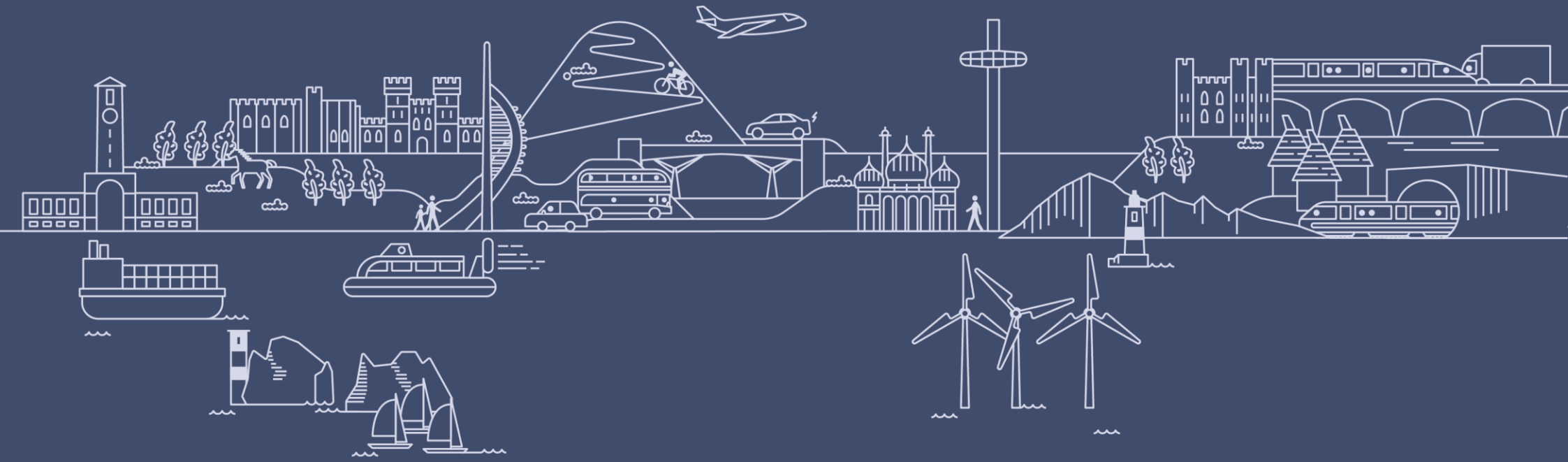
TRANSPORT FOR THE South East

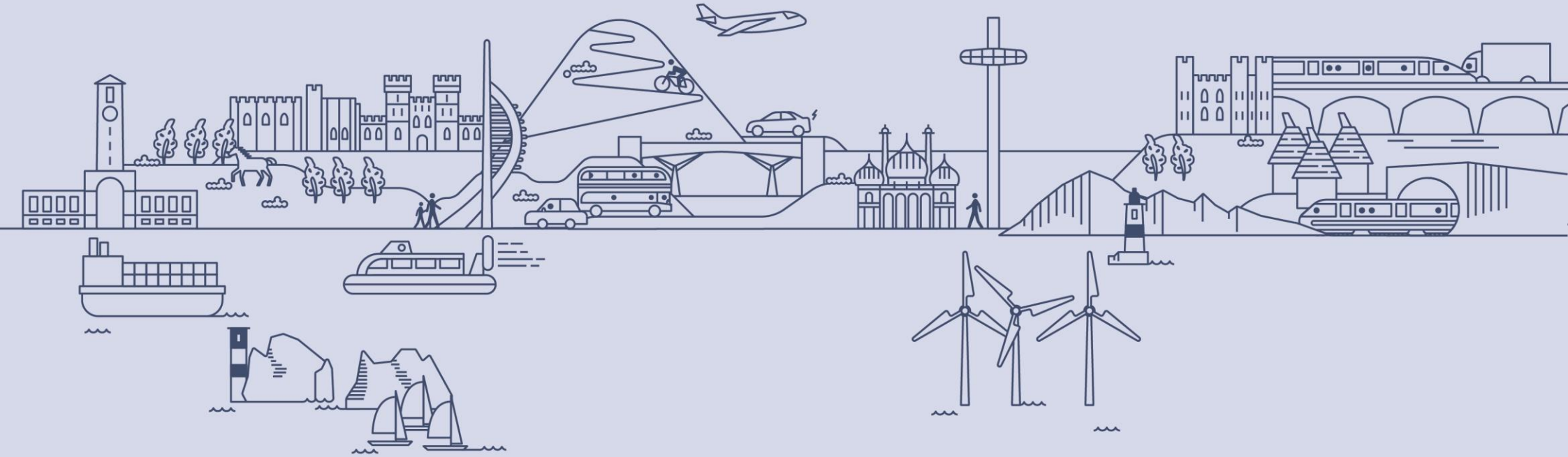


Transport Decarbonisation Thematic Plan

Version 4.2

June 2022

TRANSPORT FOR THE South East



Part 1: Introduction

Introduction

Purpose

This Thematic Plan outlines TfSE's proposed response to transport decarbonisation in the context of the Area Studies programme and Strategic Investment Plan.

This plan, as part of the Area Studies programmes, sits alongside a number of related documents (see **Figure 1.1** overleaf):

- An overarching Strategic Narrative and Delivery Plan for the Packages of Interventions identified as part of the Area Studies programme;
- Strategic Programme Outline Cases for four areas within the TfSE area providing a place-based business case for the Packages; and
- five other cross-cutting Thematic Plans for Strategic Active Travel and Micromobility; Bus, Mass Transit and Shared Mobility; Rail; Highways; and Levelling Up.

This plan then outlines a set of policy packages required to facilitate pathways that map to trajectories to net zero. This details the effectiveness of different policy interventions and their 'strength' needed to make an immediate impact. These packages were subsequently modelled developed into scenarios, of which their efficacies were tested against the TfSE's People, Place and Movement types.

This thematic plan aligns the outputs of the Decarbonisation Pathways Technical Report within the wider TfSE Area Studies programme.

The Decarbonisation Pathways Technical Report is a separately published report which describes in detail the technical basis and evidence base in regards to the TfSE's trajectory to net-zero carbon.

It details the following:

- national and regional context and "business as usual" / current policy trajectories;
- national and regional net-zero trajectories;
- policy option and scenario development, modelling and assessment;
- how scenarios can be applied to a framework of people, place and movement types; and
- next steps for the direction of decarbonisation-related technical workstreams and delivery.

The Thematic Plan and supporting technical work focus on "tailpipe" emissions of domestic surface transport.

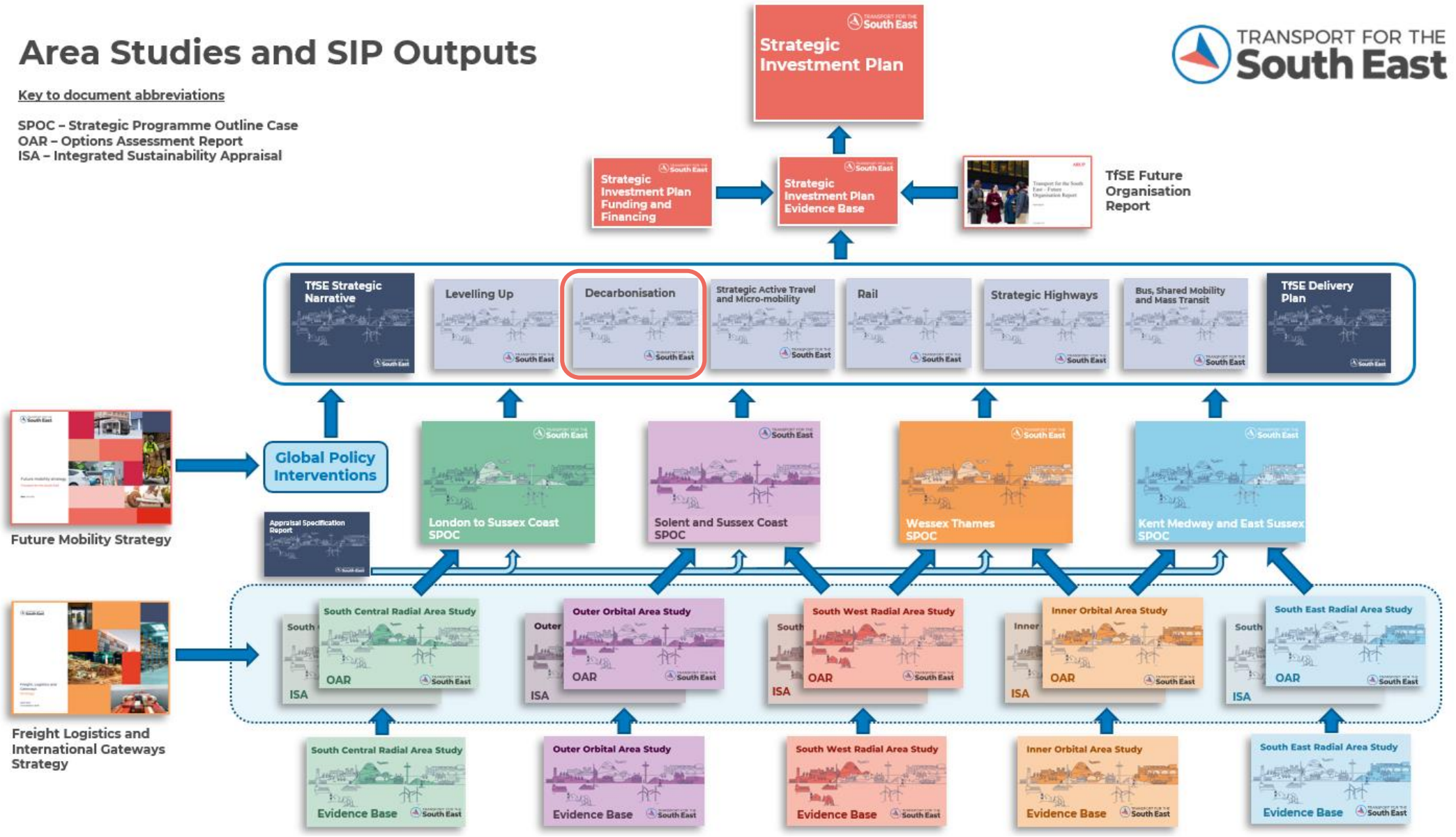
Transport for the South East has an acute appreciation that the route to net zero carbon require a whole lifecycle approach that also considers:

- domestic and international travel;
- aviation and maritime travel;
- the embedded carbon of manufacturing (including supply chains) and construction (including materials);
- energy production and transmission; and
- renewals and maintenance.

The influence of TfSE and the challenges of calculating and planning for carbon reduction across these sources of emission are vast. Transport for the South East is committed to continuing to work with it partners – public and private sector, along with academic and research partners - to better understand and plan for reducing all emissions.

Area Studies Outputs

Figure 1.1: TfSE Area Studies and Strategic Investment Plan Document Hierarchy



Introduction

Contents

The rest of this plan is as follows:

- **Part 2** describes the **context** for decarbonisation. This demonstrates the national and regional context, baseline and outlines trajectories of the South East developed from existing data sources.
- **Part 3** summarises the **challenges and opportunities** for decarbonisation in the south east, and provides a strategic overview on current forecast trajectories to net-zero.
- **Part 4** outlines the **vision and objectives,** aligning the decarbonisation strategy into the key challenges of the TfSE's wider strategic narrative.
- **Part 5** details the decarbonisation specific **Packages of Intervention**.
- **Part 6** outlines their **benefits and costs**.
- **Part 7** outline development of more ambitious incremental **net zero scenario pathways.**
- **Part 8** sets the blueprint for the **delivery** including specific roles and responsibilities.

Next Steps

TfSE's Strategic Investment Plan will identify opportunities for investment in policy packages enabling decarbonisation.

TfSE is developing a Strategic Investment Plan (SIP) that will sythesise the technical work undertaken by TfSE to date and present a compelling case for investment in all modes of transport in South East England.

The SIP will include a more detailed examination of potential funding opportunities beyond central government, and it will outline how TfSE, its partners, and its constituent authorities will work together to deliver positive change.

Although the Transport Strategy approved and published in 2020 is not a Statutory Document, the UK government has stated it will give "due regard" to it. The SIP is an integral part of the Transport Strategy development process, articulating the case for investment and a delivery plan to 2050.

A Draft SIP is being published for a 12 week public consultation from 20 June 2022. A final version of this document is expected to be adopted by TfSE's Partnership Board early in 2023.

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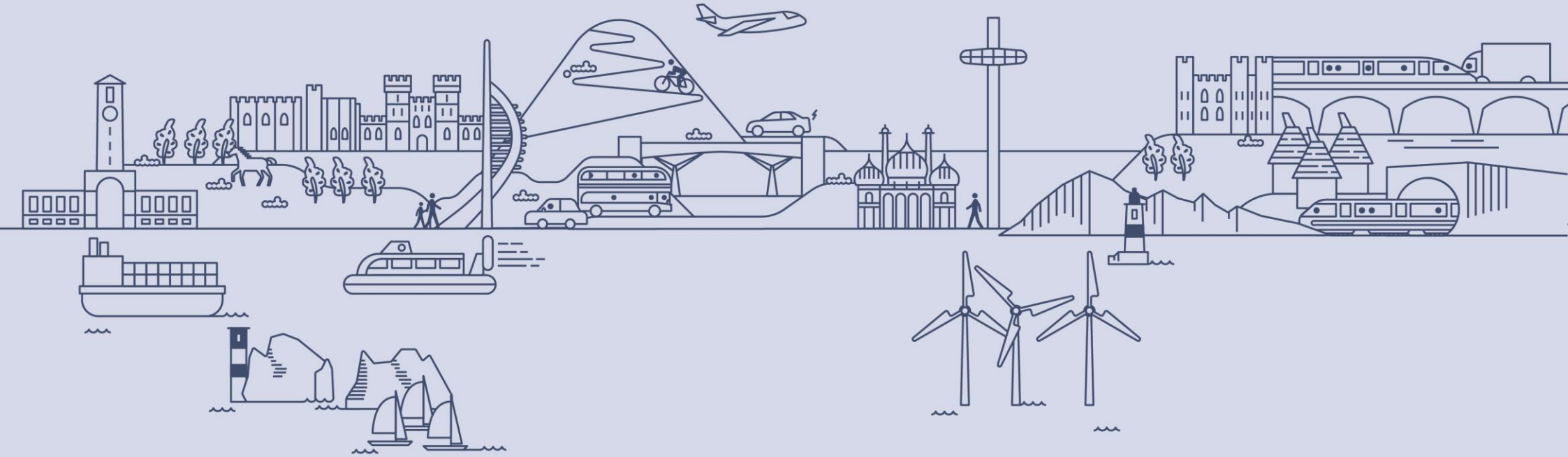


Part 2: Context

Introduction

In this report, 'decarbonisation' is defined as the suite of measures by which transport sector will reduce its carbon footprint and enable local authorities to work towards net zero. This includes private cars, commercial and freight vehicles and rail.

The challenge in decarbonising the transport sector varies greatly between development contexts and demographics, journey and vehicle types. The shift to electric cars in the UK is continuing to take place but this needs to accelerate. The challenge for a shift to electric commercial and freight vehicles continues due to technological infancy.

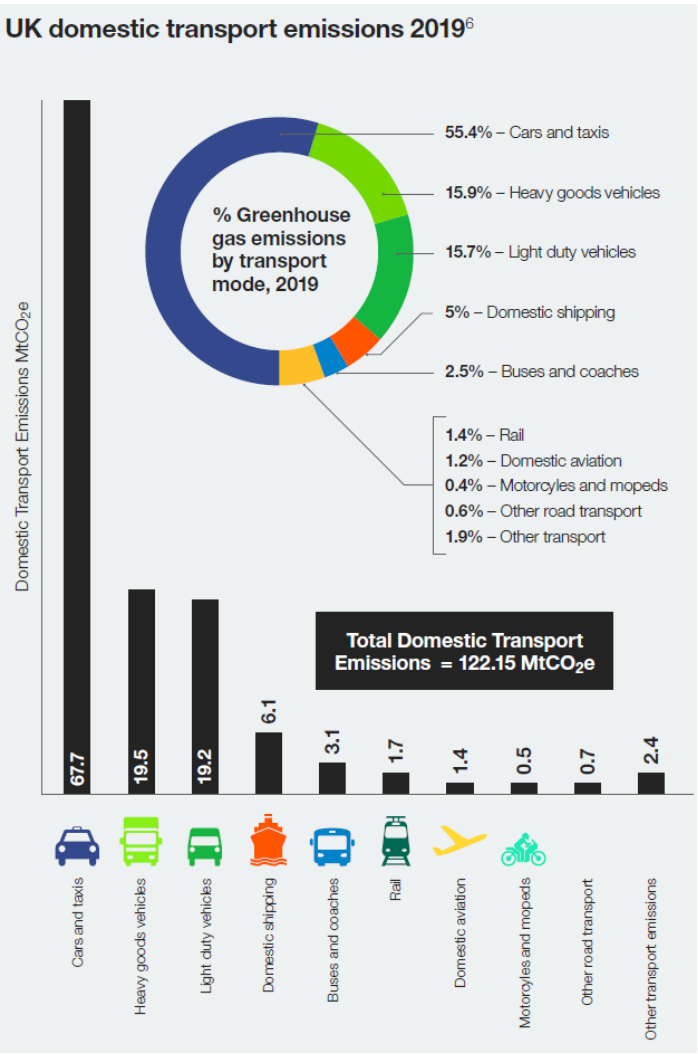
An additional challenge is facilitating modal shift from private vehicles to public transport, active travel and micromobility. As a result, policy interventions enabling these modes form a vital contribution to decarbonisation.

Existing conditions

The national context of carbon emissions in the UK illustrates wholeheartedly the scale of the challenge. Transport currently accounts for approximately one third of all emissions and is the only sector whose emissions have not declined since the late 1990s.

As shown in **Figure 2.1**, of UK-wide carbon emissions, in 2019 over half (55.4%) were derived from cars and taxis, just under one third (31.6%) from light and heavy goods vehicles with the remainder (13%) from domestic shipping, buses and coaches, rail, domestic aviation and other forms of transport[1].

Figure 2.1 UK Domestic Transport Emissions (2019)



Policy & Legislative Context

Overview

In 2019, an amendment was made to the Climate Change Act of 2008. This amendment legally committed the UK to achieving net zero greenhouse gas emissions by 2050.

In June 2021, the Climate Change Committee (CCC), an independent body created as part of the Climate Change Act to ensure the government delivers on its legal commitments, stated that:

"the willingness to set emissions targets of genuine ambition contrasts with a reluctance to implement the realistic policies necessary to achieve them."[1]

This decarbonisation report presents a detailed analysis of what those "realistic policies" are in the context of transport in the TfSE area.

The CCC identifies the scale of change required to reach these objectives, quantifying a total 70% reduction in surface transport emissions is required between 2019 – 2035[2].

United Nations

The **United Nations Framework Convention on Climate Change** is a "Rio" convention which came into force in March 1994 and ratified by 197 countries. Its ultimate objective is to prevent "dangerous" human interference with the climate system.

As a result, the UK has a statutory obligation to plan and report on its carbon emissions, alongside setting targets for their reduction. Additionally, the UK's status as an Annex I nation means it exhibits the greatest level of responsibility, and must be setting and delivering ground-breaking and innovative policy measures which can be replicated and appropriated by other nations.

Resulting from the UNFCCC was the Paris Agreement, an international treaty ratified by the UK, which entered into force in November 2016. Its goal is to limit global warming to well below 2˚C, but preferably to 1.5˚C, compared to pre-industrial levels.

As a result and demonstrated previously, TfSE and its constituent local authorities must play their part in delivering on this ambition.

Climate Change Committee

The Climate Change Committee (CCC) is a publicly appointed body responsible for producing and delivering the scientific analysis and discourse surrounding the UK's climate change-related commitments.

In order to develop a series of identifiable and measurable objectives for the UK to adopt, the CCC uses a legally binding carbon budgeting approach. This limits the level of greenhouse gases emitted within a 5-year period, and where there's a rise in emissions from one industry, a fall is required in another.

The UK first set legally binding carbon budgets in 2009, via the Carbon Budgets Order 2009. The CCC has now set the 6th Carbon Budget (2033-2037), at 965 $MtCO_2e$.

This budget sets an ambitious path to net-zero for the UK to follow, which requires a 63% reduction in emission from 2019-2035 (78% relative to 1990).

Policy & Legislative Context Cont.

Transport Decarbonisation Plan

The Transport decarbonisation plan[1], published by the DfT in 2021, sets out central government commitments to decarbonisation. This includes all modes of transport, alongside how a shift to zero emission vehicles should be facilitated.

It recognises the opportunity and challenges of alternative fuels, with a particular focus on delivering a zero-emission freight and logistics sector.

Furthermore, it determines the need for appropriate finance streams in order to minimize and negate barriers to the adoption of zero emission vehicles. It also determines the need for the strategic coordination of R&D investments to address the current challenges faced by various stakeholders in procuring efficient and affordable zero emission vehicle fleets.

Transport Decarbonisation: local authority toolkit

The DfT's and Energy Saving Trust's Transport decarbonisation: local authority toolkit[6] constitutes a set of modal and place-specific interventions, which were published in April 2022.

This toolkit was developed in response to the DfT's Transport decarbonisation plan[1]. It's aim is to highlight the benefits of different interventions, sets out how local authorities can manage and reduce carbon emissions, shares best practice and lessons from case studies of successful schemes, and signposting to other published guidance and methodologies in relation to these interventions.

This guidance will subsequently be integrated into new guidance aiming to help local authorities in the development of local transport plans.

Net Zero Strategy: Build Back Better

The Department for Business, Energy & Industrial net-zero Strategy[7] constitutes the governments plan to facilitate the net-zero transition of the UK's economy. It determines the need for the UK to be at the forefront of this transition.

This recognises the carbon demands of the economy and illustrates how changes in power and fuel supplies alongside shifts in industry will facilitate this. As a result, it determines the carbon impact of transport-originated emissions, and particularly the freight and logistics industries.

The document supports the net-zero transition of the economy, through investment in the green economy with the skills and jobs required as a result.

Key Stakeholders

Transport for the South East (TfSE)

TfSE's role will reflect its current and likely future status as an established Sub National Transport Body for South East England.

It is assumed there would be no significant change in the current distribution of powers, funding mechanisms, and democratic accountability in the TfSE area at a local level.

TfSE's role will focus on building consensus, capacity, and funding to deliver its decarbonisation priorities, and moving toward scheme promotion and sponsorship, and in so doing, support its constituent Local Transport Authority and national partners' initiatives to decarbonise. It will tailor its response to emerging technologies and approaches, whilst facilitating its partners in the planning and delivery of policy interventions.

Department for Transport (DfT)

The DfT will provide policy, guidance, and funding to local transport authorities within the TfSE area to help them plan and implementing policy interventions facilitating decarbonisation.

Resulting from the Decarbonising Transport Plan[1] the DfT published a toolkit for local authorities to support local areas and regions in reducing emissions from transport.

Network Rail

Network Rail is an arms-length public body of the DfT, who are responsible for the infrastructural management of most of the UK's railway network. In 2023 Network Rail will be superseded by a new body, Great British Railways, in 2023.

Network Rail's commitment to decarbonisation recognises the need for alternative fuels to replace diesel operations4, whilst implementing the right solutions for electrifying different rail corridors[5].

National Highways

National Highways (formally Highways England) is a government-owned company who operate, maintain and improve motorways and major A-roads in England.

They recognise the need to decarbonise the road network through three commitments:

- Net-zero for own operations by 2030
- Net-zero for maintenance and construction by 2040
- Net-zero carbon travel on our roads by 2050

These commitments are based on the evidence suggesting the continued decarbonisation of road transport, policy and legislative commitments of the UK government (by 2050). This includes National Highways' commitment to support the reduction, remoding and re-timing of journeys; and build on progress in areas such as the provision of EV charging infrastructure, the construction of cycleways and role supporting inter-modal travel[5]. Commitments to decarbonisation are detailed within their Net Zero Plan[6].

Key Stakeholders

Local Transport Authorities

The responsibility of Local Transport Authorities in terms of the continued enablement and facilitation of decarbonisation is considerable.

They will be responsible for embedding policy objectives into local transport plans which demonstrate wholeheartedly the need to facilitate the uptake of alternative fuels, modal shift to public transport and active travel, plan and implement demand management measures and finally and guide the net-zero transition of development planning.

Additionally, they will need to recognise the complex systems by which transport sits within, of which the impacts of many schemes are felt both within and beyond their spatial boundaries. The net-zero transition will require a large precedent under sustainable development principles, sitting alongside other environmental, economic and social principles and objectives.

Local Planning Authorities

It is now perceived that local transport and planning authorities will require effective integration in order to effectively facilitate the net-zero transition of our communities. Planning authorities should seek to integrate the sustainable policy objectives into local plans in coordination with the transport authorities.

Their specific role relates to promoting new development and regeneration schemes utilising localisation principles, which both reduce the number of longer-journey trips required and enables a greater proportion of remaining trips to be undertaken by public transport and active travel modes.

Public health, educational and other public sector bodies

It is recognised that other bodies will play a considerable role in decarbonisation. Public health authorities should be particularly demonstrating the considerable benefits of decarbonisation and modal shift. All should be integrating decarbonisation into their development and transport strategies.

Private Sector

The private sector has a substantial role to play in enabling and facilitating decarbonising and trajectories to net-zero.

Business and operators should be facilitating the decarbonisation of their vehicle fleets, whilst enabling staff members, patrons and other patrons to travel to and from their premises in a sustainable manner. They will have a responsibility to effectively manage Travel Plans (when appropriate), whilst integrating these principles into their wider business and sustainability strategies.

Private developers constitute the large majority of new development, of which sustainable travel must be the greatest priority during their planning, construction and operational periods.

Finally, it is recognised that the freight industries will take the longest to shift to alternative fuels. As such, they should be responding proactively to developments in the industry, and replacing fleets with zero-emission vehicles as part of their longer term transport strategies.

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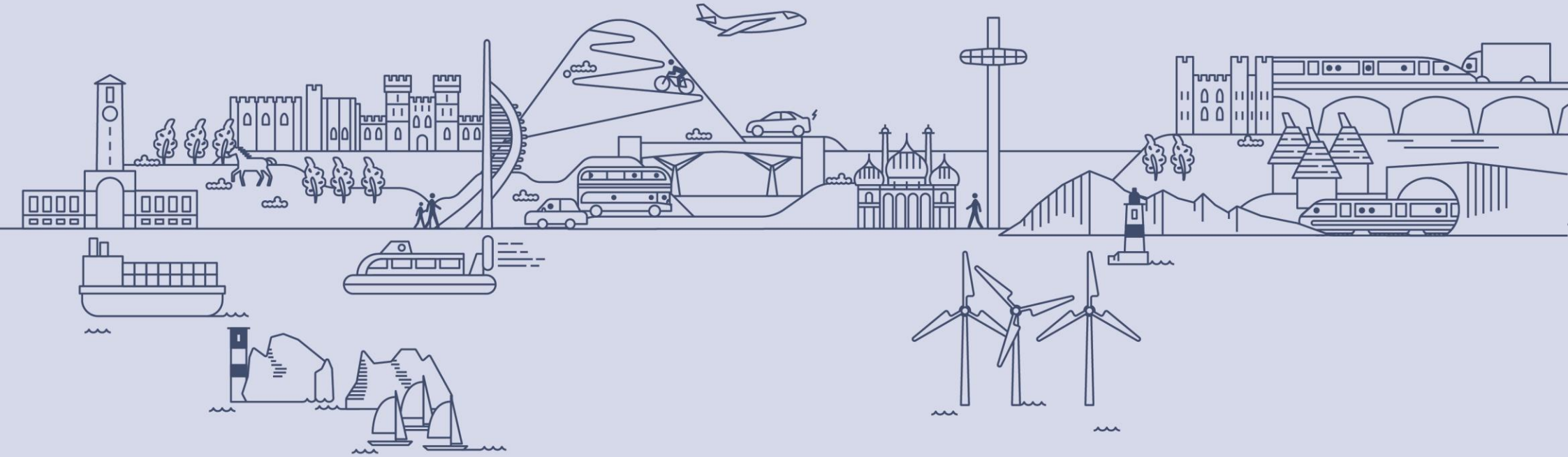


Part 3: Challenges and Opportunities

Context and Insights

Challenges

The following section presents the baseline data, and the modelled trajectories resulting from their application. Overarching transport challenges for decarbonising the South East include:

- **The transport sector remains** the greatest proportion of the UK's emissions, given its shift away from an industrial and manufacturing-based economy.
- **Net-zero forecasts are broad in range** – pathways to net-zero are highly variable and are guided by varying levels of policy and market assumptions.
- **The level of emissions below the curve is as important as the pathway to net-zero** – immediate reductions in carbon emissions will facilitate the continued fight against anthropogenic climate change.
- **Facilitating effective modal shift which contributes to decarbonisation is hugely demanding –** large amounts of investment and political determination are required to facilitate public transport and active travel.

Baseline

The baseline datasets presented on pg. 13-18 illustrate the complexities between journey modes, types and purposes and their consequential carbon impact, which includes the following insights.

- The **sum total** amount of carbon emitted by local authority varies considerably, but largely follows **population** and **employment** typologies.
- **Leisure** and **shopping** trips account for greater proportion of trips compared to **commute** or **educational** related trips.
- **Car/van driver & passenger** trips constitute for the greatest number of total trips, with **public transport** and **active travel** modes constituting minor proportions.
- **Walking** trips, as part of trips by in solitary or first/last segments of other modes, additionally constitute a large proportion of modal types.
- **Longer distance** journeys account for a **greater proportion** of emissions in comparison to **shorter distance** trips.

Trajectories

The resultant modelled trajectories presented on pg. 19-22 illustrate current forecasts to how transport will decarbonise. These have been developed from multiple datasets, and include the following insights:

- The **do nothing** trajectory demonstrates how the continued, market-driven shift to **electric vehicles** is likely to continue, facilitated by demand-responsive investment in charging facilities.
- The **national policies** trajectories present further decarbonisation resulting primarily from the **ban of the sale of ICE vehicles**, and central government incentives accelerating the **uptake of electric vehicles**.
- The **2050 budget-based** trajectories present policy outcomes designed to reach net-zero by 2050.
- The **2040 budget-based** trajectories present further manipulation of the 2050 trajectories, designed to reach net-zero by 2040 of which some local authorities have pledged to do so.

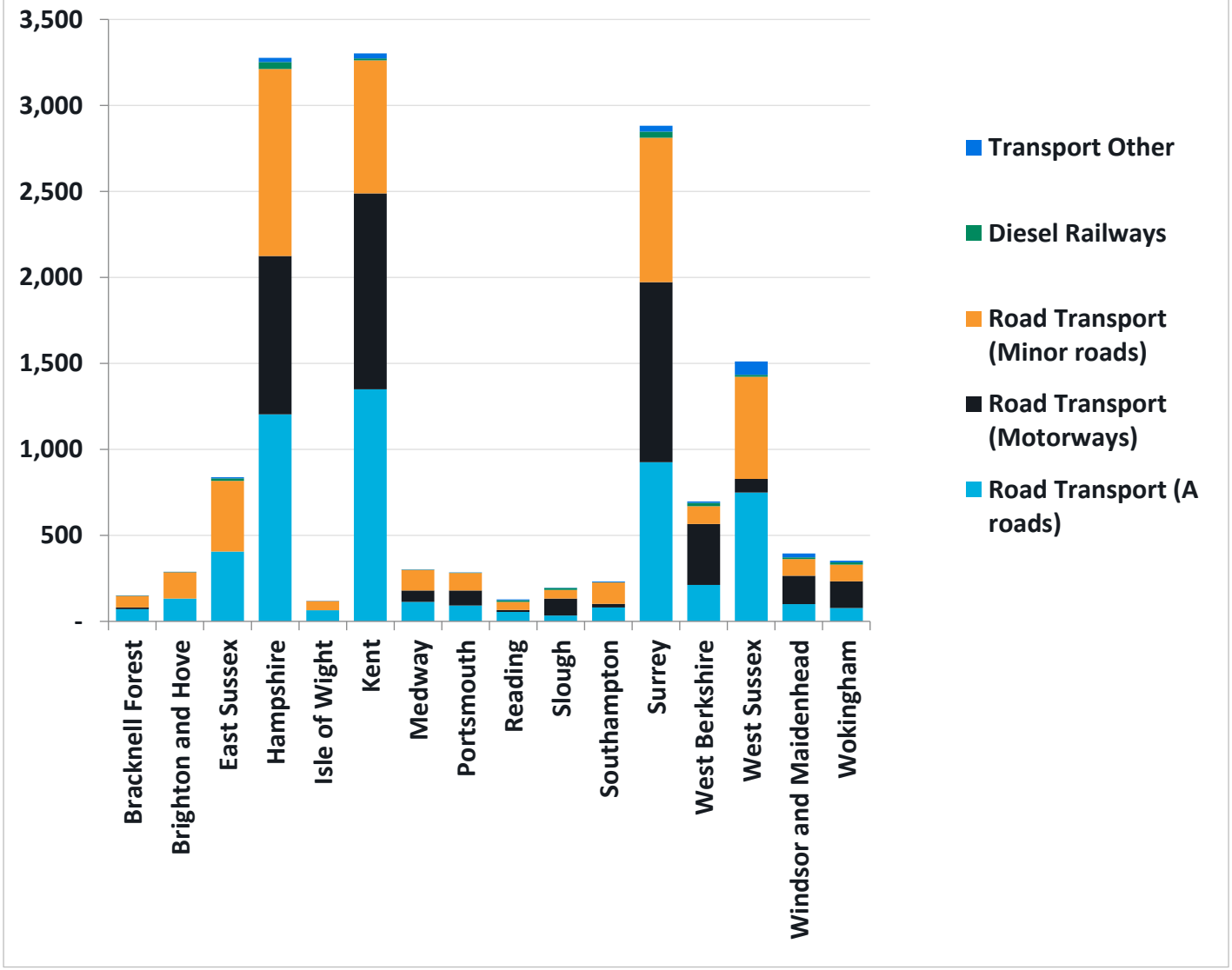
Baseline – Tailpipe emissions

Location of travel emissions

Analysis of domestic transport emissions by local authority as shown in **Figure 3.1** determines a broad alignment between population and employment levels and total levels of emissions.

The outliers of Hampshire, Kent and Surrey are each characterised by large populations, high numbers of jobs and relatively dense transport networks. Within their spatial extents they have considerable lengths of the strategic road network, alongside a number of international gateways to the UK including ports and airports.

Figure 3.1: Local Transport Authority 2019 transport emissions ($KTCO_2e$)[8]



Baseline – Trips

Context

In order to develop an accurate and conclusive baseline of the how and why of travel behaviours, a wide range of datasets must be interpreted and analysed. This allows us to develop an effective understanding of the origins of surface-transport related emissions and determines which journey purposes and modes require the greatest shifts to net-zero. Consequently, this guides the prioritisation of interventions and informs net-zero trajectories.

The UK exhibits a long, successful history of data collection, manipulation and reporting, with travel no exception. There lies a rich underlying dataset of travel modes used, journey purposes and distances, which have bene primarily sourced from the DfT's National Travel Survey (NTS). The baseline data made use of the 2018 NTS as a start.

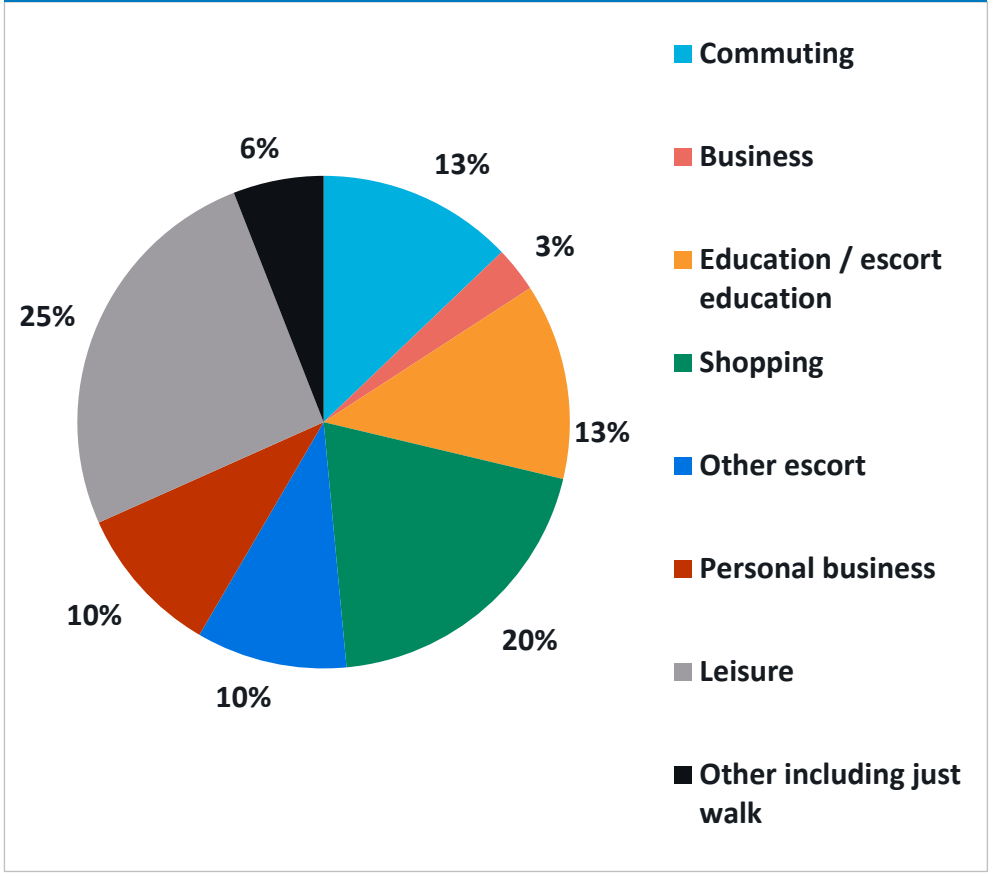
Visual representations of these datasets are both sourced, explained and illustrated within the Decarbonisation Pathways report.

Purposes

The NTS allows for a disaggregation of trips into eight disparate categories, as shown in **Figure 3.2**.

Contrary to what might be expected (and prioritised in the past in transport planning and modelling principles) this demonstrates that an increased number of raw journey trips are undertaken for leisure and shopping compared to commuting.

Figure 3.2: Trips disaggregated by journey purpose (% of total)



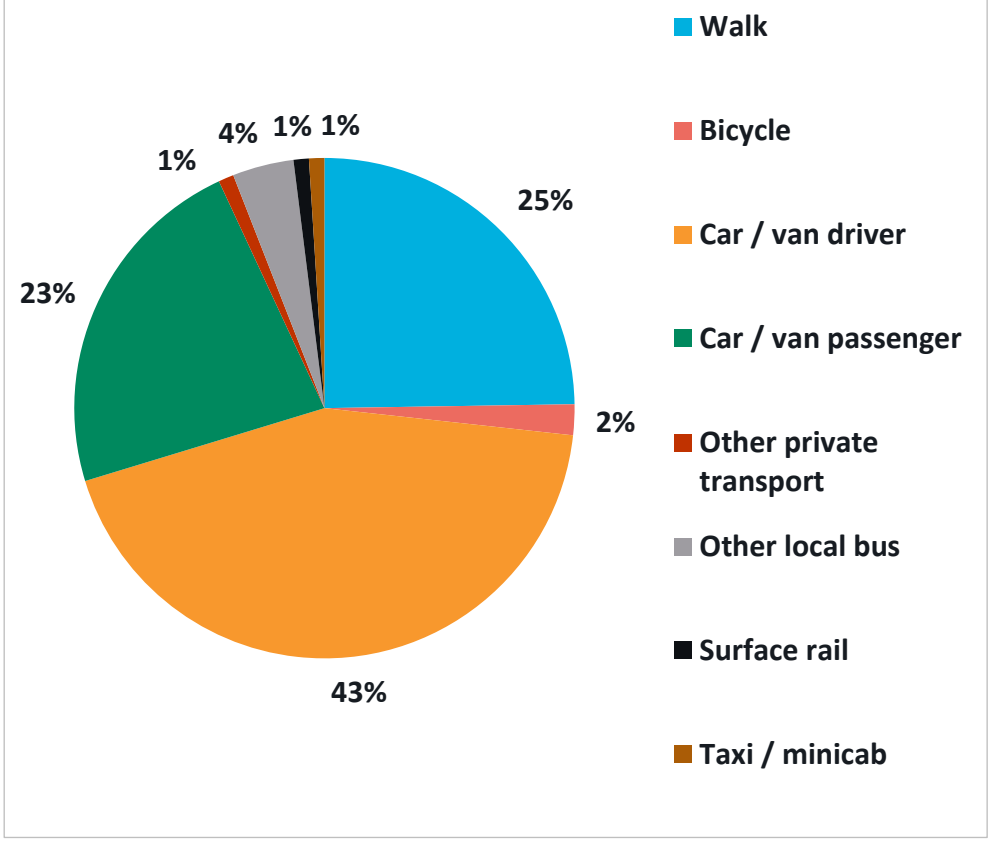
Baseline – Trips

Modes

The NTS also allows disaggregation of trips into various transport modes within the South East as shown in **Figure 3.3**.

The combination of car/van driver and passenger trips constitutes around two thirds of all trips by mode in the south east, which demonstrates the need to facilitate zero emission cars/vans. Walking trips constitute one quarter of all trips, constituted as an entire trip by themselves, or as part of a first or last segment of a trip by another mode of transport (predominantly public transport).

Figure 3.3: Trips disaggregated by journey mode (% of total)



Baseline – Trips

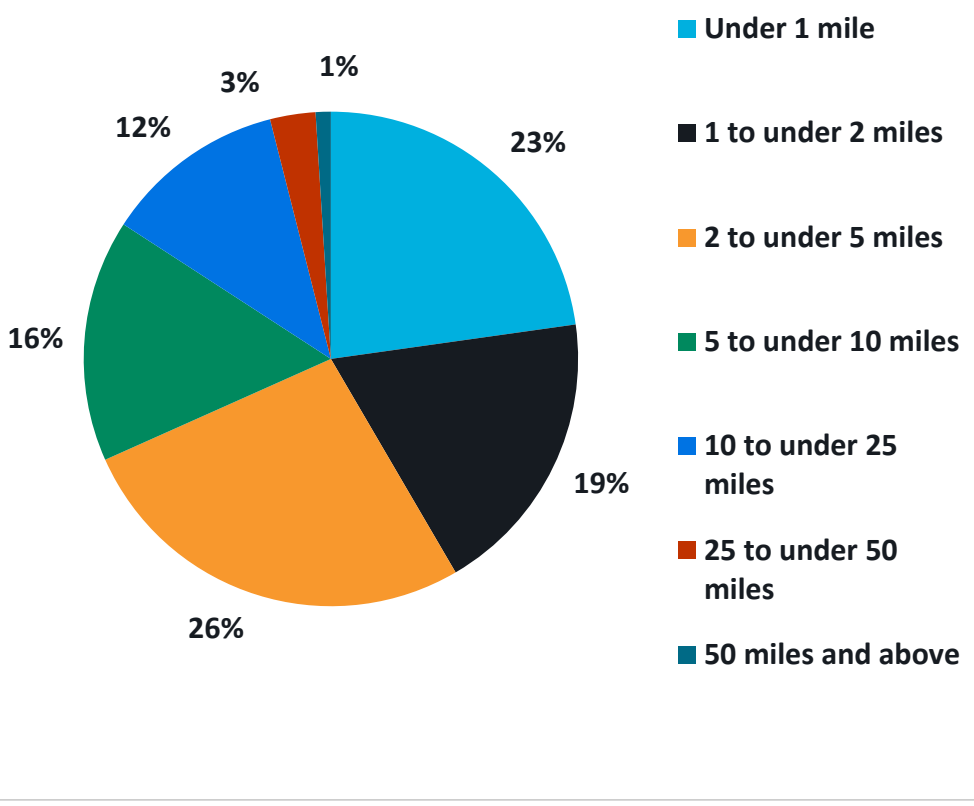
Distances

The NTS also allows disaggregation of trips into journey distances within the South East as shown in **Figure 3.4**.

It shows that just over two thirds of trips are under five miles in length, of which are generally well suited to more sustainable modes of travel such as walking, cycling and bus travel.

Only 4% of trips are over 25 miles in length, whereby active travel and bus modes become unviable.

Figure 3.4: Trips disaggregated by journey distance (% of total)



Baseline – Tailpipe emissions

Context

The range of vehicle types which are used on the UK's highway networks is broad, with vehicles characterised by varying levels of efficiencies and total vehicle kilometres driven.

Similarly, to travel modes and purposes there is a wide range of data sources available for vehicle types and journey lengths. These made use of the DfT's road traffic statistics (TRA) datasets, which additionally facilitate disaggregation to the South East spatial area.

A disparate dataset was selected in relation to vehicle emissions. The Emissions Factor Toolkit (EFT) published by DEFRA allows disaggregation of emissions (including CO_2) by year, road type, vehicle speeds and vehicle fleet compositions.

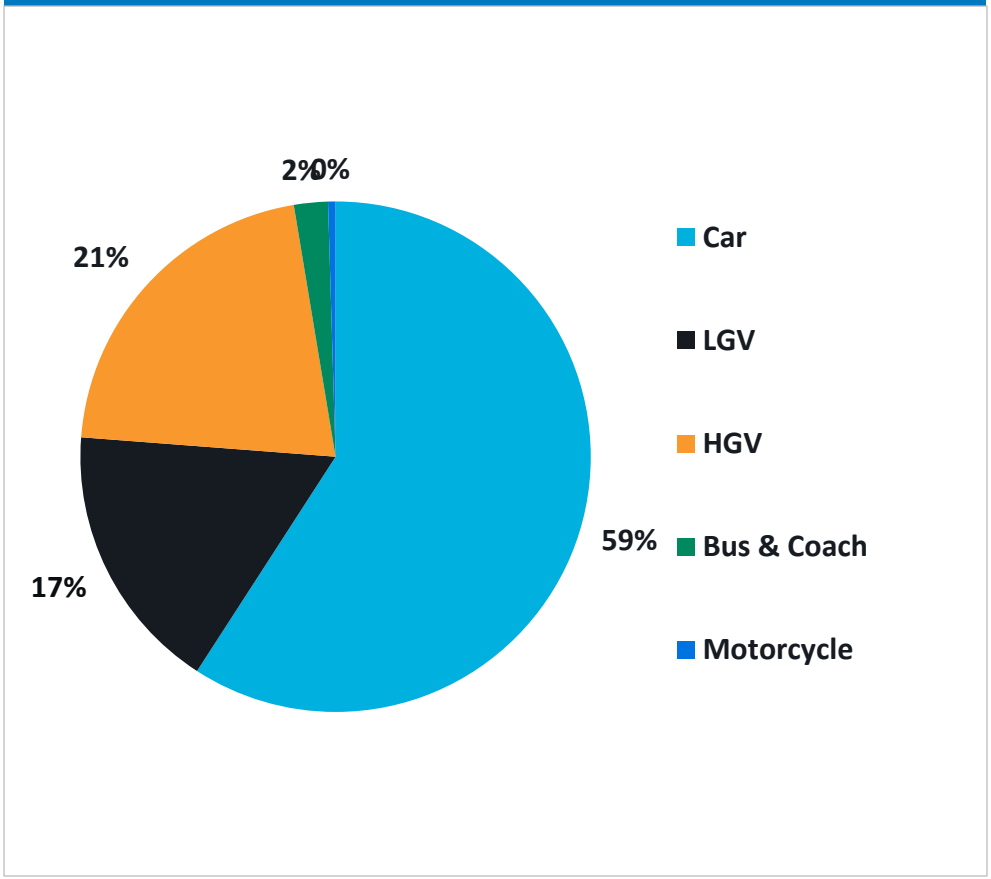
As such, this demonstrates the extensive number of variables that have been used to develop and refine the baseline.

Mode

Integrating the datasets described in **Figure 3.5** allows for the breakdown of emissions by vehicle mode/type.

Less of a surprise to the other datasets use, car-based emissions comprise a major total proportion of emissions by mode, at ~60% of total. However, almost all the remaining emissions originate from LGV and HGV fleets, demonstrating the need to facilitate the transition to zero-emission freight vehicles.

Figure 3.5: Emissions disaggregated by vehicle mode (% of total)



Baseline – Tailpipe emissions

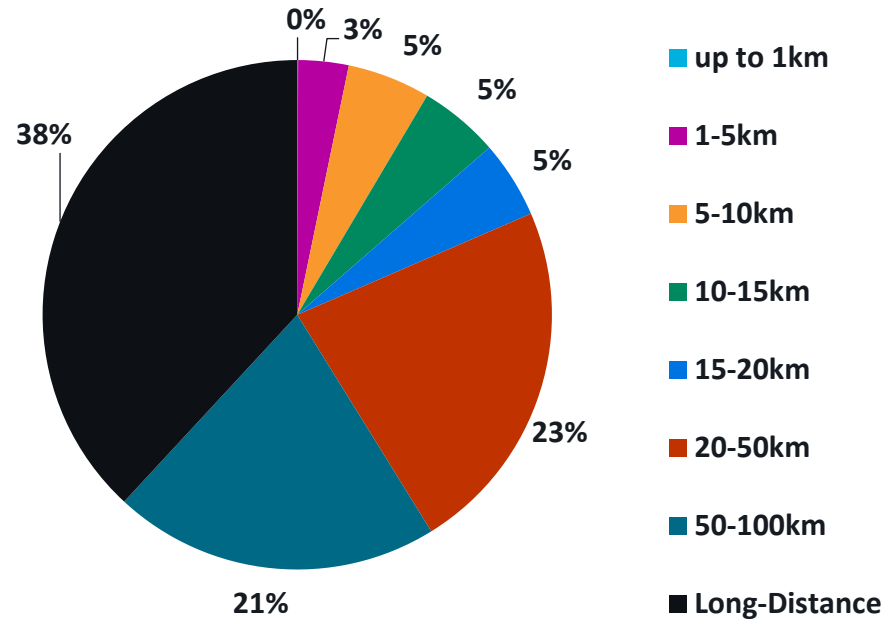
Length

The NTS also allows disaggregation of trips into journey length ranges within the South East as shown in **Figure 3.6**.

This dataset has determined that medium to longer distance journeys are responsible for the majority of emissions, with 82% originating from journeys of 20km or longer.

This however counteracts NTS data illustrating that a large number of trips are short distance. Of trips with the greatest probability of shifting to active and public transport (<5km), they are only responsible for 3% of emissions.

Figure 3.6: Emissions disaggregated by journey length (% of total)



Do Nothing

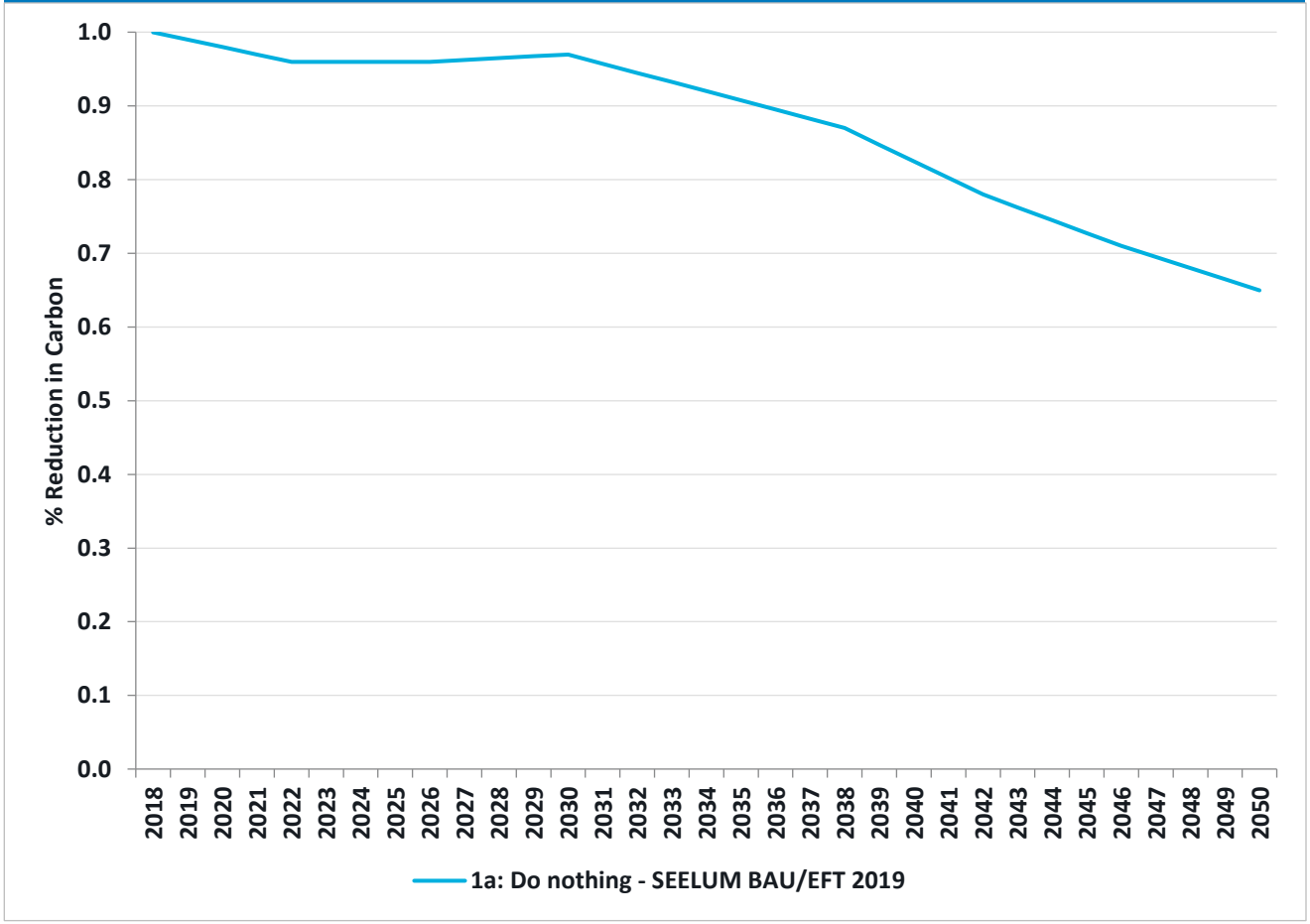
Context

The do nothing scenario shown in **Figure 3.7** provided an evidenced baseline, reflecting an imagined reversal of the existing national policy banning the future sale of internal combustion engines, low levels of modal shift and progressive spatial planning principles.

Insights

- **Vehicle technologies –** the expected and continued integration of technology within vehicles is likely to continue improving efficiencies.
- **Role of hybrid and electric vehicles** – current policy enables the continued uptake of electric vehicle charging infrastructure.
- **The number of trips will remain largely unchanged** – interventions managing the number of trips such as demand management, increased localisation and improved digital connectivity will be negligible in scope and impact.
- **Modal shift will be negligible or negative** – the cost of driving will continue to be low for many, and as such private vehicle mode shares will either continue as they are currently, or even increase.

Figure 3.7: Total Annual Carbon Emissions between now and 2050



National Policies

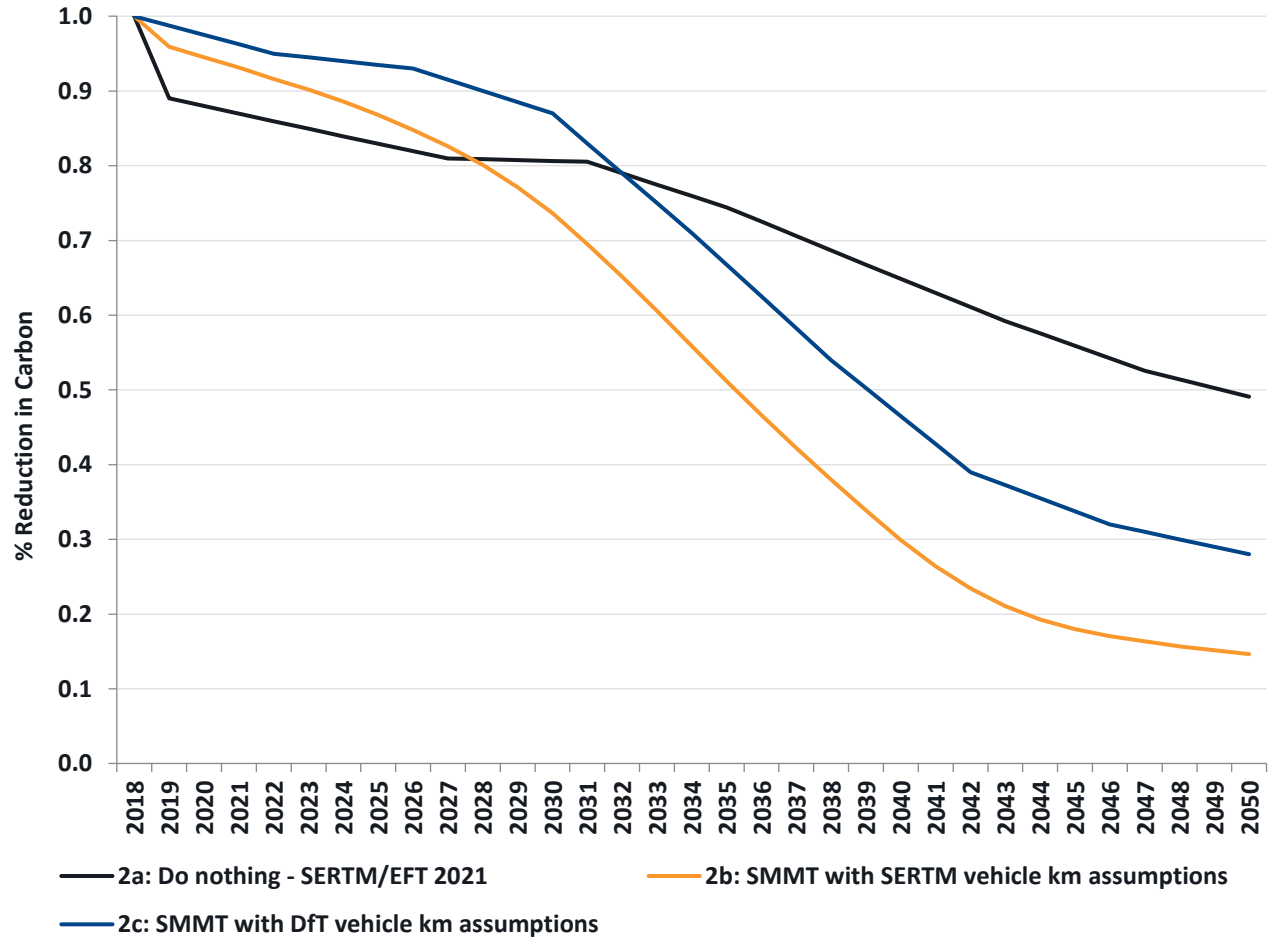
Introduction

These trajectories shown in **Figure 3.8** made use of national-level policy ambitions, primarily relating to the ban of the sale of internal combustion engine cars and vans. These three sub-trajectories reflect a difference in assumptions of how effective this policy will be, alongside wider changes in the amount and pattern of trips, but illustrate the importance of enabling zero-emission vehicle fleets.

Challenges

- **Electric vehicles being the new norm –** this trajectory suggests that by 2050 98% of vehicles will be emissions free, requiring extensive investment in charging infrastructure
- **Modal shift will be minor** – driving will continue to be affordable for many, corresponding to a lack of investment in interventions enabling modal shift
- **Congestion and air pollution** – levels of congestion will remain similar or worse than presently, alongside air pollution (albeit in a different form)
- **Freight industry remains a major pollutant** – the uptake of zero emission freight vehicles will grow at a much lower rate to cars/vans

Figure 3.8: National policy trajectories



Aiming for 2050

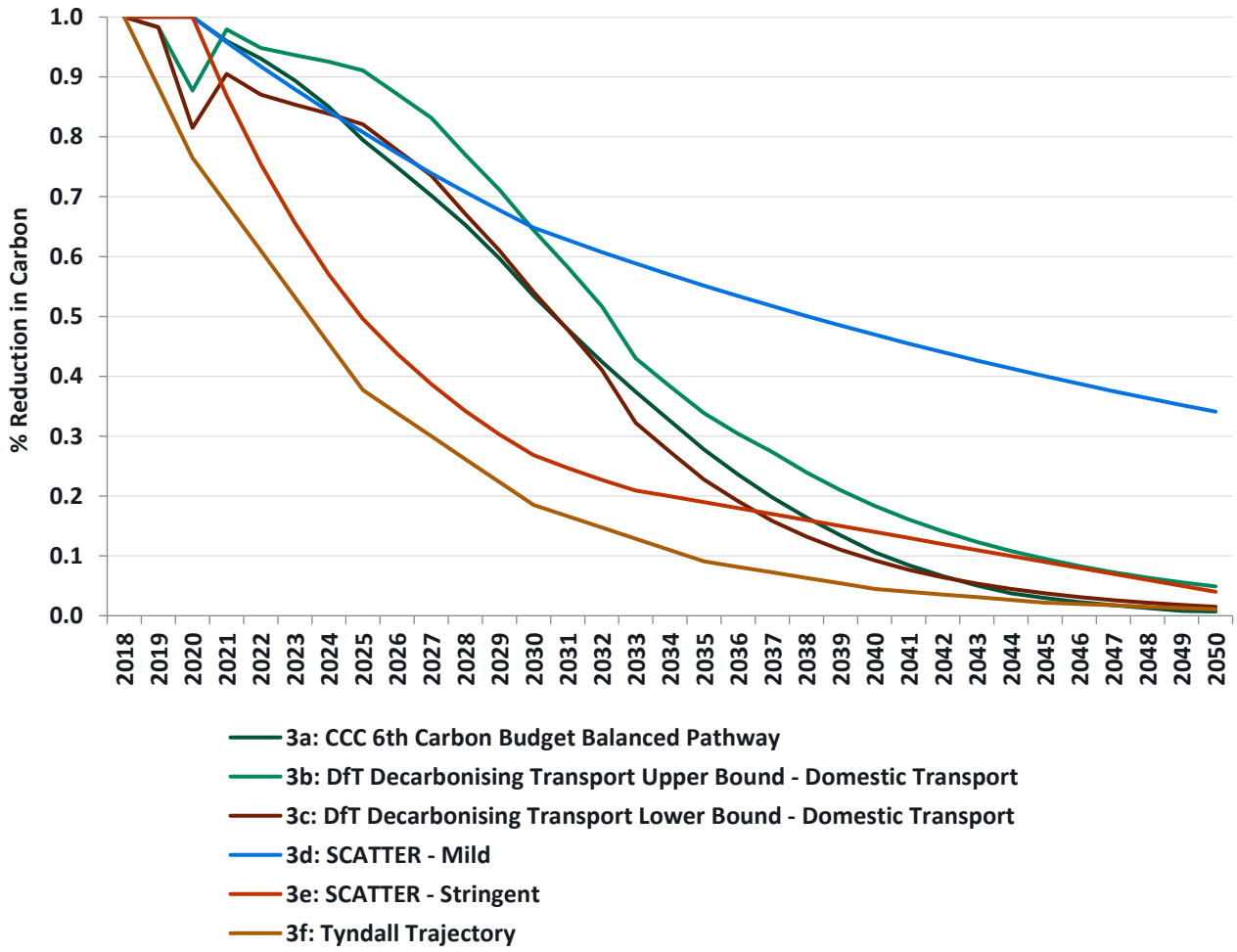
Introduction

The budget-based trajectories shown in **Figure 3.9** use a variety of vehicle kilometre and fuel mixes assumptions, against policy outcomes designed to enable trajectories to net-zero. None of these reach net-zero but most come close, to between 2-8% of current emissions.

Challenges

- **All surface transport modes are nearly fully zero emission by 2050 –** including cars/vans, freight and rail, demonstrating the need for a robust and resilient national charging infrastructures and underlying power network
- **Wholesale modal shift** – requiring much higher usage of public transport and active travel modes as currently
- **Lower number of trips, particularly longer ones** – people travel less than currently as remote working is the norm, with most of their day-to-day amenities within short travel distances
- **High vehicle efficiencies and lower consumption** – freight vehicle fleets are much more efficient with the widescale adoption of zero-emission vehicles, whilst travelling lower distances as people consume less, and more locally

Figure 3.9: 2050 budget based trajectories



Aiming for 2040

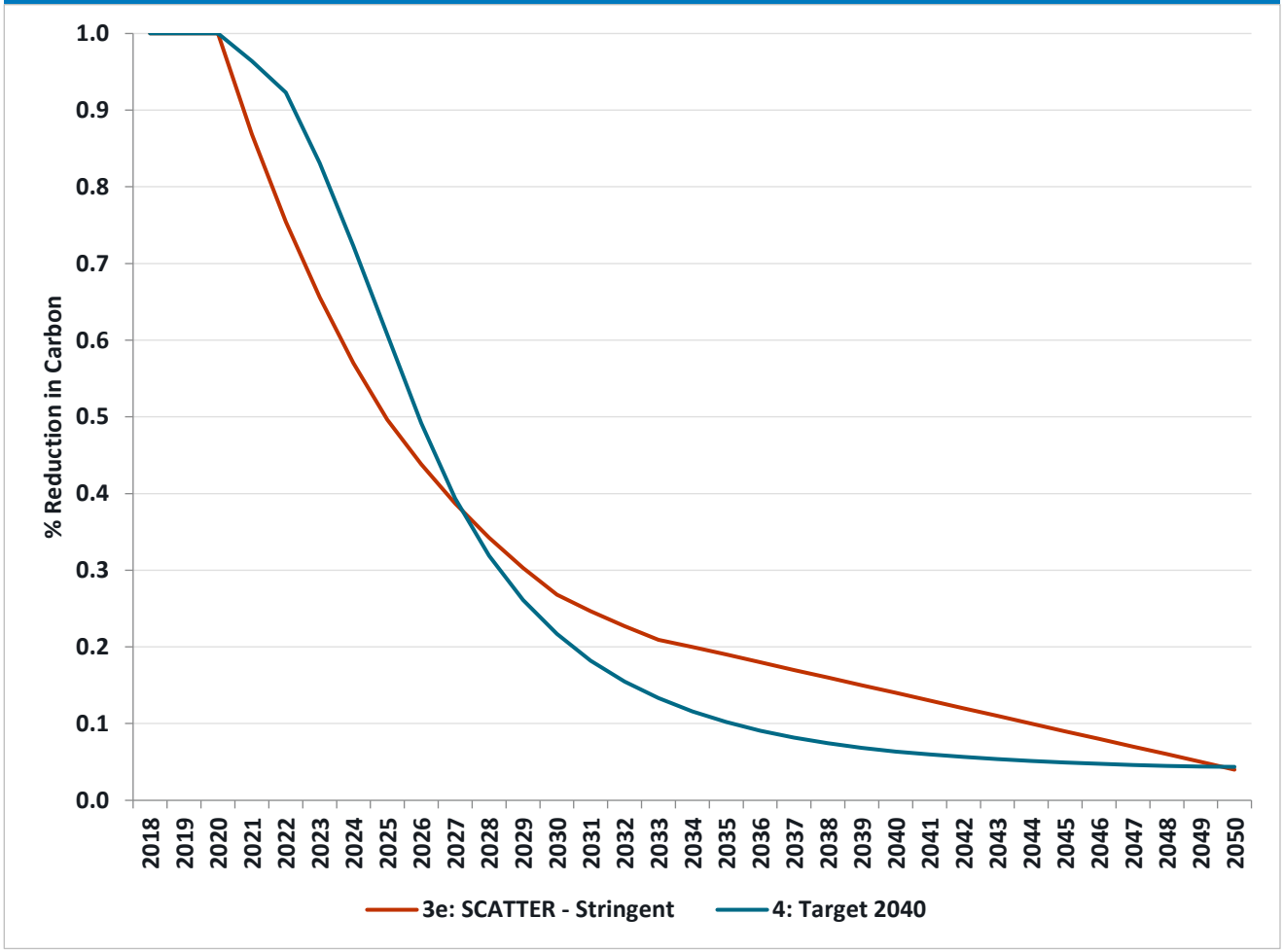
Introduction

This was informed and manipulated from the 2050 budget-based trajectories as shown in **Figure 3.10**, in order to understand the additional challenge of aiming for net-zero carbon by 2040. This are characterised by a comparatively gentle initial curve during the 2020s but requiring considerable reductions following.

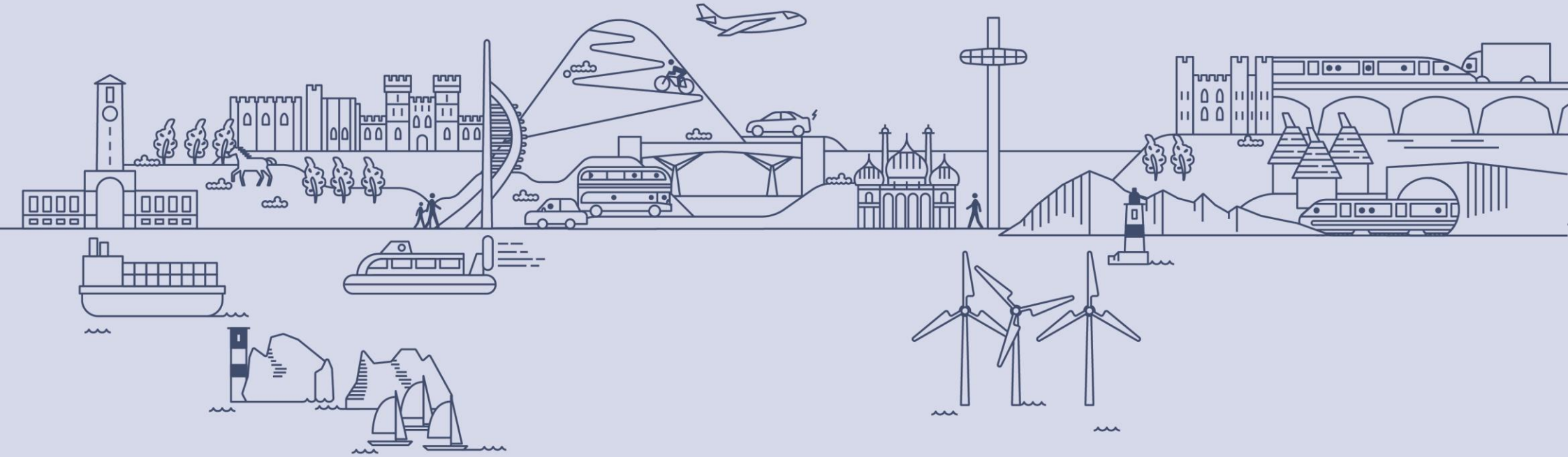
Challenges

- **Shift from ICE vehicles is required sooner –** this requires an almost immediate ban on both the sale, and usage of internal combustion engine cars/vans.
- **Immediate, wholesale modal shift** – this requires the full suite of modal shift interventions for 2050 net-zero, planned, funded and implemented in a much shorter time period.
- **People will need to travel less and much shorter distances** – this will require a much lower number of trips immediately through both a greatly increased focus towards remote working and spatial planning policies and investments achieving this.

Figure 3.10: 2040 budget-based trajectories



TRANSPORT FOR THE South East



Part 4: Vision and Objectives

Vision and Objectives

TfSE Decarbonisation Strategy

The vision for the South East's decarbonisation trajectory is designed to both support and challenge the wider vision and objectives set out in TfSE's Strategy and Area Studies.

The vision for decarbonisation is strongly reflected within the TfSE Transport Strategy Vision, which is presented below:

"By 2050, the South East of England will be a leading global region for net zero carbon, sustainable economic growth where integrated transport, digital and energy networks have delivered a step change in connectivity and environmental quality.

A high quality, reliable, safe and accessible transport network will offer seamless door to door journeys enabling our businesses to compete and trade more effectively in the global marketplace and giving our residents and visitors the highest quality of life."

TfSE Strategic Investment Plan (SIP)

The SIP provides a framework for investment in strategic transport infrastructure, services and regulatory intervention in the coming three decades.

This plan seeks to provide close alignment between itself, the TfSE Transport Strategy and local transport plans, in order to ensure individual community needs are understood and projects complement each other.

Within the plan there includes a set of 30 regional "packages" of investment opportunities across key modes of Rail, Mass Transit (bus, ferries etc), Active Travel (walking, cycling, etc) and Highways.

Within each package are considered interventions which address key "investment priorities" for the South East, including:

- **Decarbonisation and Environment:** enabling the UK to achieve net-zero by 2050 or sooner
- **Adapting to a New Normal:** enabling sustainable adaption to a post-pandemic and Brexit world.
- **Levelling Up Left Behind Communities:** delivering an affordable and accessible transport network and reducing barriers to opportunities.
- **Regeneration and Growth:** attracting investment to grow the economy and compete in the global marketplace.
- **World Class Urban Transport Systems:** delivering seamless, integrated and sustainable urban transport systems.
- **East – West Connectivity:** enhancing east – west corridors to the same level as radial links to and from London.
- **Resilient Radial Corridors:** delivering a reliable and more resilient transport network which is smarter at managing demand.
- **Global Gateways and Freight:** enhancing the capacity and contribution of the freight and logistics sector through improved connectivity to Global Gateways.

Strategic Narrative

Key Strengths of the South East

The Strategic Investment Plan sets out a Strategic Narrative underpinning the case for investing in the South East.

This narrative starts by highlighting the key strengths of the South East, including:

- a highly productive economy;
- a highly educated workforce;
- strong links and access to London;
- strengths in Financial/Professional Services, Advanced Engineering/Manufacturing, IT, Marine/Maritime, Defence, Transport/Logistics, Tourism, Low Carbon, and Creative Industries;
- several national and world leading universities;
- a favourable investment environment;
- available land for regeneration and development;
- a varied and highly valued natural environment; and
- a rich cultural and historic environment.

Key Challenges of the South East

The South East faces several challenges and threats, which in the Strategic Narrative are grouped into eight themes.

The first four focus on broader issues where action is required across multiple sectors:

- **Decarbonisation** of the transport system is not happening fast enough.
- The South East's transport systems need to adapt to a **new normal**- i.e. post pandemic, post Brexit environment.
- There is a need to **"level up" left behind communities.**
- There is a need for sustainable **regeneration and growth.**

The second group of these four themes have a more direct relevance to transport:

- The South East's largest conurbations lack **world class urban transit systems.**
- **East – West Connectivity** is poor.
- Radial Corridors lack **resilience** in places.
- There are gaps and vulnerabilities in the networks that provide serve **Freight and Global Gateways**.

Need for Intervention

Without intervention, the South East will maintain a slow trajectory to net-zero, only seeing a minor reduction total carbon emissions by 2050:

"Do nothing" scenarios demonstrates the continued uptake of mostly electric vehicles

Within significant intervention, the UK will fail to meet its obligations in regards to the Paris Agreement:

Failure to meet this overall obligation has grave ramifications given the context of wider carbon emissions, which will also impact the UK's Nationally Determined Contribution towards these targets.

Decarbonisation of surface transport provides integral rationale for alternative forms of all forms of progressive intervention:

Policies and projects accelerating the shift from ICE to zero emission vehicles, alternative modes of transport, and negating the need for travel altogether should have decarbonisation at the heart of their business case, planning and implementation.

Problem Statements

A Bottom-up approach for identifying key issues

The Area Study Programme identified specific problems (weaknesses and/or challenges) that many stakeholders wish to see the Strategic Investment Programme address. Additionally refer to Appendix B (people, place and movement type assessment results).

Some problem statements refer directly to Decarbonisation, whilst almost all the remainder exhibit demonstratable indirect relationships. A list of the Global Problem statements that could be addressed directly through Decarbonisation-related interventions is provided below:

Global Problem Statements

- Transport is not decarbonising fast enough.
- Climate change threatens the resilience of transport networks.
- Freight is heavily reliant on highways, especially for first-mile-last-mile deliveries.
- We need better coordination between land-use and transport planning.
- Rural communities are being left behind in digital, active travel, and public transport connectivity.
- Too many transport services and networks are inaccessible to all users.
- For many people, public transport fares are too high and too complicated.
- There are too few “strategic mobility hubs”, offering high quality integration and interchange between different transport services, outside town centres

SPOC Problem Statements

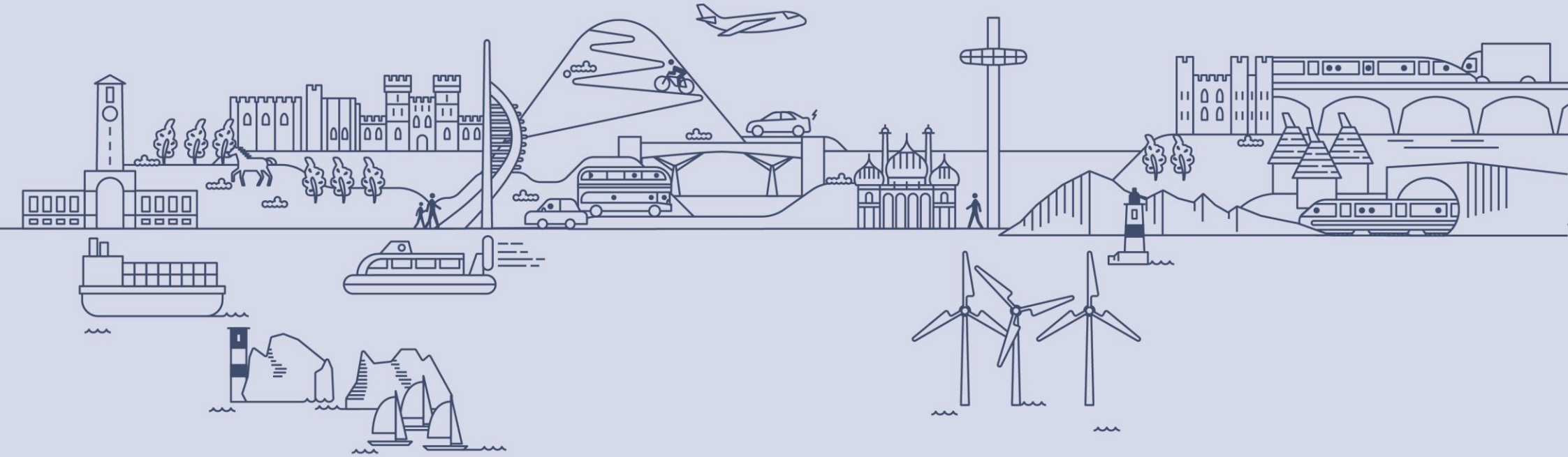
A series of Strategic Programme Outline Case (SPOC) problem statements have been developed for each sub-region, with the following insights and commonalities across areas:

- Cycling participation is low with poor levels of infrastructural provision (Kent, Medway & East Sussex, London to Sussex Coast)
- Rural communities are being left behind in digital, active and public transport connectivity (Kent, Medway & East Sussex, London to Sussex Coast)
- Rail connectivity, capacity and resilience is poor on both radial and orbital routes (London to Sussex Coast, Solent and Sussex Coast, Wessex Thames)
- Highway networks are at capacity and exhibit poor orbital connectivity (London to Sussex Coast, Solent to Sussex Coast, Wessex Thames

Decarbonisation Specific Problem Statements

- Electric vehicle charging infrastructure requires considerable densification and joining up, to facilitate the uptake of electric vehicles
- The widescale adoption of zero emission freight vehicles will require significant research and development, alongside substantial incentives to switch out ICE fleets
- Effective policy interventions enabling decarbonisation can be politically challenging due to their day-to-day impact on the way people live their lives
- Opportunities for modal shift are greatest for specific people, place and movement types

TRANSPORT FOR THE South East



Part 5: Packages of Interventions

Introduction

TfSE has worked with key stakeholders and technical advisors to develop six coherent Packages of Interventions that aim to deliver TfSE's vision and objectives for the Active Travel and Micromobility in the South East.

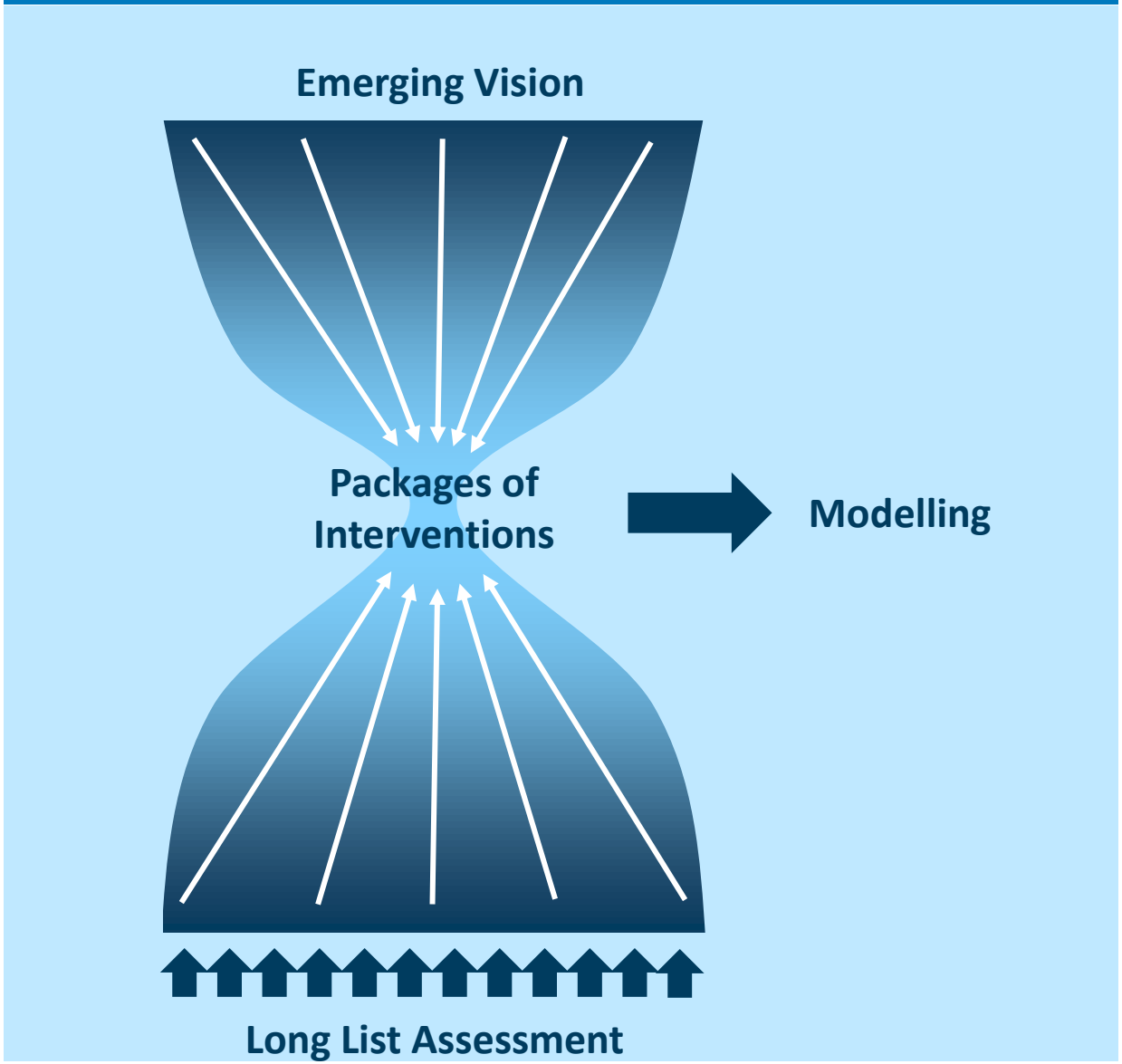
These multi-modal Packages have been developed through workshops, discussions, and careful analysis of results of the assessment of the long list of interventions described earlier.

The Packages combine an overarching vision for the Area Studies with the results of the Multi Criteria Assessment Framework.

In essence, this reflects both a 'top down' (i.e. vision led approach) and a 'bottom up' (i.e. individual intervention assessment) approach. **Figure 5.1** illustrates the essence of this combined approach.

TfSE has used a land use and transport interaction model to simulate the impacts of these Packages of Interventions. The results from this modelling exercise are presented in Part 6.

Figure 5.1: Approach to Package development



Packages of Interventions

The Area Studies Programme has identified **Packages of Interventions** that serve areas of the South East relating to decarbonisation. The interventions included are summarised below and presented on the following pages.

Package A: South Hampshire Rail (Core)

A1	Solent Connectivity Strategic Study
A1a	Botley Line Double Tracking
A1b	Netley Line Signalling and Rail Service Enhancements
A1c	Fareham Loop / Platform
A1d	Portsmouth Station Platforms
A1e	South West Main Line - Totton Level Crossing Removal
A1f	Southampton Central Station Upgrade and Timetabling
A1g	Eastleigh Station Platform and Approach Flyover Enhancement
A2	Waterside Branch Line - Reopening and Electrification
A3	West of England Service Enhancements
A4	Additional Rail Freight Paths to Southampton

Package B: South Hampshire Rail (Enhanced)

B1	Southampton Central Station - Woolston Crossing
B2	New Southampton Central Station
B3	New City Centre Station
B4	South West Main Line - Mount Pleasant Level Crossing Removal
B5	West Coastway Line - Farnham to Cosham Capacity Enhancements
B6	West Coastway Line - Cosham Station Relocation
B7	Eastleigh to Romsey Line - Electrification
B8	Havant Rail Freight Hub
B9	Fratton Rail Freight Hub
B10	Southampton Container Port Rail Freight Access and Loading Upgrades
B11	Southampton Automotive Port Rail Freight Access and Loading Upgrades

Package C: South Hampshire Mass Transit

C1	Southampton Mass Transit
C2	South East Hampshire Rapid Transit
C3	New Southampton to Fawley Waterside Ferry Service
C4	Southampton Cruise Terminal Access for Mass Transit
C5	M271 Junction 1 Strategic Mobility Hub
C6	M27 Junction 5 / Southampton Airport Strategic Mobility Hub
C7	M27 Junction 7/8 Strategic Mobility Hub
C8	M27 Junction 9 Strategic Mobility Hub
C9	M275 Junction 1 Strategic Mobility Hub
C10	Clarence Pier Bus-Hovercraft Interchange
C11	Improved Gosport - Portsmouth and Portmouth - Hayling Island Ferries

Packages of Interventions

The Area Studies Programme has identified **Packages of Interventions** that serve areas of the South East relating to decarbonisation. The interventions included are summarised below and presented on the following pages.

Package D: Isle of Wight Connectivity

D1	New Isle of Wight Mass Transit System and Active Travel Enhancements
D1a	Bus Mass Transit - Newport to Yarmouth
D1b	Bus Mass Transit - Newport to Ryde
D1c	Bus Mass Transit - Newport to Cowes
D1d	Isle of Wight Railway Service Enhancements
D1e	Isle of Wight Railway Extensions - Shanklin to Ventnor
D1f	Isle of Wight Railway Extensions - **Shanklin** to Newport (or Mass Transit alternative)
D2	Isle of Wight Ferry Service Enhancements
D2a	Operating Hours and Frequency Enhancements
D2b	New Summer Route - Ryde to Southampton

Packages E & H: Sussex Coast Active Travel

E1	Solent Active Travel (including LCWIPs)
H1	Sussex Coast Active Travel Enhancements (including LCWIPs)

Package G: Sussex Coast Mass Transit

G1	Shoreham Strategic Mobility Hub
G2	A27/A23 Patcham Interchange Strategic Mobility Hub
G3	Falmer Strategic Mobility Hub
G4	Eastbourne/Polegate Strategic Mobility Hub
G5	Sussex Coast Mass Rapid Transit
G6	Eastbourne/Wealden Mass Rapid Transit
G7	Hastings/Bexhill Mass Rapid Transit
G8	A27 Falmer – Polegate Bus Stop and Layby Improvements

Packages of Interventions

The Area Studies Programme has identified **Packages of Interventions** that serve areas of the South East relating to decarbonisation. The interventions included are summarised below and presented on the following pages.

Packages J & K: London to Sussex Coast Rail (Core)

J1	Croydon Area Remodelling Scheme
J2	Brighton Main Line - 100mph Operation
J3	Brighton Station Additional Platform
J4	Reigate Station Upgrade
J5	Arun Valley Line - Faster Services
J6	East Coastway Line - Faster Services
J7	Brighton Main Line - Reinstate Cross Country Services
J8	New Station to the North East of Horsham
J9	Newhaven Port Capacity and Rail Freight Interchange Upgrades
J10	Uckfield Branch Line - Hurst Green to Uckfield Electrification and Capacity Enhancements
J11	Redhill Aerodrome Chord
K1	Uckfield - Lewes Wealden Line Reopening - Traction and Capacity Enhancements
K2	Uckfield - Lewes Wealden Line Reopening - Reconfiguration at Lewes
K3	Spa Valley Line Modern Operations Reopening - Eridge to Tunbridge Wells West to Tunbridge Wells

Package L: London to Sussex Coast Mass Transit

L1	Fastway Extension: Crawley - Horsham
L2	Fastway Extension: Crawley - East Grinstead
L3	Fastway Extension: Haywards Heath - Burgess Hill
L4	Fastway Extension: Crawley - Redhill
L5	A22 Corridor Rural Bus Service Enhancements
L6	A23 Corridor Rural Bus Service Enhancements
L7	A24 Corridor Rural Bus Service Enhancements
L8	A26 Corridor Lewes - Royal Tunbridge Wells Rural Bus Service Enhancements
L9	A26 Corridor Newhaven Area Rural Bus Service Enhancements
L10	A272 Corridor Rural Bus Service Enhancements
L11	A264 Corridor Rural Bus Service Enhancements
L12	A29 Corridor Rural Bus Service Enhancements
L13	A283 Corridor Rural Bus Service Enhancements
L14	A281 Corridor Rural Bus Service Enhancements
L15	Three Bridges Strategic Mobility Hub

Packages of Interventions

The Area Studies Programme has identified **Packages of Interventions** that serve areas of the South East in need of Levelling Up. The interventions included in these Packages are summarised below and presented on the following pages.

Package M: London to Sussex Coast Active Travel

- **M1** Burgess Hill/Haywards Heath Local Cycleways
- **M2** East Grinstead Local Cycleways
- **M3** Eastbourne/Hailsham Local Cycleways
- **M4** Gatwick/Crawley Local Cycleways
- **M5** Horsham Local Cycleways
- **M6** Lewes/Newhaven Local Cycleways
- **M7** Reigate/Redhill Local Cycleways
- **M8** East Sussex Inter-urban Cycleways
- **M9** Surrey Inter-urban Cycleways
- **M10** West Sussex Inter-urban Cycleways
- **M11** New London - Brighton National Cycle Network Corridor
- **M12** New Crawley - Chichester National Cycle Network Corridor
- **M13** London - Paris New "Avenue Verte"

Packages of Interventions

The Area Studies Programme has identified **Packages of Interventions** that serve areas of the South East in need of Levelling Up. The interventions included in these Packages are summarised below and presented on the following pages.

Package O: Wessex Thames Rail (Core)

- **O1** Western Rail Link to Heathrow
- **O2** Southern Rail Link to Heathrow
- **O3** Reading to Basingstoke Electrification
- **O4** North Downs Line - Electrification
- **O5** North Downs Line - Level Crossing Removals
- **O6** North Downs Line - Service Level and Capacity Enhancements
- **O7** Guildford Station Upgrade
- **O8** Redhill Station Upgrade
- **O9** Dorking Deepdene Station Upgrade
- **O10** South West Main Line / Portmouth Direct Line - Woking Enhancement Scheme
- **O11** South West Main Line / Basingstoke Branch Line - Basingstoke Enhancement Scheme
- **O12** Cross Country Service Enhancements
- **O13** Portsmouth Direct Line - Line Speed Enhancements
- **O14** Portsmouth Direct Line - Buriton Tunnel Upgrade
- **O15** South West Main Line - Dynamic Signalling
- **O16** Theale Strategic Rail Freight Terminal
- **O17** West of England Main Line - Electrification from Basingstoke to Salisbury
- **O18** Reading to Waterloo Service Enhancements

Packages of Interventions

The Area Studies Programme has identified **Packages of Interventions** that serve areas of the South East in need of Levelling Up. The interventions included in these Packages are summarised below and presented on the following pages.

Package P: Wessex Thames Mass Transit

- **P1** Basingstoke Mass Rapid Transit
- **P2** Blackwater Valley Mass Rapid Transit
- **P3** Bracknell/Wokingham Bus Enhancements
- **P4** Elmbridge Bus Enhancements
- **P5** Epsom/Ewell Bus Enhancements
- **P6** Guildford Bus Enhancements
- **P7** Slough/Windsor/Maidenhead Area Bus Enhancements
- **P8** Newbury/Thatcham Bus Enhancements
- **P9** Reading Mass Rapid Transit
- **P10** Spelthorne Bus Enhancements
- **P11** Woking Bus Enhancements
- **P12** A4 Reading - Maidenhead - Slough - London Heathrow Airport Mass Rapid Transit
- **P13** A329/B3408 Reading - Bracknell/ Wokingham Mass Rapid Transit
- **P14** Winchester Bus Enhancements
- **P15** Andover Bus Enhancements
- **P16** Runnymede Bus Enhancements
- **P17** London Heathrow Airport Bus Access Enhancements
- **P18** Berkshire, Hampshire and Surrey Inter-urban Bus Enhancments

Package Q: Wessex Thames Active Travel

- **Q1** Berkshire, Hampshire and Surrey Urban and Inter-urban Cycleways

Packages of Interventions

The Area Studies Programme has identified **Packages of Interventions** that serve areas of the South East in need of Levelling Up. The interventions included in these Packages are summarised below and presented on the following pages.

Package S: Kent, Medway and East Sussex Classic Rail

- **S1** St Pancras International Domestic High Speed Platform Capacity
- **S2** London Victoria Capacity Enhancements - Signalling and Digital Rail
- **S3** Bakerloo Line Extension
- **S4** South Eastern Main Line - Chislehurst to Tonbridge Capacity Enhancements
- **S5** London Victoria to Shortlands Capacity Enhancements
- **S6** Hundred of Hoo Railway - Hoo Peninsula Passenger Rail Services
- **S7** North Kent Line / Hundred of Hoo Railway - Rail Chord
- **S8** Thameslink - Extension to Maidstone and Ashford
- **S9** North Kent Line - Service Enhancements
- **S10** North Kent Line / Chatham Main Line - Line Speed Enhancements
- **S11** Otterpool Park/Westenhanger Station Additional Platform
- **S12** Integrated Maidstone Stations
- **S13** Dartford Station Remodelling/ Relocation
- **S14** Canterbury Interchange Rail Chord
- **S15** New Station - Canterbury Interchange
- **S16** New Strood Rail Interchange
- **S17** Rail Freight Gauge Clearance Enhancements
- **S18** Crossrail - Extension from Abbey Wood to Dartford
- **S19** High Speed 1 / Waterloo Connection Chord - Ebbsfleet Southern Rail Access
- **S20** Ebbsfleet International (Northfleet Connection)
- **S21** Ebbsfleet International (Swanscombe Connection)
- **S22** Gatwick - Kent Service Enhancements

Packages T & U: Kent, Medway and East Sussex High Speed Rail

- **T1** High Speed East - Dollands Moor Connection
- **T2** High Speed 1 / Marsh Link - Hastings, Bexhill and Eastbourne Upgrade
- **U1** High Speed 1 - Link to Medway (Chatham)
- **U2** High Speed 1 - Additional Services to West Coast Main Line

Packages of Interventions

The Area Studies Programme has identified **Packages of Interventions** that serve areas of the South East in need of Levelling Up. The interventions included in these Packages are summarised below and presented on the following pages.

Package V: Kent, Medway and East Sussex Mass Transit

- **V1** Fastrack Expansion - Swanscombe Peninsula
- **V2** Fastrack Expansion - Northfleet to Gravesend
- **V3** Fastrack Expansion - Medway
- **V4** Medway Mass Transit
- **V5** Medway Mass Transit - Extnesion to Hoo Peninsula
- **V6** Medway Mass Transit - Extension to Maindstone
- **V7** Medway Mass Transit - Chatham to Medway City Estate New Bridge
- **V8** Medway Mass Transit - Chatham to Medway City Estate Water Taxi
- **V9** Maidstone Bus Enhancements
- **V10** Dover Bus Rapid Transit
- **V11** Sittingbourne Bus Enhancements
- **V12** Sevenoaks Bus Enhancements
- **V13** Thanet Bus Enhancements
- **V14** Folkestone Bus Enhancements
- **V15** Ashford Bus Enhancements
- **V16** Royal Tunbridge Wells/Tonbridge Bus Enhancements
- **V17** Thames Gateway/Gravesham Bus Enhancements
- **V18** Canterbury/Whitstable/Herne Bay Bus Enhancements
- **V19** Ferry Crossings - New Sheerness to Hoo Peninsula Service
- **V20** Ferry Crossings - Sheerness to Chatham/Medway City Estate/ Strood Enhancements
- **V21** Ferry Crossings - Harty to Whitstable Enhancements
- **V22** Ferry Crossings - Harty to Oare Enhancements
- **V23** Ferry Crossings - Ebbsfleet - Tilbury Enhancements
- **V24** Inland Waterway Freight Enhancements

Package W: Kent, Medway and East Sussex Active Travel

- **W1** Medway Active Travel Enhancements
- **W2** Medway Active Travel - Chatham to Medway City Estate River Crossing
- **W3** Kent Urban Cycleways
- **W4** Kent Inter-urban Cycleways
- **W5** Faversham - Canterbury - Ashford - Hastings National Cycle Network Enhancements
- **W6** Tonbridge - Maidstone National Cycle Network Enhancements
- **W7** Sevenoaks - Maidstone - Sittingbourne National Cycle Network Enhancements
- **W8** Bromley - Sevenoaks - Royal Tunbridge Wells National Cycle Network Enhancements
- **W9** East Sussex Local Cycleways
- **W10** East Sussex Inter-urban Cycleways
- **W11** Royal Tunbridge Wells - Hastings National Cycle Network Enhancements
- **W12** Canterbury Placemaking and Demand Management Measures
- **W13** Medway Placemaking and Demand Management Measures
- **W14** Dover Placemaking and Demand Management Measures

Package A: South Hampshire Rail (Core)

Overview

Network Rail, Solent Transport, and the Solent Authorities have developed a comprehensive package of interventions that will deliver improvements to urban and inter-urban rail journeys.

These form part of the Solent Connectivity Strategic Study (formerly the Solent Continuous Modular Strategic Plan), the main objective of which is to deliver additional local rail services so that most of the stations in the area currently served by infrequent one train per hour (1tph) services get a much more frequent "semi metro" 2 to 3tph (or perhaps “metro” 4tph) service frequency.

The plan includes interventions such as the provision of an additional through line / overtaking line at Fareham, increasing capacity on the Botley line to twin tracks, adding platform capacity at Portsmouth Harbour, signalling improvements on the Netley Line, and timetable changes to maximise capacity at Southampton Central.

A key enabler to the plan is the provision of sidings at Totton and a solution to a level crossing constraint in this area. This would then allow many local trains from Southampton to be run on to Totton for two reasons: 1) to reduce platform demand/improve capacity at Southampton Central by having fewer trains terminate there, and 2) to improve service to Totton which is currently under-served.

The Solent Connectivity Strategic Study will also complement passenger rail services to be introduced to the Fawley Branch Line and serve a large planned development in this area. While alternative uses for this railway have been explored, there appears to be consensus that this corridor should develop as (an ideally electrified) heavy rail service. Ferries could also complement this service.

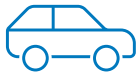
Benefits

- **Capacity** enhancements across the whole Solent conurbation
- Improvements in **service frequencies**, especially for urban metro services
- Better **interchange** and **service quality** at Southampton Central station
- More new and growing communities will have **access** to the national rail network

Modelling Results

£285m GVA uplift per annum (by 2050, 2020 prices)

15,000 More return rail trips per weekday



5,000 Fewer return car trips per weekday

Package A: South Hampshire Rail (Core)

Package B: South Hampshire Rail (Enhanced)

Overview

Building on the core package, TfSE's strategic studies have a horizon as far as 2050 and an ambition to deliver transformational change in sustainable travel options across South Hampshire. Solent Transport and Local Transport Authorities have previously stated an ambition to deliver a level of service on urban metro routes comparable to suburban London, akin to four trains per hour – a "metro" level of service.

There are also aspirations to grow freight and provide better connectivity between South Hampshire, the West of England, the Midlands, and beyond. This requires more capacity than the current network can provide. The key bottleneck preventing this from being realised is the tunnel between Southampton Central and St Denys.

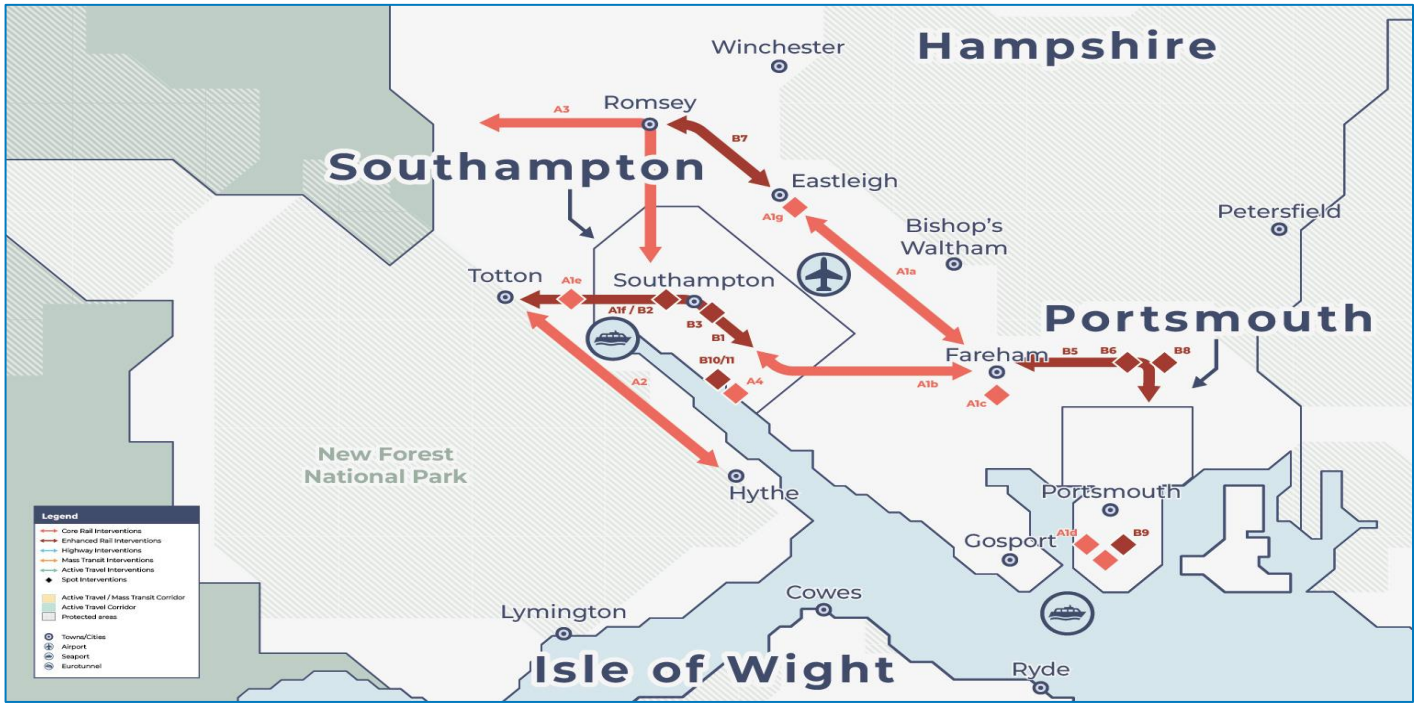
TfSE has worked with key stakeholders to develop a longer-term package of scheme that unlock significant capacity and shorter journey times between Southampton and Portsmouth City Centres. This could include a potential new underground link between Southampton Central and the Netley Line providing a more direct route and deconflicting north-south and east-west rail movements.

Benefits

- **Transformational capacity and connectivity benefits** – especially on east-west rail journeys (30 – 35 minute Southampton – Portsmouth journeys)
- Supports **regeneration** of Southampton City Centre and other **growth** areas
- Significant boost to **GVA** in a relatively deprived part of the South East
- Large **reduction in carbon emissions** from **mode shift** and **electrification**.

Modelling Results (additional to core)

£305m	GVA uplift per annum (by 2050, 2020 prices)
15,000	More return rail trips per weekday
5,000	Fewer return car trips per weekday



TRANSPORT FOR THE South East

Package C: South Hampshire Mass Transit

Overview

TfSE and the Area Study Working Group believe the South Hampshire conurbation is large enough and dense enough to support world class mass transit systems.

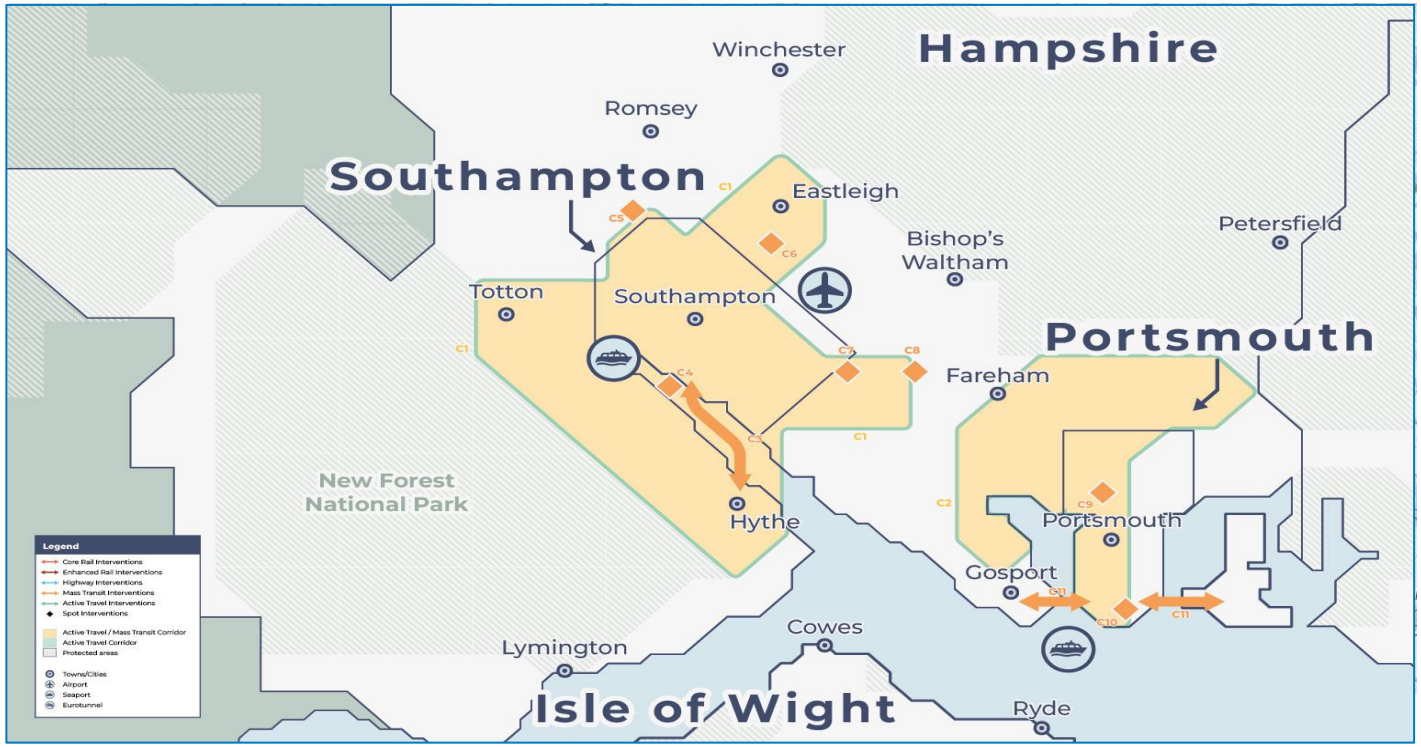
Portsmouth City Council are developing and delivering a comprehensive high quality Bus Rapid Transit that will serve the Portsmouth City Region. Southampton City Council also aspire to develop a Mass Transit System for their city region – which could take the form of Light Rail Transit, tram-train, Bus Rapid Transit, and/or ferries (and terminal facilities). Both mass transit systems will be supported by a high-quality urban rail service (see packages for core and enhanced rail in South Hampshire) and, where good interchange opportunities are available, strategic mobility hubs. These hubs should provide interchange across a range of modes including active travel and new mobility choices, as well as having the potential for the co-location of services and potentially new development and enhanced public realm to improve place-making. This package includes interventions to improve access for peninsulas/islands, in particular, through improving and expanding ferry services.

Benefits

- **Transformation improvement** in the quality, speed, and frequency of mass transit services in the Solent
- Better **interchange** and **service quality** at Strategic Mobility Hubs
- Improvements in **connectivity** between **islands and peninsulas** in the Solent
- **Significant mode shift** from car to bus, ferry, and tram, and enhanced place-making

Modelling Results

£165m	GVA uplift per annum (by 2050, 2020 prices)
110,000	More return mass transit trips per weekday
70,000	Fewer return car trips per weekday



Packages D & E: Isle of Wight Connectivity

Overview

TfSE believe the Isle of Wight has the characteristics to support a high-quality, integrated mass transit system.

TfSE and key stakeholders have identified a package of interventions aimed at improving connectivity between the Isle of Wight and the Mainland and improving connectivity within the Isle of Wight itself.

Stakeholders from the Isle of Wight and wider Solent region all raised opportunities to transform ferry services, through increasing frequency of services, extending hours of operation, more affordable ferry fares, and the possibility of new seasonal routes.

The Isle of Wight has the potential to be an exemplar for public transport given its size and unique characteristics.

With investment in ferries and public transport on the Island, there is opportunity to make the most of existing infrastructure by reinstating disused railways and complementing rail with a bus-based Mass Transit system connecting key destinations across the Island including ferry terminals and tourism hotspots and delivery of the LCWIP and island-wide segregated active travel routes.

Benefits

- **Transformational improvement** in the quality, speed, and frequency of ferry services between the Isle of Wight and Mainland.
- **Seamless integration** between ferry and public transport on the mainland and the Isle of Wight supporting sustainable onward connectivity.
- **Reduced emissions** from mode shift on the island to more sustainable modes

Modelling Results

£165m	GVA uplift per annum (by 2050, 2020 prices)
15,000	More return mass transit (incl. ferry) and rail trips per weekday
15,000	Fewer return car trips per weekday

Package E: South Hampshire Active Travel

Overview

All three Local Transport Authorities in the Solent have ambitious plans to improve cycling and walking in their areas. This ambition is supported by this study.

Active travel interventions across South Hampshire support a number of key priorities, including reducing congestion, helping to tack climate change, improving air quality, and supporting placemaking - creating high-quality attractive, liveable towns and cities.

Enhanced infrastructure also benefits bike hire schemes, e-bikes and e-scooters.

Several highway interventions – including the Southampton West Quay Road scheme – will unlock opportunities for pedestrians and cyclists by freeing up more public space in town and city centres.

The Portsmouth Clean Air Zone (CAZ) is also identified. Whilst being delivered, it is held up as good practice, a model to be built upon by other authorities as well as expanded within Portsmouth.

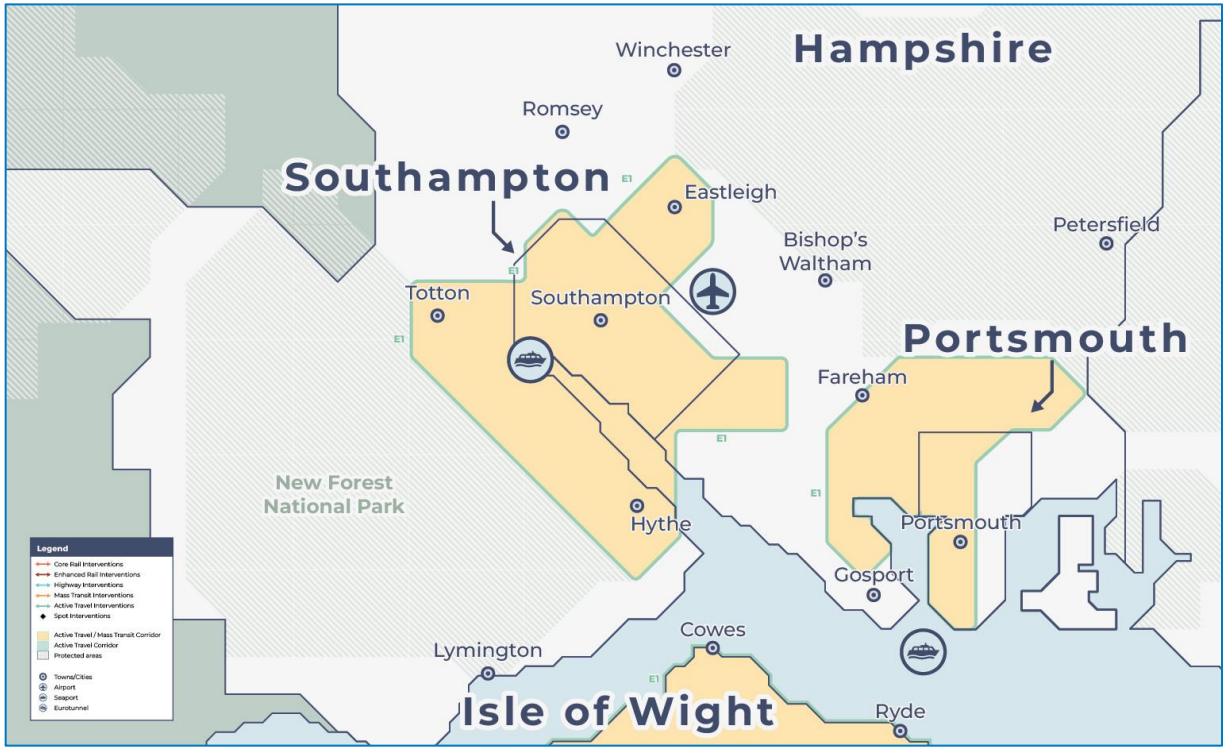
As with all sustainable mode packages, behaviour change interventions, locally, are required to optimise benefits.

Benefits

- **Material improvements to the urban realm** of the Solent Built Up Area, unlocking active travel, placemaking and regeneration/development opportunities
- Improvements in **air quality** in urban areas
- Significant **mode shift** from car to active travel, with associated decarbonisation and health benefits

Modelling Results

£10m	GVA uplift per annum (by 2050, 2020 prices)
45,000	More return active travel trips per weekday
40,000	Fewer return car trips per weekday



TRANSPORT FOR THE South East

Package F: Sussex Coast Rail

Overview

Network Rail has worked with Local Transport Authorities to develop a package of improvements for the West Coastway and East Coastway lines.

The West Coastway Strategic Study (formerly Continuous Modular Strategic Planning), if delivered, would result in faster journeys and more capacity between Brighton and Hove and Southampton. However, there is not enough capacity to accommodate all stakeholder aspirations on this corridor.

The package identified here supports those interventions that best support inter-urban and long-distance journeys – those for which car alternatives have greatest emissions and other sustainable modes are less likely to provide attractive alternatives.

In the east of Sussex Coast area, a package (see Kent, Medway and East Sussex – High Speed Rail – East), includes extending high speed rail services off High Speed 1 at Ashford along an upgraded Marsh Link Line to Hastings, Bexhill and Eastbourne. This has the potential to almost half journey times between Hastings as London, as well as considerable improvements to more local, and inter-urban travel.

Benefits

- **Faster journeys** between Brighton, Chichester, Portsmouth, and Southampton
- Potentially **more frequent longer distance services** between Brighton, Chichester, Portsmouth, and Southampton
- **Additional capacity** between Worthing and Brighton for shorter journeys

Modelling Results (excl. High Speed services to Hastings, Bexhill and Eastbourne)

£80m GVA uplift per annum (by 2050, 2020 prices)

5,000 More return rail trips per weekday

TRANSPORT FOR THE South East

Package G: Sussex Coast Mass Transit

Overview

TfSE believes there is a strong case for high-quality mass transit on the Sussex Coast.

Brighton and Hove City Council is developing plans for a high-quality public transport system along the Brighton seafront, and how to best integrate all public transport across the city, including using strategic mobility hubs to intercept car trips heading into the city. Details are to be finalised, but the typology of the city lends itself strongly to Bus Rapid Transit. There are longer term options to extend or compliment this system in East and West Sussex. At this stage, extending in East Sussex appears to be more technically feasible than West Sussex where the focus is in on supporting the existing bus network. Additionally, there are proposals for improved mass transit infrastructure and services Eastbourne and Hastings.

Benefits

- **Significant improvement** in the quality, speed, and frequency of mass transit services in Sussex Coast conurbation
- Better **interchange** and **service quality** at intermodal Strategic Mobility Hubs on the periphery of Brighton & Hove and, potentially, Eastbourne
- **Significant mode shift** from car to mass transit services

Modelling Results

£120m	GVA uplift per annum (by 2050, 2020 prices)
55,000	More return mass transit trips per weekday
35,000	Fewer return car trips per weekday

Package H: Sussex Coast Active Travel

Overview

All three Local Transport Authorities on the Sussex Coast have ambitious plans to improve cycling and walking in their areas. This is fully supported by this study.

Within Brighton & Hove, there is a sizeable intervention to renew seafront structures to support active travel.

Several smaller scale highways interventions are also proposed to support housing growth along the Sussex Coast. Most of these interventions include public transport and active travel elements, such as those being proposed for the A29 between Bognor Regis and Littlehampton, and the A259 between Chichester and Bognor Regis.

Benefits

- **Material improvements to the urban realm** of the Sussex Coast Built Up Area, unlocking active travel and regeneration opportunities
- Improvements in **air quality** in urban areas
- Significant **mode shift** from car to active travel, with decarbonisation and health benefits

Modelling Results

£5m	GVA uplift per annum (by 2050, 2020 prices)
25,000	More return active travel trips per weekday
20,000	Fewer return car trips per weekday

Package J: London to Sussex Coast Rail (Core) | London – Sussex Coast Rail (Reinstatements)

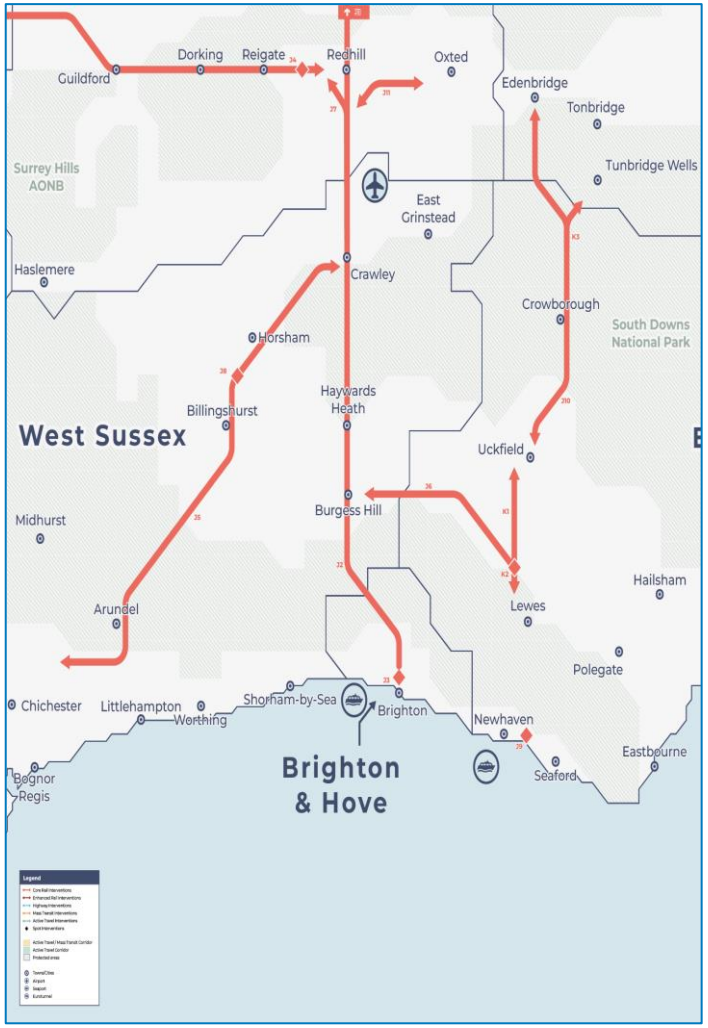
Overview

In collaboration with Network Rail and the Local Transport Authorities a package of rail interventions has been developed which will enhance connectivity, and reliability between London and the Sussex Coast.

The **Core Rail Package** addresses key bottlenecks on the Brighton Main Line, enabling faster, more reliable services. It also provides line speed enhancements allowing for faster journeys on the Arun Valley Line and the East Coastway Line. Electrification of the Uckfield Branch of the Oxted Line stimulates positive operational and environmental impacts.

The **Railway Reinstatements Package** brings back into use the Uckfield – Lewes railway and the Tunbridge Wells West – Tunbridge Wells (Central) railway. This will increase resilience of rail connectivity between the South Coast and London whilst creating a new east west rail link between the Brighton Main Line and Hastings Line.

Several other historical railways have been considered for reinstatement, but the study found the conversion to active travel corridors would have a more positive impact.



Modelling Results

£375m GVA uplift per annum (by 2050, 2020 prices)

45,000 More return rail trips per weekday

10,000 Fewer return car trips per weekday

Benefits

- Improvements to **resilience** of north south rail trips
- Increased **reliability** on Brighton Main Line serving key strategic locations
- **Faster journeys** on Brighton Main Line, Arun Valley Line and East Coastway Line.
- Improved access to **boost** (currently) **less prosperous coastal areas**.
- Enhanced **connectivity** from Brighton via Lewes and Uckfield to Tunbridge Wells.
- Large reduction in **carbon emissions** from **mode shift** and **electrification**.

Package L: London to Sussex Coast Mass Transit

Overview

TfSE and the Area Study Working Group believe that there are parts of the London to Sussex Coast Area which are populous and dense enough to support a bus based-transit network.

The **Mass Transit Package** will build on the success of the Fastway Bus Rapid Transit system in Crawley/Gatwick. Its expansion will be on high growth corridors towards (and within) nearby Major Economic Hubs. This expansion will include investing in segregated bus infrastructure where feasible on corridors to the north (Redhill), south (Haywards Heath), east (East Grinstead and Tunbridge Wells) and the west (Horsham). In addition, mass transit systems are proposed for Brighton and Hove and the wider Sussex Coast, if feasible, including the Eastbourne/South Wealden area.

This system will be supported by general improvements to non-BRT buses and Strategic Mobility Hubs at Falmer, Three Bridges, and on the periphery of Eastbourne. The overall mass transit network and service provision will be designed to provide an integrated network which facilitates seamless journeys across the London to Sussex Coast area and beyond.

Benefits

- Improvement in the **speed, frequency** and **connectivity** of mass transit services
- Better **interchange** and **service quality** at Strategic Mobility Hubs
- Improvement in the **journey experience** with better quality vehicles
- **Significant mode shift** from car to bus, and decarbonisation and decongestion benefits

Modelling Results

£100m	GVA uplift per annum (by 2050, 2020 prices)
60,000	More return mass transit trips per weekday
35,000	Fewer return car trips per weekday

TRANSPORT FOR THE South East

Package M: London to Sussex Coast Active Travel

Overview

All four Local Transport Authorities in the London to Sussex Coast area have ambitious plans to improve cycling and walking in their areas. This ambition is supported by this study.

The **Active Travel Package** expands on this, delivering improvements to enable reinstatement of the National Cycle Network routes between Crawley and Brighton & Hove and between Crawley and Chichester. This will be complemented by a more direct Avenue Verte, serving international leisure trips.

The package also includes continued roll out of regional cycleways in the four Local Transport Authorities. This will involve development of consistent branding and wayfinding and creation of an integrated network with assurance of cycle path quality.

Several highway interventions – including bypasses at Godstone and improvements to the Uckfield bypass – unlock opportunities for pedestrians and cyclists by freeing up more public space in town centres.

Benefits

- Significant **mode shift** from car to active travel, with associated decarbonisation and health benefits
- Improvements in **air quality**, particularly in urban parts of the area
- Improvements to the urban and rural public realm in South Central Area, improving **quality of life** and unlocking **regeneration** opportunities

Modelling Results

£10m	GVA uplift per annum (by 2050, 2020 prices)
40,000	More return active travel trips per weekday
35,000	Fewer return car trips per weekday

Package O: Wessex Thames Rail (Core)

Overview

TfSE, in collaboration with Network Rail and local stakeholders, have developed a comprehensive package of interventions that will deliver greater capacity and resilience to strategic railways which will translate to a higher number of passenger and freight services to be run across the Wessex Thames area.

This package includes new infrastructure interventions, the largest of which involve establishing new rail links to Heathrow, possibly via interchange Reading in the medium-term.

This package also includes targeted infrastructure enhancements at known bottlenecks along Strategic Rail corridors including Woking, Guildford and Basingstoke. This will translate to more capacity for both passenger and freight services to the Solent Ports.

This package delivers a transformational change in orbital rail connectivity, connecting Major Economic Hubs across the area. Additionally, there is a focus on out-of-region connectivity to other prominent regions in Great Britain.

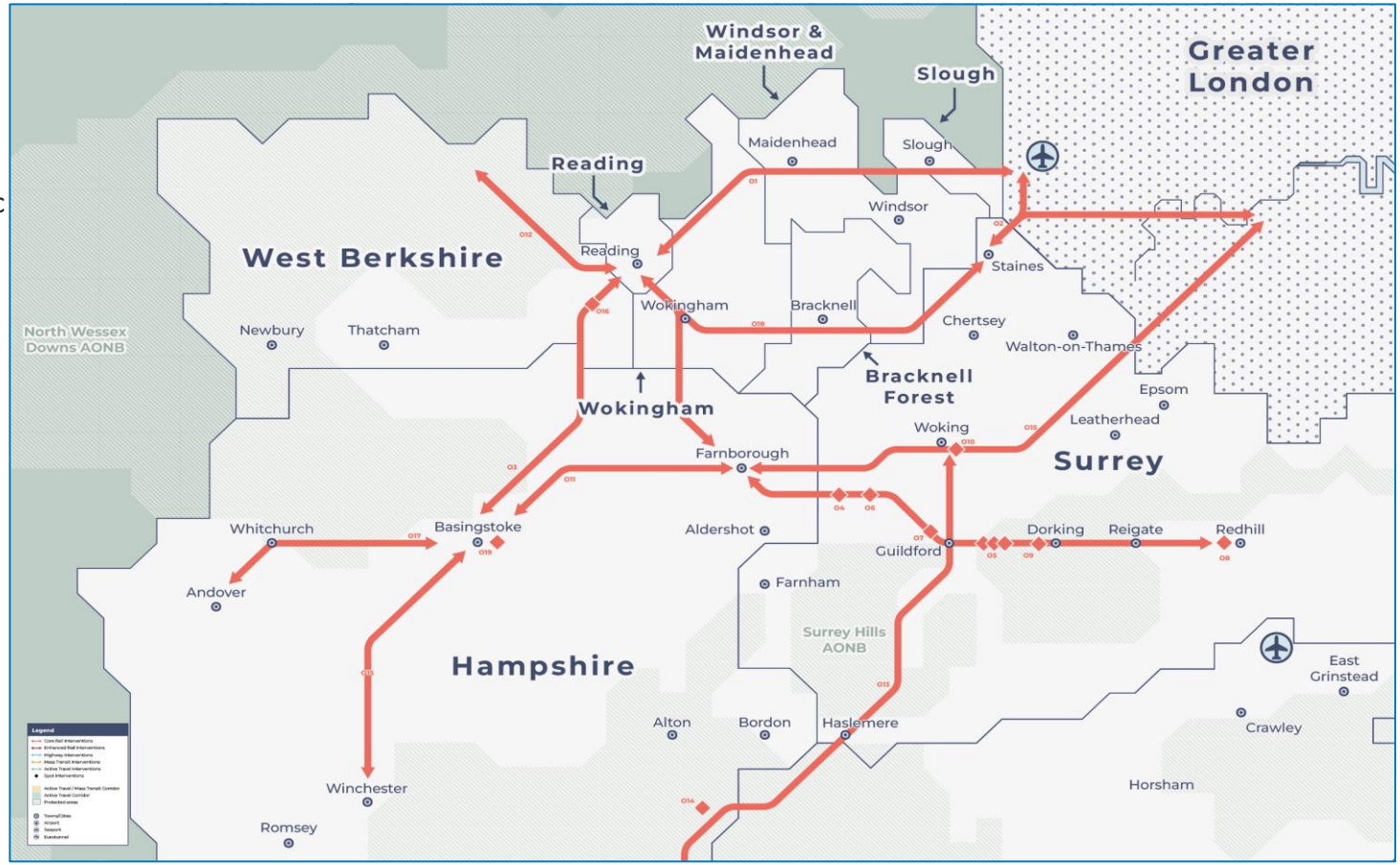
Benefits

- Increased **capacity** on key corridors
- Increased **resilience and reliability**
- **Faster, more frequent services** connecting Major Economic Hubs
- **Faster, more frequent services** connecting the area to Global Gateways
- Mode shift and reduced emissions

Modelling Results

£850m GVA uplift per annum (by 2050, 2020 prices)

45,000 More return rail trips per weekday



Package P: Wessex Thames Mass Transit

Overview

TfSE and local stakeholders are committed to providing an alternative to car use in urban centres across the area.

Mass transit options have been considered for Major Economic Hubs across the area. Enhancements include increasing the frequency, operating hours, reliability and catchment of bus services, supported with bus priority infrastructure where appropriate. Corridors with strong existing bus patronage, sufficient density and an appropriate network for bus priority include the Slough-Maidenhead-Windsor corridors, on corridors within Reading and in the Blackwater Valley – Farnham, Aldershot, Farnborough, Frimley, Camberley, Owlsmoor, Sandhurst, Yately and Blackwater.

There is a focus on ensuring Mass Rapid Transit interventions are supported by Strategic Mobility Hubs in Major Economic Hubs to provide an integrated network which facilitates seamless journeys between modes across the area.

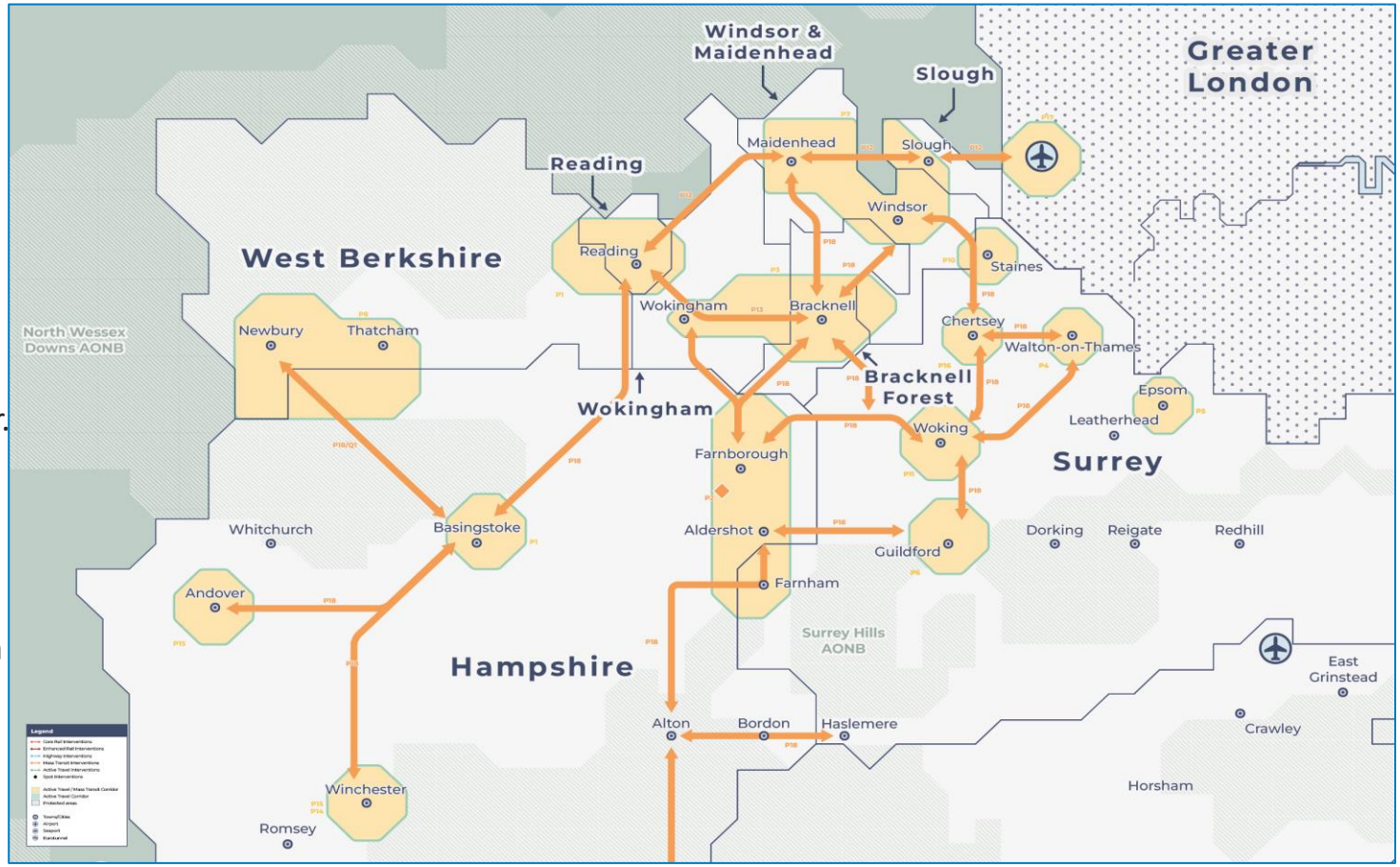
Benefits

- Improvement in the speed, frequency and connectivity of mass transit services
- Better interchange and service quality at Strategic Mobility Hubs
- Better service quality
- Significant mode shift from car to bus, and associated reduction in carbon

Modelling Results

£245m GVA uplift per annum (by 2050, 2020 prices)

225,000 More return mass transit trips per weekday



TRANSPORT FOR THE South East

Package Q: Wessex Thames Active Travel

Overview

Local Transport Authorities supports the creation of extensive walking and cycling networks that serve the requirements of local residents and connect key destinations within centres such as railway stations, schools, hospitals and promote local placemaking.

For each of the centres and corridors identified previously which stand to benefit from bus service enhancements, priority, and Mass Transit, the opportunity for a series of urban mobility interventions which increase the attractiveness of active travel have been identified. Innovations such as e-bikes now make cycling longer-distances between centres possible. Through providing segregated cycling infrastructure in line with LTN 1/20 where capacity permits, there is opportunity to make these cycle trips safer, more accessible and faster for users. Inter-urban mobility corridors can also support cycling for leisure and other purposes for those who live along or near corridors. Lastly, they can support local placemaking, with new mobility infrastructure acting as the spine which supports a transformation of public places.

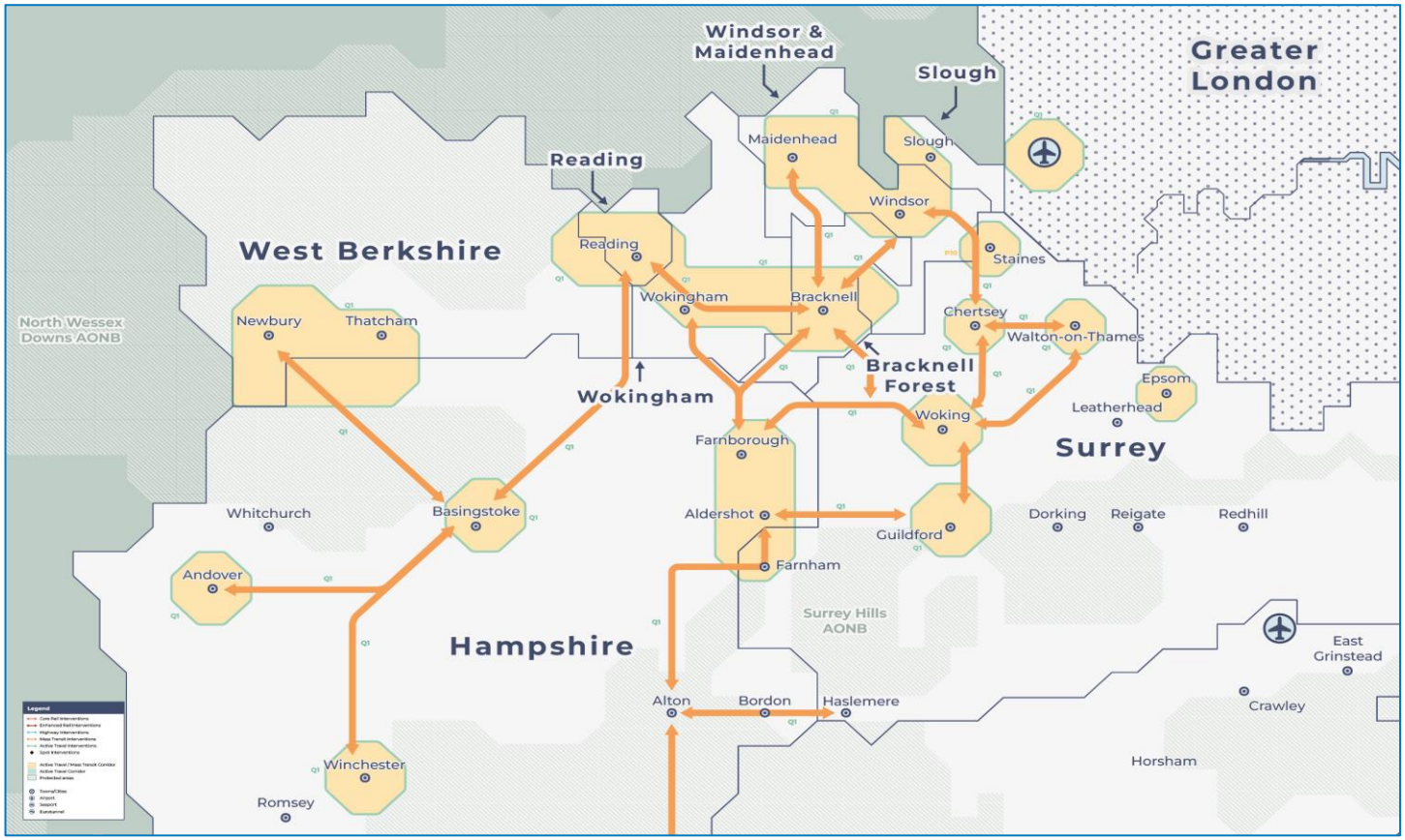
Benefits

- Significant mode shift from car to active travel, with associated decarbonisation and decongestion benefits
- Improvements in air quality
- Improvements to the urban and rural public realm, improving quality of life and unlocking regeneration opportunities

Modelling Results

£35m GVA uplift per annum (by 2050, 2020 prices)

135,000 More return active travel trips per weekday



Package S: Kent, Medway and East Sussex (KMES) Classic Rail

Overview

This package adds capacity to the classic rail network in the South East Area. It targets the areas of Kent that lie closest to London.

Areas further away from London will be served by high speed rail interventions described in the following slide.

The package includes several interventions that add capacity through additional services (e.g. Crossrail to Ebbsfleet, Thameslink to Maidstone) as well as interventions that materially increase track and platform capacity (e.g. through capacity released by the Bakerloo Line extension).

It also includes interventions that improve the integration of the rail system – notably at Ebbsfleet, Canterbury, Maidstone, and Strood – where several railway lines cross each other without providing easy interchange from one railway to another.

It also includes the introduction of passenger rail services on the Grain Branch and direct services between Gatwick Airport and Mid/East Kent.

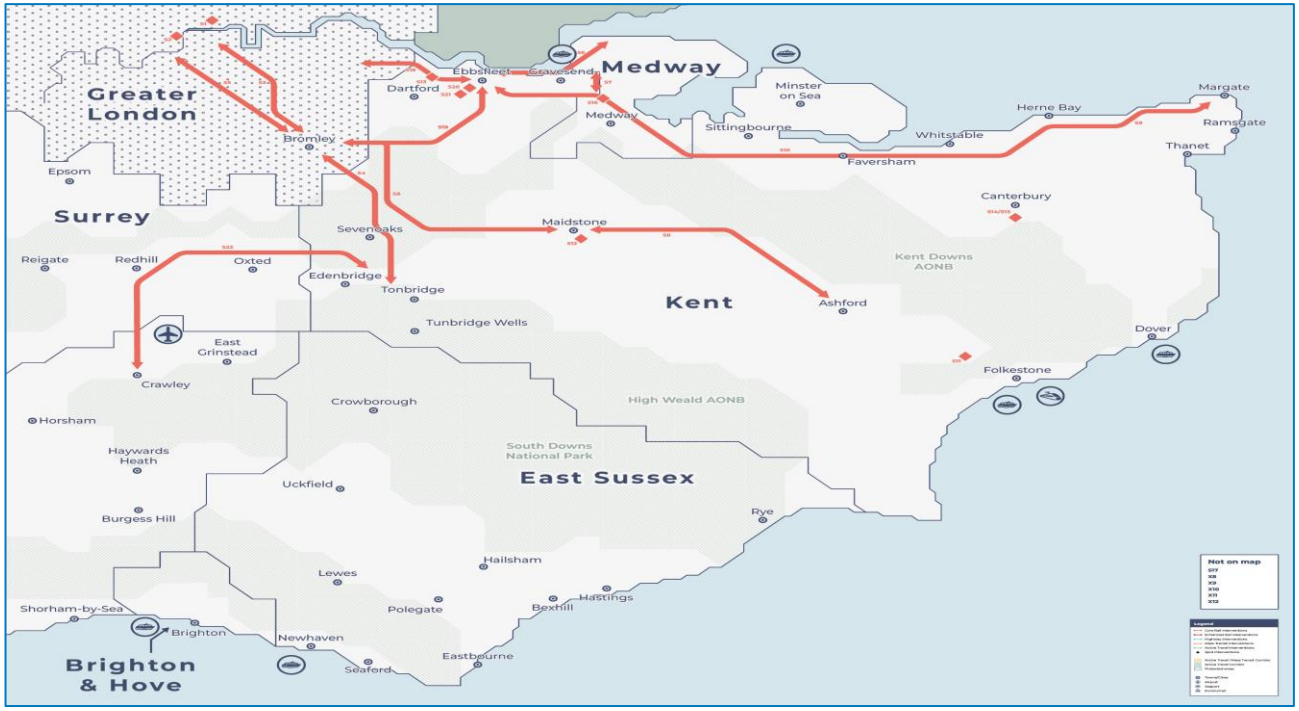
Benefits

- **Capacity** enhancements at key bottlenecks on radial corridors
- Improvements in **service frequencies**, especially for urban metro services
- Better **interchange** between rail services and other modes
- Better rail access for new/growing areas.
- Large **reduction in carbon emissions** from **mode shift** to rail.

Modelling Results

£140m GVA uplift per annum (by 2050, 2020 prices)

15,000 More return rail trips per weekday



Package T & U: KMES Rail High Speed (East) | KMES Rail High Speed (North)

Overview

These packages includes some of the more radical interventions in the long list for this study. They are based around expanding the domestic high speed service to deliver transformational improvements in journey times to Kent, Medway, and East Sussex.

The **East Package** would deliver direct High Speed services from London to Eastbourne via Ashford and Hastings, reducing journey times from Hastings/Bexhill to London by 20 minutes. It would also deliver faster journey times to Dover using a connection to HS1 at Dollands Moor, and an increase in the frequency of HS1 services to Ashford

The **North Package** aims to deliver significant improvements in connectivity to North Kent to ensure coastal communities in Medway, Swale, Canterbury, and Thanet are as well served as other parts of Kent. Several high-level options have been considered, ranging from a new link between HS1 and Medway to improvements to the North Kent Line and Rochester Bridge. The modelling represented for this package reflects one of the more interventionalist options.

There are also opportunities to replace domestic service rolling stock on HS1 and expand the fleet to capitalise on network enhancements.

Benefits

- **Transformational improvements in journey times** between London (and the rest of the UK) and the South East coast.
- Potentially **transformational improvements in capacity** between London and coastal Kent/Medway/East Sussex, delivering significant economic **boost to left behind coastal areas.**
- Large **reduction in carbon emissions** from **mode shift** and **electrification**.

Modelling Results

£350m GVA uplift per annum (by 2050, 2020 prices)

55,000 More return rail trips per weekday

TRANSPORT FOR THE South East

Package V: Kent, Medway, and East Sussex Mass Transit

Overview

This package delivers improvements to bus services in Kent, Medway, and East Sussex.

The scope for improvements and expansion are particularly strong in the North Kent and Medway areas, where high levels of growth and regeneration are expected. A step change in infrastructure and service provision should be viable thanks to the underlying demographics in this area.

This package includes an opportunity to create a new Medway River Crossing to enable faster journeys between the north and south of this conurbation by bus/mass transit and active modes (e.g. walk, wheel, cycle and microtransit such as bike hire and e-scooters).

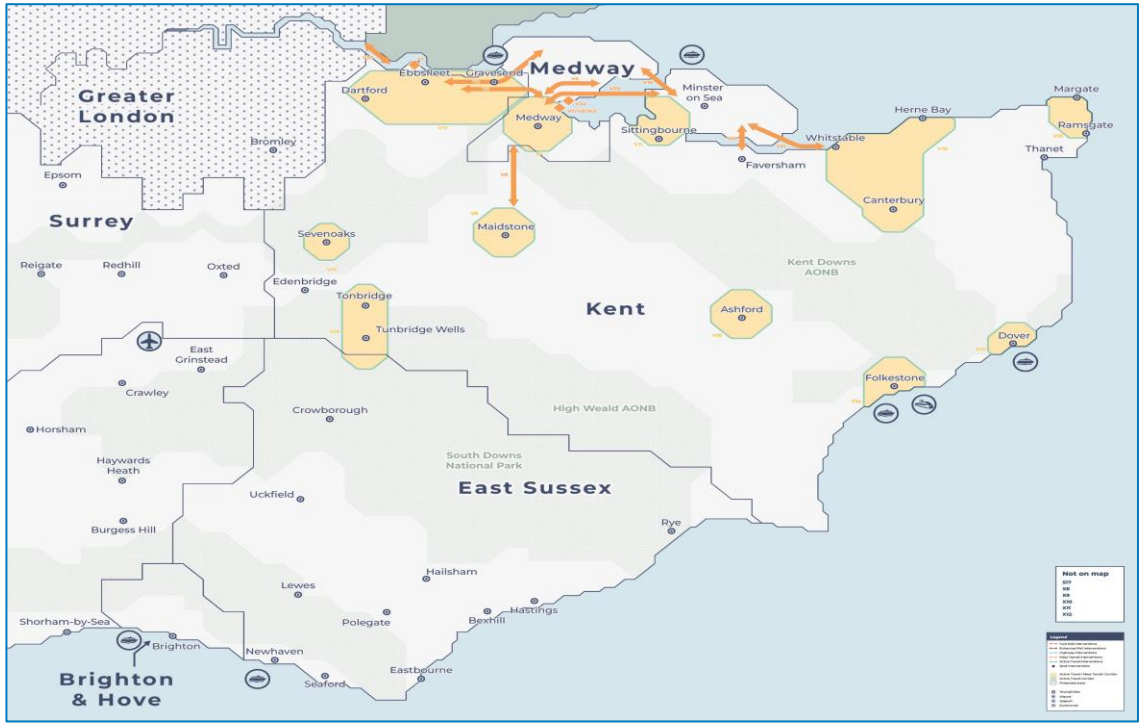
This intervention assumes all other conventional bus services in the Kent, Medway and East Sussex area experience general improvements in journey times, frequencies, and service quality.

Benefits

- **Significant improvements** in the quality, speed, and frequency of bus services in Kent, Medway, and East Sussex
- Better **interchange** between bus and rail
- Improvements in **connectivity** between **islands and peninsulas** in North Kent
- **Modal shift** from car to bus (and in some instances, ferries) reducing carbon and other emissions

Modelling Results

£45m	GVA uplift per annum (by 2050, 2020 prices)
85,000	More return mass transit trips per weekday
50,000	Fewer return car trips per weekday



TRANSPORT FOR THE South East

Package W: Kent, Medway, and East Sussex Active Travel

Overview

This package delivers general uplift in the quality of walking and cycling infrastructure, particularly in urban areas.

Kent County Council has identified inter-urban corridors on the cycling network and identified several gaps in national and regional cycle networks that many stakeholders wish to see addressed. Urban areas are identified with most need and potential for investment.

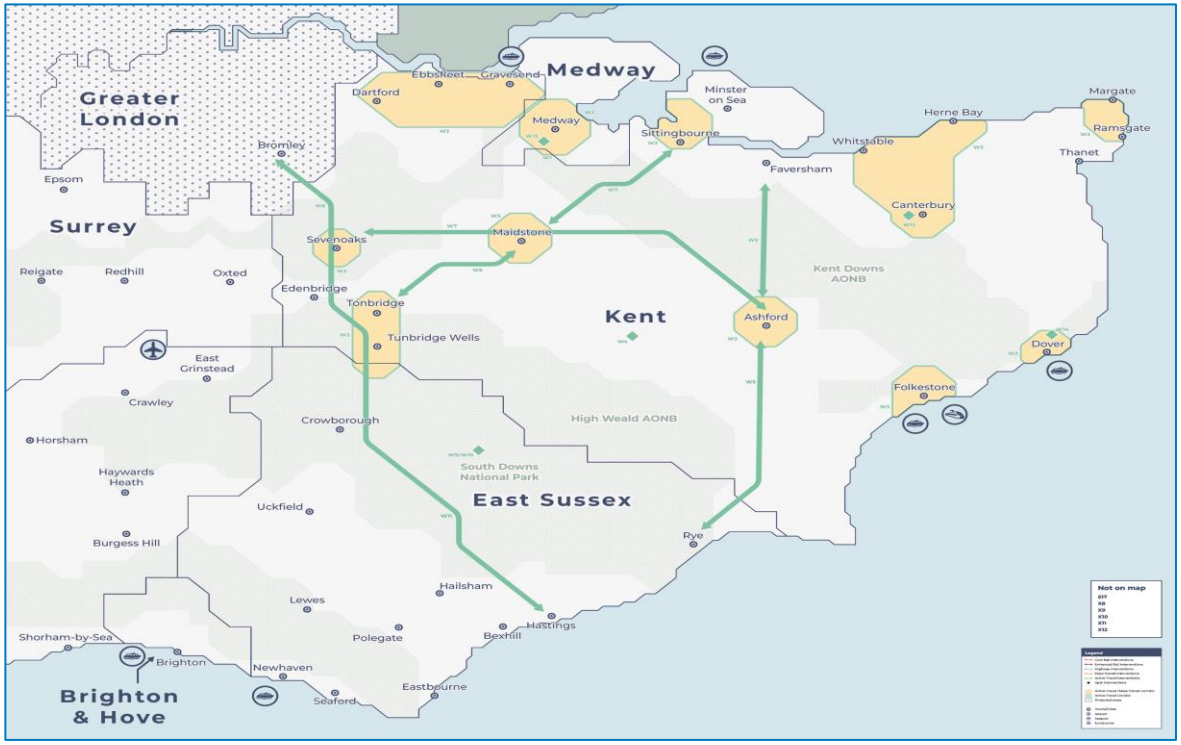
Similarly, East Sussex County Council has developed a Local Walking and Cycling Infrastructure Plan which provides details of network of routes for its main towns including Bexhill, Hastings, Battle and Rye.

Benefits

- **Material improvements to the urban realm** of urban areas, unlocking active travel and regeneration opportunities
- Improvements in **air quality** in urban areas
- Significant **mode shift** from car to active travel, with associated decarbonisation, decongestion, and health benefits

Modelling Results

£15m	GVA uplift per annum (by 2050, 2020 prices)
55,000	More return active travel trips per weekday
50,000	Fewer return car trips per weekday



TRANSPORT FOR THE South East

Global Interventions

Overview

Adding to the detail of the place-based interventions identified previously, the scope and range of modal specific global interventions first demonstrated on pg.29 will be required (at largely **transformational** levels), in order to enable a suitable trajectory to net-zero. Additional global packages are detailed overleaf.

A scalar approach was utilised within the Decarbonisation Pathways workstream to assess the level of policy ambition required for all types of modal-specific interventions presented henceforth. However, it is paramount that to enable a suitable trajectory to net-zero by 2050, all interventions must require transformation change.

Subsidising Public Transport Fares

- Effective and equitable public transport fares, incorporating Mobility as a service initiatives
- Making public transport more affordable enables a shift from private vehicles to bus and rail services

Zero Emission Vehicle Uptake

- Technological investment in enabling a fast rollout of electric vehicles, through charging infrastructure of varying types and forms
- Considerable research and development investment in enabling the wholescale rollout of electric freight vehicles
- Ban of the both the new and second-hand sale, and usage of internal combustion engine vehicles by 2030

New Mobility

- Barriers removed and policy guided to support the roll out of passenger mobility initiatives (car-sharing, ride-sharing and bike-sharing)
- Shared passenger mobility modes are accessibility and affordable to all

Virtual Living

- Infrastructural investment in high-speed broadband connectivity for all
- Full support for workers to work from home where possible
- Investment in Mobility as a service initiatives

Road User Charging

- Introduction of a progressive, national road user charging mechanism increasing the variable cost of driving, making it much-less attractive for all journey lengths
- Complemented with local demand management initiatives, including low-emission zones & demand management charges in urban centres, alongside a decrease & increase of parking spaces and their costs respectively

Integration & Access

- Incorporating public transport and active travel modes into strategically-located mobility hubs facilitates service choices
- Accessibility to high-quality, amenable and affordable public transport services is paramount when shifting from private car

Additional Global Interventions

Bus and Rapid Transit

- Infrastructural investment in Mass Rapid Transit across major economic hubs
- Segregated bus & tram infrastructure
- Increase in rural services to ensure the whole population are in the catchment of frequent and reliable bus services

Walk, Cycle and Micro-mobility

- Infrastructural investment in placemaking, localisation and public realm initiatives
- Infrastructural investment and policy changes to ensure appropriate priority is always given to these modes

Localisation

- Investment and focus on digitalization and other initiatives which support home working
- Adoption of urban design principles minimizing walk and cycle journey times, whilst increasing vehicle journey times
- Spatial planning policy initiatives requiring strong adherence to 15-minute city principles

Walk, Cycle and Micro-mobility

- Infrastructural investment in placemaking, localisation and public realm initiatives
- Infrastructural investment and policy changes to ensure appropriate priority is always given to these modes

Highway (Car trips)

- Significant road space reallocation to support other modes and local placemaking initiatives
- Significant road user charging and urban demand management policies

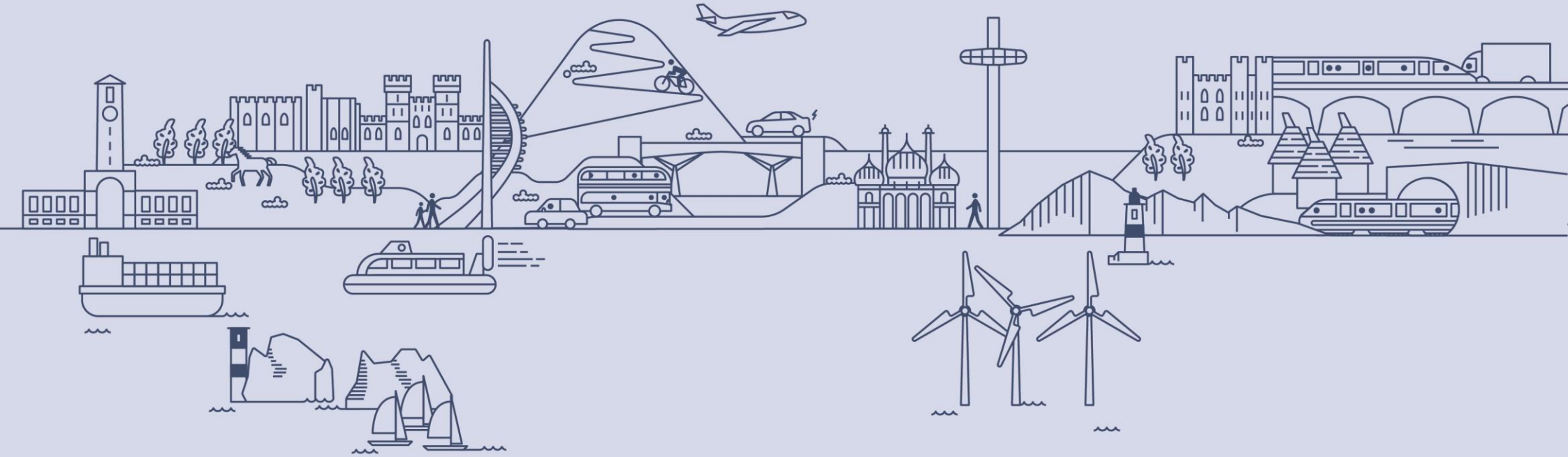
Passenger Rail

- Improvements to the accessibility and amenability of rail services
- Infrastructural improvements including new lines, higher speeds and increased capacities
- Enhancements to rolling stock, platforms and station amenities making rail travel more comfortable

Freight (Highway and Railway)

- Investment in highway schemes on key freight corridors to unlock greater road capacity for HGVs, reducing congestion
- Strong initiatives fostering the rollout and adoption of low-emissions HGVs
- Investment in electrifying rail lines, increasing railway gauges (to improve capacity) and within strategic rail freight hubs

TRANSPORT FOR THE South East



Part 6: Benefits and Costs

Modelling Approach

In 2018, Transport for the South East commissioned Steer to develop a model to test the impact of the scenarios developed in support of the development of a Transport Strategy for the South East.

This model, known as the South East Economy and Land Use Model (SEELUM), is a transport and land use model that simulates the interaction of transport, people, employers and land-use over periods of time.

SEELUM produces detailed reports on:

- changes in land-use in each zone (i.e., housing units and business premises);
- changes in households, population and the workforce in each zone;
- changes in employment (jobs filled) in each zone and the unemployment rates;
- changes on CO_2 emissions from transport activity;
- travel patterns, volumes and mode shares; and
- time savings benefits for appraisal and impacts on productivity.

To model each Package in SEELUM, adjustments were made to Active Travel Generalised Journey Times (GJTs) within and between each zone (by mode).

The Packages were modelled in SEELUM from a base year of 2018 and run for 32 years to 2050. The results are presented as a comparison to a Business as Usual Scenario (BaU), which is based on the Department for Transport's National Trip End Model (NTEM) that also projects employment and population growth to 2050.

The results of the modelling of all seven Rail Packages of Interventions is presented in **Table 6.2**.

Results presented in Table 6.2 are for all place-based packages and not just those aligned to decarbonisation, presented in the previous part.

Estimating Costs

Capital cost estimates have been prepared to a level of detail commensurate with the maturity of the design of the Packages of Interventions and are presented overleaf in Table 6.1.

Items and quantities have been priced using historic project data and industry standard published data, with adjustments made to capture the influence that quantity, access, time constraints, site location and conditions will have on labour, plant and materials input costs.

A contingency has been added for minor items that have not been measured. Allowances have been made for main contractor's preliminaries and overhead and profit, temporary works and traffic management where required. Allowances for professional fees and STATS upgrades/ relocation have also been added to the construction cost estimate. To reflect the maturity of the design a risk allowance has been applied.

Operations, Maintenance, Renewal and impacts on tax revenue are excluded from these costs.

Benefits – Global Package Interventions

Table 6.1: Global Package Interventions – Modelled Benefits

Package	Pop.	New jobs	GVA (£m)	Total CO_{2e} (tonnes)	Car Trips (weekday return)	Rail Trips (weekday return)	Bus, Mass Transit and Ferry Trips (weekday return)	Total Trips (weekday return)
Micromobility and Active Travel	500	200	-	(35,000)	(135,000)	-	(15,000)	-
Public Transport Fares	(32,000)	(300)	500	(190,000)	(315,000)	90,000	300,000	(70,000)
Road User Charging	5,400	(3,900)	(700)	(375,000)	(195,000)	10,000	25,000	(60,000)
Virtual Living	33,300	7,300	900	(750,000)	(875,000)	(90,000)	(70,000)	(1,150,000)
Combined Impacts	**7,200**	**3,300**	**700**	**(1,350,000)**	**(1,520,000)**	**10,000**	**240,000**	**(1,280,000)**

Relationship to Scenario Development

Global Package Interventions largely require the intervention of central government and its agencies, local authorities across multiple functions, the private sector, and local communities and the behavioral responses of households and workplaces. Through the relatively modest assumptions tested, approximately 10% to 15% of carbon emissions can be reduced a year by 2050. More significant policy ambition can see this increase towards about a third based on the six key area modelled.

Ultimately, it will be integrated spatial planning, digital technology, vehicle technology, and local and private sector intervention in providing attractive alternatives to private cars and goods vehicles running on fossil fuels, supported by central government regulation, policy and investment that will get us to net zero carbon.

Modelling Notes

- GVA (Gross Value Added) is GVA per annum in 2050 in 2010 prices
- Carbon emissions are CO_2 tonnes equivalent
- Cost are mid price capital cost estimates for construction in 2020 prices
- Changes in trips are weekday return trips
- Embodied carbon has not been considered

Benefits and Costs – All Place-based Packages and Global Package Interventions

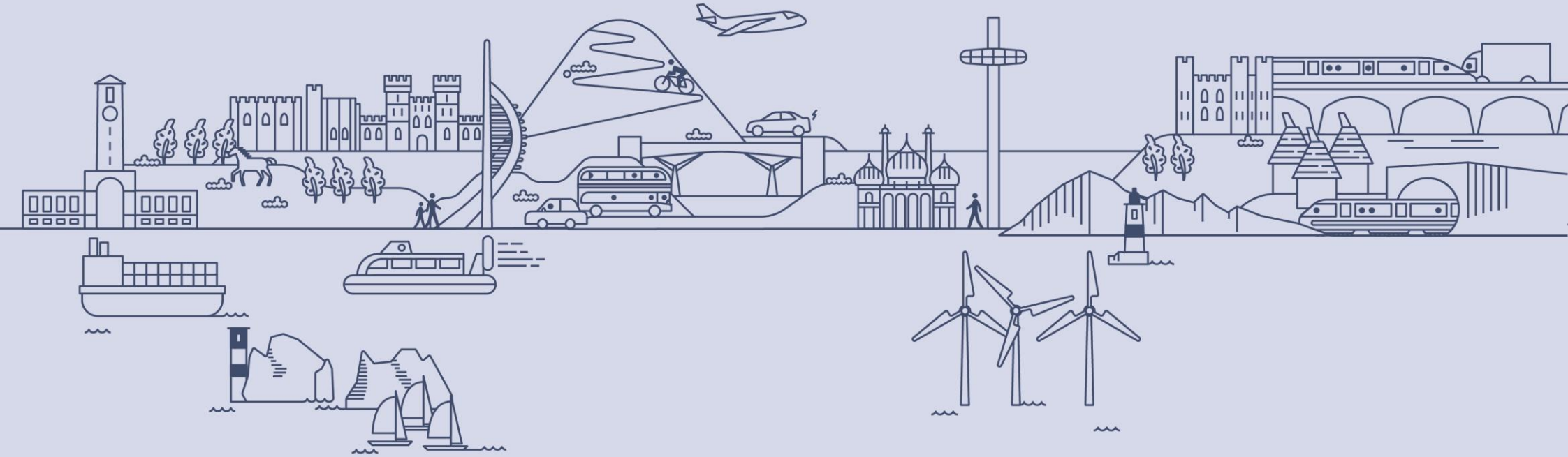
Table 6.2: Place-based Packages - Modelled Benefits and Costs

All PACKAGES	Population	New jobs	GVA (£m)	Total CO_{2e} (tonnes)	Total Trips (Daily Return)	Cost (£m)
Solent and Sussex Coast	6,400	7,900	1,250	-10,000	-10,000	12,800
London – Sussex Coast	700	1,350	615	-10,000	-10,000	3,600
Wessex Thames	7,100	5,600	1,205	-60,000	-60,000	10,400
Kent, Medway, East Sussex	28,400	8,400	745	30,000	30,000	19,400
Sum of Place-based Packages	**42,600**	**23,250**	**3,815**	**(5,000)**	**(50,000)**	**44,600**
Sum of Global Packages	**7,200**	**3,300**	**700**	**(1,350,000)**	**(1,280,000)**	**-**
Combined Impact (not phased)	**49,800**	**26,550**	**4,515**	**(1,400,000)**	**(1,330,000)**	**44,600**

Modelling Results

- Most multi-modal and all global packages decrease tailpipe CO_2e emissions.
- For packages in the Kent, Medway and East Sussex area, it is its two Highway Packages which increase emissions – the first, the Lower Thames Crossing, and the second, a series of highways interventions, many of which support the integration of the Lower Thames Crossing into Kent and movement on to Channel ports.
- The sum of emissions reduction overall is a c.15% reduction on a "Business as usual" scenario in 2050, rather than a complete reduction to net zero.
- Global Package Interventions have been tested to a relatively modest extent. Further sensitivities have seen impacts growing to a 30% reduction on the "Business as Usual" scenario.
- Therefore, there is a need to deploy further intervention, most likely resting within the scope of Global Package Interventions.
- Additionally, all packages significantly increase the number of total trips resulting, but this is complimented with strong elements of modal shift.
- However, all packages reduce the number of car trips – the majority of walk and cycle trips are made by car drivers and passengers shifting modes, with a corresponding reduction in carbon emissions.
- There is a small economic response in terms of additional development increasing housing/population and job numbers, with a corresponding uplift in GVA.

TRANSPORT FOR THE South East



Part 7: Net Zero Pathway Scenarios

Scenarios

Alignment of Scenarios with the Strategic Investment Plan

The Strategic Investment Plan includes a series of Packages of Intervention across both the area studies (i.e. place-based packages) and Global Package Interventions which align towards the principles of decarbonisation and the three modelled scenarios.

It has been identified that the SIP's Global Package Interventions prove a 15% reduction in emissions by 2050, with an opportunity to increase to 30% given modest assumptions regarding these Global Packages. These would likely form an additional reduction to the national policy trajectories.

This aligns from a policy perspective and ambition to the future scenario developed as part of *Sustainable Route to Growth*.

However, this does not get us to net-zero by 2050, and nor does the shape of the curve align to budgeting approaches reducing the total volume of emissions emitted between now and 2050.

Overview of Scenarios

In order to visualise how policy intervention packages will perform, each were modelled to determine the shape and end-result of the curve.

These interventions were grouped into three scenarios (see **Figure 7.1** and **Figure 7.2**):

- **Sustainable Futures:** with a high focus on facilitating sustainable transport through investment in services and reducing fares
- **Digital Growth:** with a intense focus on trip rate reduction (particularly travel to work), whilst enabling the utilisation of autonomous vehicles and car/lift share products
- **Sustainable Route to Growth (SRtG):** which took a combination of initiatives from both sustainable futures and digital growth

These scenarios were the result of a workshop undertaken during a TfSE Transport Strategy Working Group. This required officers from the TfSE's constituent local authorities to prioritise policy interventions based on priority and timescale of implementation. Consequentially, these scenarios were modelled based on the results of the workshop.

Developing and Assessing Scenario Interventions

Interventions modelled covered a combination of transport and other topics. In general, these modelled improvements across a variety of factors, including journey times, accessibility, connectivity and cost. The three modelled scenarios were comprised of a variety of progressive transport-planning policy intervention packages which reduced the total number of trips whilst facilitating a shift of the remainder to zero emission cars/vans, public transport and active travel. Additionally, these policy packages also included an element of discouraging private car usage.

The full set of interventions are ranked against each of the scenarios on the following page. The efficacies of each SIP-related intervention for the case of scenario development is illustrated in Appendix A Each scenario exhibited a variety of modal/topical policy ambitions ranging from a significant discouragement to a transformational improvement. Also identified are a series of commonalities across the modelled scenarios, representing the results of the transport strategy working group workshop.

Summary of Results

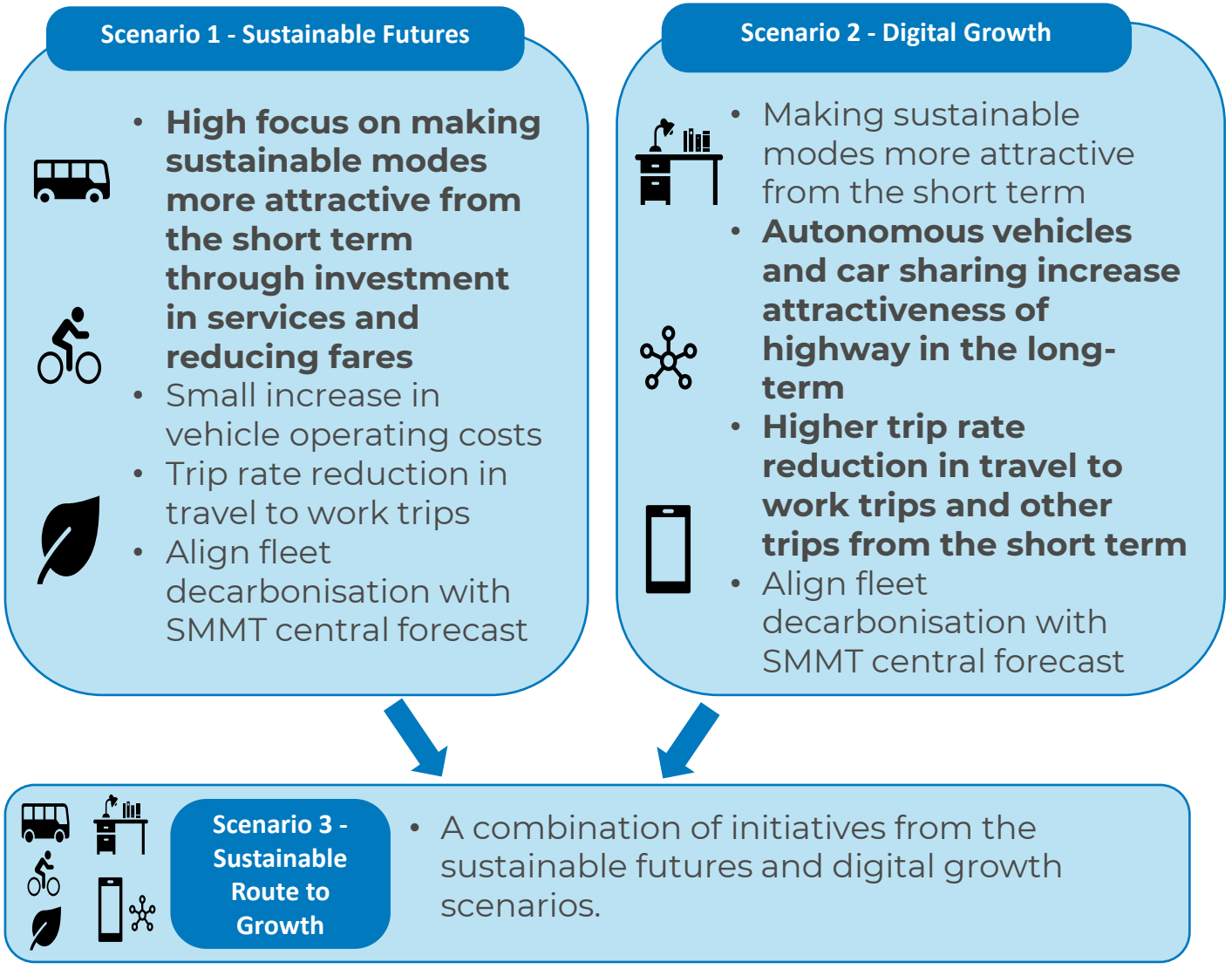
As the initial scenarios modelled expressed strong similarities, an additional set of scaled-up scenarios with the objective to reach a net-zero trajectory, were henceforth modelled.

All three of the workshopped scenarios achieved similar results (see **Figure 6.3**), with between 71-73% reductions in emitted carbon in 2050 compared to 2022, and a carbon budget spend reduction of between 31-33% vs. the business as usual between 2022-2050.

The split between total emissions reductions and carbon budget spend quantifies the constraint of the initial scenarios, demonstrating that they are far off from those scenarios modelling a carbon budgeting approach, of which the UK has a legislative commitment towards. This is detailed further on pg. 53, but determines an overall target of 95% reduction in total carbon emissions and 70% reduction in carbon budget spend.

The following two pages present underlying principles of the three scenarios, alongside their development process.

Figure 7.1: Core Scenario Principles & Development



Core Scenario Characteristics

Figure 7.2: Scenario Policy Interventions and Ambition

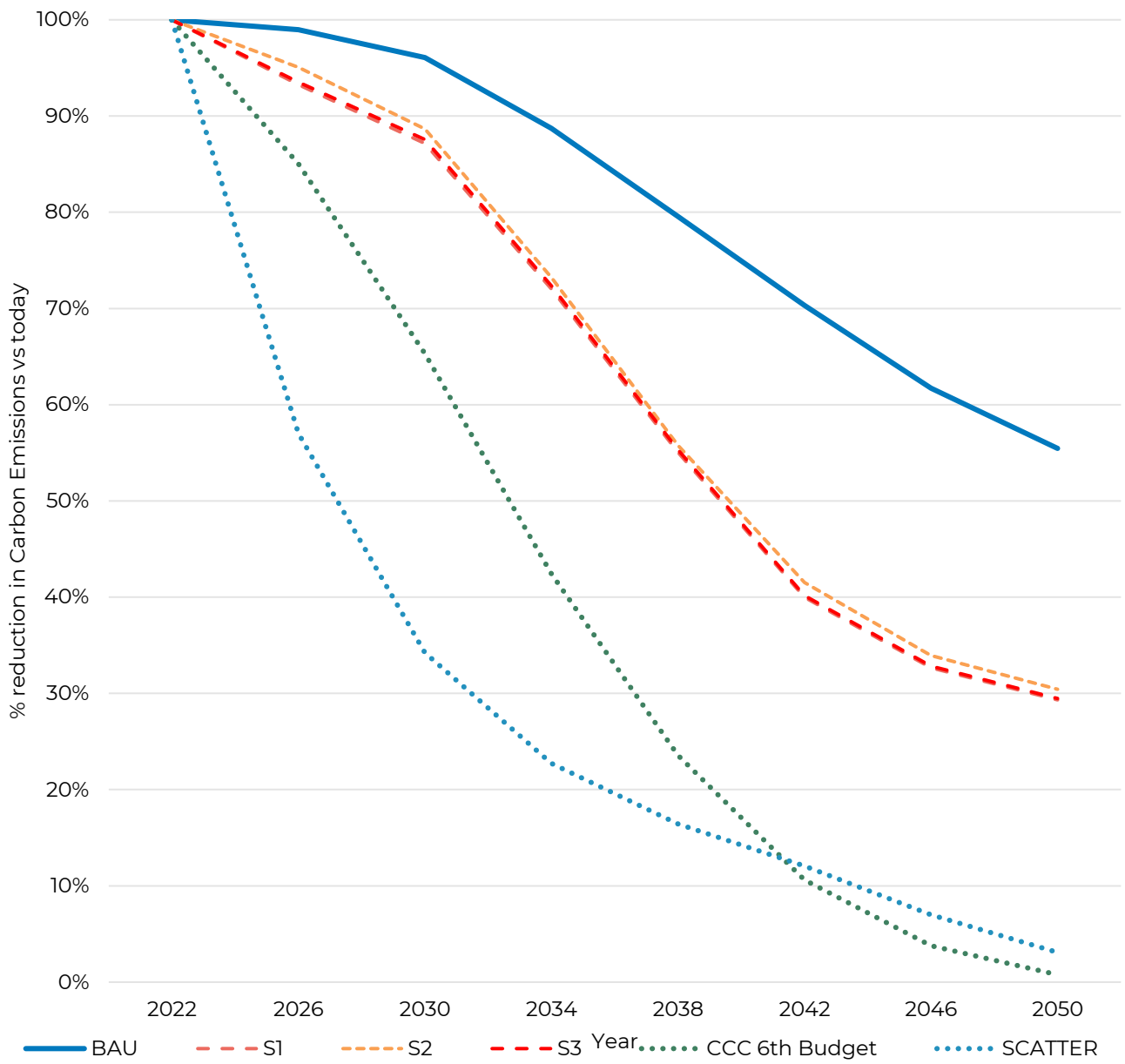
Scenario development by desired outcomes by typology	Rail	Bus	Walk	Cycle & Micro-Moblity	Shared Mobility – Passenger	Highway – Car	Highway – Freight	Demand Mgmt – Local	Demand Mgmt - National	Local-isation	Digital Connect-ivity	ZE Vehicle uptake
1. Sustainable Futures	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓	×	✓	✓	✓	✓	✓	✓✓
2. Digital Growth	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓	✓	✓	✓✓	✓✓	✓✓
3. Sustainable Route to Growth	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	×	✓	✓	✓	✓✓	✓✓	✓✓

Policy Score	Level of Policy Ambition
✓	Moderate improvement
✓✓	Significant improvement
✓✓✓	Transformational improvement
×	Moderate discouragement
××	Significant discouragement

Core Scenario Modelling Results

Figure 7.3: Core scenarios model results – reduction in carbon emissions vs. today

Scenario	Carbon emitted in 2050 (vs 2022)	Carbon Budget Spend vs BAU (2022-2050)
BAU	-45%	-
1. Sustainable Futures	-73%	-33%
2. Digital Growth	-71%	-31%
3. Sustainable Route to Growth	-72%	-32%
CCC 6th Carbon Budget Balanced Pathway	-99%	-59%
SCATTER – Stringent Pathway	-96%	-70%



Further Scenario Development

Additionally Modelled Scenarios

As a result of the first three scenarios not reaching net zero carbon, a set of five additional scenarios (presenting on the following pages in **Figure 6.4** and **Figure 6.5**) have been developed, building upon the Sustainable Route to Growth scenario, including additional policy interventions, largely aligned to increasing the extent or accelerating the delivery of different Global Package Interventions identified earlier:

4. Faster adoption and use of zero emission vehicles – all zero emission by 2050
5. Spatial planning policies and faster roll out and adoption of digital technology and remote working / virtual access to services
6. Urban demand management policies
7. National road user charging policies
8. Acceleration of all vehicles zero emission by 2040

All five of the modelled scenarios achieved much improved results in comparison to the initial three (see **Figure 7.6**), which included between 97-98% reduction in carbon emitted in 2050 vs. 2022, and a carbon budget spend reduction of between 45-68% vs. the business as usual between 2022-2050.

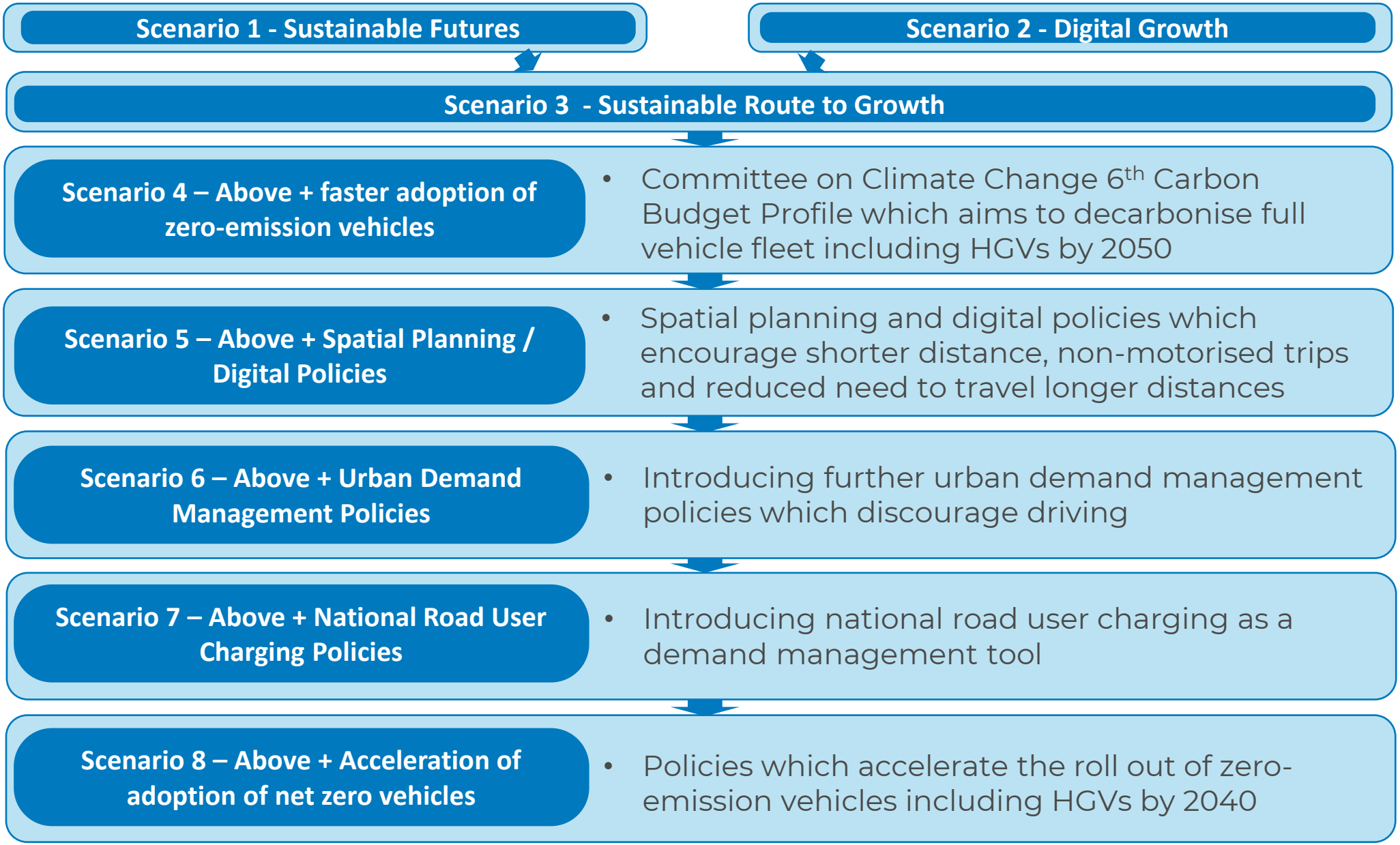
Link to Global Packages

Global Packages largely require the intervention of central government and its agencies, local authorities across multiple functions, the private sector, and local communities and the behavioural responses of households and workplaces. Through the relatively modest assumptions tested, approximately 15% of carbon emissions can be reduced a year by 2050. More significant policy ambition can see this increase towards about a third based on the six key area modelled. Ultimately, it will be integrated spatial planning, digital technology, vehicle technology, and local and private sector intervention in providing attractive alternatives to private cars and goods vehicles running on fossil fuels, supported by central government regulation, policy and investment that will get us to net zero carbon.

It is also the integration of interventions that will support the Levelling-up of our left behind communities in the region and nationally - all the more prescient as we strive to recover from the global COVID pandemic.

Further Scenarios

Figure 7.4 Additional scenario sequential development process



Further Scenario Characteristics

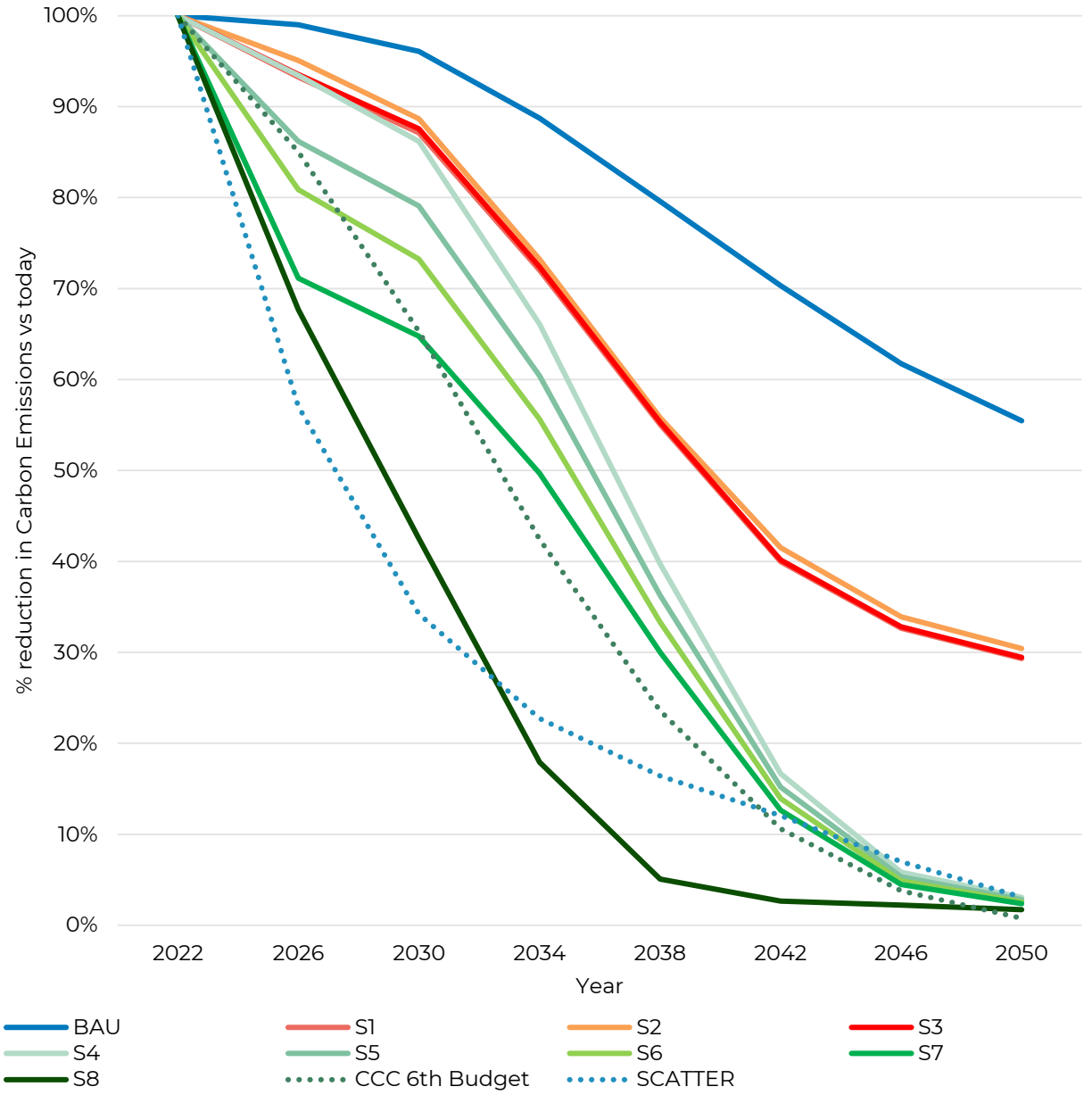
Figure 7.5: Further scenario characteristics

Scenario development by desired outcomes by typology	Rail	Bus	Walk	Cycle & Micro-Moblity	Shared Mobility – Passenger	Highway – Car	Highway – Freight	Demand Mgmt – Local	Demand Mgmt - National	Local-isation	Digital Connect-ivity	ZE Vehicle uptake
4. Above + faster adoption of zero-emission vehicles	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	×	✓✓	✓	✓	✓✓✓	✓✓✓	✓✓✓
5. Above + Spatial Planning Policies	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	×	✓✓	✓	✓	✓✓✓	✓✓✓	✓✓✓
6. Above + Urban Demand Management Policies	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	××	✓✓	✓✓✓	✓	✓✓✓	✓✓✓	✓✓✓
7. Above + National Road User Charging Policies	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	××	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
8. Above + Acceleration of adoption of net zero vehicles	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	××	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓✓

Further Scenario Modelling Results

Figure 7.6: Additionally Modelled Scenarios

Scenario	Carbon emitted in 2050 (vs 2022)	Carbon Budget Spend vs BAU (2022-2050)
BAU	-45%	-
1. Sustainable Futures	-73%	-33%
2. Digital Growth	-71%	-31%
3. Sustainable Route to Growth	-72%	-32%
4. Above + faster adoption of zero-emission vehicles	-97%	-45%
5. Above + Spatial Planning Policies	-97%	-49%
6. Above + Urban Demand Mgmt Policies	-98%	-52%
7. Above + National Road User Charging Policies	-98%	-56%
8. Above + Acceleration of net zero vehicles by 2040	-98%	-68%
CCC 6th Carbon Budget Balanced Pathway	-99%	-59%
SCATTER – Stringent Pathway	-96%	-70%



Carbon Budgeting

Overview

It has been determined that the UK's legislative context prioritises a carbon budgeting approach in terms of decarbonisation, in order to effectively manage emissions in line with the Climate Change Committees approach.

Figure 6.7 overleaf illustrates a comparison between the following budget-based trajectories and scenarios:

- **Business as usual** – Do nothing
- **National policies** – CCC 6th Carbon Budget Balanced Pathway and SCATTER Stringent
- **Scenario 3** – Sustainable Route to Growth (SIP Alignment)
- **Scenario 7** – Sustainable Route to Growth Route to Growth + Net-zero 2050 + Additional Policies
- **Scenario 8 – Scenario 7 + Net-zero 2040**

The resultant budget periods thus conclude that ambitious policy packages are required in order to facilitate the UK's adoption of CCC's carbon budgeting periods.

Trajectories and Scenarios

As illustrated overleaf, the business as usual trajectory does not help align with the carbon budgeting approach for any of the allocated periods, demonstrating an excess level of carbon emissions below the curve.

Additionally, the interventions contained within the SIP, approximately constituting Scenario 3 Sustainable Route to Growth, achieves improvements over business as usual, but similarly does not align with the carbon budgeting approach.

Scenarios 7 and 8 both exhibit carbon budgets with much improved alignment to trajectories set out by the CCC and SCATTER.

Carbon Budgeting Alignment

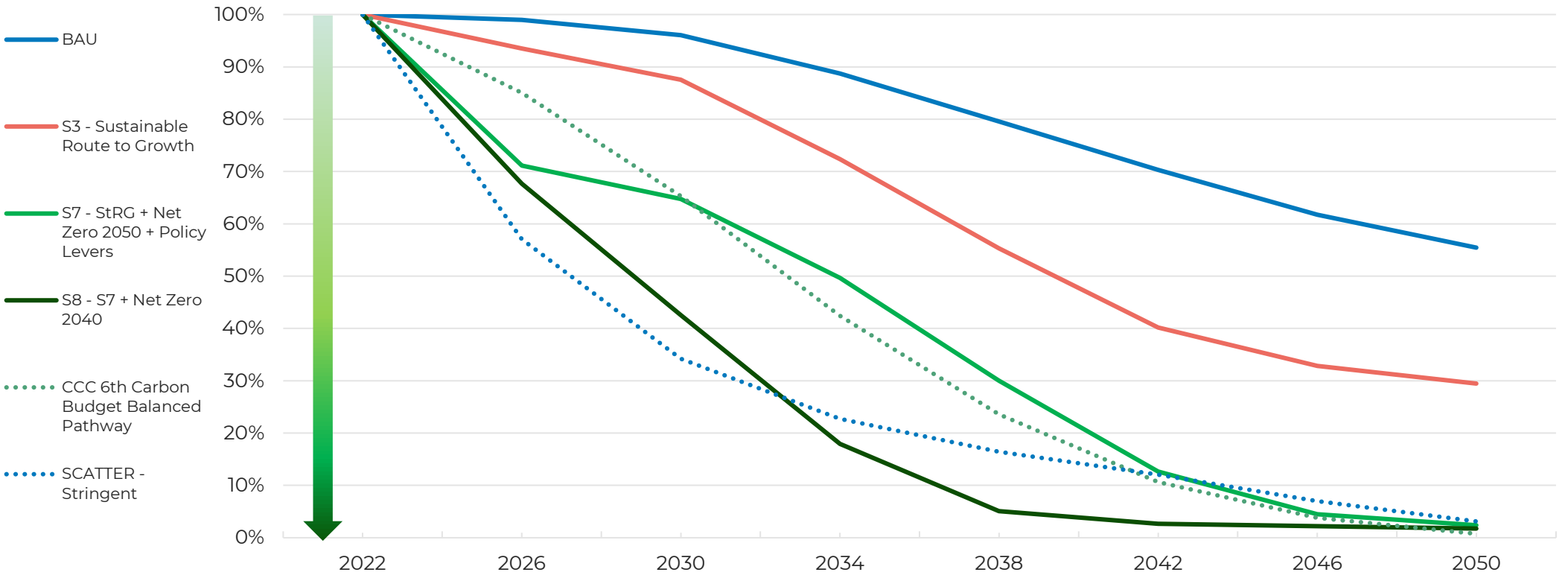
Only the scenarios constituting the most ambitious policy packages provide an ample level of carbon reduction aligning with the UK's carbon budgeting approach.

As set out within Figure 6.6, Scenario 7 corresponds to a 56% reduction in the carbon budget spend between 2022-2050 in relationship to the BAU, whilst Scenario 8 corresponds to a 68% reduction.

These reductions in carbon spend do not appear to align with the percentage reductions outlined within the net-zero trajectories to 2050, which illustrate a 98% reduction in comparison to 2022, for both Scenarios 7 and 8 respectively. They do, however provide the opportunity to facilitate the carbon budgeting approach by reducing the volume under the curve quickly enough.

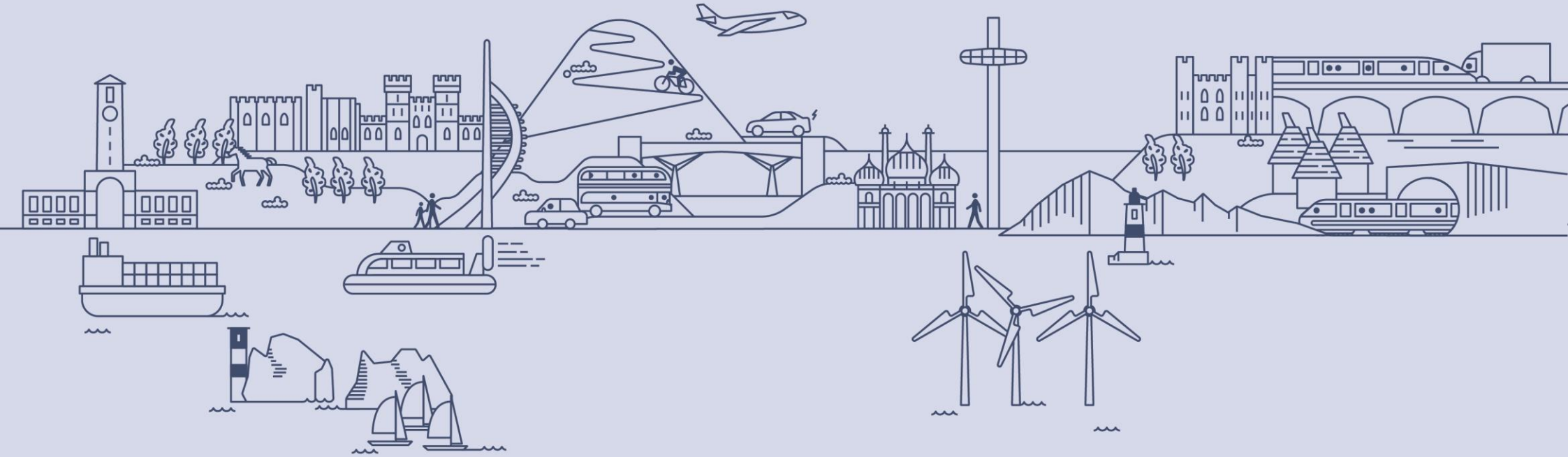
Carbon Budget Comparison

Figure 7.7: Scenario Carbon Budget Comparison



Scenario	Carbon Budget Spend vs BAU						
	2022-2026	2027-2030	2031-2034	2035-2038	2039-2042	2043-2046	2047-2050
S3. Sustainable Route to Growth	-7%	-13%	-14%	-26%	-42%	-49%	-50%
S7. SRtG + Net Zero 2050 + Additional Policies	-21%	-36%	-38%	-54%	-76%	-89%	-95%
S8. Above + Net Zero 2040	-23%	-51%	-59%	-79%	-96%	-97%	-97%
CCC 6th Carbon Budget Balanced Pathway	-9%	-27%	-49%	-69%	-85%	-94%	-98%
SCATTER – Stringent Pathway	-29%	-58%	-74%	-81%	-86%	-90%	-93%

TRANSPORT FOR THE South East



Part 8: Delivery

Introduction

TfSE will work with partners to deliver the Global Interventions, infrastructure and services outlined in the previous Part.

The delivery of the packages of interventions will need consider:

- timing and phasing;
- roles and responsibilities;
- funding and financing; and
- monitoring and evaluation.

This part provides an overview of a suggested approach to the topics listed above.

Timing and Phasing

All packages have been identified as being deliverable and phased for delivery. Typical timescales for delivery can be found in **Table 8.1** overleaf.

Some interventions often present "quick wins" for Local Transport Authorities and other delivery parents.

Delivery, will be dependent on each individual intervention and its local context, the complexity of the scheme, the stage of scheme and business case development, as well as funding.

Roles and Responsibilities

As outlined in the Introduction, local transport authorities will typically be responsible for delivering the Area Study Packages and Global Interventions, with support from partners where necessary.

TfSE's role will reflect its current and likely future status as an established Sub National Transport Body for South East England. It is assumed there would be no significant change in the current distribution of powers, funding mechanisms, and democratic accountability in South East England at a local level.

TfSE's role will therefore focus on building consensus and capacity to deliver its transport strategy through others. It will tailor its approach to the mode, scale, and level of development of each prioritised intervention.

A suggested approach for delivering the Packages of Interventions in terms of roles and responsibilities – including Global Policy Interventions – is provided in **Table 8.2**.

Timing and Phasing

Table 8.1: Timing and Phasing of different intervention type

Category	Sub Category	Timeframe	Implementation
Rail	New Offline Rail Infrastructure	15-20 years	5 years
Rail	New Online Rail Infrastructure	5-10 years	2 years
Rail	Service Improvement	2-7 years	1 year
Rail	Reinstating Line	10-15 years	4 years
Rail	Level Crossing Removal	5-7 years	1 year
Bus, Ferry, Mass Transit, Shared Mobility	New BRT/MRT	5-10 years	3 years
Bus, Ferry, Mass Transit, Shared Mobility	New Ferry/Waterway	5-8 years	2 years
Bus, Ferry, Mass Transit, Shared Mobility	Service Improvement	2-5 years	1 year
Bus, Ferry, Mass Transit, Shared Mobility	New Strategic Mobility Hub	3-5 years	2 years
Bus, Ferry, Mass Transit, Shared Mobility	Infrastructure Improvement	3-5 years	1 year
Active Travel and Micromobility	New Cycleway/Footways	2-5 years	1 year
Active Travel and Micromobility	Improved Cycleways/Footways	1-3 years	1 year
Active Travel and Micromobility	Service Improvement	0-2 years	1 year
Active Travel and Micromobility	Mobility Hubs	2-3 years	1 year
Active Travel and Micromobility	Online Road Improvements	2-3 years	1 year
Active Travel and Micromobility	Offline Road Improvements	3-5 years	1 year
Active Travel and Micromobility	New Cycleways/Footways	3-5 years	1 year

Roles and Responsibilities (contd.)

Table 8.2: Roles and Responsibilities – global packages

Intervention	Potential Scheme Promoter	TfSE Role
Global Package - lower public transport fares	• Central government (e.g. Department for Transport) / Local Authorities	• Stakeholder engagement • Pre-feasibility work and funding for relevant scheme promoters, likely delivery partners and other key stakeholders • Business case development and support, including use of and providing access to TfSE's emerging analytical framework • Advocacy and securing funding
Global Package – active travel (e.g. delivery of LCWIPs, trends in micro-mobility, wider behavioural change programmes)	• Local Transport Authorities	• Pre-feasibility work and funding for relevant scheme promoters, likely delivery partners and other key stakeholders • Business case and scheme development and support, including use of and providing access to TfSE's emerging analytical framework • Advocacy and securing funding
Global Package – national road user charging	• Central government (e.g. Department for Transport)	• Further strategy development • Stakeholder engagement • Pre-feasibility work • Advocacy
Global Package – integrated spatial and transport planning	• Central government (e.g. Department for Transport and Department for Levelling up, Housing and Communities) / Local Transport Authorities / Local Planning Authorities	• Stakeholder engagement • Pre-feasibility work • Use of TfSE's emerging analytical framework • Advocacy
Global Package – digital technology and use of remote working and virtual access to services	• Central government (e.g. Department for Transport and Department for Culture, Media, Sports and Digital) / Local Authorities / Private Sector	• Further strategy development • Stakeholder engagement • Pre-feasibility work • Business case development and support • Advocacy and securing funding
Global Package – decarbonisation: faster adoption and regulation for zero emission vehicles	• Central government (e.g. Department for Transport and Department for Business, Environment and Industrial Strategy) / Local Authorities / Private Sector	• Further strategy development • Stakeholder engagement • Pre-feasibility work • Business case and scheme development and support, including use of and providing access to TfSE's emerging analytical framework • Advocacy and securing funding

Roles and Responsibilities (contd.)

Table 8.2: Roles and Responsibilities - rail

Intervention	Potential Scheme Promoter	TfSE Role
Passenger rail services that can be introduced without new infrastructure, but which will likely require government support and/or capacity allocation within a passenger service contract (or franchise)	• Today: Department for Transport • Future: Great British Railways	• Stakeholder engagement between central government, operators and local partners • Business case development, including use of and providing access to TfSE's emerging analytical framework • Advocacy and securing funding
Passenger rail services that can be introduced without new infrastructure, and without central government intervention (e.g. more international services to Mainland Europe, more freight services).	• Open Access Operators	• Stakeholder engagement with operators, local partners and central government • Use of and providing access to TfSE's emerging analytical framework • Advocacy
For passenger or freight rail services requiring new infrastructure (e.g. high speed services to Hastings)	**Schemes under development**	
	• Department for Transport (very large projects e.g. Crossrail) • Network Rail (most schemes e.g. Croydon Area Remodelling)	• Stakeholder engagement with central government and local partners • Business case and scheme development and support, including use of and providing access to TfSE's emerging analytical framework if at an earlier stage of development • Advocacy and securing funding
	Schemes not currently under development	
	• Likely Network Rail and, later on, Great British Railways • TfSE could be a joint scheme promoter	• Stakeholder engagement with central government and local partners • Pre-feasibility work • Business case and scheme development and support, including use of and providing access to TfSE's emerging analytical framework • Advocacy and securing funding

Roles and Responsibilities (contd.)

Table 8.2: Roles and Responsibilities – bus, ferry, mass transit and shared mobility

Intervention	Potential Scheme Promoter	TfSE Role
Mass Transit services that can be introduced without new infrastructure, but which will likely require local government support.	• Local Authority • TfSE could be a joint scheme promoter	• Stakeholder engagement between central government, operators and local partners • Business case development, including use of and providing access to TfSE's emerging analytical framework • Advocacy and securing funding
Mass Transit services that can be introduced without new infrastructure, and without Central Government Intervention (e.g., more Fastrack services).	• Local Authority • TfSE could be a joint scheme promoter	• Stakeholder engagement with operators, local partners and central government • Use of and providing access to TfSE's emerging analytical framework • Advocacy
For Mass Transit services requiring new infrastructure (e.g. the larger mass transit interventions/networks proposed in the South East	**Schemes under development**	
	• Department for Transport (very large projects) • Local Transport Authorities (smaller schemes e.g. HIF)	• Stakeholder engagement with central government and local partners • Business case and scheme development and support, including use of and providing access to TfSE's emerging analytical framework if at an earlier stage of development • Advocacy and securing funding
	Schemes not currently under development	
	• Local Transport Authorities • TfSE could be joint scheme promoter	• Programme management, including stakeholder engagement with local partners and operators • Pre-feasibility work • Potential joint scheme promotion • Business case and scheme development and support, including use of and providing access to TfSE's emerging analytical framework • Advocacy and securing funding

Roles and Responsibilities (contd.)

Table 8.2: Roles and Responsibilities – active travel and micromobility

Intervention	Potential Scheme Promoter	TfSE Role
Active travel packages	• Local Transport Authorities / Active Travel England / Sustrans National Highways / TfSE	• Stakeholder engagement, where appropriate, with local partners, Sustrans, National Highways and central government • Pre-feasibility work • Potential joint scheme promotion • Business case and scheme development and support, including use of and providing access to TfSE's emerging analytical framework • Advocacy and securing funding

Other Delivery Considerations

Funding and Financing

The Strategic Investment Plan will consider funding and financing options in detail.

This topic is are best considered from a pan-regional, multi-modal perspective, as there may be opportunities for developing linkages between modes at a local level.

Ultimately, a Full Business Case will need to be developed for each intervention, and this will be instrumental in making the case for investment. The best way of securing funding is, therefore, to prioritise those schemes that offer the most compelling case for intervention.

Funding for modal shift-related infrastructure can be sourced from:

- central government funding;
- central government loans/bonds;
- local government contributions (e.g., Workplace Parking Levy, Business Rate Supplement); and
- private investment to authorities (e.g. developer contributions – s106 & CIL).

Additional funding sources could include:

- Council Tax and Business Rates (including precepts);
- borrowing against future revenues;
- land value capture;
- alternative income streams (e.g. advertising); and
- parking revenue and road pricing hypothecation).

Given the scale of investment proposed and the range of transport infrastructure interventions, a portfolio of funding sources will be required reflecting the nature of beneficiaries and the criteria for the funds.

Governance

TfSE and local transport authorities should establish appropriate governance to oversee the development, delivery, and benefits realisation arising from interventions included in this strategy (particularly the larger and/or more complex interventions). The arrangements will vary according to the type of intervention and its stage of development.

Monitoring and Evaluation

A selection of potentially suitable KPIs for monitoring and evaluation the Packages of Interventions in this Plan are presented in **Table 8.3** on the following pages.

In addition, **Appendix A** and **Appendix B** are high level toolkits for A) the scale of policy ambition required to meet net zero carbon; and B) how areas of intervention may need to vary or be customised subject to a framework of people, place and movement typologies – that is, the efficacy or potential of different areas of intervention to effect reductions in carbon emissions.

Theory of Change Monitoring and Evaluation Framework

Table 8.3: Key Performance Indicators – rail

Inputs	Outputs	Outcomes	Impacts
• **Integrated planning** for transport, land use and wider policy • **Policy and guidance** shaping the nature of the interventions developed • **Funding** invested in rail • **Staff resource** to create, design and deliver schemes	• **Delivery of Global Policy Interventions:** reduction in public transport fares • **Delivery of rail Interventions:** capacity (seats, services per hour), and connectivity (better journey times, frequencies, direct/indirect services, 'turn up and go' service, internet connectivity)	• **Journey Time/Reliability:** improvements for specific groups, perturbation recovery • **Demand:** increased public transport usage • **Modal shift**: public transport mode share increased, move to non-caron emitting transport modes • **Resilience and performance**: Operating performance indicators (e.g. minutes delay/early, cancelations, etc.) • **Quality**: Customer Satisfaction Surveys, Service Quality Regimes, Mystery Shopper Regimes, other "trust" related/reliable indicators, enhanced interchange • **Accessibility**: improvement for all passengers, especially people with protected characteristics. number of fully accessible stops and stations, portion of buses, ferries, trams and other vehicles that are fully accessible • **Affordability**: Affordable fares for all, new products to make attractive • **Revenue**: Revenue raised per annum	• **Reduced carbon emissions to net-zero:** reduced trip rates, higher sustainable transport mode share, fewer private vehicle kilometres, lower or zero emission per vehicle kilometre • **Productivity**: Boosted through better skills matching, knowledge sharing and agglomeration • **Reduce poverty:** for all residents and enable the "levelling up" of socioeconomic outcomes. • **More financially sustainable public transport**: Portion of operating costs recovered through revenue • **Realisation of TfSE's Vision and Objectives** presented in Part 4 of this Plan • **Resolution of the Problem Statements** identified in Part 4 of this Plan

Theory of Change Monitoring and Evaluation Framework (contd.)

Table 8.3: Key Performance Indicators – bus, ferry, mass transit and shared mobility

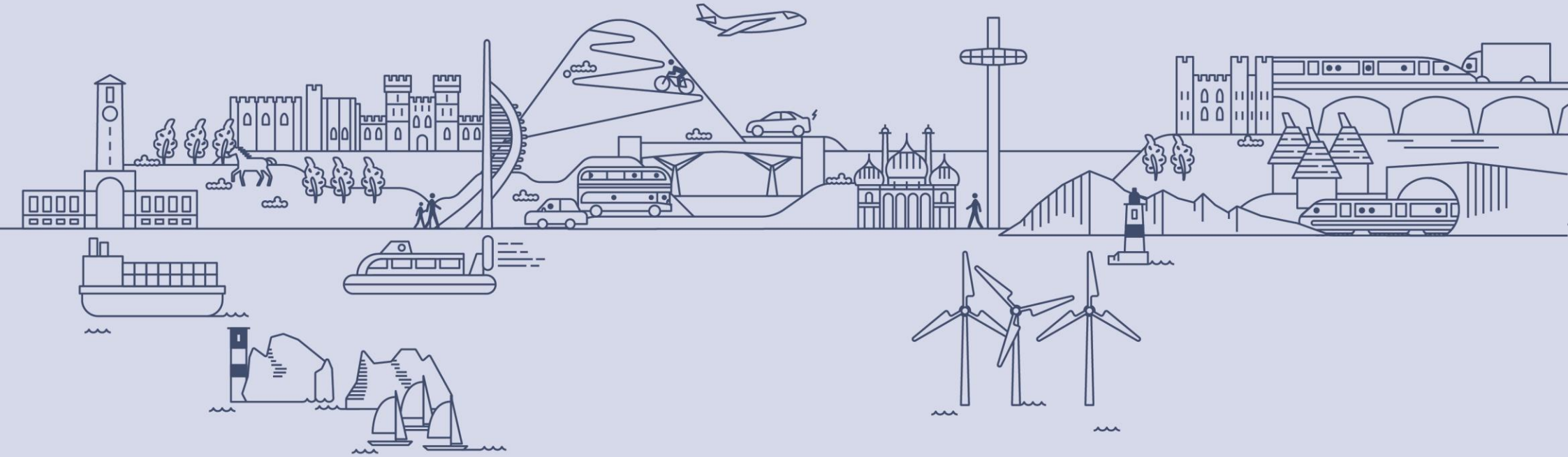
Inputs	Outputs	Outcomes	Impacts
• **Integrated planning** for transport, land use and wider policy • **Policy and guidance** shaping the nature of the interventions developed • **Funding** invested in bus, ferry, mass transit and shared mobility • **Staff resource** to create, design and deliver schemes	• **Delivery of Global Policy Interventions:** reduction in public transport fares • **Delivery of bus, ferry, mass transit and shared mobility Interventions:** capacity (seats, services per hour), and connectivity (better journey times, frequencies, direct/indirect services, 'turn up and go' service, internet connectivity)	• **Journey Time/Reliability:** improvements for specific groups, perturbation recovery • **Demand:** increased public transport usage • **Modal shift**: public transport mode share increased, move to non-caron emitting transport modes • **Resilience and performance**: Operating performance indicators (e.g. minutes delay/early, cancelations, etc.) • **Quality**: Customer Satisfaction Surveys, Service Quality Regimes, Mystery Shopper Regimes, other "trust" related/reliable indicators, enhanced interchange • **Accessibility**: improvement for all passengers, especially people with protected characteristics. number of fully accessible stops and stations, portion of buses, ferries, trams and other vehicles that are fully accessible • **Affordability**: Affordable fares for all, new products to make attractive • **Revenue**: Revenue raised per annum	• **Reduced carbon emissions to net-zero:** reduced trip rates, higher sustainable transport mode share, fewer private vehicle kilometres, lower or zero emission per vehicle kilometre • **Productivity**: Boosted through better skills matching, knowledge sharing and agglomeration • **Reduce poverty:** for all residents and enable the "levelling up" of socioeconomic outcomes. • **More financially sustainable public transport**: Portion of operating costs recovered through revenue • **Realisation of TfSE's Vision and Objectives** presented in Part 4 of this Plan • **Resolution of the Problem Statements** identified in Part 4 of this Plan

Theory of Change Monitoring and Evaluation Framework (contd.)

Table 8.3: Key Performance Indicators – active travel, micromobility and demand management

Inputs	Outputs	Outcomes	Impacts
• **Integrated planning** for transport, land use and wider policy • **Policy and guidance** shaping the nature of the interventions developed • **Funding** invested in Active Travel and Micromobility • **Staff resource** to create, design and deliver schemes	• **Delivery of Global interventions:** including national and local road user charging, increased digital connectivity, and accelerated roll-out and take-up of active travel, shared mobility, and micro-transit solutions • **Delivery of Active Travel, Public Realm and Micromobility Interventions**: kilometres of safe and convenient routes; number of cycle hubs and parking; number of public transport hubs well served by active travel routes; number of behavioural change initiatives delivered.	• **Trip rates:** reduced demand for travel • **Increases in Active Travel and Micromobility**: More people are walking, cycling or using micromobility due to new infrastructure • **Motor traffic volumes reduced:** Due to fewer people are driving shorter trips (or driving less often) • **Improved connectivity**: Increased ability for people to access local services by walking, cycling or micromobility • **Increased accessibility to public transport:** Greater access to public transport as part of multi-modal journeys	• **Reduced carbon emissions to net-zero:** reduced trip rates, higher sustainable transport mode share, fewer private vehicle kilometres, lower or zero emission per vehicle kilometre • **Improved air quality:** Due to fewer people driving and reduction in congestion • **Reduced congestion:** Due to fewer people driving local journeys • **Road safety improved:** Due to high quality routes protecting people cycling from motor traffic • **Public health improved:** Due to more people getting daily exercise while using Active Travel or Micromobility modes • **Realisation of TfSE's Vision and Objectives** presented in Part 3 of this Plan • **Resolution of the Problem Statements** identified in Part 4 of this Plan

TRANSPORT FOR THE South East



APPENDIX A – MODAL & TOPICAL POLICY SCENARIO TOOLKIT

Policy Development – Scenario Characteristics

Scenario development by desired outcomes by typology	Rail	Bus	Walk	Cycle & Micro-Moblity	Shared Mobility – Passenger	Highway – Car	Highway – Freight	Demand Mgmt – Local	Demand Mgmt - National	Local-isation	Digital Connect-ivity	ZE Vehicle uptake
1. Sustainable Futures	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓	×	✓	✓	✓	✓	✓	✓✓
2. Digital Growth	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓	✓	✓	✓✓	✓✓	✓✓
3. Sustainable Route to Growth	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	×	✓	✓	✓	✓✓	✓✓	✓✓
4. Above + faster adoption of zero-emission vehicles	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	×	✓✓	✓	✓	✓✓✓	✓✓✓	✓✓✓
5. Above + Spatial Planning Policies	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	×	✓✓	✓	✓	✓✓✓	✓✓✓	✓✓✓
6. Above + Urban Demand Management Policies	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	××	✓✓	✓✓✓	✓	✓✓✓	✓✓✓	✓✓✓
7. Above + National Road User Charging Policies	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	××	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
8. Above + Acceleration of adoption of net zero vehicles	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓	××	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓✓

Policy Development – Rail

Policy Score	Desired outcomes	Desired outputs	Interventions to achieve desired outcomes
✓	• Moderate increase in rail patronage from new journeys and modal shift from highway journeys	• Moderate increase in the frequency of rail services provided across all routes • Moderate reduction in rail journey times and interchange wait times • Moderate increase in the reliability and comfort of rail services	• Signalling and timetable optimisation initiatives enabling more services to be operated more reliably • Investment in improving the passenger experience including the rolling stock, station assets • Investment in initiatives such as integrated ticketing, wayfinding and passenger information
✓✓	• Significant increase in rail patronage from new journeys and modal shift from highway journeys	• Significant increase in the frequency of rail services provided across all routes • Significant reduction in rail journey times and interchange wait times • Significant increase in the reliability and comfort of rail services	• *Increased investment in the above +* • Targeted infrastructure investment to overcome known bottlenecks to unlock greater capacity on heavily utilised railway lines • Ensuring railway fares are competitive vs other modes
✓✓✓	• Transformational increase in rail patronage from new journeys and modal shift from highway journeys	• Transformational increase in the frequency of rail services and reduction in journey times provided across all routes • The introduction of new routes which increases the catchment of users who have access to a direct, competitive useful rail service • Transformational increase in the reliability and comfort of rail services	• *Increased investment in the above +* • Transformational infrastructure investment to upgrade existing railway lines and open new routes which ensure rail is a competitive option vs other modes for all medium and longer-distance journeys

Policy Development – Bus and Mass Rapid Transit

Policy Score	Desired outcomes	Desired outputs	Interventions to achieve desired outcomes
✓	• Moderate increase in bus/MRT patronage from new journeys and modal shift from highway journeys	• Moderate increase in the coverage and frequency of bus/MRT services provided facilitating a turn-up and go service on major corridors • Moderate reduction in journey times and interchange wait times • Moderate increase in the reliability and comfort of services	• Investment in expanding the bus fleet and improving the comfort and reliability of the bus fleet • Investment in bus infrastructure, including interchanges. • Investment in initiatives such as integrated ticketing, wayfinding and passenger information
✓✓	• Significant increase in bus/MRT patronage from new journeys and modal shift from highway journeys	• Significant increase in the coverage and frequency of bus/MRT services provided facilitating a turn-up and go service on most corridors • Significant reduction in journey times and interchange wait times • Significant increase in the reliability and comfort of services	• *Increased investment in the above +* • Targeted bus priority infrastructure investment on busy corridors to reduce journey times and increase the reliability of bus services. • Ensuring bus fares are competitive vs other modes
✓✓✓	• Transformational increase in bus/MRT patronage from new journeys and modal shift from highway journeys	• Transformational increase in the coverage and frequency of bus/MRT services provided across all corridors • Transformational reduction in journey times and interchange wait times • Transformational increase in the reliability and comfort of services	• *Increased investment in the above +* • Transformational infrastructure investment in Mass Rapid Transit in major economic hubs across the area, including the creation of fully segregated tram and bus rapid transit where appropriate • Transformational increase in rural services to ensure the whole population are in catchment of a frequent and reliable bus service

Policy Development – Walk, Cycle and Micro-mobility

Policy Score	Desired outcomes	Desired outputs	Interventions to achieve desired outcomes
✓	• Moderate increase in the proportion of trips which are undertaken by sustainable modes and subsequent modal shift of short distance highway journeys	• Moderate investment in increasing the coverage of urban and inter-urban mobility corridors which effectively accommodate sustainable modes	• Investment in upgrading corridors with significant demand generators and attractors (including strategic mobility hubs) to ensure seamless first-last mile connectivity for users • Investment in local placemaking initiatives and the public realm which make sustainable modes more attractive and intuitive for new users
✓✓	• Significant increase in the proportion of trips which are undertaken by sustainable modes and subsequent modal shift of short distance highway journeys	• Significant investment in increasing the coverage of urban and inter-urban mobility corridors which effectively accommodate sustainable modes	• *Increased investment in the above +* • Significant investment in increasing the coverage of fully segregated, mobility corridors across urban areas and ensuring an almost complete network whereby micro-mobility users have a dedicated right of way and do not need to cross paths with highway traffic
✓✓✓	• Transformational increase in the proportion of trips which are undertaken by sustainable modes and subsequent modal shift of short distance highway journeys	• Transformational investment in increasing the coverage of urban and inter-urban mobility corridors which effectively accommodate sustainable modes	• *Increased investment in the above +* • Transformational infrastructure investment and policy changes (including road space reallocation) to ensure priority is always given to micro-mobility modes

Policy Development – Shared Passenger Mobility

Policy Score	Desired outcomes	Desired outputs	Interventions to achieve desired outcomes
✓	• Moderate increase in the proportion of trips which are undertaken by shared transport modes and subsequent modal shift of short distance highway journeys	• Moderate increase in the number of services offering shared passenger mobility solutions such as car-sharing, ride-sharing and bike-sharing, offering users a flexible way to travel and less reliant on private vehicles	• Ensure policies are in place which overcome known barriers and help support the roll out of shared passenger mobility initiatives include car-sharing, ride-sharing and bike-sharing
✓✓	• Significant increase in the proportion of trips which are undertaken by shared transport modes and subsequent modal shift of short distance highway journeys	• Significant increase in the number of services offering shared passenger mobility solutions such as car-sharing, ride-sharing and bike-sharing, offering users a flexible way to travel and less reliant on private vehicles	• *Increased investment in the above +* • Policies which ensure shared passenger mobility modes are accessible and affordable to all

Policy Development – Highway (Car trips)

Policy Score	Desired outcomes	Desired outputs	Interventions to achieve desired outcomes
✓	• Moderate increase in car trips by 2050.	• Moderate increase in road capacity, moderate reduction in congestion resulting in faster journey times and improved journey time reliability • Successful rollout of connected and autonomous vehicles (CAVs) in the long term	• Investment in a moderate number of highway schemes to be delivered in the longer term which unlock greater road capacity and reduce congestion • Policy facilitation and investment in connected and autonomous vehicles (CAVs) technology
×	• Moderate decrease in car trips by 2050.	• Small increase in the perceived and/or actual journey times relative to other modes. • Small increase in perceived and/or actual cost of car trips relative to other modes.	• Moderate road space reallocation to support other modes and local placemaking initiatives • Moderate Road user charging and Urban demand management policies
××	• Significant decrease in car trips by 2050.	• Significant increase in perceived and/or actual journey times relative to other modes. • Significant increase in perceived and/or actual cost of car trips relative to other modes.	• Significant road space reallocation to support other modes and local placemaking initiatives • Significant Road user charging and Urban demand management policies

Policy Development – Freight (Highway and Railway)

Policy Score	Desired outcomes	Desired outputs	Interventions to achieve desired outcomes
✓	• Moderate increase in highway freight trips by 2050. • Moderate increase in rail freight trips by 2050. • Moderate growth of key ports facilitated by an increase in capacity and reliability of highway and railway freight network in accommodating onward freight movements	• Moderate increase in road capacity on key corridors connecting ports, supporting a moderate reduction in congestion resulting in faster journey times and improved journey time reliability. • Moderate increase in rail capacity on key corridors connecting ports, facilitating the growth of ports in the area and ensuring a moderate shift of freight to rail.	• Investment in a moderate number of highway schemes on key freight corridors such as the A34 to be delivered in the longer term which unlock greater road capacity for HGVs and reduce congestion. • Initiatives which foster innovation and seek the effective roll out of low-emission HGV vehicles. • Investment in rail schemes which look to maximise paths for rail freight on key corridors such as the South West Main Line.
✓✓	• Moderate increase in highway freight trips by 2050. • Significant increase in rail freight trips by 2050. • Significant growth of key ports facilitated by an increase in capacity and reliability of highway and railway freight network in accommodating onward freight movements	• Moderate increase in road capacity on key corridors connecting ports, supporting a moderate reduction in congestion resulting in faster journey times and improved journey time reliability. • Significant increase in rail capacity on key corridors connecting ports, facilitating the growth of ports in the area and ensuring a moderate shift of freight to rail.	• *Increased investment in the above +* • Increasing railway gauges to accommodate higher loadings and longer freight trains. • Investment in electrifying rail lines to ensure decarbonised freight movements in 2050. • National investment in strategic rail freight hubs across the country for onward rail freight connectivity. • Digital innovation, embracing just in time logistics to maximise freight carried by the transport network using sustainable modes.

Policy Development – Local Demand Management

Policy Score	Desired outcomes	Desired outputs	Interventions to achieve desired outcomes
✓	• Moderate reduction in highway demand in urban centres	• Moderate increase in the cost of private vehicle use in urban centres. Desired outputs from other policy areas: • *Moderate decrease in road capacity, making private vehicle use less attractive in urban centres.* • *Complementary increase in the provision of sustainable modes to ensure a net-gain in connectivity options for users.*	• Moderate decrease in the availability of car parking and subsequent increase in the cost of car parking including workplace parking levy's in urban centres. • Increased roll out of low-emission zones in urban centres. • Investigating the potential introduction of urban demand management charges in other urban areas.
✓✓✓	• Transformational reduction in highway demand in urban centres	• Significant increase in the cost of private vehicle use in urban centres. Desired outputs from other policy areas: • *Significant decrease in road capacity, making private vehicle use less attractive in urban centres.* • *Complementary increase in the provision of sustainable modes to ensure a net-gain in connectivity options for users.*	• Significant decrease in the availability of car parking and subsequent increase in the cost of car parking including workplace parking levy's in urban centres. • Significant roll out of low-emission zones in urban centres. • Strong consideration of the potential introduction of urban demand management charges in largest urban centres.

Policy Development – National Demand Management

Policy Score	Desired outcomes	Desired outputs	Interventions to achieve desired outcomes
✓	• Moderate reduction in highway demand across the country	• Moderate increase in the cost of private vehicle use across the country. Desired outputs from other policy areas: • *Moderate decrease in road capacity, making private vehicle use less attractive in urban centres.* • *Complementary increase in the provision of sustainable modes to ensure a net-gain in connectivity options for users.*	• Introduction of a national road user charging mechanism which increases the variable cost of driving in light of a shift away from fossil-fuel based cars, counteracting current revenue from fuel taxes and replacing existing road tax mechanisms. • Policies which ensure equity consequences are considered to ensure those who need to drive are allocated discounts and exemptions where appropriate.
✓✓✓	• Transformational reduction in highway demand across the country	• Significant increase in the cost of private vehicle use across the country. Desired outputs from other policy areas: • *Significant decrease in road capacity, making private vehicle use less attractive in urban centres.* • *Complementary increase in the provision of sustainable modes to ensure a net-gain in connectivity options for users.*	• Introduction of a progressive, national road user charging mechanism which increases the variable cost of driving to where driving is much-less attractive than alternative modes for short, medium and longer-distance journeys. • Policies which ensure equity consequences are considered to ensure those who need to drive are allocated discounts and exemptions where appropriate.

Policy Development – Localisation

Policy Score	Desired outcomes	Desired outputs	Interventions to achieve desired outcomes
✓	• Moderate change in our approach to spatial and transport planning policy which looks to facilitate complete neighbourhoods where residents have access to services.	• Moderate change in spatial and transport planning which meets desired outcomes. Desired outputs from other policy areas: • *Complementary increase in the provision of sustainable modes to ensure short-distance trips are accessible and attractive for all.*	• Spatial planning policy initiatives encouraging mixed-use developments • Urban design policy initiatives which promote higher-density developments
✓✓	• Significant change in our approach to spatial and transport planning policy which looks to facilitate complete neighbourhoods where residents have access to services.	• Significant change in spatial and transport planning which meets desired outcomes. Desired outputs from other policy areas: • *Complementary increase in the provision of sustainable modes to ensure short-distance trips are accessible and attractive for all.*	• *Increased focus in the above +* • Digitalisation and other initiatives which support home working • Designing an attractive public realm with local leisure facilities to encourage more local trips are made by sustainable modes
✓✓✓	• Transformational change in our approach to spatial and transport planning policy which delivers the concept of a "15-minute city" which ensures residents meet most of their daily needs within a short distance from home through delivering a decentralized urban environment which revitalizes local centres.	• Transformational change in spatial and transport planning which meets desired outcomes. Desired outputs from other policy areas: • *Complementary increase in the provision of sustainable modes to ensure short-distance trips are accessible and attractive for all.*	• *Increased focus in the above +* • Urban design principles which minimize walk and cycle journey times whilst increasing vehicle journey times • Spatial planning policy initiatives require to adhere to 15-minute city principles

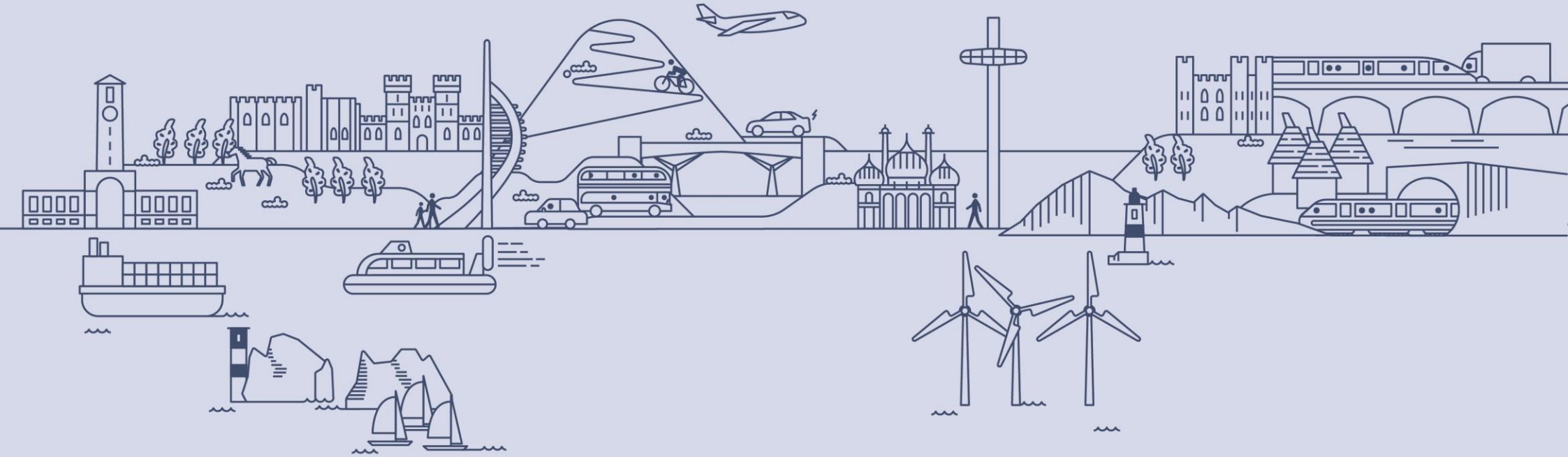
Policy Development – Digital Connectivity

Policy Score	Desired outcomes	Desired outputs	Interventions to achieve desired outcomes
✓	• Moderate reduction in the need to travel for working purposes.	• More residents are working from home	• Small-scale increase in digital connectivity, such as reliable broadband connectivity for all
✓✓	• Moderate reduction in the need to travel for working purposes. • Moderate reduction in the need to travel for other purposes, such as leisure.	• More residents are working from home • More residents are conducting leisure activities at home and/or locally • When residents do travel, they are embracing Mobility as a service applications which when coupled with a reduction in the need to travel, supports a shift away from personally-owned modes of transportation and towards mobility provided as a service.	• Significant investment in high-speed broadband connectivity for all • Significant innovation and investment in Mobility as a service initiatives
✓✓✓	• Significant reduction in the need to travel for working purposes. • Significant reduction in the need to travel for other purposes, such as leisure.	• Significantly more residents are working from home • Significantly more residents are conducting leisure activities at home and/or locally • When residents do travel, they are embracing Mobility as a service applications which when coupled with a reduction in the need to travel, supports a shift away from personally-owned modes of transportation and towards mobility provided as a service.	• Transformational investment in high-speed broadband connectivity for all • Opportunities and support for workers to work from home if possible • Transformational innovation and investment in Mobility as a service initiatives

Policy Development – Zero Emission Vehicle Uptake

Policy Score	Desired outcomes	Desired outputs	Interventions to achieve desired outcomes
✓	• Significant reduction in emissions from transport vehicles in 2050.	• Mostly decarbonised car and vehicle fleet by 2050 (in line with EFT 2021 assumptions). • Small reduction in emissions from HGV through more efficient vehicles by 2050.	• Moderate technology investment to ensure successful rollout of electric vehicles that are accessible to the population. • Ban of ICEs by 2035.
✓✓	• Near net zero emissions from transport vehicles in 2050.	• Fully decarbonised car and LGV fleet by 2050 (in line with SMMT Central Scenario fleet assumptions). • Significant reduction in emissions from HGV through technology development	• Significant technology investment to ensure successful rollout of electric vehicles that are accessible to the population. • Significant technology investment to ensure successful rollout of electric HGVs. • Ban of ICEs by 2035.
✓✓✓	• net zero emissions from all transport vehicles in 2050.	• Fully decarbonised vehicle fleet in 2050 (including cars, LGVs, HGVs, buses and other vehicle types) in line with Carbon Sixth Budget Trajectory.	• Transformational technology investment to ensure successful rollout of electric vehicles that are fully accessible to the population. • Ban of ICEs by 2035. • Significant technology investment to ensure successful rollout of electric HGVs from 2035.
✓✓✓✓	• net zero emissions from transport vehicles in 2040.	• Fully decarbonised vehicle fleet in 2040 (including cars, LGVs, HGVs, buses and other vehicle types).	• Transformational technology investment to enable a fast rollout of electric vehicles, and particularly that of electric HGVs (from 2030). • Ban of ICEs by 2030.

TRANSPORT FOR THE South East



APPENDIX B – PEOPLE, PLACE AND MOVEMENT FRAMEWORK TOOLKIT

Introduction

Overview

The People-Place-Movement Framework identifies that the TfSE area is diverse in terms of its population demographics, places, and movement types. The objective of this phase is to determine which policy interventions are likely to be more or less effective based on these differences.

Method

It will use the people personas, place and journey types sourced from the TfSE Transport Strategy and Future Mobility Strategy respectively.

It then utilises a scoring system against each of the intervention types for their constituent efficacies. This was developed based off a professional judgement approach. As such this'll reflect the degree to which each people, place or movement type will subsequently respond to decarbonisation-related interventions.

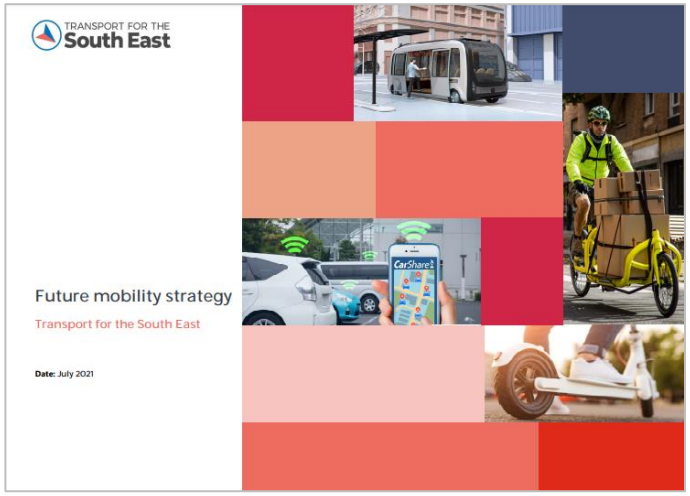
Interpretation

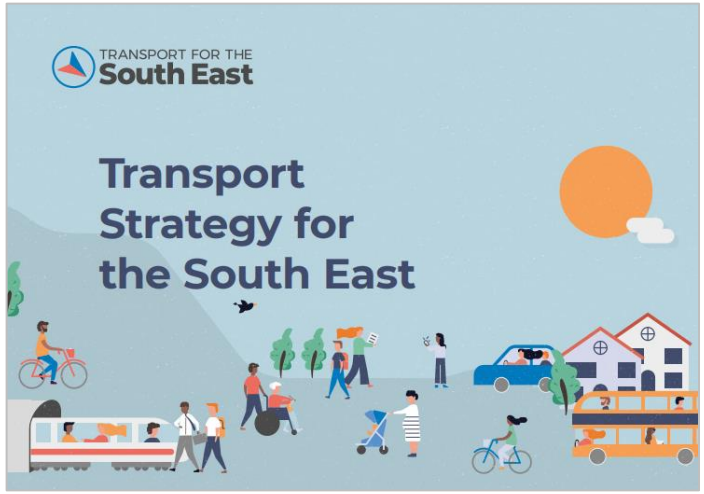
This final phase is vital as each of the constituent local authorities will exhibit a wide range of people, place and movement types, and likely possess an ambition to increase the diversity of their communities. Interventions facilitating decarbonisation differs considerably across these types.

Interpretation of the people, place and movement types tables on the next pages can be led either by intervention groups (columns) or the people, place and movement types (rows).

Scoring System

Score
Major positive efficacy
Moderate positive efficacy
Minor positive efficacy
No efficacy
Moderate negative efficacy
Major negative efficacy





People Typologies

Sociodemographic Group	Headline Description
Village life	The population of this segment live in areas that are less densely populated, typically in a village or small town. They tend to be older and well educated and to live in detached properties which they own, though an above average proportion live in retirement homes. Each household is likely to have multiple motor vehicles, and these will be the most common method of transport to their places of work.
Central connectivity	The majority of people in the Central Connectivity segment live in relatively densely populated urban areas. They include an above average proportion of young adults without children, including full time students.
Family terraces	This segment typically live on the edge of a town centre, in the transitional areas between the core and the suburbs, There is an above average proportion of families with pre-school or school age children. Typically they will have one car between two adults, with one driving to work and the other walking or using public transport.
Service sector workers	The Service Sector Workers segment tend to live in urban areas and work in the information and communication, financial, public administration and education related sectors. There is an above average likelihood of being young children in the household and a below average likelihood of older age adults.
Comfortable 'self-sufficiency'	Those in the Comfortable Self-sufficiency segment are typically approaching retirement age or already retired. They tend to live in a detached property or flat and are quite likely to have paid off their mortgage and have no dependent children, so while they may have a modest income are still quite likely to have both time and money.
Semi-detached suburbia	People living in areas of Semi Detached Suburbia will typically have school age children and own at least one car. The will mostly work in information and communication, finance, public administration and education sectors. It also includes some recently retired people living in semi-detached or detached housing.
Traditional towns	Households in this segment are more likely than average to have older non-dependent children and to live in semi-detached or terraced property. Their level of qualifications tend to be lower than average with jobs typically in the wholesale and retail, energy and transport related industries.
Sparsely populated	Locations with very few people living there (less than 50 people per 1km2).
Pre-school families	A significant increase in younger people, living in urban areas, who are more concerned over the environmental issues focusing on minimising consumption including home-working and sustainable modes of transport.
Semi-retired flexibility	A gradual increase in older people at the latter end of their working lives, in better paid roles, who can take a more flexible approach to working hours and the days they work.
School-run suburbia	A growing segment of suburban families who, within their means, try to take action to reduce their environmental impact including reducing the impact of their travel choices.

People Typologies (contd.)

Sociodemographic Group	Rail	Bus	Walk	Cycle & Micromoblity	Shared Mobility – Passenger	Highway – Car	Demand Management – Local	Demand Management – National	Localisation	Digital Connectivity	ZE Vehicle uptake
Village life											
Central connectivity											
Family terraces											
Service sector workers											
Comfortable 'self-sufficiency'											
Semi-detached suburbia											
Traditional towns											
Sparsely populated											
Pre-school families											
Semi-retired flexibility											
School-run suburbia											

People Typologies (contd.)

Key findings

- Each intervention area exhibits a wide range of impacts on sociodemographic groups, from those living within the centre of major cities and towns to those in very rural and sparsely populated areas.
- Demand management, digital connectivity and uptake of zero-emission vehicles exhibit the greatest levels of efficacy against many of the sociodemographic groups.
- Highway-based interventions are likely to impact those who are likely to drive more, such as those within villages or dispersed suburban areas.
- Modal-specific interventions generally exhibit lower levels of efficacy against all the people types.

Sociodemographic Groups

- Those living in suburban areas and villages are also likely to respond positively to measures improving digital connectivity, facilitating both home working and entertainment and reducing the need to take trips in the first place.
- Those with younger children (not yet in school), and semi-retired are likely to have a need to travel less frequently, and as a result exhibit lower levels of responses to all interventions.

Place Typologies (contd.)

Overview

Place typologies across the South East follow that of their corresponding economic hub, and are typified by the following:

- Coastal and estuarine
- Well-connected larger rural hinterlands further from London
- Large urban centres
- Local and regional administrative centres further from London
- London commuter towns
- London orbital business hubs

For the purposes of this assessment, the place types have been split largely by their corresponding movement patterns, determining their ability to decarbonise. This also illustrates the proportion of populations residing within these place typologies.

Place Types	Headline Description
Major Economic Hubs (MEH)	Economic drivers of the South East's economy and the focus by which other, smaller settlements are concentrated, comprising the ~60% of the SE's population.
Urban areas	Other urban areas exhibiting strongest connections to and reflect conditions within MEHs and the rest of the SE, comprising ~24% of its population. These urban areas vary significantly in size from a population of ~5,000 – 133,000.
Rural	Larger rural settlements ranging in size ~150 – 5,000, comprising ~9% of the population of the SE.
Remote rural	The remaining population of the SE of ~300,000 resides within small villages, hamlets and dispersed dwellings in places with less than 140 residents.

Place Typologies (contd.)

Place Types	Rail	Bus	Walk	Cycle & Micro-mobility	Shared Mobility – Passenger	Highways	Demand Management - Local	Demand Management - National	Localisation	Digital Connectivity	ZE Vehicle uptake
Major Economic Hubs (MEH)											
Urban Areas											
Rural											
Remote rural											

Key findings

- Localisation and digital connectivity-led policy interventions have the greatest levels of efficacy across each of the place types due to their ability to reduce the need for medium and longer-length journeys which are unlikely to be walked or cycled.
- Highway-based policy interventions see negative efficacies against all place types.

Place Types

- Major economic hubs and other urban areas exhibit the greatest opportunities for demand management and localization-based interventions and as such are likely to respond the best – those living within them would be more likely to walk, cycle or take public transport for shorter journeys.
- Rural place types generally respond less well to modal-specific interventions (whereby lower densities reduces accessibility and amenability) but are more likely to respond well to digital connectivity reducing the need for a trip in the first place.

Movement Typologies

Overview

Movement typologies across the South East have a stronger relationship to journey types across the UK. However, the South East's proximity to London and coastal location both results in a great number of international and freight-related journeys.

Movement Types	Headline Description
Radial	Longer distance passenger journeys which typically use either the Strategic Road Network (radiating from the M25) or main line railways that terminate in central London.
Orbital and Coastal	Longer distance passenger journeys which use corridors running perpendicular to the radial corridors described previously. Generally these roads and railways are sparser with lower capacity and speeds than most radial corridors. These provide important links between economic hubs across the South East but have lacked investment in recent years.
Inter-urban	Medium distance passenger journeys between economic hubs and the Strategic Road Network. These journeys are predominantly served by the South East area's Major Road Network and any railways that mirror these corridors.
Local	Short distance journeys to destinations within the same community, village, town or city. They also include the first or last part of longer distance journeys (first/last mile movements) that form the other journey types.
International gateways and freight	Passenger and freight international gateways comprising airport, rail and port infrastructures. They are critically important for businesses particularly outside the TfSE area, including London, Midlands and North of England.

Movement Typologies (contd.)

Movement Types	Rail	Bus	Walk	Cycle & Micromobility	Shared mobility	Highway - Car	Highway - Van	Highway - HGV	Demand Management - Local	Demand Management - National	Localisation	Digital Connectivity	ZE Vehicle uptake
Radial													
Orbital and Coastal													
Inter-urban													
Local													
International gateways and freight													

Movement Typologies (contd.)

Key findings

- Uptake of Zero Emission Vehicles has the greatest efficacies across all movement types, as they facilitate the shift to decarbonise existing vehicle trips.
- Demand management-led interventions additionally exhibit high levels of efficacy against most movement types due to their ability in shifting vehicle trips to alternative modes.
- Further consideration is given to the planning and deliverability of such schemes in Appendix E, supported by the full report in the appendix to the Area Studies' Highways Thematic Plan. The exploration of these options also considers the capital and operating cost costs and revenues over a 28 year appraisal period. The potential for mode shift and revenue generation to hypothecate into other sustainable transport and related options is vast.

Movement Types

- All movement types respond particularly well to demand management and Zero emission vehicle policy interventions.
- Some movement types respond slightly better to various modal-specific interventions, which is based largely on the length of journey. Longer journeys typically respond well to rail-based interventions whilst local journeys respond well to all other modal-specific interventions.

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