Report
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TfSE Transport Strategy Refresh Scenario Planning Technical Report

Prepared by:

Steer
14-21 Rushworth Street
London SE1 0RB

+44 20 7910 5000
www.steergroup.com

Prepared for:

TfSE
East Sussex County Council, County Hall,
St Anne's Crescent
Lewes
East Sussex
BN7 1UE

Our ref: 24481605

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1 Introduction

Introduction

1.1 As part of the development of the second Transport Strategy for Transport for the South East (TfSE), a series of stakeholder workshops have been held to help develop the refreshed strategy and inform the updated vision, objectives and key priorities for this strategy. As part of this process, a scenario planning exercise has been undertaken, reflecting changes in the baseline condition of the TfSE area since the previous transport strategy was adopted.

1.2 Scenario planning has been used to test and ensure the emerging strategy is robust and resilient to future uncertainties, with the flexibility and resilience to rapidly respond to changing local, national and international contexts. With TfSE committed to a mission-based transport strategy, they have guided TfSE to ensure the strategy, and the desired outcomes, outputs, policies, and schemes are robust against possible changes in all future scenarios.

1.3 This appendix summarises the rationale, methodology and outcomes from the scenario planning process workshops, and how it has influenced the development of the strategy.

Why scenario planning?

1.4 By considering how different futures may come about and their implications, a scenario planning approach allows TfSE and its key stakeholders to understand how different versions of the future may support or hinder the transport strategy and its associated missions from coming to fruition.

1.5 Scenario planning is used to:

- Understand the uncertainty of the future and what that could mean for transport and travel.
- identify alternative versions of the future – plausible, hypothetical alternatives – not target-seeking or visionary alternatives, which capture external factors which could have both positive and negative implications on transport and travel.
- help provide insights into the issues and opportunities different corridors or areas may face and a need for intervention; and
- help shape the strategy and test the resilience of a vision and plan.

1.6 This enables the development and confirmation of an approved strategy with an agreed vision that is more likely to remain relevant in the future. This approach also enables planners to more fully consider the components of their strategy; the conditions needed to achieve it, and the factors that are both within and outside of their control.

1.7 A better understanding of uncertainty is intended to improve and assist future investment and policy making decisions; and ensure the second TfSE Transport Strategy proposes actions that represent ‘no regrets’ decisions.

2 Scenario development process

2.1 Between April and May 2024, workshops were held with TfSE stakeholders, to develop future scenarios to be used in the scenario modelling. Two workshops were held with representatives of TfSE's Transport Strategy Working Group and Senior Officer Group, and two further workshops were held with TfSE staff. These workshops were used to identify four future scenarios, which were then refined, assessed, quantified and tested against the emerging strategy in the summer and autumn of 2024. The content discussed in these workshops and details of the scenario refinement and resilience testing is outlined below:

Workshop 1 - Drivers of change, driver mapping and axes of uncertainty (April 2024)

- Identifying the factors that may influence how people live and work and their travel patterns and needs.
- Assessing drivers of change by future importance and level of uncertainty
- Assessing the different ways in which the most important and uncertain may play out in the future.

Workshop 2 - Scenario Development (May 2024)

- Developing four future scenarios which represent plausible futures with different transport and wider impact characteristics
- Modelling impact of future scenarios to understand impacts on travel patterns and other socio-economic indicators

Scenario refinement and resilience testing of the emerging strategy (Summer - Autumn 2024)

- Further refinement of the scenarios following testing and feedback
- Testing the resilience of the emerging strategy by identifying the implications of future scenarios on the key missions, desired outcomes, policies and schemes

2.2 Findings between these workshops were consolidated and presented for confirmation at the following workshop to ensure key discussion points were captured and that there was stakeholder alignment across the groups. Workshop participants and wider stakeholders were also presented and reminded of the refined scenarios through the strategy development process, both as part of specific scenario planning workshops and through other TfSE forums.

2.3 This technical note will focus on documenting the outcomes of the workshops centred around scenario development and refinement and present the key characteristics and modelling results of the four scenarios which portrayed differing alternative futures for the South East. It will also present the results of modelling of the different scenarios, and how the scenarios were applied to ensure the strategy is robust against a variety of futures.

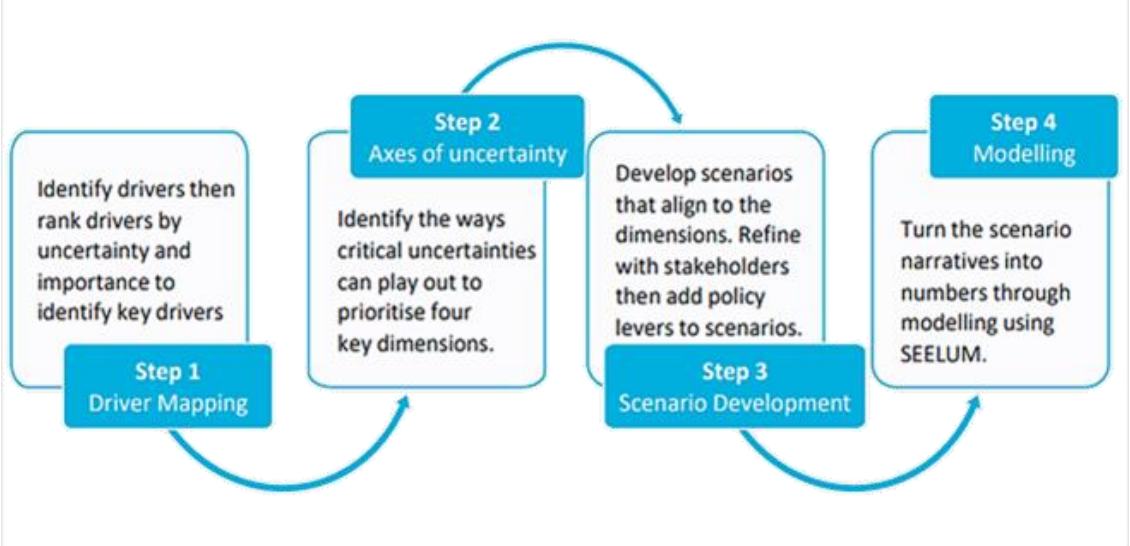
2.4 Note, in the development of the first transport strategy, scenario planning was primarily a tool used to define and gain consensus on the preferred vision for the future and the key objectives and outcomes. In this refreshed strategy, given we already had a vision which was broadly fit for purpose and had consensus (though subject to some refinement as the refreshed strategy developed), the activity was focussed more on defining plausible

alternative futures by which to test our resilience of the emerging strategy with its constituent missions and policy route maps against.

3 Scenario development workshop discussions, findings and outputs

3.1 Steer has developed and refined a four-step process that produces bespoke scenarios tailored to a geography and – importantly - uses the inputs of stakeholders in that geography, which were followed in the initial workshops. Stakeholders are asked what factors, both within the control of the public sector and outside of their control, could impact on what the future brings for the region, as shown in Figure 3.1 below

Figure 3.1: Overview of four-step scenario planning process[1]



Workshop 1 – Introduction, Driver Mapping and Axes of Uncertainty

Step 1: Driver Mapping

3.2 Participants were asked to identify key drivers of future uncertainty using a PESTLE framework (Political, Economic, Social, Technology, Legal, Environment). The conversation was steered towards seeking drivers which will impact on the demand for movement and the choices people and businesses will make when travelling.

3.3 Identified drivers were then mapped based on:

1. how important each driver is; and
2. how uncertain its future trajectory might be.

[1] In this diagram, SEELUM refers to the South East Economic and Land Use Model, which is described in greater detail later in this technical note.

3.4 **The aim was to identify drivers which are both important *and* uncertain, and hence be a key uncertainty that influences or forms the basis of alternative scenarios.**

3.5 For example, population growth is a driver that may be important, but relatively certain. Population growth is an important factor in planning future transport. However, the trajectory of population growth may be reasonably certain due to detailed forecasts and modelling undertaken, for instance, through rigorous forecasts produced by the Office for National Statistics. Subsequently, population growth may not be considered a key driver of future uncertainty.

3.6 Table 3.1 summarises the key drivers identified and assessed by stakeholders at the workshop – **with drivers identified in bold those which were identified as being most important and uncertain by workshop participants**, and therefore formed the key differentiating characteristics in our future scenarios.

Table 3.1: List of drivers considered in the workshop

Theme	Driver of change
Policy	**Level of government spending**
Policy	Private sector transport spending
Policy	Level of Devolution
Policy	**Transport policy focus and change**
Policy	Integrated transport and spatial planning focus
Policy	Economic policy focus
Policy	Social Policy focus (on levelling-up, deprivation and exclusion)
Policy	**Environmental policy focus**
Economy	Demographic change
Economy	**Economic shocks**
Economy	**International trade**
Economy	Robotics/AI in industry
Economy	**Industrial make-up**
Economy	**Labour and skills shortage**
Social / Attitudes	Changes in working patterns
Social / Attitudes	Changes in remote activities
Social / Attitudes	Attitudes to health
Social / Attitudes	Attitudes to shared mobility
Social / Attitudes	Attitudes to the environment
Technology	Autonomous technology
Technology	Clean transport technology
Technology	New transport modes
Technology	Digital transport
Technology	Data and connectivity
Legal and Regulatory	**Transport pricing (road and public transport)**
Environment and Energy	**Energy/fuel pricing**
Environment and Energy	Energy sources
Environment and Energy	Net zero emissions policies
Environment and Energy	Impacts of climate change

3.7 Appendix A provides further detail on these drivers, andthe extent or degree to which there would be a future change vs the situation today, and the associated impacts they may have on transport and travel patterns.

3.8 Appendix B presents the raw workshop outputs of how the drivers above were mapped by stakeholders on a 3x3 grid of importance and uncertainty – and how the drivers highlighted in bold in **Error! Reference source not found.**were identified.

Step 2: Axes of Uncertainty

3.9 After identifying the most important and least certain drivers, participants were then asked to create an uncertainty axis specific to that driver.

3.10 The aim of the activity was to describe the driver at the two poles of an axis, to consider the extent to which the driver might impact and influence how TfSE, national government and local partners may deliver transport outcomes. To note, the two poles were not to be thought of as opposing positives and negatives. Merely as two extremes of the same driver.

3.11 The table below summarises the possible future extremities of key drivers analysed in this activity assessed by workshop attendees. The following drivers were assessed:

- Policy – Transport outcomes from varying levels of government spending
- Policy – Transport outcomes from varying types or levels of transport and environmental policy focus
- Economy – Transport outcomes under different external economic situations – including economic stability and changes to international trade
- Energy - Transport outcomes under different levels of energy/fuel pricing and energy network resilience scenarios
- Transport pricing - Transport outcomes under different models of road-pricing and public transport funding

Table 3.2: Drivers and extreme scenario axes identified under the axes of uncertainty mapping exercise

Axis 1 outcome	Driver	Axis 2 outcome
• More centralised decision making • Sparse funding which is centrally controlled is not allocated to the South East • High volatility in decision making • Deeper evaluation of business cases and trade-offs delays investment • Maintenance and renewal spend is prioritised	**Varying levels of government spending**	• Higher levels of funding • More flexibility and discretion for what should be prioritised regionally • Fairer spatial distribution of funding across the nation • More stability and more confidence, easier to think strategically and longer-term
• Interventionist approach – legally enforced budgets – central control over identifying priorities and resource allocation to • Focus on making best use of infrastructure • Focus on “avoid and shift” principles for achieving decarbonisation • Look to equitable road pricing and demand management to fund and achieve outcomes • Delivers right scale of development and regeneration to meet growth ambitions	**Varying types or levels of transport and environmental policy focus**	• Laissez-faire approach enables local discretion to decide priorities • Focus on the “improve” principle for achieving decarbonisation – focus on accelerating EV roll out • Leverage role of private sector in delivery • Greater chance of growing inequality and spatial outcomes for different user groups and areas of the South East • Free market forces mean ports and airports have a growing role and influence in the area

		• Relaxing of planning controls – may lead to sprawl
• More economic instability leads to more reactionary and short-term thinking • Fluctuating interest rates impact investment decisions – leads to more stop/start issues • Labour market shortage – cost of operation increases, more strikes and disruption – impact on transport operation finances • Transport poverty increases – fares rise, operating costs rise as workers demand higher wages • Industrial decline – more spatial differences in outcomes	**Different external economic situations**	• Stability and consistent economic landscape enable longer-term thinking • Increased innovation and take up of new technology • More productive society – translates to more tax income and investment in transport • Diverse and vibrant industry – more global specialisation – increased trade – more freight traffic to ports and airports, but may mean some areas win and others may be left behind
• Energy is plentiful and cheap and accessible • This leads to a lower cost to travel for private and public modes • This may also incentivise more demand and car usage, more individual mobility - more congestion	**Different levels of energy/fuel pricing and energy network resilience**	• Energy is sparse and expensive – costs of public and private transport rise • Growing regional disparity in energy accessibility • Need to be more efficient with resources • Slower roll out of EV charging and decarbonisation trajectory
• Crude national transport pricing adopted to replace fuel duty – easier to implement • Local inconsistency in demand management • Public transport provision only where it can cover its operating costs - leads to concentration of demand and development	**Different models of road-pricing, demand management and public transport pricing**	• Sophisticated, equitable demand management policies • More opportunity to influence behaviours through road-pricing and demand management • Local and national push – local policies may vary but each look to implement what is best for their area • Public and active travel provision based on where it can best deliver strategic outcomes – funded by road-pricing initiatives • Lower public transport fares subsidised by road pricing • Facilitates better access to opportunities and more equitable outcomes

3.12 Appendix C presents the raw workshop outputs of the axes of uncertainties exercise conducted by three stakeholder groups.

Workshop 2 – Scenario development and refinement

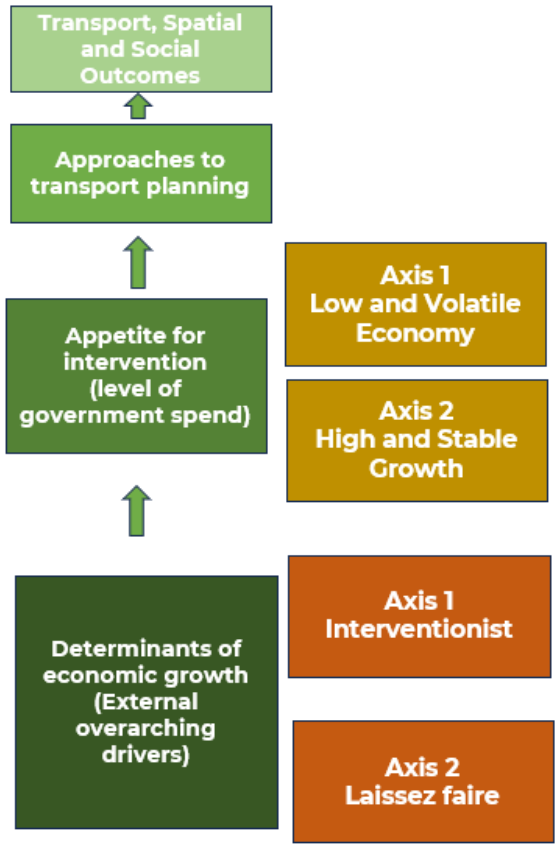
Step 3: Scenario development

3.13 In Workshop 2, the technical team and participants worked to agree on two primary axes of uncertainty which would form the basis for developing four alternative scenarios.

3.14 The drivers identified in workshop 1 were grouped as follows to find two differentiating axes which would have greatest influence and uncertainty of how transport and travel may be provided and used in the future:

- **Group 0 - Approaches to transport planning** – a strategy direction that may form policy recommendations rather than an external driver and were hence not considered as part of the axes of uncertainty
- **Group 1 - Appetite for intervention –** a push to a more interventionist or laissez-faire approach to providing transport (at a national, regional and local level) compared to today or a business-as-usual forecast of the future
- **Group 2 - Determinants of economic growth** – low and volatile economic growth vs high and stable economic growth – vs today or a business-as-usual forecast of the future

Figure 3.2: Diagram summarising the rationale for the axes chosen



3.15 Table 3.3 overleaf summarises how the approach outlined above determined the key axes for scenario identification.

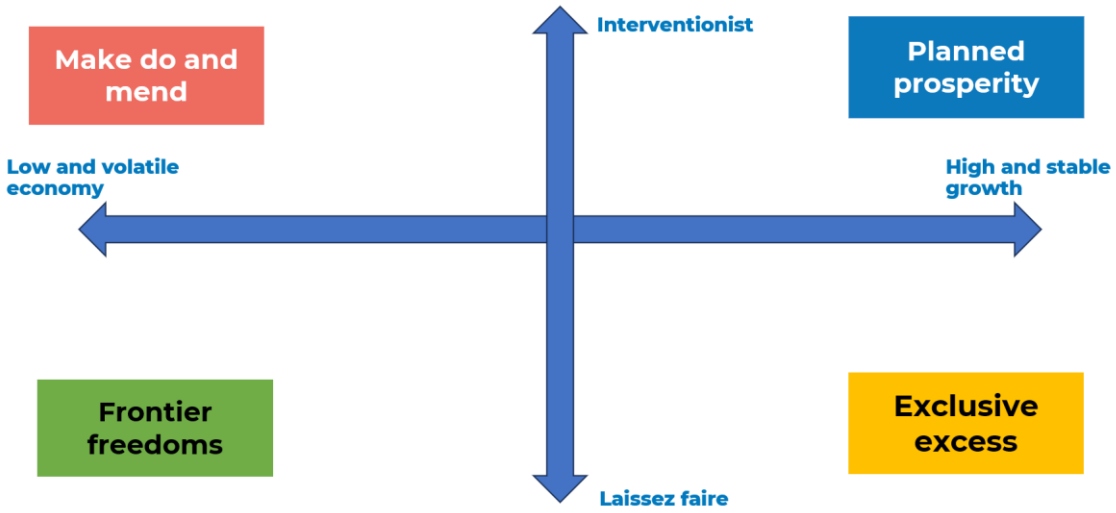
Table 3.3: Summary of drivers and axes identified and to determine our key axes for scenario identification

Group	High importance and uncertainty drivers	Axis 1	Axis 2
0	**Approaches to transport planning**		
0	Road user charging	Crude - replaces fuel duty, national and weak	Sophisticated - demand management tool to influence behaviours
0	Transport pricing	Public transport provision only where it can cover its operating costs - leads to concentration of demand and development	Public transport provided based on delivering outcomes - supports levelling up
0	Transport policy shifts	Interventionist, legally forced budgets, demand management, make best use of existing infrastructure, focussed rollout	Consensus for behaviour change, more organic mode shift
1	**Appetite for intervention**		
1	Level of government spending	Low level, volatile, centralized, not for south east, higher trade-offs, for maintenance only	Plentiful, consistent, spread to everywhere, national and local
1	Regulation and competition	Everything is regulated, nationally organized trains/buses, costly, monopoly	More variety, devolution
1	Environmental policy focus	Removal of planning controls and constraints, uncontrolled sprawl	Supports right scale of development, regeneration
1	Attitudes to the environment	People know what they should do, but do not do it. EVs grow in popularity and car usage continues to grow.	People take an active role in changing their carbon impact, travelling more sustainably and reducing their travel.
1	Integrated transport land use planning	Relaxed planning with no guiding mind. Reactive and market led leading to a fragmented transport system.	Regulated planning with a coordinated approach. Integrated, multi-modal transport.
2	**Determinants of economic growth**		
2	Interest rates and economic shocks	High fluctuation, stop-start nature of delivery, less investment, wages and op costs rise faster than fares, short-term firefighting	More stability, more confidence, easier to think strategically and longer-term
2	International trade	Brexit leaves lasting impacts, ports and airports don't grow	Continued growth, ports and airports have a bigger influence on the TfSE area
2	Labour skills shortage	Scarce, high wages, PT fares grow	Plentiful, high economic productivity
2	Industrial make up	Narrow, fragile, declining sector, reliant on external area	Diverse, vibrant, integrated with global supply chains
2	Energy/fuel pricing and resilience	Plentiful and cheap energy – leads to more cars, more congestion, more individuality	Sparce and expensive - leads to social equity issues, less choice

3.16 From these two axes, we identified the following four scenarios (visualised in Figure 3.3):

- Make do and mend (Low and volatile economic growth / Interventionist
- Planned Prosperity (High and stable growth / Interventionist)
- Frontier Freedoms (Low and volatile economic growth / Laissez faire)
- Exclusive access (High and stable growth / Laissez faire)

Figure 3.3: Identification of key axes and four scenarios



Step 4: Scenario refinement

3.17 Next, we started to identify what each of these scenarios may mean for transport planning approaches, and how these approaches may influence socio-economic and environmental outcomes.

3.18 This process involved identifying a summary scenario narrative for each of the scenarios, which provided a basis to undertake more detailed exploration as part of the workshops. A summary of these four scenarios and the key differentiating characteristics is provided below:

Make do and mend

A big state fixes things and makes best use of limited resources

- People have less, travel less, but also work less. Inequality reduces through redistributive policies.
- The state ensures development is strategic, controlling location and scale and focussing on protecting and enhancing existing social housing.
- There are few new public transport projects, but existing provision is brought into public ownership, mostly run at a loss. Reduction in travel demand supports decarbonisation. There is a significant focus on maintenance, renewal, and small upgrades to existing infrastructure.

Frontier freedoms

Residents are given increased freedoms to tackle economic volatility.

- This freedom allows for greater entrepreneurialism, innovation and stronger local economies but exacerbates inequalities between the “haves and have nots”.
- Without strategic transport coordination, public transport provision decreases, increasing private car usage and leaving some communities behind through community severance.
- Planning policy is relaxed allowing for increased self-building, but also allowing for large scale developers to provide extensive housing of highly variable quality.

Exclusive excess

State steps aside stimulating growth, investment and inequality

- The region becomes a hub for high value industries and undergoes rapid economic growth. On average, residents are wealthier, though inequality has grown.
- With limited regulation, we see low density urban sprawl around economically buoyant towns and cities creating disconnected, car-dependent neighbourhoods, leaving many parts of the region behind.
- Funding is reserved for transport schemes which serve big business, boosting connections by rail and road to London and international gateways. Local trips are served by Connected and Autonomous Vehicles (CAVs) and ridesharing services.

Planned prosperity

A big state drives economic growth through investment in public projects.

- Residents have less control over the location and scale of change, however, there is reduced inequality and transport related social exclusion.
- Car-free developments are carved out of the greenbelt on rapid transit corridors, and urban areas are densified through redevelopment.
- Through transformational investment in public transport, powered entirely by sustainable sources, the state can tackle decarbonisation head-on, shifting most trips away from private car.

4 Scenario modelling and testing

Workshop discussions and outputs to inform scenario model inputs

4.1 As part of the second scenario workshop and refinement of the scenario characteristics, stakeholders conducted the following activities:

- **Activity 1** - sense checking and validating the scenarios and discussing their characteristics across a range of areas.
- **Activity 2** - define the likely transport and land-use outcomes of each scenario in terms of the how much people travel, where and why, and the modes that they use - this will inform how the scenarios are modelled.

4.2 Figure 4.1 below summarises the findings from Activity 1. It summarises how the stakeholders considered specific macro-economic characteristics to differ for the four scenarios. This qualitative assessment of the scenarios helped summarise the key differentiating factors in the first workshop and informed the modelling of the scenarios.

Figure 4.1: Differentiating macro-economic characteristics for each scenario

Alternative Future	Level of government spending	Regulation and competition (more of less regulation)	Environmental policy focus (high or lower importance)	Interest rates and economic shocks (more or less stable)	International trade	Labour skills shortage (greater or lesser availability of skilled workers)	Industrial make up (more or less diverse)	Energy pricing and resilience (more of less stable)
Business as usual	•	•	•	•	•	•	•	•
Make do and mend	+	+	+	-	-	-	-	-
Frontier freedoms	- -	- -	•	- -	- -	++	+	- -
Exclusive excess	-	-	- -	+	++	++	++	+
Planned prosperity	+ +	+ +	+	++	+	++	•	++

• In line with Business as Usual
+ More than Business as Usual
- Less than Business as Usual

4.3 Appendix D presents the outputs developed by three of the workshop groups, of which Figure 4.1 above is an amalgamation.

4.4 Next, stakeholders were asked to think about the transport and land-use outcomes for each scenario. This gave the team an initial understanding of the key differentiating transport and land-use characteristics of each scenario which could be modelled. This quantitative assessment of the scenarios helped inform the parameters for scenario modelling using the South East Economy and Land Use Model (SEELUM).

Introduction to the South East Economy and Land Use Model (SEELUM)

4.5 SEELUM tests how investment in transport, coupled with changes to land-use policy, affects the economic performance of the South East area. It does this by simulating how changes in

patterns of connectivity and access affect how attractive different locations are for employers and/or households to locate in, how they respond to these changes, and what transport patterns arise from these changes.

4.6 For example, if travel costs rise in a particular area (say, due to highway congestion), depending on the other options available, people may change their mode of travel, change where they live or change where they work. In the extreme, if there are no other viable options to access work, people can become unemployed. Similarly, businesses can relocate to an area if transport costs reduce, increasing their accessibility to the workforce.

4.7 SEELUM also simulates how urban areas evolve over time. It considers how house builders and property developers provide new housing; the inward and outward migration of households; and the start-up and closure of businesses. It includes internal models of highways, bus and rail services, and walking and cycling networks. These all connect places together and influence their relative advantages as places to live or work. SEELUM can incorporate planned land-use changes and investment in transport infrastructure or services.

Scenario model inputs

4.8 The Steer technical team then translated these workshop outputs into SEELUM modelling inputs, summarised in Figure 4.2 on the next page. The Steer technical team then started to test and refine these scenarios using SEELUM. Further information of the SEELUM model can be found in the SEELUM technical report.

4.9 Furthermore, to accompany SEELUM outputs which provide insight into carbon reductions through mode shift and from interpreting different vehicle fleet transition pathways, the modelling team took the opportunity to test policy levers and leverage scenarios found in the recently launched Carbon Assessment Playbook[2], launched by TfSE, England's Economic Heartland (EEH) and Transport East (TE) as a suite of data, tools and guidance to support evidence-informed carbon reduction in local transport planning.

1.1 [2] Carbon Assessment Playbook (2024) - https://qcrinfo.wordpress.com/

Figure 4.2: Key differentiating transport and land use scenario characteristics modelled in SEELUM

Scenario	Change in highway generalised journey costs	Change in rail generalised journey costs	Change in bus/mass transit generalised journey costs	Change in active travel generalised journey costs	Change in land use and development	Roll-out of electric and alternative fuelled vehicles
Business-as-Usual (BaU)						• BaU
Make Do and Mend	• 10% increase in vehicle operating costs to reflect national road user charging and local demand management initiatives which recover costs of operating public transport services.	• No GJC change for urban and inter-urban radial rail services • 10% increase on orbital and rural services as services are reduced and reliability worsens due to reduced appetite and funding for services	• No GJC change for urban and inter-urban bus services • 10% increase in rural bus services as services are reduced and reliability worsens due to reduced appetite and funding for services	• 10% reduction in Active Travel GJCs as local initiatives are prioritised with the limited funding available for transport	• No change vs BaU	• No stimulus for accelerating roll out from public or private sector • However, Targeted investment in EV charging helps some areas decarbonise faster than others
Frontier Freedoms	• No change vs BaU	• No GJC change for urban and inter-urban radial rail services • 10% increase on orbital and rural services as services are reduced and reliability worsens due to reduced appetite and funding for services	• No GJC change for urban and inter-urban bus services • 10% increase in rural bus services as services are reduced and reliability worsens due to reduced appetite and funding for services	• 10% reduction in Active Travel GJCs as local initiatives are prioritised with the limited funding available for transport	• Concentration of all new development in rural areas	• No stimulus for accelerating roll out from public or private sector

Scenario	Change in highway generalised journey costs	Change in rail generalised journey costs	Change in bus/mass transit generalised journey costs	Change in active travel generalised journey costs	Change in land use and development	Roll-out of electric and alternative fuelled vehicles
Planned Prosperity	• 20% increase in vehicle operating costs to reflect national road user charging and local demand management initiatives	• 20% decrease in rail GJCs as planned capital investments in mass transit are delivered and services improved across the region, including rural areas	• 20% decrease in bus GJCs as planned capital investments are delivered and services improved across the region	• 20% reduction in Active Travel GJCs as local initiatives are prioritised to support sustainable growth	• Concentration of all new development in urban areas with strong transport links	• Focussed roll out of EVs through various policies from the public sector
Exclusive Excess	• 10% decrease in vehicle operating costs to reflect technology rollout of EVs which encourages a more car dependent society	• 10% decrease in rail GJCs on key urban and inter-urban radial routes as sufficient demand and concentration of economic growth in prosperous areas makes these rail services sustainable • 10% increase in rural rail GJCs as operational support to running services is reduced and service and reliability worsens	• No change in urban bus GJCs • 10% increase in rural bus GJCs as operational support to running services is reduced and service and reliability worsens	• 10% reduction in Active Travel GJCs as new technology such as e-bikes and shared mobility initiatives are rolled out faster and make travelling easier for all	• No change vs BaU	• Faster technology evolution from the private sector, and more wealth leads to faster renewal of vehicle fleets to ZEV

Note: Generalised journey costs (GJCs) are the estimated perceived travel times and cost of a journey – which factor the direct in-vehicle journey time and time for access, wait and interchange (generalised journey time – GJT), which is converted to a cost using a value of time value for different types of users, and the cost (which includes fares and vehicle operating costs).

Scenario model outputs – Transport outcomes

4.10 Figure 4.3 and Figure 4.4 show the changes to transport impacts that may occur for each of the four alternative scenarios modelled, when compared with a Business-as-Usual (BaU) scenario in 2050.

4.11 Appendix E also shows the distribution of trip impacts spatially across the TfSE area.

Figure 4.3: Change in number of daily return trips to/from and within the TfSE area by mode in 2050 vs Business as Usual

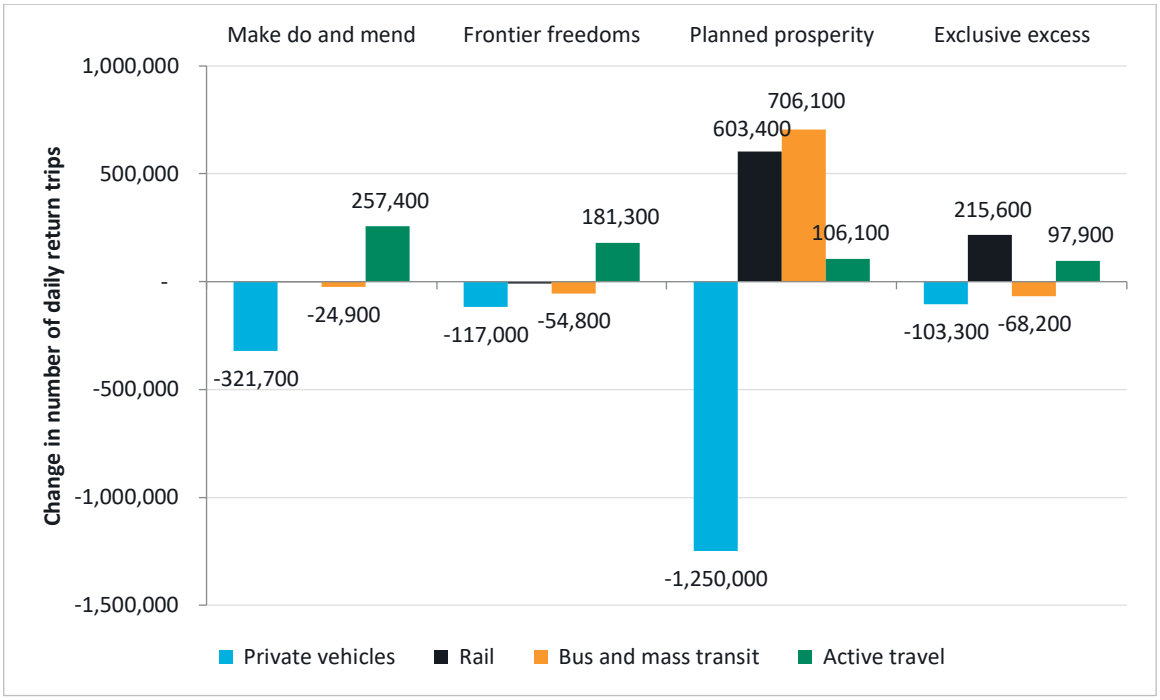
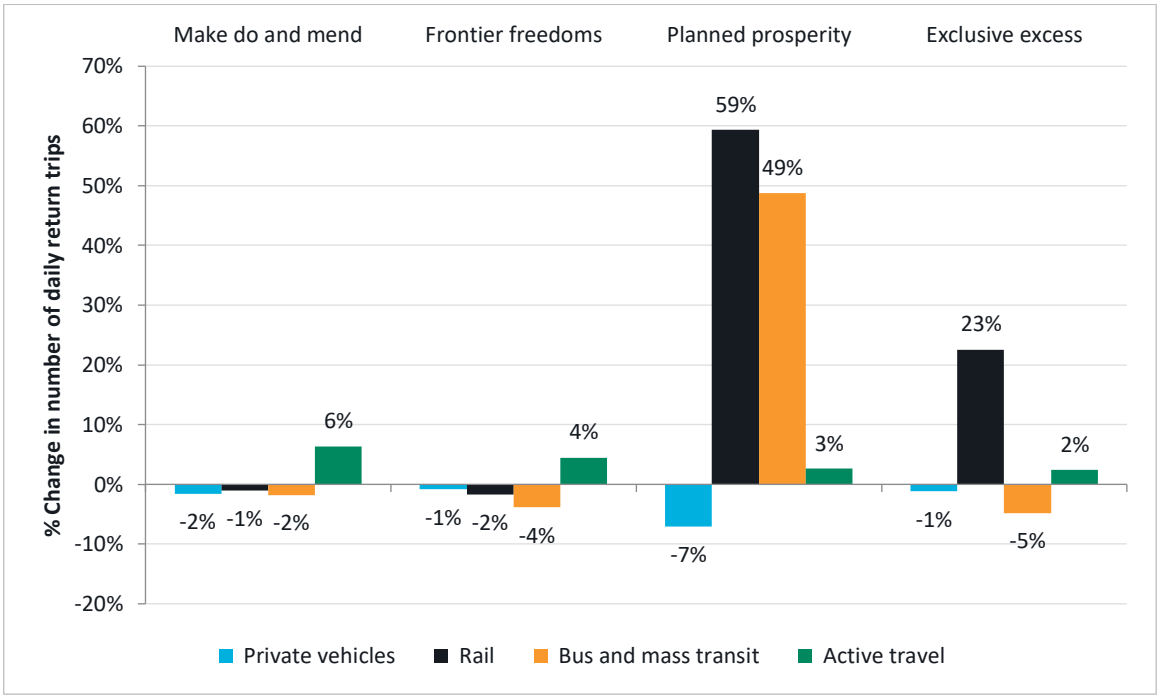


Figure 4.4: Percentage change in number of daily return trips to/from and within the TfSE area by mode in 2050 vs BaU



4.12 **In the Make Do and Mend scenario,** there is a greater requirement for strategic resource management and redistribution. The government's role is focussed on maintaining existing infrastructure and services rather than expanding them. With less emphasis on economic growth, there may be limited resources available for major transport projects, which restricts significant improvements in public transport relative to a BaU scenario.

4.13 There is a reduction of 321,700 private vehicle trips compared to a BaU scenario, due to a combination of reduced economic activity reducing the demand for travel, and effective policies which encourage users to switch to cheaper, accessible active modes.

4.14 **The Frontier Freedoms scenario** allows for greater individual freedoms and entrepreneurialism but lacks comprehensive transport planning. The absence of strategic coordination leads to a decline in public transport options and leads to more development in rural areas with poorer access to transport links and services There is economic volatility and uncertainty which increases a social divide. While some communities may thrive, others fall behind, leading to inequitable access to transport. Those with fewer resources may be less able to access public transport, driving them to rely on private vehicles, or travel only when it is critical if they do not have a car.

4.15 This leads to a small decrease in transport usage across public and private modes, relative to a BaU scenario, with a small uptick in active travel as people walk and cycle to access services instead.

4.16 **Under a future Planned Prosperity scenario,** stronger state intervention leads to a significant commitment from the government to invest in public transport and sustainable infrastructure. It indicates a proactive, co-ordinated approach to urban planning and transport. The investment in public projects drives economic growth and addresses social inequalities, creating a more balanced transportation network that encourages public transit use. As people see enhanced public transport options and the promotion of active travel, there's a shift in social behaviour favouring these modes over private vehicles.

4.17 The focus on public transport provision leads to a drastic reduction in private vehicle usage, with over 1.25 million fewer trips per day. There is high mode shift to rail, bus and mass transits, which both experience upwards of a 50% increase in ridership when compared to a BaU scenario.

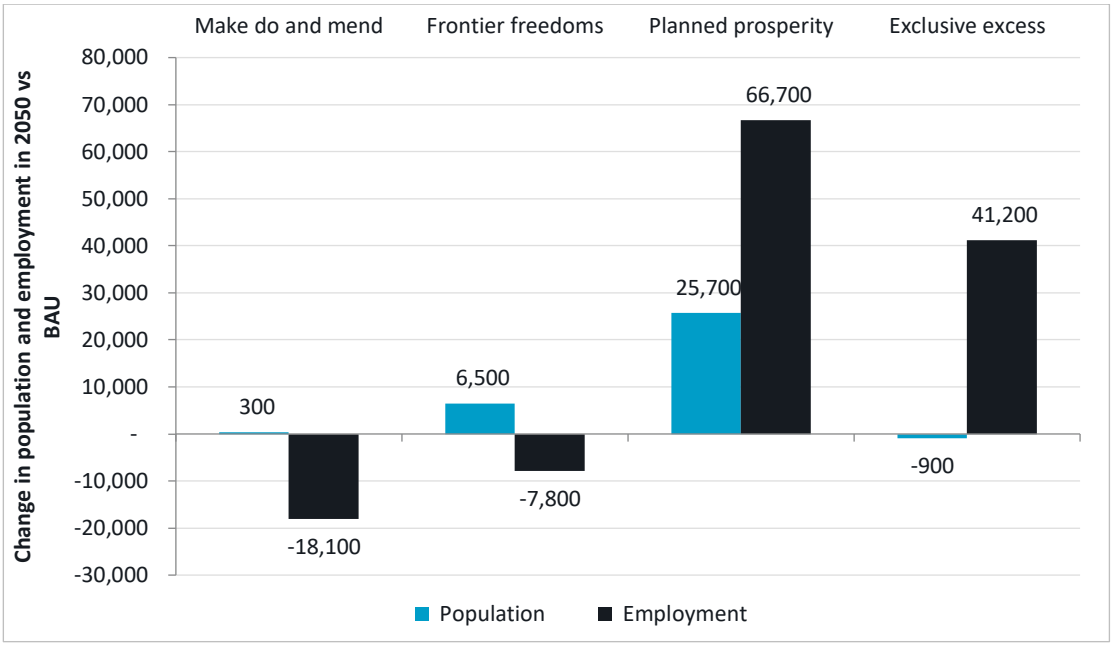
4.18 **In an Exclusive Excess future scenario,** everyone prioritises free market economic growth and there is focussed public and private investment in supporting high-value industries at the expense of improving social and environmental outcomes. Transport is provided where there is a strong case that it will help stimulate economic growth and support the growth of new businesses or housing, rather than providing equitable transport solutions. For instance, inter-city railway services between thriving urban centres may be improved instead of rural services serving deprived coastal communities. The lack of regulation and oversight from a central government leads to urban sprawl, where affluent areas benefit from excellent transport links while poorer communities remain disconnected.

4.19 Whilst there is some investment in rail on radial routes where there is a market, such as to and from the economic hubs of London, Reading and Southampton, the overall increase in car dependency results in modest shifts towards public transport without substantial reductions in private vehicle use, when compared to a BaU scenario.

Scenario model outputs – Socio-economic outcomes

4.20 Figure 4.5 shows the changes to population and employment within the TfSE area that may occur for each of the four alternative scenarios modelled, compared with a Business-as-Usual scenario in 2050. Note this baseline is based on ONS population growth estimates, and that the changes represented are relative to that background growth.

Figure 4.5: Modelled change in population and employment in the TfSE area by 2050 vs Business as Usual



4.21 In a **Make Do and Mend scenario**, restrained development, minimal economic growth, and redistributive policies limit both population and job growth. People are encouraged to use fewer resources, travel less, and work less, while the state ensures equitable distribution of resources. There is little expansion of new housing and jobs. Population growth remains steady, but there are significantly fewer job opportunities vs a BaU scenario, which also leads to reduced GVA and worsening socio-economic outcomes for the region.

4.22 In a **Frontier Freedoms scenario**, the relaxed regulatory environment promotes some entrepreneurship, but results in fragmentation and inequality, dampening overall growth. The relaxing of planning requirements moderates an influx of new homes and residents, particularly in rural areas who seek to benefit from the relaxed economic environment. However, the uneven development and lack of coordinated infrastructure planning limit population and economic growth, leading to reduced GVA and worsening socio-economic outcomes for the region.

4.23 In a **Planned Prosperity scenario**, consistent, targeted public investment in transport and sustainable place-making leads to the region being a more attractive place to live and work for all, leading to significant growth in both population and employment vs a BaU scenario. Much of this growth comes from more co-ordinated transport and land-use planning, meaning all new development is concentrated in urban areas with strong existing transport links.

4.24 In an **Exclusive Excess scenario**, economic growth is high, but it is unevenly distributed. Despite several economic hubs thriving, driving job creation and associated opportunities, there is a net decline in population as some areas are left behind. A focus on providing for businesses and wealthier individuals creates isolated and less liveable environments for many.

Decarbonisation scenario modelling

4.25 SEELUM outputs provide insight into carbon reductions through interpreting mode shift and from different vehicle fleet transition pathways. To accompany these outputs, the team also tested policy levers, leveraged scenarios and explored potential decarbonisation pathways presented in the recently launched Carbon Assessment Playbook[3]. The Carbon Assessment Playbook was launched by TfSE, EEH and TE as a suite of data, tools and guidance to support evidence-informed carbon reduction in local transport planning.

4.26 Several defining characteristics were identified in the scenario planning work as alternative futures, and each were compared to what would happen in a BaU case. This BaU profile for emissions reductions between 2019 and 2050 were very similar in SEELUM and in the Playbook. This is because they are both derived from Department for Transport, Transport Appraisal Guidance (DfT TAG)[4] and represent a view of decarbonisation based on firm and funded policies in line with current assumptions and recognised growth forecasts from the National Traffic Model[5].

4.27 However, it is noted in the Carbon Assessment Playbook guidance that this is a pessimistic view which doesn't capture the latest policy on the banning of Internal Combustion Engines and likely research and roll-out trajectory of zero-emission technology. Therefore, a baseline that represents a more likely future based on defined policy (e.g. the ZEV mandate) and extrapolating current rates of uptake has been recommended to compare future assessments against. The tool accounts for mileage split by fuel type (i.e. ZEV uptake) assumptions which are specific to each Local Authority[6].

4.28 For each of the four scenarios, the emissions per annum until 2050 are adjusted based on the varying levels of state intervention, technology uptake, and the pace of change expected in each scenario as referenced in the characteristics defined by workshop attendees.

4.29 **Make Do and Mend** – Slow, managed decarbonisation

- **Characteristics**: Focus is on reducing the demand for travel, and incremental improvements to public transport and active travel without large investments which helps decarbonisation in the 2030s. In the 2040s, the adoption of new technologies occurs.
- **Model outputs and decarbonisation outcome:** Aligns with localised ZEV uptake**,** with slightly better performance due to slightly reduced travel demand and small-scale public sector interventions which support mode shift to active travel. Does not achieve net-zero by 2050.

4.30 **Frontier Freedoms** – Fragmented, market-driven decarbonisation

- **Characteristics**: Decarbonisation occurs as there is reduced need to travel as more people live and work locally, reducing the need to travel far distances. There is some decarbonisation, driven by local innovation and entrepreneurship, however this varies across the area. People still rely on private vehicles, and the rate at which they switch to newer, more efficient, low or zero emission vehicles is slower than in BaU. The rate also

[3] Carbon Assessment Playbook (2024) - https://qcrinfo.wordpress.com/
[4] https://www.gov.uk/guidance/transport-analysis-guidance-tag
[5] Note: UEBaU is a shorthand metric used for this scenario in the DfT's draft QCR guidance.
[6] Note: UE-ZEV-LA is a shorthand metric used for this scenario in the DfT's draft QCR guidance.

varies significantly across the region based on disposable income and different behavioural attitudes to decarbonisation.

- **Model outputs and decarbonisation outcome:** This leads to a pessimistic trajectory akin to the DfT TAG BaU at a regional level. Levels of decarbonisation vary as some areas are slower to roll-out ZEVs compared to others. There is some benefit as trip distances are shorter, and some switch to active modes. However, this scenario is furthest from achieving net-zero by 2050.

4.31 **Planned Prosperity** – Accelerated, co-ordinated decarbonisation

- **Characteristics**: Strong state-led intervention with significant investment in public transport and electrification. Most aggressive decarbonisation strategy at a national and local level to roll-out charge-points and support the roll-out of ZEVs.
- **Model outputs and decarbonisation outcome:** Substantial reductions in emissions, aligned with more ambitious decarbonisation targets such as the CCC 6th Carbon Budget. This scenario is closest to achieving net zero by 2050.

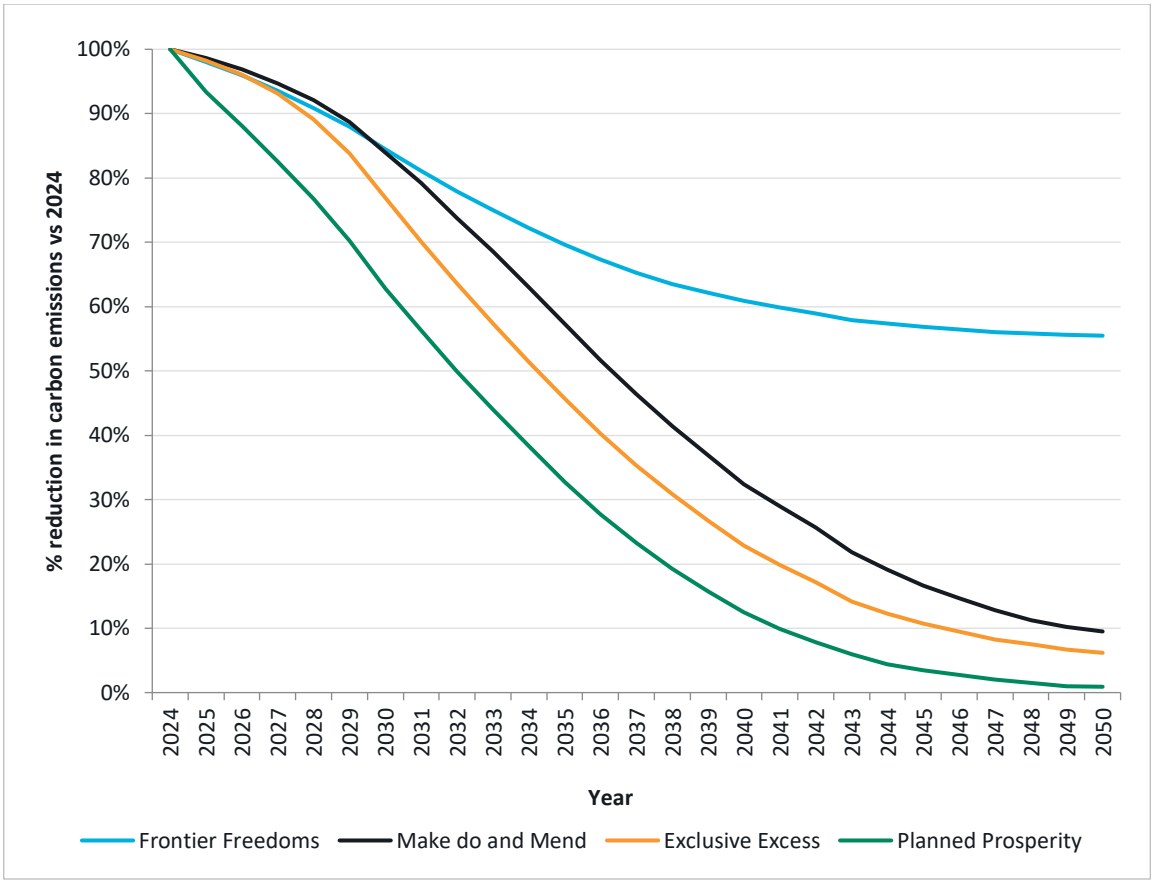
4.32 **Exclusive Excess** – High-tech, but uneven decarbonisation

- **Characteristics**: Wealthy areas achieve rapid decarbonisation through advanced technologies, but lower-income areas lag. Private vehicle use remains high, but private vehicles are mostly zero-emission by 2050.
- **Model outputs and decarbonisation outcome:** Moderate emissions reduction in high-tech hubs, but overall, decarbonisation is hindered by uneven progress across regions. This scenario follows the accelerated ZEV uptake profile in the carbon playbook, and is mostly net zero by 2050, however vehicle traffic rises and leads to other negative outcomes such as congestion.

Table 4.1: Potential decarbonisation trajectories for future scenarios between 2024 and 2050 - as presented in the Carbon Assessment Playbook for TfSE

Future scenario	Carbon Assessment Playbook profile which best matches the likelihood of the future scenario	% reduction in emissions in 2050 vs 2024
Frontier Freedoms	BaU - DfT TAG Guidance (UEBaU)	45%
Make Do and Mend	Localised ZEV uptake (UE-ZEV-LA) – what Carbon Assessment Playbook recommends as a likely BaU	90%
Exclusive Excess	Accelerated ZEV uptake (UE-ZEV)	94%
Planned Prosperity	CCC 6th Carbon Budget (Balanced)	99%

Figure 4.6: Potential decarbonisation trajectories for future scenarios



Conclusions

4.33 Developing the scenarios and investigating the potential impacts of these scenarios on transport and socio-economic outcomes has been a useful exercise in identifying impacts associated with varying levels of economic stability and appetite for providing transport interventions. These scenarios evidence how a more interventionist or a more laissez-faire approach (at a national, regional and local level) – vs today or a BaU forecast of the future, has on how people may live, work and travel.

4.34 These scenarios also show that regardless of alternative futures, the negative impact on public transport usage is low. For instance, in both the Make Do and Mend scenario and Frontier Freedoms scenario which are characterised by low and volatile economic growth, the negative consequences on transport are only slightly lower than what we expect in a BaU forecast of the future. This is because in both these scenarios, rural unprofitable services are likely to be cut, which make a small proportion of total bus and rail ridership. However, these vital connections will still be lost to those who rely on them.

4.35 However, scenarios characterised by stable growth, public investment, and co-ordinated strategic planning yield the most significant reductions in private vehicle usage and increased public transport adoption. In comparison, those focussed on market-driven growth or individual freedoms tend to maintain or even increase car dependency. This underscores the importance of co-ordinated policies and investments in shaping transportation behaviour and promoting sustainable outcomes.

5 Testing the resilience of the strategy against the scenarios

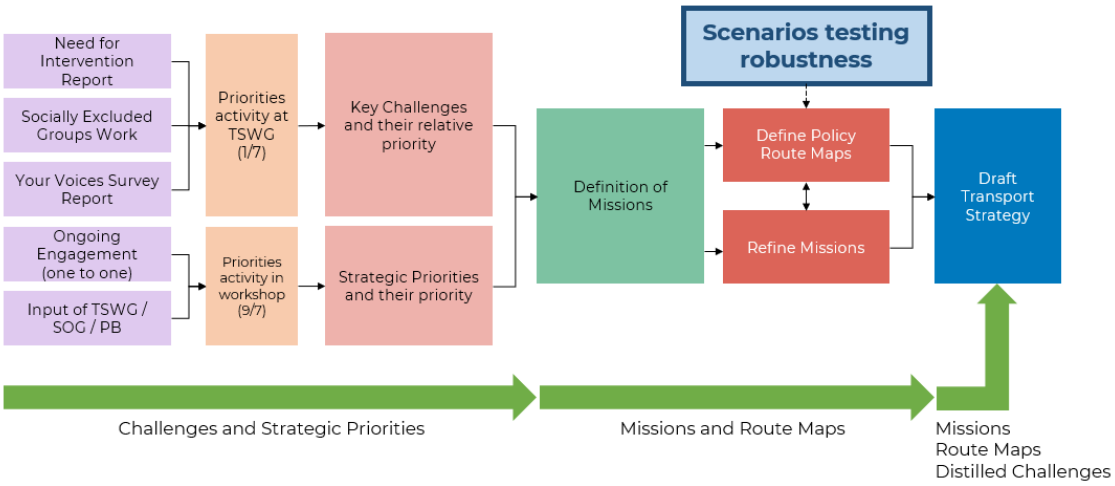
How the scenarios have informed strategy development

5.1 The scenarios informed subsequent workshops which focussed on:

1. Refining the existing vision for the TfSE region and identifying a key focussed set of missions for the refreshed Regional Transport Plan to develop priorities around; and
2. Developing route maps which identify policies and schemes and delivery actions for which TfSE, with national government and local partners can deliver the desired missions.

5.2 During this process, the technical team and stakeholders were continually reminded to reflect upon the alternative scenarios. This was to ensure identified interventions and policy actions in the emerging strategy and mission route maps are fit for purpose, despite future uncertainty and potential constraints, particularly around funding and who will be in the lead in delivering an element of the strategy or initiative.

Figure 5.1: How scenario testing fits into the wider strategy refresh programme



Testing the resilience of the emerging strategy against the scenarios

Methodology

5.3 Following the initial development of the Transport Strategy, TfSE deployed a methodology based upon a method developed by Transport Scotland, which wished to test how effective different policy packages might be under various future scenarios when creating their transport strategy. Building on this, the technical team created a tool to enable TfSE to explore the impact of different futures on the interventions planned by TfSE in their strategy.

5.4 The tool facilitated a technical workshop where members of TfSE's technical team **evaluated how proposed policy measures presented the emerging route maps might support or hinder TfSE's ability to deliver desired outcomes,** both in a "business-as-usual" scenario or in these four alternative scenarios.

5.5 The tool provided qualitative insights on the potential policy implications in each scenario. The following indicators, identified in Table 5.1 below, were evaluated by the technical team[7].

Table 5.1: Key mission indicators assessed under each scenario

Mission of the strategy	Key Indicator
Strategic Connectivity	Average journey times by road and rail between major economic centres and international gateways
	Reliability of journeys by road and rail between major economic centres and international gateways
	Percentage of trips between major economic centres and international gateways undertaken by non-car modes of transport
Resilience	Reliability of journeys by road and rail between major economic centres and international gateways
	Condition of the major road network
Inclusion and Integration	Percentage of population at risk of Transport-Related Social Exclusion
Decarbonisation	Carbon emissions by surface transport modes per annum
Sustainable Communities[8]	Percentage of occupants of major new housing developments within 400m of a regular public transport service

5.6 For each indicator and each scenario (including a Business-as-Usual Scenario), participants are asked how this indicator will change relative to the current position, with 5 options being available:

- Significantly Improve
- Improve

[7] It should be noted that the full Transport Strategy includes several indicators by which to measure progress towards achieving desired outcomes under each mission, for example, the Inclusion and Integration Mission also includes indicators on customer satisfaction. However, for this exercise, only a subset of the key indicators were tested under the four alternative scenarios.

[8] This is called Sustainable Growth in the Draft Transport Strategy, but was called this at the time of the assessment.

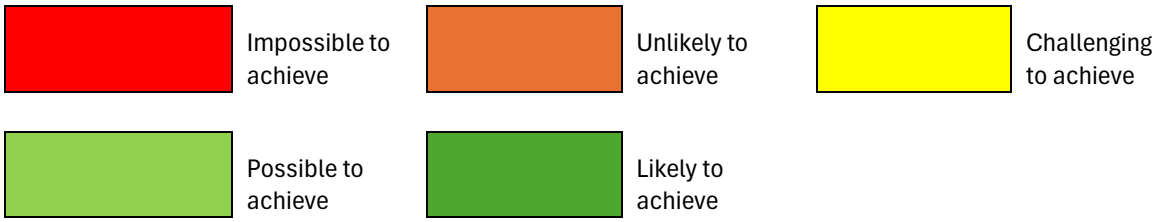
- No change
- Worse
- Significantly Worse

5.7 This process is undertaken in both a case where there was:

- **no intervention** by TfSE (i.e. TfSE continues in a Business-as-Usual state and there are no new activities), and
- where TfSE delivers the **planned policy interventions identified in the Policy Route Maps** in full, as presented in the main strategy document.

5.8 Based upon an average score for the indicators for each mission, a Red / Amber / Green status is given as an overall indication of how challenging it will prove to be to deliver each respective mission. This is summarised below.

Figure 5.2: How each mission was evaluated for each scenario



Results and insights

5.9 The summary of the performance of each mission under the four scenarios with no intervention and the Policy Route Maps is captured in Table 5.2 below.

Table 5.2: Results of the resilience testing

	Business as Usual	Make Do And Mend		Frontier Freedoms		Planned Prosperity		Exclusive Access	
		No intervention	With Policy Route Map	No intervention	With Policy Route Map	No intervention	With Policy Route Map	No intervention	With Policy Route Map
Strategic Connectivity									
Resilience									
Inclusion and Integration									
Decarbonisation									
Sustainable Communities									

5.10 The results show that there was variability in how possible it was to achieve each mission between each scenario. However, **under all alternative scenarios, delivering the strategy route maps and component policies and schemes will deliver more positive transport and wider socio-economic outcomes for the region, compared to if there was no strategic direction or intervention at all.**

Results by scenario

5.11 A summary of the discussions, findings and insights from the workshop where each scenario was evaluated is presented below.

5.12 **Business-as-Usual -** Strategic Connectivity, Resilience, and Inclusion outcomes are unlikely to be achieved, while delivering the Decarbonisation and Sustainable Communities missions face significant challenges. Limited infrastructure expansion and gradual bus service decline exacerbate issues, while decarbonisation efforts focus on rolling out private passenger electric

vehicles but struggle with decarbonising freight. Sustainable community outcomes progress modestly through planning but are constrained by housing demands.

5.13 **Make Do and Mend** - Without intervention, efforts focus on maintaining the current system with limited improvements. With a policy route map, there's a shift from merely patching the network to enhancing capacity and resilience. Strategic investments target vulnerabilities, addressing future threats like climate change more effectively.

5.14 **Frontier Freedoms** - TfSE's role might be reduced, but its strategic vision remains valuable. Achieving Strategic Connectivity and Resilience outcomes is difficult due to minimal public intervention, though there may still be an organic focus on infrastructure resilience. Delivering inclusion is challenging, with limited volunteer-led services, while decarbonisation progresses through electric vehicle adoption. Sustainable community outcomes are mixed, with varied development patterns across the region leading to varying outcomes.

5.15 **Planned Prosperity** – This scenario benefits from increased central investment, with the strategy and policy route maps ensuring targeted, regionally relevant actions. Strategic connectivity improves as key infrastructure is delivered and enhanced. Resilience efforts are better focused on vulnerable areas. An enhanced, integrated transport network with targeted support to vulnerable communities improves equity and inclusion outcomes. Decarbonisation and Sustainable growth outcomes also progress steadily, driven by central government policies, and facilitated and delivered at a regional and local level by collaboration between local stakeholders and the private sector.

5.16 **Exclusive Excess** - Strategic investments are prioritised by business needs, which leads to greater regional connectivity, particularly to and from areas of the South East which are growing. Resilience is improved on links where it is critical to support growth. Decarbonisation accelerates rapidly with targeted interventions by the private sector accelerating the roll-out of zero emission vehicles. However, achieving inclusive, sustainable growth outcomes becomes difficult due to a shift toward business-focused, car-dependent solutions.

5.17 Further detail of the results, insights, implications and considerations are presented in Appendix H.

6 Next steps

6.1 TfSE has effectively leveraged the scenario development, testing and reflection process to support several areas of strategy development, ensuring the refreshed Transport Strategy addresses and remains resilient despite the uncertainties surrounding the future of transport and travel.

6.2 This approach has helped refine a clear set of focused missions, ensuring the strategy remains adaptable and relevant. By testing the potential policy impacts under different scenarios, TfSE has gained a stronger understanding on the conditions required for achieving desired outcomes, uncovered the factors that are within and beyond their control, and can ensure the strategy supports "no-regrets" investment decisions.

6.3 The scenarios work has concluded that under all alternative scenarios, the strategy route maps with its component policies and schemes deliver more positive transport and wider socio-economic outcomes for the region, compared to if there was no strategic direction or intervention at all.

6.4 Looking ahead, TfSE will concentrate on translating these insights into deliverable route maps, collaborating with national and local partners to implement priority measures. Continuous reflection on alternative scenarios will ensure that proposed interventions are deliverable despite future uncertainties, and that the policy direction remains resilient, realistic, and aligned with future constraints, particularly around funding and leadership responsibilities.

Other potential uses of the defined preferred and alternative scenarios

6.5 The preferred and alternative scenarios could have several uses for TfSE and partner Local Authorities going forward:

- They can be referenced in future to understand the opportunities and threats to the vision and action plans laid out in the Regional Transport Plan.
- They can be used as part of future detailed strategic planning of movement and connectivity in the region to understand how future uncertainty might impact decision making and prioritisation.
- They could also be used as a means of ‘stress-testing’ the strategic and economic case for specific schemes considered for the region and support local decision making.

Appendices

A Drivers of change

Explanation of drivers considered in mapping exercise

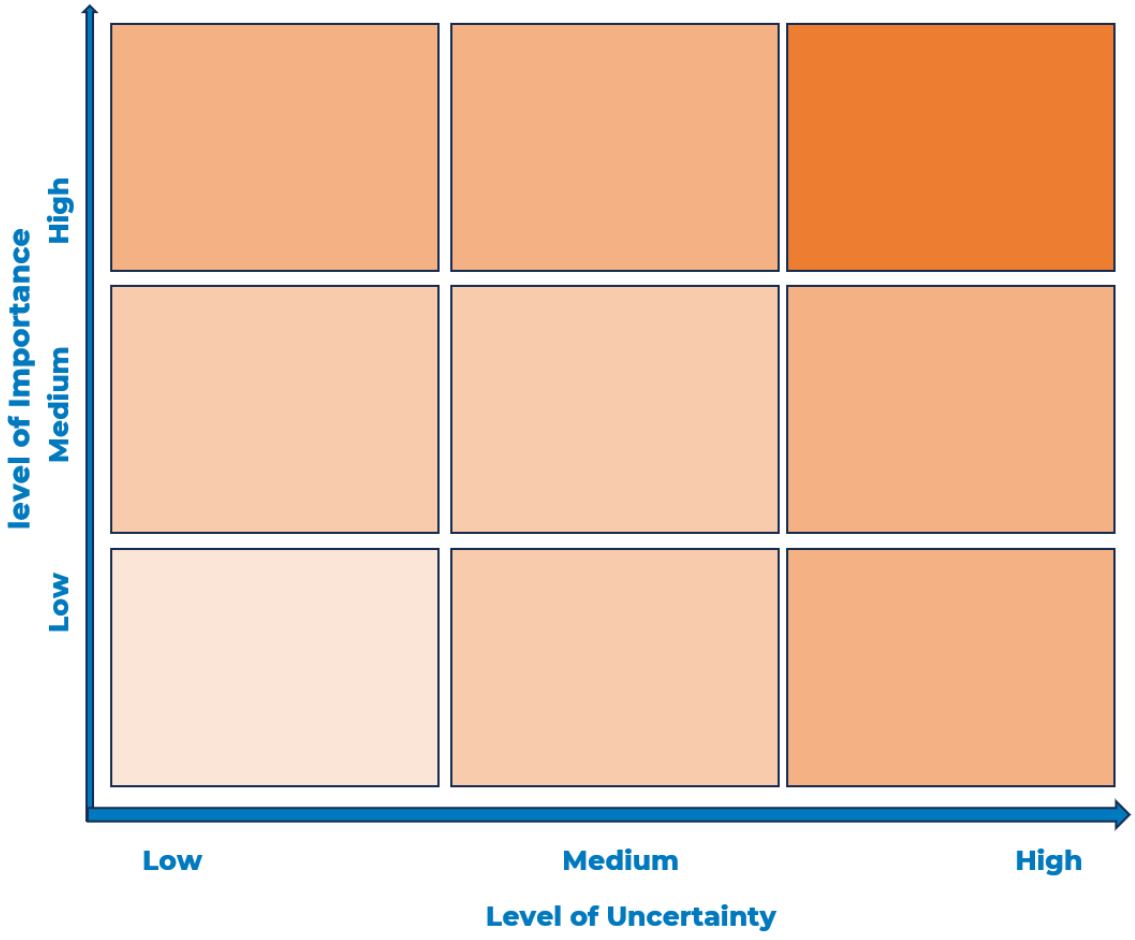
Theme	Driver of change	Detail (the extent or degree to which there is a change vs today, and the impacts they may have on transport and travel patterns)
Policy	Level of government spending	Level of public expenditure available overall, and the allocation given to infrastructure, transport, local/regional authorities
Policy	Private sector transport spending	The level of private sector transport expenditure (e.g. through new/innovative forms of private sector financing)
Policy	Level of Devolution	Extent to which devolution gives power to local government with greater control, influence and discretion to deliver change
Policy	Transport policy focus and change	Extent to which local transport plans and strategies necessitate a degree of connectivity beyond the private car, focus away from planning for vehicles and shift to planning for people and places
Policy	Integrated transport and spatial planning focus	Extent to which there is greater co-ordination of integrated transport, land use and planning policies
Policy	Economic policy focus	Extent to which government focusses investment to achieve economic growth
Policy	Social Policy focus (on levelling-up, deprivation and exclusion)	Extent to which government focusses investment to achieve levelling-up ambitions, and tackles deprivation and social exclusion issues
Policy	Environmental policy focus	Extent to which government focusses on decarbonisation, biodiversity, habitats and protection of historical and natural assets
Economy	Demographic change	Degree to which we experience changes in migration patterns and age profiles (e.g. ageing population)
Economy	Economic shocks	Degree of economic stability nationally and regionally (e.g. changing impact due to trade wars and conflicts)
Economy	International trade	Degree of change in globalisation or isolationism, such as the impacts of more or less trading with EU and other partners

Economy	Robotics/AI in industry	Extent to which automation impacts employment (how people work, and how many people work) and businesses (how businesses function)
Economy	Industrial make-up	Extent to which the industrial make up changes, either due to a strategic effort to encourage economic transformation, or organic change
Economy	Labour and skills shortage	Extent to which there is changing labour or skills shortage more generally or in specific sectors, which leads to changing travel patterns
Social / Attitudes	Changes in working patterns	Extent to which flexible working changes and its effects on commuting and travel patterns
Social / Attitudes	Changes in remote activities	Extent to which remote activities increase/decrease over face-to-face (business, leisure, retail, education)
Social / Attitudes	Attitudes to health	Extent to which government and the public put importance of addressing public health individually and collectively, and make health-conscious decisions
Social / Attitudes	Attitudes to shared mobility	Extent to which people are willing to share journeys and reduce private vehicle ownership
Social / Attitudes	Attitudes to the environment	Degree of support for tackling climate change; protection of the natural environment; and increasing interest in active travel
Technology	Autonomous technology	How fast driverless vehicles are rolled out, and the impact of potential consequences, such as on safety or changes on local streetscapes
Technology	Clean transport technology	The rate lower carbon transport technologies are rolled out (e.g. electrification, hydrogen fuel), and its impacts on emissions and travel more generally
Technology	New transport modes	Extent to which the modal mix of mobility changes with new modes entering the industry (e-scooters, drones) impact travel patterns
Technology	Digital transport	Extent to which transport initiatives relying on digital innovation/collaboration (e.g. integrated fares or MaaS) are delivered
Technology	Data and connectivity	Extent of transformation of communications technology and influence of data and networks on service delivery
Legal and Regulatory	Transport pricing (road and public transport)	Extent to which forms of payment for consuming mobility change including distance or tax-based pricing
Environment and Energy	Energy/fuel pricing	Extent to which oil, gas and electricity wholesale cost changes

Environment and Energy	Energy sources	Extent to which our energy sources in the economy change (coal-powered, gas, wind, solar etc.)
Environment and Energy	Net zero emissions policies	Extent of commitment and delivery of Net Zero emissions policies
Environment and Energy	Impacts of climate change	Extent to which climate change impacts worsen and there is a greater need to focus on resilience

B Drivers of change mapping – workshop raw outputs

Grid used to identify most important and uncertain drivers



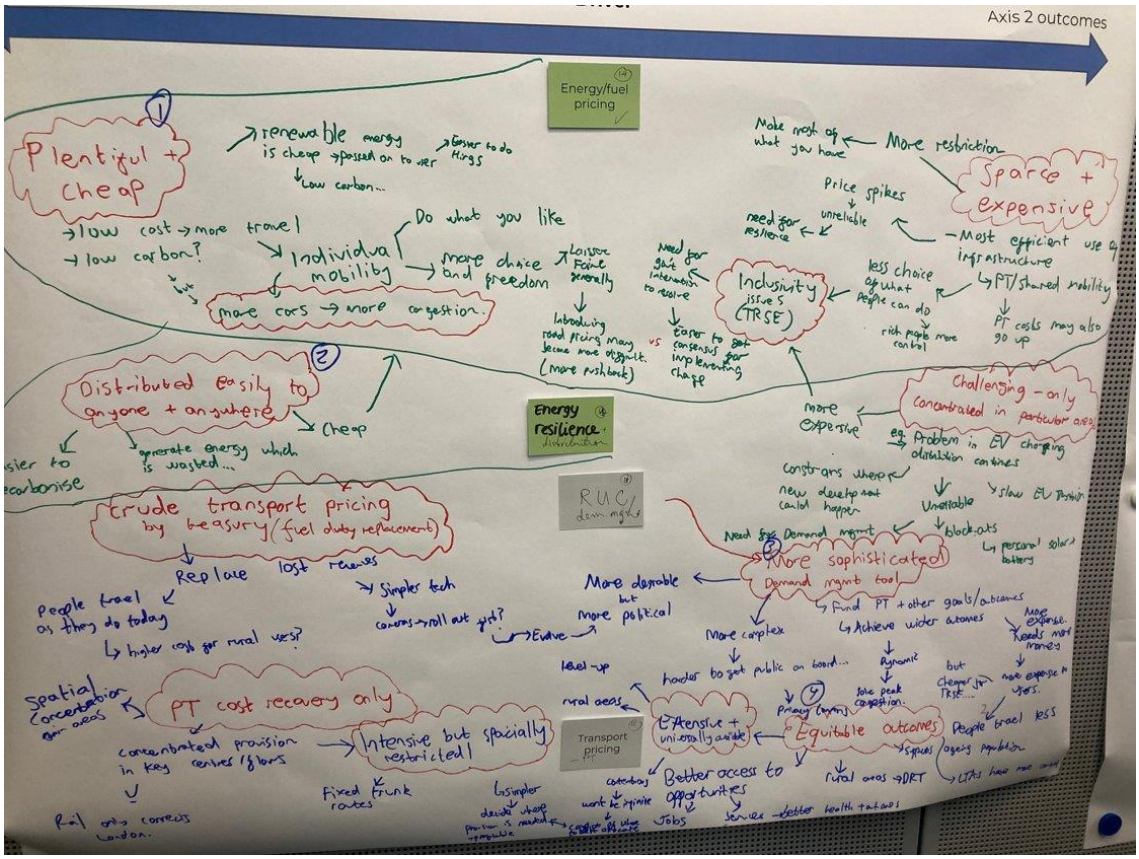
Workshop outputs – 3 groups

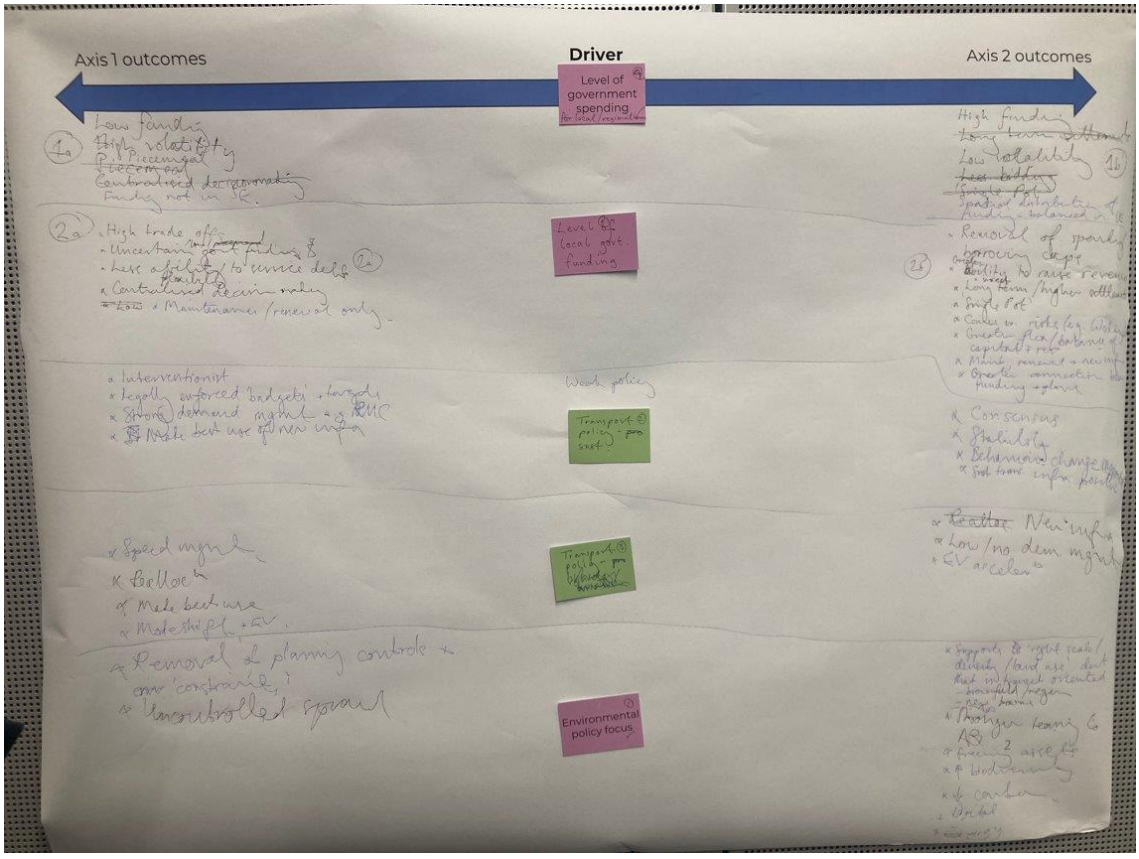
steer

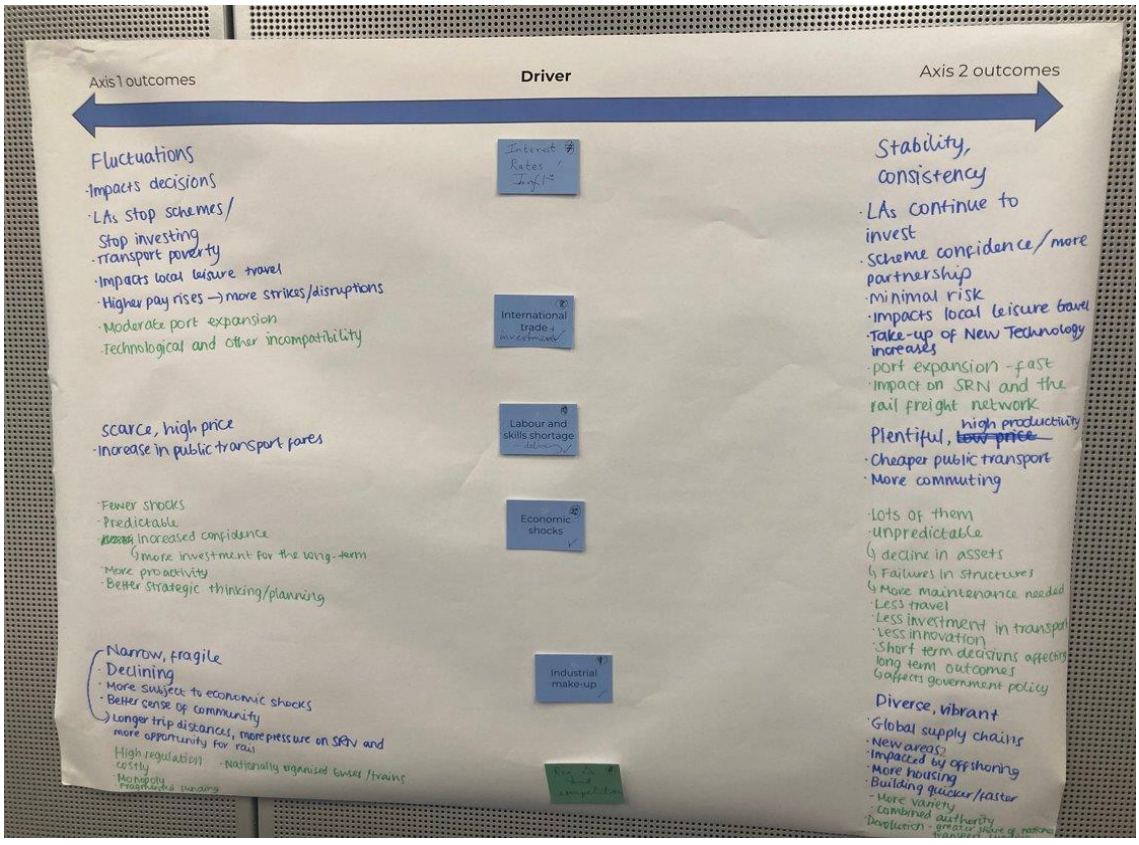

Level of Importance
High
Medium
Low
Impacts of climate change
Transport policy focus and change
Demographic change
Net zero emissions policies
Economic policy focus
Integrated transport and spatial planning focus
Level of government spending
Environmental policy focus
Level of devolution
Transport pricing
Social policy focus
Attitudes to health
Attitudes to the environment
International trade
Energy/fuel pricing
Industrial make-up
Economic shocks
Clean transport technology
New transport modes
Private sector transport spending
Attitudes to shared mobility
Autonomous technology
Energy sources
Digital transport
Data and connectivity
Labour and skills shortage
Changes in working patterns
Changes in remote activities
Low
Medium
High
Level of Uncertainty

steer

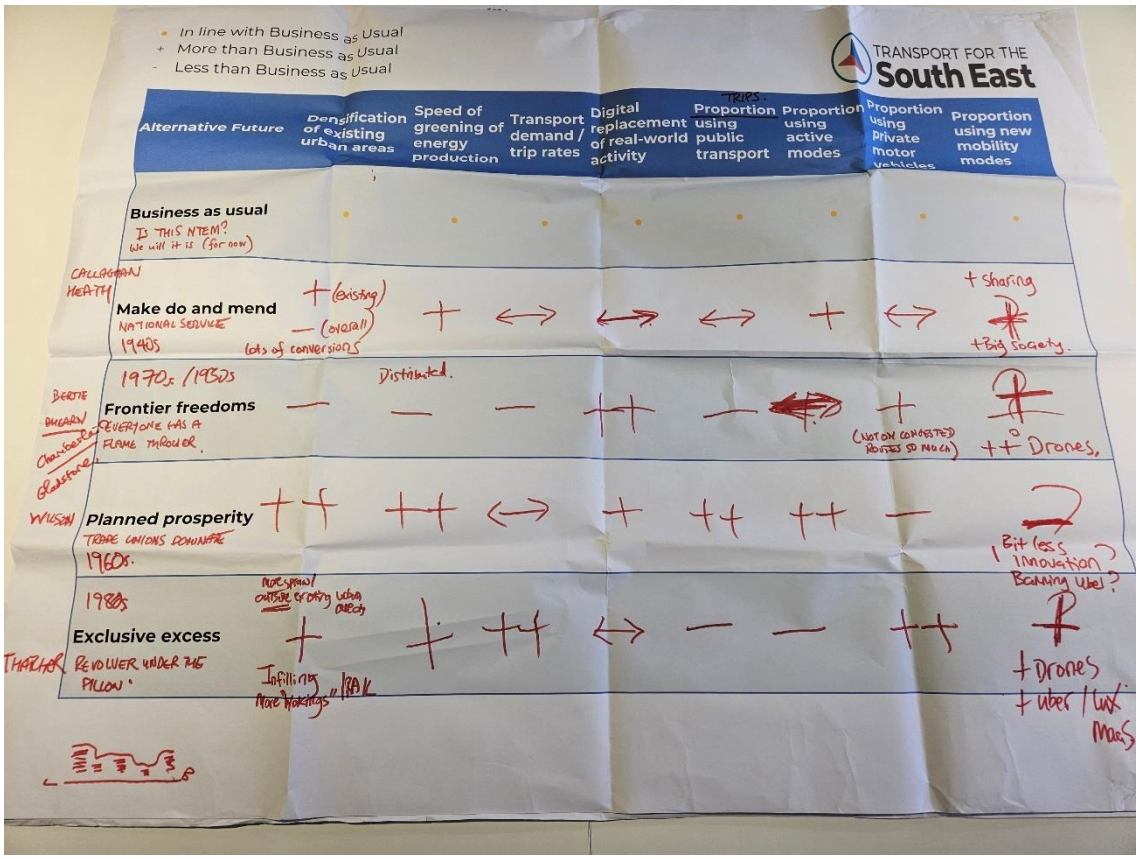
C Axes of uncertainty – workshop raw outputs

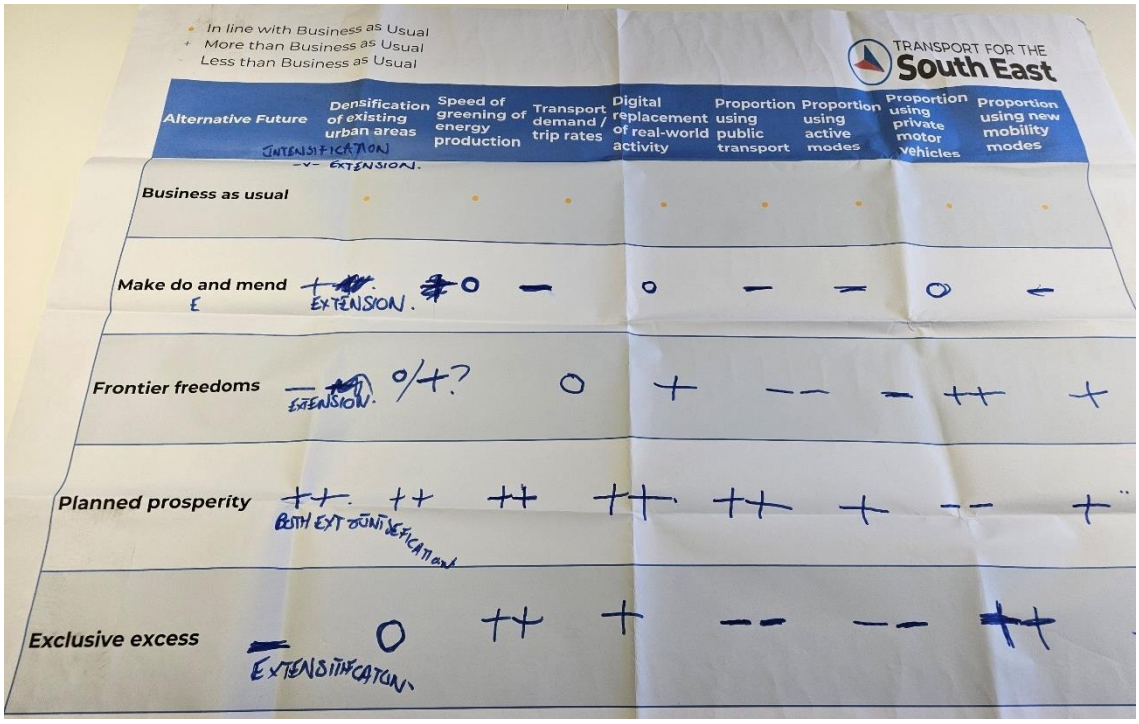


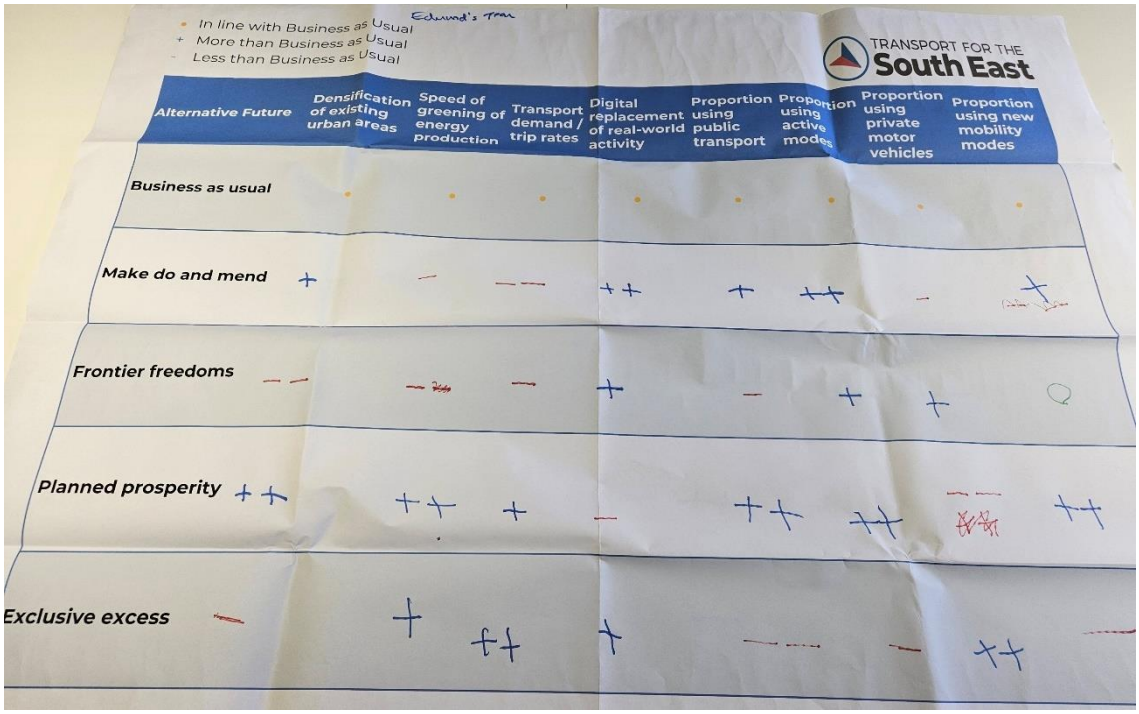

Axis 1 outcomes
Driver
Axis 2 outcomes
Level of government spending
Level of local govt funding
Transport policy
Transport policy
Environmental policy focus


Axis 1 outcomes
Driver
Axis 2 outcomes
Interest Rates
International trade
Labour and skills shortage
Economic shocks
Industrial make-up
Fluctuations
·Impacts decisions
·LAs stop schemes/ Stop investing
·Transport poverty
·Impacts local leisure travel
·Higher pay rises → more strikes/disruptions
·Moderate port expansion
·Technological and other incompatibility
scarce, high price
·Increase in public transport fares
·Fewer shocks
·Predictable
·Increased confidence
↳more investment for the long-term
·More proactivity
·Better strategic thinking/planning
Narrow, fragile
·Declining
·More subject to economic shocks
·Better sense of community
↳Longer trip distances, more pressure on SRN and more opportunity for rail
High regulation costly
·Nationally organised buses / trains
·Monopoly
Stability, consistency
·LAs continue to invest
·Scheme confidence / more partnership
·Minimal risk
·Impacts local leisure travel
·Take-up of New Technology increases
·port expansion - fast
·Impact on SRN and the rail freight network
Plentiful, high productivity
·Cheaper public transport
·More commuting
·Lots of them
·unpredictable
↳decline in assets
↳Failures in structures
↳More maintenance needed
·Less travel
·Less investment in transport
·Less innovation
·Short term decisions affecting long term outcomes
↳affects government policy
Diverse, vibrant
·Global supply chains
·New areas
·Impacted by offshoring
·More housing
·Building quicker/faster
·More variety
·Combined authority
·Devolution - greater value e.g. regional

D Scenario characteristics - workshop raw outputs




In line with Business as Usual
More than Business as Usual
Less than Business as Usual
TRANSPORT FOR THE South East
Alternative Future
Densification of existing urban areas
Speed of greening of energy production
Transport demand / trip rates
Digital replacement of real-world activity
Proportion using public transport
Proportion using active modes
Proportion using private motor vehicles
Proportion using new mobility modes
INTENSIFICATION -v- EXTENSION.
Business as usual
Make do and mend
EXTENSION.
Frontier freedoms
EXTENSION.
Planned prosperity
BOTH EXT & INTENSIFICATION
Exclusive excess
EXTENSIFICATION.


In line with Business as Usual
More than Business as Usual
Less than Business as Usual
Edmund's Team
TRANSPORT FOR THE South East
Alternative Future
Densification of existing urban areas
Speed of greening of energy production
Transport demand / trip rates
Digital replacement of real-world activity
Proportion using public transport
Proportion using active modes
Proportion using private motor vehicles
Proportion using new mobility modes
Business as usual
Make do and mend
Frontier freedoms
Planned prosperity
Exclusive excess

E SEELUM model results tables

Table E.1: Total and changes in trips to/from and within the TfSE area by mode

	Private vehicles	Rail	Bus and mass transit	Active travel	All modes
Business as usual	17,813,900	889,200	1,433,500	4,031,200	24,167,900
Make do and mend	17,492,200	887,600	1,408,600	4,288,600	24,076,900
Frontier freedoms	17,696,900	880,200	1,378,700	4,212,500	24,168,300
Planned prosperity	16,563,900	1,492,600	2,139,600	4,137,300	24,333,300
Exclusive excess	17,710,600	1,104,800	1,365,300	4,129,100	24,309,800
Make do and mend	-2%	-1%	-2%	6%	0%
Frontier freedoms	-1%	-2%	-4%	4%	0%
Planned prosperity	-7%	59%	49%	3%	1%
Exclusive excess	-1%	23%	-5%	2%	0%
Make do and mend	- 321,700	- 1,600	- 24,900	257,400	- 91,000
Frontier freedoms	- 117,000	- 9,000	- 54,800	181,300	400
Planned prosperity	- 1,250,000	603,400	706,100	106,100	165,400
Exclusive excess	- 103,300	215,600	- 68,200	97,900	141,900

Table E.2: Total and changes in population, jobs filled, GVA and carbon (due to mode shift between modes) in the TfSE area by mode

	Population	Jobs filled	GVA
BAU	8,218,700	4,160,200	393,303,034,800
Make do and mend	8,219,000	4,142,100	390,294,989,300
Frontier freedoms	8,225,200	4,152,400	392,268,147,700
Planned prosperity	8,244,400	4,226,900	402,869,745,900
Exclusive excess	8,217,800	4,201,400	399,548,054,900

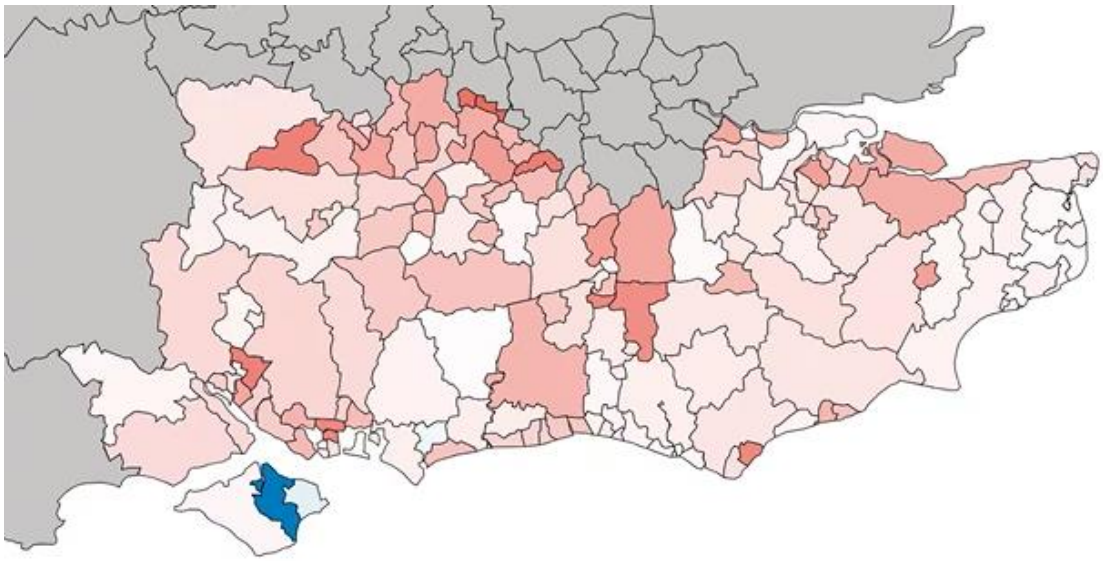
Make do and mend	0.0%	-0.4%	-0.8%
Frontier freedoms	0.1%	-0.2%	-0.3%
Planned prosperity	0.3%	1.6%	2.4%
Exclusive excess	0.0%	1.0%	1.6%

MDM	300	- 18,100	- 3,008,045,500
FF	6,500	- 7,800	- 1,034,887,100
PP	25,700	66,700	9,566,711,100
EE	- 900	41,200	6,245,020,100

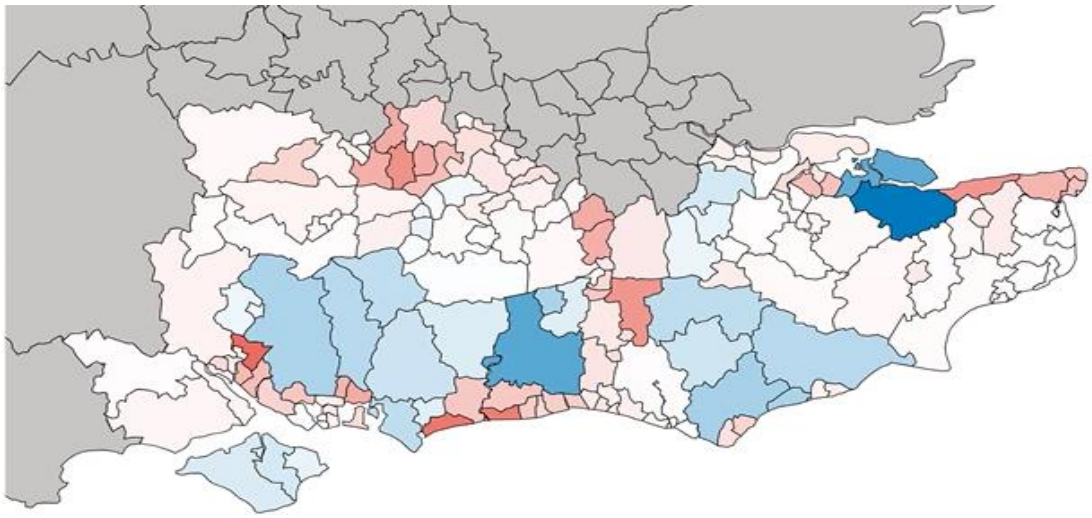
F Spatial outcomes modelled for the four scenarios

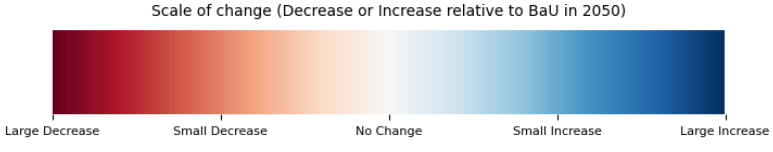
F.1 Note the outputs show the change in trips in the origin zone by mode. Note each map has a differing scale, therefore it is difficult to easily cross-compare the impact of trips in one zone in one scenario vs another. The SEELUM output dashboard is still under development, and this was the first piece of work it has been trialled for. Changes to car trips by scenario

Make Do and Mend



Frontier Freedoms

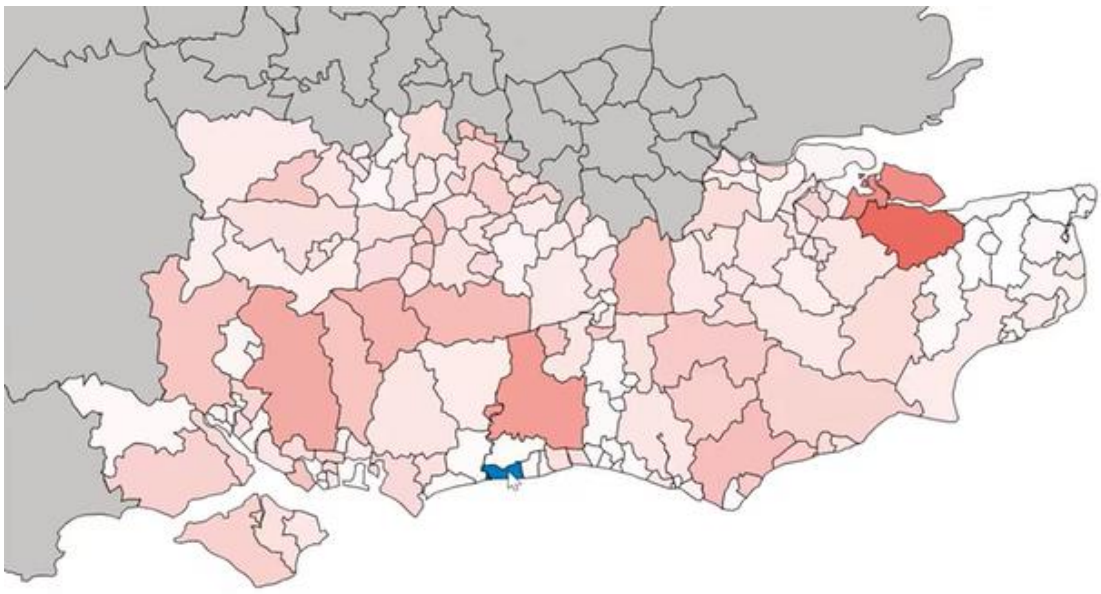




F.2 For Make Do and Mend, there is a large decrease in car trips as there is an increase in cost due to a national user charging mechanism and push for shift to active modes.

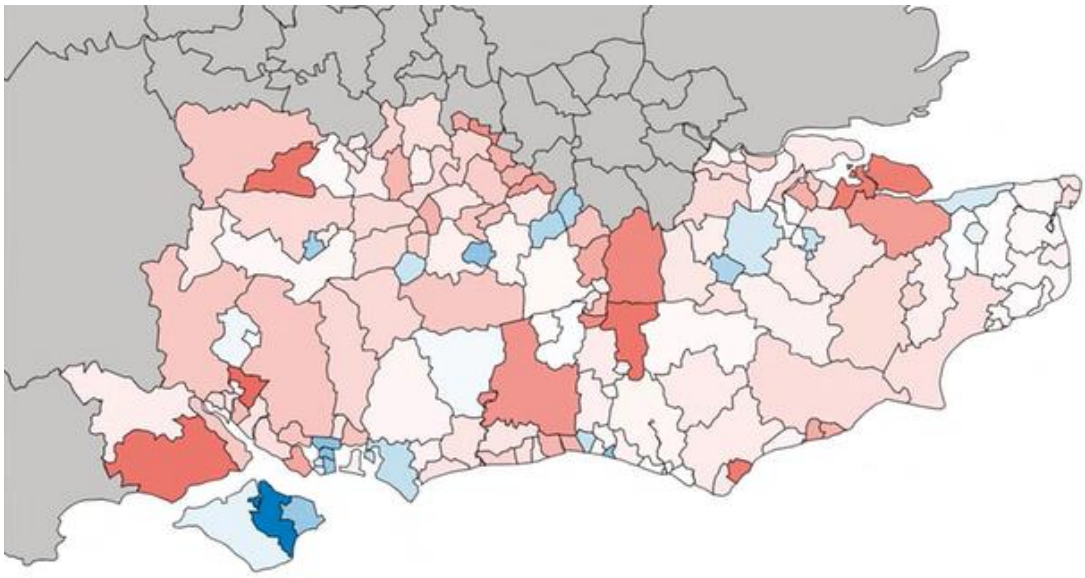
F.3 For Frontier Freedoms, changes vary, rural development is accelerated causing an increase in car trips as people leave urban areas.

Planned Prosperity

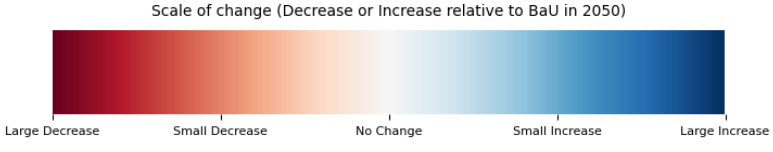


F.4 There is a large decrease in car trips across all other zones as there is mode shift to rail, bus and active modes. Note, only a negligible increase in trips in Adur.

Exclusive Excess

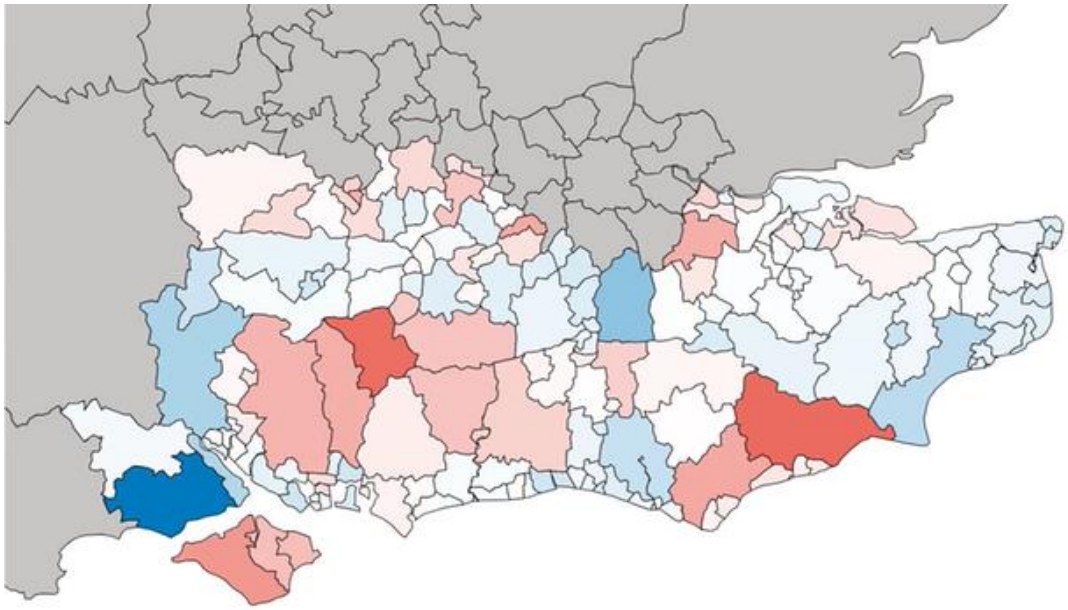


F.5 Note, decrease in trips along core rail radial corridors as journey times to London are improved and jobs are concentrated there, however increase in trips in rural areas where public transport is less provided.



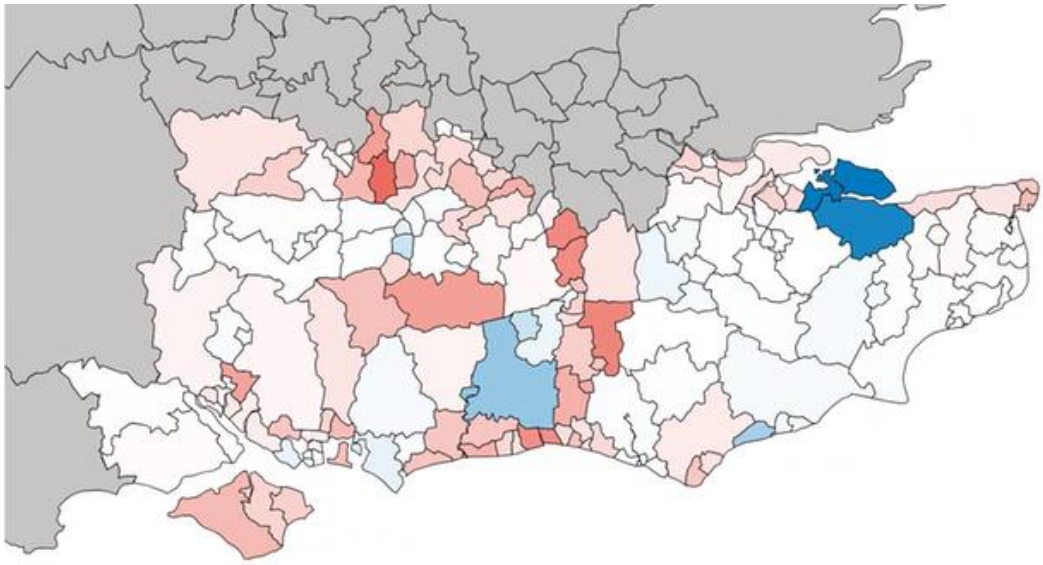
Changes to rail trips by scenario

Make Do and Mend

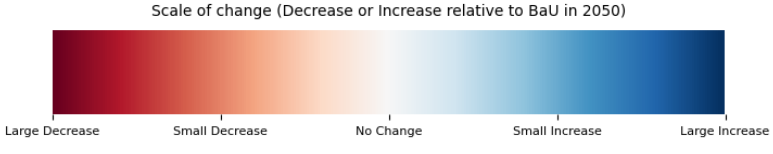


F.6 In Make Do and Mend, there is a decrease in rural rail trips as services are reduced due to reduced spending, however there are small increases in rail as there is an increase in car costs, leading to a net small change in rail trips.

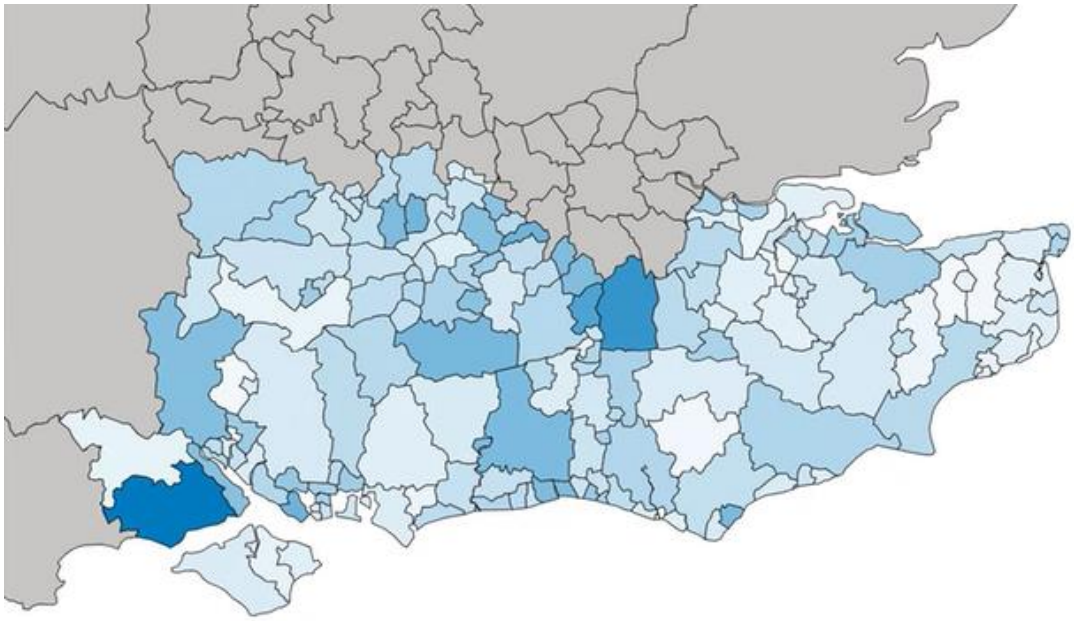
Frontier Freedoms



F.7 In Frontier Freedoms, generally rail trips reduce, however some rural areas see a population increase and some see a small increase in trips.

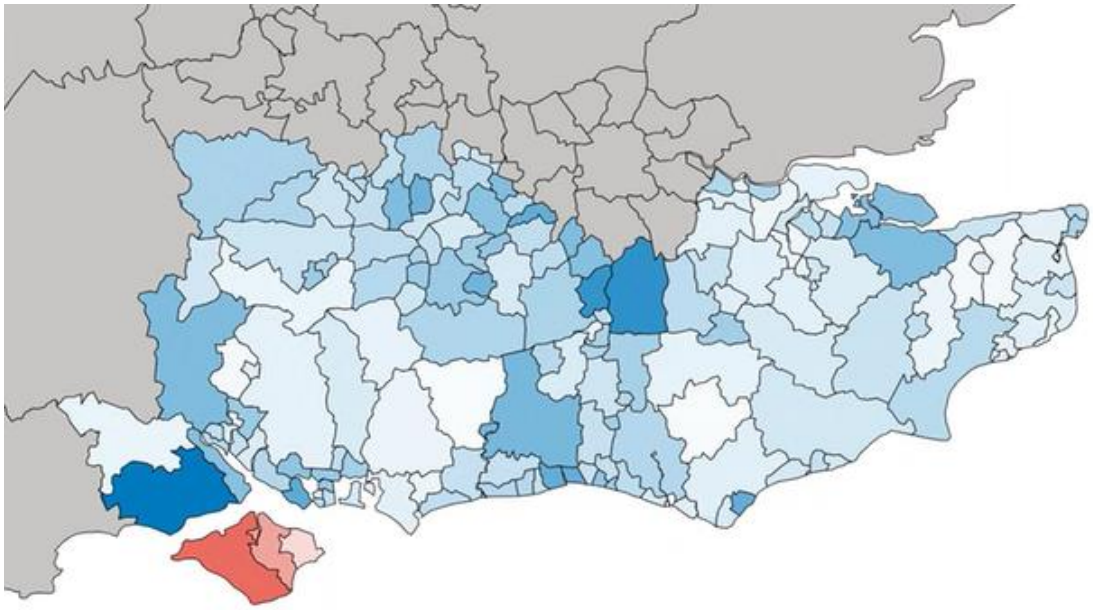


Planned Prosperity

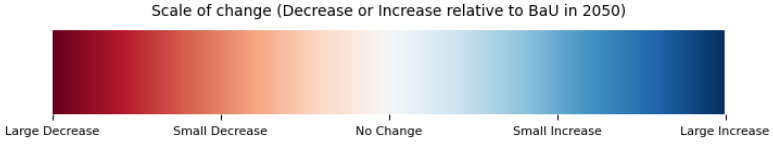


F.8 In Planned Prosperity, rail trips increase across the region, particularly on radial corridors where there are already good existing rail links and high rail mode share.

Exclusive Excess

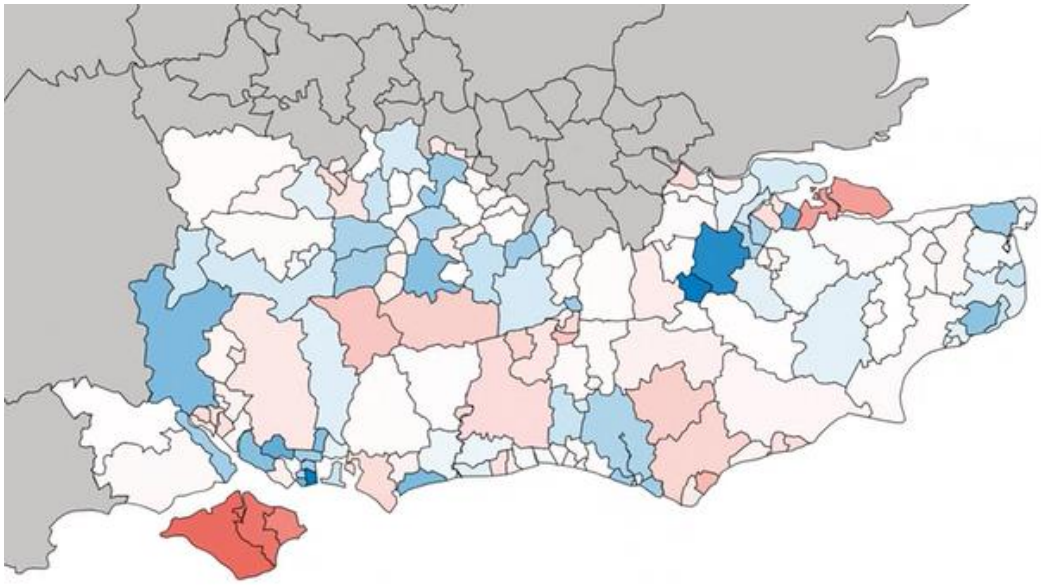


F.9 In Exclusive Excess, rail provision is concentrated on core corridors and rail trips on these existing rail links also increase as more people travel to London.



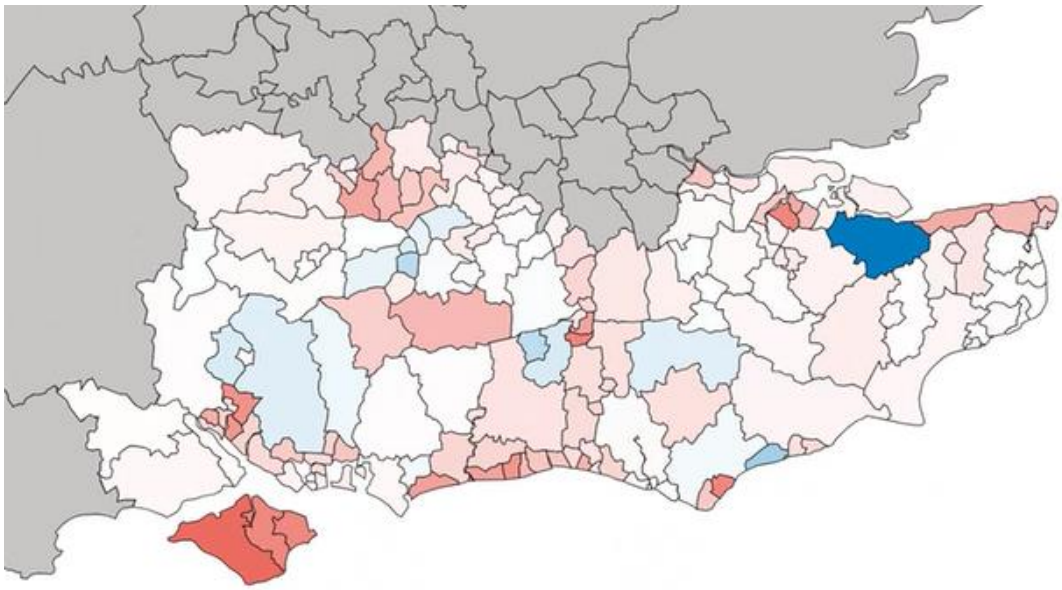
Changes to bus trips by scenario

Make Do and Mend

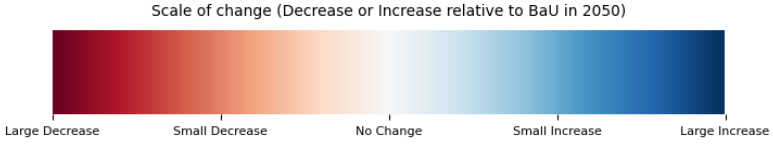


F.10 There are varying changes to buses, rural bus services are reduced such as on the Isle of Wight, whereas where bus services are maintained in urban areas, cars become more expensive to run, and people shift to bus services.

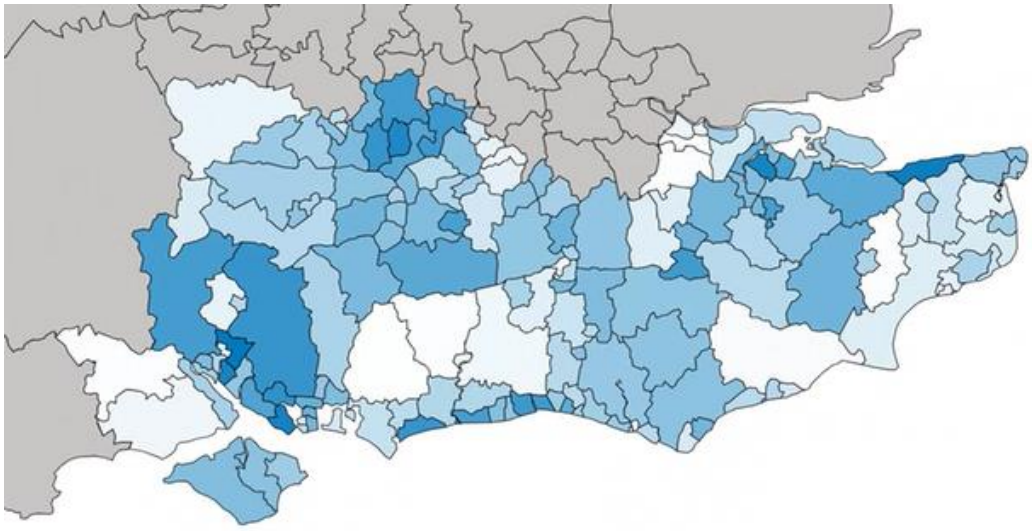
Frontier Freedoms



F.11 There is generally a reduction in bus patronage across the region, outside a few areas where rural housing growth has been concentrated such as Swale.

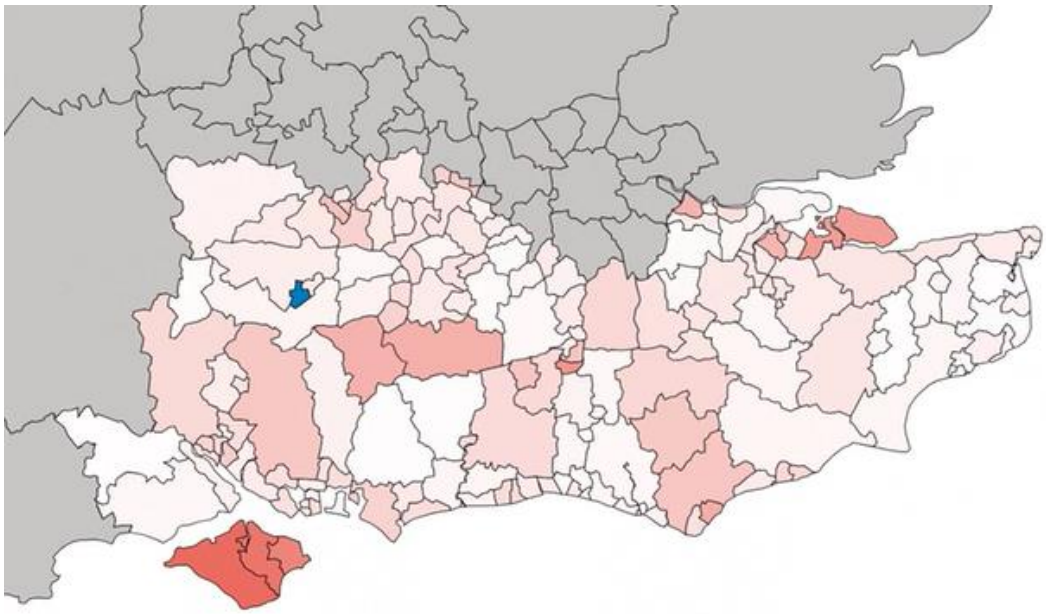


Planned Prosperity

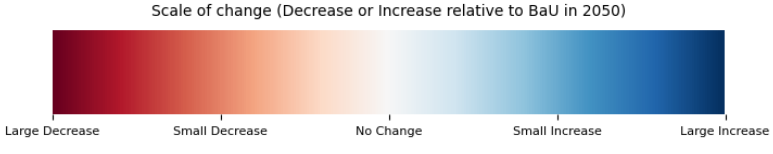


F.12 There is generally a high increase in bus patronage across the region, as bus services are improved attracting new users and cars become relatively more expensive causing mode shift.

Exclusive Excess



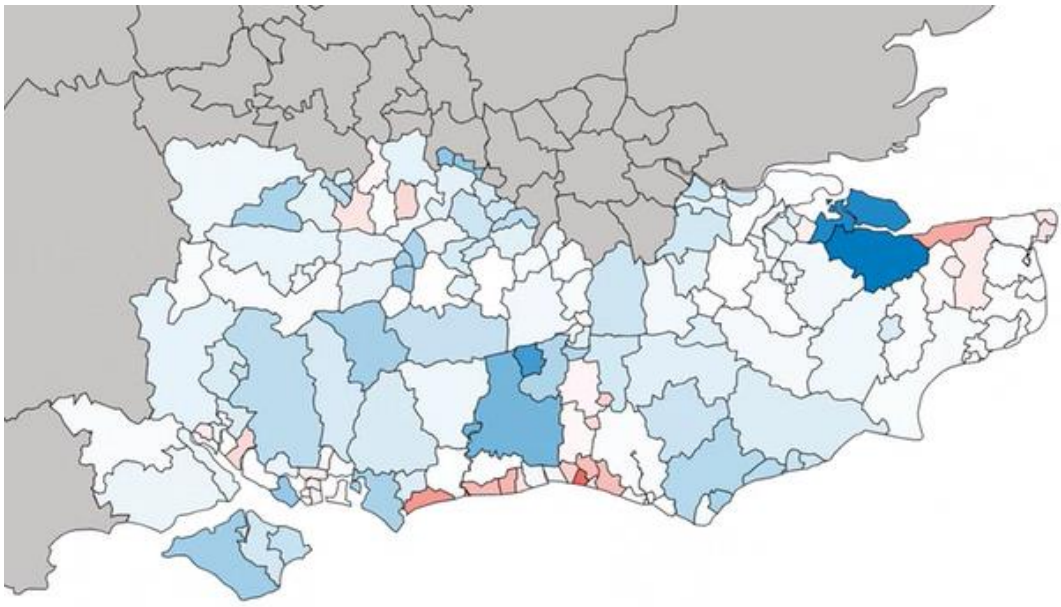
F.13 There is generally a decrease in bus patronage across the region, as people prefer using their cars. Note Basingstoke sees 73 more bus trips.



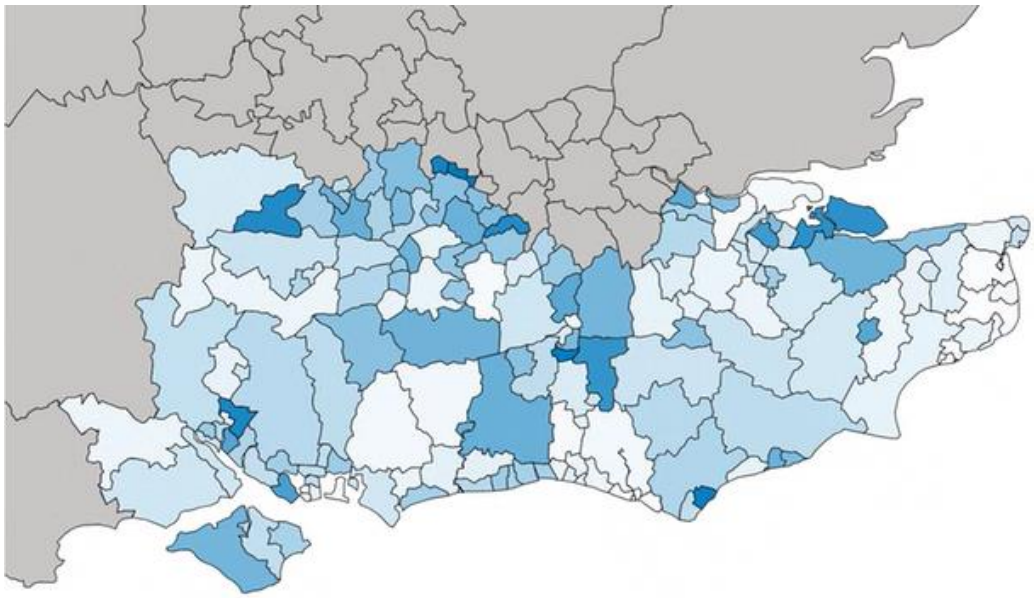
Changes to active travel trips by scenario

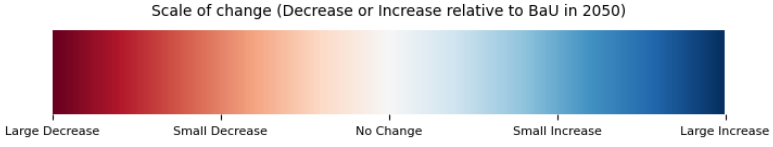
F.14 Active travel trips increase across the region in all scenarios as local initiatives are prioritised with the limited funding available for transport in MDM and FF or prioritised to support growth in PP. New technology such as e-bikes and shared mobility initiatives are rolled out faster and make travelling easier for all in PP and EE.

Make Do and Mend

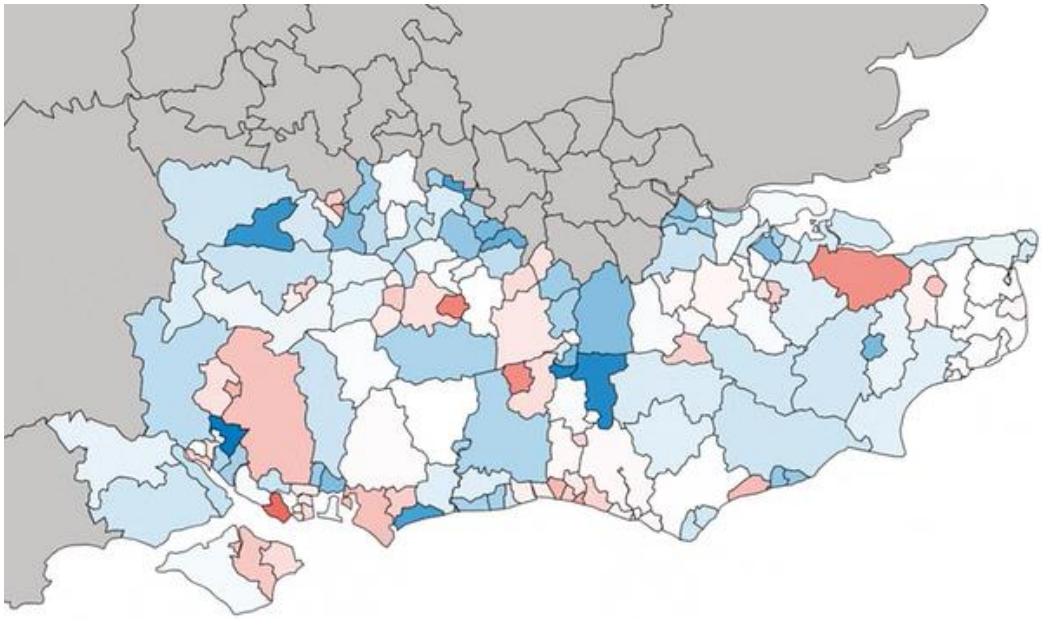


Frontier Freedoms

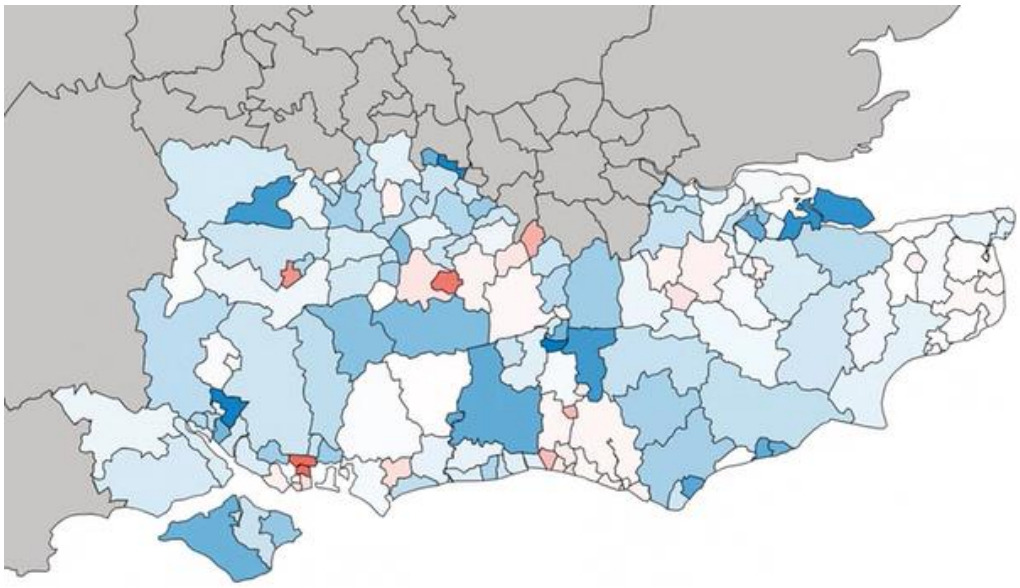


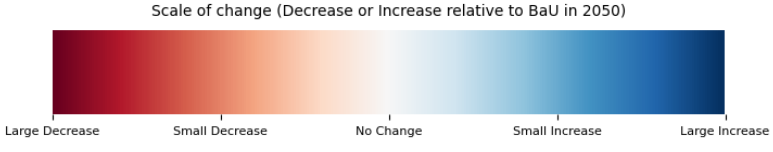


Planned Prosperity



Exclusive Excess

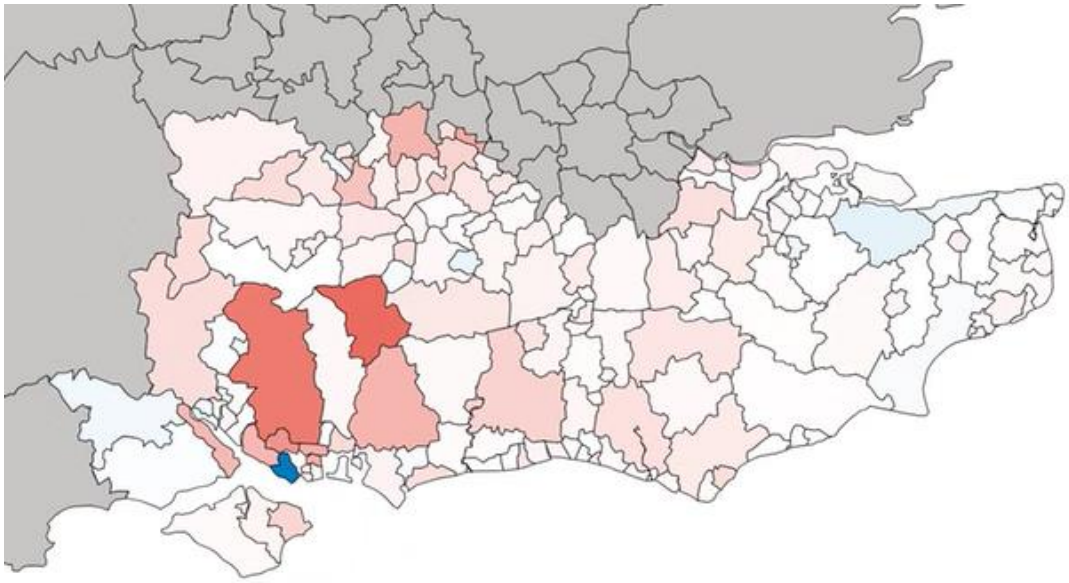




steer

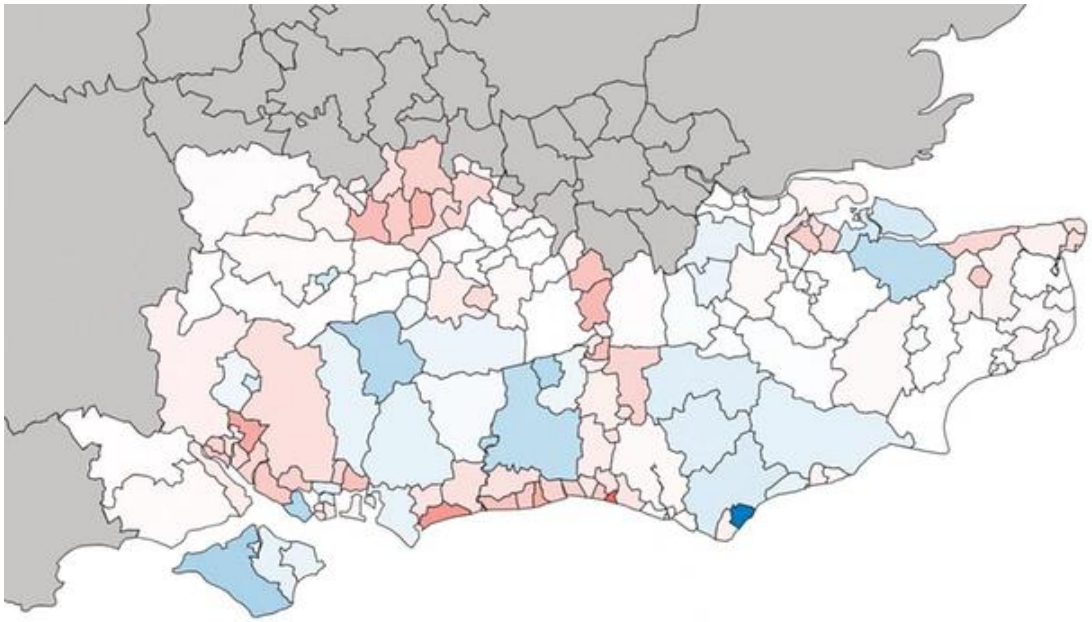
Changes to Jobs filled by zone by scenario

Make Do and Mend

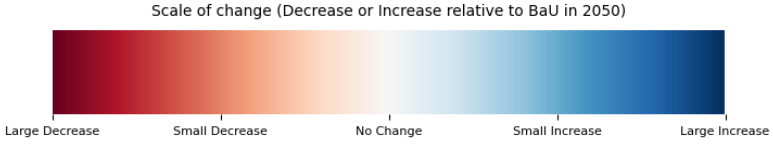


F.15 In Make Do and Mend, jobs filled varies across the area, although there is a shift of people living and working in rural areas where services are cut and driving is expensive to more urban areas where bus and active travel provision is maintained and improved, as seen in Hampshire as people migrate from the hinterland to coastal areas.

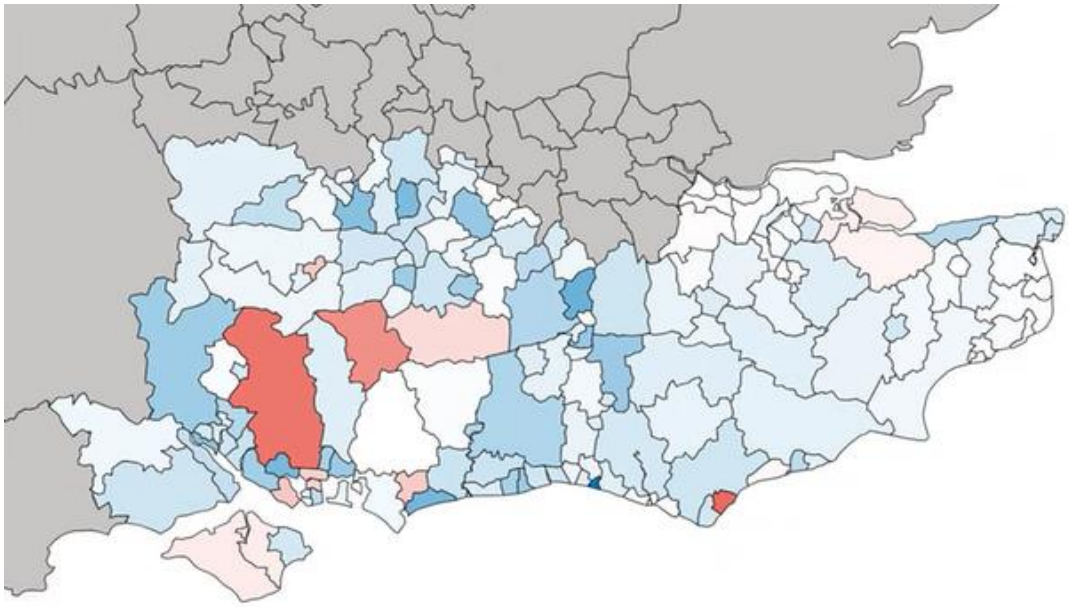
Frontier Freedoms



F.16 In Frontier Freedoms, jobs filled increase in rural areas as people move away and new development sprawls in these areas.

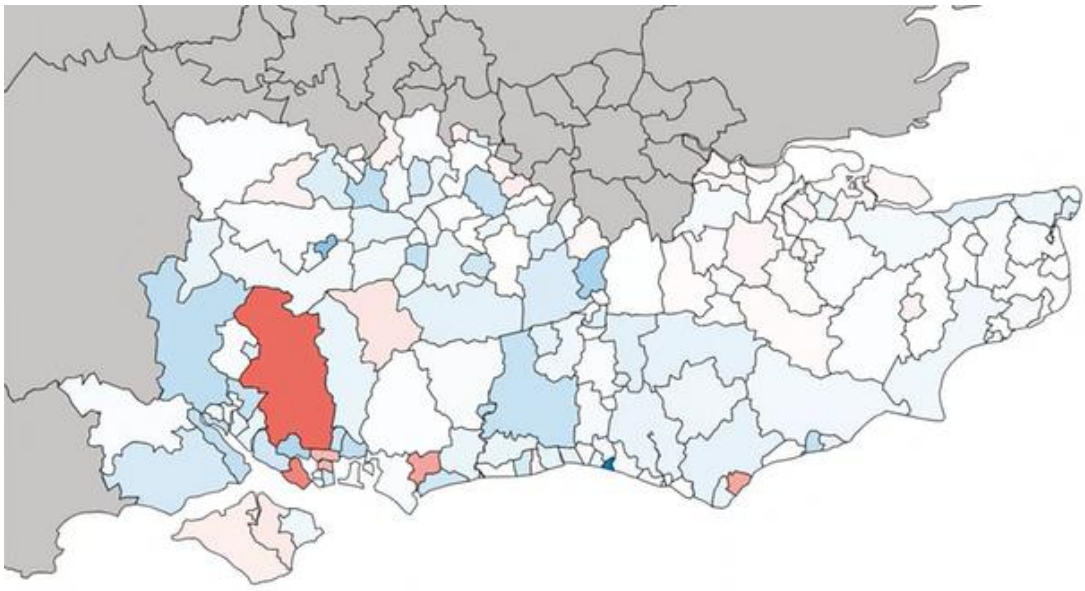


Planned Prosperity

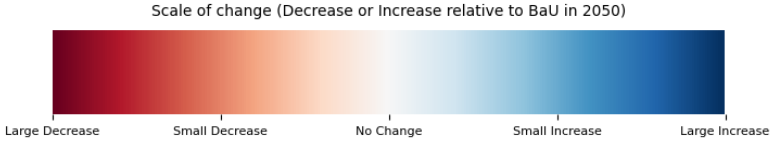


F.17 In Planned Prosperity, greater densification and concentrated transport provision means moving to urban areas to live and work is more attractive.

Exclusive Excess



F.18 In Exclusive Excess, jobs are shifted to London and select urban areas in the region, with there being a reduction in rural areas.



G List of organisations invited to the scenarios workshops

Bracknell Forest Council
Brighton and Hove City Council
East Sussex County Council
Hampshire County Council
Isle of Wight Council
Kent County Council
Medway Council
National Highways
Network Rail
Portsmouth City Council
Reading Borough Council
Royal Borough of Windsor and Maidenhead Council
Slough Borough Council
Southampton City Council
Surrey County Council
Transport for London
Transport for the South East
West Berkshire Council
West Sussex County Council
Wokingham Borough Council

H Resilience testing using the scenarios – results

Considerations

H.1 This is a qualitative exercise, which relies on the judgement of technical transport planning professionals participating in a workshop to agree on a likely direction and outcome.

H.2 Undertaking this exercise requires careful consideration of several factors relating to the nature of the scenario, and challenges to delivery. For instance, evaluating how could TfSE deliver anything in a scenario where it could feasibly not exist at all, or would involve changing operating model from its current form was challenging to evaluate.

H.3 Ultimately, there may be instances where a consensus is reached within the group as to what is likely to happen, as opposed to firm conclusions on which the group is completely confident.

Headline Results

H.4 A summary of the results of this exercise is shown below.

Table H.1: Summary of scenario results by mission, with no intervention and with policy route map delivered

	Business as Usual	Make Do And Mend		Frontier Freedoms		Planned Prosperity		Exclusive Access	
		No intervention	With Policy Route Map	No intervention	With Policy Route Map	No intervention	With Policy Route Map	No intervention	With Policy Route Map
Strategic Connectivity									
Resilience									
Inclusion and Integration									
Decarbonisation									
Sustainable Communities									

Key

	Impossible to achieve		Unlikely to achieve		Challenging to achieve
	Possible to achieve		Likely to achieve		

Table H.2: Summary of scenario results by indicator - with no intervention

Mission	Key Indicator	Business as Usual	Make Do And Mend	Frontier Freedoms	Planned Prosperity	Exclusive Excess
Strategic Connectivity	Average journey times by road and rail between major economic centres and international gateways	Worse	Worse	Worse	No Change	No Change
	Reliability of journeys by road and rail between major economic centres and international gateways	Worse	Worse	Worse	No Change	No Change
	Percentage of trips between major economic centres and international gateways undertaken by non-car modes of transport	Worse	Worse	Significantly Worse	No Change	Significantly Worse
Resilience	Reliability of journeys by road and rail between major economic centres and international gateways	Worse	Worse	Worse	No Change	No Change
	Condition of the major road network	Worse	No Change	Significantly Worse	Worse	Worse
Integration and Inclusion	Percentage of population at risk of Transport-Related Social Exclusion	Worse	No Change	Significantly Worse	Improve	Significantly Worse
Decarbonisation	Carbon emissions by surface transport modes per annum	No Change	Significantly Improve	No Change	Significantly Improve	Significantly Improve

Mission	Key Indicator	Business as Usual	Make Do And Mend	Frontier Freedoms	Planned Prosperity	Exclusive Excess
Sustainable Communities	Percentage of occupants of major new housing developments within 400m of a regular public transport service	No Change	Worse	Worse	Significantly Improve	Significantly Worse

Table H.3: Summary of scenario results by indicator - with full policy route map delivered

Mission	Key Indicator	Business as Usual	Make Do And Mend	Frontier Freedoms	Planned Prosperity	Exclusive Excess
Strategic Connectivity	Average journey times by road and rail between major economic centres and international gateways		Improve	Improve	Significantly Improve	Significantly Improve
	Reliability of journeys by road and rail between major economic centres and international gateways		No Change	No Change	Improve	No Change
	Percentage of trips between major economic centres and international gateways undertaken by non-car modes of transport		No Change	Significantly Worse	Significantly Improve	Improve
Resilience	Reliability of journeys by road and rail between major economic centres and international gateways		No Change	No Change	Improve	No Change

Mission	Key Indicator	Business as Usual	Make Do And Mend	Frontier Freedoms	Planned Prosperity	Exclusive Excess
	Condition of the major road network		Improve	Improve	Improve	No Change
Integration and Inclusion	Percentage of population at risk of Transport-Related Social Exclusion		No Change	Worse	Significantly Improve	Worse
Decarbonisation	Carbon emissions by surface transport modes per annum		Significantly Improve	Improve	Significantly Improve	Significantly Improve
Sustainable Communities	Percentage of occupants of major new housing developments within 400m of a regular public transport service		Improve	Worse	Significantly Improve	Significantly Worse

Business-as-Usual Scenario

H.5 In this scenario, the Strategic Connectivity, Resilience, and Inclusion and Integration Missions were unlikely to be achieved, while decarbonisation and sustainable communities are challenging to achieve. The main reasons for this are as so:

H.6 Population and jobs are anticipated to grow with relatively little intervention from government. While some expansion of highways and rails is anticipated, the pace is not anticipated to meet the increasing levels of demand.

H.7 While resources to tackle resilience issues are likely to increase over time, this is at a scale that is unlikely to meet the future challenges of issues such as climate change.

H.8 While some improvements are likely to be made to strategic rail services, socially necessary bus services are anticipated to continue their historic gradual decline, further isolating vulnerable communities

H.9 Progress is made on decarbonisation, particularly on the roll out of electric vehicles as they become a more viable proposition for vehicle manufacturers. However, hard to decarbonise sectors of transport like freight continue to prove challenging.

H.10 Some headway is made on creating sustainable communities, primarily through revised design guidance and planning obligations. However, this can be overridden by the desire to build ever greater number of homes

Make do and Mend

H.11 Under the *Make Do and Mend Scenario*, there are notable variations between there being No Intervention and a Policy Route Map, with the main observations being as so.

H.12 For Strategic Connectivity, much of the improvements to it relate to the reliability of journeys and tackling key pinch points in the strategic transport network. The presence of the policy route map changes the narrative on this investment – away from patching up the existing network to building in capacity at the same time as fixing the current network

H.13 It is a similar case for Resilience. Without intervention, much of the effort – maybe justifiably so – is focussed on keeping the existing network in an operational condition. Funding is tight, and therefore investment focusses on the best value maintenance and resilience schemes. However, with the Route Map, this discussion moves from simply one of fixing what is working to considering strategic resilience to future threats when doing so. For example, taking the opportunity to shore up highway embankments against a greater risk of flooding due to a greater understanding of how prevalent this risk will be in the future, and prioritising investment that does this.

H1.2 Frontier Freedoms

H.14 Under the *Frontier Freedoms* scenario there was much discussion as to whether TfSE would exist at all under this scenario. With a consensus being that should it exist it is likely to be somewhat different to how it operates now. But the fact that it does exist and provides a vision is significant.

H.15 For Strategic Connectivity, even with a route map it will be tricky for this mission to be achieved. This is primarily because, with a focus more on individualism and lack of public sector intervention, it will be challenging to deliver significant infrastructure projects. Should

TfSE find the ability to deliver the infrastructure projects in the route map, greater individual travel (primarily by private car) is more likely.

H.16 For Resilience the change is more pronounced. It is anticipated that under this scenario, and regardless of whether the route map is delivered, greater personal resilience is anticipated across the population more generally. Though for those who find this challenging, they will face much more significant challenges. Delivery of the route map for resilience, focussing on infrastructure, therefore significantly improves the resilience of the overall network. This is primarily through targeted investment in the most vulnerable areas and encouraged more joined up thinking to ensuring effective network operation between network operators who do exist.

H.17 For Inclusion and Integration, even with the presence of a route map this is a very challenging mission to deliver. This is due to services that excluded groups rely on only being provided in an extremely limited number of cases, with even those likely to be volunteer led. However, supporting investment and some integrated ticketing could make a small difference in this scenario.

H.18 Decarbonisation is still likely to make progress under this scenario. Like Make Do And Mend, this is due to the roll out of electric vehicles even without intervention. However, with the route map in place, TfSE could assist in accelerating this roll out, making it possible to achieve decarbonisation targets.

H.19 Finally, with Sustainable Communities, it is likely to be a mixed bag. On the one hand, developments could spring up that are highly accessible and favour occupants using their own two feet or cycling. On the other, more isolated developments in rural areas are also likely, with some increased car dependency as a result. The presence of the route map makes little difference in this scenario, as it is primarily based on principles as opposed to more direct intervention.

Planned Prosperity

H.20 *Planned Prosperity* was the closest thing that this exercise identified to a preferred scenario. Interestingly, this was the case whether TfSE did anything or not for many of the missions.

H.21 For Strategic Connectivity, the main value add from the route map is that it focusses investment on what is important for the region, providing a regional lens for centralised priorities and investment. While things are likely to improve regardless due to increased central investment, without a route map the impacts of this investment on the region is likely to be hit and miss.

H.22 In Resilience, the effect is more pronounced. While greater centralised resources are thrown at the resilience issue, it is considered that without this regional direction to target the resources at more vulnerable area, progress will be made but the mission is unlikely to be achieved. But the knowledge and expertise in delivery authorities on matters such as resilience is essential to its delivery.

H.23 For Inclusion and Integration, improvements are likely to be seen as more funding is provided for supported transport services and transport improvements in deprived areas. The route map means that infrastructure schemes and integrated ticketing, for instance, could be accelerated.

H.24 For Decarbonisation and Sustainable Communities, there is relatively little difference between no intervention and with a route map. This shows two things. Firstly, with significant policy levers on decarbonisation being pulled by central government, much of the heavy lifting on decarbonisation through electric vehicles is achieved. The route map simply speeds up the process of achieving it. Secondly, stronger planning guidance focussing development on sustainable locations as dictated by central government and local plans means that the principles of sustainable development will be delivered. Although there is a risk of central government policy direction changing towards encouraging more development regardless of location.

Exclusive Excess

H.25 Finally, for *Exclusive Access* the impact of the route map is much more mixed. What's more, the benefits are much more focussed on the needs of businesses compared to the needs of residents.

H.26 This is shown most starkly under Strategic Connectivity. With nothing happening, progress on delivering major infrastructure projects that are likely to boost businesses will be slower. But strategic connectivity is likely to be super-charged if the route map is delivered, as journey times and reliability are targeted through such improvements.

H.27 For Resilience, with or without the route map it's a double-edged sword. On the one hand, investment in improving the reliability of transport systems is likely to be significantly increased for the benefits of businesses. However, by doing so the strategic networks are likely to become busier, and consequently less reliable as a result. Making the mission challenging to achieve.

H.28 Under Inclusion and Integration, delivering the route map is likely to lead to modest improvements. Without the route map, all investment is focussed on the needs of business, leaving little by way of funding for socially necessary services, or to help tackle the needs of excluded groups. Some of the interventions in the route maps, like new mobility hubs, may help to make modest improvements in transport-related social exclusion.

H.29 Decarbonisation is likely to be achieved with or without the route map. The difference here is one of pace and of focus. The route map helps to accelerate electric vehicle charging point roll out, likely helping decarbonisation goals to be achieved earlier. Meanwhile, the focus of effort may switch from electric vehicles to electrifying heavier vehicles over time, regardless of the route map or not, in response to business pressure.

H.30 For Sustainable Communities, the presence of autonomous vehicles and ridesharing services is likely to reduce the use of public transport, walking, and cycling, regardless of whether the route map is present or not. This makes achieving this mission extremely difficult.

Reflections on this exercise

H.31 This exercise proved very useful in understanding the value of the route maps. While no changes to the route maps are proposed because of this exercise, several observations can be made.

H.32 In all the scenarios, the mere existence of the route map is likely to influence delivery, even if there is some uncertainty as to the degree of impact. This is primarily because providing this direction is a valuable thing in and of itself, as it focusses effort and planning towards a common goal.

H.33 This leaves the method somewhat open to the criticism that it assumes that the route map is delivered in full, as opposed to a likely scenario of it changing over time. Which is a valid criticism. However, notwithstanding the practical implications of retesting many different delivery approaches under each of the scenarios, it is anticipated that the delivery of the strategy will necessitate iteration over time. And this came into the thinking of the participants.

H.34 Another observation is the impact of process over funding. Whilst more funding will mean that achieving the missions is more likely, as indicated by this exercise, changes to the planning and delivery approach are necessary also. The observation was made during discussion that simply putting more funding into the existing system would have diminishing rates of return over time as delivery is held up.

H.35 What this exercise does not answer is what approaches should be delivered, aside from having a more purpose-driven public sector as the driving force is more likely to achieve a positive outcome for each of the missions. Many approaches, such as local government reform and the status of TfSE as a sub-national transport body, have been discussed as the strategy has been developed, but with no firm conclusions as to what is the more likely to deliver radical changes needed. This exercise did not progress this matter any further, nor was its intention to do so.

H.36 The approaches of the different route maps also had a demonstrable effect on how effective they proved to be in overcoming the issues in different scenarios. A notable example is the Sustainable Communities route map, which is more principles based compared to the other route maps. Consequently, it found itself less able to affect the outcomes of different scenarios because it focussed much more on influencing others, as opposed to practical action being taken.

Conclusions for the Strategy

H.37 What this exercise has shown is that the approach being taken in the strategy is likely to have a more beneficial outcome for each of the missions compared to no intervention in each scenario. It is also more likely to have a beneficial outcome for each of the missions compared to Business as Usual.

H.38 No changes to the route maps or missions are proposed because of this exercise.

Control Information

Prepared by

Steer
14-21 Rushworth Street
London SE1 0RB
+44 20 7910 5000
www.steergroup.com

Prepared for

TfSE
East Sussex County Council, County Hall,
St Anne's Crescent
Lewes
East Sussex
BN7 1UE

Steer project/proposal number

24481605

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Author/originator

HKP

Reviewer/approver

SGB

Other contributors

JRC, FII

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