documents/reports/cat09/1907101151_20190709_Non_Exhaust_Emissions_typeset_Final.pdf)

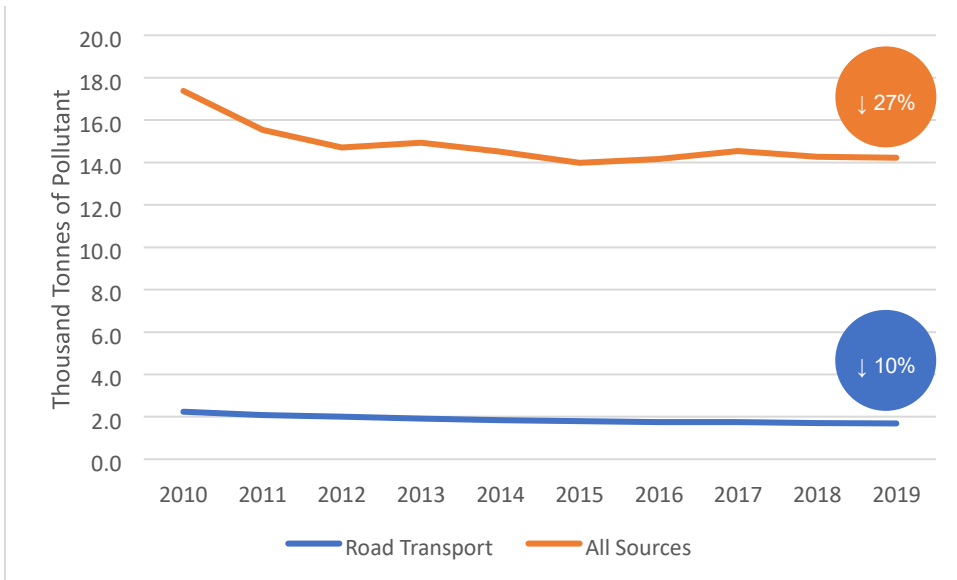


Figure 11.5: PM<sub>10</sub> Emissions in Scotland<sup>65</sup>

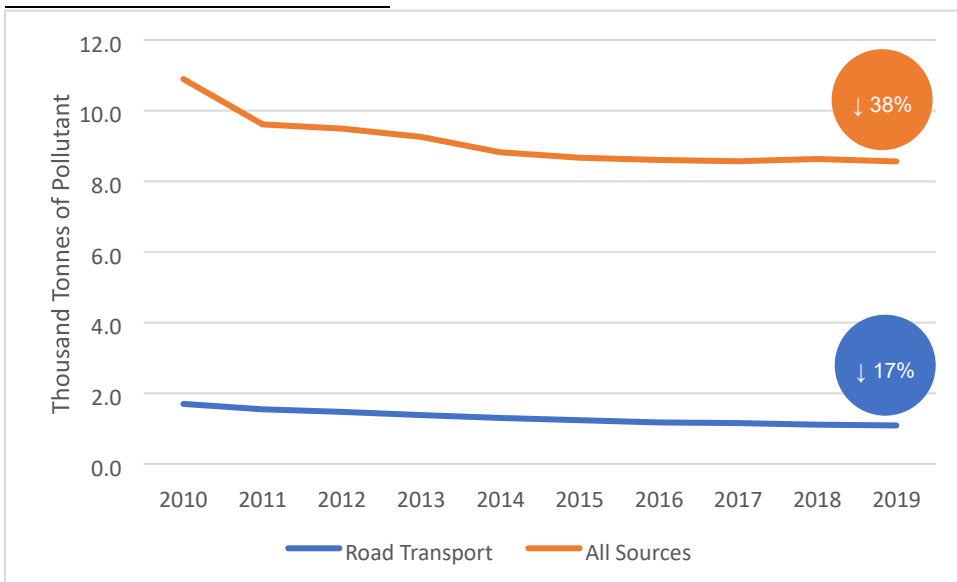


Figure 11.6: PM<sub>2.5</sub> Emissions in Scotland<sup>65</sup>

There is also a national disparity in terms of air pollution exposure with higher exposure in the central belt, centred on Glasgow and Edinburgh, with additional higher exposure areas around Fife, Dundee and Aberdeen.

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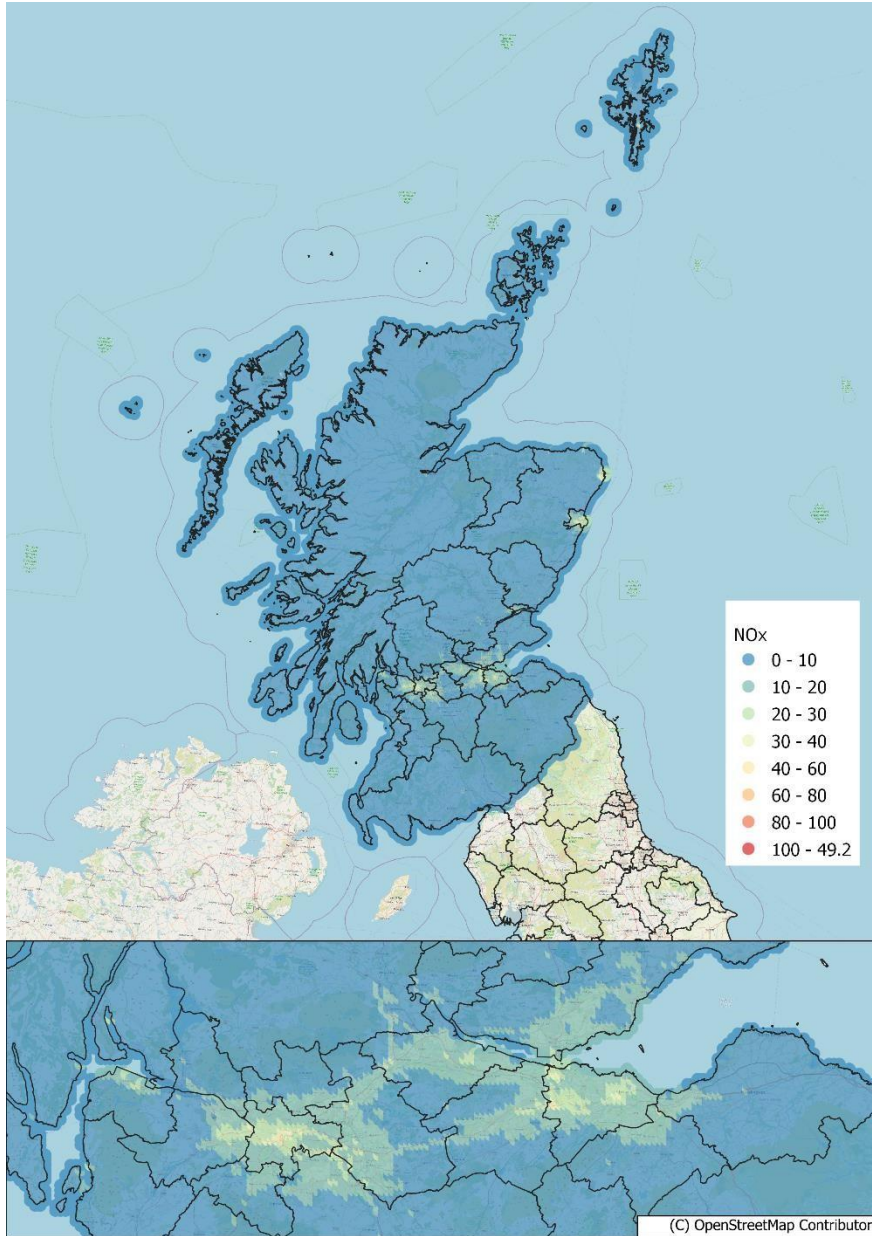


Figure 11.7: Annual Mean NOx Concentration (Scotland and Central Belt)<sup>58</sup>

Localised pollution remains an issue with 167km of road links in exceedance of limiting values for NO<sub>2</sub> emissions with 102.5km of these confined to the Glasgow Urban Area<sup>65</sup>. Research has shown that traffic related air pollution has typically higher concentration in areas of greater socio-economic deprivation<sup>66</sup>.

### Health and Wellbeing

<sup>58</sup> Scottish Government, Scottish Air Quality Maps, 2019, [https://www.scottishairquality.scot/sites/default/files/orig/assets/documents/Scottish\\_mapping\\_report\\_2019.html#executive\\_summary](https://www.scottishairquality.scot/sites/default/files/orig/assets/documents/Scottish_mapping_report_2019.html#executive_summary)<sup>66</sup>  
Milojevic, A, Niedzwiedz, C, Pearce, J, Milner, J, MacKenzie, I, Doherty, R & Wilkinson, P 2017, 'Socioeconomic and urban-rural differentials in exposure to air pollution and mortality burden in England', *Environmental Health*. <https://doi.org/10.1186/s12940-017-0314-5>

Car dependency can lead to a decline in physical activity and social connectivity, and the dominance of cars and other vehicles on roads blights the public realm and deters people from enjoying active lifestyles<sup>59</sup>.

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## Accidents

Car use contributes to thousands of road casualties<sup>2</sup>, and there has been a plateauing of road safety fatality figures<sup>59</sup>. Younger drivers are disproportionately represented in collision statistics<sup>57</sup>.

## Disruptive Technology

### Mobility as a Service (MaaS)

People have already become accustomed to treating car use as a service. Car clubs, trip sharing apps and Uber Pool are all examples of mobility services and people are much more amenable to those systems in the new sharing economy<sup>60</sup>. MaaS, in combination with Autonomous Vehicles (AVs), could render car ownership superfluous by providing cheap on demand vehicles<sup>57</sup>.

### Autonomous Vehicles

AVs and associated transport technology are advancing, and it is likely that in the future will impact how roads are used, the costs associated with driving, and land use<sup>68</sup>. AVs have the potential to dramatically reduce the costs of road transport and supply trips that are not currently taken<sup>59</sup>. AVs could attract new demand from people currently unable to drive themselves<sup>57 68 61</sup> and people preferring the comfort and convenience of private driverless travel so they can work or rest<sup>69</sup>. New mobility services will also bring additional demand as some people will make private car journeys from which they were previously dissuaded by the capital cost of buying a car<sup>69</sup>. AVs could radically increase highway capacity without building new infrastructure<sup>68 62</sup> but we may still see an increase in congestion, potentially above what is currently forecast due to induced demand<sup>59 68</sup>. AVs have the potential to fundamentally transform car use into a public form of transport<sup>57</sup>.

There may also be other disruptive consequences of AVs, for example a lack of urban parking spaces could potentially lead to passengers vacating their driverless cars but instructing their vehicle to continue circling the shopping centre without any occupants<sup>57 68</sup>, and indeed other trips such as picking up dry cleaning or going to the car wash could be undertaken by the AV alone<sup>68</sup>, or shared AVs 're-positioning' themselves in anticipation for a surge in demand around a particular location<sup>68</sup>.

### Electric Vehicles

The switch to electric cars will reduce air pollution and carbon emissions. Other low carbon innovations, such as hydrogen fuel cells, biofuels and renewable energies (collectively known as Ultra Low Emission Vehicles or ULEVs) are also being developed and as time passes they will help to reduce the environmental burden of cars<sup>70</sup>. However, as noted in section 0, there is no such thing as a zero emissions car<sup>55</sup>. ULEVs and EVs are not expected to fundamentally change travel patterns, merely replace one type of fuel with a different type<sup>57</sup>. EV owners pay no fuel duty or VED<sup>61</sup>. The risk is that in lowering the cost of motoring, electrification will increase car use and congestion and make mode shift to public transport and active travel harder to deliver and locking in car dependency<sup>55</sup>. Road traffic will increase as motoring costs reduce unless we transition from fuel duty to a

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<sup>59</sup> Silviya Barrett, with Martin Wedderburn and Erica Belcher, Green Light: Next Generation Road User Charging for a Healthier, More Liveable, London, <https://www.centreforlondon.org/publication/road-user-charging/>

<sup>60</sup> Pricing for Prosperity – Wolfson Economics Prize Submission, 2017, <https://policyexchange.org.uk/wpcontent/uploads/2017/07/Volterra-Jacobs-Pricing-for-Prosperity-Revised-Submission.pdf>

<sup>61</sup> TForward, Delivering Better Roads – Wolfson Economics Prize Submission, 2017,

<https://policyexchange.org.uk/wpcontent/uploads/2017/07/Catriona-Brown-TForward-Revised-Submission.pdf>

<sup>62</sup> Derek Turner CBE FREng, An Independent Review of Road User Charging in Wales, 2020, <https://gov.wales/independent-review-roaduser-charging-wales>

new way of paying for road use<sup>55</sup>. The challenge is how to introduce road pricing in a way that can be delivered politically, and which does not disincentivise the switch to EVs<sup>55</sup>.

## 11.1.2 Decreasing Revenue from Fuel Duty and VED

### *Reducing Taxation Returns*

Fuel duty and VED raise some £35 billion a year. Approximately 20% of that revenue is disbursed on maintaining and developing the roads<sup>61</sup>.

Until 2000 Fuel Duty revenue growth was largely in line with traffic level growths. Since then the gap has gradually diminished<sup>57</sup>. While there has been a 13% increase in the total number of vehicles licensed in Scotland between 2003 and 2011, and a slight increase in the estimated volume of traffic on Scotland's roads,

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revenue raised from fuel duty and VED has stayed virtually static in real terms and has fallen as a percentage of the total revenue raised in Scotland<sup>56</sup>.

Neither fuel duty nor VED duty are currently levied on EVs (since VED is linked to the CO2 emissions of the vehicle, battery EVs are zero rated). The Government is phasing out the sale of petrol and diesel cars by 2030<sup>61</sup>. As a result of more fuel efficient vehicles, the switch to EVs and political resistance to increasing fuel taxes, governments will see a continuing fall in their revenues used to fund roads<sup>55 59 61 68</sup>. A failure to replace existing motoring taxes with an alternative road charging mechanism will lead to either decreased investment in public services, including road maintenance, or increased Government borrowing<sup>61</sup>.

### *Disconnect Between Taxes and Funding*

Vehicle journeys have negative effects on society and the environment which are not fully accounted for by the current tax system. These negative externalities include local and global air pollution, noise, oil dependency, traffic congestion and traffic accidents, and these harm the poorest and most vulnerable in society the most<sup>67</sup>. Though drivers do bear some of the cost of these externalities, imposed through either "fixed costs" like VED or "average costs" like fuel duties<sup>68</sup>, they do not meet the full cost and so undervalue the true societal cost of their mode choice. Lack of funding has also led to a backlog of repairs and poorly maintained roads<sup>59 70</sup>. Maintenance spending by local highways authorities is reducing, affecting two-thirds of motor traffic and almost all of pedestrian and cycling traffic in the UK. There is no connection between the traffic that roads handle and the money that flows to highway authorities. For the highway authorities, roads are liabilities that cost money, not assets that generate a return, so they are a low priority in a world of limited resources and competing demands.

### *Resistance To Change*

There have been various barriers to introducing demand management:

- The technology to implement the scheme has been expensive and visually intrusive requiring significant roadside infrastructure<sup>59</sup> (see also section 11.2.4).
- Drivers and civil liberties groups have been concerned with the invasions of privacy involved in tracking vehicle location<sup>59</sup> (see also section 0).
- Any mandated change of funding system that is broadly revenue neutral would have a significant number of losers. This makes it difficult to gain widespread community acceptance<sup>59</sup>.
- People perceive roads to be free. Large sections of the community are suspicious of any politician 'selling' the benefits of an alternative payment system<sup>59</sup> (see also section 0).
- People are concerned that road pricing will disproportionately hit lower socioeconomic groups<sup>59</sup> (see also section 0).
- People can be reluctant to opt for a new payment system voluntarily even if it clearly benefits them. For example, people don't switch energy suppliers even when an alternative supplier would be cheaper<sup>57</sup>.

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- Although there is a lack of public support for road pricing, support for schemes tends to increase after implementation<sup>56</sup> <sup>70</sup>, and there is a greater public unhappiness with current road based taxation than there is for road pricing<sup>56</sup>.

A recent Scottish example where a TDM scheme failed to gain public acceptance was the Edinburgh Congestion Charge which was rejected in a public referendum by 74% to 26%. Many reasons are thought to be behind this lack of public buying including strong campaigning against the scheme by opposition parties on the council, the lack of an independent champion for the scheme, opposition from surrounding local authorities and no visible public transport improvements had been made prior to the scheme being put to a public vote. Additional factors behind the lack of public buy in included the policy being seen as unfair which resulted in negative media coverage<sup>63</sup>.

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A number of factors are thought to influence the acceptability of a TDM scheme which include<sup>64</sup>:

- Attributes of TDM Policy – level of charge, degree of coverage.
- Allocation of Revenue – reducing taxes, investing in transport.
- Individual Characteristics – socio-economic group and demographic factors.
- Problem Awareness – make people aware and believe in the benefits.
- Personal and Social Norm – personal responsibility and behavioural mirroring.
- Perceived effectiveness, fairness and freedom.

### 11.1.3 Transport Inequality

#### *Socio-economically disadvantaged groups*

People on lower incomes in Scotland are overall less likely to have access to a car<sup>65</sup> and households in the lowest income groups are often exclusively reliant on public transport and have no access to private transport<sup>74</sup>. A lack of practical alternatives to car travel in certain areas also risks placing people into transport poverty by creating a situation of 'forced car ownership'<sup>66</sup>. The ability of people on lower incomes to access employment options, can also be limited by the reach of the public transport network and the time of day that services run<sup>67</sup>. As illustrated in Figure 11.8, the total distance travelled by car in Scotland increases with annual household income. Though household income does not provide an accurate overall measure of socio-economic advantage, this data does provide further evidence that those in lower income groups are less likely to travel by car.

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<sup>63</sup> John P. F. Saunders, The rise and fall of Edinburgh's congestion charging plans, 2005, <https://www.icevirtuallibrary.com/doi/epdf/10.1680/tran.2005.158.4.193>

<sup>64</sup> Fatai Yakeen, Reza Torkan & Seyed Ghadiri, Factors Influencing Motorists' Acceptability of Transport Demand Management Measures: A Review, 2019, [https://www.researchgate.net/publication/360754732\\_Factors\\_Influencing\\_Motorists'\\_Acceptability\\_of\\_Transport\\_Demand\\_Management\\_Measures\\_A\\_Review](https://www.researchgate.net/publication/360754732_Factors_Influencing_Motorists'_Acceptability_of_Transport_Demand_Management_Measures_A_Review)

<sup>65</sup> Transport Scotland, Scottish Transport Statistics Table 1.20. 2021 <https://www.transport.gov.scot/publication/scottish-transport-statistics-2021/> <sup>74</sup> Transport Scotland (2021) Transport and Child Poverty – Beyond the Pandemic, <https://www.transport.gov.scot/media/49932/transport-and-child-poverty-beyond-the-pandemic.pdf>

<sup>66</sup> Curl, A., Clark, J., & Kearns, A. Household car adoption and financial distress in deprived urban communities: A case of forced car ownership? 2018 Transport Policy, 65, 61-71.

<sup>67</sup> Crisp, R., Ferrari, E., Gore, T., Green, S., McCarthy, L., Rae, A., Reeve, K. and Stevens, M., 2018. Tackling transport-related barriers to employment in low-income neighbourhoods. Available at: <https://www.shu.ac.uk/-/media/home/research/cresr/reports/t/tacklingtransport-related-barriers-low-income-neighbourhoods.pdf>



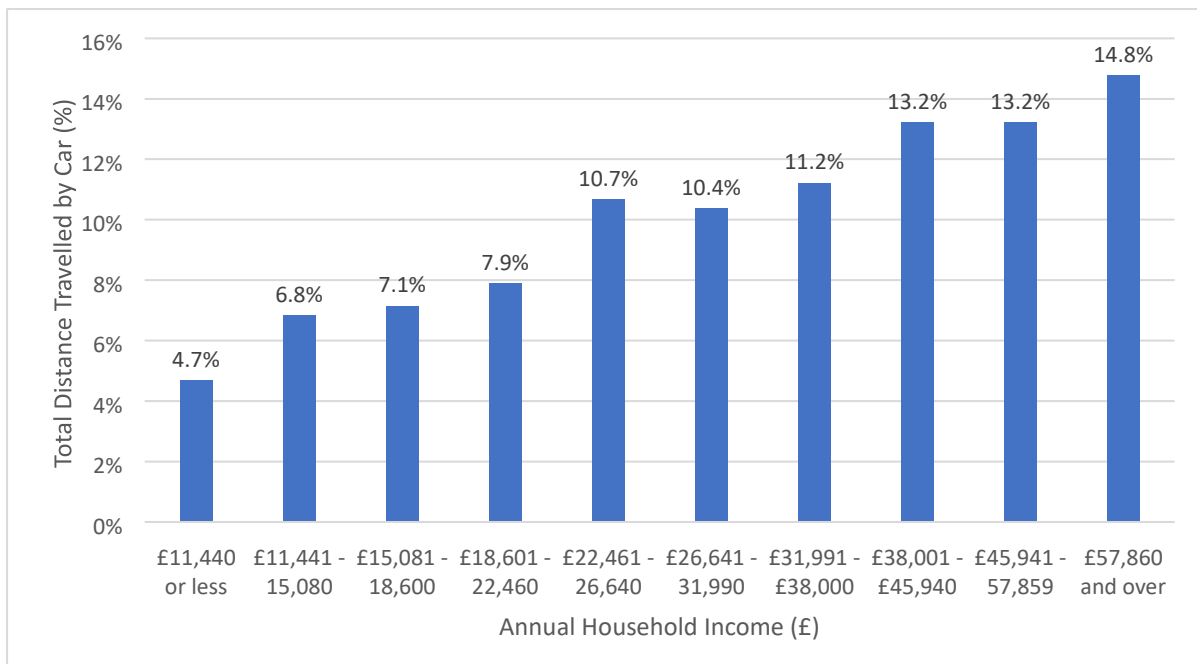


Figure 11.8 Total distance travelled by car for each annual household income decile category<sup>68</sup>

Existing fuel taxes are imposed at the point of sale for consumers and are not sensitive to the individual or their journey characteristics. As such, these taxes could be described as regressive in nature. Due to the cost of purchasing a new vehicle, the transition to EVs could also disproportionately impact on people from lower income groups as the people who transition more rapidly to EVs are those that replace their car more frequently, and typically purchase a new car. This is likely to be people in higher socioeconomic groups<sup>59</sup>. The transition to EVs will also present new problems such as access to charging infrastructure and affordability of vehicles, including availability of second hand EVs<sup>55</sup>.

In Scotland, people living in deprived areas tend to live in more hazardous road traffic environments, with greater proximity to high volumes of fast-moving traffic and high levels of on-street parking and, as such, they have higher levels of exposure to road traffic risk<sup>69</sup>. There is strong relationship between deprivation and pedestrian casualties. In particular, more children and young people from deprived areas were found to be involved in traffic injuries, for whom the risk was highest on main roads and on residential roads near shops and leisure services. There is an established causal relationship between increased motorised transport and increased road casualties and deaths between different socio-economic groups. People from deprived neighbourhoods are more likely to be injured or killed as road users and people in the highest socio-economic groups are substantially less at risk of death as car occupants than people in the lower groups<sup>70</sup>.

<sup>68</sup> Transport Scotland, Annex for a route map to achieve a 20 per cent reduction in car kilometres by 2030: Reducing car use for a healthier, fairer, and greener Scotland. 2022, <https://www.transport.gov.scot/media/50873/technical-annex-a-route-map-to-achieve-a-20-per-cent-reduction-in-car-kms-by-2030.pdf>

<sup>69</sup> Quayle, Investing in cycling to tackle transport poverty and promote equity. The Scottish Transport Applications and Research (STAR) Conference. 2019 <https://starconference.org.uk/star/2019/Quayle.pdf>

<sup>70</sup> UK Government Office for Sciences, Inequalities in Mobility and Access in the UK Transport System, 2019 [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/784685/future\\_of\\_mobility\\_access.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784685/future_of_mobility_access.pdf)



Research published in July 2022 indicate that almost two thirds of people polled in Scotland did not feel that decision making in transport considered the needs of those on low-incomes and, of relevance for the prospects of demand management acceptability, significant support was found for road space reallocation<sup>71</sup>.

### *Protected Characteristic Groups*

Evidence is available which shows differences in car use among the following protected characteristic groups in Scotland:

- Age.
- Sex.
- Disability.
- Race.

Though further differences may exist among other protected characteristic groups, no specific data is currently available to confirm this.

#### **Age**

Scottish Household Survey Data shows that the 30 to 44, 45 to 59, 60 to 64 and 65 to 74 age categories made up a higher proportion of vehicle kilometres travelled than they did of the total population, demonstrating that both older and younger age groups are less likely to travel by car. Both older and younger age groups are also more likely to be adversely affected by affected by the health impacts relating to road traffic<sup>81</sup>. Implementation of demand management therefore has the potential to impact positively on both old and young age groups.

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<sup>71</sup> Institute for Public Policy Research (2022) Fairly reducing car use in Scottish cities: A just transition for transport for low-income households <https://www.ippr.org/files/2022-07/fairly-reducing-car-use-in-scottish-cities-july-22.pdf> <sup>81</sup> WHO Air Pollution and Child Health, 2019 <https://apps.who.int/iris/rest/bitstreams/1157950/retrieve>

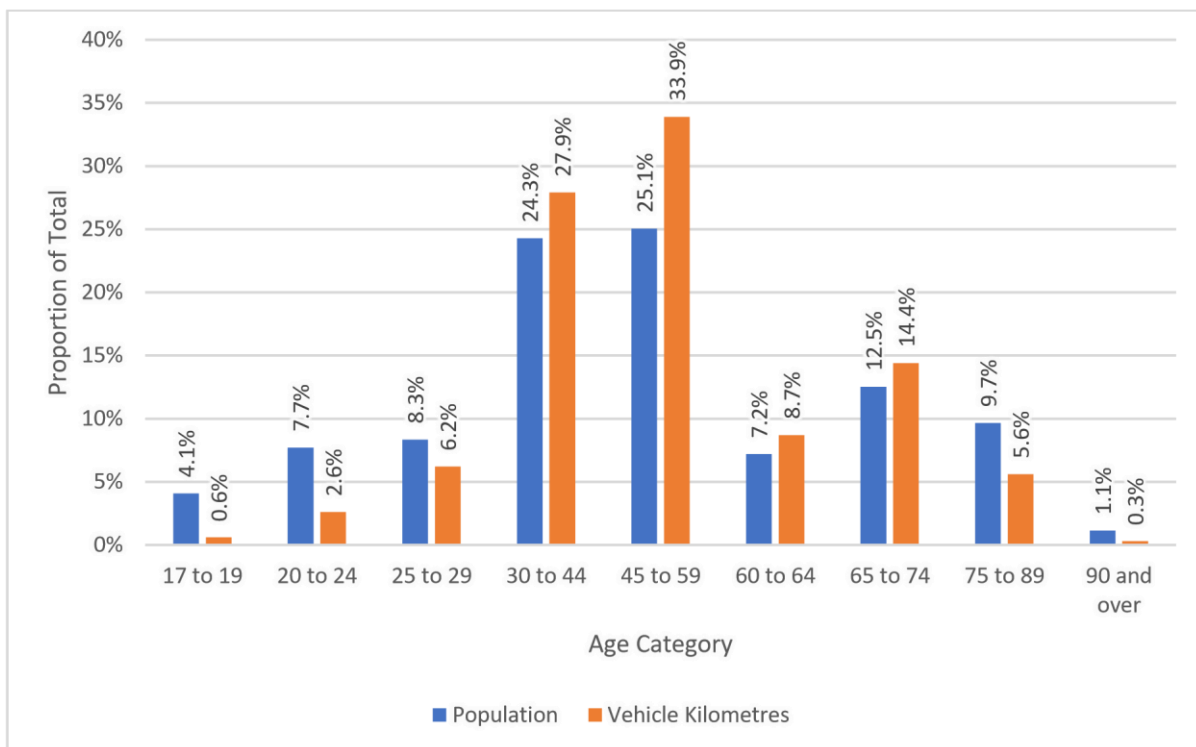


Figure 11.9 Total distance travelled by car for each age category<sup>772</sup>

## Sex

Figure 11.10 shows a clear difference in car use between sexes, with men travelling further overall by car. This trend reflects different travel behaviours and needs between sexes, with women generally making multiple, shorter, multi-use 'trip-chaining' journeys associated with care responsibilities and requiring the ability to carry passengers. Female travellers are more concerned by personal safety issues and more likely to favour car transport where there is a perceived risk to personal safety<sup>73</sup>. Given the greater number of men travelling by car, demand management measures have the potential to have a greater impact upon men rather than women. However, given the differences in journey types between men and women this will be highly dependent on the nature of the measure implemented. For example, congestion charging within urban areas

<sup>72</sup> Office for National Statistics, National Population Projections, Figure 3- Age structure of the UK population Data, 2020, <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/nationalpopulationprojections/2020basedinterim#changing-age-structure>

<sup>73</sup> Motherwell, Are we nearly there yet? Exploring gender and active travel. 2018, <https://www.sustrans.org.uk/media/2879/2879.pdf>

would impact those making multiple short trips within the urban area more than those making longer interurban journeys on trunk roads for commuting.

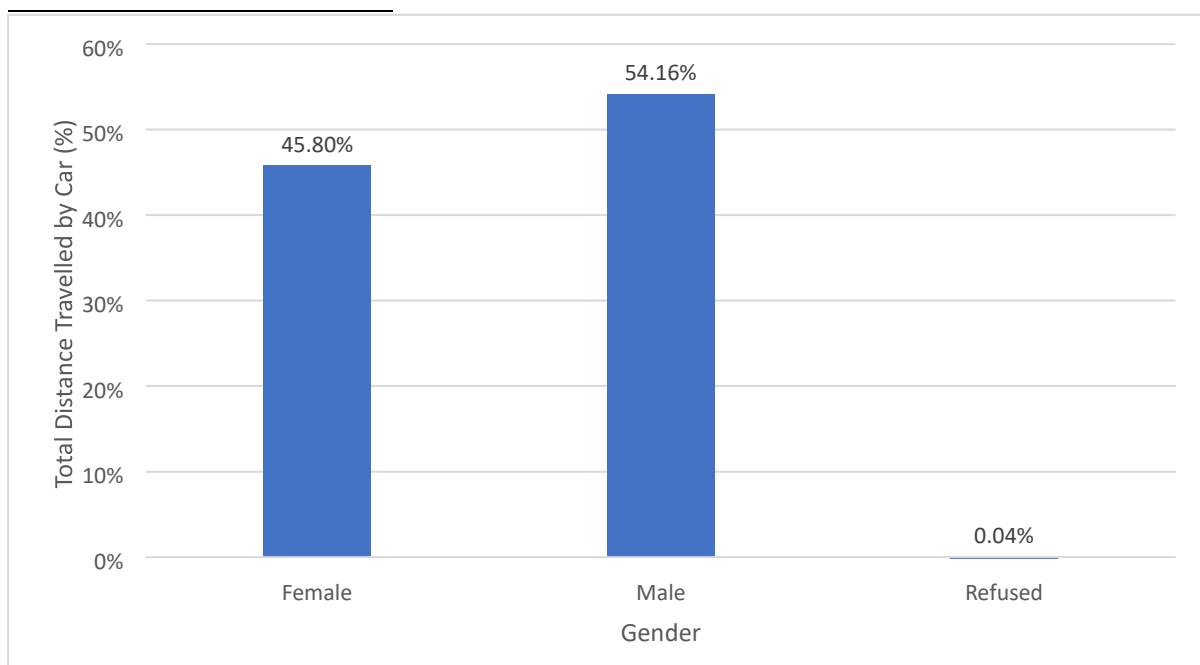


Figure 11.10 Total distance travelled by car for each gender<sup>77</sup>

### Disability

According to Scottish Household Statistics analysis, disabled people are less likely to drive than non-disabled people (42% compared to 54%), and more likely to be a car or van passenger (18% compared to 12%), take the bus (11% compared to 7%), or walk (24% compared to 21%)<sup>74</sup>. Disabled people are less likely to own a driving licence and less likely to live in a household which has access to a car. Disabled people, such as those who are visually or mobility impaired, can also experience a greater impact from uncontrolled or pavement parking

<sup>74</sup> Transport Scotland, Disability and Transport: Findings from the Scottish Household Survey, 2019, <https://www.transport.gov.scot/media/50208/sct07219924801.pdf>

than non-disabled people. However, some disabled people, especially those in more rural areas can be more reliant on car transport, as a driver or a passenger<sup>75</sup>.

## Race

According to Scottish Household Statistics, certain ethnic minority households were less likely to hold a driving licence. Whilst 72% of 'White Scottish' and 81% of 'White other British' people were likely to have a driving licence, only 50% of 'White Polish', 53% of 'Other White' people and 57% of Asian, Asian Scottish or Asian British were likely to hold a licence. Certain ethnic minority groups are more likely to travel to work by walking or public transport<sup>52</sup>. Demand management measures would therefore act upon the white Scottish and White British majority and potentially impact less upon more marginalised groups.

### *Rural and Island Communities*

People living in rural areas make more trips and travel further than people living in urban areas **Error! Bookmark not defined.** There is roughly a 15p difference in the cost of a litre of petrol between the cheapest areas and most expensive, meaning rural drivers filling up a 70 litre tank (such as in a Ford Mondeo) pay over £10 more at the pump<sup>56</sup>. Official figures also suggest that people living in more remote areas have less access to public transport alternatives<sup>56</sup>.

Data from the Scottish Household survey shows that those in rural settings are much more likely to be car dependent than those in higher income households – see Figure 11.11. **Disability**

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<sup>75</sup> Mobility and Access Committee for Scotland, MACS response to the consultation on 'Reducing car use for a healthier, fairer and greener Scotland', 2022, <https://www.transport.gov.scot/our-approach/accessible-transport/mobility-and-access-committee-for-scotlandmacs/macs-response-to-the-consultation-on-reducing-car-use-for-a-healthier-fairer-and-greener-scotland/>

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<sup>76</sup> Transport Scotland, Disability and Transport: Findings from the Scottish Household Survey, 2019, <https://www.transport.gov.scot/media/50208/sct07219924801.pdf>

<sup>77</sup> Mobility and Access Committee for Scotland, MACS response to the consultation on 'Reducing car use for a healthier, fairer and greener Scotland', 2022, <https://www.transport.gov.scot/our-approach/accessible-transport/mobility-and-access-committee-for-scotlandmacs/macs-response-to-the-consultation-on-reducing-car-use-for-a-healthier-fairer-and-greener-scotland/>

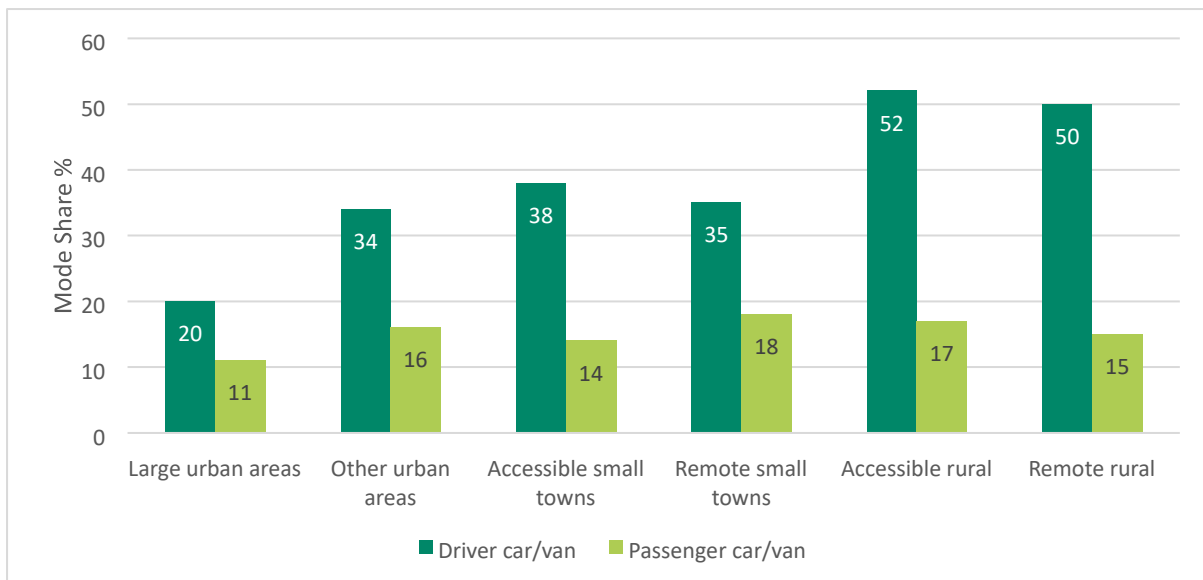


Figure 11.11: Car Mode Share by Urban / Rural Classification<sup>52</sup>

Rural drivers also tend to drive longer distances than drivers in urban areas. Those in remote small towns drive a smaller median distance compared to those in accessible small towns, perhaps reflecting a situation where small accessible towns are more interdependent on large urban centres in proximity for goods and services, while remote small towns are more independent for services such as GP practices, shops and schools<sup>78</sup>.

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<sup>78</sup> Scottish Towns Partnership, Understanding Scottish Places (Online Tool), 2022, <https://www.usp.scot/>

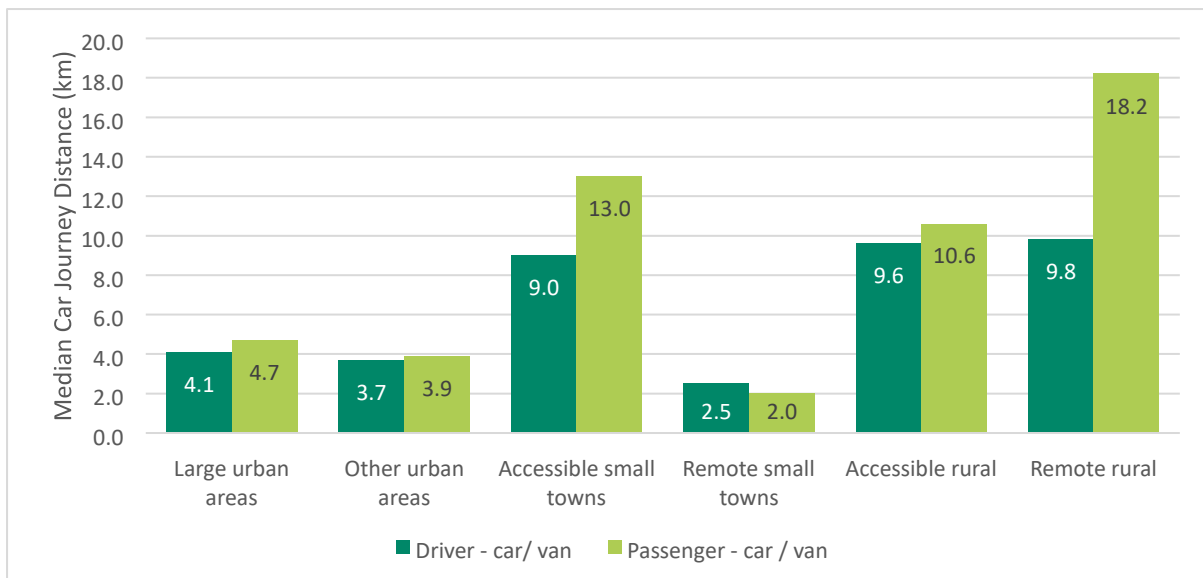


Figure 11.12: Median Car Journey Length<sup>52</sup>

### Intersectionality

Intersectionality is the term used to describe the combined influence of an individual’s social and economic circumstances and their physical characteristics on the level of disadvantage they experience in society<sup>79</sup>. Though little analysis exists of the intersectionality of the factors described above, the problem of intersectionality as it relates to transport poverty and social inclusion, must be considered<sup>90</sup>. Transport interventions that serve the status quo and do not address a diverse range of needs across society are unlikely to be successful in maximising wider social benefits and contributing fully to the National Outcomes within Scotland’s National Performance Framework<sup>80</sup>.

## 11.2 Opportunities

Opportunities relating to demand management have been generated from a literature review, discussions with stakeholders and data analysis.

### 11.2.1 Changing Attitudes

#### Clean Air Zones/LEZs and other existing mechanisms

Pioneering schemes under the Local Government Deal have reduced local congestion and pollution, delivered local road improvements, and created clean air zones, and are providing a model to other local authorities<sup>69</sup>, which could contribute to a change in attitudes and reduce resistance to further extending road charging.

Sustainability is now generally regarded throughout society as a significant issue<sup>70</sup>. Growing concern about air quality and increased use of more sustainable travel means there is less support for unfettered use of private road transport and more support for charging for negative externalities such as emissions<sup>68 70</sup>.

LEZs will be introduced in four Scottish cities – Aberdeen, Dundee, Edinburgh and Glasgow, by 2024<sup>81</sup>. These present an opportunity to utilise some of the same enforcement infrastructure and present TDM as a logical ‘next-step’. London has taken a similar phased approach, instead starting with a congestion charging scheme then expanding to an LEZ and Ultra Low Emission Zone in 2019<sup>82</sup> so the imposed charge on motorists both

<sup>79</sup>The Scottish Government, Using intersectionality to understand structural inequality in Scotland: evidence synthesis, 2022 <https://www.gov.scot/publications/using-intersectionality-understand-structural-inequality-scotland-evidence-synthesis/documents/><sup>90</sup> Woodcock, J.B.A. and Gut, K., 2022, April. How can Gender Smart Mobility Become a More Intersectional Form of Mobility Justice. In ICGR 2022 5th International Conference on Gender Research. Academic Conferences and publishing limited. Available at: <https://papers.academic-conferences.org/index.php/icgr/article/view/236>

<sup>80</sup> Scottish Government, Scotland’s National Performance Framework, 2018, <https://nationalperformance.gov.scot/>

<sup>81</sup> Low Emission Zones Scotland, About Low Emission Zones, 2022 <https://www.lowemissionzones.scot/about>

<sup>82</sup> Greater London Authority, Mayor Confirms World’s First Ultra Low Emission Zone, 2015, <https://www.london.gov.uk/pressreleases/mayoral/ultra-low-emission-zone>

reflects congestion and environmental external costs. The London Model shows how different schemes can operate on overlapping areas in order to tackle different, but related, problems.

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### *Improvements in Data Security and Growing Acceptance of Data Sharing*

Information security is still a consideration for public acceptability but can be viewed within the context of widespread mobile phone and social media uptake, and telematics insurance based on a person's driving habits making insurance more affordable for many young people<sup>69</sup>. Data security laws in the EU and UK are considered to provide a strong framework of control for governments to regulate and monitor data gathering or data breaches<sup>83</sup>. Though some concerns persist around unauthorised use of data by bad actors, privacy concerns should no longer be considered insurmountable<sup>70</sup>.

Today people's location data is routinely shared with many private companies through their mobile phone location data and use of common digital platforms such as social media and mobile navigation services. People have been willing to exchange access to personal information with private companies for services that they value<sup>59</sup>.

### 11.2.2 Low Uptake of EVs To Date

Electric and plug-in hybrid ownership is still relatively low and led by early adopters<sup>55</sup> **Error! Bookmark not defined..** Only 3% of all vehicles licenced in Scotland are either electric or electric hybrid<sup>84</sup>. Therefore, there is a window of opportunity to introduce a form of road user charging prior to EVs making up a much larger portion of vehicle propulsion type, which helps increase public acceptability given the current exemptions to VED and Fuel Duties for electric and ultra low emission vehicles. However, 2020 had a record 23,845 electric or electric hybrid vehicles registered in Scotland, representing 15% of all new vehicle registrations, so uptake is increasing.

There is still an opportunity to inform people of the rules of the game in advance, rather than changes happening after purchasing a vehicle<sup>82</sup>. Once EVs become established as mainstream vehicles it will be more difficult to convince owners of the benefits of road user charging because the owners will have more to lose, and it will become politically difficult to extract motoring taxes from them in future given the current exemptions from VED and Fuel Duty<sup>61</sup> **Error! Bookmark not defined..** At present ULEVs are still more expensive and therefore it is more likely their owners are wealthier**Error! Bookmark not defined..**

### 11.2.3 Political Context

The agreement between the Scottish National Party and the Scottish Green Party – known as the Bute House Agreement – sets the basis of a working political relationship between the two governing parties in Scotland which is positive towards achieving climate change targets and addressing inequalities across Scottish society, including transport<sup>85</sup>. At the UK level, there is some uncertainty around the election of a new leader of the Conservative Party and Prime Minister due on 5<sup>th</sup> September 2022. However, a new government may present an opportunity for new ideas.

### 11.2.4 New Technologies

The availability of new technologies will improve the deliverability of road user charging**Error! Bookmark not defined..** Technology limitations should no longer be considered insurmountable<sup>70</sup> as various forms of road pricing operate successfully across the world<sup>61</sup>.

New technology has the potential to move beyond a simple charge for miles travelled. Telematics inside vehicles allows real-time data to be recorded and transferred to a pricing mechanism, potentially setting the

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<sup>83</sup> Kitchin, R. Getting smarter about smart cities: Improving data privacy and data security. Data Protection Unit, Department of the Taoiseach, Dublin, Ireland, 2016, <https://smardublin.ie/resources/getting-smarter-smart-cities-report/>

<sup>84</sup> Transport Scotland Scottish Transport Statistics 2020, Table 1.1 & 1.2, 2021, <https://www.transport.gov.scot/publication/scottishtransport-statistics-2021/>

<sup>85</sup> The Scottish Government (2021) Scottish Government and Scottish Green Party: draft shared policy programme. Available at: <https://www.gov.scot/publications/scottish-government-and-scottish-green-party-shared-policy-programme/>



cost of motoring based on the duration and time of the journey and vehicle type and size<sup>61</sup>. As detailed in section 0, the relevant technology already exists and is in common usage by car insurance companies.

## 11.3 Constraints

### 11.3.1 Devolved Powers of Scottish Government

#### *Introduction*

Most road pricing schemes if implemented at a national level would require reform of existing road taxation. These powers do not currently sit with the Scottish Government and the UK Government are unlikely to devolve or reform these taxes in the near future, despite calls from the House of Commons Transport Select \_\_\_\_\_ Committee<sup>61</sup>. The main constraint with regard to the design and implementation of a car demand management scheme in Scotland is therefore the Governance structure of Scotland.

#### *Existing Devolved Taxation*

Currently the Scottish Government has devolved responsibilities for five taxes. Income tax is partially devolved, from 2016 the Scottish Government has had the power to set a different rate of Income Tax in Scotland as well as set tax band thresholds. The UK government remains responsible for the collection and management of the tax<sup>86</sup>. Scottish Government also has devolved powers over Lands and Buildings Transaction Tax, Scottish Landfill Tax and has powers over local taxes (Council Tax and Non-Domestic Rates). Additionally, two further taxes (Air Departure Tax and an Aggregates Levy replacement) have been devolved but have yet to be implemented by the Scottish Government, therefore are still reserved. Furthermore, the Scottish Parliament has the powers to create new local taxes, which can be collected and administered by local authorities to fund local authority spending.

#### *Reserved Taxation Powers*

A raft of taxes remains reserved to the UK Government including National Insurance Contributions, Consumption Tax (VAT), Excise Duties, Corporation Tax and Stamp Duty.

Current taxes applied on motoring are fuel duty and VED. Fuel duty is applied at the point of sale for different types of fuel at different rates with the dual purpose of raising revenue and discouraging the excessive use of fuels. The current rate is 52.95 pence per litre – recently cut from 57.95 given the recent increase in wholesale fuel prices<sup>87</sup>. VED is charged yearly and for vehicles registered between 2001 and 2017 depends upon the vehicle CO<sub>2</sub> emissions. However, for cars registered after 2017, VED is only charged based on vehicle emissions for the first year, then a flat rate of £140 applies for all non-zero emission vehicles<sup>88</sup>.

#### *Other Enabling Powers for Local Authorities*

Local Authorities within Scotland have a range of powers which could be utilised as part of the implementation of any demand management measures. The 2001 Transport Scotland Act granted powers which allowed a local authority to introduce a Road User Charging Scheme; either on their own or with neighbouring authorities. The legislation allows for a high degree of flexibility with the design of any scheme, but also allows Scottish Ministers power over exemptions and setting equipment standards<sup>89</sup>.

The 2019 Transport Scotland Act granted more transport related powers to local authorities including powers to establish LEZs and Workplace Parking Levies within their areas. The Scottish Government has the power to set consistent national standards relating to some operational aspects of these schemes including penalties, grace periods, exemptions and entry criteria (for LEZs). Additionally, this Act also removed a 1985 Transport Act

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<sup>86</sup> Scottish Government, Taxes, 2022, <https://www.gov.scot/policies/taxes/income-tax/>

<sup>87</sup> UK Government, Tax on Shopping and Services, 2022 <https://www.gov.uk/tax-on-shopping/fuel-duty>

<sup>88</sup> HM Revenue & Customs, Policy Paper: Vehicle Excise Duty, 2015, <https://www.gov.uk/government/publications/vehicle-exciseduty/vehicle-excise-duty>

<sup>89</sup> Legislation.gov.uk Acts of the Scottish Parliament, Transport (Scotland) Act 2001, <https://www.legislation.gov.uk/asp/2001/2/part/3> <sup>101</sup> Transport Scotland, Bus Services and the Transport (Scotland) Bill, 2019, <https://www.transport.gov.scot/our-approach/transportscotland-act-2019/bus-services-and-the-transport-scotland-bill/>

restriction on local authorities operating bus services and secondary legislation is to be introduced in 2023 to allow bus franchising<sup>101</sup>.

Since 1997, parking enforcement has been decriminalised. Local authorities can use the income generated from parking enforcement to fund road and public transport improvements. The balance generated from parking enforcement varies among local authorities; whilst Edinburgh and Glasgow make the largest return of £12.2 million and £2.7 million respectively, 71% of local authorities enforce parking at a loss<sup>90</sup>.

### *Timescale of delivery*

Scotland's timescales for decarbonisation of the transport sector are more ambitious than elsewhere in the UK<sup>91</sup>. The timescales of delivery required to meet the 20% reduction in car kilometres required by 2030 and enable the net zero emissions target by 2045, require implementation of effective demand management within

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very short timescales. The need for primary legislation to introduce new powers, or secondary legislation to give effect to existing powers would introduce a delay to implementation and the roll out of necessary infrastructure and technological solutions would also impose a time- constraint. As with the introduction of LEZs, there would also potentially be the need for inclusion of a grace period and a sunset period, further slowing the delivery timescales<sup>92</sup>. Any measures requiring further devolution of powers to Scotland from the UK Government is unlikely to be a swift process and so would introduce yet further delay<sup>44</sup>.

### *Summary*

Overall while the Scottish Government and Scottish Local Authorities have powers to implement demand management measures such as road user charging, workplace parking levies or more stringent parking enforcement and restrictions, these powers are currently underutilised. While secondary legislation could improve the uptake of existing powers, a more comprehensive overhaul of motoring taxation, replacing existing Fuel Duty and VED with a charge related to demand or use, would require additional devolution of powers or a UK wide approach to reform.

## 12. Transport Planning Objectives

### 12.1 Approach to TPO Development

As outlined in section 1.1, the headline objective of this study is to support the Scottish Government commitment **to reduce car kilometres travelled in Scotland by 20% by 2030**.

While the purpose of this study is already clearly defined through the headline objective, we will validate, expand upon, and refine this using a Scottish Transport Appraisal Guidance (STAG)-based methodology as follows:

- An initial “bottom up” exercise, to develop evidence-based objectives, directly linking from the problems and opportunities identified in section 11.
- A “top down” sense check of these objectives, to determine strategic alignment with policy, based on the policy review undertaken in section 10.

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<sup>90</sup> Decriminalised Parking Enforcement: Local Authorities Income and Expenditure: 2020-2021, 2021, <https://www.transport.gov.scot/media/51156/decriminalised-parking-enforcement-income-and-expenditure-2020-to-2021-revisedreport-12-january-2022.pdf>

<sup>91</sup> The Climate Change Committee (2021) Progress reducing emissions in Scotland – 2021 Report to Parliament. Available at: <https://www.theccc.org.uk/publication/progress-reducing-emissions-in-scotland-2021-report-to-parliament/>

<sup>92</sup> Rehfish, A. 2018. Transport (Scotland) Bill: Low Emission Zones SPICe Briefing. The Scottish Parliament, Edinburgh. Available at: <https://sp-bpr-en-prod-cdnp.azureedge.net/published/2018/9/5/Transport--Scotland--Bill--Low-Emission-Zones/SB%2018-55.pdf>

- Refinement and development of these objectives in line with SMART principles: Specific, Measurable, Achievable, Relevant, and Time-bound.

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## 12.2 Development of TPOs from Problems and Opportunities

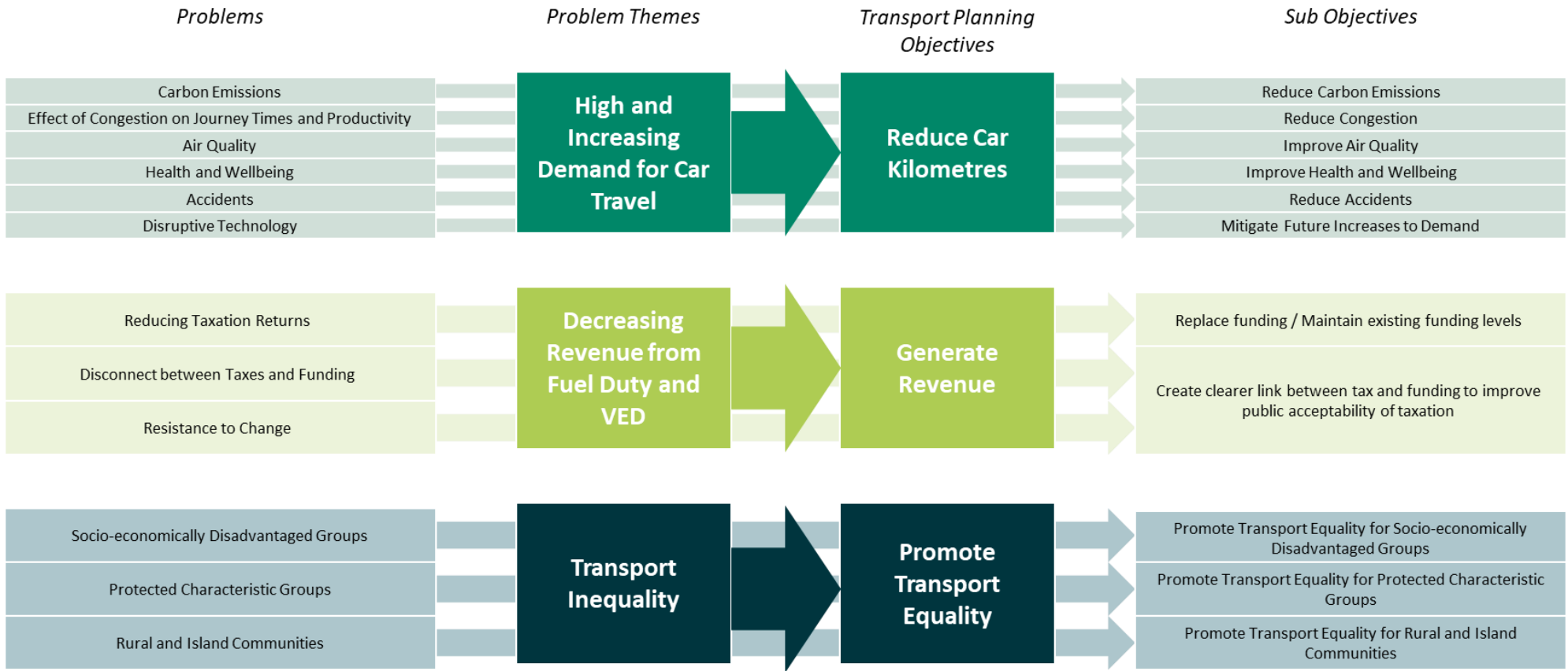


Figure 12.1: Development of TPOs from Problems and Opportunities

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### 12.3 Alignment with Policy

Each of the TPOs aligns to a greater or lesser extent to each of the key policy documents detailed in Section 10. These policy interactions are summarised below and a matrix showing the high-level alignment of the TPOs with policy is presented in Appendix A.

- **Reduce Car Kilometres** – This TPO filters down directly from the Climate Change Plan update, through the priorities of NTS2 and the route map for 20% reduction in car kilometres. A reduction in car kilometres is key to achieving the full benefits of the recommendations put forward by STPR2.
- **Generate Revenue** – Scotland’s National Strategy for Economic Transformation highlights the opportunity for Scotland’s transition to net-zero to be harnessed and bring about positive employment, revenue and community benefits. As outlined in the Scottish Government Framework for Tax, fair taxation is the key mechanism by which wealth is redistributed in order to generate stable revenues, support a wellbeing economy, deliver national outcomes. This TPO aligns with national policy and also, potentially, provides a route to funding for delivery of STPR2 recommendations which support delivery of NTS2. It also aligns with the outcome of the National Performance Framework to tackle poverty by sharing opportunities, wealth and power more equally.
- **Promote Transport Equality** – Beyond fulfilling the requirements of the Equalities Act and fairer Scotland Duty as statutory duties, ensuring equal access to transport feeds directly from NTS2 priority to reduce inequality and the outcome of the National Performance Framework to tackle poverty by creating communities that are inclusive, empowered, resilient and safe.

### 12.4 TPO Refinement and Development

Table 12.1 overleaf demonstrates how the TPOs align with the SMART principles.





Table 12.1: Alignment of TPOs with SMART Principles

TPO	Specific	Measurable	Achievable	Relevant	Time-bound
<b>Reduce Car Kilometres</b>	Objective relates to contributing towards a key government target of a 20% car use reduction compared to 2019 levels.	This metric is published annually by Transport Scotland in Chapter 5 of the Scottish Transport Statistics.	Steps to be taken to meet the target are outlined in A route map to achieve a 20 per cent reduction in car kilometres by 2030 <sup>2</sup> .	Addresses problems relating to high and increasing demand for car travel as outlined in section 11.1.1.	A 2030 date for the target to be met is given by Transport Scotland.
<b>Generate Revenue</b>	Objective relates to the generation of revenue to replace existing motoring taxes.	Measurable by government tax receipts from road use.	There are various options available to generate revenue. Some of these may require further devolution of taxation powers.	Addresses problems relating to decreasing revenue from fuel duty and VED as outlined in section 11.1.2.	Additional means for revenue generation is required to be in place by 2030 as this coincides with the phasing out of the sale of petrol and diesel cars.
<b>Promote Transport Equality</b>	Objective relates to reducing inequalities in affordability of transport, including for socioeconomically disadvantaged groups, rural and island communities, and protected characteristic groups.	Measurable by split of distance travelled by each identified group.	Can be achieved by targeting methods of revenue generation which favour the identified groups.	Addresses problems relating to transport inequality as outlined in section 11.1.3.	Objective to be achieved by 2030 in line with other timescales.



## Appendix A TPO Alignment With Policy

Policy	TPO1: Reduce Car Kilometres	TPO2: Generate Revenue	TPO3: Promote Transport Equality
A Route Map to Achieve a 20% Reduction in Car Kilometres by 2030	✓		
Climate Change Plan (Update)	✓	✓	
NTS2	✓		✓
STPR2	✓		
Strategic Road Safety Plan Scotland's Road Safety Framework to 2030	✓		
Scottish Trunk Road Network Asset Management Strategy	✓		
Infrastructure Investment Plan	✓		
NPF4	✓		✓
Scotland's National Economic Strategy for Economic Transformation			✓
Programme for Government	✓	✓	✓
Scottish Government Framework for Taxation		✓	
Equalities Act			✓
Fairer Scotland Duty			✓
Islands Act			✓

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**NEW CHAIN**

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**Subject: TDM Options Study - approach to quantitative appraisal**

[redacted]/[redacted]

We've been throwing around some ideas, and have the germ of an approach. Would you have any availability to discuss in the second half of next week?

There will need to be some simplifications and assumptions in order to meet the study requirements while respecting the time and budget constraints. I've tried to note them below.

Here's the basics:

- 1) By the end of the qualitative appraisal have a good understanding of the geographic segmentation we're interested in.
- 2) Using the 2030 TMfS low scenario run with the 'some form of charging' generalised cost adjustment removed, aggregate veh kms to the geographic segmentation agreed in 1.
- 3) Also produce a tool that calculates emissions on a link basis rather than end to end average speed. Emissions are an output requested by the ITT, and doing it in this way will help produce a total more reflective of the fact that a veh-km in an urban setting will tend to produce more emissions than a veh-km in a rural setting, though TMfS, of course, does not represent the urban areas particularly brilliantly.

So, 2) and 3) will give us our 'without charging' case. We could also, if required, have a 'with no charging but with STPR2' if you'd like. Worth discussing.

- 4) We will then need some discussion on how to do this, but I think as a minimum we should segment the veh-km into socio-economically disadvantaged. This will require some level of assumptions, and some tweaking of the TMfS assignment, perhaps. We won't be able to do a true segmentation, which would reflect lower average trip lengths and different purpose splits of different income brackets, but we should be able to produce something worthwhile.

In order to assess each type of charging, we just then need to understand what proportion of the veh-km is subject to the charge. This will depend on the design of the charging mechanism, and will differ by the type of charge (eg if we're looking at cordon based charging around cities, or [redacted]ing charges for certain areas, or country-wide distance charging) but also by the design of the charging exemptions/differences that may be introduced at the packaging stage to mitigate negative impacts.

Once we have that for each, then 5) apply fuel price elasticity in respect to veh-km, adjusted for gdp/capita change since it was derived (it's 20ish years old). Discussion point here is to whether we need to change the elasticity based on income. Having gone back and forth on this, I think I'm settled on the side of arguing that we shouldn't. The response to a cost change is multi-faceted ie could be mode change, could be retiming, could be rerouting, etc, etc, and we know that usually a lower income band would be more sensitive than average to changes in cost, BUT we also know that the availability of certain possible responses changes by other factors, such as rurality, hence higher car ownership for low incomes in rural areas. So, the cleanest solution here is just to use the standard elasticity across all incomes. Again, it's a simplification, but I think a defensible and necessary one.

- 6) Then apply the Marginal External Costs method (TAG A5.4) in as much detail as we can, but accepting standard values where it's proportionate.



I think the above will give us everything requested in relation to car: veh-km change, emissions, revenue, economic impacts, benefits related to accidents, local air quality, and noise. However, there is the issue of freight and the whole subject of unintended consequences.

Regards

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## **NEW CHAIN**

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[Subject: WP2 Technical Note Final Draft](#)

Hi both,

Please find attached the revised literature review, amended with your comments and additions. Draft WP3 note to follow, before you both return on Tuesday.

Many thanks,

[redacted]

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**NEW CHAIN**

**26/9/2022 WP3 Draft Technical Note**

**FROM AECOM to Transport Scotland**

Hi Both,

Ahead of the workshop on Wednesday, please find the draft WP3 tech note – Options Generation and Preliminary Appraisal, attached. We will be using feedback on the note and the outputs of the workshop to inform the next stage, Option Development and Packaging.

Many thanks,

[redacted]

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Attached to the above chain is a technical appraisal report supplied by AECOM, extracted below:

Prepared for: Transport  
Scotland

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### 13. Introduction

This technical note forms Work Package 3 of the Travel Demand Management (TDM) Options Study, and follows on from the literature review<sup>105</sup> to generate, sift, and appraise the options. It is structured into the following sections:

- **Section 14 - Option Generation:** Generation of options based on the learning gained from the literature review, supplemented by consultant judgement / gap filling. At this stage the options remain high level, focusing on “what” will be charged. Potential differences in performance against criteria relating to “where” and “who” will be charged for each option will be considered through the appraisal (Work Package 4, Packaging), and this will inform further option development prior to the quantitative detailed appraisal stage.
- Section 15 - Consolidation and Sifting: An initial sift of options. This identifies any “show-stopper” issues which cannot be mitigated, reduces the options for appraisal to a manageable number.
- Section 16 - Preliminary Appraisal: Qualitative appraisal against the research objective, deliverability criteria, STAG criteria, Policy Alignment, and Sustainable Investment Hierarchy. The appraisal discusses any design considerations which could impact performance against criteria, informing further option development.

### 14. Option Generation

Options have been generated based on the suite of examples examined within the literature review. These examples were further discussed and consolidated into a list of options which constitute all reasonable theoretical instruments which could be applied to address the central research question. The overarching options are:

- **Cordon-based charging:** Any charge imposed for entering a pre-defined area, route, or corridor. This could include any charge for using specific roads, such as the trunk-road network or structures, such as bridges. Cordon-based schemes could be imposed on longer distances or specific areas.
- **Area-based charging:** Any charge imposed for moving within a pre-defined area, captured by ANPR, and charged per day. Most congestion charge models would be considered under this option. Area based charging is suited to local schemes in and around a specific urban centre. Low emissions zones (LEZs) are an example of a type of area charge which is already in use in Scotland.
- **Parking Charges:** This option includes consideration of any change to the cost of parking via either public parking charges, workplace or out-of-town parking levies or residents permits
- **Vehicle Levy:** A charge which applies to the ownership of a vehicle enabling targeting of different vehicle types or sizes.
- **Fuel Levy:** Charges which apply to the consumption of fuel or energy enabling targeting of consumption which is linked to vehicle use.
- **Distance based charging:** A charge which can be imposed according to any length of journey on any part of the road network. A more innovative or theoretical models of national road user charging which enable specific journeys to be charged at individual rates would fall under this option.
- **Time-based charging:** This option considers any charge based on the time spent travelling, rather than the length or location of the journey.
- **Vignettes:** Permits to use a particular road or road network for a given period, ranging from a week to a year.
- **Road-space reallocation:** Road-space reallocation encompasses any option which specifically seeks to manage car demand by removing road capacity.
- **Road-space rationing:** Any option which limits the number of vehicles allowed to use the road during certain times, either by an arbitrary allocation or on dedicated ‘car free days’.

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## 105 Travel Demand Management Options Study: Background and Evidence Review Technical Note”, AECOM, September 2022

- **Development planning:** This option would be implemented through review of local development planning standards to reduce or eliminate parking provision from urban centres.

### 15. Consolidation and Sifting

Options considered within the literature review, which do not appear in the list of options generated above, have been judged to be complementary measures rather than stand-alone TDM interventions. These interventions will be considered during Option Development, which will include packaging of options in order to mitigate negative impacts identified within the appraisal. These include:

- **Vehicle occupancy charging and priority;**
- **Behaviour change;** and
- **Incentives.**

Five of the options generated have been sifted out prior to the appraisal as they are judged to be an inappropriate way of achieving the intended objective and addressing the identified transport problems directly. These are:

- **Time-based charging:** This option has been sifted out due to the likelihood that it would incentivise unsafe road user behaviour, principally, the risk of speeding.
- **Vignettes:** The use of vignettes is being phased-out across many countries which had previously used them in favour of distance-based charging, as vignettes do not reflect actual road use and are highly regressive in the way the charge is distributed.
- **Road-space reallocation:** Road -space reallocation takes place as a consequence of the ongoing process of re-balancing transport infrastructure away from private vehicles and towards more sustainable and inclusive modes, via introduction of bus lanes, wider pavements, trams and cycleways. However, it is rarely implemented in isolation as a specific means of transport demand management. It is considered that the suite of public and active travel projects recommended within STPR2 would encompass some element of road-space reallocation and these will be considered complementary to any direct TDM measures proposed.
- **Road-space rationing:** Road-space rationing has been introduced in certain locations, such as Mexico City, as an emergency measure, in response to dangerous levels of air pollution. As such it is not considered to be a long-term and sustainable way of managing demand.
- **Development planning:** Development planning must encompass a range of considerations specific to the needs of the local area, housing type and community need. It is likely that local authorities will review their housing requirements and parking standards in-line with the guidance set out in NPF4. However, demand reduction as a result of changes in development planning, such as reduction in parking provision, would be a long-term effect and is unlikely to directly address the objective of reducing car use in the timeframe required.

### 16. Preliminary Appraisal

#### 16.1 Introduction

##### 16.1.1 Appraisal Criteria

Each option will be assessed against the following criteria:

- Research Objective ○ Reduce Car Kilometres by 20% by 2030
- Deliverability ○ Feasibility



- Affordability
- Public Acceptability

The appraisal will also consider the option's position in the Sustainable Investment Hierarchy.

### 16.1.2 Appraisal Scale

For the Research Objective, STAG and Policy Alignment criteria, each option will be assessed qualitatively on a 7 point scale defined as follows:

Major Positive +++

Moderate Positive ++

Minor Positive +

Neutral 0

Minor Negative -

Moderate Negative --

Major Negative ---

For the deliverability criteria, a risk-based approach has been used, categorising options as follows:

High

Medium

- STAG Criteria ○ Environment ○ Climate Change ○ Health, Safety, and Wellbeing ○  
Economy  
○ Equality and Accessibility
- Policy Alignment

- 
- 
- 
- 
- 
- 
-

- 
- 
- Low

### 16.1.3 Purpose of Preliminary Appraisal

The preliminary appraisal will be an early qualitative appraisal of the high-level options, providing an initial indication of performance against criteria and identifying areas where mitigation may be required as part of further option development to optimise performance. The appraisal will identify design considerations and discuss how these may affect performance against each criterion. This will inform further option development and packaging. Design considerations include:

- geographical coverage;
- the target of the intervention (short-trips or long-distance journeys); and
- the type of vehicle affected (size and engine type).

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## 16.2 Cordon Based Charging

Research Objective	Implementability (Risk)			STAG Criteria					Policy Alignment	Position in Sustainable Investment Hierarchy	Decision
	Feasibility	Affordability	Public Acceptability	Environment	Climate Change	Health, Safety & Wellbeing	Economy	Equality & Accessibility			
Reduce Car km by 20% by 2030	Medium	Medium	High	++	+	+	+	-	++	Makes better use of existing capacity	<b>Retain</b>

### 16.2.1 Summary

Cordon based charging has the potential to reduce car kilometres at a local level, with positive impacts on climate change. It can be used to target congested areas, with positive implications for environment, health and wellbeing and economy.

For feasibility and affordability reasons cordon charging would be most effective as discrete schemes in congested areas in large town/city centres.

Cordon based charging has greater impacts on those living outside the cordon, so can be unfair. This may have implications for public acceptability and depending on the specific geographical characteristics of the area could increase or reduce inequalities.



## 16.2.2 Potential Behaviour Responses

- Make the same trips across the cordon and pay the charge.
- Make fewer trips across the cordon.
- Reroute trips to avoid the cordon.
- Use an alternative mode for trips that cross the cordon, including car sharing.
- Combine trips to destinations within the cordon.
- Park outside the cordon and use an alternative mode to travel to the destination.
- Get a lift to be dropped off outside the cordon and use an alternative mode to travel to the destination.
- Move house to within the cordon.
- Move business to outside the cordon.

## 16.2.3 Research Objective

*Reduce Car Kilometres by 20% by 2030*

### **Minor Positive**

There is evidence that cordon-based charging can be effective in reducing car trips. However, the nature of cordons means that charges only apply to vehicle movements that cross specific points, so cordon-based charging may encourage behaviour change to avoid the cordon but not the trip. This could even increase car kilometres in some cases where an alternative route is longer. There is also no financial disincentive to travelling within the cordon once the cordon has been crossed. Cordon based charging may also encourage people to park their vehicles just outside the cordon, which might limit the potential reduction in car kilometres. Cordon-based charging is therefore likely to be most successful at reducing car kilometres in locations where cordons can be designed to capture the largest traffic flows, where alternative routes are either also captured by cordons or the cordon(s) enclose a wide enough area that the charge cannot be avoided by minor displacements, and/or where parking is restricted beyond the cordon boundary.

## 16.2.4 Deliverability

### *Feasibility*

### **Medium Risk**

There are several cordon charging schemes in operation worldwide, proving the technical and operational feasibility of discrete schemes. However, if cordon charging was implemented more broadly, there may be challenges with procurement and installation due to the quantity of automatic number plate recognition (ANPR) infrastructure required. Though the Transport (Scotland) Act 2001 provides local authorities with discretionary power to implement local schemes, these can only apply to local roads, and further secondary legislation would be required so that local authorities could enforce the schemes.

### *Affordability*

### **Medium Risk**

There is evidence that existing cordon charging schemes have covered their own costs and generated revenue. However, existing schemes tend to be in congested locations with high traffic flows. There is therefore some uncertainty around affordability of a broader roll out of cordon charging, depending on the traffic flows at proposed locations.

#### *Public Acceptability*

### **High Risk**

All proposed charging measures, particularly those which are intended as deterrents to car travel, are likely to be met with significant public opposition. However, because cordon charges are likely to be proposed in locations with existing congestion, there may be more acceptance that high car use is problematic.

People who live just outside the cordon may perceive the charging structure as unfair, since they would have to pay to travel to destinations within the cordon while people who live just within the cordon would not have to pay for the same trip. This may result in opposition due to the perception of unfairness.

People who have fewer alternatives to car travel, are likely to be more opposed to cordon charging, including disabled people, older people, and socioeconomically disadvantaged people who may live in areas with poorer connectivity and be reliant on a car, or who may need to travel to work at times of the day when public transport is not available. Cordon charging is less likely to be proposed in rural and island locations, so it is assumed that there would not be much opposition from these groups. However, if cordon charging was implemented in these locations it would likely be met with significant opposition due to lack of alternative modes. 16.2.5 STAG Criteria

#### *Environment*

### **Moderate Positive**

There is evidence that cordon charging reduces car demand at a local level but could result in a shift in traffic flows to routes which are currently quieter. While an overall reduction in demand would have a positive impact on biodiversity and habitats, landscape and noise and vibration; shifting negative impacts from an existing high traffic route to a lower traffic route would have negative impacts. These quieter alternative routes are likely to be more sensitive to the impacts associated with an increase in traffic. The impact against these sub criteria is therefore considered to be minor negative.

The nature of cordon charging means it is likely to be implemented in the most congested areas with the highest traffic flows, and this is likely to coincide with the worst air quality. The negative environmental impacts of air quality depend on the local concentration of pollutants, so reducing emissions in the most congested areas would have the biggest impact on air quality. There may also be some rerouteing as a result of cordon charging. Shifting emissions from a more polluted area to a less polluted area would also have positive impact on air quality. However, if alternative routes are close to existing routes, then rerouteing may not shift emissions far enough away to make a major difference to air quality. It is also important to note that the nature of cordon charging means there is no disincentive for internal travel within the cordon. This could even encourage people to drive more within the cordon to improve value for money, which could increase emissions and worsen air quality within the cordon, which as previously noted is likely to have poor air quality and be

more susceptible to an increase in emissions. The impact against this sub criterion is therefore considered to be major positive.

Cordon charging is not expected to change the physical characteristics of the existing road network, only the traffic flows, so the impacts on geology and soils, land use, ecology and flooding, and historic environment are expected to be neutral.

#### *Climate Change*

##### **Minor Positive**

There is evidence that cordon charging reduces car demand and carbon emissions at a local level in towns and cities where it is implemented. However, the nature of cordons means that charges only apply to vehicle movements that cross specific points, so cordon-based charging may encourage behaviour change to avoid the cordon but not the trip. This could even increase carbon emissions in some cases where an alternative route is longer. Cordon-based charging is therefore likely to be most successful at reducing carbon emissions in locations where cordons can be designed to capture the largest traffic flows, and where alternative routes are either also captured by cordons or significantly less attractive. Emissions from internal trips within the cordon will also not be addressed by cordon charging. The impact against this sub criterion is therefore minor positive.

The impacts of cordon-based charging on vulnerability to the effects of climate change and potential to adapt to the effects of climate change are expected to be neutral.

#### *Health, Safety and Wellbeing*

##### **Minor Positive**

The nature of cordon charging means it is likely to be implemented in the most congested areas with the highest traffic flows, and this is likely to coincide with accident hotspots. Reduced traffic flows in congested areas will reduce the number of conflicts thus reducing risk of accidents. However, if the reduction in traffic results in an increase in speed, this may increase the severity of accidents. The impact against this sub criterion is therefore expected to be minor negative.

The technology required to implement cordon charging has potential implications for security of personal data. While ANPR technology is already in use; widespread use for congestion charging would increase the coverage and therefore potentially increase the level of damage if hacked or compromised. However, the likelihood of a security breach is extremely low, so the overall impact against this sub criterion is therefore expected to be neutral.

Cordon charging is expected to be implemented in areas with high congestion and thus relatively poor air quality. The negative health impacts of air quality depend on the local concentration of pollutants, so reducing emissions or shifting emissions from a more polluted area to a less polluted area would have an overall positive impact on health. However, if alternative routes are close to existing routes, then rerouting may not shift emissions far enough away to make a major difference to health. Reduced congestion may contribute to increased levels of walking and cycling, which would bring additional health benefits. The impact against this sub criterion is therefore considered to be moderate positive.

Access to health and wellbeing would be unchanged in terms of physical access, however affordability is likely to be a barrier to access for some groups (see affordability sub criterion under Equality and Accessibility Criterion below). There is



evidence that cordon charging reduces car demand at a local level but could result in a shift in traffic flows to routes which are currently quieter. While an overall reduction in demand would have a positive impact on visual amenity; shifting negative impacts from an existing high traffic route to a lower traffic route would have negative impacts. These quieter alternative routes are likely to be more sensitive to the negative visual amenity impacts associated with an increase in traffic. The impact against this sub criterion is therefore considered to be minor negative.

#### *Economy*

#### **Minor Positive**

Cordon charging has the potential to improve journey times and reliability by reducing congestion. However, potential rerouting could result in a shift in congestion from one route to another. The benefits are likely to be higher where alternative routes are not available or are also captured by cordons. The impact against TEE is therefore considered to be minor positive.

There may be some limited land use changes where people move to live within the cordon or businesses move to live outside the cordon, the net agglomeration impacts are likely to be neutral. The impact against WEI is therefore considered to be neutral.

#### *Equality and Accessibility*

#### **Minor Negative**

Cordon charging would not directly affect public transport or active travel network coverage. However, if the scheme was successful in reducing traffic levels it could improve bus journey times and potentially enable more services to run. Similarly, if there were fewer conflicts between pedestrians/cyclists and cars then walking and cycling journey times would be reduced. The impact against these sub criteria is therefore considered to be minor positive.

Comparative access by people group and geographic location would be unchanged in terms of physical access, however, affordability is likely to be a barrier to access for some groups (see affordability sub criterion below). The impact against these sub criteria is therefore considered to be neutral.

As for all proposed charging measures, cordon pricing will make driving less affordable. This would have a greater impact on disabled and older people who may be more reliant on car travel due to difficulties accessing alternative modes and for people who do not feel safe using other modes, potentially including women, LGBT+ people, younger people, older people, people with disabilities, and people belonging to ethnic or religious minority groups. Cordon charging would also have a greater impact on people with low incomes due to charges making up a higher proportion of their income. Cordon charging is less likely to be implemented in rural and island locations due to the relatively low traffic flows. It is therefore assumed that the affordability risk to individuals would be higher in urban geographies than in rural and island geographies. However, if cordon charging was implemented more broadly then the affordability risk for rural and island geographies would be higher, due to fewer alternative modes.

Cordon charging has a greater effect on trips with origins outside the cordon and destinations within the cordon, so its impacts will vary depending on the geographical characteristics of the area.

There may be some positive effects on affordability of public transport if reduced congestion results in sufficient journey time savings to allow bus operators to operate the same service frequency with fewer buses, reducing operating costs. Bus savings are more achievable in locations such as cities and towns where congestion is having a significant impact on journey times, and where services tend to be more frequent and cover shorter distances. Cordon charging is likely to be implemented in these types of locations.

Overall, the impact against this sub criterion is considered to be moderate negative.

16.2.6 Policy Alignment

#### Moderate Positive

Cordon charging would contribute to the 20% car reduction target identified in the **Climate Change Plan** and aligns positively with the **NTS2** priorities to “Takes climate action” and “Improve health and wellbeing” although potentially conflicts with the priorities to “Deliver inclusive economic growth” and “Reduce inequalities”. The option has the potential to complement public transport and active travel options recommended through **STPR2**, by encouraging modal shift to sustainable and increasing the usage of such options, ultimately improving value for money. Cordon charging also aligns with planning policy outlined in the **NPF4**, which proposes building 20 minute neighbourhoods to significantly reduce the need to travel; strengthening support for development in town centres and restricting out-of-town retail and leisure to encourage a transition away from car-dependent developments and stimulating new models of low carbon living in our rural areas as well as our towns and cities, by facilitating further investment in digital infrastructure, building in more space for people to work remotely and creating community hubs. There may be some conflicts with the **Equalities Act (2010)** and the **Fairer Scotland Duty** due to potential negative differential impacts on affordability for women, LGBT+ people, younger people, older people, people with disabilities, people belonging to ethnic or religious minority groups, and people experiencing socio-economic disadvantage. It may be possible to mitigate these negative impacts through the option design, for example through discounts or exemptions.

16.2.7 Sustainable Investment Hierarchy

#### Makes better use of existing capacity

16.2.8 Differential Impacts and Design Considerations

For feasibility and affordability reasons cordon charging would be most effective as discrete schemes in congested areas in large town/city centres.

Cordon based charging has greater impacts on those living outside the cordon, so can be unfair. This may have implications for public acceptability and depending on the specific geographical characteristics of the area could increase or reduce inequalities.

16.2.9 Decision and Rationale

It is recommended that cordon charging should be **retained** for further consideration at detailed appraisal.

Cordon charging has the potential to address vehicle kilometres travelled in the most congested areas. There are potential environmental benefits to cordon charging due to reduced vehicle emissions in areas with poor air quality and potential health benefits due to reduced traffic congestion making active travel more attractive, improving health outcomes and reducing conflicts which could cause accidents.

There are some potential negative impacts on equality and accessibility due to the effect on affordability, although this could be mitigated to some extent with discounts or exemptions.

There are some deliverability risks, particularly with public acceptability amongst those who live within or near the cordon, although these could be mitigated to some extent by discounts or exemptions. There may also be feasibility and affordability risks associated with procurement and installation of ANPR to support widespread implementation.

### 16.3 Area Based Charging

Research Objective	Implementability (Risk)			STAG Criteria					Policy Alignment	Position in Sustainable Investment Hierarchy	Decision
Reduce Car km by 20% by 2030	Feasibility	Affordability	Public Acceptability	Environment	Climate Change	Health, Safety & Wellbeing	Economy	Equality & Accessibility			
+	Medium	Medium	High	+++	+	+	+	-	++	Makes better use of existing capacity	Retain

#### 16.3.1 Summary

Area based charging has the potential to reduce car kilometres at a local level, with positive impacts on climate change. It can be used to target congested areas, with positive implications for environment, health and wellbeing and economy.

For feasibility and affordability reasons area charging would be most effective as discrete schemes in congested areas in large town/city centres.

People who live within the area may perceive the charging structure as unfair, since they would have to pay the charge every time they travelled by car. This could be mitigated through discounts or exemptions; however, this would reduce the effectiveness of the scheme and may also be perceived as unfair by those who live just outside the area and regularly travel within the area to access work, education and services. Area charging is also likely to be implemented in locations with good active travel and public transport connectivity.



### 16.3.2 Potential Behaviour Responses

- Make the same trips through and within the area and pay the charge.
- Make fewer trips through and within the area.
- Reroute trips to avoid the area.
- Use an alternative mode for trips through and within the area, including car sharing.
- Combine trips through and within the area.
- Park outside the area and use an alternative mode to travel to the destination.
- Get a lift to be dropped off outside the area and use an alternative mode to travel to the destination.
- Move house to outside the area.
- Move business to outside the area.

### 16.3.3 Research Objective

*Reduce Car Kilometres by 20% by 2030*

#### **Minor Positive**

There is evidence that area-based charging can be effective in reducing car trips. However, this is likely to be most effective in locations where most trips passing through the area have origins or destinations within the area. For trips through the area, area based charging could encourage rerouting, which may even increase car kilometres in some cases where an alternative route is longer. However, this rerouting effect is likely to be less than for cordon based charging. Once within the area there is also no financial disincentive to travelling within the area, since there is usually a single charge per day (or other defined time period). Area based charging may also encourage people to park their vehicles just outside the charging area, which might limit the potential reduction in car kilometres.

Area-based charging is therefore likely to be most successful at reducing car kilometres in high traffic locations, where the charge covers a wide enough area that it cannot be avoided by minor displacements, and/or where parking is restricted beyond the area boundary.

### 16.3.4 Deliverability

#### *Feasibility*

#### **Medium Risk**

There are several area charging schemes in operation, proving the technical and operational feasibility of discrete schemes. However, if area charging was implemented more broadly, there may be challenges with procurement and installation due to the quantity of ANPR infrastructure required. Though the Transport (Scotland) Act 2001 provides local authorities with discretionary power to implement local schemes, these can only apply to local roads, and further secondary legislation would be required so that local authorities could enforce the schemes.

#### *Affordability*

#### **Medium Risk**

There is evidence that existing area charging schemes have covered their own costs and generated revenue. However, existing schemes tend to be in congested locations with high traffic flows. There is therefore some uncertainty around affordability of a broader roll out of area charging, depending on the traffic flows at proposed locations. However, it is noted that discrete schemes in cities or towns could use a combined back-office function, improving cost efficiency for smaller scale schemes.

#### *Public Acceptability*

### **High Risk**

All proposed charging measures, particularly those which are intended as deterrents to car travel, are likely to be met with significant public opposition. However, because area charges are likely to be proposed in locations with existing congestion, there may be more acceptance that high car use is problematic.

People who live within the area may perceive the charging structure as unfair, since they would have to pay the charge every time they travelled by car. This could be mitigated through discounts or exemptions; however, this would reduce the effectiveness of the scheme and may also be perceived as unfair by those who live just outside the area and regularly travel within the area to access work, education and services. Area charging is also likely to be implemented in locations with good active travel and public transport connectivity, which may result in less opposition. Area charging is likely to be implemented in urban areas, with a higher density; areas where it is practical to provide and enhance alternative modes. Hypothecation could, therefore, be a particularly effective method of improving public acceptability. People who have fewer alternatives to car travel, are likely to be more opposed to area charging, including disabled people, older people, and socioeconomically disadvantaged people who may live in areas with poorer connectivity and be reliant on a car, or who may need to travel to work at times of the day when public transport is not available. Area charging is less likely to be proposed in rural and island locations, so it is assumed that there would not be much opposition from these groups. However, if cordon charging was implemented in these locations it would likely be met with significant opposition due to lack of alternative modes. 16.3.5 STAG Criteria

#### *Environment*

### **Major Positive**

There is evidence that area charging reduces car demand at a local level but could result in a shift in traffic flows to routes which are currently quieter, although this impact is likely to be less than for cordon charging. Area charging also targets short distance movements within the area, where cordon charging is unable to do so. While an overall reduction in demand would have a positive impact on biodiversity and habitats, landscape and noise and vibration; shifting negative impacts from an existing high traffic route to a lower traffic route would have negative impacts. These quieter alternative routes are likely to be more sensitive to the negative impacts associated with an increase in traffic. The impact against these sub criteria is therefore considered to be neutral.

The nature of area charging means it is likely to be implemented in the most congested areas with the highest traffic flows, and this is likely to coincide with the worst air quality. The negative environmental impacts of air quality depend on the local concentration of pollutants, so reducing emissions in the most congested areas



would have the biggest impact on air quality. While the rerouting effect due to area charging is likely to be less than for cordon charging, it could still impact on air quality. Shifting emissions from a more polluted area to a less polluted area would also have a positive impact on air quality. However, if alternative routes are close to existing routes, then rerouting may not shift emissions far enough away to make a major difference to air quality. It is also important to note that the capped nature of area charging means there is no disincentive for further travel once that charge has been paid for the defined time period. This could even encourage people to drive more to improve value for money, which could increase emissions and worsen air quality within the area, which as previously noted is likely to have poor air quality and be more susceptible to an increase in emissions. Area charging also targets short distance movements within the area, where cordon charging is unable to do so. This is likely to disincentivise short distance urban trips that should be easily substitutable and that have a disproportionate impact on pollutant emissions. The overall impact against this sub criterion is considered to be major positive. Area charging is not expected to change the physical characteristics of the existing road network, only the traffic flows, so the impacts on geology and soils, land use, ecology and flooding, and historic environment are expected to be neutral.

#### *Climate Change*

#### **Minor Positive**

There is evidence that area charging reduces car demand and carbon emissions at a local level in towns and cities where it is implemented. However, the nature of area charging means that charges only apply to vehicle movements that pass through the area, so this option may encourage changes in route for trips with origins and destinations outside the charged area in order to avoid the area but still undertake the trip. This could even increase carbon emissions in some cases where an alternative route is longer. The risk of this is likely to be less for area charging than for cordon charging because by nature an area is more likely to capture the main flows and any potential alternative routes. This impact against this sub criterion is therefore minor positive.

In contrast to Cordon Based Charging, Area Based Charging will also disincentivise short distance urban trips that should be easily substitutable and that have a disproportionate CO<sub>2</sub> impact.

The impacts of area charging on vulnerability to the effects of climate change and potential to adapt to the effects of climate change are expected to be neutral.

#### *Health, Safety and Wellbeing*

#### **Minor Positive**

The nature of area charging means it is likely to be implemented in the most congested areas with the highest traffic flows, and this is likely to coincide with accident hotspots. Reduced traffic flows in congested areas will reduce the number of conflicts thus reducing risk of accidents. Area charging also targets short-distance movements within the area, where cordon charging is unable to do so. This is likely to disincentivise short distance urban trips that should be easily substitutable and that have a disproportionate impact on accidents. However if the reduction in traffic results in an increase in speed, this may increase the severity of accidents. The impact against this sub criterion is therefore expected to be minor negative. The technology required to implement cordon charging has potential implications for



security of personal data. While ANPR technology is already in use; widespread use for congestion charging would increase the coverage and therefore potentially increase the level of damage if hacked or compromised. However, the likelihood of a

security breach is extremely low, so the overall impact against this sub criterion is therefore expected to be neutral.

Area charging is expected to be implemented in areas with high congestion and thus relatively poor air quality. The negative health impacts of air quality depend on the local concentration of pollutants, so reducing emissions or shifting emissions from a more polluted area to a less polluted area would have an overall positive impact on health. However, if alternative routes are close to existing routes, then rerouteing may not shift emissions far enough away to make a major difference to health, and there is also a risk that once the charge has been paid there is no disincentive to travel which could even increase emissions and worsen air quality. Reduced congestion may contribute to increase levels of walking and cycling, which would bring additional health benefits. Area charging also targets short-distance movements within the area, where cordon charging is unable to do so. This is likely to disincentivise short distance urban trips that should be easily substitutable and that have a disproportionate impact on pollutant emissions. The impact against this sub criterion is therefore considered to be major positive.

Access to health and wellbeing would be unchanged in terms of physical access, however affordability is likely to be a barrier to access for some groups (see affordability sub criterion under Equality and Accessibility Criterion below). There is evidence that area charging reduces car demand at a local level but could result in a shift in traffic flows to routes which are currently quieter. While an overall reduction in demand would have a positive impact on visual amenity; shifting negative impacts from an existing high traffic route to a lower traffic route would have negative impacts. These quieter alternative routes are likely to be more sensitive to the negative visual amenity impacts associated with an increase in traffic. The impact against this sub criterion is therefore considered to be minor negative.

#### *Economy*

##### **Minor Positive**

Area charging has the potential to improve journey times and reliability by reducing congestion. Area charging also targets short-distance movements within the area, where cordon charging is unable to do so. This is likely to disincentivise short distance urban trips that should be easily substitutable and that have a disproportionate impact on congestion, affecting journey times and reliability. However potential rerouteing could result in a shift in congestion from one route to another. The benefits are likely to be higher where the area captures the highest traffic flows and any potential alternative routes. The impact against TEE is therefore considered to be minor positive.

There may be some limited land use changes where people or businesses move outside the area, however the agglomeration impacts are likely to be minor. The impact against WEI is therefore considered to be minor negative.

#### *Equality and Accessibility*

##### **Minor Negative**

Area charging would not directly affect public transport or active travel network coverage. However, if the scheme was successful in reducing traffic levels it could improve bus journey times and potentially enable more services to run. Area charging also targets short-distance movements within the area, where cordon charging is unable to do so. This is likely to disincentivise short distance urban trips that should be easily substitutable and that have a disproportionate impact on traffic levels. Similarly, if there were fewer conflicts between pedestrians/cyclists and cars then walking and cycling journey times would be reduced. The impact against these sub criteria is therefore considered to be minor positive.

Comparative access by people group and geographic location would be unchanged in terms of physical access, however, affordability is likely to be a barrier to access for some groups (see affordability sub criterion below). The impact against these sub criteria is therefore considered to be neutral.

As for all proposed charging measures, area pricing will make driving less affordable. This would have a greater impact on disabled and older people who may be more reliant on car travel due to difficulties accessing alternative modes and for people who do not feel safe using other modes, potentially including women, LGBT+ people, younger people, older people, people with disabilities, and people belonging to ethnic or religious minority groups. Area charging would also have a greater impact on people with low incomes due to charges making up a higher proportion of their income. Area charging is less likely to be implemented in rural and island locations due to the relatively low traffic flows. It is therefore assumed that the affordability risk to individuals would be higher in urban geographies than in rural and island geographies. However, if area charging was implemented more broadly then the affordability risk for rural and island geographies would be higher, due to fewer alternative modes. There may be some positive effects on affordability of public transport if reduced congestion results in sufficient journey time savings to allow bus operators to operate the same service frequency with fewer buses, reducing operating costs. Bus savings are more achievable in locations such as cities and towns where congestion is having a significant impact on journey times, and where services tend to be more frequent and cover shorter distances. Area charging is likely to be implemented in these types of locations.

Overall, the impact against this sub criterion is considered to be moderate negative.

16.3.6

Policy Alignment

#### Moderate Positive

Area charging would contribute to the 20% car reduction target identified in the **Climate Change Plan** and aligns positively with the **NTS2** priorities to “Takes climate action” and “Improve health and wellbeing” although potentially conflicts with the priorities to “Deliver inclusive economic growth” and “Reduce inequalities”. The option has the potential to complement public transport and active travel options recommended through **STPR2**, by encouraging modal shift to sustainable and increasing the usage of such options, ultimately improving value for money. Area charging also aligns with planning policy outlined in the **NPF4**, which proposes building 20 minute neighbourhoods to significantly reduce the need to travel; strengthening support for development in town centres and restricting out-of-town retail and leisure to encourage a transition away from car-dependent developments and stimulating new models of low carbon living in our rural areas as well as our

towns and cities, by facilitating further investment in digital infrastructure, building in more space for people to work remotely and creating community hubs. There may be some conflicts with the **Equalities Act (2010)** and the **Fairer Scotland Duty** due to potential negative differential impacts on affordability for women, LGBT+ people, younger people, older people, people with disabilities, people belonging to ethnic or religious minority groups, and people experiencing socio-economic disadvantage. It may be possible to mitigate these negative impacts through the option design, for example through discounts or exemptions.

#### 16.3.7 Sustainable Investment Hierarchy

<b>Makes better use of existing capacity</b>
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#### 16.3.8 Differential Impacts and Design Considerations

For feasibility and affordability reasons area charging would be most effective as discrete schemes in congested areas in large town/city centres.

People who live within the area may perceive the charging structure as unfair, since they would have to pay the charge every time they travelled by car. However an area charge can be perceived as fairer than a cordon, given everyone travelling within the zone has paid the same to access it. Concerns around unfairness could be mitigated through discounts or exemptions; however, this would reduce the effectiveness of the scheme and may also be perceived as unfair by those who live just outside the area and regularly travel within the area to access work, education and services. Area charging is also likely to be implemented in locations with good active travel and public transport connectivity.

#### 16.3.9 Decision and Rationale

It is recommended that area charging should be **retained** for further consideration at detailed appraisal.

Area charging has the potential to address vehicle kilometres travelled in the most congested areas. There are potential environmental benefits to area charging due to reduced vehicle emissions in areas with poor air quality and potential health benefits due to reduced traffic congestion making active travel more attractive, improving health outcomes and reducing conflicts which could cause accidents.

There are some potential negative impacts on equality and accessibility due to the effect on affordability, although this could be mitigated to some extent with discounts or exemptions.

There are some deliverability risks, particularly with public acceptability amongst those who live within or near the area, although these could be mitigated to some extent by discounts or exemptions. There may also be feasibility and affordability risks associated with procurement and installation of ANPR to support widespread implementation.

## 16.4 Parking Charges

Research Objective	Implementability (Risk)			STAG Criteria					Policy Alignment	Position in Sustainable Investment Hierarchy	Decision
	Feasibility	Affordability	Public Acceptability	Environment	Climate Change	Health, Safety & Wellbeing	Economy	Equality & Accessibility			
Reduce Car km by 20% by 2030	Low	Medium	Medium	+	+	0	-	-	++	Makes better use of existing capacity	<b>Retain</b>

### 16.4.1 Summary

Parking charges have the potential to reduce car kilometres at a local level, with positive impacts on climate change and the environment where they are implemented. However, they may result in increased inequality and reduced accessibility and result in negative economic impacts depending on the design and operation of the charging regime. Parking charges can take a variety of forms including single use charges, workplace parking levies, out-of-town parking levies or resident parking permits with key distinctions on who and what type of journeys are targeted. For affordability and optimising the economic impact of parking charges they would be most effective when focused on a key destination or urban centre. They should also be comprehensive and consistently applied within the charging area to reduce negative environmental and climate impacts outwith the charging area.

Parking charges could have a negative impact on those living outside of the charging area and may not be operationally affordable given the high costs associated with certain methods of enforcement. Additionally, they could have differential impacts on those with fewer transport options through either personal health and mobility or availability and viability of alternatives.



#### 16.4.2 Potential Behaviour Responses • Pay parking charge and not change behaviour.

- Make fewer trips to destination.
- Park in alternative locations to avoid charges, including those which are unsuitable. • Searching for a cheaper/longer time allowance space – thereby increasing driving distance.
- Demand induced by quieter roads - reductions in congestion cause previous non drivers to drive more frequently, particularly those who can easily afford the charge.
- Switch to alternative mode, such as active or public transport.
- Encourages more ride sharing and combining of trips. • Trip maker gets dropped off at destination by a second person, who then returns to the start point, doubling the car kilometres travelled.
- Reconsider car ownership (for residents permits).
- Not compatible with autonomous vehicles – can programme to operate empty instead of paying charge.

#### 16.4.3 Research Objective

*Reduce Car Kilometres by 20% by 2030*

##### **Minor Positive**

Evidence suggests a parking charge or restrictions can have a direct influence on mode choice, by targeting key destinations and presenting the trip maker with a highly visible cost to completing their journey. They can, however, result in additional car kilometres being driven if drivers are aware of locations where charges do not apply or are significantly less in areas of high demand. If the trip maker has the availability of a second person to give them a lift to their destination this removes the disincentive of the parking charge and doubles the amount of car kilometres travelled. The advent of autonomous vehicles may reduce the effectiveness of parking charges, as vehicles could be programmed to drive empty while the driver completes their trip purpose, and thus avoid paying a parking charge. While this may not become an issue in the project timescales, it does call into question the longterm effectiveness of parking charges. In the shorter term, a shift to MaaS could increase use of taxis and car clubs, which would also reduce the effectiveness of this option. A single use or hourly parking charge can be effective at targeting people who make regular and repeat journeys given this charge will factor into the mode choice decision each time the journey is made but is less effective for deterring non-regular visitors to an area.

A workplace parking levy is well targeted to regular commuting journeys and evidence shows when this charge is passed on to employees, widescale and sustained behavioural change is possible.

An out-of-town parking levy will have less of a direct impact on the person making the journey, given the difficulties and 'invisibility' of passing this charge on to customers or parking users. However, it could have a large impact on the supply of

parking spaces with developers urged to consider active and public transport accessibility to sites ahead of car parking.

Residents' permits could reduce car kilometres by encouraging residents to reconsider car ownership, given the additional costs required to own or have access to a parking space.

#### 16.4.4 Deliverability

##### *Feasibility*

#### **Low Risk**

Generally implementing parking charge measures in Scotland is feasible, with some variation across the different options. Simple single use parking charges can be introduced and operated with ease and are already in operation by most Scottish local authorities.

A workplace parking levy can also be introduced easily as the 2019 Transport (Scotland) Act gives local authorities the enabling powers to introduce these schemes and there is a successful exemplar scheme in Nottingham.

An out-of-town parking levy in the UK was first mooted in 1997 and proposed in a review into reviving Scotland's Town Centre. While legislation would need to be passed in order to implement this, it would function in a very similar way to the Workplace Parking Levy with the owner of the parking space charged an annual levy. Residents' permits have also been introduced by local authorities in cities including Edinburgh, Glasgow and Aberdeen, usually in zonal systems covering the innermost urban area and applying only to on-street parking. There may be feasibility difficulties with introducing a residents permit for 'private' parking such as driveways or parking included within the ownership of a property, requiring 'unbundling' of parking and property which is a long term.

##### *Affordability*

#### **Medium Risk**

Parking charges have contrasting performance against this criterion depending on the type of charge. For simple single use/hourly parking charges, 71% of local authorities in Scotland enforced parking at a loss in 2020-21 with the three most profitable parking enforcement regimes in the cities of Edinburgh, Glasgow and Aberdeen. Typically, cities with stronger trip attractors have a higher balance of funds when expenditure is deducted from Penalty Charge Notices and Pay & Display income. In Scotland: Edinburgh has a balance of £12 million, Glasgow £2.7 million and Aberdeen £1 million from parking enforcement, including pay & display and residents permits in 2020-21. However, more rural local authorities enforce parking at a net loss, with Fife, South Lanarkshire, and Perth & Kinross enforcing parking at losses over £1 million. This highlights a disparity in affordability depending on geographical characteristics and is explained by the high enforcement costs associated with this type of charge.

Workplace parking levies and out-of-town levies are more affordable to administer and can generate significant sums of money. The Nottingham WPL generated £25.3 million during the first three years, with costs of administration only 5% of revenue generated.

##### *Public Acceptability*



## Medium Risk

Parking charges have varying performance against this criteria depending on the type of charge. Simple single use/hourly parking charges in specific urban areas or at key trip attractors are considered acceptable given their widespread use and exemptions for those with fewer travel options such as those with disabilities. They are also seen as more acceptable if there are other transport options available, such as free park and ride sites outside of the charging zone.

However, the acceptability of a WPL or out of town levy may be lower given people are accustomed to parking at these destinations for free. Acceptability becomes an even greater issue for introducing new resident parking permit areas, particularly if they also cover what was formerly considered part of a person's property.

Public acceptability can be increased if any revenue generated from parking charges or levies is hypothecated to significant public transport improvements. 16.4.5 STAG

Criteria

*Environment*

### Minor Positive

All types of parking charge would have a positive environmental impact in the area which they are implemented as they reduce demand to/from that location. Parking charges implemented in urban centres are particularly well targeted to improving air quality. However, some of the potential behavioural changes could result in negative environmental outcomes, particularly if people spend more time driving searching for a cheaper or less restrictive parking space, demonstrating the need for a consistent and comprehensive charging zone.

Workplace parking levies can also have a positive environmental impact as the success of the Nottingham WPL has meant there is no need to introduce an additional clean air zone as the city can meet air quality obligations without one. If single use/hourly charges are introduced across a zone, land use within parking charge areas could significantly change as developers could provide free off-street parking to make their sites more attractive in the absence of free on street alternatives. This could be mitigated by closely linking transport and urban planning policies and this option is therefore neutral against the land use criteria. Parking charges of any nature are not expected to change the physical characteristics of the existing road network, only impact the traffic volume, so the impacts on geology and soils, ecology and flooding, and historic environment are expected to be neutral.

*Climate Change*

### Minor Positive

There is evidence that parking charges of any type can lead to mode choice behaviour changes including increased active travel and public transport journeys or reducing the number of trips taken.

A possible behaviour change where charges are avoided by taking a lift from a second person doubles the emissions polluted from the trip but generally the potential for re-moding and leads to a minor positive score.

The impacts of parking charges on vulnerability to the effects of climate change and potential to adapt to the effects of climate charge are expected to be neutral.

## Health, Safety and Wellbeing

### Neutral

When parking charges are implemented in congested areas they are likely to reduce traffic flows and hence accidents as the number of conflicts reduces. However, this reduced congestion could lead to an increase in speed, increasing the severity of any accidents. Furthermore, if drivers are spending time searching for a cheaper or less restrictive space this could increase driver stress and lack of focus on driving and lead to accidents. The impact on this subcriterion is therefore minor negative.

There is likely no impact of parking charges on security given they can be implemented and enforced simply with tickets and wardens, however, many parking charge infrastructures now use ANPR cameras which have associated security concerns, although the risk is a breach is very low. The impact on this subcriterion is therefore neutral.

While parking charges at key destinations are likely to be targeted in areas of high pollution, if people choose to park in residential areas instead this could increase air pollution and worsen health outcomes in these areas. The impact on this subcriterion is therefore neutral but can be mitigated by designing a comprehensive charging scheme

Access to health and wellbeing would be unchanged in terms of physical access, however, affordability is likely to be a barrier to access for some groups (see affordability sub criterion under Equality and Accessibility Criterion below). The impact on this subcriterion is therefore neutral.

Parking charges and restrictions could have a positive impact on visual amenity at the destination given they can discourage cars from accessing the destination, providing opportunities for public realm and environment improvements. Additionally visual amenity in residential areas can increase if permits are used to discourage car ownership and facilitate road use reallocation or public realm improvements but could decrease if parking from workplaces or on-street charging zones migrates to formerly quiet residential streets. The impact on this subcriterion is therefore neutral.

## Economy

### Minor Negative

Parking charges have varying performance against this criterion depending on the type of charge

A single use/hourly charge may improve TEE given it presents an upfront cost, able to account for some of the externalities of driving, to the mode choice decision maker for every journey made. This would improve journey times and reliability by reducing congestion.

A workplace parking levy may be less effective at improving TEE given the charge is 'fixed' in nature per year but there is evidence it leads to sustained positive behaviour change. Furthermore workplace parking levies can lead to economic

growth – in Nottingham 2000 jobs have been created since implementation at a faster rate than comparable UK cities with businesses valuing reduced congestion and demonstratable improvements in public transport.

A concern with parking charge zones is they push business to out of town and less easily accessible sites. This can be mitigated by introducing an out of town parking levy but this is potentially the most difficult type of parking charge to implement at present. Additionally there is a risk that out of town levies place additional costs on businesses and make it difficult for them to compete with online alternatives for consumers. Therefore the impact against WEI for parking charges generally is considered to be moderate negative.

#### *Equality and Accessibility*

### **Minor Negative**

A parking charge of any nature would not directly affect public transport or active travel network coverage. However, if the scheme was successful in reducing traffic levels it could improve bus journey times and potentially enable more services to run. Similarly, if there were fewer conflicts between pedestrians/cyclists and cars then walking and cycling journey times would be reduced. The impact against these sub criteria is therefore considered to be minor positive.

Comparative access by people group would vary by scheme type given charges would be introduced upon those who previously were able to park for free.

Affordability is likely to be a barrier to access for some groups and single use/hourly parking charges do not differentiate on the basis on income or ability to pay and will have the greatest impact on disabled and older people who may be more reliant on car travel due to difficulties accessing alternatives modes and for people who do not feel safe using other modes, potentially including women, LGBT+ people, younger people, older people, people with disabilities, and people belonging to ethnic or religious minority groups.

Workplace parking levies may also be unaffordable to some on low incomes unable to access a specific workplace by other modes. An out-of-town levy could have the impact of passing the cost of the space onto all customers, including those who don't drive and therefore is unequitable unless the cost is passed onto drivers.

Resident permits can be more equitable given they could be associated with council tax bands, property size, accessibility to public transport, or vehicle type/emissions. The impact against the affordability sub criterion is therefore considered to be minor negative.

In terms of rural/urban differential impact, a parking charge may be considered more equitable than some alternative options given the charge only applies at the end of the journey and is not dependent upon the distance travelled to reach the destination.

16.4.6

Policy Alignment

### **Moderate Positive**

Parking charges would contribute to the 20% car reduction target identified in the **Climate Change Plan** and aligns positively with the **NTS2** priorities to “Takes climate action” and “Improve health and wellbeing” although potentially conflicts with the priorities to “Deliver inclusive economic growth” and “Reduce inequalities”. The option has the potential to complement public transport and active travel options recommended through **STPR2**, by encouraging modal shift to sustainable and

increasing the usage of such options, ultimately improving value for money. Parking

charges also align with planning policy outlined in the **NPF4**, which proposes building 20 minute neighbourhoods to significantly reduce the need to travel; strengthening support for development in town centres and restricting out-of-town retail and leisure to encourage a transition away from car-dependent developments and stimulating new models of low carbon living in our rural areas as well as our towns and cities, by facilitating further investment in digital infrastructure, building in more space for people to work remotely and creating community hubs. There may be some conflicts with the **Equalities Act (2010)** and the **Fairer Scotland Duty** due to potential negative differential impacts on affordability for women, LGBT+ people, younger people, older people, people with disabilities, people belonging to ethnic or religious minority groups, and people experiencing socio-economic disadvantage. It may be possible to mitigate these negative impacts through the option design, for example through discounts or exemptions.

#### 16.4.7 Sustainable Investment Hierarchy

### Makes better use of existing capacity

#### 16.4.8 Differential Impacts and Design Considerations

For affordability and optimising the economic impact of parking charges, parking charges are most effective when focused on key destinations such as city centres. They are also most effective if they apply across an area consistently to prevent a concentration of demand in areas or streets where charges do not apply and drivers spending time searching for a space.

A single use/hourly charge and workplace parking levy can be effective at leading to widespread and sustained behavioural change for those making regular journeys. An out of town levy may result in costs being passed on to all consumers regardless of whether they are car users making this type of scheme inequitable.

To mitigate impacts on wellbeing and health care access, there can be discounts or exemptions at hospitals and other medical centres. Similarly, it is common for exemptions for blue badge holders who find it more difficult to re-mode. Charges can also be dynamic so the price increases with demand, however this adds complexity and could incentivise car journeys at times of low demand. Resident permit schemes or workplace parking levies would disincentivise car ownership and car travel to work, which would indirectly reduce car kilometres travelled. However, for those who choose to pay the levy, there is no incentive to limit vehicle kilometres. These measures could be combined with distance-based disincentives to maximise effectiveness.

#### 16.4.9 Decision and Rationale

It is recommended that parking charges should be **retained** for further consideration at detailed appraisal as a complementary measure.

Parking charges have the potential to address vehicle kilometres travelled by targeting key destinations and applying a visible charge at point of use.

There are some potential negative impacts on equality and accessibility due to the effect on affordability, although this could be mitigated to some extent with discounts or exemptions. Additionally, there can be economic concerns with charging for parking which decrease the attractiveness of certain destinations.

While implementing parking charge is a feasible option, given they are already implemented in many Scottish local authorities, they may not be affordable in less densely populated urban areas and lack the same revenue generation potential as other options. Similarly, while they may be accepted in locations which are easily accessible by active or public transport, further roll out to workplaces and residential streets may not be publicly acceptable.

## 16.5 Vehicle Levies

Objective	Implementability (Risk)			STAG Criteria						Policy Alignment	Position in Sustainable Investment Hierarchy	Decision		
	Feasibility	Affordability	Public Acceptability	Environment	Climate Change	Health, Safety & Wellbeing	Economy	Equality & Accessibility						
Reduce Car km by 20% by 2030			+	Medium	Medium	Medium	+	+	+	+	-	++	Makes better use of existing capacity	Retain

### 16.5.1 Summary

While vehicle levies have the potential to reduce vehicle kilometres travelled by disincentivising vehicle ownership, there is no disincentive to travelling long distances once the yearly charge has been paid and there is a risk that car owners increase their distance travelled to improve “value for money”. The option performs well against STAG criteria with environmental, climate and health benefits given they can be used to encourage uptake of greener vehicles or discourage the ownership of a vehicle all together. However, like all options it would have a negative impact on equality without further mitigation in the packaging stage.

The option overall has some deliverability risk as charging a vehicle based on emissions is seen as fair and currently done, there may be issues with establishing bespoke arrangements for Scotland and rolling the charge out to electric vehicles. Depending how the levy were applied, there could be conflicting messages around current incentives for zero emissions vehicles, and a further charge then being applied.

A key design consideration is whether the levy is delivered as a tax or an additional surcharge, with associated impacts on feasibility and acceptability. A surcharge could be hypothecated to transport network improvements which helps the affordability of the option whereas increasing the VED tax rate would result in more money for general government expenditure.

A vehicle levy performs well against environment and climate change criterion given it can be adjusted by vehicle emissions and size. This also makes it more equitable given lower income groups tend to own smaller and cleaner vehicles but this is countered by the charge not being related to ability to pay, with a differential impact on certain groups such as rural dwellers or families requiring certain types of vehicle. Therefore there is potential for discounts or exemptions for certain groups to increase the equality but these would diminish the effectiveness of the charge.





## 16.5.2 Potential Behaviour Responses

- Fewer new vehicles purchased.
- Vehicles sold and not replaced.
- Increased use once charge is paid.
- Shift towards cleaner and smaller vehicle if charge varies among vehicle types/emissions.
- Currently EVs are exempt from VED, so an alternative or additional vehicle-based charge could reduce incentive to switch to EV.

## 16.5.3 Research Objective

*Reduce Car Kilometres by 20% by 2030*

### **Minor Positive**

While vehicle levies have the potential to reduce vehicle kilometres travelled by disincentivising vehicle ownership, there is no disincentive to travelling long distances once the yearly charge has been paid and there is a risk that car owners increase their distance travelled to improve “value for money”.

## 16.5.4 Deliverability

*Feasibility*

### **Medium Risk**

A levy on vehicle ownership can be implemented as either a charge or a tax. A charge is added to the cost of a good or service and used to pay for the provision of that good or account for some external costs of using or owning that good. By comparison, receipts from a tax are used for general government expenditure. Vehicle ownership is charged annually already across the UK, through Vehicle Excise Duty (VED), demonstrating the technical and operational feasibility of applying a charge at this stage of the journey and enforcing payment compliance. A vehicle levy could involve increasing the existing VED rates or creating a separate additional charge. However, the Scottish Government may not have the powers to implement such a charge if it is considered a new tax as the Scottish Government at present has only specific powers over certain types of taxation so further devolution may be required to make this option feasible. Conversely, Scotland is the only part of the UK to levy a charge on disposable cups, implemented through the Circular Economy Bill, which shows there are powers in place to charge for environmentally damaging goods, but there may be practical and legal issues of amending this bill to include high value goods such as vehicles.

*Affordability*

### **Medium Risk**

While existing VED generates around £5 billion annual revenue, this has been reducing in recent years given the trend towards cleaner electric vehicles which are currently exempt from the tax. Increasing VED rates would result in government income to fund a variety of departments and functions as this is general taxation. An additional charge could be hypothecated towards improving the transport network, and could capture electric vehicles too. Administering such a charge should be affordable given the infrastructure already exists to collect and enforce payment.

**Medium Risk**

Continuing to use VED as a form of tax on vehicle ownership is likely to be more publicly acceptable than a new road user charging scheme. A surcharge in addition to existing VED may receive some opposition but will likely remain a 'hidden' cost and perceived as the same as a VED and therefore opposition may be minor. There is general support for a charge which varies by vehicle type and size given the perceived fairness of this principle and the ability to pay is usually higher among those with larger and higher polluting vehicles. However, it may be difficult to increase vehicle taxation or implement surcharges to make charges on vehicle ownership more effective as a demand management tool, particularly for electric vehicles, which are currently exempt from such tax with many people incentivised to switch to a cleaner vehicle due to the fact they are not currently subjected to additional taxes or surcharges.

16.5.5 STAG Criteria

*Environment*

**Minor Positive**

A charge on vehicle ownership may have a minor positive impact on noise and vibration and air quality given this can be accounted for within the charge and encourage people to buy more efficient and less polluting vehicles. A charge on vehicle ownership is not likely to impact on biodiversity and habitats, geology and soil, land use, water, drainage and flooding, historic environment, or landscape. *Climate Change*

**Minor Positive**

A vehicle ownership charge could have a positive impact on climate change given the charge could be used to incentivise the ownership of cleaner and more efficient vehicles. However, once the charge is paid (typically annually) there is no disincentive to reduce vehicle use, and hence has a limited impact on consumption and emissions. The impact on the greenhouse gas emissions subcriterion is therefore expected to be minor positive. The impacts of vehicle levies on vulnerability to the effects of climate change and potential to adapt to the effects of climate change are expected to be neutral.

*Health, Safety and Wellbeing*

**Minor Positive**

A vehicle levy could reduce the number of vehicles using the road and hence the number of accidents would be expected to fall. However, any reduction in traffic volumes could lead to increased speed and increase the severity of accidents. The impact on this subcriterion is therefore minor negative. A reduction in vehicle ownership due to the Vehicle Levy could lead to more active travel and improved health outcomes. Vehicle duties which alter by emission could have a positive impact on health by encouraging a shift to cleaner vehicles, leading to improvements in pollution and potentially fewer health impacts such as asthma and lung disease. Similarly visual amenity could be increased if there are fewer cars as land can be repurposed for public realm. The impact against the health and visual amenity subcriteria is therefore minor positive.

Access to health and wellbeing would be unchanged in terms of physical access, however affordability is likely to be a barrier to access for some groups (see affordability sub criterion under Equality and Accessibility Criterion below). The impact against this subcriterion is therefore neutral.

There is not expected to be any security impacts of applying a vehicle surcharge. The impact against this subcriterion is therefore neutral.

#### *Economy*

##### **Minor Positive**

Vehicle levies have the potential to improve journey times and reliability by reducing congestion. The impact against TEE is therefore considered to be minor positive. The impact against WEI is considered to be neutral.

#### *Equality and Accessibility*

##### **Minor Negative**

A vehicle levy will not have a direct impact on public or active travel network coverage. The impact against these sub criteria is therefore considered to be neutral. Comparative access by people group and geographic location would be unchanged in terms of physical access, however affordability is likely to be a barrier to access for some groups who may be more car dependant given their health or geographic area). The impact against these sub criteria is therefore considered to be neutral . A vehicle levy would make driving less affordable which would have the greatest impact on disabled and older people who may be more reliant on car travel due to difficulties accessing alternatives modes and for people who do not feel safe using other modes, potentially including women, LGBT+ people, younger people, older people, people with disabilities, and people belonging to ethnic or religious minority groups.

A vehicle levy which does not account for vehicle use may be considered inequitable given different groups of people will pay the same regardless of their use of the vehicle or ability to pay. Lower income groups would pay a greater portion of their income on the charge compared to higher income groups, with consumption not affecting the charge. However, the charge can be varied depending on the type of the vehicle which can discourage the purchase of large and highly polluting vehicles, but this can have a negative impact on families who may require a larger vehicle or those who own a large or highly polluting older vehicle but cannot afford to replace it. A vehicle levy may be unaffordable to certain groups and have a differential impact on low income people in rural settings, who may have no other option but to own and use a vehicle. The impact against the affordability subcriterion is therefore minor negative.

#### 16.5.6 Policy Alignment

##### **Moderate Positive**

Vehicle levies could contribute to the 20% car reduction target identified in the **Climate Change Plan** and aligns positively with the **NTS2** priorities to “Takes climate action” and “Improve health and wellbeing” although potentially conflicts with the priorities to “Deliver inclusive economic growth” and “Reduce inequalities”. The option has the potential to complement public transport and active travel options recommended through **STPR2**, by encouraging modal shift to sustainable and increasing the usage of such options, ultimately improving value for money, though

the scope for modal shift and revenue generation is less than other options considered

Vehicle levies also align with planning policy outlined in the **NPF4**, which proposes building 20 minute neighbourhoods to significantly reduce the need to travel; strengthening support for development in town centres and restricting out-of-town retail and leisure to encourage a transition away from car-dependent developments and stimulating new models of low carbon living in our rural areas as well as our towns and cities, by facilitating further investment in digital infrastructure, building in more space for people to work remotely and creating community hubs. There may be some conflicts with the **Equalities Act (2010)** and the **Fairer Scotland Duty** due to potential negative differential impacts on affordability for women, LGBT+ people, younger people, older people, people with disabilities, people belonging to ethnic or religious minority groups, and people experiencing socio-economic disadvantage. It may be possible to mitigate these negative impacts through the option design, for example through discounts or exemptions.

#### 16.5.7 Sustainable Investment Hierarchy

##### **Makes better use of existing capacity**

#### 16.5.8 Differential Impacts and Design Considerations

A key design consideration of a vehicle levy is whether it is delivered as a new charge or an increase in existing VED. Applying a new charge is likely to be more feasible given motoring taxation is not currently within the devolved competency of the Scottish Government and devolution of further powers appears unlikely in the short-medium term. There are already provisions for charges to “items proven to cause environmental harm” in Scotland, but these have up to this point not been applied to a high value good such as a car.

A vehicle levy could also function in a similar way to Vignettes, which allow access to the roads over a given period of time if the charge is payable annually or allows access to only certain types of road, which could have an impact on limiting demand. A vehicle levy could be applied universally to all vehicles at the same rate which would not be an equitable or environmentally effective solution given those with higher polluting vehicle would pay the same as those with cleaner vehicles. Varying the charge by vehicle emissions or size would help the option perform against equity criteria given those on lower incomes are more likely to own a smaller and less polluting car but some on low incomes are ‘locked’ into owning an older and highly polluting vehicle given the costs associated with replacing the vehicle. Additionally, there could be discounts or exemptions on the levy for those with disabilities who may find their personal mobility significantly impacted by not owning or having access to a private vehicle.

#### 16.5.9 Decision and Rationale

It is recommended that vehicle levies should be retained for further consideration at detailed appraisal.

Vehicle levies will have some impact on vehicle kilometres travelled by disincentivising vehicle ownership, but is not well targeted to reducing distance travelled. The option performs well against STAG criteria with environmental, climate and health benefits given they can be used to encourage uptake of greener vehicles or discourage the ownership of a vehicle all together. However, like all options it

would have a negative impact on equality without further mitigation in the packaging stage.

The option overall has some deliverability risk as charging a vehicle based on emissions is seen as fair and currently done, there may be issues with establishing bespoke arrangements for Scotland and rolling the charge out to electric vehicles.

DRAFT

## 16.6 Fuel Levies

Research Objective	Implementability (Risk)			STAG Criteria					Policy Alignment	Position in Sustainable Investment Hierarchy	Decision
Reduce Car km by 20% by 2030	Feasibility	Affordability	Public Acceptability	Environment	Climate Change	Health, Safety & Wellbeing	Economy	Equality & Accessibility			
++	High	High	Medium	+	+	0	+	-	++	Makes better use of existing capacity	<b>Retain</b>

### 16.6.1 Summary

Fuel levies have the potential to address vehicle kilometres travelled by charging fuel consumption which is directly linked to distance travelled. There are some potential negative impacts on equality and accessibility due to the effect on affordability, particularly for people in rural areas who may have no choice but to travel long distances by car. There are some deliverability risks, particularly for feasibility and affordability, with uncertainty around how electricity used for vehicle fuel could be differentiated and the potential costs to implement such technology.

The effectiveness of fuel levies will be highly dependent on the ability to adapt to include electricity. There are some potential negative impacts on equality and accessibility due to the effect on affordability, although this could be mitigated to some extent with discounts or exemptions. Fuel levies could also have a negative differential impact on rural communities, given the lack of alternative mode choice and longer distances travelled, and this may not be easily mitigated.



## 16.6.2 Potential Behaviour Responses

- Continue to drive as before and pay fuel levies.
- Reduce vehicle kilometres travelled (this would affect cars but also other vehicles e.g. motorbikes and HGVs).
- More fuel-efficient driving.
- Shift to hybrids/EVs.
- Shift to alternative modes (including car sharing).

## 16.6.3 Research Objective

*Reduce Car Kilometres by 20% by 2030*

### **Moderate Positive**

Fuel levies are likely to reduce the number of car kilometres travelled by increasing the cost of fuel consumption and disincentivising car use. However, fuel consumption is also related to speed, as well as distance, and in many cases, particularly longdistance journeys, the most fuel-efficient route is not always the shortest by distance. It is important to acknowledge the anticipated transition from petrol and diesel to alternative fuels, however, provided a feasible solution can be found to implement a levy on the new fuel sources, the efficacy in reducing car kilometres will remain unchanged.

## 16.6.4 Deliverability

*Feasibility*

### **High Risk**

Fuel duty is a levy which is already implemented on petrol and diesel sales in the UK, and theoretically this could be increased as a demand management tool. However, since fuel duty is currently reserved to the UK government, any changes to fuel duty in Scotland would require additional devolution powers. An alternative approach would be to implement a separate charge on fuel in Scotland in addition to fuel duty. An additional charge can be added to “environmentally damaging goods” through the Circular Economy Bill. Currently this is limited to plastic bags and disposable cups so there are practical and legal concerns about amending this bill to include fuel and energy.

As fuel use transitions from petrol and diesel to electric and hydrogen, the practicalities of implementation will change. It is currently relatively straightforward to apply a targeted surcharge for vehicle fuel, because petrol and diesel are almost exclusively used as vehicle fuel and obtained at petrol stations. It will be more difficult to apply a vehicle fuel surcharge to electricity, because electricity is used for many other purposes and is available to people in their homes. Any charge on electricity would have to be applied for all usage purposes or new technology would need to be developed to determine usage purpose.

*Affordability*

### **High Risk**



The initial affordability to apply a duty on petrol and diesel will be low risk, since it is likely to incur minimal set up costs and generate revenue.

However, if a targeted tax was to be applied on electricity used for vehicles, this would have significant set up costs for the development of the technology and the deployment and installation to all households.

#### *Public Acceptability*

### **Medium Risk**

Fuel duty is already applied to petrol and diesel purchases, and while there may be some opposition to additional charges, it is likely to be accepted as part of the cost of fuel.

If an additional charge or tax was applied to electricity consumption, there would likely be opposition due to potential impacts on the cost of living, particularly in a context where prices are increasing regardless of any future fuel levies. People may also be opposed to installation of technology to determine the purpose of their electricity usage.

#### 16.6.5 STAG Criteria

#### *Environment*

### **Minor Positive**

Fuel levies will encourage an overall reduction in fuel consumption, which will reduce emissions of pollutants and improve air quality. However, unlike cordon charging or area charging, the fuel levies do not specifically target congested locations. The negative environmental impacts of air quality depend on the local concentration of pollutants, so options which target congested locations are more effective than those which reduce emissions in general. The impact against this subcriterion is therefore minor positive.

Fuel levies could reduce total traffic flows across Scotland, which would have a positive impact on biodiversity and habitats, landscape, and noise and vibration. The impact against these sub criteria is therefore considered to be moderate positive. Cordon charging is not expected to change the physical characteristics of the existing road network, only the traffic flows, so the impacts on geology and soils, land use, water, drainage and flooding, and historic environment are expected to be neutral.

#### *Climate Change*

### **Minor Positive**

A charge on fuel use is likely to have a positive impact on greenhouse gas emissions given fuel consumption is directly related to greenhouse gas emissions. However, if this charge was extended to electricity, this could remove a key incentive for changing to cleaner vehicles, as currently they are not subjected to the same taxes as fossil fuels. Unless mitigated this could have a minor negative impact on the greenhouse gas emission criterion given these will continue to increase if electric vehicle uptake is halted.

The option will have no impact on the vulnerability to effects of climate change or potential to adapt to the effects of climate change sub criterion.

#### *Health, Safety and Wellbeing*

### Neutral

A fuel levy could reduce the number of vehicles using the road and hence the number of accidents would be expected to fall. However, any reduction in traffic volumes could lead to increased speed and increase the severity of accidents. This would lead to a minor negative impact against this subcriterion.

Fuel duties on fossil fuels could have a positive impact on health by encouraging a shift to cleaner vehicles, leading to improvements in pollution and potentially fewer health impacts such as asthma and lung disease. This impact would therefore be minor positive.

Access to health and wellbeing would be unchanged in terms of physical access, however affordability is likely to be a barrier to access for some groups (see affordability sub criterion under Equality and Accessibility Criterion below). This would be a minor negative impact.

There is not expected to be any impacts of a vehicle levy on security or visual amenity.

#### *Economy*

### Minor Positive

Fuel levies have the potential to improve journey times and reliability by reducing congestion. The impact against TEE is therefore considered to be minor positive. If fuel levies encourage densification of land use, there may be improvements to productivity. The impact against WEI is therefore considered to be minor positive.

#### *Equality and Accessibility*

### Minor Negative

Fuel levies would not have an impact on public transport or active travel network coverage. This impact against this sub criterion is therefore neutral.

Comparative access by people group and geographic location would be unchanged in terms of physical access, however affordability is likely to be a barrier to access for some groups who may be more car dependant given their health or geographic area). The impact against these sub criteria is therefore considered to be neutral.

Fuel levies would make driving less affordable which would have the greatest impact on disabled and older people who may be more reliant on car travel due to difficulties accessing alternatives modes and for people who do not feel safe using other modes, potentially including women, LGBT+ people, younger people, older people, people with disabilities, and people belonging to ethnic or religious minority groups. Therefore discounts or exemptions should be considered for different user groups. Fuel levies would also have a greater impact on people with low incomes due to charges making up a higher proportion of their income. Fuel levies could also have a negative differential impact on rural communities, given the lack of alternative mode choice and longer distances travelled.

#### 16.6.6 Policy Alignment

### Moderate Positive

Fuel levies would contribute to the 20% car reduction target identified in the **Climate Change Plan** and aligns positively with the **NTS2** priorities to “Takes climate action” and “Improve health and wellbeing” although potentially conflicts with the priorities to “Deliver inclusive economic growth” and “Reduce inequalities”. The option has the

potential to complement public transport and active travel options recommended through **STPR2**, by encouraging modal shift to sustainable and increasing the usage of such options, ultimately improving value for money.

Fuel levies also align with planning policy outlined in the **NPF4**, which proposes building 20 minute neighbourhoods to significantly reduce the need to travel; strengthening support for development in town centres and restricting out-of-town retail and leisure to encourage a transition away from car-dependent developments and stimulating new models of low carbon living in our rural areas as well as our towns and cities, by facilitating further investment in digital infrastructure, building in more space for people to work remotely and creating community hubs. There may be some conflicts with the **Equalities Act (2010)** and the **Fairer Scotland Duty** due to potential negative differential impacts on affordability for women, LGBT+ people, younger people, older people, people with disabilities, people belonging to ethnic or religious minority groups, and people experiencing socio-economic disadvantage. It may be possible to mitigate some of these negative impacts through the option design, for example through discounts or exemptions, however it may be more difficult to mitigate the impact on people living in rural areas.

#### 16.6.7 Sustainable Investment Hierarchy

##### **Makes better use of existing capacity**

#### 16.6.8 Differential Impacts and Design Considerations

The effectiveness of fuel levies will be highly dependent on the ability to adapt to include electricity. There are some potential negative impacts on equality and accessibility due to the effect on affordability, although this could be mitigated to some extent with discounts or exemptions. Fuel levies could also have a negative differential impact on rural communities, given the lack of alternative mode choice and longer distances travelled, and this may not be easily mitigated.

#### 16.6.9 Decision and Rationale

It is recommended that fuel levies should be **retained** for further consideration at detailed appraisal.

Fuel levies have the potential to address vehicle kilometres travelled by charging fuel consumption which is directly linked to distance travelled.

There are some potential negative impacts on equality and accessibility due to the effect on affordability, particularly for people in rural areas who may have no choice but to travel long distances by car.

There are some deliverability risks, particularly for feasibility and affordability, with uncertainty around how electricity used for vehicle fuel could be differentiated and the potential costs to implement such technology.

## 16.7 Distance Based Charging

Research Objective	Implementability (Risk)			STAG Criteria					Policy Alignment	Position in Sustainable Investment Hierarchy	Decision
	Feasibility	Affordability	Public Acceptability	Environment	Climate Change	Health, Safety & Wellbeing	Economy	Equality & Accessibility			
Reduce Car km by 20% by 2030	High	High	High	+	++	+	+	0	++	Makes better use of existing capacity	Retain

### 16.7.1 Summary

Distance-based charging has the potential to apply specific charges to use of the road network, directly related to usage. Distance based charging could be implemented on a local or national level and could be tailored to meet the needs of urban and rural communities. It is therefore highly likely to be able to meet the objective of reducing car kilometres, in a targeted way.

A requirement of distance-based charging is the ability to closely estimate the exact milage being consumed and charge for it directly. This would likely be achieved with the use of incar telematics of the type already implemented within fleet tracking and insurance, in combination with enforcement via the use of ANPR. Though the technology is readily available, the feasibility of universal adoption of on-board devices would pose the greatest feasibility challenge.

The close feedback required of any distance-based charging scheme would enable it to be targeted towards specific journeys and geographies, allowing for adjustments to the level of charge in rural areas. The impact of this option on both the achievement of the objective and the equity of its implementation would be positive.



### 16.7.2 Potential Behaviour Responses

- Make fewer discretionary car journeys
- Switch modes for some journeys according to cost and convenience • Start travelling shorter distances to access goods and services more locally (even though they may not represent the greatest choice or lowest cost)
- Accept the charge and continue current behaviour
- Combines trips of different purposes
- Increased ride sharing
- Uses the shortest route by distance, though possibly not the most suitable or quickest (avoids motorways or ring roads)

### 16.7.3 Research Objective

*Reduce Car Kilometres by 20% by 2030*

#### Major Positive

Though few real-world examples currently operate, distance-based charging is considered by many research studies to represent the optimum solution to the question of efficiently pricing road usage and thereby reducing car kilometres. Distance-based charging would allow for charges to be directly placed on the amount of driving undertaken and have the greatest impact on longer length journeys which make up the majority of car kilometres travelled in Scotland. However, some evidence suggests a distance-based charge in urban settings would not have the same impact given the short distances, and consequently low charges encountered, so a complementary measure may be required to mitigate this unintended consequence. Further evidence, from the roll-out of energy smart meters, suggests that the behaviour changing effect of better access to price information leads consumers to make more informed choices. Similarly, distancebased charging provides opportunity for greater levels of feedback to the consumer on the real-time cost of a journey. Depending on how it was implemented, the charge could be tailored according to geographical location to target shorter urban journeys, and also to reflect lack of alternatives for more remote locations. As such, it scores as major positive in respect of the research question.

### 16.7.4 Deliverability

*Feasibility*

#### High Risk

Distance-based charging requires an effective means of estimating the exact distances travelled by the individual vehicle. This can be achieved using in-car telematic devices and these are already in widespread usage in commercial fleets and as part of some insurance schemes. However, linking already fitted devices and undertaking a mass procurement and roll out of new devices under a single system will be logistically challenging. Telematic tracking makes use of the Global Navigation Satellite System (GNSS) system and there are known ways in which this system can be bypassed – known as ‘jamming’ or ‘spoofing’. For this reason, a GNSS based system would likely require checking and enforcement by ANPR. Manual checking of ANPR requires a significant ‘back office’ of staff to monitor cameras and process the

data. For these reasons, although the technology is readily available to deliver distance-based charging, the overall feasibility risk is judged as being high.

#### *Affordability*

### **High Risk**

A distance-based charging system based on GNSS would require capital expenditure on the purchase of telematic devices and on the creation of a network of ANPR cameras, ongoing costs associated with maintenance of the system and revenue costs associated with the 'back office' of staff required to monitor and process the data. Because of the intricacies of such a system is its unlikely that local authorities would have the capacity to administer local distance-based charging systems. It is therefore likely that distance-based charging would be administered at the national level. The initial capital, maintenance and revenue costs would therefore be borne by the Scottish Government, while the cost of the telematic devices could be passed on to the user, or as a deduction from the road user charge. Collectively, the initial capital costs and ongoing revenue costs for a national scheme would be significant.

#### *Public Acceptability*

### **High Risk**

All proposed charging measures, particularly those which are intended as deterrents to car travel, are likely to be met with significant public opposition. Though distancebased charging affords the opportunity to create a more balanced and fair system of charging, which could be an attractive proposition for the public, the overriding impact of compelling individuals to install tracking devices in their vehicles would be pose a significant barrier to delivery. This could potentially be overcome by working with the car insurance industry to design legislation which required telematics as a precondition of insurance cover. However, there remains a high degree of uncertainty around the exact pathway for delivery of such an option. A charging design that was mindful of the availability of different travel options in different areas and hypothecation to positive alternative modes of travel could also help acceptability.

#### 16.7.5 STAG Criteria *Environment*

### **Minor Positive**

Distance based charging could encompass the entirety of the public road network and therefore avoid unwanted environmental impacts associated with traffic rerouting to avoid charges. However there may be some re-routing from longer distance or circuitous motorways or ring roads to local roads less able to cope with high traffic volumes. The overall impact of road transport on the environment would reduce in proportion to the number of vehicle kilometres saved. However, in terms of noise and air quality, charging by distance alone would not shift vehicle or engine choice away from more polluting types and would not focus improvements toward the areas with the highest congestion, where these impacts are concentrated. Though the installation of the required ANPR infrastructure would have some impacts on the environment, effectively managing demand would reduce or eliminate the need for additional road capacity works, resulting in an overall positive impact of this option on geology and soils, land use, ecology and flooding, and historic environment.

#### *Climate Change*

### **Moderate Positive**

Distance based charging would be one of the most efficient ways of managing demand for road use. While internal combustion engine vehicles are still in use, this would have a strongly positive impact on reducing greenhouse gas emissions. As zero emissions vehicles assume the majority of the vehicles in use, the impact on greenhouse gas emissions will be less, with the level of this reduction dependent on the overall mix of energy production. The embodied carbon within vehicle production would potentially be reduced if distance-based charging led to mode switching and a reduction in the number of vehicles manufactured and purchased. The impact against greenhouse gas emissions is therefore minor positive. The impacts of distance-based charging on vulnerability to the effects of climate change and potential to adapt to the effects of climate change are expected to be neutral.

#### *Health, Safety and Wellbeing*

### **Minor Positive**

A distance-based charge could reduce the number of vehicles using the road and hence the number of accidents would be expected to fall. However, any reduction in traffic volumes could lead to increased speed and increase the severity of accidents. This would lead to a minor negative impact against this sub-criterion. The technology required to implement distance -based charging has potential implications for security of personal data. While ANPR and in-vehicle telematic technology is already in use; widespread use for congestion charging would increase the coverage and therefore potentially increase the level of damage if hacked or compromised. However, the likelihood of a security breach is extremely low, so the overall impact against this sub criterion is therefore expected to be neutral. Reduction in demand across the network and commensurate shifts in travel behaviour towards more active and sustainable modes would create an overall positive impact on health, with the level of positive impact being dependent on how these journeys were redistributed. Access to health and wellbeing would be unchanged in terms of physical access, however affordability is likely to be a barrier to access for some groups (see affordability sub criterion under Equality and Accessibility Criterion below). The impact against this sub criterion is therefore considered to be positive.



## Economy

### Minor Positive

Distance based charging has the potential to improve journey times and reliability by reducing congestion. However potential rerouting to the shortest distance route could result in a shift in congestion from high-capacity roads such as motorways to local roads with less capacity and more vulnerable to congestion. However, a distance based charge provides a constant price signal to the decision maker about their journey. The impact against TEE is therefore considered to be minor positive. If fuel levies encourage densification of land use, there may be improvements to productivity. However, demand for transport is derived from economic activity and economic growth (GDP) and traffic growth (vehicle km) have, historically, been closely correlated. If a charge were over-applied to the extent that the costs imposed were disproportionate to the societal benefit gained, there would be a highly negative impact on the wider economy. The impact against WEI is therefore considered to be minor positive.

## Equality and Accessibility

### Neutral

Distance based charging using GNSS tracking would enable differential charges to be applied according to location. This would reduce or mitigate the impact of road user charging on island or rural communities. The reduction in congestion would confer journey time and reliability benefits for bus users and could free up road space for the addition of active travel infrastructure.

The affordability of car transport would be affected by any road user charge, and this could have a negative impact on people experiencing socio-economic disadvantage, particularly those who are reliant on car journeys due to lack of alternatives. Where socio-economic disadvantage exists in rural areas, there is the possibility for highly negative impacts, which would require additional complementary measures to mitigate.

### 16.7.6 Policy Alignment

### Moderate Positive

Distance charging would contribute to the 20% car reduction target identified in the **Climate Change Plan** and aligns positively with the **NTS2** priorities to “Takes climate action” and “Improve health and wellbeing” although potentially conflicts with the priorities to “Deliver inclusive economic growth”. The effect on “Reduce inequalities” is uncertain, there is potential within this option to mitigate negative impacts on this objective. The option has the potential to complement public transport and active travel options recommended through **STPR2**, by encouraging modal shift to sustainable and increasing the usage of such options, ultimately improving value for money.

Distance charging also aligns with planning policy outlined in the **NPF4**, which proposes building 20 minute neighbourhoods to significantly reduce the need to travel; strengthening support for development in town centres and restricting out-of-town retail and leisure to encourage a transition away from car-dependent developments and stimulating new models of low carbon living in our rural areas as well as our towns and cities, by facilitating further investment in digital infrastructure, building in more space for people to work remotely and creating community hubs.

There may be some conflicts with the **Equalities Act (2010)** and the **Fairer Scotland Duty** due to potential negative differential impacts on affordability for women, LGBT+ people, younger people, older people, people with disabilities, people belonging to ethnic or religious minority groups, and people experiencing socio-economic disadvantage. It may be possible to mitigate these negative impacts through the option design, for example through differential costs for short and long journeys.

#### 16.7.7 Sustainable Investment Hierarchy

### **Makes better use of existing capacity**

#### 16.7.8 Differential Impacts and Design Considerations

The technical and administrative challenges of implementing distance-based road user charging mean that this option is only likely to be feasible at Scottish or UK national level. The use of telematic tracking using GNSS, combined with enforcement and verification via ANPR would provide the potential for differential costs to be imposed on different lengths of journey and at different locations. Without such a tailored approach, a flat rate distance charge would have negative impacts on those in remote and rural communities and would not target the shorter journeys which are potentially more substitutable for public or active alternatives.

#### 16.7.9 Decision and Rationale

It is recommended that distance charging should be **retained** for further consideration at detailed appraisal.

Distance charging has high potential to directly address vehicle kilometres travelled in absolute-terms. Though the technology is widely available, this option would present a significant challenge in terms of public acceptability and, because it would need to be implemented at national level, would come at significant cost. The environmental benefits would be dispersed across the existing road network, rather than at specific points of current congestion.

There are potential negative impacts on equality and accessibility, should a distance based charge be applied as a flat rate. However, the nature of the technological solutions available allow a high degree of adaptability for differential charges according to distance and location.

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16.8 Summary of Appraisal 16.8.1  
Appraisal Scoring

	Research Objective	Implementability (Risk)			STAG Criteria					Policy Alignment	Position in Sustainable Investment Hierarchy	Decision
	Reduce Car km by 20% by 2030	Feasibility	Affordability	Public Acceptability	Environment	Climate Change	Health, Safety & Wellbeing	Economy	Equality & Accessibility			
Cordon Charging	+	Medium	Medium	High	++	+	+	+	-	++	Makes better use of existing capacity	Retain
Area Charging	+	Medium	Medium	High	+++	+	+	+	-	++	Makes better use of existing capacity	Retain
Parking Charges	+	Low	Medium	Medium	+	+	0	-	-	++	Makes better use of existing capacity	Retain
Vehicle Levies	+	Medium	Medium	Medium	+	+	+	+	-	++	Makes better use of existing capacity	Retain
Fuel Levies	++	High	High	Medium	+	+	0	+	-	++	Makes better use of existing capacity	Retain
Distance Charging	+++	High	High	High	+	++	+	+	0	++	Makes better use of existing capacity	Retain

16.8.2 Option Decision, Design Considerations, Mitigation and Packaging

Decision	Rationale	Design Considerations	Mitigation and Packaging
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Cordon Charging	Retain	<p>Cordon charging has the potential to address vehicle kilometres travelled in the most congested areas. There are potential environmental benefits due to reduced vehicle emissions in areas with poor air quality and potential health benefits due to reduced traffic congestion making active travel more attractive, improving health outcomes and reducing conflicts which could cause accidents.</p>	<p>Cordon charging is best suited to urban areas and could be applied in cities or in towns with a population greater than a defined threshold. Rollout may be limited by availability of ANPR infrastructure and contractors for installation.</p> <p>There are some potential negative impacts on equality and accessibility due to the effect on affordability.</p> <p>There are some deliverability risks, particularly with public acceptability amongst those who live within or near the cordon.</p> <p>There may also be feasibility and affordability risks associated with procurement and installation of ANPR to support widespread implementation.</p>	<p>Cordon charging is effective at targeting high concentration, short distance urban journeys, but could be implemented in combination with other options to maximise effectiveness at reducing different types of journeys.</p> <p>Equality and acceptability risks could be mitigated through discounts or exemptions.</p>
Area Charging	Retain	<p>Area charging has the potential to address vehicle kilometres travelled in the most congested areas. There are potential environmental benefits due to reduced vehicle emissions in areas with poor air quality and potential health benefits due to reduced traffic congestion making active travel more attractive, improving health outcomes and reducing conflicts which could cause accidents.</p>	<p>Area charging is best suited to urban areas and could be applied in cities or in towns with a population greater than a defined threshold. Rollout may be limited by availability of ANPR infrastructure and contractors for installation.</p> <p>There are some potential negative impacts on equality and accessibility due to the effect on affordability.</p> <p>There are some deliverability risks, particularly with public acceptability amongst those who live within or near the area.</p> <p>There may also be feasibility and affordability risks associated with procurement and installation of ANPR to support widespread implementation.</p>	<p>Area charging is effective at targeting high concentration, short distance urban journeys, but could be implemented in combination with other options to maximise effectiveness at reducing different types of journeys.</p> <p>Equality and acceptability risks could be mitigated through discounts or exemptions.</p>

Retain

Parking charges have the potential to reduce car kilometres at a local level.

Parking charges are most effective in locations where alternative parking does not exist or is also subject to charges. Depending on the type of charge, the level of enforcement varies. These factors may limit the locations where parking charges can be effectively implemented.

There are some potential negative impacts on equality and accessibility due to the effect on affordability.

There are some deliverability risks, particularly with public acceptability of certain types of charge.

There are risks associated with affordability given the high operating costs associated with enforcement of some types of charge.

Parking charges are effective in urban areas and key destinations, but could be implemented in combination with other options to maximise effectiveness at reducing different types of journeys.

Equality and acceptability risks could be mitigated through discounts or exemptions.

Retain

Vehicle levies have the potential to reduce vehicle kilometres travelled by disincentivising vehicle ownership. There are also potential environmental, climate and health benefits.

Vehicle levies are effective at disincentivising car ownership. This is most likely to be effective in locations with good alternatives to car.

There is no disincentive to travelling long distances once the yearly charge has been paid and there is a risk that car owners increase their distance travelled to improve “value for money”.

There are some potential negative impacts on equality and accessibility due to the effect on affordability.

There are feasibility risks associated with implementing both a tax, which would require further devolution, and a charge, which would require new primary legislation. There are also risks associated with public acceptability, although these are likely to be lower for a hypothecated charge which is reinvested in transport network improvements than for a tax, which would result in more money for general government expenditure.

Parking charges are effective at disincentivising car ownership in urban areas with good alternatives to car, but could be implemented in combination with other options to maximise effectiveness at reducing different types of journeys.

Some of the feasibility and acceptability risks could be mitigated by implementing as a charge instead of a tax, due to potential for hypothecation and removing the need for further devolution, but new primary legislation would still be required.

Equality and acceptability risks could be mitigated through discounts or exemptions.

Retain

Fuel levies have the potential to address vehicle kilometres travelled by charging fuel consumption which is directly linked to distance travelled.

Vehicle levies are effective at disincentivising fuel consumption. This targets less fuel-efficient journeys.

There are some potential negative impacts on equality and accessibility due to the effect on affordability, particularly for people in rural areas who may have no choice but to travel long distances by car.

There are some deliverability risks, particularly for feasibility and affordability, with uncertainty around how electricity used for vehicle fuel could be differentiated and the potential costs to implement such technology.

Fuel levies are effective at disincentivising fuel-inefficient journeys and could be implemented as a short-term measure with an exemption for EVs to encourage a shift to EVs. This could be done in combination with other options to maximise effectiveness at reducing different types of journeys. This approach would remove the feasibility risks associated with charging electricity consumption. However its success would depend on timescales for implementation.

Some of the feasibility and acceptability risks could be mitigated by implementing as a charge instead of a tax, due to potential for hypothecation and removing the need for further devolution, but new primary legislation would still be required.

Equality and acceptability risks could be mitigated through discounts or exemptions.

## Retain

Distance-based charging has the potential to apply specific charges to use of the road network, directly related to usage. Distance based charging could be implemented on a local or national level and could be tailored to meet the needs of urban and rural communities. It is therefore highly likely to be able to meet the objective of reducing car kilometres, in a targeted way.

The close feedback required of any distancebased charging scheme would enable it to be targeted towards specific journeys and geographies, allowing for adjustments to the level of charge in rural areas. The impact of this option on both the achievement of the objective and the equity of its implementation would be positive.

A requirement of distance-based charging is the ability to closely estimate the exact mileage being consumed and charge for it directly. This would likely be achieved with the use of in-car telematics of the type already implemented within fleet tracking and insurance, in combination with enforcement via the use of ANPR. Though the technology is readily available, the feasibility of universal adoption of on-board devices would pose the greatest feasibility challenge.

Distance based charging is effective at addressing longer journeys. This could be done in combination with other options to maximise effectiveness at reducing different types of journeys.

Equality and acceptability risks could be mitigated through discounts or exemptions.



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## NEW CHAIN

### From AECOM to Transport Scotland

#### 13/10/22 RE: TDM Options Study - data sources for quantification

Hi [redacted],

Thanks for your response, answers in green below.

Would we also be able to get vehicle km travelled by taxi compared with overall travel, ideally with minicabs separate from taxicab (if this is at all a possibility!).

As with the other data ideally we would be looking for an understanding of geographical variation if that can be provided. Dis-aggregations by a combination of LA together with the SG urban-rural classification would be useful. Ideally we would look at the 6 fold classification, but if this should not be possible a combination of LA and 3-fold or 2-fold urban rural classification would also be useful.

Thanks very much for your help, it's much appreciated!

[redacted]

From: [redacted].[redacted]@...transport.gov.scot  
<[redacted].[redacted]@...transport.gov.scot> Sent: 13 October 2022 11:03  
To: [redacted], [redacted] <[redacted].[redacted]@...aecom.com>;  
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[redacted], [redacted] <[redacted].[redacted]@...aecom.com>; [redacted], [redacted]  
<[redacted].[redacted]@...aecom.com>  
Subject: RE: TDM Options Study - data sources for quantification

Hi [redacted]

I should be able to produce most of this from Scottish Household Survey data, but not data for carers.

#### Disability

In the Scottish Household Survey, we ask if People have a long-term physical or mental health condition, whether it affects their ability to carry out everyday activities and the nature of the condition (19 categories). I'll check with colleagues working on disability what would constitute a disability affecting mobility.

I should be able to give car km driven and availability for this group and the general population.

## Carers

I don't think I find anything close to 'employees in social care professions'. There's no detail on what jobs people do.

## Rural poor

I should be able to find 'rural poor'. We can give by urban-rural location and income, possibly by equivalised income (taking household size into consideration). Do you have a definition of 'poor'. eg lowest 20% or lowest 30% of incomes? **Ideally we're looking for benefits claimants, but in the absence lowest 20% income would be useful.**

I should be able to give car km driven and availability for rural poor and the general population.

## Location

This should be OK. It might not be possible to give much detail by purpose.

## Geography

I might not be able to go to great detail on geography – what geography would you like? We can calculate Local Authority and Regional Transport Partnership Areas easily (although numbers could be too low). I could look into other geographies, if you wanted. **A combination of Local Authority and Scottish Government urban rural classification (as outlined above) would be useful.**

## Years covered

I should be able to produce more detail by combining years. Would you be happy with up to 5 years combined? **Yes**

2020 was an unusual year, where data was collected only over a short period, where there were tight covid restrictions, and the methodology of the survey changed. Due to the unusual travel conditions and the data not being considered compatible with previous years, I'd be disinclined to include it. 2021 data won't be available until February or March 2023.

So data would be up to 2019. **ok**

Let me know of any particular definitions/classifications you'd like, and if there's anything else you'd like to ask.

Thanks

[redacted]

[redacted] [redacted] Transport  
Statistics

Transport Scotland

2D North, Victoria Quay, Edinburgh

[redacted]

From: [redacted], [redacted] <[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)>

Sent: 12 October 2022 15:23

To: [redacted] A ([redacted]) <[redacted].[redacted]@...transport.gov.scot>; [redacted] ([redacted]) <[redacted].[redacted]@...transport.gov.scot>; [redacted] ([redacted]) <[redacted].[redacted]@...transport.gov.scot>  
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All,

Following an initial sift and consideration of unintended consequences we've identified some groups that would potentially need to be exempt from charging, so we need to quantify the proportion of travel undertaken by those groups. To inform this it would be helpful to have access to the data indicated in the table below.

It would be great if you could forward what's available and advise if otherwise.

Many thanks for your help.  
 [redacted]

Group	Data needed	Data we have
People with a disability affecting their mobility, or if unavailable, blue badge holders as a proxy	Proportion of population in the group, by as small a geographic unit as possible.  Average car-km per year for the group, to compare with average for population as a whole (so we can adjust for car use intensity), or if unavailable average trips. Ideally disaggregate by purpose.  Car availability/ownership for the group and comparison to average.	As of March 2021 there were 238,970 Blue Badges in use across Scotland. Source: <a href="https://www.transport.gov.scot/ourapproach/accessible-transport/visionand-priorities-for-2021-2022/bluebadge/">https://www.transport.gov.scot/ourapproach/accessible-transport/visionand-priorities-for-2021-2022/bluebadge/</a>

<p>Carers (defined as employees in social care professions, who require cars in exercising their duties)</p>	<p>Average car-km per year for the group, to compare with average for population as a whole (so we can adjust for car use intensity) ), or if unavailable average trips.</p>	
<p>Rural poor (benefits claimants)</p>	<p>Proportion of population in the group, by as small a geographic unit as possible.</p> <p>Average car-km per year for the group, to compare with average for population as a whole (so we can adjust for car use intensity), or if unavailable average trips. Ideally disaggregate by purpose.</p> <p>Car availability/ownership for the group and comparison to average.</p>	<p>SIMD, which provides the proportion of population by a small geographic unit.</p>
<p>Location (by SG urban-rural classification)</p>	<p>Average car km by home location (SG urban rural</p>	
	<p>classification). Ideally disaggregate by purpose.</p> <p>Average car veh-km by income (quintiles) and urbanrural classification to help inform the establishment of 'free' allowance, or if</p>	



	<p>unavailable average trips.</p> <p>Car availability/ownership for the group and comparison to average.</p>	
--	--	--

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**NEW CHAIN**

**3/11/22 RE: Option Generation and Packaging Technical Note Draft**



## From AECOM to Transport Scotland

Hi [redacted],

Please find attached final draft version of WP4 with the comments and subsequent discussions addressed.

Many thanks,

[redacted]

From: [redacted].[redacted]@....transport.gov.scot  
<[redacted].[redacted]@....transport.gov.scot> Sent: 31 October 2022 13:08  
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Note Draft

From: [redacted], [redacted] <[redacted].[redacted]@....aecom.com> Sent: 25 October 2022 11:00  
To: [redacted] ([redacted]) <[redacted].[redacted]@....transport.gov.scot>

Hi [redacted],

Please find attached the draft technical note back with some comments.

Best wishes,

[redacted]

From: [redacted], [redacted] <[redacted].[redacted]@....aecom.com>  
Sent: 25 October 2022 11:00  
To: [redacted] ([redacted]) <[redacted].[redacted]@....transport.gov.scot>  
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Note Draft

Hi [redacted]

Please find attached the Option Development and Packaging draft technical note.

Regards

[redacted]

[redacted] [redacted], [redacted]

[redacted], Future Mobility

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Attached to this email chain is a draft version of technical studies supplied by AECOM, extracted below:

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- Prepared for: Transport Scotland AECOM ii

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- **1. Introduction**
- This technical note details the further option development and packaging, and the additional sift that has been undertaken based upon the preliminary appraisal and the unintended consequences workshop. It is structured into the following sections:
  - **Section 2 – Unintended Consequences:** Summary of the findings of the unintended consequences workshop.
  - **Section 3 – Option Development and Packaging:** Process to further develop the highlevel categories of options by specifying key details and packaging with mitigative and complementary measures.
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- **2. Unintended Consequences**
- The preliminary appraisal identified the likely effectiveness, broad feasibility and potential impacts of six transport demand management options which had been derived from international examples, a review of existing Scottish Government powers, and impact assessments of existing policy documents. This preliminary appraisal was used in order to frame a wider discussion on the further unintended consequences of the options under consideration.
 

A workshop was held with key Scottish Government and external stakeholders representing the interests of local government, taxation, health, accessibility, freight and logistics, a just transition, public transport and the low carbon economy in order to build upon the understanding of possible downstream effects and build mitigation into the packaging and charging design. The key questions posed to the workshop were:

  - • **Who?** Identify populations which may be affected by implementation of the option
  - • **What?** Identify potential impacts which may unintentionally result from the measure
  - • **How?** Establish the causal link between the two
  - • Can this impact be effectively mitigated through design of the scheme?
- 
- A summary of the workshop outputs is contained in Appendix 1.
- **2.1 Geographically defined options**
- **Potential Impacts:** The workshop identified potential impacts to people with a disability affecting their mobility, carers – who may not themselves qualify for exemptions under existing schemes – and taxis, which are often relied upon by those with mobility or visual impairments. The definition of the area for the charge to be applied also identified as a critical factor in designing a scheme which would not disproportionately affect those in rural or remote areas without access to alternatives. Direct impacts may be experienced by those experiencing socioeconomic disadvantage in urban areas, who work unsocial hours.
- **Mitigation and packaging:** The key deliverability issue raised in relation to cordon or areabased charging, beyond those that had been picked up in the preliminary appraisal, were the potential deliverability issues around the capacity of local authorities to implement such schemes. These are evidenced in part by the fact that, though legislation has been in place since 2001, no schemes have been successfully implemented. Given that the 20% reduction in car kilometres target is a Scottish Government policy, which would require implementation on roads for which local authorities are the statutory roads authority, it was judged that, both politically administratively, the burden of implementing such schemes could be shared between local and national government. The Scottish Government could enable local authorities to implement area or cordon-based schemes by creating a framework of funding and support and centralised ‘back office’ functions. Greater uptake of car share could reduce the absolute number of cars on the road, further contributing to the reduction of road space needed to service private vehicles and providing access to a car for those in socioeconomically disadvantaged areas. Though they would not be subsidised, or necessarily implemented by local or national government, exempting commercial car clubs or community car share schemes from charges would provide a cost incentive for greater uptake of car share, improving their viability and reducing their cost in absolute terms.
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## 2.2 Nationwide options

- **Potential Impacts:** Of the retained options from the preliminary appraisal, the potential impacts of alternative distance-based charge models were discussed. The discussion centred around the need to consider the impacts on people with mobility impairments and provide allowances or variable rates for those in rural areas trapped in car dependency due to lack of alternatives or for whom driving is essential due to unsociable working hours. A nationally based scheme in Scotland would also encounter border issues with vehicles arriving from other parts of the UK.

**Mitigation and packaging:** Appropriate mitigation would be provided for people with a disability affecting their mobility, or blue badge holders as a proxy, carers (defined as employees in social care professions, who require cars in exercising their duties), and allowances or variable rates would be provided for socioeconomically disadvantaged groups (benefits claimants as a proxy) or those in rural areas as defined by the Scottish Government Urban Rural Classification. Reduced costs for car share schemes would also be considered and could provide access to a car for those in socioeconomically disadvantaged areas. National border issues could be addressed using geofencing or grace period exemptions for vehicles from outwith Scotland could be enabled.

## 3. Option Development and Packaging

- The retained options from the preliminary appraisal have each been considered against the outcomes of the unintended consequences workshop and further discussions and have been further defined in order to allow for quantitative analysis and detailed appraisal to take place. This has been an iterative process and has also been informed by the data available to support the quantitative appraisal. For each option, a list of suitable exemptions, allowances, reductions or caps have been considered and these will be used to conduct sensitivity tests around each option in order to arrive at an indication of the optimum solution.
- Deliverability and acceptability issues identified in the preliminary appraisal, along with the outputs of the unintended consequences workshop, have been used to identify suitable complementary measures and mitigation. Though this is likely to be expanded within the detailed appraisal, the measures identified within this note comprise the 'core' measures which must be applied in order for the option to be taken forwards. Other complementary measures, such as the suite of recommendations set out within STPR2, will form the wider context into which any TDM measure is set, however the individual measures within STPR2 which separately complement an option are not detailed.
- Where significant residual impacts persist, once exemptions and complementary measures have been applied, the option will be sifted out and removed from further consideration.
- Figure 3.1 below provides an overview of this process.

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- **Figure 3.1: Option Development Process** Travel Demand Management Options Study  
Project number: 60686513
- Prepared for: Transport Scotland AECOM 4

Table 3.1: Option Development, Packaging and Further Sifting

Option	Geographic Coverage	Charging Method	Governance	Enforcement	Allowances / Exemptions / Reductions / Caps	Unintended Consequences	Complementary Interventions / Mitigations	Sifting Rationale
Cordon Based (Simple Cordon)	Large urban areas as defined by SG Urban Rural Classification	Daily fee applied upon crossing cordon.	Local Authorities	NPR	People with a disability affecting their mobility or if unavailable, blue badge holders as a proxy	Boundary effects. Administrative burden disproportionately placed on local authorities. Direct impacts on those experiencing socioeconomic disadvantage in urban areas, who work unsociable hours.	Parking charges at boundaries. Scottish Government framework of funding and support, with centralised 'back office' functions to enable Local Authorities to implement schemes. Revenues loosely hypothecated directed towards local transport strategies. Car share/car club schemes would be exempt and could provide access to a car for those in socioeconomically disadvantaged areas.	Retain
Area (Cordon Based)	Large urban areas as defined by SG Urban Rural Classification	Daily fee applied upon crossing any cordon in the area.	Local Authorities	NPR (in and out Radial / Mobile checks and internal screen fees)	People with a disability affecting their mobility or if unavailable, blue badge holders as a proxy	Boundary effects. Administrative burden disproportionately placed on local authorities to administer. Direct impacts on those experiencing socioeconomic disadvantage in urban areas, who work unsociable hours.	Parking charges at boundaries. Scottish Government framework of funding and support, with centralised 'back office' functions to enable Local Authorities to implement schemes. Revenues loosely hypothecated directed towards local transport strategies. Car share/car club schemes would be exempt and could provide access to a car for those in socioeconomically disadvantaged areas.	Retain
Distance (Flat Rate, no allowance)	Nationwide	Rate applied per kilometre travelled nationwide	Scottish Government	Automatic + NPR enforcement or submit a reading with checks at MOT / insurance. Will need further consideration in terms of enforcement.	A flat rate charge does not allow for the charge to be applied differentially.	National border issues. Direct impacts on people with a disability affecting their mobility, carers, taxis, those experiencing socioeconomic disadvantage.	Geofencing or grace period exemptions for vehicles from outwith Scotland. Higher rate given to second cars. Variable allowances or rates (see further options below) Revenues hypothecated to national transport portfolio.	Sift: Inequitable
Distance (Flat Rate, Fixed Allowance)	Nationwide	Rate applied per kilometre travelled nationwide	Scottish Government	Automatic + NPR enforcement or submit a reading with checks at MOT / insurance. Will need further consideration in terms of enforcement.	Fixed allowance of free miles per vehicle, same allowance for everyone based on average annual mileage in Scotland.	National border issues. Multiple car purchases to use up the free mileage. Direct impacts on people with a disability affecting their mobility, carers, taxis, those experiencing socioeconomic disadvantage.	Geofencing or grace period exemptions for vehicles from outwith Scotland. Variable allowances or rates (see further below options) Revenues hypothecated to national transport portfolio.	Sift: Inequitable

Option	Geographic Coverage	Charging Method	Governance	Enforcement	Allowances / Exemptions / Reductions / Caps	Unintended Consequences	Complementary Interventions / Mitigations	Sifting Rationale
Distance (Flat Rate, Variable Allowance)	Nationwide	Rate applied per kilometre travelled nationwide. Allowance defined by 'area', with rural areas having higher allowances	Scottish Government	Automatic + NPR enforcement or submit a reading with checks at MOT / insurance. Will need further consideration in terms of enforcement.	Greater mileage allowance for those classed within the lowest 20% income group AND living in areas defined as 'remote rural' according to the SG Urban Rural Classification. Exemptions for people with a disability affecting their mobility, or if unavailable, blue badge holders as a proxy.	National border issues. Multiple car purchases to use up the free mileage. House price premium, boundary effects in rural/semi-rural.	Geofencing or grace period exemptions for vehicles from outwith Scotland. No allowances given on second cars. Potential for vehicle allowances to be traded. Revenues hypothecated to national transport portfolio. Allowances would be applied to car share schemes and could provide access to a car for those in socioeconomically disadvantaged areas.	Retain
Distance (Flat Rate, Individual Allowance)	Nationwide	Rate applied per person, per kilometre travelled nationwide	Scottish Government	Automatic + NPR enforcement or submit a reading with checks at MOT / insurance. Will need further consideration in terms of enforcement.	Greater mileage allowance for those classed within the lowest 20% income group AND living in areas defined as 'remote rural' according to the SG Urban Rural Classification. Exemptions for people with a disability affecting their mobility, or if unavailable, blue badge holders as a proxy.	National border issues.	Geofencing or grace period exemptions for vehicles from outwith Scotland. Potential for individual allowances to be traded. Revenues hypothecated to national transport portfolio.	Sift: Undeliverable – administrative burden of charging a person as opposed to a vehicle
Distance (Geographically Variable Rate)	Nationwide or sub-areas as defined by SG Urban Rural Classification	Non-zero rate applied per kilometre travelled nationwide.	Scottish Government	Automatic + NPR enforcement or submit a reading with checks at MOT / insurance. Will need further consideration in terms of enforcement.	Lower rate for those classed within the lowest 20% income group AND living in areas defined as 'remote rural' according to the SG Urban Rural Classification. Exemptions for those with a long-term physical or mental health condition, whether it affects their ability to carry out everyday activities.	National border issues. Boundary effects for rates may encourage people to locate to, or register their vehicles in, areas defined as rural, on the edge of urban areas.	Geofencing or grace period exemptions for vehicles from outwith Scotland. Revenues hypothecated to national transport portfolio. Variable rates would be applied to car share/car club schemes and could provide access to a car for those in socioeconomically disadvantaged areas.	Retain



## NEW CHAIN

### FROM TS TO AECOM

#### 17/11/22 RE: Timescales

Thanks [redacted]. I think whatever you can provide in terms of a ballpark figure for potential revenues for the national pricing scheme would be useful. A quick chat on Monday would be good – I'm free 9-10:30 and 11:30-1.

Many thanks [redacted]

From: [redacted], [redacted] <[redacted].[redacted]@....aecom.com>

Sent: 17 November 2022 16:46

To: [redacted] ([redacted]) <[redacted].[redacted]@....transport.gov.scot>; [redacted] ([redacted]) <[redacted].[redacted]@....transport.gov.scot>

Cc: [redacted], [redacted] <[redacted].[redacted]@....aecom.com>

Subject: RE: Timescales

Hi [redacted],

We're moving forward with the quantitative appraisal but it is a complex task and we are looking to allocate as much time to it as possible. My previous exchange with [redacted] indicated we'd be focused on the 1<sup>st</sup> of December date so that we have some good detail to present. To be clear though, this will be pitched at showing potential revenues in relative terms, rather than giving a direct revenue estimation for a given scheme. If we could get together to discuss the requirements for the paper your writing though, I think we'll be able to help. Are you free early next week to chat with myself and [redacted]. Monday is good if you'd like to suggest a time?

Many thanks,

[redacted]

From: [redacted].[redacted]@....transport.gov.scot

<[redacted].[redacted]@....transport.gov.scot> Sent: 17 November 2022 16:14

To: [redacted], [redacted] <[redacted].[redacted]@....aecom.com>;

[redacted].[redacted]@....transport.gov.scot

Cc: [redacted], [redacted] <[redacted].[redacted]@....aecom.com>

Subject: RE: Timescales

Hi [redacted], [redacted]

What's the ETA on sending over the latest report? We've got the steering group next Thurs and I'm assuming you'll send it over early next week? We're putting together a paper for ministers and it'd be really useful to provide some estimates of potential revenues at this stage.

Thanks  
[redacted]

From: [redacted], [redacted] <[redacted].[redacted]@...aecom.com>

Sent: 08 November 2022 10:59

To: [redacted] ([redacted]) <[redacted].[redacted]@...transport.gov.scot>

Cc: [redacted] ([redacted]) <[redacted].[redacted]@...transport.gov.scot>; [redacted],

[redacted] <[redacted].[redacted]@...aecom.com> Subject: Timescales

Hi [redacted],

I'm just checking back on timescales for delivery of our detailed appraisal (WP5). We'd previously talked about having something to present for 'mid-November' but I'm unsure whether this timescale was linked to the ministerial presentation, which is now scheduled for the start of December? Essentially, the longer we have to complete the quantitative appraisal work the better. Once we have the outputs of the quantitative analysis we can complete the detailed appraisal by layering that on top of what we have already done. [redacted] has been invaluable in gathering the data we need but it has taken some time to get this all in order so our strategic modellers can get to work.

Many thanks,

[redacted]

[redacted] [redacted], [redacted]

[redacted], Transport Planning, UK M:

[redacted]

[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)

Please note: My working days are Monday to Thursday.

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## NEW CHAIN

### 28/11/22 RE: Draft Tech note with a few comments

Hi [redacted],

Apologies as just a couple of minor comments to flag which didn't make it onto this version due to tech issues – I wonder if the costs of area/cordon based schemes are being overstated under affordability risks – for eg setting out the costs of the London scheme without noting the significant revenue raised (and also I think the London scheme is area-based and wonder if a cordon-based scheme would be less expensive to run). It might be helpful to state upfront that this risk varies significantly by local area and scheme design – I think we'd be keen to avoid an implication that affordability will be a barrier to the larger more urban local authorities.

Thanks, [redacted]

From: [redacted] ([redacted]) <[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)>

Sent: 28 November 2022 14:38

To: [redacted], [redacted] <[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)>; [redacted] ([redacted])

<[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)>; [redacted] ([redacted])

<[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)>

Subject: [Draft Tech note with a few comments](#)

Hi [redacted],

I hope you had a lovely weekend!

Here is the tech note back with a few comments.

Best wishes,

[redacted] [redacted] [redacted]  
[redacted]

Climate Change & Just Transition | Transport Strategy & Analysis | Transport Scotland

## NEW CHAIN

### 29/11/22 RE: Updated revenue estimate

Apologies: those axes labels are swapped. X axis is speed.

From: [redacted], [redacted]

Sent: 23 November 2022 11:27

To: [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot); [\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)

Cc: [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot); [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)

Subject: [RE: Updated revenue estimate](#)

[redacted]

A complicated question.

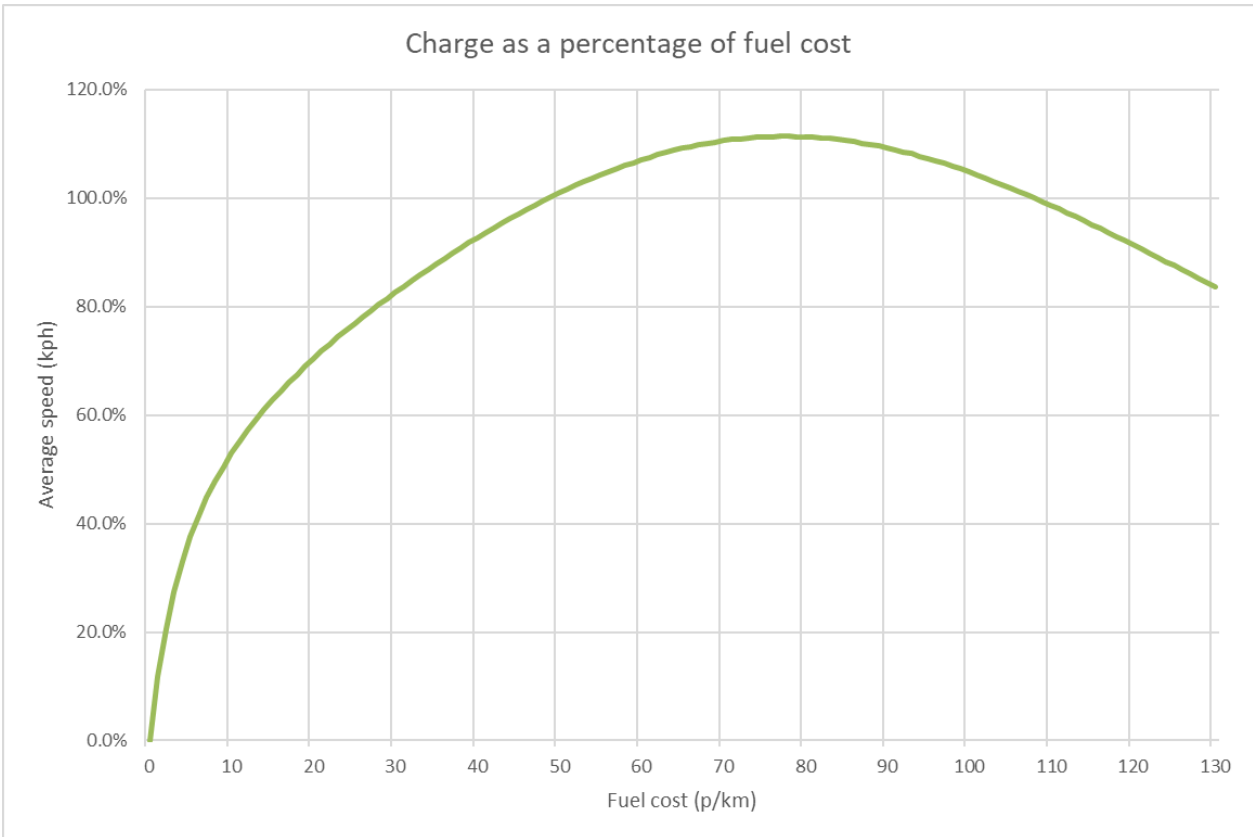
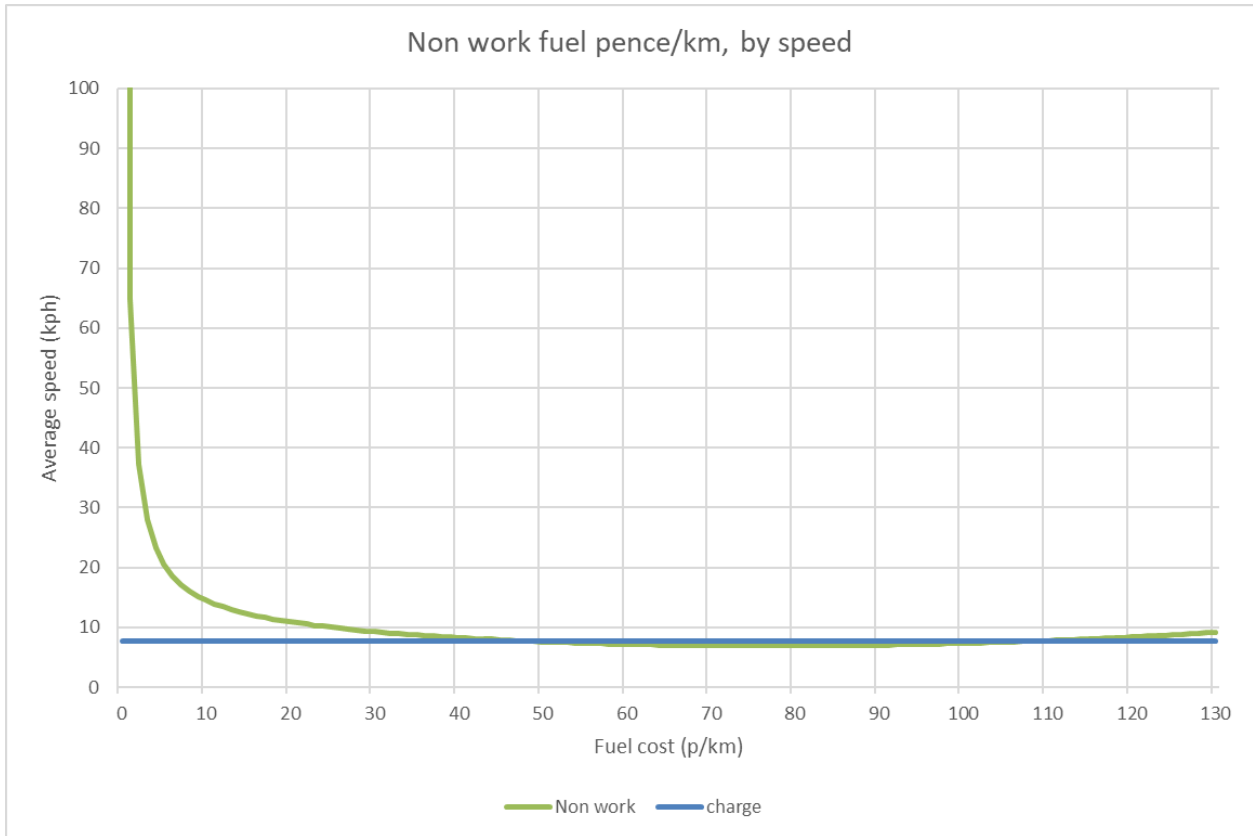
As we are applying fuel cost elasticities developed 20+ years ago, then we should make adjustments for how society has changed over that time (more wealthy, fleet has changed, etc, etc). The most straightforward was around this is to use fuel costs as they were in 2010, and express the additional charges in relation to that (they'd be put into the model in 2010 prices anyway). The p/km is based on the TAG databook, which gives emissions curves to give litres/km, factors for how engine efficiency changes over time, and fuel composition, which is needed as this is all expressed as per 'average car' (so the cost is an average of the petrol and diesel cost in this case). Costs do include fuel duty and VAT, as this the cost as perceived.

We undertake the calculation of the 'without charge' cost (so we can calculate % change in cost) on a cell by cell basis in the matrix (803 by 803, for each zone in the transport model), having derived distance and time cost matrices, so we can calculate speed (as the input to the fuel consumption curves is speed). So the 'without charge' cost will vary with whatever the average speed is. Here's a chart:



The minimum is at 78kph, 6.89644.

So, the upshot of all this is that the % change will differ for every individual journey. But, for your 10p/km test (which is expressed in 2022 Q3 prices), that equates to about 7.68p/km in 2010 prices, so you can see that for the great majority of trips that's roughly doubling, though for very slow trips it will be less than that.



Please note that we've also made sure that we include the issue that value of time varies with distance, so short journeys will be more elastic, but longer ones less. So that's something else to complicate the response.

I'm sorry that answer wasn't shorter!

Regards

[redacted]

From: [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)  
<[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)> Sent: 23 November 2022 10:35  
To: [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted],[redacted]<[redacted].[redacted]@...aecom.com>); [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted],[redacted]<[redacted].[redacted]@...aecom.com>)  
Cc: [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot); [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)  
Subject: [RE: Updated revenue estimate](#)

Hi [redacted], [redacted]

Thanks again for producing this. We've asked our economist colleagues to give us an idea of how those figures compare to the current cost of driving. As a rough calculation if we assume average fuel consumption is 40 mpg this equates to 5.9, say 6 L per 100km, fuel duty is about 55p per L at the moment, so very roughly about 3p per km. So the headline would be that the national pricing scheme would make driving twice or 3x as expensive.

Note that ignores VAT and is based just on Fuel duty – VAT adds about ½ as much again – is your assumption that VAT would still be in place? And also – I'm pretty sure your analysis below assumes zero fuel duty, but can you confirm that – or is the charge on top of fuel duty?

[redacted]

From: [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted],[redacted]<[redacted].[redacted]@...aecom.com>)  
Sent: 22 November 2022 16:03  
To: [\[redacted\] P \(\[redacted\]\) <\[redacted\].\[redacted\]@...transport.gov.scot>](mailto:[redacted] P ([redacted]) <[redacted].[redacted]@...transport.gov.scot>)  
Cc: [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted],[redacted]<[redacted].[redacted]@...aecom.com>)  
Subject: [Updated revenue estimate](#)

Hi,

Updated version with 0.065p per mile cost attached.

Initial analysis indicates that national charging, exempting disabled people, and applying 50% charge reduction to rural poor (remote rural classification) would result in:

- a charge per km of £0.10 would raise £2.2bn in 2030 (+50%) , giving a 40% reduction in vehkm.
- a charge of £0.065/km would raise £1.6bn +- 50%, giving a 30% reduction in veh-km.

[redacted]

[redacted] [redacted], [redacted]  
[redacted], Transport Planning, UK M:  
[redacted]  
[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)

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**NEW CHAIN**

**11/1/23 RE: TDM emissions and revenue estimates**

Hi [redacted]

This goes back to my email exchange with [redacted]. We supply percentage reductions in tailpipe emissions for a particular forecast scenario developed using TMfS and TELMoS. That scenario uses the Element Energy Policy Scenario 3 as the way the f[redacted]t is transitioning away from



petrol and diesel. It wouldn't be advisable to take the absolute levels of reduction, as the forecast of tailpipe emissions for those years will not be the same as other forecasts that I assume are embedded elsewhere within the CCP work. We're deriving this from a national scale model that concentrates on inter-urban movements and, while we are attempting to correct for the underrepresentation of urban trips in the model (by comparing model outputs for 2019 with DfT car veh-km estimates by local authority) they won't be the same as other forecasts. So, I'd recommend taking whatever absolute forecasts you have for emissions for those years and then using the percentage reductions to derive the absolute reduction.

Regards

[redacted]

From: [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)  
<[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)> Sent: 11 January 2023 12:05  
To: [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted],[redacted]@...aecom.com); [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted],[redacted]@...aecom.com); [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)  
Cc: [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)  
Subject: RE: TDM emissions and revenue estimates

Hi [redacted] One more question – would it be possible for you to express the emissions reduction for each scheme in metric tonnes of CO2? It'd be helpful to get a better idea of the scale of reduction and for consistency with other advice going

Thanks [redacted]

From: [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted],[redacted]@...aecom.com)

Sent: 10 January 2023 16:10

To: [\[redacted\] \(\[redacted\]\) <\[redacted\].\[redacted\]@...transport.gov.scot>](mailto:[redacted] ([redacted]) <[redacted].[redacted]@...transport.gov.scot>); [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted],[redacted]@...aecom.com); [\[redacted\] \(\[redacted\]\) <\[redacted\].\[redacted\]@...transport.gov.scot>](mailto:[redacted] ([redacted]) <[redacted].[redacted]@...transport.gov.scot>)  
Cc: [\[redacted\] \(\[redacted\]\) <\[redacted\].\[redacted\]@...transport.gov.scot>](mailto:[redacted] ([redacted]) <[redacted].[redacted]@...transport.gov.scot>)  
Subject: RE: TDM emissions and revenue estimates

Hi [redacted]

My recollection of their 2021 report is that they sort of did it back to front, constructing the scenario outcomes, and then looking at blockers. Looking back, they only seem to discuss road user charging explicitly as something that must be adopted to combat the cheapness of electric vehicles, rather than something that was needed to actually achieve the rapid transition itself.

I remember in discussions with [redacted] [redacted] at the time he said he thought that the report was light on how this was going to be achieved. I've dug out the vehicle stock and vehicle kilometre spreadsheet that I was supplied by EE via [redacted], and, although the stock composition and total does vary between PS0 and PS3, the assumption about distance per vehicle is fixed for all types of car and fixed over time (13,900km per car per vehicle). So, though PS3 has 9.6% fewer cars in 2030 compared with 2019 it also has 9.6% fewer car veh-km. This suggests that charging is not implicitly included, since the intensity of vehicle use is identical. Based on that, I think we're ok to suggest that the behavioural changes captured by the elasticity of using the lower number of cars less is ok.

To counter that, as these are long term elasticities, there's probably some element of reduced ownership tangled up in them. However, for looking at broad brush impacts this is sufficient, I think.

Regards

[redacted]

From: [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)  
<[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)> Sent: 10 January 2023 15:18  
To: [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted], [redacted] <[redacted].[redacted]@...aecom.com>);  
[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)  
Cc: [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted], [redacted] <[redacted].[redacted]@...aecom.com>);  
[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)  
Subject: [RE: TDM emissions and revenue estimates](#)

Hi [redacted], [redacted] – happy new year,

Many thanks for this – just in terms of EE's work they did include road pricing as an assumption in terms of how we would achieve the 20% car km reduction, so I think the emissions reductions below would be 'priced into' (no pun intended) their PS3 scenario, rather than being 'on top of'?

Cheers [redacted]

From: [redacted],

[redacted]

<[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)

> Sent: 09

January 2023

14:51

To: [\[redacted\] \(\[redacted\]\) <\[redacted\].\[redacted\]@...transport.gov.scot>](mailto:[redacted] ([redacted]) <[redacted].[redacted]@...transport.gov.scot>); [\[redacted\] \(\[redacted\]\) <\[redacted\].\[redacted\]@...transport.gov.scot>](mailto:[redacted] ([redacted]) <[redacted].[redacted]@...transport.gov.scot>)

Cc: [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted], [redacted] <[redacted].[redacted]@...aecom.com>)

Subject: [TDM emissions and revenue estimates](#)

Hi [redacted],

Here are the figures we have modelled for the percentage reduction in emissions and revenue generation for the various schemes, for a range of prices. It's important to note that the reduction with charging is 'on top of' the Element Energy Policy Scenario 3 scenario, which already forecasts a reduction in car kms with no charge. The reduction given for the local schemes is a national figure, not just the reduction within those areas – so you can see that, for example, a £10 area-based charge (with £5 discounted rate), implemented across all the large urban areas would result in a 21% reduction in car kms nationally, as it would capture all trips to, through and between large urban areas.

Charge type	Charge	2030 Car km reduction (compared with 2030 without charging)	Car emissions reduction (CO2E) in 2030 (compared with no charge scenario)	2030 Revenue (in 2022 Q3)
Distance	10p, 5p (discounted)	-26%	-27%	£ 2,286,287,546
Distance	6.5p, 3.3p (discounted)	-17%	-17%	£ 1,682,590,160
Distance	3p, 1.5p (discounted)	-8%	-8%	£ 864,578,036
Area	£15, £7.50 (discounted)	-25%	-26%	£ 1,322,374,709
Area	£10, £5 (discounted)	-21%	-22%	£ 1,081,676,941
Area	£5, £2.50 (discounted)	-14%	-15%	£ 789,566,611
Cordon	£15, £7.50 (discounted)	-16%	-17%	£ 874,222,458
Cordon	£10, £5 (discounted)	-12%	-13%	£ 747,429,847
Cordon	£5, £2.50 (discounted)	-7%	-7%	£ 534,280,748

Note: discounted rate applied to residents of urban/rural classification 6 only: "remote rural".

#### Estimated Costs – local:

- Implementation costs of local schemes vary significantly depending on the type of enforcement and area covered. As an indication, the design and implementation cost of a 3km<sup>2</sup> LEZ charge zone is estimated to be around £1.2M (<https://www.transport.gov.scot/media/43653/developing-cost-estimates-for-low-emission-zones-in-scotland-sept-2017.pdf>). However, the large urban areas that would be required to be covered by the schemes outlined above are much larger and would include areas with no pre-existing enforcement infrastructure. A conservative estimate for implementation cost would therefore be between £50m - £100m. Any decisions relating to implementation of any specific scheme would need further practical and legal consideration by each local authority.
- Operation costs for local schemes range between 20% and 51% of revenues due to cost of ANPR enforcement and back office functions. However, shared back-office functions could help reduce the cost burden on individual authorities to as low as 10% of revenue (<https://policyexchange.org.uk/wp-content/uploads/2017/07/Volterra-Jacobs-Pricing-forProsperity-Revised-Submission.pdf>).

#### Estimated Costs – national:

- Implementation costs of a national, distance based scheme are highly dependent on the way in which it is implemented. On board units (OBUs) commercially retail at around £30 each. So supplying one to each of the 2.5 million cars in Scotland would be in the order of £100m (assuming no economy of scale). However, smartphone app based systems or a hybrid approach could be significantly cheaper.

- Operating costs of a telematics based, national road charging system have been estimated to be around 33% of revenue ([https://www.researchgate.net/publication/288444162\\_The\\_costs\\_of\\_implementing\\_road\\_pricing\\_systems](https://www.researchgate.net/publication/288444162_The_costs_of_implementing_road_pricing_systems)).

I'm awaiting some further detail on costs from [redacted] [redacted] but didn't want to hold you up by on sending the carbon figures. The WP5 note will follow with any further detail on costs.

In the meantime, please just give me a call if you want to discuss any of the above.

Many thanks,

[redacted]

[redacted] [redacted], [redacted]

[redacted], Transport Planning, UK M:

[redacted]

[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)

Please note: My working days are Monday to Thursday.

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Edinburgh,

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[\[redacted\]](#) | [\[redacted\]](#) | [\[redacted\]](#) | [\[redacted\]](#)



**NEW CHAIN**

**31/1/23 re:Timescale slide**

Will do, thanks [redacted].

[redacted]

[redacted] [redacted], [redacted]  
[redacted], Transport Planning, UK M:  
[\[redacted\]](#)  
[\[redacted\].\[redacted\]@...aecom.com](#)

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[\[redacted\]](#) | [\[redacted\]](#) | [\[redacted\]](#) | [\[redacted\]](#)



From: [\[redacted\].\[redacted\]@...transport.gov.scot](#)  
<[\[redacted\].\[redacted\]@...transport.gov.scot](#)> Sent: 31 January 2023 15:46  
To: [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](#)  
Cc: [\[redacted\].\[redacted\]@...transport.gov.scot; \[redacted\].\[redacted\]@...transport.gov.scot](#)  
Subject: [FW: timescales slide](#)

Hi [redacted], can you amend as follows please?

Description	Primary legislation Legislation?	Secondary	Indicative minimum timescale required?
Distance- rate	Policy development, based including the crucial Variable legal consideration of whether a national scheme meeting the national pricing necessary policy	Yes	Significant legal work will be required to consider whether those proposals for are capable of being enacted within the Scottish Parliament's legislation is progressed, then the earliest

	competency, to be primary legislation (if appropriate)	enforcement would be in 2029. followed by	
Areabased	No (discretionary powers provided to local authorities under Transport (Scotland) Act 2001)	Yes	Earliest implementation by local authorities: 2025 Earliest enforcement by local authorities: 2026 18-24 months for regulations to be put in place; local authority timescales estimated to be further 12-24 months for enforcement.

From: [redacted], [redacted] <[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)>

Sent: 31 January 2023 15:34

To: [redacted] E ([redacted]) <[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)>

Subject: timescales slide

Description	Primary legislation required?	Secondary Legislation?	Indicative minimum timescale
Distancebased Variable rate	Yes	Yes	Earliest enforcement: 2029 24 months: primary legislation 18-24 months: regulation and scheme design 18-24 months: implementation
Distancebased Variable allowance	Yes	Yes	Earliest enforcement: 2029 24 months: primary legislation 18-24 months: regulation and scheme design 18-24 months: implementation
Cordonbased	No (discretionary powers provided to local authorities under Transport (Scotland) Act 2001)	Yes	Earliest enforcement: 2025 18-24 months for regulations to be put in place; local authority timescales estimated to be further 12-24 months for enforcement.
Areabased	No (discretionary powers provided to local authorities under Transport (Scotland) Act 2001)	Yes	Earliest enforcement: 2025 18-24 months for regulations to be put in place; local authority timescales estimated to be further 12-24 months for enforcement.

[redacted] [redacted], [redacted]

[redacted], Transport Planning, UK M:  
[redacted]

[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)

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## NEW CHAIN

### 6/2/23 RE: Query on DM report

Hi [redacted],

Not really a fairness thing, no, more a technological thing. Any given charging system should be of an agreed, common specification, in terms of the technology used, charging structure and pay platform, so that you wouldn't end up with a patchwork approach, with different systems nationally, locally, or between areas. Having an agreed set of requirements would be necessary for procuring a system from a service provider. Apologies if point wasn't clear enough point in the report.

I don't think you need to legislate for this, but it would require SG and COSLA to agree on a common set of standards, and these would be set out in the Framework. Then, dependent on the balance of finances and how the government choose to implement, there would be a role for SG to provide the common technology platform and back office functions in order to share the burden of implementation and running costs with LAs.

Hope that makes sense, happy to provide further detail if necessary.

[redacted]

[redacted] [redacted], [redacted]

[redacted], Transport Planning, UK M:  
[redacted]

[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)

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From: [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)

[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot) Sent: 03 February 2023 11:42

To: [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted], [redacted] <[redacted].[redacted]@...aecom.com>); [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted], [redacted] <[redacted].[redacted]@...aecom.com>)

Cc: [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot); [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)

Subject: Query on DM report

Hi [redacted],

I hope you're well! I was hoping to pick up one point with you that came up during the presentation on Wednesday – specifically on interoperability. (I don't remember it having come up previously but I also haven't been as close to the work for the last couple of months, so apologies if I missed something).

Can you clarify what the issue with this is – is it primarily a 'fairness' thing that you think is important for DM success, or is it just the basis on which the modelling was done (ie more conservative than assuming drivers between urban areas would be charged twice)? My concern is that we have no legislative basis to require this – I'm also not sure that this is the basis of other congestion schemes for eg if you were to drive between London and another English city considering implementing a scheme, and whether it's more or less 'fair' to charge more/twice for travel between two urban



areas with PT alternatives compared to charging 'once' for travel between an urban area and a rural area.

I'd just be grateful for any clarification on this and whether you expect it to appear in the final report.

Many thanks, [redacted]

[redacted] [redacted] Climate  
Change Unit Transport  
Strategy and Analysis  
Directorate | Transport  
Scotland  
Mobile: [redacted]

\*\*\*\*\*

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\*\*\*\*\*

### 3/10/24 RE: TDM Options Study Final Report

From: [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>  
Sent: Tuesday, October 1, 2024 6:56 PM  
To: [redacted], [redacted] <[redacted].[redacted]@....aecom.com>; [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>  
Cc: [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted], [redacted] <[redacted].[redacted]@....aecom.com>; [redacted], [redacted] <[redacted]@....aecom.com>; [redacted], [redacted] <[redacted]@....aecom.com>; [redacted], [redacted] <[redacted]@....aecom.com>  
Subject: RE: TDM Options Study Final Report

That's great [redacted] – just to note that we've not got a definitive on publication – still some internal exchanges needed – but we are definitely more hopeful of heading in that direction and of publishing in the sort of timescales that [redacted] sets out.

Thanks

[redacted]

[redacted] [redacted]

[redacted]

Transport Strategy and Analysis Directorate  
Transport Scotland, Scottish Government



[redacted] [redacted] [transport.gov.scot](https://transport.gov.scot)

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Transport Scotland, Buchanan House,  
58 Port Dundas Road, Glasgow, G4  
0HF

From: [redacted], [redacted] <[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)>

Sent: Tuesday, October 1, 2024 4:27 PM

To: [redacted] [redacted] <[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)>

Cc: [redacted] [redacted] <[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)>; [redacted] [redacted] <[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)>; [redacted], [redacted]

<[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)>; [redacted], [redacted] <[\[redacted\]@...aecom.com](mailto:[redacted]@...aecom.com)>; [redacted], [redacted] <[\[redacted\]@...aecom.com](mailto:[redacted]@...aecom.com)>; [redacted], [redacted]

<[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)>

Subject: RE: TDM Options Study Final Report

Hi [redacted],

That's very welcome news! As far as I can see, the final communication we had was with [redacted] [redacted] in May '23, who was making some final, minor changes - see attached.

My feeling is that, given this is now well over a year old, we would be allowed some time to review this and check for any references that are obviously out of date, or that have been superseded.

I'd be happy to arrange a short call to catch up and discuss how best to assist you with this. [redacted] and I have good availability next week, if you would like to suggest some options?

Best regards,

[redacted]

[redacted] [redacted], [redacted]  
[redacted] Transport Planning, UK  
M: [redacted]  
[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)

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[\[redacted\]](#) | [\[redacted\]](#) | [\[redacted\]](#) | [\[redacted\]](#)

From: [redacted].[redacted]@...transport.gov.scot  
<[redacted].[redacted]@...transport.gov.scot> Sent: Tuesday, October 1, 2024 3:18 PM  
To: [redacted], [redacted] <[redacted].[redacted]@...aecom.com>  
Cc: [redacted].[redacted]@...transport.gov.scot; [redacted].[redacted]@...transport.gov.scot;  
[redacted], [redacted] <[redacted].[redacted]@...aecom.com>; [redacted], [redacted]  
<[redacted]@...aecom.com>; [redacted], [redacted] <[redacted]@...aecom.com>;  
[redacted], [redacted] <[redacted].[redacted]@...aecom.com> Subject: RE: TDM  
Options Study Final Report

Dear [redacted], colleagues,

There has been a fair amount of turnover in the team since this last email chain, below. I'd like to introduce myself – I'm [redacted]'s successor, [redacted], and my colleague [redacted] [redacted] (copied) has also joined the team to replace [redacted]. I'm unsure if there was any further correspondence between yourselves and [redacted] following this, but this was the most recent that I could find.

I'm emailing to advise that it's looking like we'll finally be publishing this research, alongside an updated route map for a 20% car use reduction, in the w/c 11 November. I'm unsure if there's any arrangements which need to be made on your side to allow this to proceed?

Best,

[redacted]

[redacted] [redacted] [redacted]  
Climate Change & Just Transition | Transport Strategy & Analysis | Transport Scotland

From: [redacted], [redacted] <[redacted].[redacted]@....aecom.com>  
Sent: Monday, March 20, 2023 3:30 PM  
To: [redacted] ([redacted]) <[redacted].[redacted]@....transport.gov.scot>  
Cc: [redacted] ([redacted]) <[redacted].[redacted]@....transport.gov.scot>; [redacted] ([redacted]) <[redacted].[redacted]@....transport.gov.scot>; [redacted] ([redacted]) <[redacted].[redacted]@....transport.gov.scot>; [redacted], [redacted] <[redacted].[redacted]@....aecom.com>; [redacted], [redacted] <[redacted]@....aecom.com>; [redacted], [redacted] <[redacted]@....aecom.com>; [redacted], [redacted] <[redacted]@....aecom.com>  
Subject: RE: TDM Options Study Final Report

Hi [redacted],

Thanks, no problem, changes added in the attached. Please let me know if the accessibility team need anything further.

Many thanks,

[redacted]

[redacted] [redacted], [redacted]  
[redacted], Transport Planning, UK  
M: [redacted]  
[\[redacted\].\[redacted\]@....aecom.com](mailto:[redacted].[redacted]@....aecom.com)

Please note: My working days are Monday to Thursday.

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From: [redacted].[redacted]@....transport.gov.scot  
<[redacted].[redacted]@....transport.gov.scot> Sent: 16 March 2023 16:57  
To: [redacted], [redacted] <[redacted].[redacted]@....aecom.com>  
Cc: [redacted].[redacted]@....transport.gov.scot; [redacted].[redacted]@....transport.gov.scot;

[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot); [redacted], [redacted]  
[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com); [redacted], [redacted] [\[redacted\]@...aecom.com](mailto:[redacted]@...aecom.com);  
[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com); [redacted], [redacted]  
[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)

Subject: RE: TDM Options Study Final Report

Hi [redacted]

Many thanks for this. We've reviewed and are very happy with the final product.

In terms of final touches, we have requested a few minor changes to the Exec Summary – mainly just deletions of unnecessary text to try to keep things simple. Can you let me know if you're content to make those changes?

The next step will be for us to send the report to our digital comms team for review for accessibility purposes ahead of publication (we're now aiming for May for publication, FYI) – hopefully all will be fine but if digital comms have any issues/feedback we'll forward on.

Best wishes, [redacted]

From: [redacted], [redacted] [\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)

Sent: 09 March 2023 16:40

To: [redacted] ([redacted]) [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)

Cc: [redacted] ([redacted]) [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot); [redacted] ([redacted])

[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot); [redacted] ([redacted])

[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot); [redacted], [redacted]

[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com); [redacted], [redacted] [\[redacted\]@...aecom.com](mailto:[redacted]@...aecom.com);

[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com); [redacted], [redacted]

[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)

Subject: TDM Options Study Final Report

Good afternoon [redacted],

I'm very pleased to attach our Final Report for the TDM study, with exec summary and the recent changes we discussed. I've supplied the Word version, so that you can easily paste it into other formats as required. If you would like to discuss any final touches, please just let me know. Otherwise, it only remains to say that this has been an incredibly valuable exercise and hopefully one that you will be able to draw on for future development.

Many thanks,

[redacted]

[redacted] [redacted], [redacted]

[redacted], Transport Planning, UK M:  
[redacted]  
[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)

Please note: My working days are Monday to Thursday.

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**NEW CHAIN**

**Any attachments referred to from this point are superseded by the published report 13/12/24  
RE: Final Report**

Hi [redacted],

I see the report has been.. erm.. welcomed by the press. I also noticed that our colleague [redacted] [redacted] is the only name on the second title page and that the file name contains [redacted] [redacted]. Given they are not the only authors, or ultimately responsible for our output, I would be very grateful if you could re-upload the attached version in place of the one currently online?

Many thanks in advance and apologies for not spotting this earlier!

[redacted]

From: [redacted].[redacted]@....transport.gov.scot  
<[redacted].[redacted]@....transport.gov.scot> Sent: 11 December 2024 15:06  
To: [redacted], [redacted] <[redacted].[redacted]@....aecom.com>; [redacted], [redacted]  
<[redacted]@....aecom.com>  
Cc: [redacted].[redacted]@....transport.gov.scot; [redacted], [redacted]  
<[redacted].[redacted]@....aecom.com>; [redacted], [redacted]  
<[redacted].[redacted]@....aecom.com>; [redacted].[redacted]@....transport.gov.scot;  
[redacted].[redacted]@....transport.gov.scot; [redacted]@....gov.scot;  
[redacted].[redacted]@....transport.gov.scot; [redacted].[redacted]@....transport.gov.scot;  
[redacted]@....transport.gov.scot; [redacted].[redacted]@....transport.gov.scot; [redacted].  
[redacted] <[redacted].[redacted]@....aecom.com>  
Subject: RE: TDM Options Study Final Report

Hi [redacted],

Just following up to let you know this went live at 2pm today. The link is here for your awareness:  
[Travel Demand Management Options Study | Transport Scotland](#)

Best,

[redacted]

[redacted] [redacted] - [redacted]

Climate Change & Just Transition | Transport Strategy & Analysis | Transport Scotland



From: [redacted], [redacted] <[redacted].[redacted]@....aecom.com>  
Sent: 09 December 2024 15:15  
To: [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted], [redacted]  
<[redacted]@....aecom.com>  
Cc: [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted], [redacted]

[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com); [redacted], [redacted]  
[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com); [redacted] [redacted]  
[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot); [redacted] [redacted]  
[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot); [redacted] [redacted] [\[redacted\]@...gov.scot](mailto:[redacted]@...gov.scot);  
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[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot); [redacted], [redacted]  
[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com)

Subject: RE: TDM Options Study Final Report

Hi [redacted],

That's exciting news, thanks for letting me know. I'm not aware of any further changes required, assume it will be published under AECOM cover, dated March '23 ?

Thanks,

[redacted]

From: [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)  
[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot) Sent: 09 December 2024 14:24  
To: [\[redacted\], \[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted], [redacted] <[redacted].[redacted]@...aecom.com>); [redacted], [redacted]  
[\[redacted\]@...aecom.com](mailto:[redacted]@...aecom.com)  
Cc: [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot); [redacted], [redacted]  
[\[redacted\].\[redacted\]@...aecom.com](mailto:[redacted].[redacted]@...aecom.com); [redacted], [redacted]  
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[\[redacted\]@...transport.gov.scot](mailto:[redacted]@...transport.gov.scot); [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot); [redacted],  
[\[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted] <[redacted].[redacted]@...aecom.com>)  
Subject: RE: TDM Options Study Final Report

Hi [redacted],

Thanks for sharing the below, reassuring as you say!

As another update from us (this has been a fast-moving, live issue on our side), it's now looking like we will be publishing the research on Wednesday. There's been a few factors at play to influence the decision but thought you'd want to be aware, we've used the updated document you sent ac[redacted] as the basis for this but please let us know if you're aware of any other changes which need to be made.



Best,

[redacted]

[redacted] [redacted] [redacted]

Climate Change & Just Transition | Transport Strategy & Analysis | Transport Scotland



From: [redacted], [redacted] <[redacted].[redacted]@....aecom.com>

Sent: 06 December 2024 10:11

To: [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted], [redacted] <[redacted]@....aecom.com>

Cc: [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted], [redacted] <[redacted].[redacted]@....aecom.com>; [redacted], [redacted]

<[redacted].[redacted]@....aecom.com>; [redacted] [redacted]

<[redacted].[redacted]@....transport.gov.scot>; [redacted] [redacted]

<[redacted].[redacted]@....transport.gov.scot>; [redacted] [redacted] <[redacted]@....gov.scot>;

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<[redacted].[redacted]@....transport.gov.scot>; [redacted] [redacted]

<[redacted]@....transport.gov.scot>; [redacted] [redacted]

<[redacted].[redacted]@....transport.gov.scot>; [redacted], [redacted]

<[redacted].[redacted]@....aecom.com>

Subject: RE: TDM Options Study Final Report

Hi [redacted],

I spotted [this recent talk from \[redacted\]](#), which offers some reassurance on our/your general thinking:

So – what could the Government do.

I think there is a need for a pragmatic approach. First, I think it is dangerous to allow there to be zero tax paid on driving as a principal. We already have an established means of, essentially, paying per mile in fuel duty. This should be extended to EVs.

In New Zealand they have done this with a per mile fee which is collected annually. This impacts only EV users and grows through the population over time. It avoids the big bang headlines in the Daily Garbage.

Other ideas are to introduce that for all vehicles but, at the same time, reduce fuel duty by an equivalent amount for fossil fuel cars so that drivers are not worse off in the new system – the question then is one about trust in Government. Let's park that.

A further idea is to set up a system where people can opt in to a new system over time and once enough people do so then you transition the remainder on a mandatory basis. They have trialled this in Oregon in the US – where per mile fees replace duty at the pump - but it has not really mainstreamed as yet.

None of these are perfect but they are at least implementable.

[redacted]

From: [\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)  
<[\[redacted\].\[redacted\]@...transport.gov.scot](mailto:[redacted].[redacted]@...transport.gov.scot)> Sent: 28 November 2024 16:48  
To: [\[redacted\],\[redacted\] <\[redacted\].\[redacted\]@...aecom.com>; \[redacted\],\[redacted\] <\[redacted\]@...aecom.com>](mailto:[redacted],[redacted]<[redacted].[redacted]@...aecom.com>; [redacted],[redacted]<[redacted]@...aecom.com>)  
Cc: [\[redacted\].\[redacted\]@...transport.gov.scot; \[redacted\],\[redacted\] <\[redacted\].\[redacted\]@...aecom.com>; \[redacted\],\[redacted\] <\[redacted\].\[redacted\]@...aecom.com>; \[redacted\].\[redacted\]@...transport.gov.scot; \[redacted\].\[redacted\]@...transport.gov.scot; \[redacted\]@...gov.scot; \[redacted\].\[redacted\]@...transport.gov.scot; \[redacted\].\[redacted\]@...transport.gov.scot; \[redacted\]@...transport.gov.scot; \[redacted\].\[redacted\]@...transport.gov.scot; \[redacted\],\[redacted\] <\[redacted\].\[redacted\]@...aecom.com>](mailto:[redacted].[redacted]@...transport.gov.scot; [redacted],[redacted]<[redacted].[redacted]@...aecom.com>; [redacted],[redacted]<[redacted].[redacted]@...aecom.com>; [redacted].[redacted]@...transport.gov.scot; [redacted].[redacted]@...transport.gov.scot; [redacted]@...gov.scot; [redacted].[redacted]@...transport.gov.scot; [redacted].[redacted]@...transport.gov.scot; [redacted]@...transport.gov.scot; [redacted].[redacted]@...transport.gov.scot; [redacted],[redacted] <[redacted].[redacted]@...aecom.com>)  
Subject: RE: TDM Options Study Final Report

Hi [redacted], Thanks for this really helpful response. Can I confirm on point 3) that this also stands for the Revenue (ie that this is annual and not cumulative)? Best, [redacted] [redacted] [redacted] - he/him/his (Why have I included this?) Senior Policy Officer

Hi [redacted],

Thanks for this really helpful response. Can I confirm on point 3) that this also stands for the Revenue (ie that this is annual and not cumulative)?

Best,

[redacted]

[redacted] [redacted] [redacted]

Climate Change & Just Transition | Transport Strategy & Analysis | Transport Scotland



From: [redacted], [redacted] <[redacted].[redacted]@....aecom.com>

Sent: 28 November 2024 16:02

To: [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted], [redacted] <[redacted]@....aecom.com>

Cc: [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted], [redacted] <[redacted].[redacted]@....aecom.com>; [redacted], [redacted]

<[redacted].[redacted]@....aecom.com>; [redacted] [redacted]

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<[redacted]@....transport.gov.scot>; [redacted] [redacted]

<[redacted].[redacted]@....transport.gov.scot>; [redacted], [redacted]

<[redacted].[redacted]@....aecom.com>

Subject: RE: TDM Options Study Final Report

Hi [redacted],

Good to hear progress is being made. Please see responses below. If this isn't clear, feel free to give me a call to clarify.

- 1) No problem, I have addressed the numbering inconsistencies in the attached.
- 2) Table 4.1 in the report refers only to the rapid sifting of ways to implement distance charging – resulting in the selection of 'Variable Allowance' or 'Variable Rate', which then went forward for appraisal. Also, I think you are using a superseded version of the presentation – the one you screen grabbed was from earlier on in the process and was never given, I think due to a change in the transport minister. The final one is attached.
- 3) Annual, not cumulative. The column title in Table 5-1 states "Car emissions reduction (CO2e) in 2030 (compared with no charge scenario)" meaning that in that year (2030) that will be the reduction you would see.

As mentioned, please feel free to get in touch if you'd like to talk about it or have any further questions.

Many thanks,

[redacted]

From: [redacted].[redacted]@...transport.gov.scot  
<[redacted].[redacted]@...transport.gov.scot> Sent: 27 November 2024 18:28  
To: [redacted], [redacted] <[redacted].[redacted]@...aecom.com>; [redacted], [redacted]  
<[redacted]@...aecom.com>  
Cc: [redacted].[redacted]@...transport.gov.scot; [redacted], [redacted]  
<[redacted].[redacted]@...aecom.com>; [redacted], [redacted]  
<[redacted].[redacted]@...aecom.com>; [redacted].[redacted]@...transport.gov.scot;  
[redacted].[redacted]@...transport.gov.scot; [redacted]@...gov.scot;  
[redacted].[redacted]@...transport.gov.scot; [redacted].[redacted]@...transport.gov.scot;  
[redacted]@...transport.gov.scot; [redacted].[redacted]@...transport.gov.scot  
Subject: RE: TDM Options Study Final Report

Hi [redacted],

Given the time that's passed since we last spoke, below, and I'm sure you'll have noted that the 20% route map and the demand management research haven't yet published, we thought it would be good to reach out to provide an update on where things are at.

It's now looking like the earliest the route map may publish is in early 2025, and the demand management research is still intended to be published as a part of the suite of documents which accompany this. It has, however, continued to form a useful resource internally for us. We have a few queries regarding the content which we were hoping to run by you. I've set these out below, and would appreciate your input, I've attached the draft of the research which we've had access to for ease, to ensure there are no version control issues or inconsistencies between the drafts we're using. To note that these are mostly points for clarification (and in one case, a consistency issue for numbering) rather than any substantive changes.

- 1) We've noticed a few inconsistencies with table numbering and their corresponding in-text citations, are you able to review these at all? For example, a couple that we noticed were a reference in the text that which references "Table 3-4 below" but the table immediately below that is Table 5-2; and also that a reference to Table 3-5 in text appears to actually reference subheading 5.2.3.
- 2) It was also noted that whilst table 4.1 on the research report it says: 'table 4.1 on inequitable grounds the options taken forward section 4 sets out four options: two local /regional options: Cordon based, Area based and two national schemes: Distance (geographical variable rate) and Distance (flat rate, variable allowance). Of these the optional appraise summaries shows against STAG criteria: Cordon based (minor negative on equalities), Area based (neutral on equalities), Distance based variable rate (neutral on equalities). Distance

based (flat rate) (minor negative on equalities)’. However, in the slides the below table is included, which does not seem to align with this text. Was wondering where the difference between the slides and the report on assessing equity comes from?

### What works?

Description	Effectiveness in achieving the 20% reduction	Equity	Revenue potential
<b>Cordon-based</b>	+	-	?
<ul style="list-style-type: none"> <li>Cordon-based in the 4 city LAs (Glasgow, Edinburgh, Aberdeen, Dundee collectively) would <b>intercept 27% of all veh-kms</b></li> <li>Cordon schemes typically deliver 20-30% reductions in user demand locally</li> </ul>		<ul style="list-style-type: none"> <li>Greater impacts on those <b>living outside</b> the cordon – inter urban trips</li> <li>Diversion effects could increase inequalities on the cordon boundary</li> </ul>	<ul style="list-style-type: none"> <li>Offer significant revenue generator for local authorities</li> <li><b>Operation costs between 20% and 40%</b> of revenues due to cost of ANPR enforcement</li> <li>Nationally implemented technology platform could reduce costs to as low as <b>10% of revenue</b></li> </ul>
<b>Area-based</b>	+	+	?
<ul style="list-style-type: none"> <li>Cordon and area-based in the 4 city LAs collectively would intercept <b>36% of all veh-kms</b></li> </ul>		<ul style="list-style-type: none"> <li>Greater impacts on those <b>living within</b> the charged area, who are potentially more able to substitute</li> </ul>	<ul style="list-style-type: none"> <li>As above</li> </ul>
<b>Distance-based</b>	++	++	+
<ul style="list-style-type: none"> <li><b>Variable allowance</b></li> <li>Direct targeting of those who drive the most frequently and over the longest distances</li> <li>May induce demand from people wanting to 'use up their miles'</li> </ul>		<ul style="list-style-type: none"> <li><b>Greater mileage allowances</b> for remote rural communities who find it most difficult to switch modes</li> </ul>	<ul style="list-style-type: none"> <li>'top-slicing' would significantly reduce the potential to achieve the full revenue return indicated below</li> </ul>
<b>Distance-based</b>	+++	++	++
<ul style="list-style-type: none"> <li><b>Variable rate</b></li> <li><b>15-30% reduction in car vehicle-km</b> when compared with 2019 values</li> </ul>		<ul style="list-style-type: none"> <li><b>Lower charges</b> mitigate the impact on remote rural communities who find it most difficult to switch modes</li> </ul>	<ul style="list-style-type: none"> <li>a charge per km of £0.10 would raise <b>£2.2bn</b> in 2030 (+/-50%), giving a <b>25-30%</b> reduction</li> <li>a charge of £0.065/km would raise <b>£1.6bn</b> (+/- 50%), giving a <b>15-20%</b> reduction</li> </ul>

3) And finally, in the below table. Could you please confirm if the 2030 figure is the cumulative total to 2030, or the annual amount expected by 2030?

The indicated effectiveness of each TDM option is outlined in the Table below:

Charge type	Charge	2030 Car km reduction	2030 Revenue	Car emissions reduction	Equity impacts and mitigation
<b>Area</b>	£15 per day, (£7.50 discounted)	-25%	£1,300m	-26%	Greater impacts on those living within the charged area, who are potentially more able to substitute
	£10 per day, (£5 discounted)	-21%	£1,100m	-22%	
	£5 per day, (£2.50 discounted)	-14%	£800m	-15%	
<b>Distance</b>	10p per km, (5p discounted)	-26%	£2,300m	-27%	Lower charges mitigate the impact on remote rural communities who find it most difficult to switch modes
	6.5p per km (3.3p discounted)	-17%	£1,700m	-17%	
	3p per km (1.5p discounted)	-8%	£875m	-8%	

Grateful for your insights, thanks!

Best,

[redacted]

[redacted] [redacted] [redacted]



From: [redacted], [redacted] <[redacted].[redacted]@...aecom.com>

Sent: 08 October 2024 16:54

To: [redacted] [redacted] <[redacted].[redacted]@...transport.gov.scot>; [redacted] [redacted] <[redacted].[redacted]@...transport.gov.scot>; [redacted], [redacted] <[redacted]@...aecom.com>

Cc: [redacted] [redacted] <[redacted].[redacted]@...transport.gov.scot>; [redacted], [redacted] <[redacted].[redacted]@...aecom.com>; [redacted], [redacted] <[redacted].[redacted]@...aecom.com>

Subject: TDM Options Study Final Report

Hi All,

Good to catch up today and pleased to see progress towards the update to the 20% route map. As discussed, we would be content to see the study published under AECOM cover as a supporting consultant report, dated March 2023. Our report *does* reference the interim targets in the 2019 Act.

As mentioned, the area most relevant to what (I think) is being proposed is the option we assessed under section 5.2.2 Area Based Charging - A daily charge applied for driving into or within large urban areas (as defined in the Scottish Government Urban Rural Classification 2020) and including Glasgow, the upper Clyde Valley, Edinburgh, Aberdeen and Dundee. We also looked at a sub-option comprising just Edinburgh and Glasgow. The area based charging options indicated a potential revenue of around £1bn if implemented.

Our key recommendation was to establish a Framework of Implementation for TDM measures to ensure interoperability between different local schemes comprising common legal, organisational, contractual, commercial, procedural and technical standards for the delivery of the service. Existing legislation states net proceeds should be used to support objectives of the local transport plan. So, yes, local authorities would be benefiting from the revenue but there is still a role for TS in coordinating and standardising things, which, yes, would incur a cost.

Let me know how you would like to proceed and if there is anything further we can do to assist.

Best regards,

[redacted]

[redacted] [redacted], [redacted]

[redacted] Transport Planning, UK

M: [redacted]

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Communications with the Scottish Government may be monitored or recorded in order to secure the effective operation of the system and for other lawful purposes. The views or opinions contained within this e-mail may not necessarily reflect those of the Scottish Government.

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Hi [redacted],

Yes, that would be annual too.

Thanks,

[redacted]

From: [redacted].[redacted]@....transport.gov.scot  
<[redacted].[redacted]@....transport.gov.scot> Sent: 28 November 2024 16:48  
To: [redacted], [redacted] <[redacted].[redacted]@....aecom.com>; [redacted], [redacted]  
<[redacted]@....aecom.com>  
Cc: [redacted].[redacted]@....transport.gov.scot; [redacted], [redacted]  
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Subject: RE: TDM Options Study Final Report

Hi [redacted],

Thanks for this really helpful response. Can I confirm on point 3) that this also stands for the Revenue (ie that this is annual and not cumulative)?

Best,

[redacted]

[redacted] [redacted] [redacted]

Climate Change & Just Transition | Transport Strategy & Analysis | Transport Scotland



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Sent: 28 November 2024 16:02  
To: [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted], [redacted]  
<[redacted]@....aecom.com>



Cc: [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted], [redacted] <[redacted].[redacted]@....aecom.com>; [redacted], [redacted] <[redacted].[redacted]@....aecom.com>; [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted] [redacted] <[redacted]@....gov.scot>; [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted] [redacted] <[redacted]@....transport.gov.scot>; [redacted] [redacted] <[redacted].[redacted]@....transport.gov.scot>; [redacted], [redacted] <[redacted].[redacted]@....aecom.com>

Subject: RE: TDM Options Study Final Report

Hi [redacted],

Good to hear progress is being made. Please see responses below. If this isn't clear, feel free to give me a call to clarify.

- 4) No problem, I have addressed the numbering inconsistencies in the attached.
- 5) Table 4.1 in the report refers only to the rapid sifting of ways to implement distance charging – resulting in the selection of ‘Variable Allowance’ or ‘Variable Rate’, which then went forward for appraisal. Also, I think you are using a superseded version of the presentation – the one you screen grabbed was from earlier on in the process and was never given, I think due to a change in the transport minister. The final one is attached.
- 6) Annual, not cumulative. The column title in Table 5-1 states “Car emissions reduction (CO<sub>2</sub>e) in 2030 (compared with no charge scenario)” meaning that in that year (2030) that will be the reduction you would see.

As mentioned, please feel free to get in touch if you'd like to talk about it or have any further questions.

Many thanks,

[redacted]

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<sup>1</sup> Transport Scotland, NTS2, 2020, <https://www.transport.gov.scot/media/47052/national-transport-strategy.pdf>

<sup>2</sup> Transport Scotland, NTS2 Delivery Plan 2020-2022, 2020, <https://www.transport.gov.scot/media/48839/nts-delivery-plan-2020-2022.pdf>

<sup>3</sup> Transport Scotland, STPR2, Draft Technical Report, 2022, <https://www.transport.gov.scot/media/50946/draft-technical-reportjanuary-2022-stpr2.pdf>

<sup>4</sup> Transport Scotland, STPR2, Draft National Appraisal Summary Table, <https://www.transport.gov.scot/media/50939/detailedappraisal-summary-table-national-draft-technical-report-stpr2.pdf>

<sup>5</sup> Transport Scotland, Scotland's Road Safety Framework to 2030: Together Making Scotland's Roads Safer, 2021, <https://www.transport.gov.scot/media/49893/scotlands-road-safety-framework-to-2030.pdf> <sup>6</sup> Transport Scotland, Scottish Trunk Road Network Asset Management Strategy, 2018, <https://www.transport.gov.scot/media/43925/sct10188149681.pdf>

- <sup>7</sup> Scottish Government, A National Mission With Local Impact: Infrastructure Investment Plan for Scotland 2021-22 to 2025-26, 2021, <https://www.gov.scot/publications/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-202526/documents/>
- <sup>8</sup> Scottish Government, Scotland 2045: Our Fourth National Planning Framework Draft, 2021, <https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/documents/>
- <sup>9</sup> Scottish Government, Delivering Economic Prosperity: Scotland's National Strategy for Economic Transformation, 2022, <https://www.gov.scot/publications/scotlands-national-strategy-economic-transformation/documents/> <sup>10</sup> Scottish Government, A Fairer, Greener Scotland: Programme for Government 2021-22, 2021, <https://www.gov.scot/publications/fairer-greener-scotland-programme-government-2021-22/documents/>
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