Alternative Fuels for Road Freight Strategy

Western Gateway and Peninsula Transport Sub-national Transport Bodies

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Project information

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1. Introduction and Background

Western Gateway and Peninsula Transport Sub-National Transport Bodies (STBs), who represent for the South West of England, commissioned Atkins and Cenex to undertake research examining the opportunities and barriers associated with the transition to alternative fuels for freight and logistics vehicles. The study followed on from the successful 2019-2020 study for Midlands Connect (a neighbouring STB) that provided guidance on how to best support and influence the uptake of alternative fuels such as hydrogen, gas and electric power within the Midlands. The overall research aim is to understand the challenges and opportunities associated with the adoption of alternative fuels and assess how these might impact the South West.

Freight and logistics will play a key role in servicing the needs of the South West over the next 30 to 50 years. Western Gateway and Peninsula Transport could strongly benefit from identifying sustainable methods to cultivate regional industry growth whilst maximising the effective distribution of freight and logistics. Within the scope of this research project, Western Gateway and Peninsula Transport are seeking to understand the current and future policies relevant to the use of alternative fuels for the freight and logistics sector. The primary objective of the study is to outline the opportunities and challenges faced by businesses in the region and to identify actions which will enable them to exploit opportunities concerning alternative fuels for sustainable and dynamic growth, and drive a path for future net-zero compliance. While the study has primarily focussed on road freight, in order to build a holistic picture of the future opportunities and barriers facing the sector, consideration of the needs of other modes and sectors, including rail, ports/maritime, agriculture, and coach, has also been made. Opportunities for road freight to be aligned with these modes have been identified, and potential synergies have been examined.

This report details the outputs of each phase of the project:

- A **review of national, regional and local policy**, which has been carried out to understand the appetite and demand for alternative fuels within the freight and logistics sector. The review highlights the key measures and impacts of the current policy landscape on freight and logistics businesses and examines the issues likely to be faced by the South West of England as the freight and logistics sector moves away from fossil fuels. The conclusions and recommendations presented in this report are guided by a strategic overview of the freight and logistics industry, future trends and challenges for regional policy makers.
- **Stakeholder engagement** to understand local stakeholder knowledge, attitudes and opinions. The stakeholder engagement exercise illuminated the factors influencing supply, uptake and use of alternatively fuelled vehicles and supporting infrastructure in the South West, and developed an understanding of the appetite, demand and theoretical compliance levels for alternative fuels within the sector. This exercise supported the identification of the gaps constraining the industrial development of alternative fuels in the freight and logistics sector within the South West.
- **Forecasting of future trends**, focussing on the supply and uptake of vehicles and infrastructure. The methodology employed used a combination of secondary data sources and the stakeholder engagement outputs to assess the technical and commercial maturity of a range of alternative fuels and their likely uptake.
- **Identification of refuelling locations**, focussing on locations suitable for HGVs and potential locations for refuelling stations as identified in the Department for Transport (DfT) 2017 National Survey of Lorry Parking[1] conducted by AECOM. These sites are all within five kilometres of the Strategic Road Network (SRN), in line with the DfT's National Survey of Lorry Parking. This is considered the maximum distance drivers are willing to deviate from their route to access refuelling facilities.

Finally, this report details the limitations of the study as well as outlining recommendations for next steps pertaining to the implementation of alternative fuels in the freight and logistics industry in the South West.

[1] National survey of lorry parking - GOV.UK (www.gov.uk)

Literature, Research and Policy Review

2. Introduction and Methodology

Relevant policy, strategy and research documents were identified by the project team to understand previous research and policy that may influence the development of this strategy. Documents include strategic authority plans, market reviews and policy frameworks. The content of each document has been summarised, highlighting the key policies and findings, and particularly those findings that are relevant to alternative fuels, such as strategic freight policy. Sources have been separated into groups based upon their geographic applicability, with relevant policy, literature, objectives being reviewed at each level. A full list of sources can be found in Appendix A.

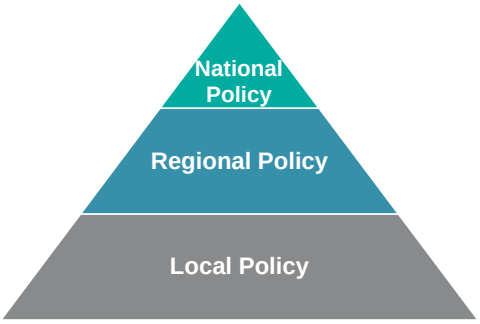


Figure 2-1 – Geographic Levels

The national policy was important to consider as the Government has a major influence at all levels, affecting regional and local policy. The corresponding national literature from independent organisations has also been summarised, such as that from Logistics UK and National Infrastructure Commission. Regional literature from the Western Gateway and Peninsula Transport sub-national transport bodies has also been summarised. Strategies at a regional level aim to unify local authorities and ensure a cohesive plan to maximise policy effectiveness. Finally, the relevant objectives announced by each local authority have been identified, which acts as a consensus from members of the regional bodies. A summary is given showing which local authorities have declared a climate crisis, as well as which authorities have net-zero or decarbonisation plans.

The literature has also been further categorised by theme, in increasing order of focus on freight: **Clean Economy**, **Clean Transport**, and **Clean Freight**, as shown in **Figure 2-2**. For example, working from the bottom of the diagram, while Alternative Fuels remains a major decarbonisation strategy for Clean Freight, general Transportation Policies can also influence a Clean Freight strategy in a broader way, with initiatives such as Clean Air Zones affecting all road transportation. Furthermore, literature around the economy has been analysed, as policies around green funding mechanisms will affect all new technologies relevant to Net Zero, such as alternative fuels.

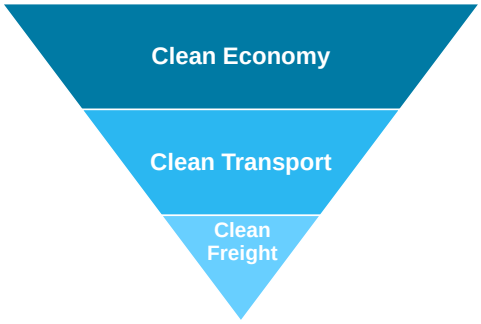


Figure 2-2 – Key Themes

3. National Policy and Strategy Review

This section relates to national policy, strategy, research, and objectives, published by the Government and by independent organisations.

3.1. National Clean Economy Objectives

3.1.1. UK Government

Many of the national policies for a clean economy, clean transport and clean freight originate from the 2008 **Climate Change Act**, which follows on from the Paris Agreement and forms the basis of the UK's approach to tackling and responding to climate change. The Act legally requires that emissions of carbon dioxide (CO_2) and other Greenhouse Gases (GHG) are reduced for the whole of the UK, including all industries and sectors. The original legislation required the Government to reduce the UK's net carbon account by at least 80% by 2050 (compared to the 1990 baseline of 800 MtCO2e), this was later updated to at least 100% by 2050. The legislation also introduced 5-year carbon budgets, which act as periodic targets for the Government to achieve on the way to net zero. The legally binding net zero target means that the freight industry will be under increasing pressure to decarbonise and adopt alternative fuels.

Net Zero Strategy: Build Back Greener Strategy, published in 2021, set out the Government's next steps to cut emissions, seize green economic opportunities, and leverage further private investment into net zero over the next three decades. The Strategy presents how the UK will 'build back better' from the pandemic by 'building back greener', levelling up the country with new high-skilled, high-wage, sustainable jobs in every part of the United Kingdom, as well as fully decarbonising the electricity grid by 2035. The strategy includes policies on Power, Fuel Supply, Industry, Buildings and Transport to name a few. In the document, the Government state that they will trial three zero emission HGV technologies at scale on UK roads to determine their operational benefits, as well as their infrastructure need. In parallel, the Government will encourage modal shift for freight movements away from roads to more sustainable modes, such as cargo bike, inland waterways and rail. The outcome of these initiatives and trials will be an important consideration as this strategy is implemented over the coming years, potentially affecting demand for specific fuel types, and road freight movements overall.

The Clean Growth Strategy, published in 2017, is a set of policies and proposals with the aim of delivering increased economic growth while decreasing carbon emissions. The UK's approach to reducing emissions is based on two underpinning objectives: meet the Climate Change Act commitments at the lowest cost to UK taxpayers, consumers and business; and maximise the benefits for the UK as a result of this transition. The Government will set targets to support development of advanced fuels suitable for HGVs, aviation and ships, as well as trialling HGV platooning to improve energy efficiency. It is advised that a regional strategy could utilise and work with national policies such as these to increase overall effectiveness.

Industrial Strategy: Building a Britain fit for the future, published in 2017, sets the scene for the UK's key economic drivers with the ambition to narrow the productivity gap and boost earning power across the country. It demonstrates the Government's proactive approach to new technologies and in responding to a changing economic context. The Government also states its ambition to be at the forefront of the future industries, including Future Mobility and Clean Growth. The strategy recognises that one of the five foundations of productivity is a major upgrade to the UK's infrastructure; a key policy included is £400m of investment towards charging infrastructure on roads to aid decarbonisation and the transition to alternative freight.

Air pollution is now recognised as the top environmental risk to human health in the UK. The **Clean Air Strategy** sets out the case for action and demonstrates the Government's determination to improve air quality. The strategy, published in 2019, sets out a commitment to reduce particulate matter emissions by 46% by 2030. The strategy states that new powers will be made available to take action in areas with an air pollution problem. These actions could include the creation of Clean Air Zones which would affect road freight, and further encourage a transition towards alternative fuels.

The **Cost of Energy Review** was carried out independently by Professor Dieter Helm CBE (on behalf of UK Government), who put forward proposals on how to reduce costs in the power system in the long-term whilst ensuring the UK meets its climate change targets. The review concluded that the cost of energy is significantly higher than required for the Government to meet its net zero objectives, and that the energy policy, regulation, and market design are not fit for the purposes of the emerging low-carbon energy market.

The Royal Agricultural Society's **'Farm of the Future: Journey to Net Zero'** report outlines a vision for how farming in the UK can adapt to the challenges posed by climate change. It covers a range of topics such as low-carbon and renewable energy, agri-tech innovation, and novel crops. The report emphasises the importance of

effective government support to ensure farm business viability throughout the transition to a low-carbon farming future. It also highlights the need for greater involvement of farmers and representative organisations in the formulation and implementation of government policies. The report suggests that farmers need access to research, knowledge transfer, and advisory services to help them better manage land and water resources, increase biodiversity, and restore soil health. The report also discusses the need for improved rural connectivity, mobile communications, and rural power networks to enable farmers to modernise their operations and embrace digital and artificial intelligence technologies. The installation and extension of this would have an impact on alternative fuels and local power distribution for charging electric vehicles.

The Royal Agricultural Societies' **Decarbonising Farm Vehicles and Future Fuels** document discusses the need to replace diesel as the primary fuel for farm vehicles in the next two decades and highlights the importance of the government's role in supporting the transition to low-emission alternatives. The document suggests that gas, including biofuels, biomethane generation/supply, and hydrogen, could be potential replacements for diesel. The document emphasizes that low-emission fuels should make use of existing engine technology to be affordable. The document also highlights the need to consider alternative farming systems, including the use of smaller, more compact, controlled traffic farming systems and autonomous and robotic vehicles and machines. The document suggests that field-scale trials and on-farm demonstration events are essential to encourage farmers to adopt low and zero emission vehicles and systems change and should receive external funding support.

The Government has produced a 25-year plan to help the natural world regain and retain good health, called **A Green Future: Our 25 Year Plan to Improve the Environment**. This plan aims to deliver cleaner air and water in our cities and rural landscapes, protect threatened species and provide richer wildlife habitats. It calls for an approach to agriculture, forestry, land use and fishing that puts the environment first. Key goals of the plan are to mitigate against climate change and achieve clean air, both of which clean freight has a key part to play. The Clean Air Strategy, described above, is a key element of the wider 25-year strategy.

The **National Infrastructure Strategy 2020** sets out the Government's strategy to deliver an improvement in the quality of the UK's infrastructure, helping to level up the country, strengthen the Union, and put the UK on the path to net zero emissions by 2050. This infrastructure strategy was the first of its kind, and is based on advice from the National Infrastructure Commission (NIC), responding to its 2018 assessment of the country's infrastructure needs. The strategy notes that, unlike cars, there is currently not a commercially viable path to decarbonise heavy goods vehicles (HGVs), which contribute 17% of UK transport emissions. The strategy states that the Government will invest £20 million in 2021-22 to establish zero emission road freight trials, demonstrating the government's commitment to finding a commercially viable path for decarbonised HGVs.

The **National Planning Policy Framework**, first published in 2012 and last updated in 2021, sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally prepared plans for housing and other development can be produced. The framework would be relevant for development of alternative fuels infrastructure, roadside infrastructure, and rail freight interchanges, for which there is expected to be an increase in demand as freight transitions from road to rail as part of a decarbonisation strategy.

3.2. National Clean Transport Objectives

3.2.1. UK Government

The Road to Zero sets out the UK strategy towards cleaner road transport with an objective to put the UK at the forefront of the design and manufacturing of zero emission vehicles. This document sets out long-term targets and measures to reduce emissions from vehicles already on UK roads, with a focus on reducing emissions from HGV and road freight and the introduction of a target to reduce HGV emissions by 15% by 2025 (from 2015 levels). The Road to Zero presents a set of measures to encourage the uptake of clean new vehicles, introducing several Government actions to support the development of the design and manufacturing of zero emission vehicles and corresponding infrastructure. Key measures include working with National Highways to identify and assess zero emission technologies suitable for HGVs, extending the electric plug-in grant to vans, as well as increasing R&D investment with a £245 million investment into battery technology. The Government are also leading by example, with a commitment to have 25% of the Government fleet as Ultra-Low Emissions Vehicle by 2022 and 100% by 2030.

In 2021, the Government published **Decarbonising Transport – A Better, Greener Britain**, setting out the Government's commitments and the actions needed to decarbonise the entire transport system in the UK, including accelerating the modal shift to public and active transport, while decarbonising road transport and the freight system. The plan describes the pathway to net zero, as well as the wider benefits that net zero transport can deliver. Key policies include publishing a zero-emission car and vans delivery plan, particularly relevant for

'last mile' deliveries, while demonstrating zero emissions HGV technology via trials. The government is consulting on phase-out dates of non-zero emission technologies, while stimulating demand for zero emission trucks through financial and non-financial incentives, as well as supporting efficiency improvements and emission reductions in the existing fleets.

The 2018 **Industrial Strategy: Automotive Sector Deal** builds on the Government's partnership with the UK automotive sector to ensure that the UK continues to reap the benefits from the transition to ultra-low and zero-emission vehicles by continuing to build the agile, innovative and cost competitive supply chain needed to secure international investment. The strategy outlines the Industry and Government action to improve Research & Development (R&D), the Business Environment and Infrastructure of sustainable vehicles. To encourage innovation, it will increase the R&D tax credits to 12%, while increasing total R&D investment to 2.4% of GDP. To support the increase in EVs the government is committing £400m to charging infrastructure investment and an extra £100m to the plug-in vehicle grant. The polices around infrastructure and innovation could be utilised by a regional freight strategy.

The **Road Investment Strategy 2 (RIS 2) 2020-2025**, provides a long-term strategic vision for the SRN, specifying the performance standards National Highways must meet, while outlining planned enhancement schemes until 2025, for which the Government has committed £27.4 billion. The second investment strategy helps the network move towards its 2050 vision: a greener network, a network that supports the economy, a smarter network, a more integrated network, and one that is safer and more reliable. National Highways has pledged to support modal integration and the expected increase of rail freight. It also states it will be supporting the development of a network of rapid charge points along the SRN, which is now underway through Project Rapid. A regional strategy could therefore work with National Highways to identify and implement strategic charge points to support with anticipated demand.

The 2017 **UK Plan for tackling roadside Nitrogen Dioxide concentrations** set out the UK's plan for reducing roadside nitrogen dioxide concentrations. Unlike greenhouse gases, the risk from NO2 is focused in particular areas, with an increase in the concentration in the air and the associated health risks. Given the local nature of the problem, it is recognised that local action is needed to achieve the improvements in air quality, requiring local authorities to carry out studies or implement actions to meet the legal limits for nitrogen dioxide within the set deadlines. The implementation of corresponding actions by local authorities will have an effect on the freight passing through and could therefore encourage uptake of non-polluting alternative fuels.

Published in 2019, the **Clean Air Strategy** shows how the UK will tackle all sources of air pollution, making the air healthier to breathe and protecting nature, while boosting the economy. The strategy sets out new legislation that will create a stronger and more coherent framework for action to tackle air pollution from all sources, not just from the transportation industry. The strategy will be underpinned by new England-wide powers to control major sources of air pollution, in line with the risk they pose to public health and the environment, as well as new local powers to take action in areas with an air pollution problem. The creation of Clean Air Zones, backed up with enforcement mechanisms, will help lower emissions from transportation including freight. One key strategy to reducing pollutants from road freight is to encourage the use of rail as a more sustainable mode with fewer emissions. The Government is making £1 million of funding available for demonstrator projects to help decarbonise rail further.

The **2022 Clean Air Zone Framework** sets out the principles for the operation of Clean Air Zones in England. It provides the expected approach to be taken by local authorities when implementing and operating a Clean Air Zone. Clean Air Zones aim to deliver and align with three themes: supporting local growth and ambition (decoupling growth and pollution); accelerating the transition to a low emission economy; and immediate action to improve air quality and health. The framework highlights the potential measures that could be taken in response to a clearly defined air quality problem. With HGVs being a major emitter, the creation of Clean Air Zones by authorities could have a major impact on freight and the uptake of alternative fuels.

The Government recognises that the sale of electric vehicles is accelerating at a rapid pace, and that a sufficient charging infrastructure is fundamental to support and deliver net zero road transport. The **Taking Charge: the electric vehicle infrastructure strategy**, published in 2022, sets out the strategic approach in delivering this charging infrastructure until 2030. The deployment of more public charge points is aimed at enabling long distance journeys while also supporting those without off-street parking. The government states it is making funding available for sub-national Transport Bodies to produce regional assessments to support the planning of charging infrastructure provision. This funding could help support the planning for a regional strategy and deployment.

The **2019 Clean Maritime Plan** sets out the ambitious government vision for maritime that net-zero and "clean" operation will be "commonplace" by 2050, driven by the UK as an industry leader and pioneer in zero emissions shipping and port operations. Although the plan sets out some ambitious targets, there are relatively few firm commitments in a regulatory or policy aspect that would affect business as usual operations of domestic or

international shippers and ports. Because the sector is so heavily dominated by international trade, and the resultant international maritime regulations, it makes it difficult for the government to set and enforce regulations distinct from normal global operating procedures, and there is a perceived aspect of restricting innovation at this current juncture.

3.2.2. Other Sources

Published in 2021 by the Zemo Partnership and the Electric Vehicle Energy Taskforce, the **Commercial EV Fleet Charging Requirements** report looks at how the fleet market can be encouraged to switch to electric vehicles by focusing on EV charging strategies and how these will need to adapt to allow a significant increase in the proportion of EV fleets. The report identifies barriers to the provision and use of charging infrastructure as well as securing the finance to enable an EV transition. Recommendations include greater sharing of fleet data between local operators, noting that regional/local forums should be established to allow the sharing of data between relevant actors to assist in planning. Other recommendations include clearer public charging information and pricing, and a streamlining of regulatory processes for the installation of public charge points.

National Highways' **Net zero highways**[2] lays out an ambitious programme of decarbonisation for the SRN, proposing a pathway to net zero, at a corporate level by 2030, for maintenance and construction emissions by 2040, and for road user emissions by 2050. The workplan related to road user emissions sets forward strategic priorities and investment pathways related to alternative fuels on the SRN, and alongside wider net-zero freight objectives from central government, will complement and augment the continual application of the findings from this report.

Network Rail's **Traction Decarbonisation Network Strategy (TDNS)** is the strategic document acting as a formal proposal of rolling electrification of currently un-electrified track and infrastructure. Although this document lays out the priorities and associated programme of electrification as the main intervention for decarbonisation of the railways, the capital investment required for rollout is extremely significant, even over a 90 year appraisal period. Alternative fuel types for passenger and freight transportation are put forward as medium term carbon mitigations until capital funding for line and network electrification is secured. Across the South West, the TDNS recommends the electrification of the core main lines, while branch lines are put forward for a mix of electrification, battery or hydrogen power

Capacity of the rail network for increased levels of freight is also highlighted as a concern, with significant capacity and throughput a barrier for network growth without infrastructure beyond electrification.

Figure 3-1 - Network Rail Traction Decarbonisation Network Strategy Recommendations for the South West

[2] Net zero highways - National Highways

The Rail Environment Policy Statement sets out the environmental priorities for mainline railways in Great Britain, including long-term goals for rail reform with the intention of integrating sustainability, and carbon reduction directives across the network. The policy statement mentions specificallyhow the policy relates to TDNS, and is pessimistic about the potential of hydrogen and battery electric modes to meet the physical requirements of rail-freight, and makes an environmental justification on the current comparative environmental efficiency of rail freight when compared to other modes.

The Confederation of Passenger Transport's **Bus and Coach: The route to net zero** report analyses the potential impact of switching car journeys to bus and coach journeys (referred to as "modal shift") on achieving the UK's Net Zero emissions goal. In their initial report, titled "The Decarbonisation Dividend", the authors established the critical role that modal shift from car to bus and coach would play in supporting the country's objective of reaching Net Zero emissions. The report also highlights the magnitude of the necessary modal shift and the associated benefits.

3.3. National Clean Freight Objectives

3.3.1. UK Government

Future of Freight: a long-term plan, published in June 2022, is the Government's most recent plan for the sector. The plan recognises the importance of the freight industry as well as the current challenges, such as COVID-19, the Russia-Ukraine war, the new relationship with the EU, changing consumer behaviour, and the challenges of transitioning to net zero. The document focuses on 5 priority areas for the industry, including identifying a multimodal National Freight Network (NFN), improved planning, expanding sector skills, using data and technology, and transitioning to net zero. The key policies include establishing a Freight Energy Forum to build confidence in the transition to net zero, developing a strategy for the deployment of low carbon fuels across different transport modes, and encouraging modal shift of freight from road to more environmentally sustainable alternatives, such as rail, cargo bike and inland waterways. The Government will consult on the phase-out date of the sale of new non-zero emission HGVs ranging from 3.5 tonnes to26 tonnes by 2035, and all new non-zero emission HGVs by 2040. The Government states that it will invest a further £20m to accelerate the zero-emission trucks technology, as well as providing fiscal incentives to encourage market movement towards zero-emission trucks. The review notes that the uncertainty around the appropriate fuels and technology to achieve net zero, coupled with volatile energy prices, is leading to investor uncertainty. The recently published plan will be an important consideration for developing a regional strategy to ensure alignment and with governmental policy and maximise strategy effectiveness.

The **Freight Carbon Review**, published in 2017, aims to bring together the opportunities for and barriers to reducing road freight GHG emissions, to identify key evidence gaps, and to consider potential policy solutions. HGVs are currently estimated to account for around 17% of UK GHG emissions from road transport. This report sets out the key findings of the review, identifying a range of Government and industry-led decarbonisation measures to support the road freight sector's reduction in GHG emissions. Measures include supporting more efficient driving technologies, alternative fuels, and a modal shift from road to rail. The review notes that biofuels have the potential to reduce emissions in the short-term, but also that mass production for longer-term use may be restricted. The review recommends further research into advanced fuels that could have a greater supply to satisfy growing demand.

Published in 2011, **The Logistics Growth Review - Connecting People with Goods** presents a package of measures that targets the barriers to growth for the logistics industry and its users. Its aim is to examine the conditions for logistics sector success, identifying Government actions for industry growth. The review identifies measures covering rail freight, road freight and aviation freight, and includes actions such as leveraging private sector investment, supporting sustainable development projects, reducing unnecessary regulation, and improving the network's capacity, performance and resilience. A major barrier identified is a lack of confidence to invest in sustainable technologies and methodologies, but it is noted that support from Government could encourage private investment.

3.3.2. Other Sources

The **Better Delivery: The Challenge for Freight** report, published by the National Infrastructure Commission in 2019, provides advice to Government on how to ensure an efficient, low-carbon freight system, that manages its impacts on congestion and utilises technology to support the UK's growth and global competitiveness. The report focuses on road and rail freight, and finds that through the adoption of new technologies and planning, it is possible to decarbonise road and rail freight by 2050, while managing its contribution to congestion. It is noted that Government can achieve this via clear objectives, working with the energy sector, freight industry and local

areas to ensure sufficient infrastructure for alternative fuels, as well as securing the land required for efficient freight operations.

Published by Logistics UK in 2012, **The Route to Net Zero: A Manifesto for Logistics** summarises the use of logistics in the UK, the importance of decarbonising the logistics sector, and an outline of 11 steps which need to be in place to decarbonise the sector. The manifesto focuses on road freight but includes increasing modal shifts to rail and water freight. The manifesto calls for support to transitioning to ultra-low emission vans, greater information on the best technologies and how to manage them, changes to maximum vehicle weight for emerging alternative power trains, and fiscal incentives to help overcome costs.

Logistics UK (formerly known as the FTA) commissioned a study, called the **FTA Electric Vehicle Report,** to understand how vehicle operators are responding to the policies and regulations that are encouraging the decarbonisation of the logistics industry. The study surveyed 31 members ranging from local operators to international fleets, covering a variety of sectors and locations, assessing the EV fleet size, perceptions around charging, and the overall position on investment into electric vehicles and their reasons why. The majority of respondents found the process of installing charging infrastructure challenging or disruptive, showing that greater support could be made to business around the installation process. The review notes that, on average, the cost to run an EV was cheaper than expected, but that the cost to buy, range and capability of EVs were worse than expected. Improving information around implementation and use of an EV fleet could help improve performance predictability and improve the experience of transitioning.

3.4. National Policy Review Summary

The Government has an obligation to monitor the markets and set national policy to steer industries to help achieve net zero in an economically sustainable manner. In June 2019, Parliament passed legislation legally requiring the Government to reduce the UK's net emissions of greenhouse gases by 100% by 2050 (relative to 1990 levels), thereby making the UK a 'net zero' emitter. The legally binding target sets a basis for many of the national policies developed to support decarbonisation.

Since the Climate Change Act in 2008 the Government has published several reports providing national strategy on decarbonisation, in line with the Government's 5-year carbon budget targets. The UK's next budget for the 2023–2027 period is 1,950 MtCO2e. Reductions in transportation emissions will play an essential role in achieving this budget as the transportation sector is now the biggest emitter compared to other sectors. High-level national policies include how private investment can be leveraged to speed up the transition to net zero, as well as increased research and development funds to increase advancements in technology.

Several sources focus on the transportation sector; with a key focus on investment in transportation infrastructure to support and encourage the transition to alternative fuels. Some air pollutants, particularly nitrogen dioxide, are recognised as localised issues, so to combat them government has given local authorities greater powers to create and enforce clean air zones. Clean Air Zones will have a direct influence on freight and could be used as a further mechanism by local authorities for encouraging the uptake of alternative fuels.

As well as Government reviews, there are a few independent reports from the Energy Taskforce, National Infrastructure Commission and Logistics UK, specifically reviewing the decarbonisation of the freight industry. These reviews include greater Government incentives to transition to ultra-low emission vans and changes to the maximum weight restrictions for the emerging alternative powertrains. The reports also suggest that further research into more efficient powertrains will be required, as well as more investment in the specific infrastructure that will be needed. The reports predominantly focus on road freight, but also suggests a shift to more efficient modes such as rail and water freight.

The reports recognise that electric powertrains are a more attractive option for smaller freight completing the 'last mile' delivery, but that other alternative fuels may be better suited to larger inter-urban freight. Further investigation could help identify more regional policies for specific alternative fuel types, such as biofuels and hydrogen, helping identify the extent to which specific supporting infrastructure will be needed.

The conclusions from the freight industry reviews could be used to form a regional strategy. For example, the call for greater information around alternative fuels could be addressed with a specific regional forum. Furthermore, a regional strategy could utilise the national funding mechanisms in infrastructure and net zero technology to boost regional investment, speeding up the transition to alternative fuels.

4. Regional Policy and Strategy Review

This section relates to regional policies published by local authorities and independent businesses, covering Regional Clean Economy Objectives, Regional Transport Plans, Regional Clean Transport Objectives and Regional Clean Freight objectives.

4.1. Regional Clean Economy Objectives

The **Western Gateway: Powering a greener, fairer future** document, published in January 2022, outlines the key facts, jurisdiction, missions and objectives of the region, with a focus on three primary ambitions. Firstly, it focusses on connectivity as Western Gateway pledges to "deliver world class physical and digital connectivity into and within our area to boost productivity, unlock housing and lead our transition to a net zero future." While freight is not explicitly mentioned here, the transport body promises delivery of improvements to major parts of the strategic road network including upgrades to the M4 and M5, improved connectivity through Swindon into England's Economic Heartland, and the installation of electric charging points across the region - particularly on the M4 and M5 road corridors.

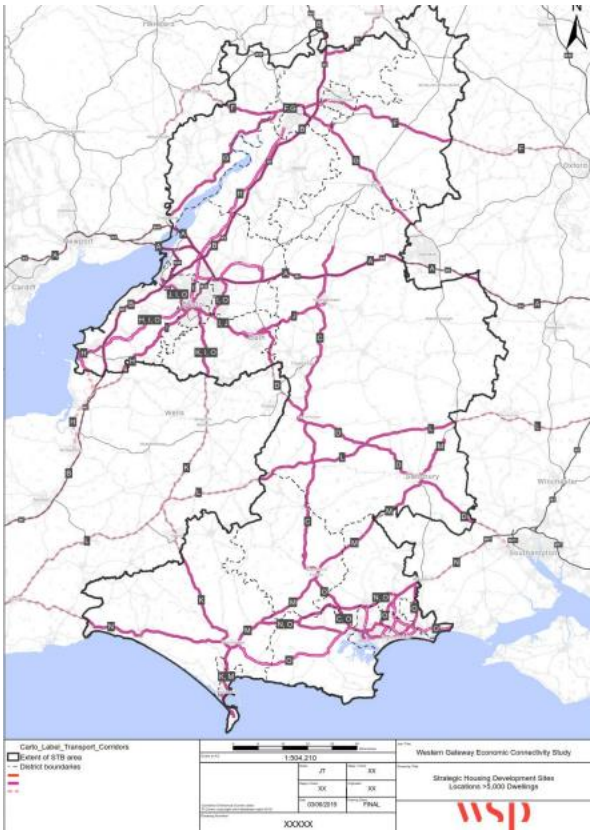
Secondly, the document focusses on the promise of becoming "Britain's Global Gateway for export and investment-led growth" through the delivery of their Global Gateway Strategy and by recognising the importance of strong trade links both domestically and internationally. To deliver this vision, Western Gateway intends to collaborating closely with neighbouring STBs to become a true Gateway to the UK for international trade. The importance of strong and progressive freight infrastructure is highlighted to enable the delivery of these ambitious plans. For example, mission 3 of the plan revolves around adopting renewable energy to work towards decarbonisation. This includes hydrogen fuel as they plan on developing their hydrogen hub in Swindon, with the aim of becoming a nationally significant and highly integrated Hydrogen cluster.

Lastly, Western Gateway plans to innovate by "bringing our universities, businesses, and natural assets together to meet the grand challenges and to create the new industries of the 21st century". The push for net-zero transport and freight is of the upmost importance in the current climate of technological and scientific research, and key to becoming an internationally recognised powerhouse for innovation. Western Gateway explicitly states its intention to become a global leader in the development of ultra-low emission vehicles, low carbon propulsion systems and lightweight structures for cars and planes. Therefore, this movement towards innovative, low-carbon forms of transport is highlighted here through using new, alternative technologies that are being developed to act as a solution for creating a cleaner economy within transport.

Published in 2022, the **West of England Combined Authority's Climate and Ecological Strategy and Action Plan** follows the declaration of a climate emergency in the region in 2019**.** The plan outlines ambitious goals and aspirations to tackle climate change and move towards a low carbon economy, setting out the scale of the challenges and actions needing to be taken. Five key priorities are identified, which include the development of a low carbon transport network, decarbonisation of buildings, places and businesses, helping nature recover from the impacts of climate change, and improving the uptake of renewable energy within the region. From a transport perspective, the plan outlines ambitions to reduce vehicle movements, increase the share of sustainable modes, increase the uptake of low carbon and electric vehicles, and encourage use of public transport. Relevant to the development of this strategy are commitments to increase the amount of electric charging infrastructure in the region, and a commitment to support industry partners to develop future transport fuels and energy systems. However, in order to achieve their ambitions, West of England Combined Authority requires support from the Government to accelerate progress towards net-zero and for goals to remain obtainable.

Included in the Regional Evidence Base (REB) submitted to the Department of Transport in 2019, the **Western Gateway Economic Connectivity Study** is a response to the Government's request to identify sub-national priorities for the Major Road Network from 2020 until 2025. The document identifies 15 strategic travel corridors, as shown in Figure 4-1 below, considered as high-level facilitators of increased economic activity, according to their existing status. These corridors link strategically important locations across Western Gateway, and are vital for boosting trade across the area, helping to rebalance the national economy away from reliance on London and the South-East, generating economic activity for neighbouring STBs in the process.

Figure 4-1 - The 15 Strategic travel corridors



In the context of freight, the document indicates that the STB will provide better connectivity for freight flows (both road and rail borne) to the major sea ports in the Western Gateway, in particular at Poole and Bristol, and to airports in the region including Bournemouth and Bristol. With large volumes of freight traffic moving to and from the sea ports in the Western Gateway region, the strategic corridors have a vital role to play in ensuring journey times, costs, and delays are kept to a minimum.

The **Peninsula Transport Economic Connectivity Review**, published in 2020, highlights the importance of strategic connections – those in and out of the peninsula – in bringing people together, facilitating trade and supporting clean growth in its economy. It also analyses current and future economic activity in the peninsula in relation to transport.

Although freight is not explicitly mentioned in this document, the Peninsula region currently emits around five million tonnes of CO2 each year. Therefore, to stay in line with decarbonisation goals, the body states that it must; reduce the CO2 emissions of each vehicle trip by making the vehicle more efficient, driving it more efficiently or increasing the number of passengers, reduce the number of vehicle trips that people make or the distances they travel and encourage modal shift to reduce reliance on private vehicles.

4.2. Regional Transport Plans

A component element of the Peninsula strategic transport plan is highlighted in the 2021 **Peninsula Transport: Vision** document, which outlines the vision, goals, challenges and opportunities, and role of the Peninsula Transport STB. The document provides context and statistics regarding the region's travel and mobility behaviours, alongside a summary of the strategies and studies used to support the development of the full Transport Strategy.

Another component of the Peninsula strategic transport plan can be found in the **Peninsula Transport: Regional Evidence Base document, published in 2019.** This is where Peninsula Transport identified a set of key transport schemes for submission to the Government's Major Road Network and Large Local Major fund. The Regional Evidence Base details the regional transport challenges and opportunities, prioritising the schemes submitted by outlining information about current transport schemes in development in the Peninsula area. The key challenges discussed regarding the current transport network include:

- Increased traffic volumes on the strategic road networks
- High visitor numbers placing further strain on networks (21m domestic visitors in 2017)
- High journey times within the peninsula and beyond
- Vulnerability and resilience of existing rail infrastructure
- High proportion of business population is rural
- Low utilisation of bus for Travel to Work (<4% average.)
- Ageing port and airport infrastructure

Produced in 2020, **Western Gateway's Strategic Transport Plan (2020-2025)** outlines the role and functions of the Sub-national Transport Body by identifying both the short-term strategic issues and the long-term delivery outcomes and scheme priorities over the next five years. The plan enables a long-term vision to be developed that identifies a sequenced list of investment priorities based on regional rather than local need. Understanding

this will provide clarity on transport investment priorities enabling more effective and meaningful engagement with Government.

The aim of this Strategic Transport Plan is to deliver sustainable growth by ensuring the Western Gateway area is sustainably connected and provides high quality and value for money travel opportunities for all businesses, residents, and visitors. To help achieve these aims, five economic, environmental and social challenges have been identified:

- The legacy of COVID-19 which is likely to have a significant impact on traditional journeys and freight travel patterns;
- The need to decarbonise the transport network with partner authorities declaring a climate emergency;
- The importance of improving connectivity to support the delivery of sustainable growth;
- Tackling rural accessibility gaps by working with partners to develop sustainable solutions to maintaining rural transport infrastructure; and
- Reducing the regions productivity gap by removing transport constraints.

More specifically, the strategy outlines a broad intention to meet regional electrification objectives for passenger transport matching timelines identified in Network Rail's Traction Decarbonisation Network Strategy. With regard to freight, rail freight, and its interaction with road freight, the strategic direction is to improve the overall network freight experience, therefore increasing the popularity of multi-modal hubs, and decrease the distance travelled by HGVs as a result of freight movement through ports and rail in the region, and beyond that, end-destination freight destinations.

The **Western Gateway Rail Strategy** highlights specific regional blockers to the uptake of rail freight as a key freight mode in the region. Chief among them is the discrepancy between the loading gauges in the Western Gateway region, and the industry and European standards for the transportation of multi-modal containerised freight leading to specific network development bottlenecks. The strategy goes on to classify through a SWOT analysis the various delivery and strategy priorities needed to be undertaken to meet the ultimate strategic themes of choice, decarbonisation, social mobility, productivity, and growth.

In 2020, Western Gateway commissioned a **Review of Multi-modal Access to Ports and Airports**, which conducted a thorough analysis of modal accessibility of ports and maritime hubs in the Western Gateway area. By profiling and classifying the South West maritime sector in a national and international trade context, the study applied a robust research methodology to assess general and transport-related challenges faced by ports in the area. The report provided insightful recommendations across five themes: digitisation and technological connectivity, sustainability and mode shift, infrastructure renewal, freeports as a political tool, and regeneration and change of use for small ports. Considering the diverse operating environments of each port in the study, the authors advised further research into the role of freight

The **2020 West of England Combined Authority 10 Year Rail Delivery Plan** lays out the strategic and delivery objectives in relation to the development of the railways in the West of England Combined Authority area. Although the document mainly focuses on passenger transportation, associated amenities and station facilities, there is explicit mention of rail freight, in particular the desire to develop an understanding of the particular freight movement demands in the area, and associated electrification works which will continue to support decarbonisation through identifying strategic and local freight capability routes. By increasing network capacity and resilience, the operational effectiveness of freight traffic will be supported.

4.3. Regional Clean Transport Objectives

Produced in March 2020 (Pre-COVID) **Travelwest Joint Local Transport Plan 2020-2036** is the fourth Joint Local Transport Plan (JLTP4) led by West of England Combined Authority. Covering Bath & North East Somerset, Bristol, North Somerset, and South Gloucestershire Councils, this document sets out the transport aims and strategies to achieve them up until 2036. The primary objectives outlined are to take action against climate change and address poor air quality, to support sustainable and inclusive economic growth, to enable equality and improve accessibility, and to contribute to better health, wellbeing, safety and security. This plan aims to create a well-connected sustainable transport network for residents. It highlights the need for alternatives to high carbon transportation, and supports the adoption of low carbon forms of transportation, such as public transport and cycling.

This plan focusses on improving transportation at four levels; beyond the West of England, within the West of England, at a local level and at neighbourhood level. In terms of alternative fuels, it highlights the need for vehicles, for example, public transport to be of high modern standards to utilise alternative fuels where possible and minimise emissions. This solution also applies to freight transportation. It highlights the need for all future transportation and infrastructure to be designed to take account of climate change and abide by national policy

and best practice design, to ensure a constant progression towards a better future. Furthermore, it states new transport modes should use sustainable fuels, for example, electric vehicles.

Freight is considered as part of JLTP4. It mentions embracing innovation through existing and developing partnerships, particularly using lower emission and automated freight vehicles. Through the existing Ultra-Low West programme, funding will be used to expand the low-emission Freight Consolidation scheme to reduce the number of heavy-goods vehicles entering the city centre and link this with micro-consolidation and 'last mile delivery' for small and medium-sized businesses. Therefore, this scheme highlights that freight transportation can be decarbonised through implementing solutions like these that work towards creating lower emissions.

Published in 2022, the **West of England Combined Authority Sustainable Transport Settlement** is a document which sets out the vision and plan for sustainable transport in the West of England area, led by the Metro Mayor and constitutes a joint effort between the local authorities of Bristol, South Gloucestershire, and Bath and North East Somerset, alongside the Combined Authority. The document describes a coherent programme of investment in public transport, cycling and walking, and the benefits and outcomes expected from these.

On decarbonisation of transport, West of England Combined Authority states it will "take a big step forward decarbonising transport and improving our environment". The interventions detailed are expected to help achieve West of England Combined Authority's target to reduce carbon emission in the region by 464 kilotonnes CO2e each year, which is aligned with the Government's ambitions for each carbon budget and for net zero by 2050. In terms of freight transportation, this document addresses the need for West of England Combined Authority to support high volumes of freight journeys whilst ensuring highway congestion does not eliminate potential growth. The vision is to create large-scale improvements in its rail network to produce long-term impacts allowing rail users to rely on the rail network for many more journeys. This will directly benefit freight transporters as there is a reduction in the amount of freight inefficiently transported by road as congestion is lowered on the highways. Also, the plan states that significant decarbonisation benefits will result from electrifying the rail network in the medium-term future.

4.4. Regional Clean Freight Objectives

Western Gateway and Peninsula Transport jointly produced a key document on **the South West Freight Strategy.** Produced in 2021, this document addresses the opportunities, challenges, and priorities for freight in the wider area over the next 30 years to 2050. The joint approach taken by both STBs was designed to create a more streamlined and strategic approach to overcome the challenges facing freight in the region.

The document identifies the high-level behaviours of freight transportation in the region. Food and Drink, Quarrying and Mining (Peninsula) are the largest commodity categories imported and exported from the area, with the quarrying industries providing raw materials across the UK for manufacturing and construction sectors. Due to this, Western Gateway and Peninsula Transport are planning expansive developments into heavy rail freight and mode shifting away from long distance haulage of these aforementioned bulk goods. The benefits of doing so are listed as having less congestion on the roads (therefore more capacity for other road freight movements), a reduction in environmental damage, and greater efficiencies within the freight industry. Intermodal terminal opportunities are identified in the document, promising to reduce 'empty running' HGVs which currently stand at 22% of all HGV journeys in the region.

Road congestion has also been identified as one of the biggest issues freight transport faces as the South West SRN is less developed than other areas of the country, resulting in pinch points across the SRN. This is due to congestion being caused by having few alternative routes after an incident has occurred on the highway. This is an issue around larger conurbations, such as Bristol, Exeter, Bournemouth and Plymouth, especially around peak holiday seasons.

The availability of electric charging or gas fuelling infrastructure presents itself as a challenge when transitioning into alternative fuel technologies, for example, due to charging infrastructure being essential at terminals/depots to enable charging overnight and the level of investment this requires. In addition, there are questions over the role of STBs in addressing the issues outlined and shaping future priorities with different stakeholders. For example, what role should Peninsula Transport and Western Gateway play in facilitating schemes and projects and working with the private sector to leverage industry goals.

The strategy has a specific focus on rail freight in a multi-modal context, and recognises the role rail freight can play in decarbonising the freight industry as a whole, with one rail locomotive moving the equivalent of between 30 and 80 HGV loads depending on its route and weight. It supports the use of electric locomotives in rail freight due to their efficiency and better traction capabilities. In addition to this, rail freight operators have alternative methods to decarbonisation, such as, bi and tri-mode locomotives, and electric power being available. There are

also trials of hydrogen freight locomotives being introduced in Canada, which could be an efficient way to decarbonise freight transport.

Despite the potential contribution of rail freight, the strategy recognises that the current volume of rail freight in the Peninsula Transport area is relatively low, with the primary movement being aggregated from Merehead and Whatley Quarries to the London area for the construction sector. Rail freight volumes are higher in the Western Gateway area due to aggregate transit and significant steel movements and some intermodal services.

The strategy also examines the role of ports and maritime in a broad freight context. South West ports, such as Bristol, bolster the UK economy with a £640m Gross Value Added contribution and 10,100 direct jobs. Despite evolving commodity dynamics since the 2008/2009 recession, coastal shipping remains vital for the region's daily life. Infrastructure enhancements have addressed shifting demands, like automotive traffic in Bristol and fuel at Falmouth, while inland freight movements primarily rely on A roads. Congestion issues on key corridors (e.g., A30, A38, and M5) highlight opportunities for improved road infrastructure and port access. With limited international freight capacity, the South West relies on the Port of Southampton for deep-sea traffic.

To successfully decarbonise freight and facilitate goods movement in the South West, the strategy argues that several elements must be in place. These include sufficient aggregated volumes of goods, suitable quality freight paths, terminals to load and unload cargo, suitable loading gauge and route availability, market interest, assistance from Great British Railways, financial help through Mode Shift Revenue Support, and the carbon benefits of running freight trains with alternative power propulsion methods. Despite these developments, barriers to modal shift persist in the region, with the Peninsula Transport Economic Connectivity highlighting the region's reliance on road transport. Future improvements in rail freight infrastructure and services are necessary to promote a modal shift and support decarbonisation efforts.

Over the next 30 years, the plan describes the objective of a shift to lower-carbon freight modes of transport, such as rail or coastal shipping, and using engines that run on clean and renewable fuels for those journeys that remain on the highway. The strategy also recommends embracing the role of technology in supporting the decarbonisation of the strategic transport network.

4.5. Regional Policy Review Summary

Regional authorities have shown a clear commitment to the development of alternatively fuelled, lower carbon and more efficient freight vehicles and powertrains. The regional policies act towards addressing the obligations in the Climate Change Act of 2008 with the aim of decarbonising the transportation sector, which is responsible for a large proportion of the UK's carbon emissions, and therefore aligning with the Government's 5-year carbon budget targets. These strategies, for example, the joint South West Freight Strategy by Western Gateway and Peninsula Transport, focus largely on the need for decarbonising freight transportation through adopting low carbon modes of transport. For example, electrifying the rail network would improve the amount of freight efficiently and sustainably transported. These strategies focus on creating well-connected sustainable transportation networks for residents, as well as reducing the number of heavy-goods vehicles entering urban areas and introducing 'last mile delivery' for small and medium-sized businesses to decarbonise freight transportation. The importance of improving connectivity, improving public transport infrastructure, and promoting rail journeys is foregrounded as a method of decarbonising freight transportation due to lowering congestion and journey times for freight vehicles on the highways.

Regional policy also consideres the impact of other modes on net zero objectives, and there is a mature strategy and policy base on non HGV modes such as rail and ports/maritime. These policy considerations mainly seek to join up and increase multi-modal connectivity and accessibility for regional freight traffic, with the broad intention of managing road network demand from HGVs. Policy as it relates to rail is focused on electrification, and guage improvements intent on facilitating capacity and bandwith upgrades and associated site development for multi-modal hubs in the region. These hubs have the potential to allow road-freight operators to leverage infrastructure in the rollout of alternative fuel refuelling, which supports the objective of this work.

Plans by Western Gateway also highlight the importance of net-zero transport for freight as they state its intention to become a global leader in the development of ultra-low emission vehicles, low carbon propulsion systems and lightweight structures for cars and planes. Therefore, this adoption of cleaner forms of transportation and innovative technologies act as a solution to the transportation sector's large creation of emissions.

While the benefits of these technologies are made clear and the potential effects of these are discussed in great detail, the principal challenges facing the freight industry in the South West involve tackling congestion on the SRN, improving access and availability of electric charging or gas fuelling points, and supply chain efficiency and

scalability concerns governing the advancements made in freight technology development, all of which are at the forefront of the Freight Strategy in the region.

It should be noted that the slow uptake of EVs is acknowledged and the issues causing this are listed as cost, range anxiety and charging availability. Equally, these strategies highlight the importance of innovative, strong and progressive freight infrastructure, for example, adopting renewable energy, such as hydrogen fuel to stay on track to meeting the UK's carbon emission goals. These findings highlight the importance of developing a strategy outlining the development of a cohesive refuelling network, ensuring the freight and logistics sector has the confidence to transition to alternatively fuelled vehicles.

5. Local Policy and Strategy Review

Within this section, policy documents at a local level have been reviewed (i.e. those released by the constituent local authorities within Peninsula Transport and Western Gateway). Objectives centred around Local Clean Economy, Local Clean Transport and Local Clean Freight have been identified within local policy documents to determine how each local authority is aiming to decarbonise its transport, with a specific focus on freight objectives. In order to provide an overview of the policy aims and objectives of all 13 local authorities within the two STB areas, short summaries have been provided in the following section.

5.1. Local Clean Economy Objectives

All local authorities within the Peninsula Transport and Western Gateway areas have declared a Climate Emergency. A Climate Emergency is defined as 'a situation in which immediate action is needed to reduce or stop climate change and prevent serious and permanent damage to the environment'[3].

A local authority would typically declare a Climate Emergency in order to demonstrate the need for a change in policies or planning to reduce the carbon emissions that are produced within its area to achieve a stated Net Zero/Carbon Neutral goal.

The section below summarises the net zero or decarbonisation plans for each of the local authorities within the Peninsula Transport and Western Gateway regions, including any relevant objectives directly related to transport. Net zero and decarbonisation plans were reviewed in order to determine how each local authority is planning to achieve net zero status with respect to transport, and, if applicable, how these plans fit in with freight. It is important to note that some councils within the region have declared ecological emergencies alongside climate emergencies. This commits the local authority to no biodiversity loss, which may impact the further construction of alternative fuels infrastructure siting.

5.1.1. Peninsula Transport

This section summarises the net zero and decarbonisation plans published by the local authorities contained within Peninsula Transport: Plymouth City Council, Devon County Council, Torbay Council, Somerset County Council, and Cornwall Council.

Plymouth City Council announced **Plymouth Climate Emergency Action Plan 2022** in January 2022. This report outlined the actions Plymouth County Council plan to take in order to achieve net zero by 2030.. In order to reach Net Zero targets, Plymouth plans on promoting all cars and vans in Plymouth to be electric and installing the corresponding charging infrastructure. In relation to transport, the key relevant objectives announced are developing a plan for more efficient distribution of goods across the region and publishing an 'Electric Vehicle Chargers Inclusion and Accessibility Design Guide' to raise the standard and consistency of facilities in the city. At the end of 2021, there were 283 electric vehicles registered in Plymouth, however, this plan highlights the importance for larger commercial vehicles and HGVs to also consider reducing emissions. In terms of freight transportation, the plan includes partnering with Network Rail to discuss investment into rail freight opportunities, and also plans to contribute to the Peninsula Transport Regional Rail and Freight Strategy to develop a plan that works towards more efficient delivery. In addition, this action plan involves working with partners to help achieve sustainability goals, for example working with the Plymouth Net Zero Partnership to investigate innovations in fleet technologies, and work with the University of Exeter and the University of Plymouth Sustainable Earth Institute to identify opportunities for research into clean transport technology.

Devon County Council published a report in August 2018, called the **Devon County Council's Climate Change Strategy.** This report outlined Devon County Council (DCC)'s plans to combat the climate emergency. In relation to the transport sector, this guide presents key objectives. For example, DCC will contribute to the reduction of emissions associated with transport by supporting low-carbon vehicles, by promoting sustainable transport and communication choices, and through the sustainable planning of new development. In addition, DCC will work with the freight sector to develop strategies that reduce unnecessary journeys, shorten distances covered, and minimise empty running. Lastly, DCC can help facilitate the uptake of EVs by supporting the installation of charging infrastructure, by incentivising EV use through, for example, providing priority parking spaces or reduced charge parking (where DCC has control), and provision of dedicated lanes. This could be implemented into freight transportation, for example, ensuring widespread availability of charging points along freight vehicle corridors or providing dedicated lanes for electrified freight transportation.

[3] Oxford Learner's Dictionary - https://www.oxfordlearnersdictionaries.com/definition/english/climate-emergency?q=climate+emergency

Devon Climate Emergency published it's **Devon Carbon Plan** in September 2022. This plan is a roadmap for Devon and associated councils to reach net-zero emissions by 2050. The plan divides carbon emissions into five categories: Economy and resources, energy supply, food, land and sea, transport, and the built environment. The plan covers Plymouth, Devon, and Torbay. Within the transport section, the plan makes specific reference to road-freight and alternative fuels, although does not lay out any specific action related to the issue other than supporting broader infrastructure planning.

Torbay Council published its **Carbon Neutral Council Action Plan 2022 to 2024**, in 2022, highlighting its plans to be carbon neutral by 2030. There were two main objectives in this plan relating to transport; the Local Sustainable Transport Fund (LSTF) that is working to promote a modal shift from single car occupancy to low carbon alternatives through a series of infrastructure projects, public transport service upgrades, collaboration with local employers and behaviour change programmes. Secondly, the plan focuses on its longer-term plans around five main goals; a reduction in carbon emissions, supported economic growth, promoted accessibility, contribution to better safety, security and health and improved quality of life and a healthy natural environment. The co-benefits from these measures encourage active travel, which in turn brings significant health and economic benefits. In addition to this, the plan focuses on upgrading some of the fleet to be more fuel efficient and less polluting. They plan on completing a council-wide Green Fleet Review to understand how to transition the fleet to become carbon neutral by 2030, and then plan to pilot an electric vehicle trial within the fleet. This could be adopted into freight vehicles, for example, piloting electric freight vehicles.

Somerset's Climate Emergency Strategy, published in November 2020, has a large focus on electric vehicle use as Somerset County Council promises to develop an electric vehicle (EV) strategy which ensures that there is more provision of charging infrastructure available, and that the technology associated with EVs is standardised. Therefore, this makes EVs more straight-forward to use, incentivising uptake and overcoming barriers to adoption. The strategy acknowledges that advances in LGV and HGV technologies will see an increase in the number of alternative fuelled freight vehicles. The strategy analyses existing alternative fuels research, for example, new high speed "mega chargers" that allow trucks to add 400 mile range in 30 minutes. Also, the strategy looks at Germany as an example of clean HGV transportation where trials have been taking place to test the use of overhead lines on strategic roads so that HGVs can charge on-route. It is also noted that HGVs fuelled by hydrogen have the potential to offer increased range and maximise time spent re-fuelling. Furthermore, it points out that maintenance costs in hydrogen HGVs are cheaper than diesel powered HGVs as there are fewer moving parts. The document concludes by calling for further research to be undertaken into the costs associated with hydrogen or electric freight vehicles, to support the transition.

Similarly, Cornwall Council announced their **Climate Change Plan** in July 2019 with the aim of becoming net carbon neutral by 2030. In this plan, emissions from the transportation sector are addressed through three main objectives. Firstly, Cornwall Council will aid residents and businesses to switch to ultra-low emission vehicles through providing appropriate alternative fuelling infrastructure and invest in bus operators to adopt ultra-low emission buses. Secondly, they will build a sustainable bio-methane supply chain through developing Cornwall's first commercial scale bio-methane refuelling station with the potential to fuel 50 heavy vehicles per day. In addition, they will pilot hydrogen refuelling, focussing on alternative methods of fuel in order to create less emissions in the transportation sector. Freight vehicles could also switch to ultra-low emission vehicles, and trial bio-methane refuelling or hydrogen refuelling.

5.1.2. Western Gateway

The section below summarises the net zero and decarbonisation plans published by the local authorities contained within Western Gateway: Bristol City Council, Wiltshire County Council, Bath and North East Somerset Council, North Somerset Council, Gloucestershire County Council, South Gloucestershire County Council, Dorset Council, and Bournemouth, Christchurch & Poole Council.

In February 2020, Bristol City Council announced its **One City Climate Strategy** with the aim of Bristol becoming carbon neutral by 2030. Bristol's climate vision focuses on switching to more zero carbon forms of transportation, such as, walking, and converting remaining vehicles to zero carbon fuels and transforming freight, aviation and shipping. In relation to transport, a key objective of the plan is to deliver a comprehensive freight consolidation scheme, including effective first and last mile solutions, that drastically reduce delivery trips as they aim for a total 40% reduction in vehicle miles through schemes such as these. Secondly, this plan focuses on electric vehicle promotion to a large extent, with the installation and smart management of electric vehicle charging and hydrogen refuelling infrastructure across the city being at the forefront of the plan, and engaging with the market in Bristol. Bristol is also initiating a CAZ (Clean Air Zone) within it's city centre limits. This will also influence alternative fuel uptake for freight operators in the area.

Wiltshire Council announced **Wiltshire Climate Strategy 2022-2027** in February 2022. Wiltshire County Council state that the future needs to be fuelled by clean energy that is achievable and affordable, and that actions need to be put in place now. A key element of this plan that Wiltshire County Council expressed is the importance of

acknowledging that Wiltshire's towns and cities compared to rural villages will require different solutions to achieve a transport system in Wiltshire that has zero carbon emissions. Also, this plan has an emphasis on exploring the potential for local delivery hubs, and coordinated, low-carbon forms of transport for the last mile of deliveries in towns to work towards creating fewer emissions in Wiltshire from the transportation sector. Lastly, they focussed on improving vehicles and infrastructure to promote alternatives to fossil-fuel dependent vehicles, for example, through integrating alternative fuel solutions, including electric and hydrogen solutions across Wiltshire. It points out that while hydrogen and other alternative fuels are being tested and developed, electric vehicles need to be part of the immediate solution as Wiltshire County Council plan on introducing electric vehicle charging points. In addition to this, the plan also states the need to adopt carbon neutral fuels for heavy fleet vehicles.

Bath and North East Somerset Council announced a **Climate and Ecological Emergency Action Plan** in January 2021, which entailed multiple transport-related objectives. Firstly, a Clean Air Zone (CAZ) project was implemented in accordance with the agreed programme. In addition, this plan worked towards reducing supplier journeys in Bath, with a pilot trial of a last mile delivery service, entailing 10 electronically assisted cargo bikes, provided from the Energy Savings Trust in Bath to help businesses make sustainable, pollution-free deliveries. This action plan also works towards promoting alternatives to diesel/ petrol powered vehicles through expanding the public electric vehicle charging network across B&NES with funding from the Go Ultra Low West Project including rapid charging points in public car parks to help businesses make sustainable, pollution-free deliveries.

The **North Somerset Climate Emergency Action Plan** was announced in 2019 by North Somerset Council with the aim of North Somerset becoming carbon neutral by 2030. The main aspect of this action plan relating to the transportation sector involved implementing an electric vehicle charging hub in Portishead to promote electric vehicle use, leading to lower emissions from vehicles in North Somerset. The council also plans to work and promote this to others, taking a leadership role with, for example, its contractors and service providers to reduce their carbon footprints through transitioning to an electric fleet and using renewable energy sources. This push towards electric vehicles could be used in all aspects of the transportation sector, for example, electrified freight transport.

Gloucestershire County Council published a report in December 2021 called **Gloucestershire Climate Change Strategy 2nd Annual Report & Action Plan (2022/23 – 2026/27).** This report outlines Gloucestershire County Council's response to the climate emergency. In relation to transport, the report has a large focus on the decarbonisation of the transport sector. It plans to invest in low-carbon and climate-resilient infrastructure, renewable energy and electric vehicle charging. The report detailed a plan to install over 200 new electric vehicle charging points by 2023, with rollout planned for early 2021 starting in residential areas of Cheltenham and Gloucester, with subsequent rollout in other areas of the county. In addition, it set an objective of a 30% Modal Shift in transport across all sustainable modes in by 2030. Furthermore, a review of its Local Transport Plan (LTP) is underway in view of the climate change emergency, which will focus on all transportation modes, for example, decarbonising freight transportation.

South Gloucestershire Council published a strategy to tackle the climate emergency- the **Climate Emergency Strategy 2020-2030.** Similar to previous plans, this strategy involved the promotion of electric vehicles through a wide assessment of the South Gloucestershire area to identify the EV infrastructure required, which involves the local authority identifying needs to address market failures and rural EV provision, and policy development. South Gloucestershire Council's focus on its pathway to success is based on ensuring very high reductions in transport emissions, approximately 380 kilotonnes to around 220 kilotonnes CO2e, and this is due to adopting alternative fuels and lowering vehicle mileage. It focuses on the need to switch to electric vehicles for those journeys unable to be undertaken by rail or foot. In this strategy, there is a key theme of monitoring and evaluation as South Gloucestershire Council plan on expanding its emission monitoring equipment and collecting carbon emission data for transport to aid in decision making. There is also reference made to offsetting carbon emissions.

In July 2021, Dorset Council announced its **Climate & Ecological Emergency Strategy** as a response to the Climate Emergency. In the transportation element of this document, there was an emphasis on the improvement of low-carbon transport infrastructure as it is embedded into the Local Plan and Transport Plan. There is strong encouragement of the decarbonisation of road transport in this strategy through the development of EV charging networks and the promotion of low emission transport vehicles. In addition to this, the strategy involved redirecting investment from strategic road schemes to low-carbon transport (work with Sub-national Transport Body and Local Enterprise Partnership).

In December 2019, Bournemouth, Christchurch and Poole Council created an approach called the **Response to Climate and Ecological Emergency.** This involved, similar to projects above, the development of an extended network of EV charging points for council use to provide certainty of provision. Furthermore, the report recommended an investigation of schemes, such as congestion charging, in order to change travel behaviours. The document also calls for the development of a Freight and Movement of Goods Strategy to support the sustainable movement of freight within the area.

5.2. Local Clean Transport Objectives

This section summarises the Clean Transport Objectives set out in the Transport Plans published by the local authorities contained with the Peninsula Transport and Western Gateway areas. These plans outline each Council's transport objectives and how it aims to achieve them. Any objectives related to Clean Transport have been summarised in the tables below.

5.2.1. Peninsula Transport

The section below summarises the Transport Plans and Clean Transport objectives published by local authorities contained within Peninsula Transport: Plymouth City Council, Devon County Council, Torbay Council, Somerset County Council, and Cornwall Council.

In January 2021, Plymouth City Council announced **The Plymouth Plan 2014-2034** with the aim to move towards clean transport in Plymouth. At the forefront of this plan is an investigation into promoting the growth of an electric vehicle charging network and encouraging electric vehicle take-up and use and continuing to work with partners to harness the benefits of alternative fuel technologies in both land and marine environments. When addressing freight transport in Plymouth, the plan aims to facilitate efficient freight movements at all spatial scales, with due consideration for the most appropriate mode of travel for the freight being transported, including encouraging and enabling low emission logistics, and working with operators to identify and deliver appropriate facilities.

Devon County Council and Torbay Council launched their **Devon and Torbay Local Transport Plan 2011 – 2026** in April 2011 with the aim of both councils working with the Highways Agency (now National Highways) to ensure development has a positive impact on the strategic network, supports sustainable travel and thereby facilitates economic growth in the peninsula. This plan involved Devon and Torbay developing their low carbon transport system through encouraging sustainable behaviour over the next 15 years and creating low carbon transport choices. This plan involves trialling a range of low carbon initiatives, for example, electric vehicle charging points, however, they do address that technology is always enhancing, and the need to keep up-to-date is important. Devon and Torbay Councils also are promoting the electrification of the Great Western mainline railway to Exeter, Plymouth and Cornwall to ensure faster journey times. Freight rail could follow these low carbon transport choices, for example, through trialling lower carbon forms of freight locomotives, or promoting alternative fuel recharging infrastructure at multi-modal freight hubs.

Somerset County Council announced **Somerset County Council Future Transport Plan 2011-2026** in February 2011. A main aspect of this plan involved working with hauliers to help them choose the most appropriate routes and work to improve communication between communities and the hauliers that serve them. In addition to this, the plan also focussed on alternative fuels, for example, by looking into how electric vehicles, responsibly sourced biofuels and other new technologies could help Somerset County Council meet its goals and challenges.

Cornwall Council Local Transport Plan to 2030, announced by Cornwall Council in April 2022, works towards ensuring Cornwall's transportation sector is improved by the year 2030 in order to meet the UK's carbon emission goals. Cornwall Council plan to work with the freight industry to reduce their carbon emissions through the regional Peninsula Transport Board. This will support a switch to lower carbon fuels and efficient logistics and distribution systems that where possible, utilise the rail network, local distribution centres and low carbon modes for deliveries in town centres and neighbourhoods. In addition to this, Cornwall Council plan on ensuring access for deliveries and servicing is considered and opportunities for sustainable freight distribution is maximised where possible. This plan also highlights the need for a reduction in reliance on fossil fuels, and therefore supports the introduction of low carbon technologies. This is achieved through two main objectives; securing funding to find the best method to switch from fossil fuels to alternative fuels, for example, electric vehicles, and supporting the freight industry to use lower emission modes such as rail when possible to reduce emissions.

5.2.2. Western Gateway

The section below summarises the Transport Plans and Clean Transport objectives published by local authorities contained within Western Gateway: Bristol City Council, Wiltshire County Council, Bath and North East Somerset Council, North Somerset Council, Gloucestershire County Council, South Gloucestershire County Council, Dorset Council, and Bournemouth, Christchurch & Poole Council.

Four of the local authorities in the Western Gateway: Bristol City Council, Bath and North East Somerset Council, North Somerset Council and South Gloucestershire County Council adopted a Joint Local Transport plan as part of the West of England Combined Authority , meaning that common transport objectives are shared between these Local Authorities.

The Travelwest joint Local Transport Plan 2020-2036 was announced in March 2020 by Bristol City Council, Bath and North East Somerset Council North Somerset Council and South Gloucestershire County Council. This

plan involves all four local authorities providing a well-connected and sustainable transport network to accelerate the shift towards low carbon trips. It also involves the progress of an ambitious programme to improve the efficiency, and reduce the impact, of freight movements and produce a Freight Strategy for the West of England. In addition, with the objective of decarbonising the transport sector in these areas, the adoption of Ultra Low Emission Vehicles is supported by all councils involved in this plan. Lastly, in terms of Clean Transport, new technology will be embraced to provide new travel options for people and ways of transporting goods.

Another transport plan contained within Western Gateway is the **Salisbury Transport Strategy Refresh** of May 2018 by Wiltshire County Council. This strategy ensures that development sites provide necessary infrastructure and services to facilitate journeys by sustainable modes of travel. In addition, it has the aim of reducing transport-related air pollutants and CO2 emissions, and ensures transport minimises any adverse impacts on the local environment. It addresses the potential need for electric trains, which could link to freight vehicles, as a solution to large emissions created by transportation.

Wiltshire County Council also has announced **Wiltshire County Council Local Transport Plan – Strategy** in January 2011. Wiltshire County Council states its main aim as reducing the level of air pollution and carbon emissions from transport to address Climate Change. Similar to plans previously mentioned, the provision, support and promotion of a choice of sustainable transport alternatives is at the forefront of this strategy. In terms of freight vehicles, this plan outlines the aim of encouraging the efficient and sustainable distribution of freight around Wiltshire. It looks at the uptake of alternative fuels in the long term and looks at methods of promoting alternative fuelled vehicles such as electric cars and hybrids. Furthermore, Wilshire Council plan on trialling the use of alternative fuels for their own vehicles, however, the need for significant investment into the infrastructure to enable this, for example, electric vehicle charging points, is needed.

In January 2021, Bath and North East Somerset Council announced **the Bath and North East Somerset Council – Journey To Net Zero 2014 – 2030** plan to move towards Cleaner Transport in this area. It outlined the plan to reduce vehicle carbon emissions to achieve carbon neutrality by 2030, improve air quality and health, and promote sustainable mobility. Within this scheme, the Go-Ultra Low West Scheme involves plans being in place to provide a Rapid Electric Vehicle Charging hub in central Bath with the ability to recharge in minutes. In addition to this, they have introduced electric charging points for electric car club vehicles, to allow for people who do not constantly have an electric vehicle to benefit from this infrastructure and work towards lower emissions. This initiative also provides financial support of a 50% match to businesses who want to install charge points. Furthermore, this journey to net zero involves a scheme where residents of West England were offered the opportunity to try out electric vehicles for two weeks. This could be implemented into freight transportation as trials of alternative fuels for freight would be a useful way to gather information and identify potential problems. This strategy also demonstrates how essential is it for electric vehicle charging points to be available and accessible, which freight transport would have to account for if transitioning. Reducing road freight in the city centre and the implementation of zero emission last mile delivery services is also expressed in this scheme as an effective solution.

Gloucestershire County Council introduced **Gloucestershire County Council Local Transport Plan (2020 – 2041)** in April 2021. This longer-term action plan works towards ensuring the public availability of infrastructure required for low emission vehicles, for example, ensuring there is enough electric vehicle charging points in Gloucestershire. In particular, the plan outlined the need for electric vehicle charging infrastructure to be provided at key locations, such as, interchange hubs. Similarly, the plan focusses on encouraging behaviour change amongst Gloucestershire residents and visitors to reduce travel demand, promote sustainable transport modes and develop lower-emission driving. In terms of freight transportation, Gloucestershire County Council works with freight companies and partners to achieve an increase in freight being transported by sustainable, low-carbon modes of non-road transport where possible and support the transition to ultra-low emission freight vehicles. In addition, this plan works with partners to attract investment to mitigate vehicle delay pinch points and explore opportunities for ‘trans-modal’ freight facilities.

In April 2011, Dorset Council worked with Bournemouth, Christchurch & Poole Council to create **Bournemouth, Poole and Dorset Local Transport Plan 2011 to 2026** which involves promoting the increased use of lower carbon, affordable and accessible transport modes to reduce the transportation sector’s reliance on fossil fuels. Furthermore, this plan aims to work with local “green fuel technology” businesses to advance the role of alternative fuel vehicles in Dorset. It also aims to raise awareness to the general public and freight industry of “eco-driving” techniques which reduce fuel consumption. Lastly, this plan has the objective of maximising the benefits and uptake of greener fuel vehicle technology.

5.3. Local Clean Freight Objectives

This section summarises any specific Clean Freight strategies objectives that have been published by Local Authorities contained within Peninsula Transport and Western Gateway.

Whilst the majority of Local Authorities have not published a specific freight decarbonisation plan, some references to Clean Freight were made in Local Transport or Decarbonisation plans. Where applicable, the objectives from these plans have been repeated from sections 5.1 and 5.2, and summarised in the tables below.

5.3.1. Peninsula Transport

The section below summarises the Clean Freight strategies or objectives relating to Clean Freight within documentation published by local authorities within Peninsula Transport: Plymouth City Council, Devon County Council, Torbay Council, Somerset County Council, and Cornwall Council.

In terms of freight decarbonisation, Plymouth City Council has no specific freight plan. However, as referenced in their Local Transport Plan and Decarbonisation document, **The Plymouth Plan 2014-2034,** Plymouth City Council plans to facilitate the efficient freight movements at all spatial scales, with consideration for the most appropriate mode of travel for the freight being transported, including encouraging and enabling low emission logistics, and working with operators to identify and deliver appropriate facilities.

Similarly, Devon County Council have no specific policy on alternative fuels for freight, however, in **Devon County Council's Climate Change Strategy,** the aim to work with the freight sector to develop strategies that reduce unnecessary journeys, shorten distances covered, and minimise empty running was foregrounded. DCC can help facilitate the uptake of EVs by supporting the installation of charging infrastructure, by incentivising EV use through, for example, providing priority parking spaces or reduced charge parking (where DCC has control), and provision of dedicated lanes.

Somerset County Council do have a specific strategy relating to freight transport, called **the Somerset County Council Freight Strategy** announced in December 2011. Although this does not focus on alternative fuels for freight, it focusses on the reduction of the environmental impact of freight transport (using targeted physical enhancements, sharing the load between routes, addressing loading and unloading problems, promoting rail freight and integration with other strategies).

Cornwall Council address freight transportation in their **'Cornwall Council's Climate Change Plan'**, which works towards building a sustainable bio-methane supply chain and developing Cornwall's first commercial scale bio-methane refuelling station with the potential to fuel 50 heavy vehicles per day. Cornwall Council also have announced '**Cornwall Council Local Transport Plan to 2030'** that includes Clean Freight objectives. Through the regional Peninsula Transport Board, Cornwall County Council will work with the freight industry to reduce their carbon emissions, supporting a switch to lower carbon fuels and efficient logistics and distribution systems that where possible, utilise the rail network, local distribution centres and low carbon modes for deliveries in town centres and neighbourhoods. In addition, they will ensure access for deliveries and servicing is considered and opportunities for sustainable freight distribution is maximised where possible and reduce reliance on fossil fuels and support the introduction of low carbon technologies. Furthermore, this plan involves securing funding to find the best method to switch from fossil fuels to alternative fuels. This includes electric vehicles. In terms of lower emission vehicles for freight vehicles, this strategy aims to support the freight industry using rail when possible.

5.3.2. Western Gateway

The section below summarises the Clean Freight strategies or objectives relating to Clean Freight within documentation published by Local Authorities within Western Gateway: Bristol City Council, Wiltshire County Council, Bath and North East Somerset Council, North Somerset Council, Gloucestershire County Council, South Gloucestershire County Council, Dorset Council, and Bournemouth, Christchurch & Poole Council.

Although Bristol County Council have no specific freight plan, there are clean freight objectives within **Bristol Council's One City Climate Strategy** that involves delivering a comprehensive freight consolidation scheme, including effective first and last mile solutions that drastically reduce delivery trips. Similarly, Bristol City Council, North Somerset Council, South Gloucestershire Council and Bath and North East Somerset Council are progressing an ambitious programme to improve the efficiency, and reduce the impact, of freight movements and produce a Freight Strategy for the West of England, according to their Clean Freight Objectives in **Travelwest Joint Local Transport Plan 2020-2036.**

Gloucestershire County Council have no specific freight plan, however, objectives relating to decarbonising freight transportation are mentioned in **Gloucestershire County Council Local Transport Plan.** Within this plan, Gloucestershire aim to work with freight companies and partners to achieve an increase in freight being transported by sustainable, low-carbon modes of non-road transport where possible and support the transition to ultra-low emission freight vehicles.

Local Transport Plan 3 Dorset Freight Strategy, announced in March 2017 by Dorset Council and Bournemouth, Christchurch & Poole Council, involves specific freight objectives which are working towards reducing carbon emissions from freight by increasing the proportion of biofuels used by freight. They plan to do

this by using an 'Ecostars'-like voluntary scheme to encourage vehicle operators to: (1) use fewer emitting vehicles, and (2) operate their fleet in an environmentally efficient way, therefore improving local air quality and reducing carbon emissions. Furthermore, this strategy involves identifying areas affected by air pollution caused by freight traffic and undertaking an Air Quality Management Plan.

5.4. Local Policy Review Summary

The review of Local Policies for Authorities contained within Peninsula Transport and Western Gateway has shown that all authorities have a Net Zero / Decarbonisation plan, with Authorities aiming for their areas to become Carbon Neutral between 2030-2050. Table 5- below details the Carbon Neutral / Net Zero target dates set by each Local Authority.

Table 5-1 - Net Zero Targets within Peninsula Transport and Western Gateway areas

Transport Body	Local Authority	Carbon Neutral Target Date
Peninsula Transport	Plymouth City Council	2030
	Devon County Council	2050
	Torbay Council	2050
	Somerset County Council	2030
	Cornwall Council	2030
Western Gateway	Bristol City Council	2030
	Wiltshire County Council	2030
	Bath and North East Somerset Council	2030
	North Somerset Council	2030
	Gloucestershire County Council	2045
	South Gloucestershire Council	2030
	Dorset Council	2050
	Bournemouth, Christchurch & Poole Council	2050

Upon reviewing the net zero and decarbonisation plans for local authorities within the Peninsula Transport and Western Gateway areas, it was found that most authorities' plans contained objectives relating to Clean Transport or Clean Freight. However, objectives specifically relating to freight were often not focused on in detail, and only one Local Authority (Cornwall Council) had an objective specifically relating to Alternative Fuels for Freight.

The Local Transport Plans for these Authorities were also reviewed, with a focus on objectives related to Clean Transport and Clean Freight. All these plans contained detailed objectives on ways to reduce carbon emissions in transport, with a range of objectives including facilitating the adoption of low emission vehicles and encouraging sustainable travel methods. However, this review found that there was a lack of specific local policies and objectives relating to Clean Freight, and in particular the use of Alternative Fuels in Freight. Whilst many Authorities had objectives for generally decarbonising transport, there was little mention of a focus on Road Freight, which comes with a number of challenges that would require separate strategies to other forms of lighter road vehicles.

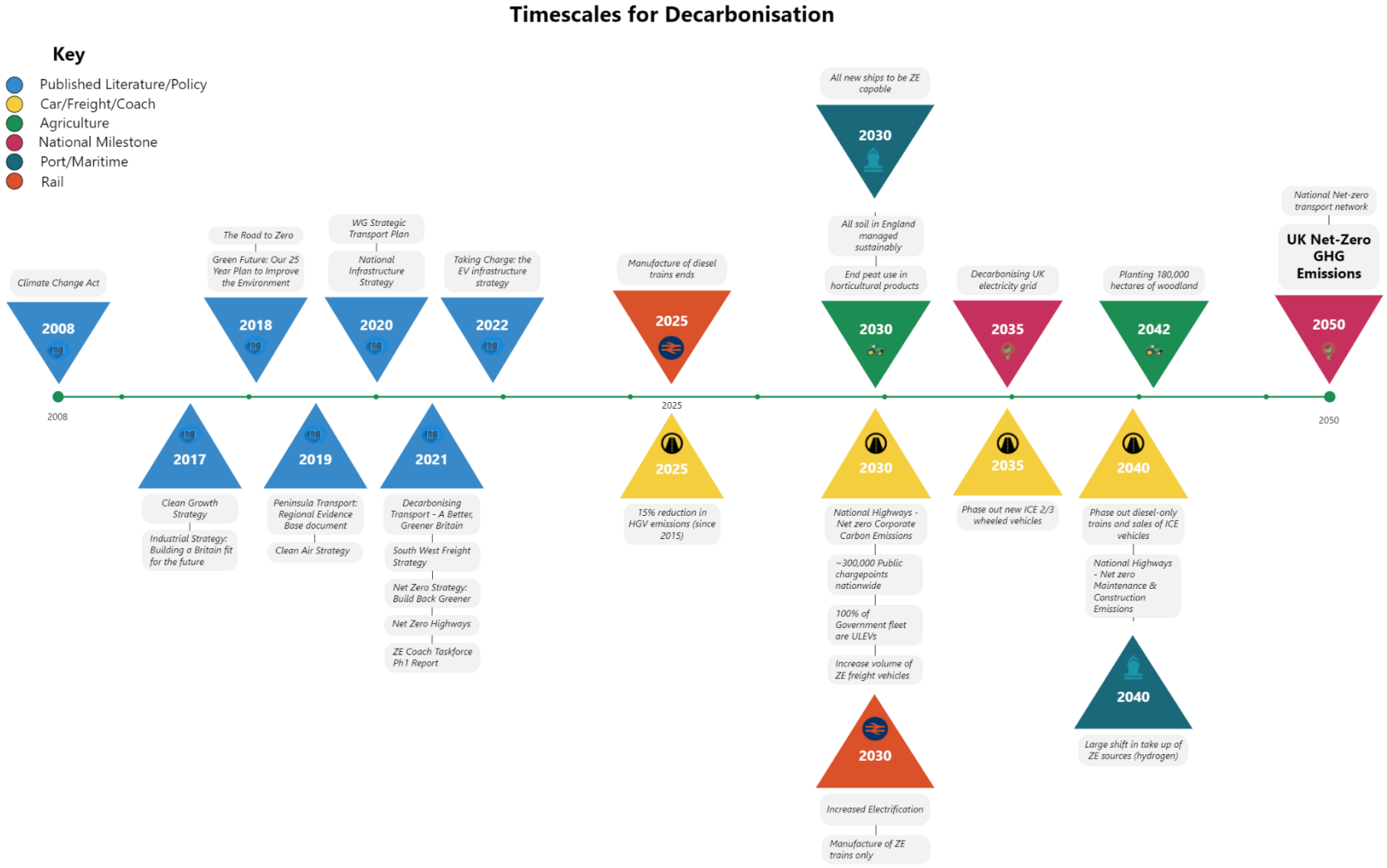
4 out of 5 Authorities in Peninsula Transport had a reference to decarbonising Freight in their Local Transport plans (Devon County Council, Plymouth City Council, Somerset County Council, Cornwall Council), and only 1 of these had a specific reference to Alternative Fuels for Freight (Cornwall Council).

In Western Gateway, 8 out of 9 Authorities had a reference to Clean Freight in their Local Transport plans (All except Wiltshire County Council), and 3 out of 9 (Gloucestershire Council, Dorset Council, Bournemouth, Christchurch & Poole Council) specifically referenced Alternative Fuels for Freight.

There is a possibility that the lack of specific Alternative Fuels for Freight policies contained within these Transport Plans is due to some of these Plans being older, therefore newer Alternative Fuel technologies would have been in their infancy at the time of publication (5 out of 10 of the reviewed Transport Plans were published in 2011). Some of the newer plans which mentioned Clean Freight also highlighted that governance surrounding the use and regulation of Alternative Fuels for Freight was currently at a National / Regional policymaking level, so would not require a reference in Local Transport Plans.

6. Timescales For Decarbonisation

This timescale diagram illustrates the UK's path to decarbonisation by mode of transport, highlighting critical milestones and associated policies or publications that shape the nation and region's obligations and milestones.



7. Conclusions

The government has committed to reducing the UK's net emissions of greenhouse gases by 100% by 2050, therefore decarbonising the transport sector, which is responsible for a significant proportion of these emissions. Documents described in this literature review explore how this can be done, and how it can be implemented into freight transportation. One of the most commonly agreed upon solutions discussed is alternative fuels for freight transportation, for example, transitioning away from diesel and towards lower carbon forms of transportation to create Clean Freight.

At a national, regional and local level, the electrification and adoption of lower carbon forms of transportation is widely accepted as a solution to the UK's large number of emissions from transport. At a **national level**, Clean Air Zones may encourage transitioning to alternative fuels for freight as it will directly impact freight on the road. As well as Government reviews, there are a few independent reports from the Energy Taskforce, National Infrastructure Commission and Logistics UK, specifically reviewing the decarbonisation of the freight industry. The push towards ultra-low emission vans and changes to weight restrictions is needed. Furthermore, the shift from road freight to more efficient modes of transport, such as, electrified rail is also highlighted within these documents. The reports recognised that electric powertrains are a more attractive option for smaller freight completing the 'last mile' delivery, but that other alternative fuels may be better suited to larger inter-urban freight.

At a **regional level**, Local Authorities, Councils, and Sub-national Transport Bodies have shown a clear commitment to the development of alternatively fuelled, lower carbon and more efficient freight vehicles and powertrains. All of the area's local authorities and transport bodies have highlighted extensive decarbonisation plans, net-zero strategies and time-based objectives that work towards promoting alternatively fuelled freight vehicles, for example, electrifying the freight rail network. Similar to the national level, documents expressed the need to decrease the number of heavy-goods vehicles entering the city centre and introducing 'last mile delivery' for small and medium-sized businesses to decarbonise freight transportation. The adoption of low carbon propulsion systems and lightweight structures in freight transportation is supported here to lower emissions from freight vehicles. Despite this, freight transportation faces many challenges to decarbonisation, such as, the availability of charging points or supply chain efficiency scalability concerns governing the advancements made in freight technology development, all of which are at the forefront of the Freight Strategy in the region.

At a **local level**, there were limited strategies directly relating to decarbonising freight transportation, however, freight transportation was addressed in other plans, for example, local transport plans, which were in support of lower carbon forms of transport being promoted at a local level, for example, the electrification of transport. In addition to this, it should be noted that schemes promoting an improvement of public transport and other individual level forms of transport, for example, walking and cycling, links to decarbonising freight transportation due to lowering congestion and journey times for freight vehicles on the highways.

With regard to the intersection between road freight decarbonisation and **other sectors** including rail, varying levels of policy and research into decarbonisation exist with a specific transportation angle. The rail sector well developed policy and strategy landscapes which clearly articulate infrastructure rollout plans, and the development of localised interventions to support uptake.

However, within the agricultural sector, and the passenger transport sector, the policy and strategy landscape is less well developed, in particular at a national government level, with the majority of research being led by industry organisations such as the Royal Agricultural Society of England, National Farmers Union, and Confederation of Passenger Transport UK.

The Martitime secor also struggles with some aspects of net-zero policy generation as the globalised nature of the industry makes it difficult to define UK specific infrastructure rollouts.

Specific to **rail transport**, Network Rail's Traction Decarbonisation Strategy identifies that full electrification of the UK railway network is the promoted path to net-zero carbon emissions. However, the industry has found difficulty in securing central government funding to implement this strategy, leading to doubt being cast over the short to medium term direction for the UK's rail fleet.

From the perspective of the **maritime sector**, although government policy supports the UK as a pioneer in alternative fuel uptake for domestic and international shipping, much of this potential work has to integrate the wider factors faced by a fundamentally international business, of which the UK is not necessarily the immediate leader.

Coach sector literature emphasizes the role of modal shift from car to bus and coach in achieving the UK's Net Zero emissions goal. Policy options should focus on encouraging this modal shift and decarbonizing the transport sector, including long-distance and tourism coaches.

Overall, the literature review underscores the need for multi-modal approaches, decarbonization strategies, and collaboration between stakeholders to achieve sustainability goals in various sectors.

Further investigation across the UK could help identify more policies for specific alternative or low carbon fuel types, such as biofuels and hydrogen for freight vehicles. These conclusions could be used to form a freight strategy, for example, through electrifying rail for freight vehicles, boosting investment into net zero technology through national funding mechanisms, speeding up the transition to alternative fuels, and introducing 'last mile delivery' for freight transport.

Stakeholder Engagement

8. Introduction and Methodology

To support the study, Atkins has engaged with key stakeholders from the public and private sectors to better understand the policy and operational contexts within which the transition to alternative fuels will be situated.

8.1. Stakeholder Workshops

Two workshops were delivered in July 2022 to facilitate more in-depth discussions with stakeholders working across the South West in the freight and logistics sectors to enable information and knowledge sharing on the following issues:

- Policy context and trends in the freight sector
- Development and marketisation of alternative fuel vehicles
- Development and marketisation of alternative fuels infrastructure
- Decarbonisation of road transport, and associated opportunities and challenges

The workshops were held virtually using Microsoft Teams, with a morning and afternoon schedule to ensure a wide reach of stakeholders had the opportunity to attend. Both workshops were advertised via our industry partners and stakeholder networks, and by Western Gateway and Peninsula Transport.

To preserve anonymity, individual names have been removed but a list of organisations who were represented in the sessions can be found in Table 8-.

Table 8-1 - Workshop Attendance

Stakeholder Group	Organisation
Representative bodies	West of England Combined Authority Peninsula Transport
Programme / Study Leads	Atkins Cenex
Local Authorities	Bath & North East Somerset Council Bristol City Council Dorset Council Plymouth Council
Industry Stakeholders	Road Haulage Association Aecom National Highways Network Rail Rail Freight Group Panoptic Group

Interactive discussion topics covered in the workshops were centred on the following topics:

Discussion One – Policy Paradise
Introducing the government's long-term vision for the UK freight sector. A look into the main challenges, objectives and actions needed to enable the transition to net zero.

Discussion Two – Alternatively Fuelled Vehicles
A review of the current uptake and early evaluation & impact of alternative fuelled vehicles across the UK. A look into the future, the technologies and funding opportunities within the freight sector.

Discussion Three – Infrastructure
Presenting the current infrastructure for alternative fuelled vehicles across the South West region. A discussion on the challenges and opportunities in expanding the infrastructure network to meet future demand.

Discussion Four – Pledge
An open and informal opportunity for attendees to showcase their contribution to helping the government's targets for decarbonisation.

The full slide deck used when facilitating the workshops can be found in Appendix E.

8.2. Online Survey

An online survey of fleet, freight and logistics operators working across the southwest was conducted; its focus was to better understand:

- The movement patterns of freight vehicles and the challenges with existing infrastructure
- The barriers and opportunities associated with the transition to alternative fuels
- Current attitudes towards decarbonisation
- Fleet development plans

The survey was open for 10 weeks from the 06 July to 12 September 2022. Distribution of the survey was initially led by Atkins following a mapping exercise to identify the target audience and key stakeholders. Due to a disappointing response rate, further promotion was undertaken by study stakeholders, Western Gateway, and Peninsula Transport. Significant challenges and pushback were encountered when attempting to engage with industry stakeholders, this was attributed to survey fatigue due to a number of other recent engagements on similar but different topics having been undertaken. Ultimately a total of 9 responses to the survey were received; despite the small sample size responses were received from a broad spectrum of stakeholders.

9. Workshops

9.1. Discussion One – Policy Paradise

Discussion One – Policy Paradise is an interactive activity that places attendees in charge of setting national freight policy.

After being updated on current local, regional and national freight policy, attendees were asked to share what action they would take and why. Prompts for discussion included Government deadlines, Government funding to help the transition and the challenges that some organisations may face in their pursuit to decarbonisation.

There was overwhelming positivity towards the Government's drive to decarbonisation across attendees at both workshops, however some attendees did share their concerns on what they believed to be unreasonable expectations and a perception by the Government of flexibility within the freight industry that in reality is not possible.

The greatest consensus amongst attendees was the need to review the current Government timeframes for decarbonisation plans, which at present will be challenging to meet. Organisations are reporting a 2 year wait for new vehicles which attendees raised as a concern considering the already limited vehicle market and uncertainty regarding the eventual preferred fuel type. Attendees believed the current phase out dates for HGVs and larger diesel vehicles means there is an opportunity and need to focus research on identifying and confirming both the short term and long term fuels of the future.

The Government's zero emission road freight demonstrator programme was applauded by attendees and was viewed as a timely support package. Attendees agreed that the £200 million being made available by the Government would provide invaluable insight into the capabilities of alternative fuelled vehicles and in turn give freight operators the confidence to make future vehicle purchases.

The topography of the UK, and the South West in particular, was discussed by attendees with both constraints and opportunities being identified. The geography of counties across the South West varies so implementation measures will need to be bespoke to each area. Attendees highlighted that Dorset for example had no motorways whilst Plymouth had an opportunity to utilise the river and Anchorages to shift road freight off land. Freight consolidation programmes were discussed by attendees, and although the opinion is very positive, it was agreed that the rurality of the South West would make it difficult to implement. The one area that may have the infrastructure for freight consolidation would be Weymouth due to the local road network.

A number of attendees identified there is now a greater appreciation of how the freight and servicing sector contributes to people's everyday life, and therefore the importance of making sure the sector operates efficiently. The Covid-19 pandemic has increased the visibility and 'human' aspect of the freight sector. However, attendees agreed that more publicity and lobbying was required to help the freight sector receive the required financial support.

9.2. Discussion Two – Alternatively Fuelled Vehicles

Stakeholders were asked a series of questions on the current and future uptake of alternative fuel vehicles in their organisation, and encouraged to elaborate on their impressions, perceived benefits and drawbacks, use cases, and their current plans for replacing internal combustion engine (ICE) vehicles in their fleets. A discussion on attitudes towards hydrogen, electric, biofuel and hybrid vehicles

took place, with a focus on the feasibility of replacing the current vehicle fleet with alternatively powered vehicles.

The large up front capital costs associated with introducing new alternatively fuelled vehicles was identified as a significant issue and barrier by stakeholders. One stakeholder explained that after a fire inside their depot which destroyed their organisation's fleet of ICE vehicles, the opportunity arose to replace these with electric vehicles in order to meet future government targets. While this decision made sense in the long run, the upfront costs of these vehicles far exceeded the cost of their traditional petrol/diesel powered counterparts. As such, the organisation was not able to replace the destroyed vehicles with new EVs, further pushing back this organisation's move to alternatively fuelled vehicles, and compliance with policy targets.

The types of fuels used in alternatively fuelled vehicles (Electric, Hydrogen, Biofuel), and their use cases, benefits, drawbacks and overall viability, were discussed with the stakeholders. The attitudes towards these differed vastly between transport sectors. For instance, stakeholders from local authorities commented that their electric fleet is ideal for the shorter local "call-out" journeys typically undertaken by their organisations, which is aided by the availability of on-site rapid charging points where the vehicles are stored.

Freight operators, on the other hand, voiced concern over the use of electric freight vehicles for longer journeys through the area. Most HGV charging points are not located in convenient positions along the key freight corridors that service the region (M5, A30 & A38). The same operators also stated that many of the public charging points currently available are not at all suitable for HGVs and larger vans, citing not enough clearance to park at the locations and long charging times due to low-powered older chargers (<70kW).

The risks associated with adopting and building infrastructure around a certain fuel such as electric, hydrogen or bio-fuel were also brought up by many stakeholders. For some, this was their primary concern regarding the future viability of alternatively fuelled fleet vehicles. Freight operators were particularly worried as it is not clear which alternative fuel is best, and/or will become the most widely used and adopted going forward. If the wrong decision is made, investment and organisation-wide adoption of a certain type of fuel runs the risk of becoming either obsolete or unsupported in the future should it not become the most viable option. For instance, procuring a large fleet of electric HGVs risks becoming a poor investment should hydrogen-powered transport technology rapidly advance in the near-future, becoming widely adopted by operators with large scale deployment of suitable public infrastructure, support and viability of electric fleets may be diminished. Stakeholders would like a degree of certainty before taking this risk, therefore at present delaying many operators from replacing their ICE fleet.

9.3. Discussion Three – Infrastructure

Stakeholders were asked a series of questions on their views and experiences of the current alternative vehicle fuelling infrastructure in the Western Gateway and Peninsula Transport Region, and how they envision the infrastructure environment to look in the future. Stakeholders were asked if the refuelling stations available are in convenient locations, if they are suitable for their operational requirements, and what facilities, fuels and refuelling locations should be prioritised to best suit the industry's needs.

The general feeling towards infrastructure in the region was negative, with the vast majority of attendees worried about the future. The first concern brought up during the workshop was the seeming lack of electricity grid enhancements being bought into the area. One stakeholder stated that "enhancements of a significant scale will be required, as many new fuel types require significant volumes of electricity". The lack of planned supporting infrastructure going forward was voiced by many stakeholders from different transport sectors, and until it is in place, freight operators feel that there is not much that they can do to progress achieving decarbonisation goals.

Stakeholders also commented that infrastructure expansion plans were confusing and unbalanced, and while some schemes for gas and biofuels are planned there exists very limited support or investment for freight and HGVs outside of EV charging points. A stakeholder from a local authority stated that "Local government is unsure of their role to deliver this infrastructure - There needs to be greater clarity on the role of the public sector and the role of private operators".

HGV EV charging point speeds was also a primary topic of discussion. Freight operator stakeholders commented that of the 44 truck stops in the South-West none are rapid-charging (>100kW) and therefore too slow to be viable for efficient use during mandatory driver rest breaks.

9.4. Discussion Four – Priorities & Pledge

To conclude the workshops, attendees were asked to make an informal pledge on behalf of themselves or an organisation. The pledge would be a small step in helping the South West region increase the usage of alternatively fuelled vehicles. Some key pledges included the following:

- *'Increase our engagement and support with local freight operators'*
- *'Increase face-to-face engagement'*
- *'Make local freight strategy a priority'*
- *'Increase operator confidence in the abilities of alternatively fuelled vehicles'*
- *'Continue to raise the argument for freight funding'*
- *'Upskill employees on decarbonisation'.*

Although a testing period for the industry, attendees also saw great opportunities in the transition to net zero. Local authorities gave a commitment to increase and widen their engagement with freight operators across their districts. Training and the upskilling of employees was another key pledge from organisations and industry leads. The ever-changing environment requires organisations to have the skills and knowledge to change and adapt.

10. Survey

10.1. Introduction and Methodology

In 2022, stakeholders relevant to the Western Gateway and Peninsula Transport region were engaged by Atkins with an Alternative Fuels for Freight Strategy survey. Distribution focused on freight and delivery companies operating in the transport region; the survey aimed to develop understanding of fleet vehicle acquisition, specification, usage, and future planning, as well as current/prospective alternatively fuelled vehicle uptake.

The online survey was conducted to collect feedback from a range of relevant stakeholders relating to freight in the Western Gateway and Peninsula Transport regions. The survey was hosted on Microsoft Forms.

Although considerable effort was allocated to increasing the response rate of the survey through freight stakeholders, it was ultimately extremely difficult to formulate a robust cohort of respondents. Despite this low response rate, we still believe the analysis and results to be indicative of wider trends in the industry, including stated difficulty in engaging organisations in alternative fuel strategy development.

10.2. Survey Findings

As part of the stakeholder engagement, an online survey of freight and logistics businesses within the Western Gateway and Peninsula Transport regions was conducted. The survey received the responses from 9 businesses. This subsection summarises the results of the survey.

10.2.1. Introductory Questions

Figure 10-1 illustrates the number of responses for each area in the South-West. Stakeholder respondents had the highest operation overlap in Cornwall and Plymouth. Businesses operating in Devon, Dorset, Torbay, and Somerset were also prominent.

Figure 10-1 – Responses to question "In which of the following areas of the South-West does your organisation operate vehicles?"

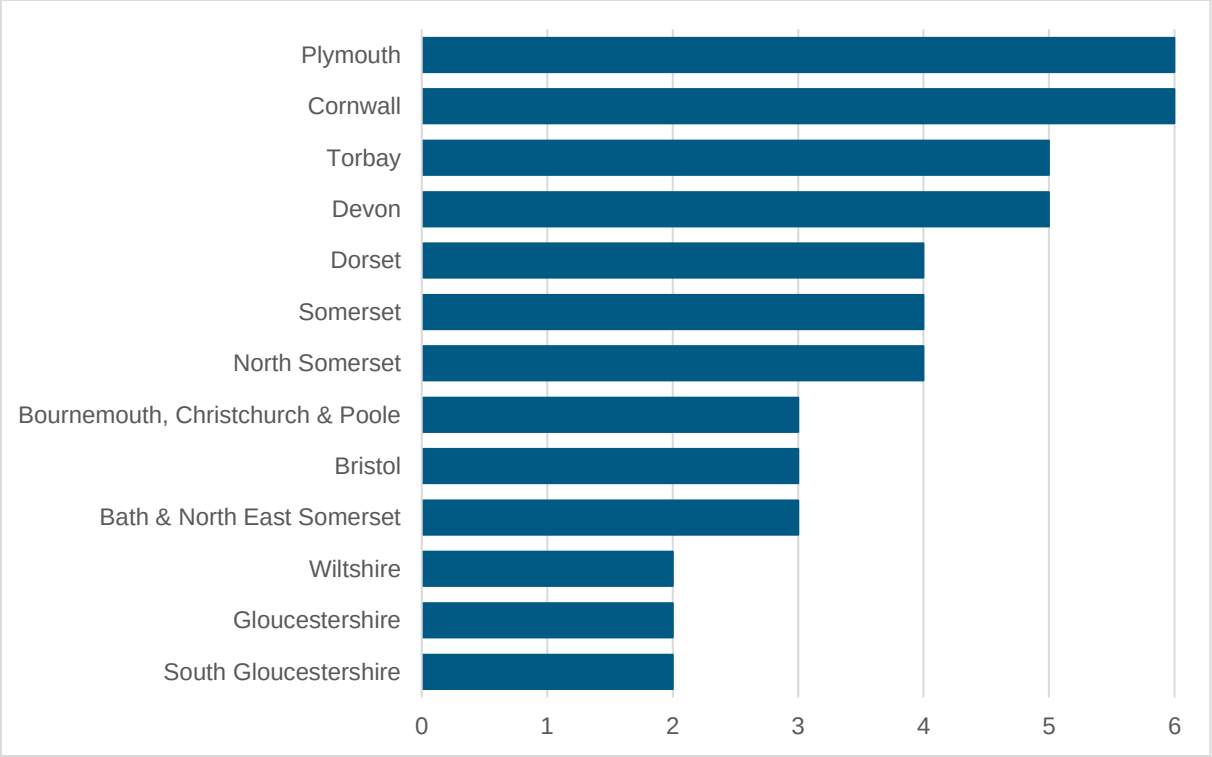
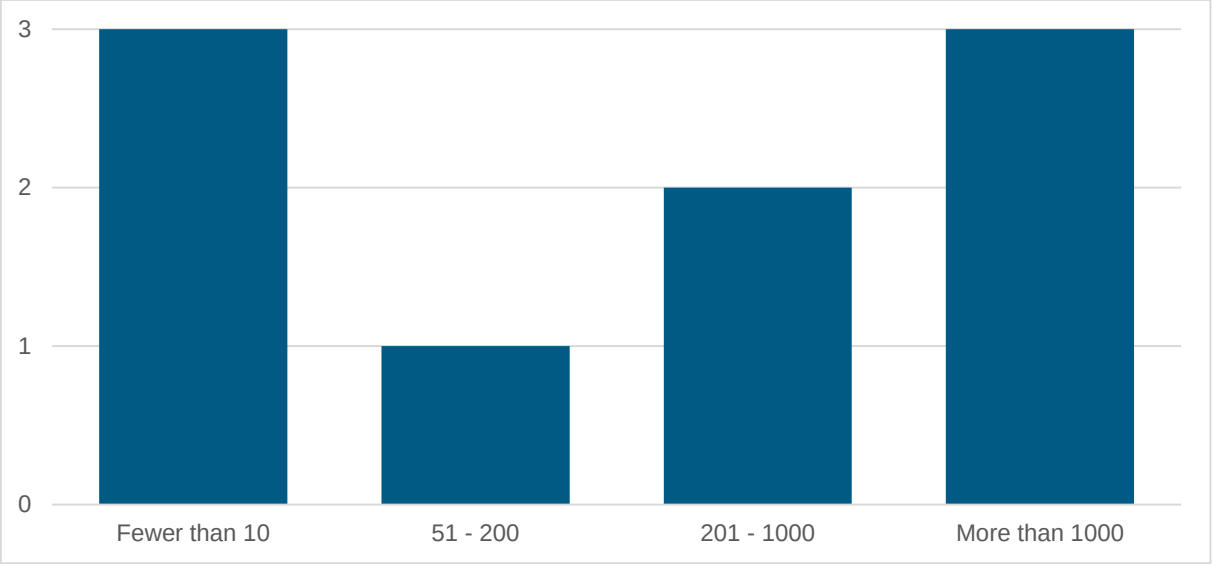


Figure 10-2 – Responses to question "What is the total number of vehicles in your fleet?"

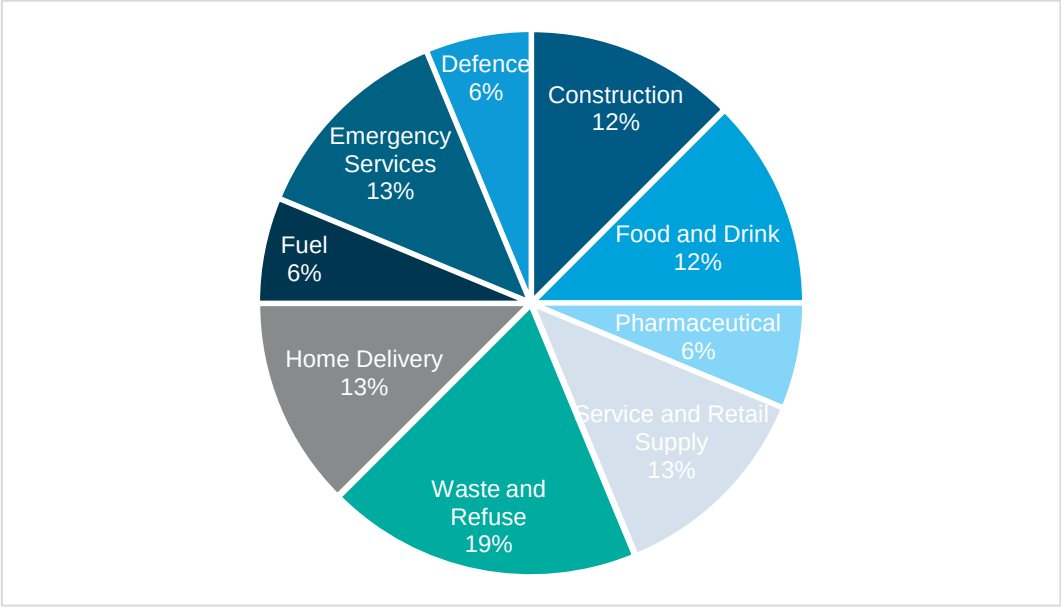


Responses to the survey were received from operators of fleets of varying sizes. 33% of responses came from fleets with greater than 1000 vehicles and another 33% from fleets with fewer than 10 vehicles. The remaining 11% and 22% of responses belonged to fleets comprised of 50-200 and 201-1000 vehicles respectively.

10.2.2. Delivery & Vehicle Questions

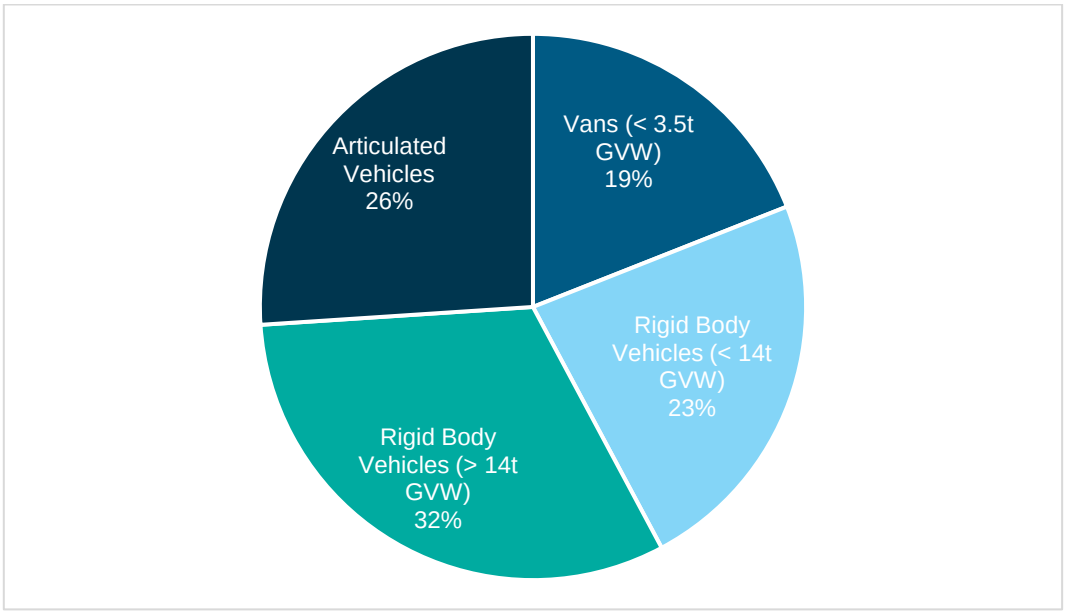
Following on from the Introductory questions, participants were asked about fleet specifications, deliveries, and refuelling. Key figures and data are presented below.

Figure 10-3 – Responses to question "What types of goods does your organisation transport?"



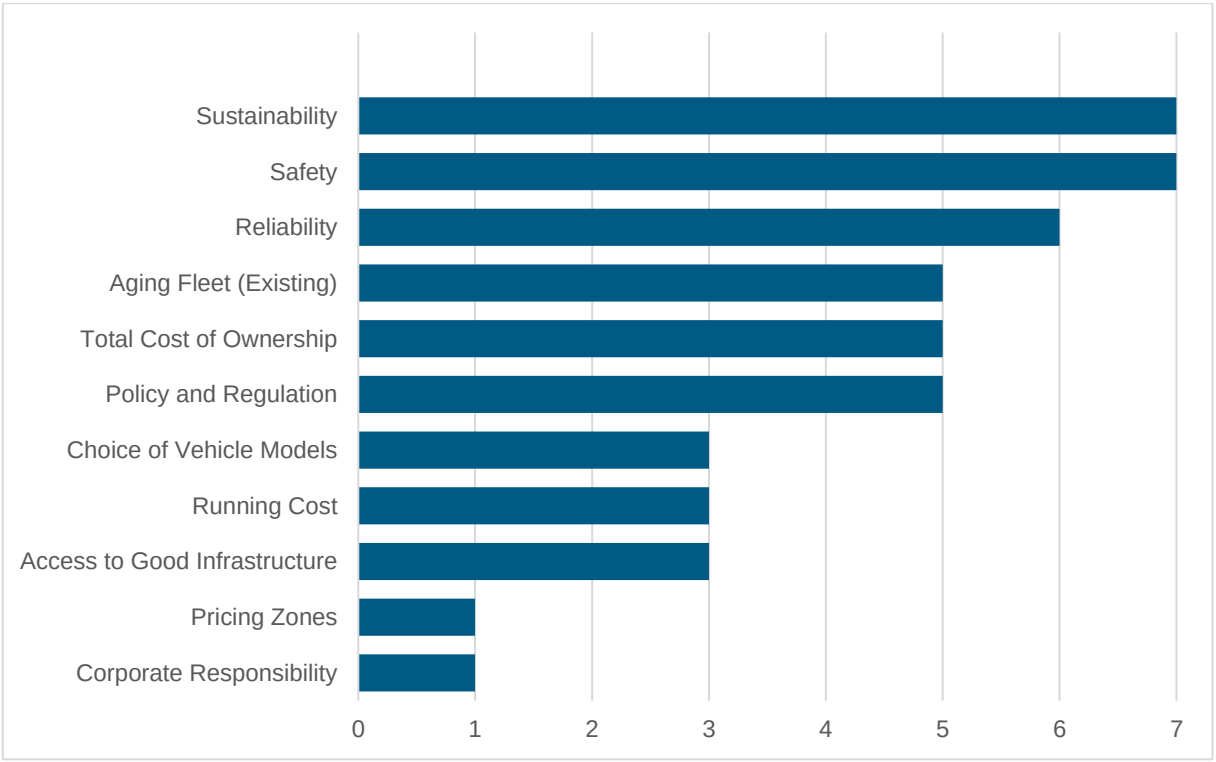
Respondent organisations in Figure 10-3 delivered a range of goods and represented a broad view of logistics and freight sectors. Waste and Refuse freight were the most common response from stakeholder organisations.

Figure 10-4 – Responses to question "Please indicate the proportion of your fleet which comprises of each type of vehicle"



Stakeholder fleet compositions were averaged to show the estimated proportions of freight vehicle types. Stakeholder responses show a mixed distribution of vehicles in Figure 10-4, with Rigid Body Vehicles (>14 GVW) and Vans (<3.5 GVW) being the most and least commonly used respectively. It was found that 55% of respondents acquire their vehicles via purchase, 22% via lease and 22% through a combination of the two.

Figure 10-5 – Responses to question "Which of the following factors influence your organisation's vehicle acquisition decisions?"



Vehicle acquisition decisions made by the engaged organisations were influenced mostly by sustainability, safety, and reliability (as seen in Figure 10-5), whilst pricing zones and corporate responsibility had influence on the fewest decisions.

Figure 10-6 – Responses to question "What percentage of time is spent by your vehicles completing each delivery type?"

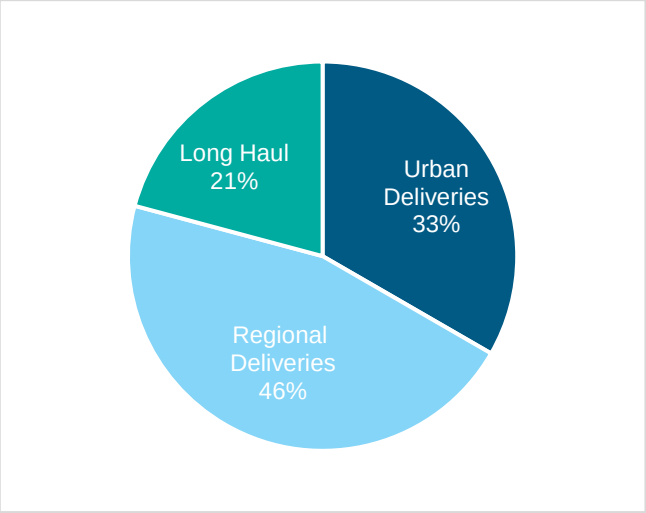
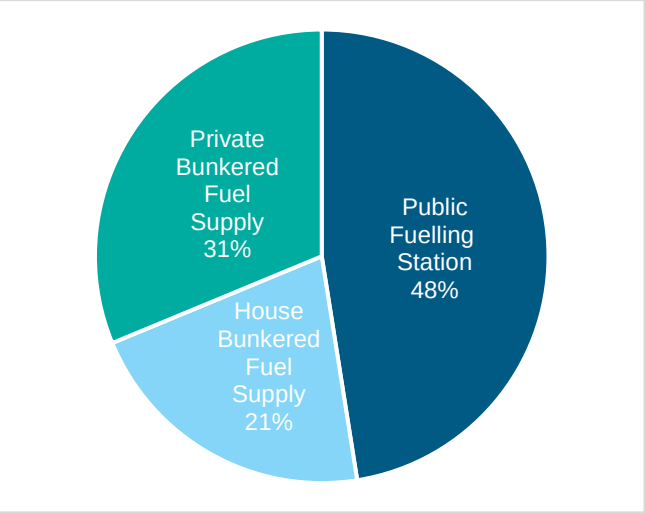


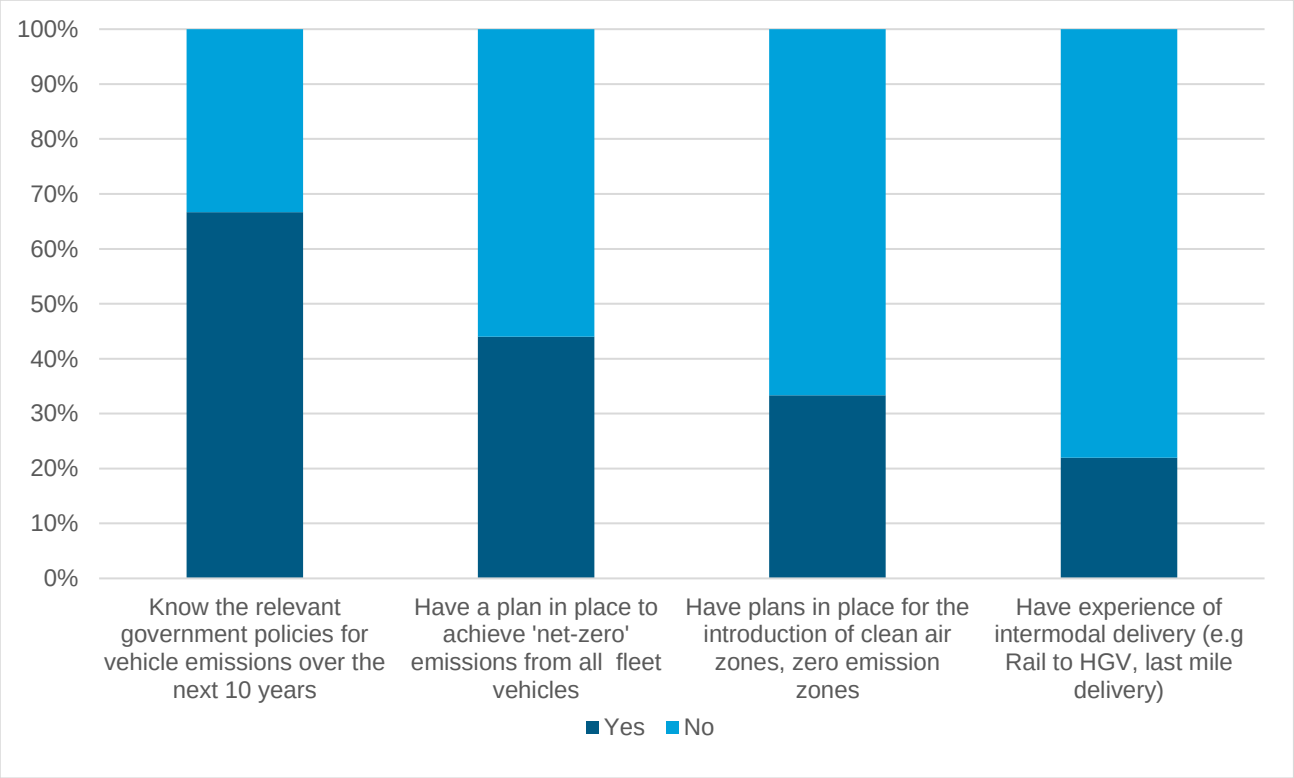
Figure 10-7 – Responses to question "What percentage of fuel used by vehicles is supplied at each type of station?"



The most common delivery type is Regional Deliveries in the South-West region at 46%, followed by Urban Deliveries at 33%, showing a potential link between South-West freight and the region's refuelling infrastructure. Freight and logistics refuelling methods used by respondents are Public Fuelling Stations 48% of the time, the most common type. House and Private Bunkered Fuel Supplies are used to refuel 21% and 31% of the time respectively.

None of the respondents use public/home parking to store fleet vehicles when not in use. However, 89% of engaged businesses usually use depot parking, while 11% use truck/trailer parks for fleet parking.

Figure 10-8 – Responses to question "Does your organisation... (Select all which apply)"



As seen in Figure 10-8 66% of stakeholders said they knew relevant government policies over the next 10 years, and 44% have a plan to achieve 'net-zero' emissions from their fleet vehicles. Only 22% of respondents had experience of intermodal delivery methods, and 33% having clean air zone (CAZ) plans.

10.2.3. Alternative Fuels

The survey asked respondents to share their opinions on Alternative Fuels. Those surveyed were asked about alternative fuel uptake factors, policies, plans, vehicles, and infrastructure. Alternative fuel uptake plans were mixed, and their current use is limited in stakeholder vehicle fleets.

Figure 10-9 – Responses to question "Would any of the following factors affect your organisation's uptake of alternatively fuelled vehicles? (Please select up to three options)"

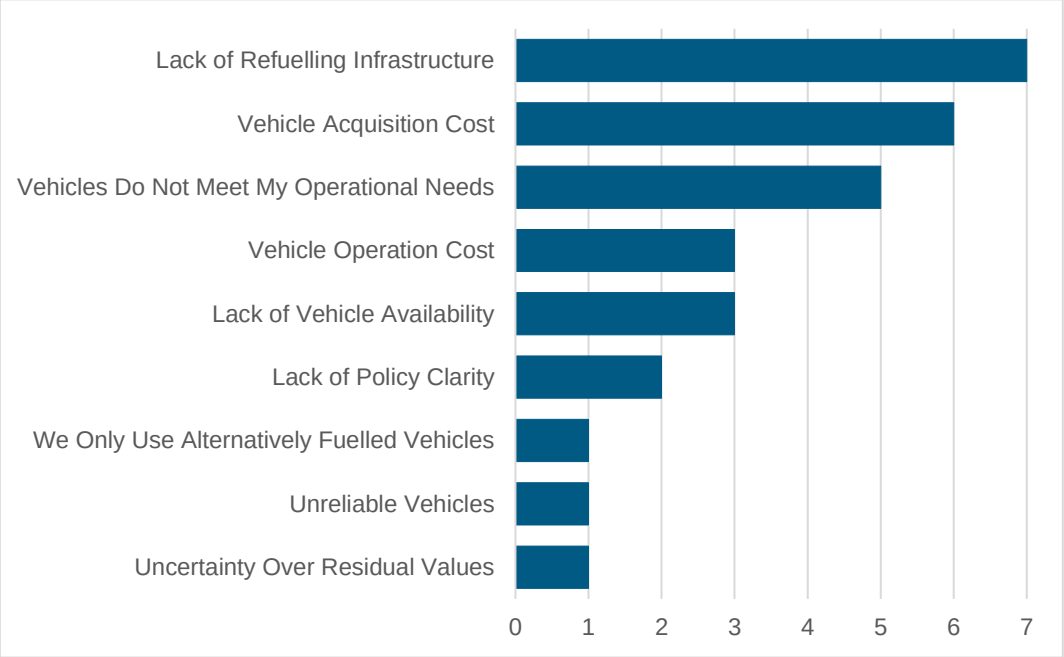
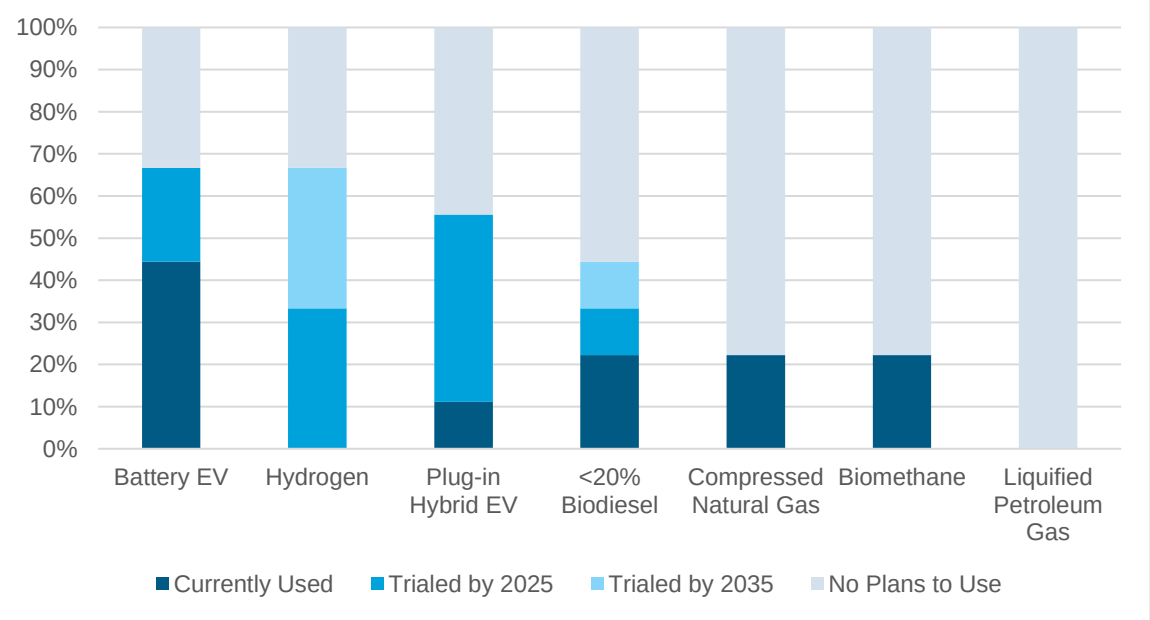


Figure 10-9 shows stakeholder opinions on the factors which may affect alternative fuel infrastructure and vehicle takeup. Alternatively fuelled vehicle uptake is inhibited most strongly by the lack of refuelling infrastructure, vehicle acquisition cost and the operational capabilities of these vehicles. Approximately half of respondents believed that vehicle operation cost and availability, as well as lack of policy clarity are factors affecting alternatively fuelled vehicle uptake. On the other hand, stakeholders were least concerned about vehicle reliability and vehicle residual values.

Figure 10-10 – Responses to question "Please select which alternative fuels are currently used by your fleet, which alternative fuels you will have trialled by 2025, and which alternative fuels you will have trialled by 2035."



From Figure 10-10 it is clear to see that stakeholders' plans and opinions regarding alternative fuels varied greatly. Battery EV technology had the greatest proportion of current usage and third highest planned trialling of the alternative fuel options. However, 33% of respondents had no plans to incorporate Battery EV into their fleets. Hydrogen fuel had the joint-lowest current usage among stakeholders (0%); however, it had the highest trialling potential of the fuels, at 66% by 2035. Plug-in Hybrid EV had the highest trialling rate by 2025 at 44% with 11% current usage, and 44% with no planned introduction to stakeholder fleets. (<20%) Biodiesel has an equal current usage and trialling rate (by 2035) of 22%, while 55% of stakeholders have no current plans to incorporate Biodiesel fuelled vehicles into their fleets. Compressed Natural Gas and Biomethane gathered equal responses from engaged stakeholders, 22% currently use these fuels, while 78% have no plans to use it in fleet vehicles. Liquified Petroleum Gas had the most negative projection, 100% of responses indicated that stakeholders have no current plans to introduce or trial this fuelling method in their fleets.

10.3. Feedback from the South West Freight Forum Sub-Groups

As part of the consideration of the links between road freight and other modes, the study team presented on the February meetings of the South West Freight Forum Aviation and Maritime, Rail, and Roads sub-groups. At each meeting, stimulus material was presented to attendees, followed by a short discussion. The purpose of these presentations was to seek additional clarification on key topics from wider regional public and private sector freight stakeholders, and to explore the initial feasibility of co-locating alternative fuel refuelling infrastructure for road freight alongside other modes. The presentations were followed up with a survey to enable stakeholders to share more detailed views and thoughts offline, and some one to one discussions to explore the emerging recommendations in more detail.

10.3.1. Rail

Participants showed a strong interest in exploring the concept of co-locating hydrogen and electric refuelling infrastructure for the road and rail sectors around a number of emerging, high-level multi-modal interchanges outlined in the South West Freight Strategy. Stakeholders identified a lack of road-rail multi-modality in the region but indicated that the road freight network might benefit from grid upgrades implemented for hopeful rail electrification purposes. To further develop this concept, stakeholders recommended increased collaboration between rail and road freight sectors to identify potential synergies and areas for joint investment in broader mode-interface infrastructure.

10.3.2. Maritime and Aviation

The maritime sector was generally supportive of the idea of integrating hydrogen and electric refuelling infrastructure at a high level. However, upon further consultation with some port stakeholders, concerns arose regarding the incompatibility of port business models and the requirements of refuelling infrastructure. Ports aim to maximize throughput and minimize vehicle dwell time, which may conflict with the time required for EV charging. However, this viewpoint was not universally recognised, with consensus amongst stakeholders not being achieved during the timescales of this study. Additionally, stakeholders noted that future fuel types for ships are considered on a different timescale than land-based transport modes due to their international dependencies, and hydrogen or electric fuels are expected to constitute a small portion of the maritime sector's future fuel mix.

10.3.3. Road

As a key audience for this work, road freight stakeholders were supportive of shared infrastructure, but concerns were raised about the requirement for a systemic shift in asset and site management culture which would be required to achieve successful integration. While organisations expressed a desire to not share infrastructure if it has significant operational impacts, there was a recognised benefit of supporting the end-to-end journeys of HGVs with fuelling infrastructure sited at both origin and destination. No significant sites were identified from road stakeholders during the engagement.

10.4. Agriculture and Coach

We were unable to engage with stakeholders from the coach sector within the timescales of this project. We recommend establishing communication channels with coach operators, relevant representative bodies, and relevant local authorities, to identify coach parking and servicing infrastructure locations, which may be suitable for the provision of co-located freight vehicle refuelling facilities. Coaches and HGVs share similar spatial footprints and have similar requirements for refuelling and staff welfare, therefore the co-location of coach and HGV alternative fuel facilities may prove beneficial, especially in rural and coastal areas where demand for mode specific facilities may be lower.

Discussions with the National Farmers Union (NFU) highlighted that the agricultural community is highly interested in the potential benefits of integrating electric refuelling infrastructure on farm premises. This approach would allow farmers to connect with on-site power generation and supply systems, enhancing their operational resilience and providing additional income streams through energy supply diversification.

Utilizing renewable energy technologies such as solar panels, wind turbines, and modular battery storage solutions, farms can deploy independent energy infrastructure that aligns with the spatial demands of heavy goods vehicles (HGVs), without disrupting existing farm layouts. The creation of rural refuelling hubs, centred on farms, has the potential to address gaps in coverage in remote areas.

10.5. Conclusions

The strategic path forward for Western Gateway and Peninsula Transport in relation to alternative fuels should consider the interests and needs of the freight and logistics organisations, who will be the end users of the deployed infrastructure. Stakeholders who responded to this engagement prioritised the alternative fuels they currently utilise as well as seek to trial by 2035. It will be key to orient the installation of planned refuelling/recharging stations to the fuel types that freight fleets expect to be using in the future. At the present time, the factor most inhibiting the uptake of alternatively fuelled vehicles by stakeholders is the lack of refuelling infrastructure; this is a significant barrier for those organisations surveyed since 48% of their fleet vehicle refuelling is carried out using public refuelling stations.

Some organisations are already using Battery EVs, with continuing trials and interest up to 2025. While a proportion (22%) of stakeholders currently have no plans to use battery EVs, this is small relative to wider interest in this technology. Stakeholders have shown interest in the use of PHEVs as a compromise between the current fuel mix and future zero emission vehicles with 44% trialling the power train by 2025.

Hydrogen has significant potential interest amongst those surveyed, with two thirds of respondents planning to trial hydrogen in their fleets by 2035. This interest signifies a developing trend towards Hydrogen as a key future fuel for logistics and freight. Refuelling infrastructure that reflects this growing interest in hydrogen would better serve the renewable and alternative fuel mix that future freight networks require. In conjunction with electric recharging, hydrogen refuelling infrastructure presents an additional contribution to enhancing the alternative fuel mix for freight fleets and delivery networks.

Biomethane, compressed natural gas, and biodiesel make up the suite of fuels currently in use by respondent stakeholders (22% current usage each). However, in the current sample size, no respondents expressed interest in trialling or using liquified petroleum gas as an alternative fuel. Potential interest from the freight and logistics sector to trial these fuels in the future could be stimulated by refuelling infrastructure improvements.

Similar themes emerged from the workshop discussions with stakeholders, who were keen to support government decarbonisation targets, and identified their importance. However, stakeholders expressed confusion and concern that they may make the wrong decisions, investing large sums of money in technology which may become obsolete. Ownership of actions around the deployment of refuelling infrastructure were unclear, meaning stakeholders did not have the confidence to progress with their decarbonisation plans at present. Consequently, stakeholders welcomed the development of the strategy, which they hoped would identify a coherent and feasible network of refuelling locations, accessible to all vehicle types, which in time would provide confidence and certainty regarding investment in new zero emission vehicles.

Alternative Fuel Uptake Forecasting

11. Introduction

11.1. Context

As part of the development of the Alternative Fuels for Road Freight Strategy, Cenex has researched the current recharging and refuelling infrastructure available for freight. Forecasts have also been made of the potential future demand for alternative fuels and of the extent of publicly accessible infrastructure required to facilitate these forecasts. The forecasts considered both light goods vehicles[4] (LGVs) and heavy goods vehicles[5] (HGVs) through to 2040 in the Western Gateway and Peninsula Transport regions. As part of Cenex's work, the following tasks were undertaken:

- **Current and Planned Infrastructure:** Mapping, using QGIS, of freight accessible infrastructure in the region, covering chargepoints with freight access, gas, and hydrogen refuelling. Cenex utilised its current database, supplemented with engagement with infrastructure providers for any planned infrastructure.
- **Forecasting Alternative Fuel Uptake:** Baselining of current vehicle parc in the region and forecasting the uptake of alternative fuels for road freight through to 2040 with high and low scenarios.
- **Forecasting Required Infrastructure:** We estimated the daily and annual energy demand required to serve the forecasted uptake of alternative fuels based off current duty cycles, efficiencies, and typical mileages. Following this, Cenex estimated the required publicly accessible infrastructure[6] to meet this demand and indicative costs.

11.1.1. Note on Scope

In the original project proposal, prepared in October 2021, Cenex proposed two possible technology pathways for HGVs: 1 - mix of biofuels (biomethane and biodiesel), electric and hydrogen, 2 - electric and hydrogen only. In November 2021, during COP 26, the UK announced a planned phase out of internal combustion engine (ICE) vehicles in the HGV sector (proposed sales ban date of 2035 for vehicles under 26 tonnes, and 2040 for vehicles over 26 tonnes[7]).

In light of this announcement, the technology pathway including a mix of biofuels (namely biomethane) is highly unlikely as these vehicles are ICE powered and are not zero emission. As such, the results of pathway 1 have been provided in an Appendix at the end of the document. Pathway 2—the electric and hydrogen pathway—for HGVs is displayed in the main report, as the most likely pathway to be followed, with a high and low uptake scenario in-line with the aforementioned policy.

12. Methodology

12.1. Current Infrastructure

Cenex performed desktop research to establish the current infrastructure for alternative fuels for freight in the two regions. After collating this data, Cenex mapped these data points for each region on QGIS alongside the Strategic Road Network (SRN), and Major Road Network (MRN).

Cenex split the infrastructure research into two main study areas: electric vehicle chargepoints, and gas and hydrogen refuelling stations (present and planned).

12.1.1. Electric Vehicle Chargepoints

We identified publicly accessible EV charging infrastructure provision for the two regions using data from Zap-Map and the National Chargepoint Registry (managed by Cenex). In the analysis, we only included

[4] Vehicles up to 3.5 tonnes gross vehicle weight (GVW)
[5] Vehicles over 3.5 tonnes GVW
[6] Publicly accessible infrastructure is equivalent to fuel forecourts which are set up and managed by the private sector, and are open access for use by fleets and drivers
[7] https://www.gov.uk/government/news/uk-confirms-pledge-for-zero-emission-hgvs-by-2040-and-unveils-new-chargepoint-design

chargepoints with a power of 22 kW or higher (commonly known as fast and rapid chargepoints), due to the high daily vehicle mileages of LGVs and HGVs. The data for these chargepoints does not include whether there is sufficient space and access for HGVs. We have assumed the majority of chargepoint sites, at present, are unlikely to be able to service HGVs, with LGVs having no such physical restriction on accessing the chargepoints mapped.

There is currently no accessible data record of non-publicly accessible chargepoints installed at businesses, so these are not included in the analysis.

12.1.2. Gas and Hydrogen Refuelling Stations

At the time of writing, there is no single database that records both gas and hydrogen refuelling stations. Cenex collated current and planned stations utilising the below sources. Where possible, Cenex has provided data regarding the accessibility, capacity, and pressures for fuel delivery.

- Gas: https://gasvehiclehub.org/
- Gas: https://cngfuels.com/vehicle-and-stations/
- Hydrogen: http://www.ukh2mobility.co.uk/stations/
- Hydrogen: https://www.glpautogas.info/en/hydrogen-stations-united-kingdom.html
- Hydrogen: UK Government Hydrogen Investor Roadmap https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1067408/hydrogen-investor-roadmap.pdf

Cenex also utilised its industry contacts for alternative fuels, to complement the desktop research conducted and to establish any future or planned refuelling stations in the two regions.

For hydrogen stations Cenex interviewed ITM Power and Octopus Hydrogen, the two leading hydrogen refuelling stations (HRS) providers in the UK. Both were able to provide us with preliminary information regarding planned HRS in the region, though these plans are still early stage and subject to planning approval.

Similarly, for biomethane stations, Cenex interviewed Air Liquide and CNG Fuels. Both were able to provide further operational details, on top of those found through desktop research, for their current stations in the two regions. At present, neither organisation has any firm plans for future stations in either of the two regions.

12.2. Forecasting Alternative Fuel Uptake

Cenex built a bespoke model to estimate the number of chargepoints and hydrogen refuelling stations required to support a fleet of alternatively fuelled LGVs and HGVs in 2040 in the two regions. The model applied the following methodology:

1. Establish the total number of LGVs and HGVs currently registered[8] (all fuel types) in the UK and the two regions, from DfT vehicle statistics dataset VEH0105 and VEH0521.
2. Estimate the baseline number of alternatively fuelled LGVs and HGVs registered in the two regions. Using DfT data table VEH1103, which shows vehicles by fuel type for the whole of the UK, we estimated the proportion of these vehicles which operate in the two regions based on the proportion of all vehicles which operate in the regions established in step 1 (a breakdown by fuel type for HGVs is not provided at regional or local authority level).

The tables below show the baseline for each STB.

[8] Some vehicles will be registered in the relative STB and operate elsewhere, while others will be registered outside the STBs and drive into that region. We assume that the effects of these variables on infrastructure requirements will be roughly equal and therefore use registrations as a proxy for vehicles operating in the STBs. Similarly, we are not aware of any large organisations in the region that register all UK vehicles to a site within the STBs but operate outside of the boundaries.

Table 12-1 - Vehicle baseline for Western Gateway

	Rigids	Artics	LGVs
Diesel	14,998	7,678	283,166
Petrol	0	0	9,134
Biodiesel	152	78	0
Plug-in Hybrid Electric Vehicles (PHEV)	0	0	295
Battery Electric Vehicle (BEV)	15	8	2,063
Fuel Cell Electric Vehicle (FCEV)	0	0	0
Gas powered (biomethane and fossil fuel gas)	45	24	0
Total	15,210	7,788	294,658

Table 12-2 - Vehicle baseline for Peninsula Transport

	Rigids	Artics	LGVs
Diesel	11,944	6,114	221,180
Petrol	0	0	7,135
Biodiesel	121	62	0
Plug-in Hybrid Electric Vehicles (PHEV)	0	0	230
Battery Electric Vehicle (BEV)	12	6	1,611
Fuel Cell Electric Vehicle (FCEV)	0	0	0
Gas powered (biomethane and fossil fuel gas)	36	18	0
Total	12,113	6,200	230,156

3. Use the forecast[9] supporting the Climate Change Committee's 2019 Net Zero report for the total number of LGVs and HGVs (all fuel types) expected in the UK from now to 2040. Cenex applied these pro rata to the two regions to forecast total LGV and HGV vehicle numbers in the region.
4. Develop scenarios for uptake of alternatively fuelled vehicles in the two regions, up to 2040, and calculate number of LGVs and HGVs for each fuel type.
    a. HGVs:
        i. Pathway 1: Mixed fuel pathway—biomethane, hydrogen and electric—with a high and low uptake scenario. As mentioned previously, this pathway is unlikely due to the planned phase out of ICE vehicles. Results have been placed in the Appendix.
        ii. Pathway 2: Zero emission technology pathway—a mix of hydrogen and electric vehicles—with a high and low uptake scenario. This is in-line with the planned phase out of ICE vehicles in the HGV sector (proposed sales ban date of 2035 for vehicle under 26 tonnes, and 2040 for vehicles over 26 tonnes[10]).

[9] Climate Change Committee Report: Zero Emission HGV Infrastructure Requirements. 2019, Ricardo Energy and Environment. Available at: https://www.theccc.org.uk/publication/zero-emission-hgv-infrastructure-requirements/
[10] https://www.gov.uk/government/news/uk-confirms-pledge-for-zero-emission-hgvs-by-2040-and-unveils-new-chargepoint-design

b. For LGVs we assume that only plug-in vehicles, rather than gas or hydrogen, will replace diesel. Cenex used its own proprietary model to calculate the rate of uptake. Plug-in vehicles will offer increasing range at decreasing cost through the 2020s and therefore the uptake of gas vehicles, which are not zero emission at the tailpipe and are more expensive per mile than plug-in vehicles, is unlikely in light duty vehicle segments. Hydrogen vehicles offer zero tailpipe emissions but are significantly more expensive to run than plug-in vehicles and, as EV range increases, are unlikely to offer any operational benefits compared to plug-in models. While the cost of hydrogen vehicles will decrease over time, the fuel costs of hydrogen will remain more expensive than electricity, due to the inherent inefficiencies of producing hydrogen through electrolysis. It is therefore unlikely that hydrogen LGVs will have any significant share of this market. If you would like to explore the whole life costs and emissions of alternatively fuelled LGVs you can do so at Cenex's Lo City Fleet Advice Tool: https://fleetadvicetool.cenex.co.uk/

The following table shows the assumptions for each scenario:

Table 12-3 - Scenario development for LGVs and HGVs

	LGVs		HGVs	
Scenario	***Assumptions***	***Source***	***Assumption***	***Source***
Pathway 1. High uptake (mixed)	100% sales of BEV and PHEV by 2030 (split 80:20) and BEV only from 2035	S-curve in-line with UK ban on internal combustion engine LGV sale in 2030 and PHEV in 2035	In 2040: 40% diesel, 6% biodiesel, 19% EV, 10% FCEV, 25% gas	Element Energy (2015) for LowCVP11
Pathway 1. Low uptake (mixed)	100% sales of BEV and PHEV by 2030 (split 50:50) and BEV only from 2035	C-curve in-line with UK ban with a slower transition of PHEV to BEV	Slow uptake of alternative fuels, mixed fleet	Half the Element Energy forecast rate of uptake
Pathway 2. High uptake (electric & hydrogen)	100% sales of BEV and PHEV by 2030 (split 80:20) and BEV only from 2035	S-curve in-line with UK ban on internal combustion engine LGV sale in 2030 and PHEV in 2035	96% of new sales of HGVs by 2035 are ZEV (42% EV, 54% FCEV) 33% of total fleet ZEV by 2035, 67% by 2040 Biodiesel to meet 10% of HGV demand by 2040	6th Carbon Budget report by CCC12 in-line with UK ban on internal combustion engine HGV sale
Pathway 2. Low uptake (electric & hydrogen)	100% sales of BEV and PHEV by 2030 (split 50:50) and BEV only from 2035	C-curve in-line with UK ban with a slower transition of PHEV to BEV	Slow uptake of alternative fuels, electric and hydrogen	Half the CCC forecast rate of uptake

12.3. Forecasting Required Infrastructure

1. Forecast vehicle mileages in the two regions up to 2040 using the most up-to-date UK Government Road Traffic Forecasts (2018)[13].
2. Convert vehicle mileage for each fuel type into quantity of fuel required. Cenex used its proprietary Fleet Advice Tool data for fuel consumption rates for each fuel and vehicle type.

[11] LowCVP Transport Energy Infrastructure Roadmap to 2050. Available at: https://www.lowcvp.org.uk/assets/reports/LowCVP%20Infrastructure%20Roadmap-Methane%20report.pdf
[12] https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf
[13] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/873929/road-traffic-forecasts-2018-document.pdf

3. Convert fuel quantities into energy demand using Defra's fuel energy density figures[14].
4. Calculate the infrastructure requirements for each fuel type for the years 2030 and 2040. This is for predicted **publicly accessible infrastructure only** (equivalent to today's petrol and diesel forecourts)[15] and does not include depot and home refuelling. The below section explains in detail the assumptions for each fuel and vehicle type:

Gas for HGVs

Cenex made the following assumptions:

- 60% of refuelling performed at depot and 40% at publicly accessible stations, as per the current estimated split of depot vs non-depot diesel refuelling in the UK, as shown in the Midlands Connect Alternative Fuels for Freight project conducted in 2019.
- Gas demand split equally between compressed natural gas (CNG) and liquefied natural gas (LNG).
- Gas station capacity will be 55,000 kg per day. This is the upper end of capacity for stations available now, but we predict this would become standard if more gas vehicles were on the road.
- Daily gas station utilisation will be 50% of total capacity as estimated by CNG Fuels.

Hydrogen for HGVs

Cenex made the following assumptions:

- 30% of refuelling performed at depot and 70% at publicly accessible stations. This is half the rate of the current ratio of depot refuelling for diesel and gas vehicles, reflecting the fact that hydrogen is a lower maturity technology with more complex building, operational, and safety requirements, and so the roll-out of depot infrastructure is likely to be slower with specialist organisations operating the stations. This was reflected in Cenex's interview with ITM Power and Octopus Hydrogen.
- Hydrogen refuelling station (HRS) capacity will be 10,000 kg per day[16]. This is the upper end of capacity for stations available now but would be likely to become standard if more hydrogen vehicles were on the road.
- Daily station utilisation is 50% of total capacity, as per typical gas station utilisation.

Chargepoints for HGVs

Cenex made the following assumptions:

- 95% of recharging performed at depot and 5% at publicly accessible sites. We have adapted this from the Climate Change Committee (CCC) forecast that 100% of HGV charging will be at depot, as we expect some non-depot charging to take place. During the Innovate funded project H2GVMids, which Cenex participated in, through operator surveys we found that 10% of HGVs travelled over 350 miles in a single day. We have assumed that battery sizes in the future will not allow a range of over 350 miles, due to the economics of installing large batteries and weight constraints. Of the 10% of vehicles travelling over 350 miles a day we have assumed that half of their daily charging requirements comes from publicly accessible chargepoints, equating to 5% of all charging requirements for the full UK fleet.
- HGVs will use a 50:50 split of 50 kW and 150 kW chargepoints. While at present there are a lack of 150 kW chargepoints available in comparison to 50 kW, it is expected that as the HGV BEV market grows there will be an increasing demand for higher capacity chargepoints—due to large battery sizes and operators wanting to limit vehicle downtime—and their availability and use will increase.
- Each chargepoint will provide an average of 6 hours of charging, assuming each chargepoint is operational for 12 hours per day and is utilised 50% of the time. There is a lack of data available showing likely chargepoint utilisation rates for HGVs; this assumption is Cenex's estimate of future network usage patterns based off current utilisation of chargepoints by cars.

[14] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021
[15] Publicly accessible infrastructure is equivalent to fuel forecourts which are set up and managed by the private sector, and are open access for use by fleets and drivers
[16] Climate Change Committee Report: Zero Emission HGV Infrastructure Requirements. 2019, Ricardo Energy and Environment. Available at: https://www.theccc.org.uk/publication/zero-emission-hgv-infrastructure-requirements/

Chargepoints for LGVs

Cenex made the following assumptions:

- 80% of recharging performed at depot or at home and 20% at publicly accessible sites. The split of depot vs. non-depot recharging will depend on several unknown variables including future vehicle battery capacities and is therefore hard to project. We made the following assumptions:
    - The UK Van Survey 2020 found that 29% of total van miles in the south west were private and 71% were business[17].
    - Of the 29% of total private van miles, we have assumed that 30% of these vehicles are owned by people without access to a driveway[18]. All these vehicles will therefore be charged using publicly accessible infrastructure (8.7% of total van miles).
    - Of the 71% of total business van miles, which will ordinarily be charged at depot, 33% of these vehicles travelled nationally out of their base (as opposed to local or regional)[19]. This equates to a total of 23% of all van miles. As per the HGV assumptions, we have assumed that half of their daily charging requirements come from publicly accessible chargepoints (11.5% of total van miles).
    - This equates to a total of 20.2% of all charging requirements performed using publicly accessible infrastructure (8.7% and 11.5% as calculated above).
- LGVs will use 22 kW, 50 kW and 150 kW chargepoints, forecast to account for 40%, 40% and 20% of charging events respectively. This split will depend on several unknown variables including future vehicle battery capacities and charging rate compatibility. The projected split is based off Cenex's expertise having worked on various chargepoint deployment and study programmes for both Innovate UK and for private clients.
- Each chargepoint is operational for 12 hours per day with an average 50% utilisation rate (as per the HGV model). There is a lack of data available showing likely chargepoint utilisation rates for LGVs; this assumption is Cenex's estimate of future network usage patterns based off current utilisation of chargepoints by cars.
- Although the maximum capacity charge point considered in this study is 150kW, we recognise that higher capacity charge delivery systems may be operational in the next 10 years. This will be better considered in the next phase of strategy development when the future technology landscape is better understood, as currently, standards are not set.

Vehicle Utilisation

As part of the model development, Cenex have assumed and accounted for shifts in vehicle mix and mileage (circa 18% growth in LGVs[20] covering 147% of current total mileage[21], and circa 4.5% fewer HGVs[22] covering 105% of current total mileage[23]). This is in line with DfT forecasts, based upon an expectation of greater efficiency across the freight and logistics sector driven through the adoption of technology to enable more efficient utilisation of resources.

Infrastructure Costs

Finally, Cenex undertook a high-level estimate of the **publicly accessible infrastructure costs only** (equivalent to today's petrol and diesel forecourts) for each scenario—this is in addition to any depot based refuelling which has not been included in this analysis as this is outside the control of the STBs. Local Authorities and STBs will not have to fund publicly accessible infrastructure entirely by themselves, with private industry investment likely to provide a large proportion of this where economically viable for their business case. We have based costs on today's prices with no adjustments made for inflation or falling costs as more infrastructure is deployed. Estimates use the following data and assumptions:

[17] UK Van Survey 2020 – Table VAN0411
[18] National Travel Survey 2020
[19] UK Van Survey 2020 – Table VAN0311
[20] CCC Sixth Carbon Budget
[21] DfT Road Traffic Forecasts, 2022
[22] CCC Sixth Carbon Budget
[23] DfT Road Traffic Forecasts, 2022

- **Gas:** CNG provider CNG Fuels estimate the total cost of installing a large capacity CNG station to be £3.25m. An equivalent capacity LNG station is estimated to cost around £1.5m. We have calculated this using a ratio of 45% to CNG station costs as reported in "Biomethane for Transport: HGV cost modelling" (TTR for LowCVP)[24].
- **Hydrogen:** The total cost of installing a large capacity hydrogen station is estimated to be £5m, as presented in "Zero Emission HGV Infrastructure Requirements" (Ricardo Energy and Environment)[25]. The HRS providers that we interviewed for previous sections—ITM Power and Octopus Hydrogen—confirmed that these costs are still accurate.
- **EV Chargepoints:** Cenex has estimated total capital costs for chargepoints from an average of three quotations provided by industry contacts[26]. Costs include equipment, electrical connection costs, enabling works and miscellaneous installation costs. Table 12 shows a cost summary. We have not included potential grid or connection upgrades in our calculations, which are more likely for large installations, however Table 12 shows indicative costs based on the size of installation.

Table 12-4 - Capital cost and enabling works for chargepoints

	22 kW Fast Charger	50 kW Rapid Charger	150 kW Ultra-Rapid Charger
Capital cost of chargepoint	£2,000	£20,000	£80,000
Enabling works and electrical connection27	£4,000	£4,000	£4,000
Total	£6,000	£24,000	£84,000

Table 12-5 - Indicative costs for major connection upgrades

	Medium (200 kVA – 1 MVA)	Large (>1 MVA)
Number of charge points	Up to 15 rapids	Above 15 rapids
Connection time	8-12 weeks	6 months+
Connection cost	£4,500 - £75,000	£75,000 - £2 million
Other considerations that may affect cost	Street work costs. Legal costs for easement & wayleaves.	Street work costs. Legal costs for easement and wayleaves. Planning permission & space for a substation.

[24] LowCVP Biomethane for Transport: HGV cost modelling. Available at: https://www.lowcvp.org.uk/assets/reports/LowCVP%20Biomethane%20Report_Part%201%20Final.pdf
[25] Zero Emission HGV Infrastructure Requirements (Ricardo Energy and Environment). Available at: https://www.theccc.org.uk/publication/zero-emission-hgv-infrastructure-requirements/
[26] Cenex review these costs every 6 months through industry engagement.
[27] Costs quoted here include an electrical connection (feeder pillar, Residual Circuit Breaker with Over-current device (RCBO), RCBO housing, RCBO protection, Miniature Circuit Breaker (MCB) installation, fixings and an assumed 5m electrical cable run), enabling works (foundations, 5m of ducting & surface reinstatement, guard raid/crash protection, bay markings, signage and branding) and warranty.

13. Findings

13.1. Current Infrastructure

13.1.1. Western Gateway

Figure 13-1 shows the current low and zero emission infrastructure within the Western Gateway boundary, alongside the MRN and the SRN, as well as known planned hydrogen infrastructure at Wimborne and Bristol Airport. Rapid chargers are well distributed throughout the region, with a focus around the SRN and MRN, as well as the major cities in the region, with more rural areas lacking in infrastructure provision.

Figure 13-1 - Current infrastructure for alternative fuels for freight - Western Gateway

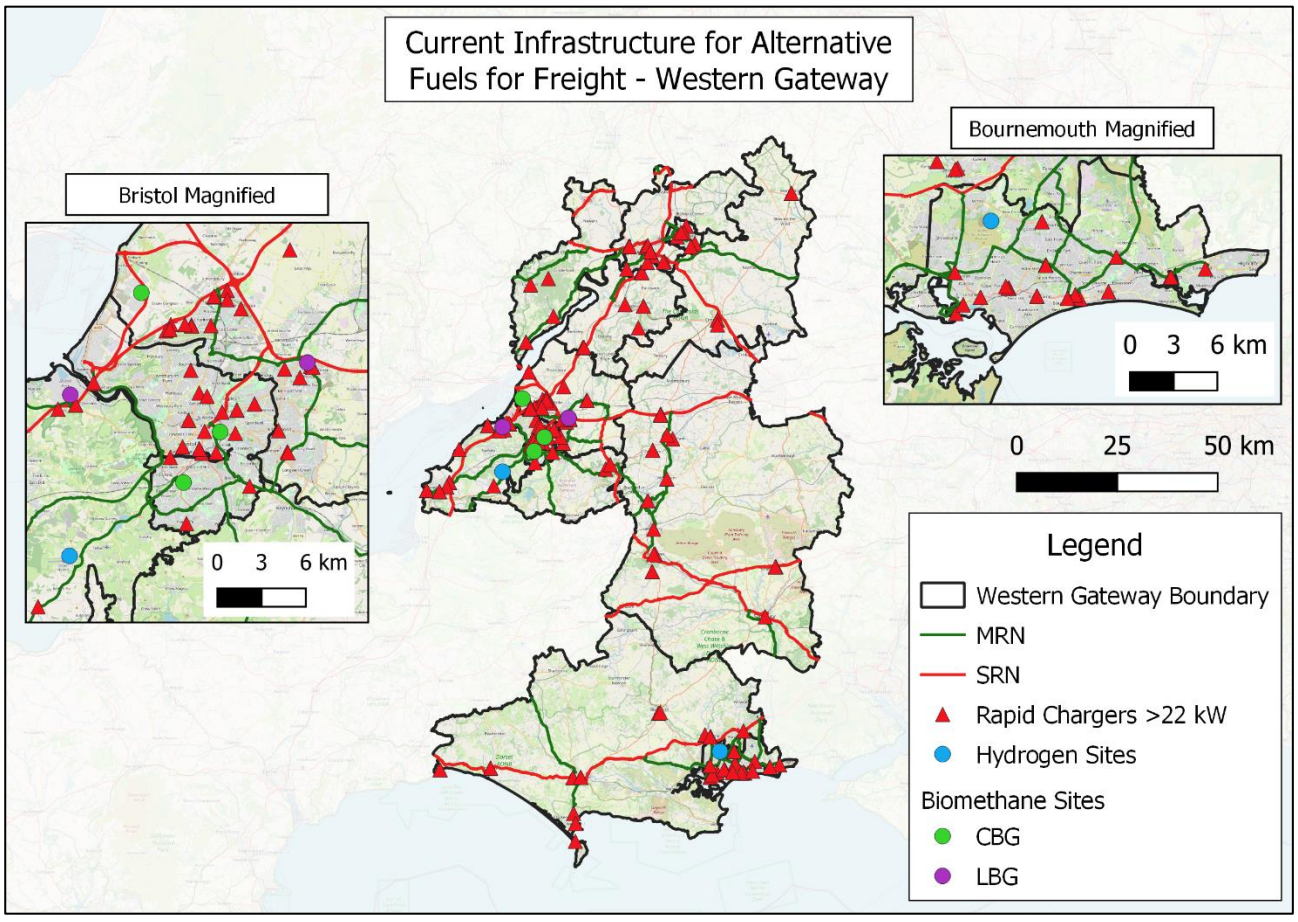


Table 13-1 - Further details of hydrogen and biomethane stations

Location	Type of station	Capacity (daily, kg)	Owned by	Access to site	Pressures	Current/ Planned	Post Code
Wimborne	Green Hydrogen	350 kg	Canford Renewable Energy Limited	TBC	350 bar	Planned	BH21 3BW
Bristol Airport	Green Hydrogen	TBC	Multiple	TBC	350 bar	Planned	BS48 3DY
Bristol-Avonmouth	Biomethane (CBG)	Unknown	CNG Fuels	Private	200 bar, 250 bar	Current	BS35 4GH
Bristol	Biomethane (CBG)	Unknown	Air Liquide	Public through prior agreement	200 bar, 250 bar	Current	BS3 5RB
Bristol	Biomethane (CBG)	Unknown	Air Liquide		200 bar, 250 bar	Current	BS5 0DZ
Bristol-Portbury	Biomethane (LBG)	8,000 kg	Air Liquide (Wincanton)		8 bar	Current	BS20 7XE
Bristol	Biomethane (LBG)	22,000 kg	Gasrec (Sainsburys)		8 bar	Current	BS16 7FE

13.1.2. Peninsula Transport

Figure 13-2 shows the current low and zero emission infrastructure within the Peninsula Transport boundary, alongside the MRN and the SRN. There is currently no live or planned hydrogen stations in the region. Rapid chargers are well distributed throughout the region, with a focus around the SRN and MRN with more rural areas lacking in infrastructure provision. The density of provision is somewhat lower than Western Gateway.

Figure 13-2 - Current infrastructure for alternative fuels for freight – Peninsula

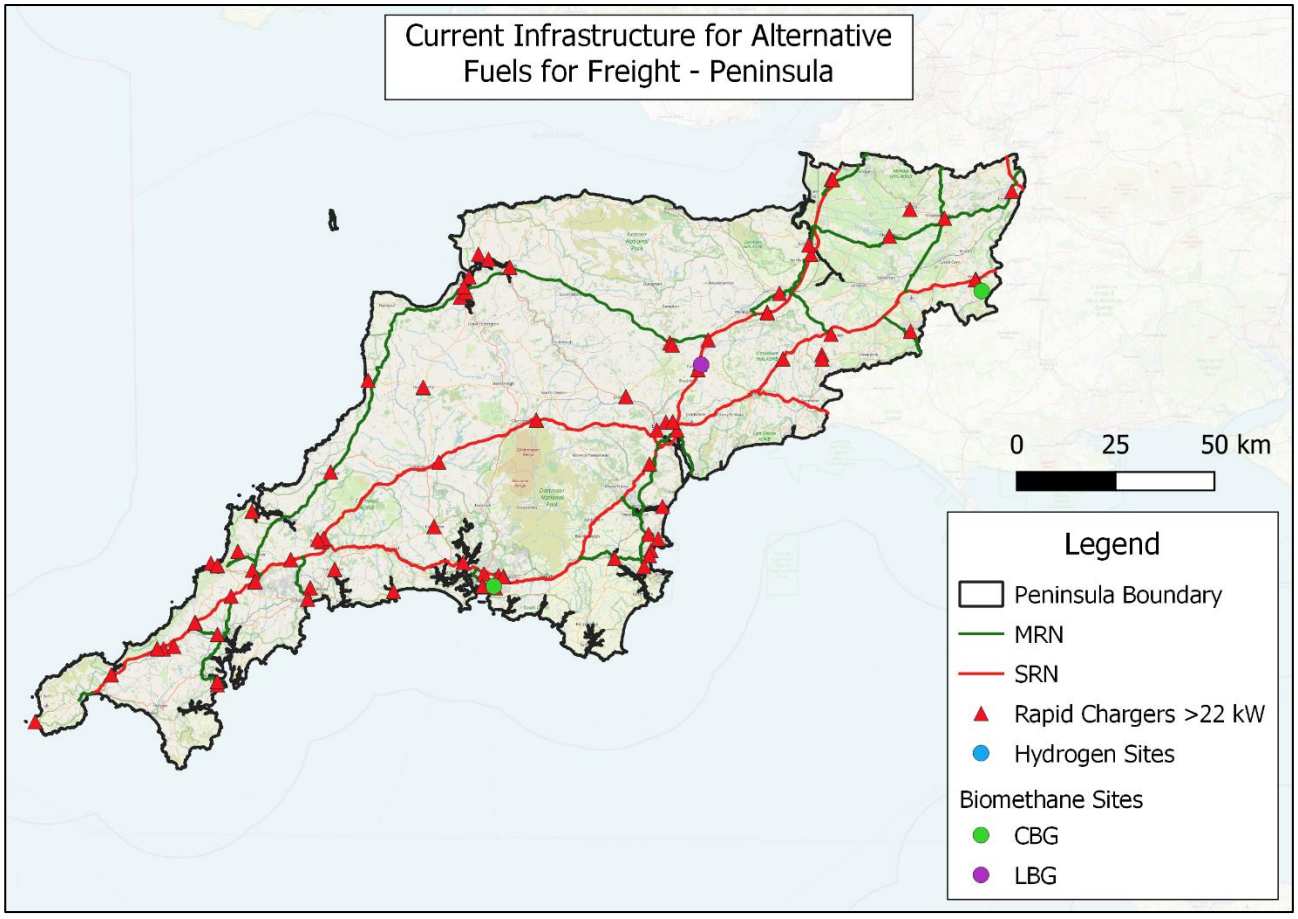


Table 13-2 - Further details of biomethane stations

Location	Type of station	Capacity (daily, kg)	Owned by	Access to site	Pressures	Current/ Planned	Post Code
Wincanton	Biomethane (CBG)	Unknown	Organic Power	Public through prior agreement	200 bar	Current	BA8 0EW
Plymouth	Biomethane (CBG)	Unknown	Air Liquide (Stagecoach)		200 bar, 250 bar	Current	PL9 7JT
Cullompton	Biomethane (LBG)	9,000 kg	Gasrec (Gregory Distribution)		7 bar	Current	EX15 1BS

13.2. Forecasting Alternative Fuel Uptake

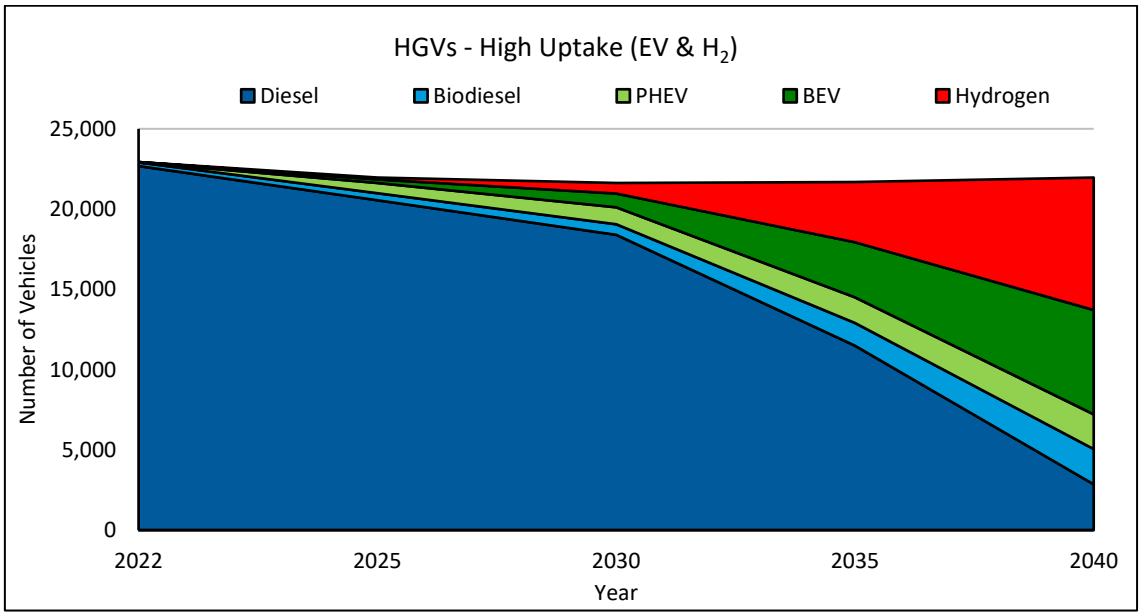
Tables with the underlying figures can be found in the Excel supplement.

Results for the mixed fuel pathway can be found in the Appendix.

13.2.1. Western Gateway

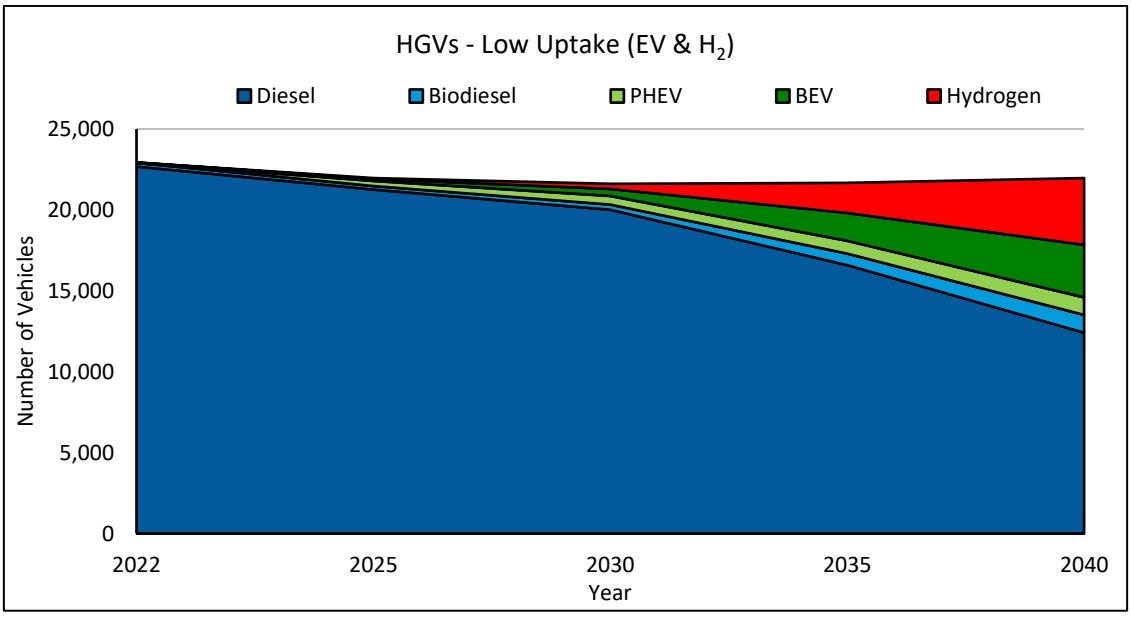
In the high uptake scenario shown in Figure 13-3, in 2040 we expect there to be 8,200 hydrogen HGVs, 8,600 BEV and PHEV HGVs, 2,200 biodiesel HGVs, and 2,800 diesel HGVs.

Figure 13-3 - Electric vehicles & Hydrogen only scenario HGVs - High uptake, Western Gateway



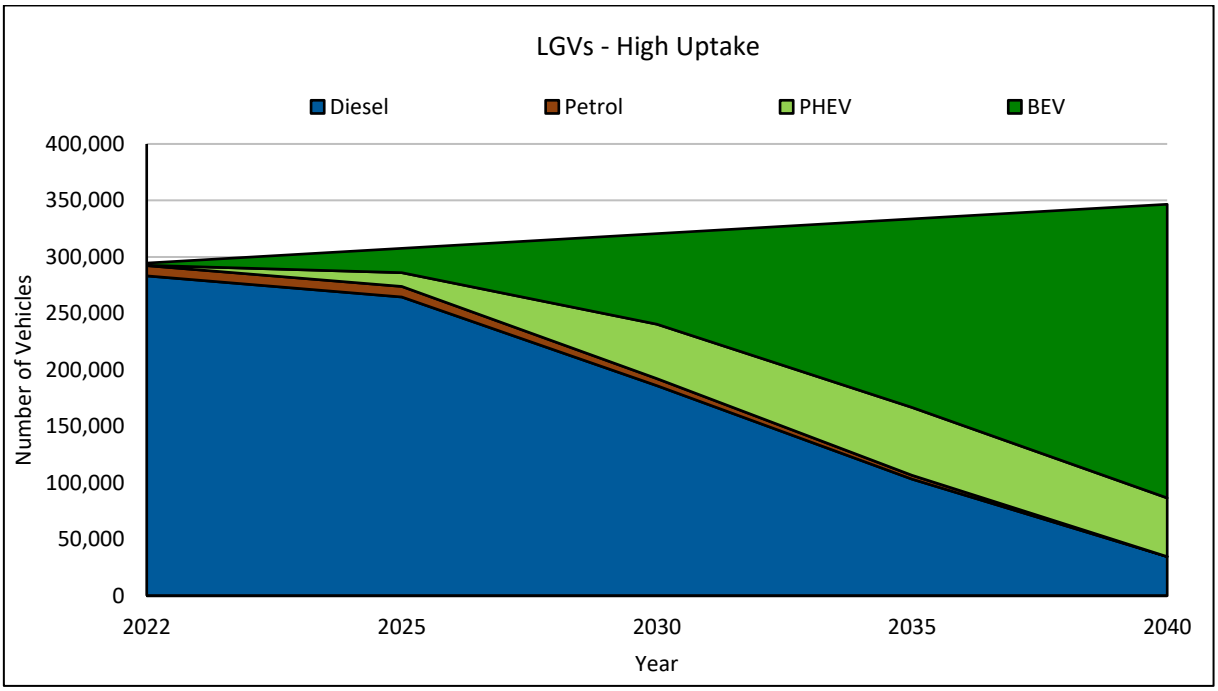
In the low uptake scenario shown in Figure 13-4, in 2040 we expect there to be 4,100 hydrogen HGVs, 4,300 BEV and PHEV HGVs, 1,100 biodiesel HGVs, and 12,400 diesel HGVs.

Figure 13-4 - Electric vehicles & Hydrogen only scenario HGVs - Low uptake, Western Gateway



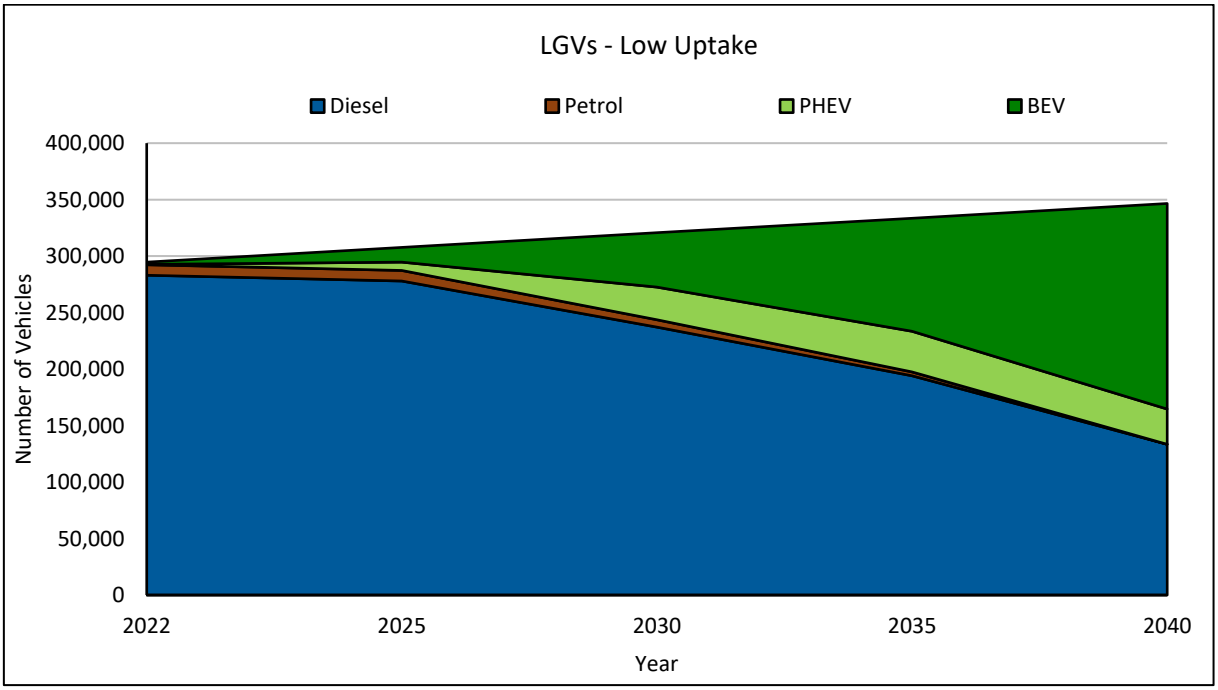
In the high uptake scenario shown in Figure 13-5, in 2040 we expect there to be 260,000 BEVs, 52,000 PHEVs, and 35,000 diesel LGVs.

Figure 13-5 - High uptake scenario for LGVs, Western Gateway



In the low uptake scenario shown in Figure 13-6, in 2040 we expect there to be 182,000 BEVs, 31,000 PHEVs, and 133,000 diesel LGVs.

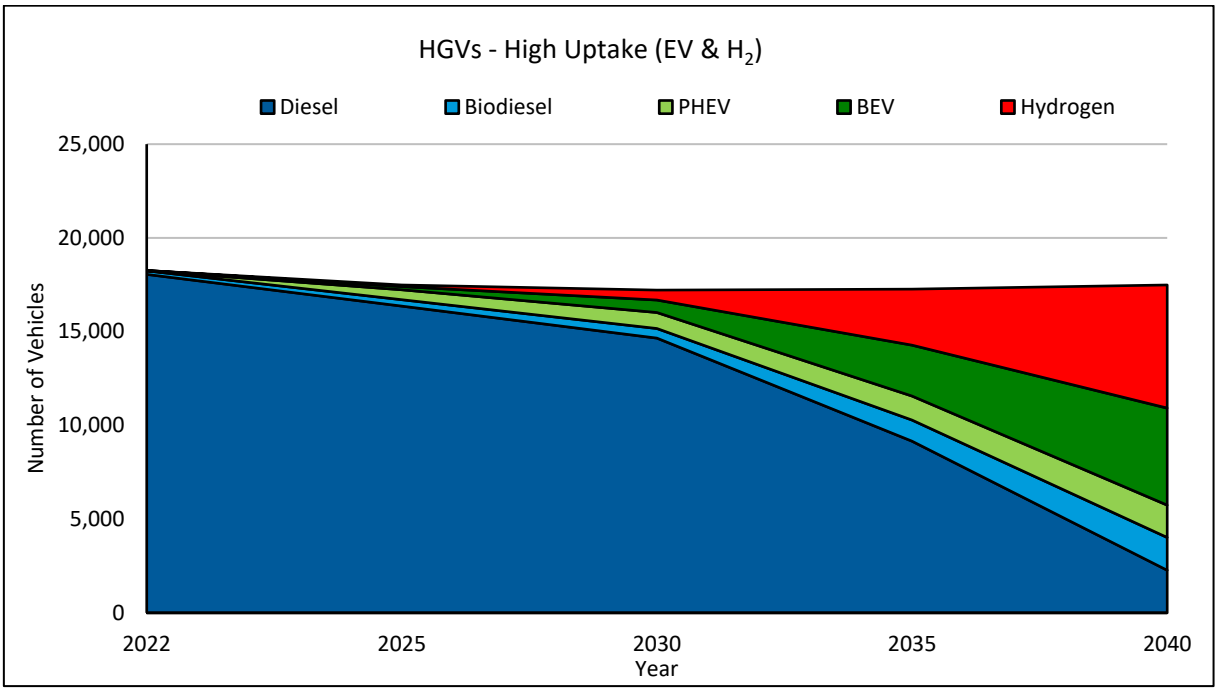
Figure 13-6 - Low uptake scenario for LGVs, Western Gateway



13.2.2. Peninsula Transport

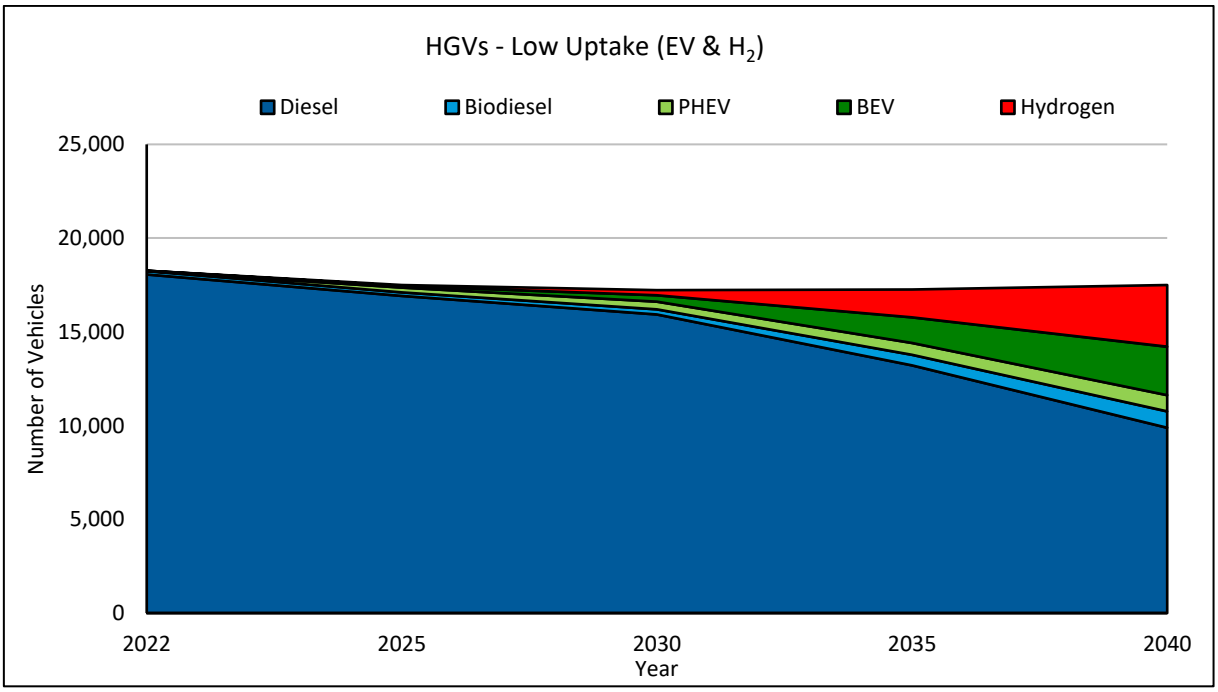
In the high uptake scenario shown in Figure 13-7, in 2040 we expect there to be 6,600 hydrogen HGVs, 6,900 BEV and PHEV HGVs, 1,800 biodiesel HGVs, and 2,300 diesel HGVs.

Figure 13-7 - Electric vehicles & Hydrogen only scenario HGVs - High uptake, Peninsula Transport



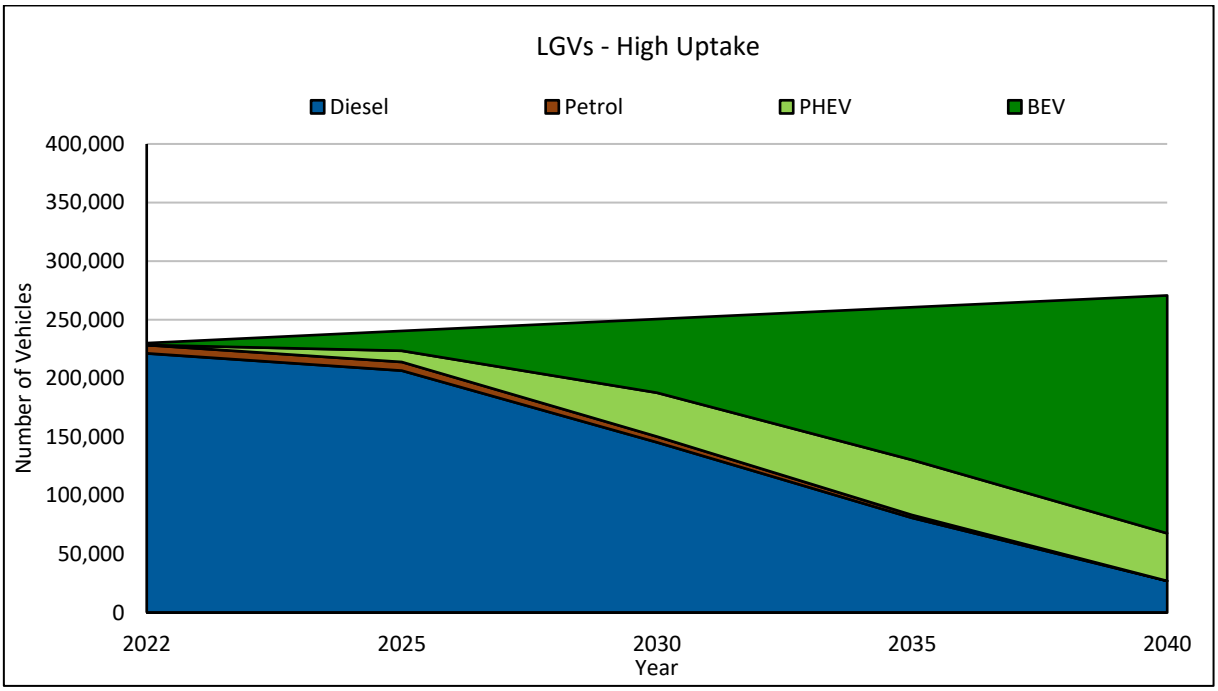
In the low uptake scenario shown in Figure 13-8, in 2040 we expect there to be 3,300 hydrogen HGVs, 3,500 BEV and PHEV HGVs, 900 biodiesel HGVs, and 9,900 diesel HGVs.

Figure 13-8 - Electric vehicles & Hydrogen only scenario HGVs - Low uptake, Peninsula Transport



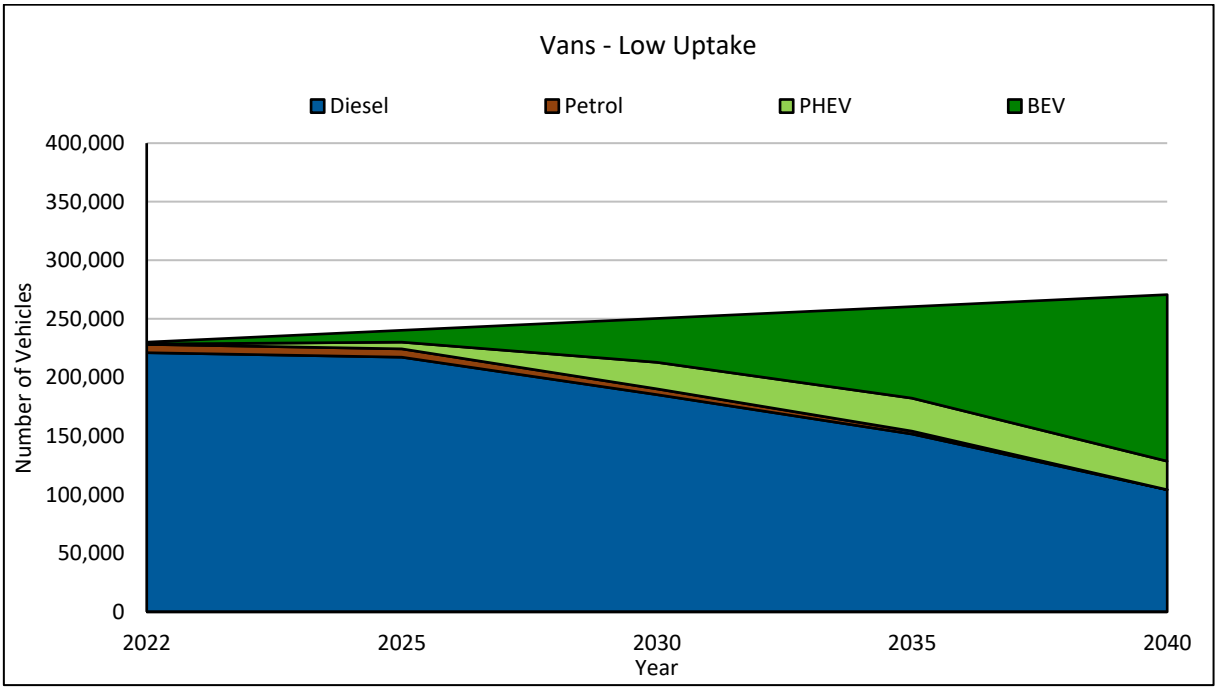
In the high uptake scenario shown in Figure 13-9, in 2040 we expect there to be 203,000 BEVs, 41,000 PHEVs, and 27,000 diesel LGVs.

Figure 13-9 - High uptake scenario for LGVs, Peninsula Transport



In the low uptake scenario shown in Figure 13-10, in 2040 we expect there to be 142,000 BEVs, 24,000 PHEVs, and 104,000 diesel LGVs.

Figure 13-10 - Low uptake scenario for LGVs, Peninsula Transport



13.3. Forecasting Required Infrastructure

Tables with underlying figures can be found in the Excel supplement. Results for the mixed fuel pathway can be found in the Appendix.

13.3.1. Western Gateway

The below figures display the total energy demand required per day to service the number of vehicles calculated in the previous section.

Figure 13-11 Electric vehicle & Hydrogen only scenario - High uptake, total energy demand per day for all LGVs and HGVs, Western Gateway

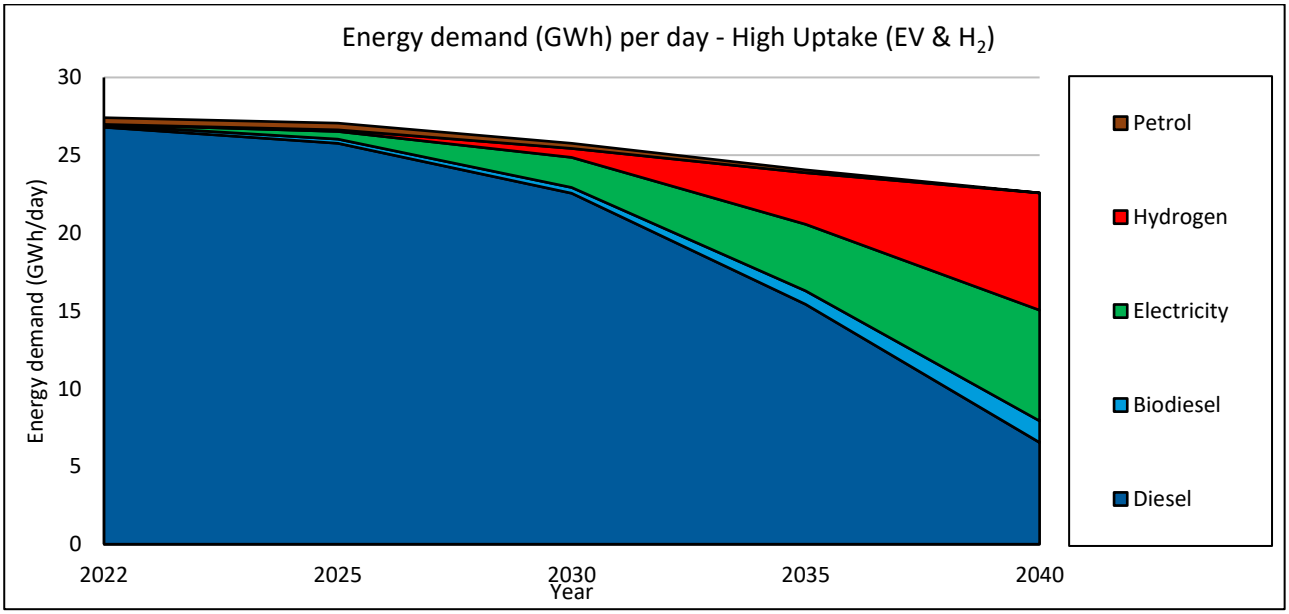


Figure 13-12 - Electric vehicle & Hydrogen only scenario - Low uptake, total energy demand per day for all LGVs and HGVs, Western Gateway

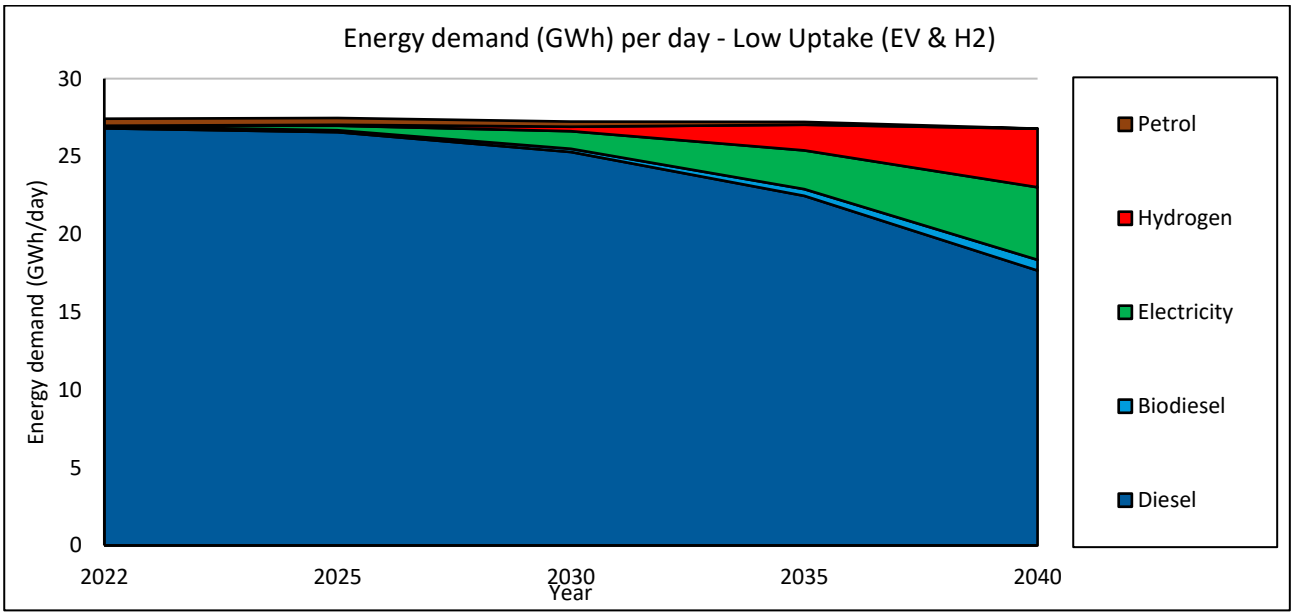


Table 13 and Table 13 show the required publicly accessible infrastructure (equivalent to today's petrol and diesel forecourts) for 2030 and 2040 respectively, showing the required growth throughout the next 20 years, for EV chargepoints and hydrogen refuelling stations (HRS). The high and low uptake scenarios provide a range of infrastructure requirements and should be observed as a single analysis. Local Authorities and STBs do not expect to fund this entirely by themselves, with private industry investment likely to provide a large proportion of this where economically viable for their business case. The split of infrastructure between rigid and artic HGVs is for indicative reasons and infrastructure specific to these different vehicles is not required. However, LGV and HGV access will differ for chargepoint infrastructure and so a distinction is advised between the infrastructure for these vehicles. In particular, LGVs will generally be able to use publicly accessible electric vehicle charging points being installed for the recharging of private cars, which generally will be unsuitable for the requirements of large or heavy freight vehicles. It will therefore be important for local authorities delivering electric vehicle charging infrastructure strategies to consider the needs of LGVs within their plans and forecasts.

Table 13-3 - Public infrastructure requirements up to 2030, Western Gateway

	High uptake (EV & hydrogen)				Low uptake (EV & hydrogen)			
	22 kW	***50 kW***	***150 kW***	***HRS***	***22 kW***	***50 kW***	***150 kW***	***HRS***
Rigids	-	10	4	1	-	5	2	1
Artics	-	7	3	2	-	4	2	1
LGVs	1,050	460	80	-	630	280	50	-
Total	1,050	477	87	3	630	289	54	2

Table 13-4 - Public infrastructure requirements up to 2040, Western Gateway

	High uptake (EV & hydrogen)				Low uptake (EV & hydrogen)			
	22 kW	***50 kW***	***150 kW***	***HRS***	***22 kW***	***50 kW***	***150 kW***	***HRS***
Rigids	-	60	20	10	-	30	10	5
Artics	-	50	15	25	-	25	8	10
LGVs	3,500	1,540	260	-	2,420	1,070	180	-
Total	3,500	1,650	295	35	2,420	1,125	198	15

The figures below show the estimated costs of the high and low scenario for the electric and hydrogen pathway. The high and low uptake scenarios provide a range of costs and should be observed as a single analysis with the high scenario following the CCC's projections exactly and the low representing a slower transition—this could be due to technology maturity not being fully realised or resistance to change from major operators.

Figure 13-13 - Total public infrastructure costs up to 2030, Western Gateway

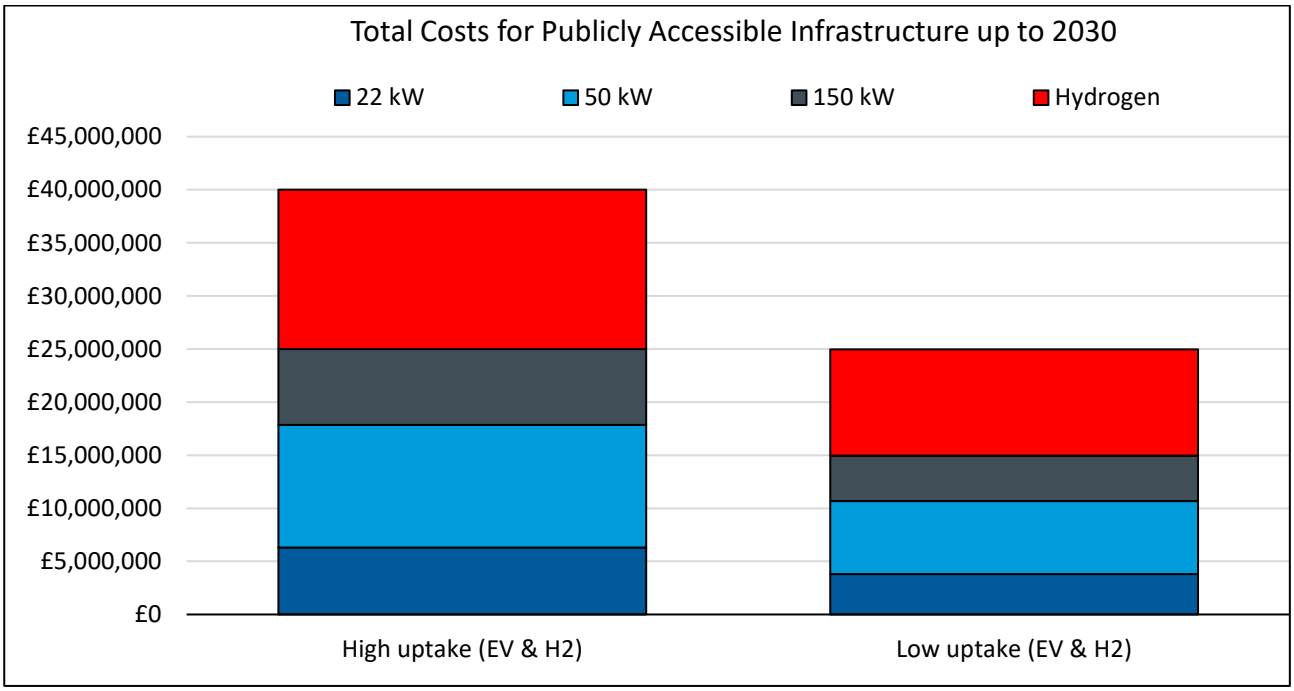
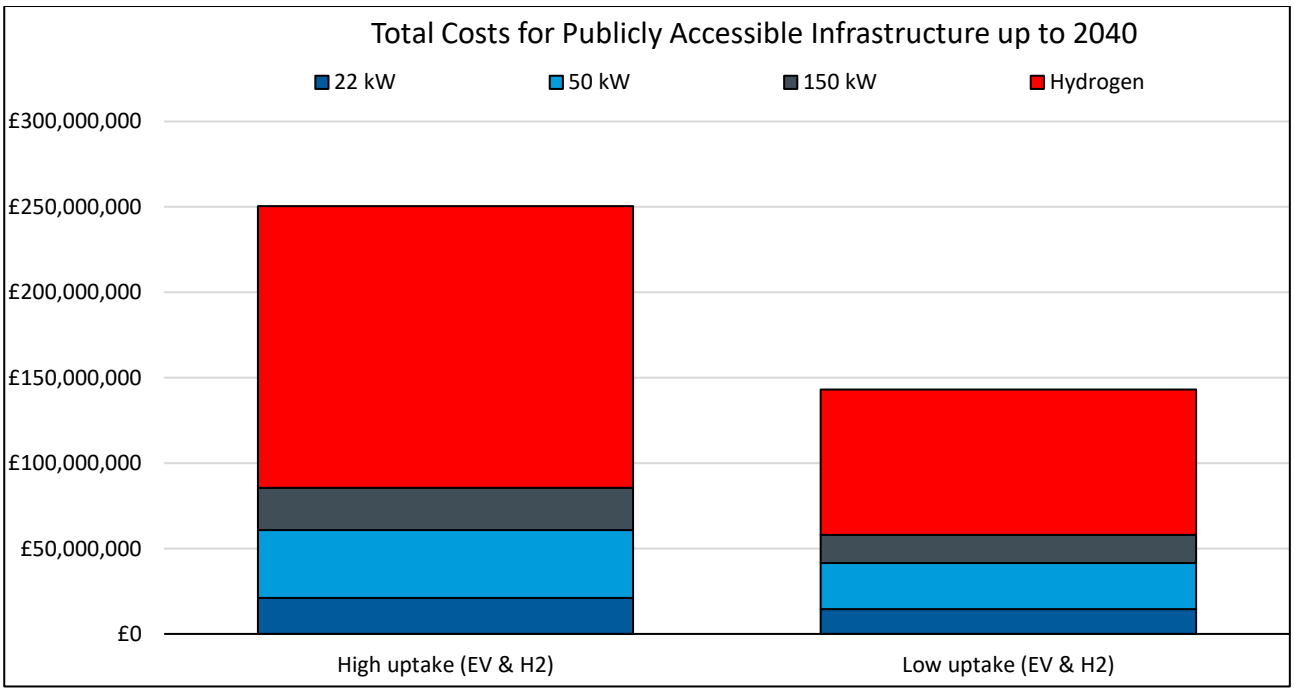


Figure 13-14 - Total public infrastructure costs up to 2040, Western Gateway



13.3.2. Peninsula Transport

The below figures display the total energy demand required per day to service the number of vehicles calculated in the previous section.

Figure 13-15 - Electric vehicle & Hydrogen only scenario - High uptake, total energy demand per day for all LGVs and HGVs, Peninsula Transport

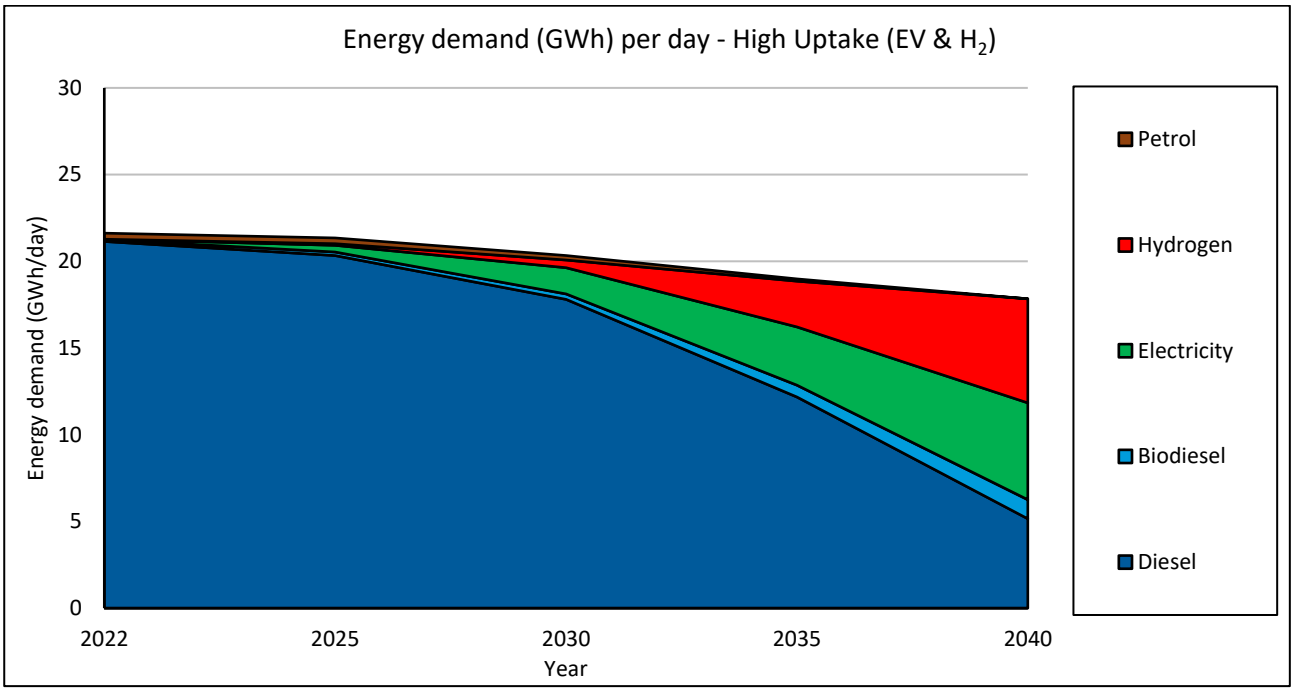


Figure 13-16 - Electric vehicle & Hydrogen only scenario - Low uptake, total energy demand per day for all LGVs and HGVs, Peninsula Transport

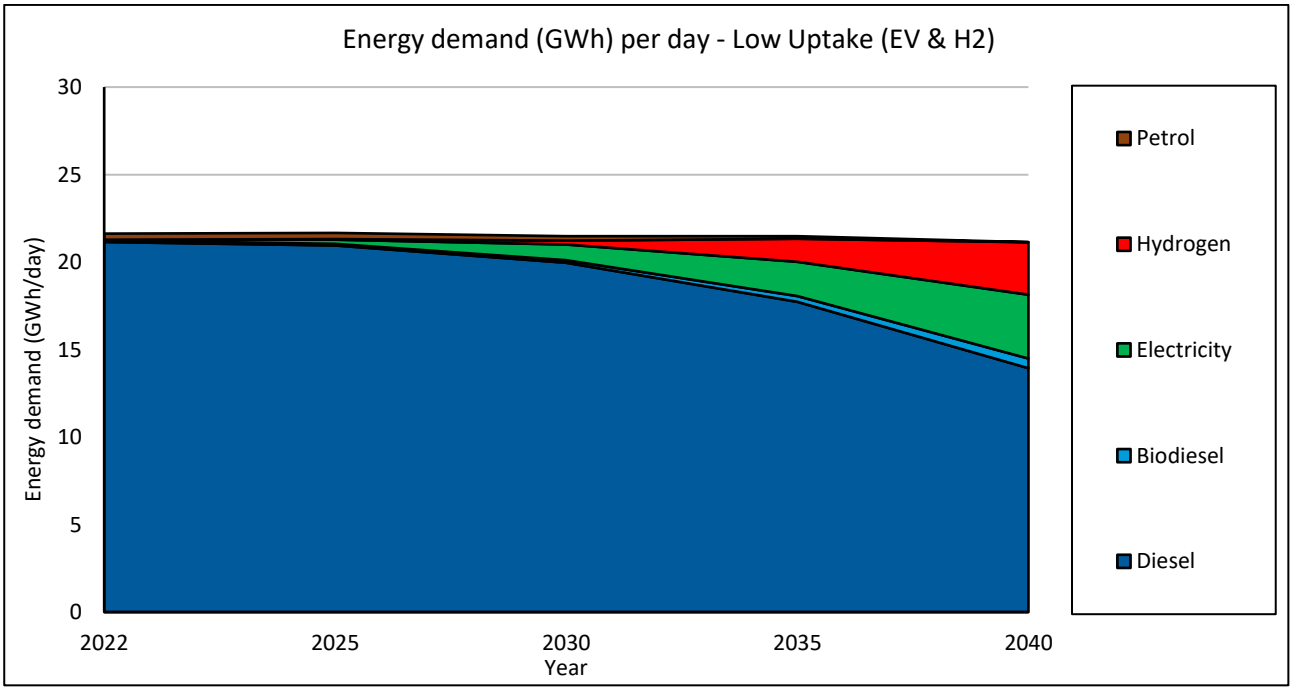


Table 13 and Table 13 show the required publicly accessible infrastructure (equivalent to today's petrol and diesel forecourts) for 2030 and 2040 respectively, showing the required growth throughout the next 20 years, for EV chargepoints and hydrogen refuelling stations (HRS). Local Authorities and STBs will not have to fund this entirely by themselves, with private industry investment likely to provide a large proportion of this where economically viable for their business case. The split of infrastructure between rigid and artic HGVs is for indicative reasons and infrastructure specific to these different vehicles is not required. However, LGV and HGV access will differ for chargepoint infrastructure and so a distinction is advised between the infrastructure for these vehicles. The high and low uptake scenarios provide a range of infrastructure requirements and should be observed as a single analysis.

Table 13-5 - Public infrastructure requirements up to 2030, Peninsula Transport

	High uptake (EV & hydrogen)				Low uptake (EV & hydrogen)			
	22 kW	***50 kW***	***150 kW***	***HRS***	***22 kW***	***50 kW***	***150 kW***	***HRS***
Rigids	-	8	3	1	-	4	2	1
Artics	-	6	2	2	-	3	1	1
LGVs	820	360	60	-	490	220	40	-
Total	820	374	65	3	490	227	43	2

Table 13-6 – Public infrastructure requirements up to 2040, Peninsula Transport

	High uptake (EV & hydrogen)				Low uptake (EV & hydrogen)			
	22 kW	***50 kW***	***150 kW***	***HRS***	***22 kW***	***50 kW***	***150 kW***	***HRS***
Rigids	-	50	20	7	-	25	9	5
Artics	-	40	10	20	-	20	7	10
LGVs	2,740	1,200	200	-	1,890	830	140	-
Total	2,740	1,290	230	27	1,890	875	156	15

The figures below show the estimated costs of the high and low scenario for the electric and hydrogen pathway. The high and low uptake scenarios provide a range of costs and should be observed as a single analysis with the high scenario following the CCC's projections exactly and the low representing a slower transition—this could be due to technology maturity not being fully realised or resistance to change from major operators.

Figure 13-17 - Total public infrastructure costs up to 2030, Peninsula Transport

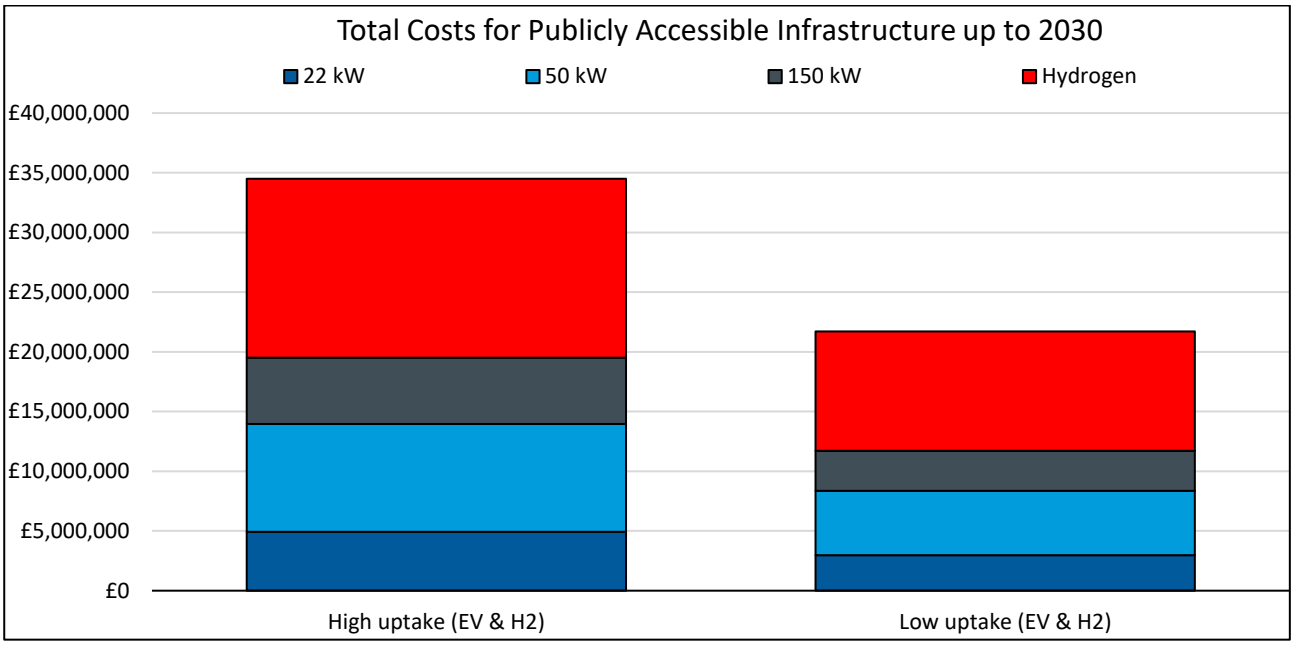
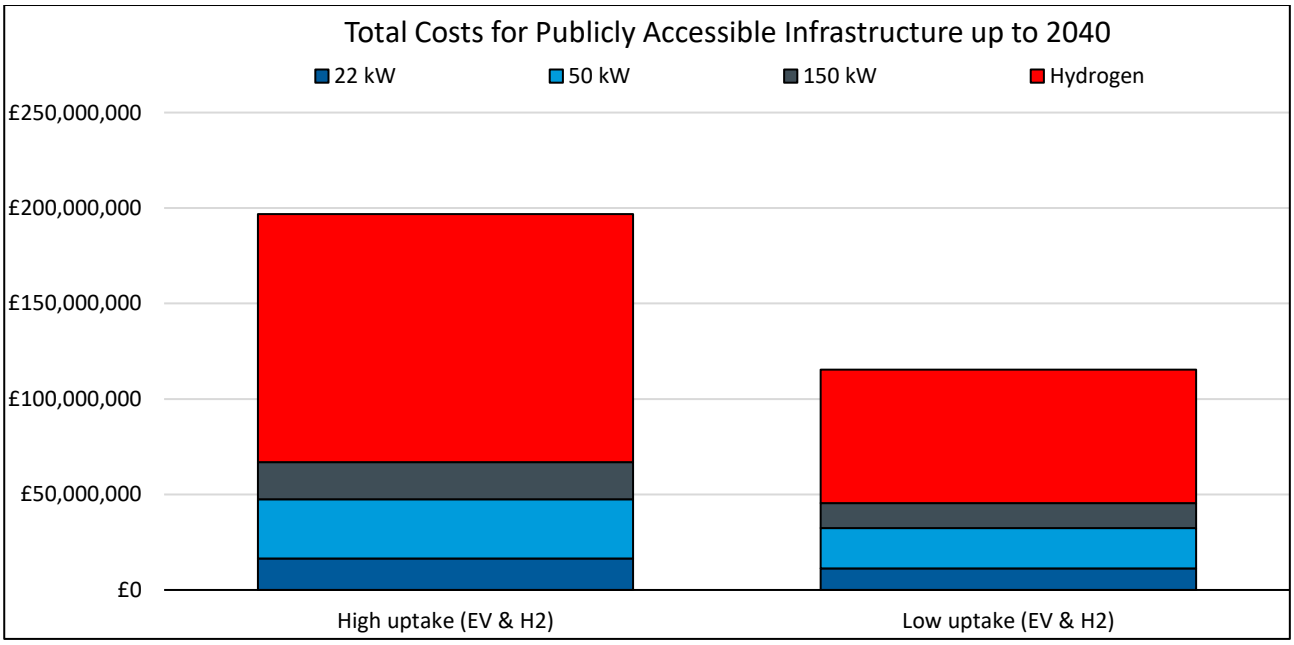


Figure 13-18 - Total public infrastructure costs up to 2040, Peninsula Transport



14. Limitations of Approach and Key Considerations

14.1. Limitations of Approach

There will always be uncertainties involved in complex forecasting work. We have referenced each source used to support the development of the forecast methodology but in some cases, assumptions were made based on Cenex's knowledge of the alternative fuels market. The outputs provided in this report and accompanying spreadsheet therefore represent the best estimates using currently available information.

The main area of uncertainty is surrounding chargepoints: Chargepoint requirements will depend on utilisation rates which in turn will be driven by future battery capacities, charging compatibility and prices charged by network operators. At this stage there are no forecasts available for these factors and therefore there is some uncertainty around the number of chargepoint sockets that will be required in 2040. However, we have a relatively high degree of confidence in the forecasts for power requirements in 2040 and this is arguably more important. Ensuring sites have sufficient power available for the number of plug-in vehicles on the road, including upgrading or building new substations, will allow the deployment of the appropriate number and type of chargepoints by network operators to match demand from the vehicles on the road.

14.2. Key Considerations

14.2.1. Introduction and background

In its document "UK Transport Vision 2050", UKRI sets out in detail the likely steps the UK will need to take over the next three decades to secure a future wherein transportation is not powered by fossil fuels. Within this document, a number of assumptions are set out regarding the short-medium-long term fuel splits of vehicle types, and the likely challenges in the supply, production, and uptake of these alternative modes. Even in the short term, by 2030, HGV truck movements and distance are expected to increase by between 2% and 4%, with greater levels of automation only expected to increase this number in response to altered freight operating economics. By 2023, liquid fuels, including biofuel, diesel and petrol, and hydrogen are still expected to be the dominant source of vehicle power, with a relational dependence on expected developments in technology in both fuel production and powertrain efficiency or hybridisation.

The main shift away from fossil fuels is expected to occur between 2030 and 2050, as government policy banning the sale of new combustion powered vehicles comes into effect in 2023 for ICE only, and 2025 for hybrids, which will be supported by similar policy decisions in the EU impacting the catalogues of international HGV manufacturers. By 2050, the split of battery versus hydrogen is expected to be 50/50, as was modelled in the main hydrogen and electric scenario in WP2 (using forecast from "UK Transport Vision 2050" which comes from the CCC[28]).

All of this points to an easily forecastable demand for both clean and abundant fuel and electricity ramping up over the next 30 years. All transport decisions should be perceived and analysed through the prism of this forecast and inducing demand through adequate supply, scaling the commercial network, and responding to lessons learnt through less technologically complex car provision.

Although local authorities and regional transport bodies have some say through various regulatory measures on how this energy demand will be procured and sourced, the energy grid is a commercially held national asset. Provision and distribution of supply, and the associated upgrading and planning of infrastructure, is managed at a more local/regional level, and by supplying DNO's with evidenced anticipated demand this can inform network readiness for a net-zero future.

There is much debate across all levels of government how this future energy demand will be practically sourced, as the 2022 war in Ukraine has led to a national realisation about how vulnerable and externally driven our existing energy supply is.

[28] Zero Emission HGV Infrastructure Requirements (Ricardo Energy and Environment). Available at: https://www.theccc.org.uk/publication/zero-emission-hgv-infrastructure-requirements/

The UK will be required to phase out all infrastructure and machinery powered by an internal combustion engine in order to meet its 2050 net-zero goals and targets. This will result in a large shift of power requirements from individuals and private enterprises, to the connected national grid infrastructure, where electrification is opted for.

While hydrogen is a liquid fuel delivered in a similar manner to current fossil fuels, mass production of green hydrogen centres around electrolysis, and therefore its availability is dependent upon National Grid electricity production in a similar way to electricity for charging electric vehicles.

Unlike electricity as a direct fuel for vehicles, the location of the delivery of electricity to the electrolyser and the location where hydrogen is delivered to vehicles can be decoupled, which can lead to differeng deployment and delivery profiles more similar to a fossil fuel supply chains, but not without significant technical and regulatory challenges.

14.2.2. Impacts of rurality

In 2021, the South West had the 4th most travelled vehicle miles in the UK, reflecting the region's rural nature and the greater distance people and goods often have to move. Because the region contains some of the most rural areas in England, this adds a layer of complexity to the planning and general adoption of alternative fuels. It is limited and impacted by several key factors which make the design, build, and operation of an alternative refuelling network difficult from a commercial operational perspective.

- **Infrastructure:** In rural areas, there is a limited availability of hydrogen refuelling stations and electric charging infrastructure. This makes it challenging to adopt these technologies for freight movement in rural areas, as the vehicles need to have enough range to cover long distances without refuelling or recharging. The problems posed by this factor can be mitigated by alternative fuel site selection providing sufficient accessibility, alongside sufficient capacity. Infrastructure linked to demand along the SRN is likely to ensure that commercial operators will be guaranteed enough traffic to recoup infrastructure investment from freight and commercial operators for both hydrogen and EV. More isolated infrastructure which serves more isolated communities may have trouble sustaining a level of traffic to support their business model.
- **Power grid capacity:** The capacity of the power grid in rural areas may not be sufficient to support the charging demands of electric vehicles, which can limit the adoption of electric power for freight movement. Additionally, the power grid infrastructure in rural areas may be outdated and need upgrades to support electric charging, for both domestic and commercial charging infrastructure. While this is currently a significant problem, the network operators and DNOs are well aware of this challenge, as UK energy use is expected to grow by 50% over the next 12 years[29]. The medium term needs of the commercial charging network are less well recognised, and there will need to be more concrete plans for transmission and distribution infrastructure investment in order to meet the needs of the coming decades.
- **Cost:** The cost of installing hydrogen refuelling stations and electric charging infrastructure in rural areas can be higher than in urban areas due to the low population density, remote locations, and increased distances to key infrastructure. This can be a barrier for the adoption of these technologies for freight movement. As demand shifts from ICE as past of the regulatory phase-out, this is expected to drive innovation and economies of scale in both the commercial and domestic supply. While this impact will minimise over time, the short to medium term profitability of supplying these networks in rural networks is not necessarily optimal.
- **Vehicle range:** Freight movement in rural areas may require longer distances to be covered compared to urban areas, making it necessary for the vehicles to have a longer range. At present, hydrogen fuel cell vehicles have a longer range compared to battery electric vehicles, which can make them a more suitable option for freight movement in rural areas. This is also likely to improve alongside future innovation for both EV and Hydrogen fuel types.
- **Maintenance:** Maintenance of hydrogen refuelling stations and electric charging infrastructure in rural areas can be challenging due to the low population density and remote locations. This can increase the cost of ownership and operation of these technologies, which can act as a barrier for commercial operators in developing a rural network.
- **Transportation demands:** Freight movement in rural areas has different demands compared to urban areas, such as longer distances, rough terrain and irregular delivery schedules following unfixed routes. These factors can influence the suitability of hydrogen and electric vehicles for freight movement and would make HGVs or larger goods vehicles unsuitable for rural operation in a higher percentage of movements, which matches the rural profile of LGVs utilising existing public car infrastructure.

[29] Where will Britain's future energy supply come from? (parliament.uk)

The impact of these factors for Peninsula Transport and Western Gateway is likely to be high, as much of the area is substantially rural, and comparatively remote in terms of distance when compared to other areas of the UK classified as “Rural”. There is as yet, a limited national research base into the impact of rural factors on freight uptake of alternative fuels. There is general confidence that as many of these problems have already been overcome by many industries, including the existing fossil fuel refuelling network, similar mitigations will be drawn by future infrastructure operators if demand linked to the ICE phase out spikes.

The South West Rural Mobility Strategy points towards freight consolidation centres as a multi-modal solution to rural freight transportation, and this has a significant impact on the feasibility of alternative fuels for freight refuelling site selection. The impact of alternative fuels needs to be considered from this consolidation angle, and sites need to be appropriate for both consolidation operation and HGV refuelling, allowing operators to continue rural operations confidently, while reducing and mitigating the risk of rural stranded assets and increasing supply chain resilience. Rural freight infrastructure also has the added issue of controversy around traffic and congestion, which although mitigated slightly by the zero emissions nature of the vehicles, still will have some impact from a safety and air quality perspective.

14.2.3. Developing the future refuelling network

The potential for commercial and private investment into the supply and operation of hydrogen and electric refuelling facilities for freight in the UK is high, driven by the growing demand for clean and sustainable transportation solutions, as well as favourable government policies and financial incentives. The public sector is expected to play a crucial role in supporting and facilitating the growth of the hydrogen and electric vehicle market, particularly in the early stages of development.

As demand is projected to grow, private and commercial investment into the network infrastructure, technology, and facilities is expected to develop in parallel. Companies with traditional portfolios in fossil fuel infrastructure and supply are expected to redirect their considerable assets into supplying both this demand, and associated opportunities which come from maintenance, supply, and construction of infrastrucutre.

To support the growth of the hydrogen and electric vehicle market, the UK government is expected to continue providing financial incentives and funding for the development and operation of refuelling facilities. The government may also provide regulatory support, such as ensuring a favourable legal framework for the development and operation of hydrogen and electric refuelling facilities.

The UK government is expected to continue providing financial incentives and funding for the development and operation of refuelling facilities in the early stages of development. This support can help to overcome some of the initial challenges faced by the industry, such as high capital costs and limited infrastructure, making it more attractive for private and commercial investment. The funding and research profile of the government also seeks to identify efficiencies in infrastructure rollout, this could include additional industry facilitation and exploration of multi-modal infrastructure for freight movement.

As the hydrogen and electric vehicle market matures and the infrastructure for these technologies improves, the public sector is expected to gradually step back and allow private and commercial investment to take over. This shift is driven by the desire for the market to become self-sustaining and for private and commercial investment to drive innovation and growth in the industry.

The UK government is still funding proof of concept/innovation type projects, consulting on format of supply chain and positioning itself for industry led delivery and is currently consulting on aspects of a future hydrogen supply chain in order to overcome some of the barriers for the potential hydrogen network.

For the charging network, there are a different set of considerations and factors which may impact the business cases for network development and not only the potential, but also the need for public investment and support into network development. In recent years, the mixed, but trending positive consumer perception of EVs for domestic and personal ownership means that technology and business models are now more detailed in their deployment and maturity of EV charging technology as opposed to the more experimental and “futuristic” implementation and operation of a hydrogen refuelling network. A combination of these domestic aspects alongside investment in public charging infrastructure by bodies such as National Highways increases sector competition and demand, while also enhancing the network for the public user. Although at this point the HGV charging network is comparatively immature, if it were to follow similar trends, it would follow a similar model, consolidating and incorporating lessons learnt.

14.2.4. Higher Capacity Chargers

It is still unclear what the impact of future developments in EV charging technology, such as the introduction of 350 kW and megawatt chargers, will have on the current development and planning of hydrogen and electric fuels for freight in the UK. However, there are some potential implications that should be considered.

The development of faster and more powerful EV chargers may increase competition between hydrogen and electric fuels, as EV technology becomes more appealing and convenient for freight operators. This will have the resultant impact of increasing innovation and competition between the two fuel types, driving costs down for both the end user, and in the vertical supply chain.

If EV technology continues to advance, it may reduce the need for hydrogen refuelling infrastructure, as freight operators may choose to use EVs instead of hydrogen vehicles, although potential demand for maritime hydrogen in the Western Gateway area may level availability at a regional level. The development of faster and more powerful EV chargers may also lead to the development of hybrid solutions, combining the benefits of hydrogen and EV technology for freight operations, having practical benefits on compounding the operational effectiveness of the proposed charging network.

Although 150 kW+ chargers are now in experimental deployment, and no standards have been set, there is some trepidation surrounding the impact on electrical infrastructure that such a move is likely to have. The connection requirements for a megawatt charger are significantly more expensive and time consuming compared to providing for a network in the 150 kW area.

Table 14-1 - Scaled Considerations of Chargepoint Installation

	Small (<70 kVA)	Medium (200 kVA – 1 MVA)	Large (>1 MVA)
Number of charge points	1-3 fast or 1 rapid charger	Up to 15 rapid chargers	Above 15 rapid chargets
Connection time	8-12 weeks	8-12 weeks	6 months+
Connection cost	£1,000 - £3,000	£4,500 - £75,000	£75,000 - £2 million
Other considerations that may affect cost	Street work costs.	Street work costs. Legal costs for easement & wayleaves.	Street work costs. Legal costs for easement and wayleaves. Planning permission & space for a substation.

Operational trends of the road freight industry also mitigate significant need for this level of charging capacity. Data shows that most HGV charging events happen at an operator's depot, where they have more control over the supply, maintenance, risk, and cost of the charging infrastructure they are deploying to their fleet. Fleet management software in use also mitigates the vast majority of charging requirements through the public network as vehicle charge levels in combination with planned trips are aggregated and managed centrally, allowing for vehicles to maintain maximum levels of operability and battery charge while minimising downtime for charging and maintenance. The integration of these software solutions would represent and require a massive ideological shift in how hauliers and other freight operators plan and manage their operations and vehicle fleets. This would not be mitigated through the installation and widespread adoption of megawatt charging infrastructure as this represents a "do maximum" scenario in which massive grid improvements must be undertaken beyond what is presently scoped by National Grid and the DNOs.

14.2.5. Planning

In a UK and South West planning context, the likelihood of negative planning impacts and blight occurring near hydrogen and EV refuelling facilities is relatively low when compared to fossil fuel filling stations. However, there

is still a potential for some localized impacts, such as noise and light pollution, which would be appropriate to consider.

The design and operation models of hydrogen and EV infrastructure are immature when compared to fossil fuel filling stations, which typically leverage large and complex infrastructure relating to hazardous and flammable material handling, with greater potential for spills and leaks. At present, planned and installed hydrogen infrastructure typically has the same footprint as existing fossil fuel forecourts, however hydrogen and EV refuelling facilities are immature in their rollout, with the design, installation, and associated planning impacts of this infrastructure being largely unexplored.

The planning process for hydrogen and EV refuelling facilities is currently more time consuming and complex when compared to other fuel stations and can be subject to local planning policies and guidelines, as well as being bound by standard planning procedure, which may be required depending on the specifics of the project. The added complexity surrounding hydrogen storage and supply, and the planning systems' lack of experience of dealing with planning applications for commercial supply of EV and Hydrogen for freight indicates that in the near to medium term, the planning applications for these technologies will take a long time to be approved.

Hydrogen and EV refuelling facilities typically have less impact on the local environment compared to fossil fuel petrol stations but highlights the need for careful consideration of the potential impacts during the planning process. Central Government is expected to implement a legal framework for hydrogen production and distribution, which may have a regulatory impact on planning process, and guidance laid out in the National Planning Policy Framework (NPPF) recommends local authorities and the broader planning system to support the net-zero transition through Local Plan development or other local policy.

Some research does exist [30][31]into the attitudes of the public to hydrogen filling and storage facilities, and opposition seems to stem from a lack of trust in safety regulations, non-environmental attitudes, and concerns about local refuelling infrastructure. Other research[32], highlights proximity as a factor to planning opposition.

Although there is limited evidence or availability of planning guidance as there are only 11 operational Hydrogen Refuelling Stations (HRSs) in the UK which are considered by the relevant planning authorities on a case by case basis, existing public planning consent on other stations in the UK indicates that planning objections to future potential sites are likely to be standard in themes (increased congestion, land-use, safety of unstaffed site, noise, etc.).

The HRSs in the UK have tended to be stand-alone stations deployed in locations tied to specific funded projects. The future pathway to mass-market deployment means that increasingly HRSs may be either:

- Integrated with conventional refuelling stations or alternative fuel refuelling hubs in the UK, such as the HRS recently installed by ITM Power in Shell refuelling stations at Cobham and Gatwick; or
- Associated with large-scale fleet deployment and renewable energy projects such as the Tyseley Energy Park.

HRS costs are presently high, as each station is essentially a bespoke design. However, costs will fall as more stations are deployed and as manufacturers begin to produce components at larger scale. The cost and timescales of installation vary significantly dependent on various factors which should all be considered when selecting future refuelling sites as follows:

- **Capacity:** The amount of hydrogen the station will be required to dispense, which in return is driven by the number and type of vehicles to be refuelled, daily mileage, and forecast future demand.
- **Types of vehicles to be refuelled:** A fuel cell van will typically use around 1 kg to 3 kg of hydrogen per 100 kilometres driven, whereas a hydrogen HGV can use between 8 kg and 12 kg to travel the same distance, dependant on the load.
- **Refuelling pressure and number of nozzles:** Hydrogen is stored and dispensed as a high-pressure compressed gas. Dictated by on-vehicle storage space and the cost of storage cylinders, vans typically refuel at 700 bar and HGVs at 350 bar.

[30]Public attitudes towards and demand for hydrogen and fuel cell vehicles: A review of the evidence and methodological implications Public attitudes towards and demand for hydrogen and fuel cell vehicles (wupperinst.org)
[31]O'Garra Investigating attitudes to hydrogen refuelling facilities and the social cost to local residents Investigating attitudes to hydrogen refuelling facilities and the social cost to local residents - ScienceDirect
[32] The evaluation of hydrogen fuel stations by citizens: the interrelated effects of socio-demographic, spatial and psychological variables The evaluation of hydrogen fuel stations by citizens 2015-06-19 (researchgate.net)

- **Performance:** The ability of an HRS to refuel vehicles back-to-back is dependent on the volume of compressed hydrogen stored. Storing large volumes of hydrogen to facilitate back-to-back performance will add to HRS costs. There is also a dependency on the distribution approach to restock the refuelling sites – assuming it will be tankers rather than pipeline.
- **On-site generation versus external supply:** If on-site generation is used, then power availability and distance to the three phase mains supply becomes an important consideration. External supply is the preferred approach due to complex legislation for large capacity on-site generation of hydrogen. It is envisaged that a hub and spoke method of delivering hydrogen is likely in the future: whereby one plant produces large quantities of hydrogen and delivers this to sites within a specified radius (e.g. 50 miles).
- **Green versus grey hydrogen:** Hydrogen generated from renewable electrolysis has essentially a zero-carbon footprint, and is referred to as 'green hydrogen'. However, around 95% of hydrogen is now produced by steam methane reforming (SMR) – referred to as 'grey hydrogen'. Vehicles fuelled by grey hydrogen have an emission footprint comparable to diesel.
- **Location and footprint:** HRSs are relatively novel pieces of infrastructure and securing planning permission is not always straightforward (discussed further in the Cenex H2ME2 report[33]).

Although the EV charging sector and associated building and planning regulations are comparatively more mature than those that exist for hydrogen fuel types, there are minimal examples of the impact of charging infrastructure with the required demand and capacity to meet the demand of the freight industry as part of a public charging network.

At present, planning policy does allow for infrastructure installation through permitted development in some applications, but these use-cases are more geared towards domestic or private charging infrastructure which usually requires less disruptive construction processes, and relatively small impact on the local distribution network. The main concerns of planning authorities and other planning stakeholders in the siting of HGV refuelling in particular would be related to increased volumes of HGVs and the associated ecological, environmental and pollution-based concerns, battery and charging technology safety concerns, and contextual land use changes, alongside the secondary impacts on power distribution infrastructure when grid upgrades are required for provision.

14.2.6. Raw material availability

The viability of EV and battery powered vehicles as an alternative to fossil fuels is a topic of concern when considered within the context of the limited global availability of lithium, cobalt and other rare metals used in the production of battery cell technology. In order to ensure that broad national, regional, and industry fuel type goals are met by 2050, it's important to consider the availability of these materials, and the impact shortage may have on supply in light of forecasted increases in demand[34].

Innovation and technological advances are expected to act as key drivers in mitigating the risk of this limited supply[35]. For example, the development and creation of new battery technologies (such as solid-state) could hold potential to significantly reduce industry manufacturing requirements for cobalt and other metals, additionally, recycling is highlighted as a current and potential solution to sourcing issues, reducing the broad need for mineral extraction and importation, potential increasing supply chain resilience at a more national level.

Battery recycling infrastructure in the UK is already generally well established, and its commercial viability has been proven over a number of decades with demand for this service and the output materials only expected to increase in the coming years. The UK Government has also launched a number of innovation funding programmes designed to stimulate this supply chain including the "Automotive Transformation Fund", the Business, Energy and Industrial Strategy's 'Battery Industrialisation Centre', and the related "Faraday Battery Challenge" designed to develop new technology in aid of solving linked supply problems.

Despite this central government support, there is still a long way to go in developing a sustainable and circular economy for EVs and associated battery manufacture in the UK. There are significant challenges in terms of establishing the infrastructure and facilities required for the recycling of batteries, as well as in establishing a

[33] Cenex H2ME2 Deliverable for Hydrogen Mobility Europe: https://h2me.eu/wp-content/uploads/2020/11/H2ME2-D5.19-Public-FV-Safety-and-RCS-lessons-learnt-%E2%80%A6.pdf
[34] Future lithium availability for EV batteries continues to be a cause for concern - Advanced Propulsion Centre (apcuk.co.uk)
[35] Are There Enough Materials to Manufacture All the Electric Vehicles Needed? - Union of Concerned Scientists (ucsusa.org)

comprehensive network of collection and recycling points. Moreover, the recycling of batteries is a complex and challenging process, requiring specialized facilities and expertise.

14.2.7. Energy demand and sourcing

The government has made several acknowledgments that in order to adequately supply projected increases in electricity demand caused by the shift to net zero, there must be broad and comprehensive changes to not only the energy generation infrastructure of the nation, but also the energy transmission infrastructure.

In terms of energy generation, power sourced to power electric vehicles or other alternative fuel generation methods linked to hydrogen, is sourced from the grid, of which 35% in 2021 was supplied by fossil fuel powered centres scattered up and down the country.

Hinkley Point C: is a nuclear power plant on the north somerset coast, expected to be in operation by September 2028. It's presently being constructed by French energy company EDF, with funding also supplied by the British government. The projected power generation capacity of the station is expected to account for 7% of the UK energy mix, which equates to around 6 million homes. As well as the construction itself, there are parallel transmission grid upgrades being conducted to allow adequate and efficient network delivery to the grid itself. The positioning of the grid on the north Somerset coast means that the South West in general is well positioned to receive a sizeable chunk of the power generated from the plant.

There are many transmission interconnectors planned to connect the country to Norway, Denmark and France, increasing European electrical resilience while also unlocking new international markets for terrestrial and off-shore renewable energy exportation. This will allow for optimal winds off the coast of Brittany, to in theory, charge an electric vehicle in Tavistock. The IFA2-France connect has recently been completed, landing in Fareham, Hampshire, providing resilience and potential connectivity to the whole of the south-west.

Offshore Wind power is expected to account for much of the renewable energy in the UK's future and projected energy usage. The Government has set an ambition to deliver up to 5GW of floating wind by 2030, and the South West is well positioned in its coastal geography to take advantage of this. The Crown Estate is exploring the viability and technical realities of a sizeable energy generation array in the Celtic Sea, and a larger extension to the Rampion array on the coast of Brighton is also planned, both projects will make landfall in or nearby the southwest immediate transmission grid.

Figure 14-1 – Future Energy Supply for the South West of England

As well as potential offshore and alternative solutions, land solar and wind generation opportunities are plentiful in the South West. Although there have been some concerns about the impact of onshore wind turbines on the local environment, including the visual impact on landscapes and the potential impact on wildlife, there is still significant potential for onshore wind and solar power in the region. The UK government has set a target of 40GW of offshore wind by 2030, but there is also scope for onshore wind power to make a significant contribution to the energy mix, particularly in areas with suitable terrain and wind conditions, such as the South West.

Tidal power is another potential source of renewable energy in the region. The UK has some of the strongest tidal currents in the world, and there are several potential sites for tidal power generation in the South West, including the Severn Estuary and the Bristol Channel. While tidal power is still a relatively new and emerging technology, it has the potential to provide a significant source of renewable energy in the future.

Overall, the South West is well positioned to take advantage of a range of renewable energy sources, including onshore and offshore wind, solar, and tidal power. As the country moves towards net zero emissions, it is likely that the region will play a key role in meeting the UK's energy needs and contributing to the transition to a more sustainable future.

14.2.8. Potential transition fuels

Although the eventual goal is for all vehicles to have zero emissions at both the tail-pipe and in their supply chain, there are a few technologies or alternative fuels which may aid freight operators across all modes in reducing their emissions in the short-to medium term, or until the supporting infrastructure for hydrogen and electric fuels is developed to a sufficient extent or ICE engines are phased out by the UK government.

14.2.8.1. Hydrotreated vegetable oils

The use of hydrotreated vegetable oils (HVO) as a near-term measure to reduce fossil-fuel emissions in the UK freight context has gained attention in recent years due to its potential to reduce greenhouse gas emissions in the short term. HVO is a renewable diesel fuel derived from vegetable oils or animal fats and it has similar properties to fossil diesel, making it a drop-in replacement, and reducing expensive vehicle and infrastructure procurement costs. Although the carbon impacts of this are significant in comparison to traditional fossil fuels, they are variable and dependant on the type of organic material or feedstock used to produce the oil, and supply chains resilience and resource uptake remains low in the freight sector.

Despite the potential benefits of HVO, its adoption in the UK freight context is still limited due to several factors. Firstly, the supply chain for HVO remains relatively small, and it can be expensive to produce and distribute the fuel. Secondly, while HVO can be used as a drop-in replacement for fossil diesel, it still produces greenhouse gas emissions when burnt. Finally, the long-term viability of HVO is uncertain as the demand for renewable fuels like hydrogen and electric is set to increase, potentially reducing demand for HVO in the future.

Overall, in the near to medium term, HVO may play a role in reducing emissions in the UK freight context, but its future as a primary fuel source is uncertain. Electric and hydrogen fuel cell technologies are likely to become more prominent in the coming years, and the UK government's commitment to phasing out ICE engines by 2030 will further drive the adoption of these technologies. Nonetheless, HVO may still have a role to play in reducing emissions for specific use cases or for operators who are unable to adopt electric or hydrogen technology in the short term.

14.2.8.2. Biodiesel

Biodiesel is a renewable, eco-friendly fuel made from waste materials like vegetable oils, animal fats, or used cooking oil. In the UK freight fleet context, it's mixed with regular diesel to reduce emissions and dependence on fossil fuels. Common blends are B20 (20% biodiesel), B30 (30% biodiesel), and B100 (100% biodiesel). UK truck manufacturers like Renault, Mercedes, DAF, MAN, and Scania support using B20 and B30 blends, while some vehicles can run on B100. It’s likely that biodiesel will help fill the gap in the medium term in regards to the carbon neutrality of fuel types, but the role fleet owners and operators can take in its rollout is restricted by their own limited impact on the fossil fuel supply chain.

14.2.9. Local impacts from future refuelling infrastructure

Induced demand is a well-documented phenomenon in transport planning, and it refers to the concept that building additional road capacity, or in this case, providing additional infrastructure for hydrogen or electric vehicles, can lead to an increase in demand for travel that results in additional traffic. This effect can occur in various ways, including through increased vehicle ownership, changes in route selection, or shifts in mode choice.

The likelihood of inducing traffic in proximity to hydrogen or EV infrastructure depends on a range of factors, including the availability and accessibility of the infrastructure, public perception and awareness, government policies, and technological advancements.

The UK government has set ambitious targets to develop the necessary infrastructure for hydrogen and EVs. The government's Road to Zero strategy aims for at least 50% of new cars to be ultra-low emission by 2030 and

for the country to be carbon-neutral by 2050. To achieve this, the government has committed to investing £2.5 billion in low-carbon transport infrastructure, including charging points for EVs and hydrogen refuelling stations.

Despite these investments, the availability of infrastructure is still a key factor that could limit the adoption of EVs and hydrogen vehicles. According to the National Audit Office (NAO), the UK currently has only 12 hydrogen refuelling stations and 25,000 charging points for EVs, which is far below the level required to meet the government's targets. As a result, the accessibility of infrastructure is also limited, particularly in rural areas where the distances between refuelling or charging stations are greater. Where infrastructure has been placed in town centres, or on-street, concerns have been raised regarding EV charging being a barrier to the construction of new cycle lanes, and the general encouragement of active travel. While a contencious issue facing the delivery of infrastructure for cars and vans, infrastructure for freight vehicles (HGVs in particular) is most likely to be sited close to existing freight and logistics facilities, and therefore less likely to affect future active travel developments.

Public perception and awareness are also crucial factors that could impact the likelihood of inducing traffic in proximity to hydrogen or EV infrastructure. While there is a growing awareness of the environmental benefits of low-carbon transport, there is still some reluctance to adopt new technologies due to concerns about range anxiety, costs, and charging times. A recent study by the UK Energy Research Centre (UKERC) found that the limited range and high upfront costs of hydrogen and EVs were still the main barriers to adoption for consumers, with similar barriers identified for commercial and business operators.

When it comes to refuelling infrastructure for hydrogen and EVs in the UK, the likelihood of inducing traffic is somewhat uncertain and depends on a variety of factors. However, existing scientific evidence provides some insights into how this phenomenon could play out in practice.

Firstly, with regard to EV infrastructure, a study published in the journal "Transportation Research Part D: Transport and Environment" in 2019 found that the installation of public EV charging stations in residential areas was associated with a slight increase in vehicle miles travelled, particularly in areas with a high density of charging stations. This effect was found to be primarily driven by increased trip-making rather than changes in trip length or mode choice.

Similarly, a 2018 study in the same journal found that the presence of EV charging infrastructure in the workplace could lead to increased car use among employees, particularly if the charging stations were perceived to be more convenient than alternative transportation options.

Regarding hydrogen refuelling infrastructure, the scientific evidence is less clear. While the deployment of hydrogen fuel cell vehicles (FCVs) is still in its early stages, there are indications that the availability of refuelling infrastructure could influence consumer adoption of the technology. For example, a study published in the journal "Energy Policy" in 2020 found that the provision of hydrogen refuelling stations in California was positively associated with FCV sales in the state.

Despite these findings, it is important to note that induced demand is not an inevitable outcome of investing in new transportation infrastructure, and that in many cases, the impact of replacing an ICE vehicle with an alternatively fuelled one could often offset any health or area impacts from induced traffic demand.

Refuelling Location Identification

15. Introduction

15.1. Context

As part of the commission, Atkins have been tasked with identifying a potential distribution of the infrastructure forecasted by Cenex. This section of the report presents a refresh of this work, updated following further stakeholder engagement and collection of new and additional data by DfT. This chapter aims to identify both currently deliverable and future potential freight and logistics refuelling sites in each of the STB areas.

Identification of specific locations for charging/refuelling stations is a complex task and requires consideration of detailed technical, spatial and commercial aspects to determine the feasibility of each location. The following paragraphs outline the methodology to distribute the infrastructure required for electric, hydrogen and gas refuelling.

Core Deliverable Locations

Within this study, the assessment has focused on locations suitable for HGVs as identified in the 2022 DfT Lorry Parking Study conducted by AECOM. These sites are all within five kilometre of the SRN as this is widely seen as the distance drivers are willing to deviate from their route to access refuelling facilities. The 2022 dataset differs from the outputs of the previous 2017 study, which collected information on a wider set of locations, not all of which were deemed fit for purpose for future refuelling stations.

Additional Ideal Locations

In order to provide a comprehensive assessment of potential locations for alternative fuel infrastructure for HGVs, Atkins also sought input from various industry groups and public sector stakeholders. This collaborative approach enabled us to identify the potential for multi-modal sites involving maritime and rail transport, as well as areas with strategic demand away from the quantified infrastructure locations on the SRN.

Industry groups with expertise in maritime and rail transport engaged through the South West Freight Forum Sub-Groups provided valuable insights into the potential for integrating alternative fuel infrastructure into existing and future multi-modal hubs. This information enabled the study team to introduce additional locations to the site selection model, broadening the coverage of the proposed refuelling network.

Public sector stakeholders, including local and regional authorities, contributed their knowledge of regional development plans and strategic priorities. This information helped us identify areas with potential demand for alternative fuel infrastructure that may not have been apparent from the data on SRN infrastrucutre alone.

Furthermore, data from the Office for National Statistics (ONS) on road freight was assessed to identify Lower Layer Super Output Areas (LSOAs) with a significant concentration of road freight employment. We used a threshold of over 50 road freight employees as an indicator of demand for alternative fuel infrastructure in these areas. This analysis allowed us to pinpoint locations with a higher likelihood of requiring alternative fuel solutions for HGVs, thus ensuring that our recommendations are better aligned with regional needs and opportunities.

While existing EV charging infrastructure for cars and vans was identified by Cenex, it was decided that these sites would not be appropriate for use by HGVs for a variety of reasons:

- **Charging power disparities:** The charging power required for HGVs vastly exceeds that of vans and cars due to their larger battery capacities and energy consumption. Electric HGVs need high-power chargers, such as those rated at 50 kW and above, to minimize downtime. Charging sites for smaller vehicles may lack the power supply or infrastructure to support the demands of HGVs.
- **Space constraints and accessibility:** HGVs are significantly larger than vans and cars, which poses challenges related to maneuvering, parking, and accessing charging or refuelling equipment. Smaller charging sites may not offer the necessary space or layout for HGVs to navigate effectively and safely, disrupting traffic flow and creating potential safety hazards.
- **Extended charging durations:** HGVs take much longer to charge than vans and cars, with some requiring several hours for a full charge, depending on the available charging power. Charging sites designed for smaller vehicles may not have the capacity to accommodate HGVs for such extended periods, leading to congestion and reduced availability for all users.

Although these impacts are significant, this is not to say however, that integration of industrial and private charging networks in a rural mobility hub context is not desirable. The consideration is the significant spatial requirements for HGV infrastructure, which needs to be considered on a site-by-site basis, minimising the trade off between infrastructure types and customer requirements.

As part of this work, we have utilised two of the high uptake scenarios produced by Cenex to inform the infrastructure required during the site selection process. The scenarios are as follows:

- **Pathway 1: Mixed fuel pathway**—biomethane, hydrogen and electric
- **Pathway 2: Zero emission technology pathway**—a mix of hydrogen and electric vehicles

The high uptake scenarios were selected to enable the identification of a sufficient number of potential sites to cater for the maximum anticipated refuelling demand by 2040. The volume and distribution of potential hydrogen and electric refuelling sites is informed by the zero emsission technology pathway, while the anticipated number of biomethane refuelling sites has been informed by the mixed fuel pathway. While recent Government commitments have resulted in the mixed fuel pathway becoming unlikely, the consideration of potential biomethane refuelling requirements, alongside the likely maximum hydrogen and electric refuelling requirements, enables this report to provide a comprehensive overview of the HGV refuelling infrastructure likely to be required in the South West by 2040.

16. Methodology

To understand the required distribution of the charging infrastructure requirements proposed by Cenex, National Traffic Model (NTM) v5 data representing the base year of 2015 has been used to develop an understanding of the modelled freight flows across both the Peninsula and Western Gateway areas on a link-by-link basis. This dataset was filtered to include A Roads and Motorways only, with HGV trips on these links increased by 5% to represent the estimated growth in HGV traffic by 2040.

A commission by AECOM[36] to understand the availability of lorry parking across the SRN has developed a consistent national register of parking available for HGV usage within five kilometres of the network. This dataset has been used to compile potential sites which may be suitable for the placement of alternative fuel recharging infrastructure. Sites which were within 5km of each other have been clustered together to represent broader areas where charging infrastructure is required, thus giving a number of charging points required in each cluster area, alongside a range of potential sites where these may be based.

The analysis in this report is based on the 2022 version of this dataset, which provides an overview of the latest data and parking suitability assumptions.

To understand the proportion of trips which may be undertaken by each of the alternative fuel modes, it was assumed that the proportion of vehicles based in each of the STB areas which were powered by differing fuel types (see Section 11) would equate to the number of trips on links within the area. For example, it is expected that 39% of HGVs will be battery electric in 2040, therefore 39% of trips will be deemed to be carried out by battery electric vehicles. Depending on the fuel source, a vehicle has a differing propensity to recharge using public infrastructure, these values have been used to calculate the approximate number of trips which would require the use of public infrastructure to refuel. The proportion of vehicles and propensity to recharge is outlined in Table 16-1.

Table 16-1 – Vehicle Fuel Types and Propensity to Charge

Fuel Type	Proportion of Trips (%- 2040 High Scenario)	Propensity of Trips Needing to Refuel using Public Infrastructure (%)
Electric[37]	39	5
Hydrogen[37]	38	70
Gas[38]	25	40

Once the distribution of trips by fuel type and propensity to recharge using public infrastructure were calculated, ArcGIS Online Network Analyst tools were used to allocate the demand on each of the links within Peninsula and Western Gateway to the closest potential freight and logistic cluster. This utilised the road network to connect the

[36] AECOM (2022) National Survey of Lorry Parking - part 1
[37] References the Electric and Hydrogen High Scenario
[38] References the Mixed High Scenario

'demand' on links to the closest potential site. This provided an output with the links demand allocated to each site, as well as the total of this demand at each of the sites.

To allocate the refuelling point estimates provided by Cenex to the freight and logistic clusters, the proportion of overall vehicle charging demand at each cluster was used. Charging points were allocated proportionately based on charging demand at each of the sites, although with some modifications made to ensure equal distribution (for example for all freight and logistic clusters to have at least one 50KWh/150KWh charging point). An example of this logic using an estimated requirement of 10 refuelling points and 100 vehicles potentially requiring charging is shown in Table 16-2. It should also be noted that the estimated catchment area for alternative fuel charging points[39] has been used to review the potential distribution of sites, as well as to highlight any potential gaps for identifyting further ideal sites.

The stakeholder engagement and desktop research described in prior sections provides an additional layer of sites (termed the 'ideal network') to be considered for 50KWh/150KWh chargers, after demand allocation to deliverable sites. The aim of the ideal network is to provide advice on the potential location of refuelling infrastructure away from the SRN, in locations of strategic importance, and to meet stakeholder and industry needs. Where possible, additional 'ideal network' sites were co-located with congruent sites, such as rail freight interchanges, major ports, and coach parks. Where network coverage was required, but a congruent site was not available, indicative locations have been provided, identified on the basis of local freight sector employment and/or strategic importance.

The output from the demand allocation models also provided a zoning system. The zones created represent an allocation catchment area for each deliverable site, where any point within these zones areas is closest to an identified deliverable site at an unrestricted driving distance. All demand is therefore allocated to a site, even where the distance from demand to site may be unattractive for day-to-day refuelling. The result of this assumption is that all demand will be catered for by the model, even if suggested catchment areas mean the distance to refuel may be greater than considered attractive.

As a result of this approach, the required number of chargers in each zone can be distributed across both the deliverable site and any other sites within the zone. Using this approach, sites can be delivered on a rolling basis, prioritised according to needs at the time of rollout. Simultaneously, the ideal network strategy presented is a flexible way to rebalance infrastructure distribution to provide greater coverage, reflecting strategic locations and needs.

The estimated catchment area assumptions were gathered from previous work conducted by Atkins and are shown in Table 16-3.

A summary of the demand allocation methodology described in this section is given in Figure 16-1.

Table 16-2 - Example of refuelling point allocation

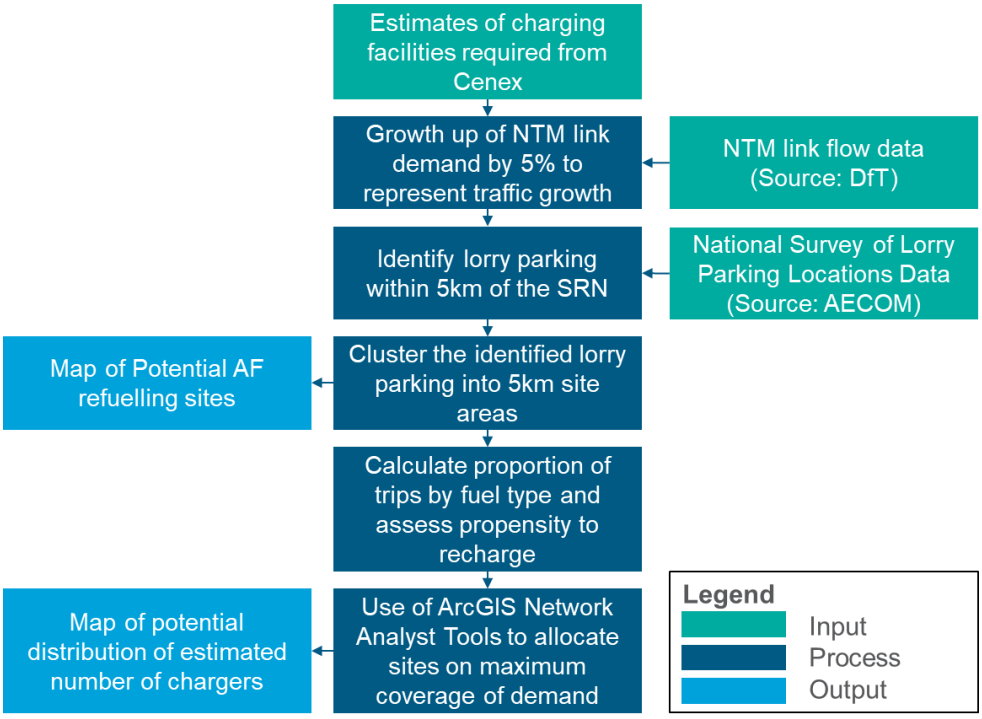
Cluster Name	Charging Demand Allocated	Proportion of Charging Demand (%)	Chargers allocated
Cluster A	50	50	5
Cluster B	30	30	3
Cluster C	20	20	2

Table 16-3 - Estimated catchment area for differing refuelling stations

Fuel Type	Coverage (km)
Electric	20
Hydrogen	100
Gas	80

[39] Atkins (2020), Midlands Connect Alternative Fuels for Freight and Logistics Task 6: Sites identification

Figure 16-1 - Methodology for allocating charging facilities



16.1.1. Traffic data validation

NTM data can only provide modelled flows over a 12-hour period, as such it was important for the project to assess the extent to which this could be used as a proxy for the 24-hour flow and the movement of HGVs during the off-peak evening period as there are no other consistent data sources available to cover this period. The validation was carried out using NTM and observed traffic count data (where some of the data is over a 24-hour period) to compare the differences in proportions of traffic on links. A variance of no greater than 4% was observed in our validation, giving confidence that the 12-hour modelled traffic flows can be used to represent the full 24-hour period.

16.1.2. Methodological limitations

Further assessment must be undertaken to explore the need for, precise location, and deliverability, of ideal sites. In addition, the future reallocation of chargers from deliverable to ideal sites should aim to sensibly rebalance supply away from demand and more towards coverage. Therefore, this needs to be considered further from a policy angle in order to justify additional ideal sites.

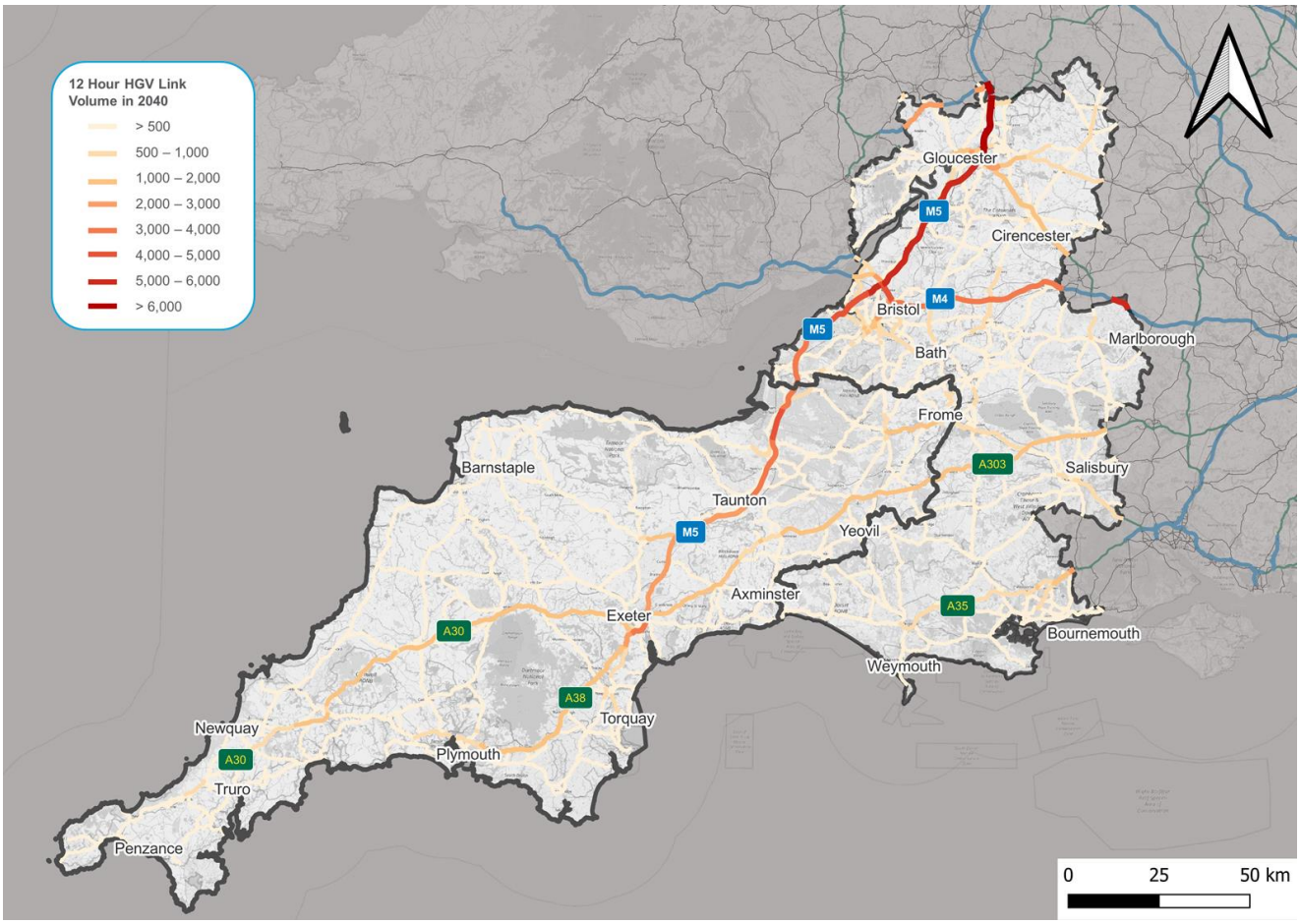
17. Findings

17.1. Traffic conditions

Figure 17-1 shows the estimated 12-hour HGV flow on A Roads and Motorways within Peninsula and Western Gateway in 2040 according to the DfT NTM data. From the figure it is evident that the largest 12-hour freight flows are found on the M5 north of Cheltenham, where up to 8,200 HGVs are expected in a 12-hour period. Other large flows include links on the M4 and M5 around Bristol, with flows between 2,900 and 5,400 vehicles continuing along the M5 into the Peninsula Transport area before gradually dissipating across the A30 and A38 beyond Exeter. In and around Exeter, the M5 has between 2,900 and 5,400 movements within the 12-hour period, whilst the A30 and A38 generally have between 1,200 and 2,900 movements in the period.

The figure also shows that the A303 is a key corridor feeding into the South West from the East. The flows on this corridor are lower than the motorway links, with around 1,200-2,900 vehicles modelled over the period on busier links, and between 400 – 1,200 HGVs on the quieter links. These busier links are seen to the north of Salisbury and around Mere.

Figure 17-1 - Estimated 12-hour HGV flows in 2040



17.2. Logistics and freight cluster locations

Figure 17-2 outlines the distribution and type of freight sites identified by AECOM in the 2022 Lorry Parking Study. This dataset identifies that there are 22 sites which may be suitable for HGV recharging in the Peninsula Transport area and 18 sites which may be suitable in Western Gateway.

The potential sites identified consist of motorway service areas, independent lorry stops, trunk road service areas and local authority owned lorry parks which could potentially host alternative fuel systems.

A limitation within this approach is that there were no consistent or reliable data sources which enabled us to build upon the dataset provided by AECOM. To overcome this, additional sites were identified via stakeholder engagement and desktop research; it is recommended that as the delivery of the network is taken forward additional research is conducted to further assess and analyse the suggested sites, including the identification of precise locations.

Sites within five kilometres of each other have been clustered to show broader areas where refuelling infrastructure should be provided. Figure 17-3 shows the clustering of the freight sites within five kilometres of each other. This shows that there are 13 freight and logistic clusters within Peninsula and 11 clusters within Western Gateway. The largest clusters are seen around the urban areas of Yeovil, Bristol and Swindon, as well as around Bridgewater. Smaller clusters of sites are seen along the extent of strategic A roads, such as the A30, A35 and A38.

A list of sites and their associated freight and logistics cluster is available in Appendix C.

Figure 17-2 - Location of existing freight and logistics sites

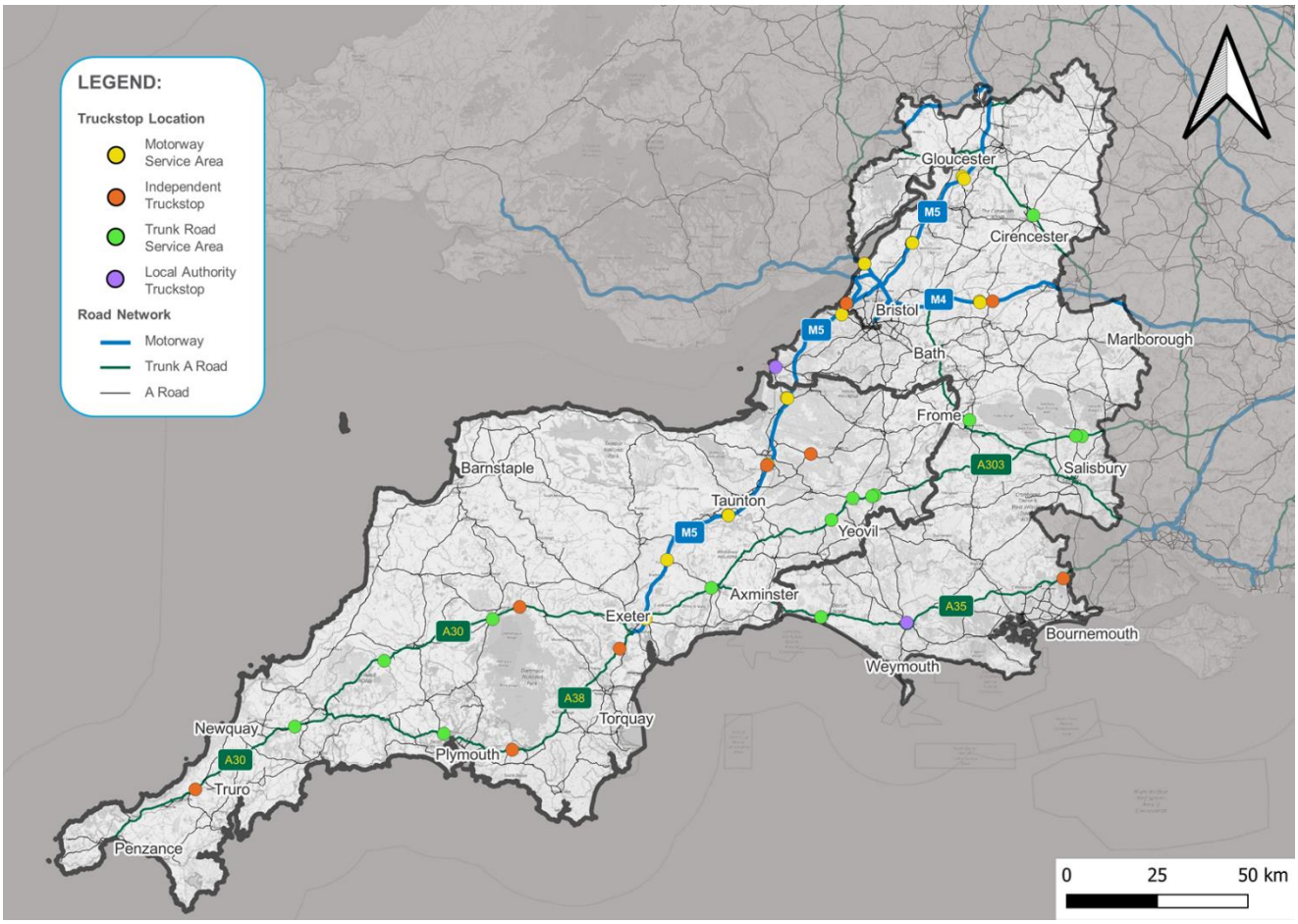


Figure 17-3 - Clustered freight and logistics sites

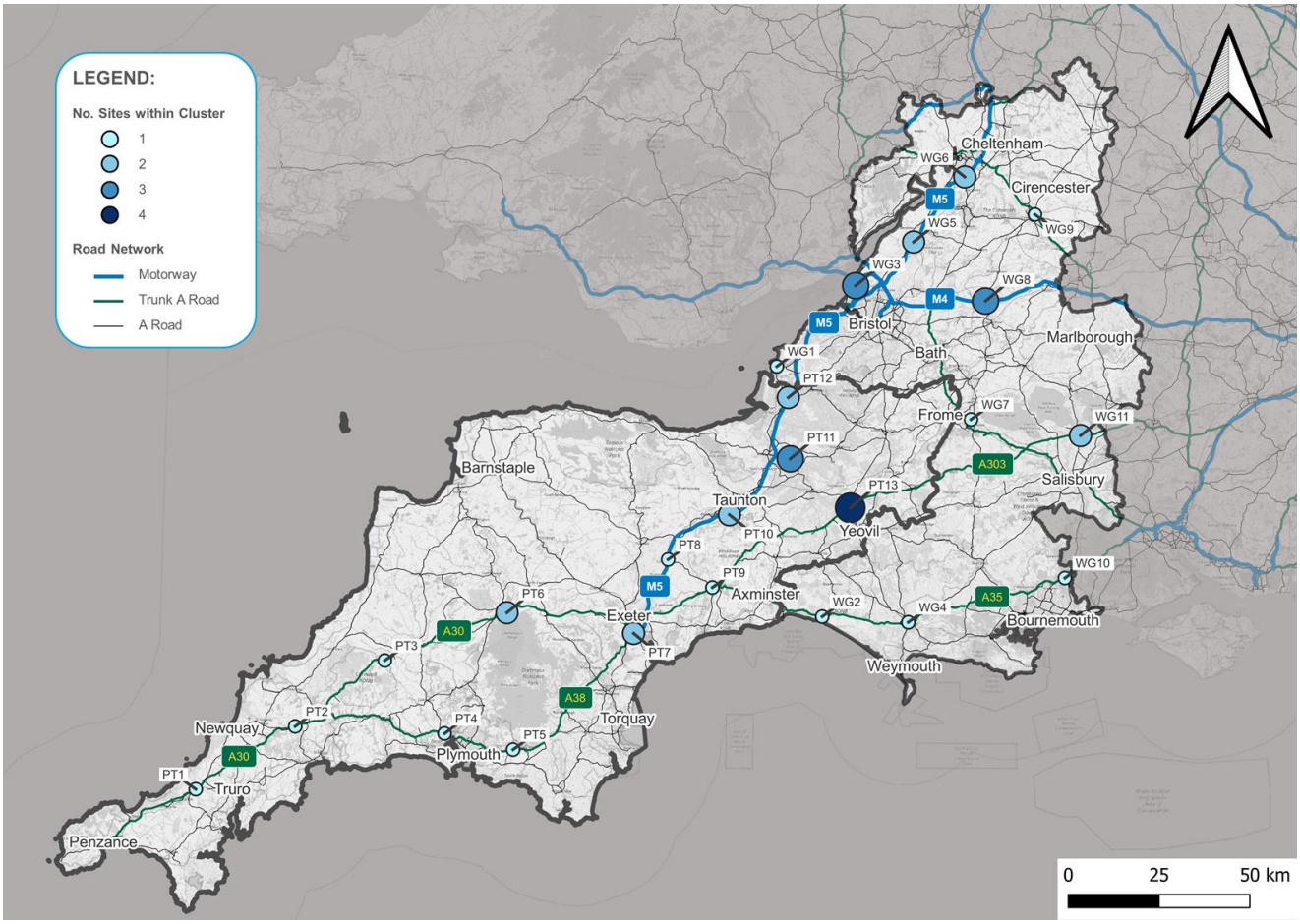


Figure 17-3 shows the location of the freight and logistics clusters alongside their reference number. Table C-1 and Table C-2 in the Appendix provide an overview of sites within these clusters, while Table D-1 and Table D-2 in the Appendix provide a breakdown of the required infrastructure at each cluster location.

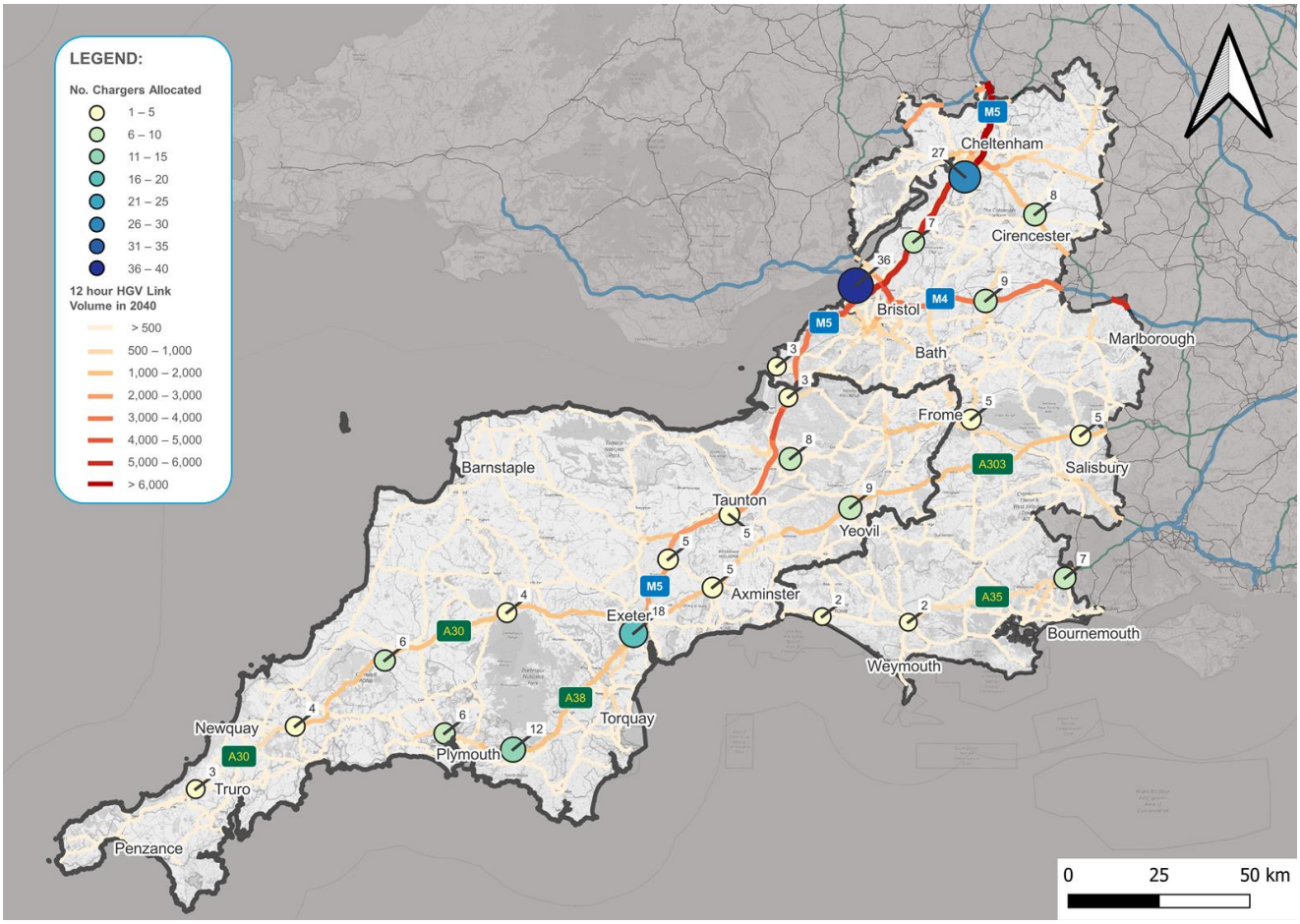
17.3. Proposed locations for charging and refuelling stations

17.3.1. Electric charging facilities – deliverable network

17.3.1.1. 50KWh chargers

Figure 17-4 shows the potential distribution of 50KWh charging points across the freight and logistics clusters within Peninsula Transport and Western Gateway. This distribution model has ensured that each cluster houses at least one 50KWh charger, with additional chargers given based on the relative proportion of battery electric vehicles which are likely to charge in proximity to the freight and logistic clusters. The distribution of charging infrastructure across the clusters is focussed on the highway links with the greatest flows, namely the M4 and M5 within Western Gateway and around the M5, A30 and A38 in the Peninsula Transport area. It is estimated that up to 36 50KWh chargers should be provided at the freight and logistics cluster near Bristol, with up to 27 chargers provided around Gloucester and Cheltenham. The largest freight and logistic cluster allocation in Peninsula is near Exeter where it is suggested there should be up to 18 50KWh chargers provided.

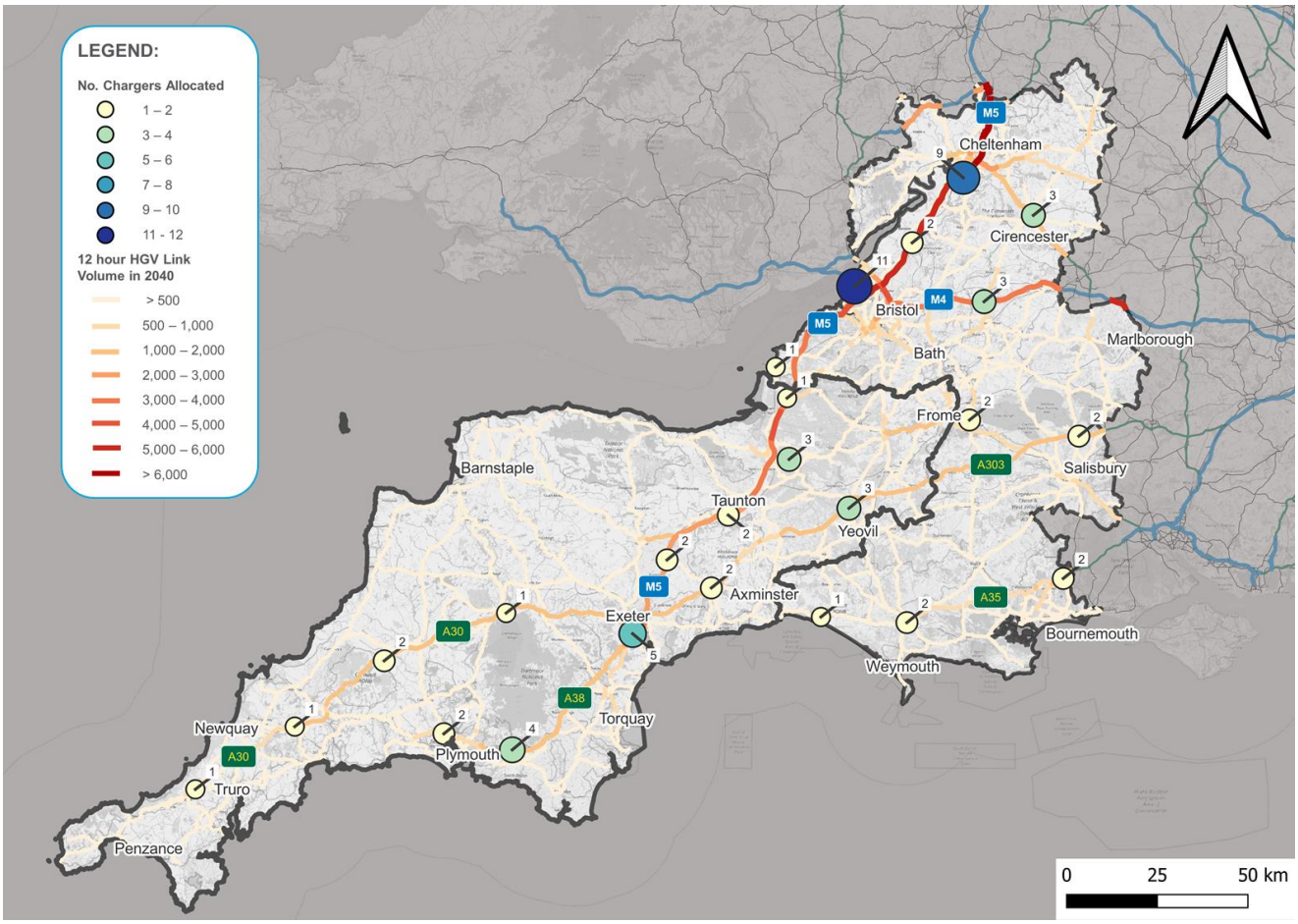
Figure 17-4 - Potential distribution of 50Kwh charging facilities



17.3.1.2. 150KWh chargers

The distribution of the 150Kwh chargers required in each of the STB areas is shown in Figure 17-5. These freight and logistic clusters follow the same distribution profile as for the 50KWh charging points. As there are a lower number of 150KWh charging points to be provided the numbers allocated to each cluster is less than the proposed distribution of the 50KWh chargers. The largest number of chargers would likely be required at the freight and logistic cluster around Bristol, with up to 11 chargers needed to meet demand in this area, similarly there is expected to be a need for up to 9 chargers at the freight and logistic cluster in Gloucester and Cheltenham, and up to 5 at the cluster near Exeter.

Figure 17-5 - Potential distribution of 150Kwh charging facilities



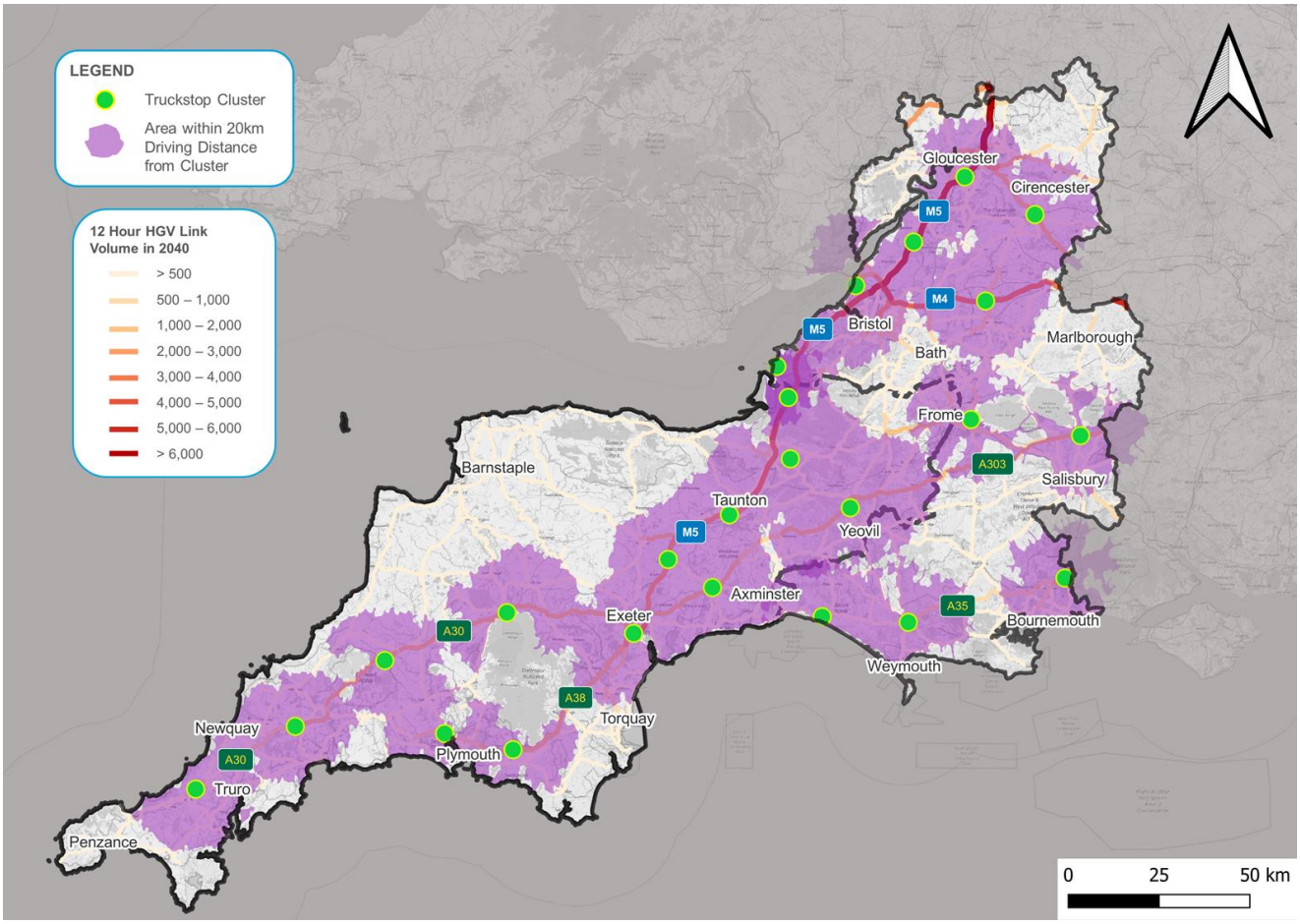
17.3.2. Catchment of electrical recharging equipment – deliverable network

Previous work has suggested that the catchment for electric vehicle recharging points is around 20km[40]. Due to the limited data available on the location of freight and logistics sites beyond the SRN, there are some gaps in the network where there is potentially a need for additional sites to be identified. To visualise this, Figure 17-6 shows the current approximate catchment of each of the deliverable charging clusters based on the allocation of road link demand to the sites. This is shown alongside a 20-kilometre buffer of each of the sites which is seen as the maximum distance a vehicle would drive to access the sites.

The largest gap in the coverage is seen in north Devon, where there is no coverage of the A roads in and around areas such as Barnstaple and Ilfracombe, instead the modelling suggests that these would be covered by sites along the A30. There are also other small gaps across the network, including to the south west of Salisbury. Another larger gap is observed around Marlborough, where there are no freight and logistics clustered identified. Here there may be a need to identify a potential site, or to work collaboratively with England's Economic Heartland to understand how provision in Swindon would benefit freight flows in close proximity to Marlborough.

For the most part, these gaps identified are mainly in rural areas, highlighting how data gaps and a focus on the heaviest traffic flows can draw investment towards these areas. Although these areas with gaps in catchment coverage are for the most part likely to be lower priority due to low HGV flows, it is important that consideration is made for access to charging points in rural areas alongside ensuring sufficient provision along large key freight corridors. To address this, an additional layer of ideal sites is proposed to provide greater rural coverage. This is presented in the following section.

Figure 17-6 - Approximate catchment of freight clusters



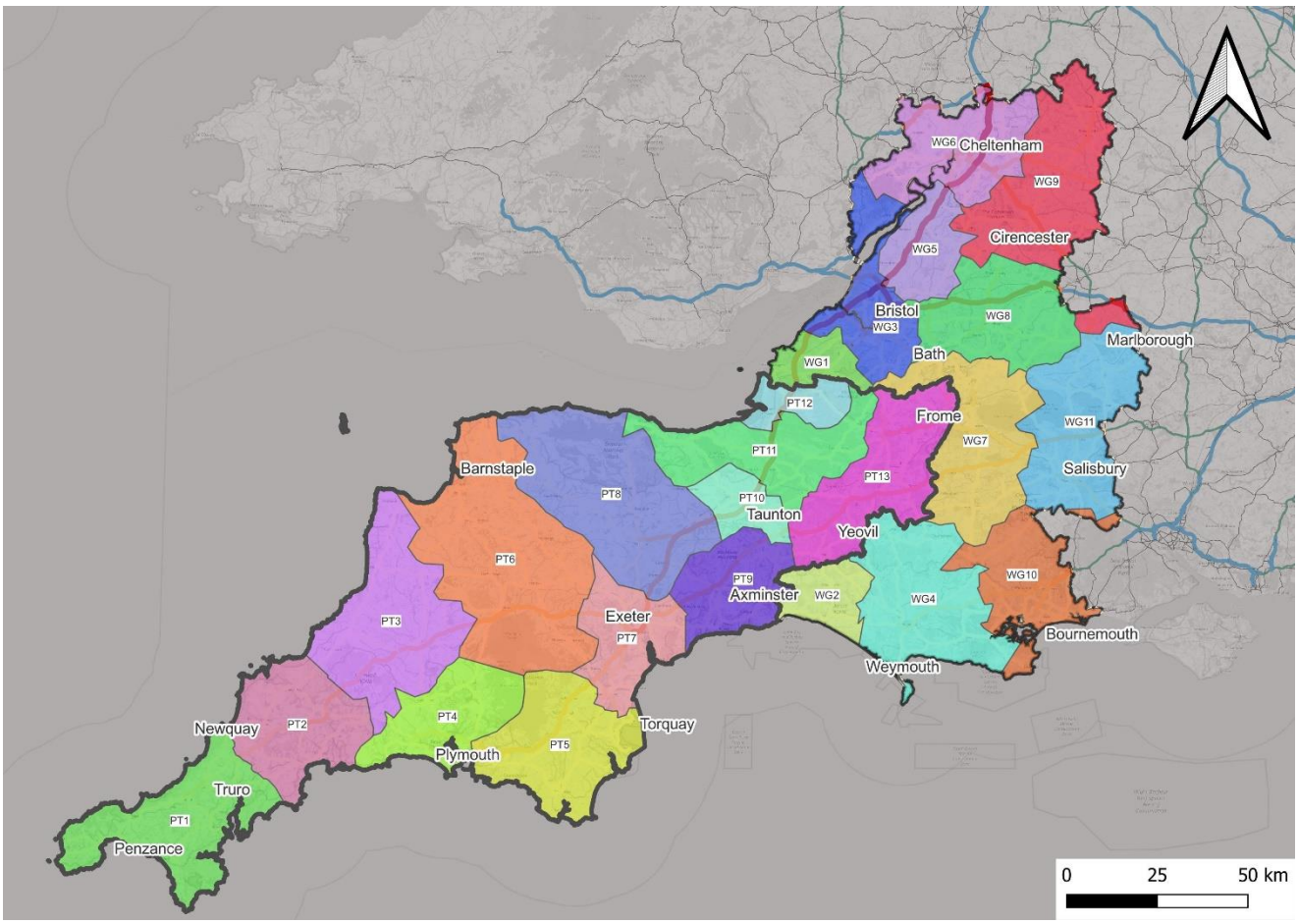
[40] Atkins (2020), Alternative Fuels for Freight and Logistics Task 6: Sites identification

17.3.3. Electric charging facilities – ideal network

17.3.3.1. Zoning for ideal network charger re-distribution

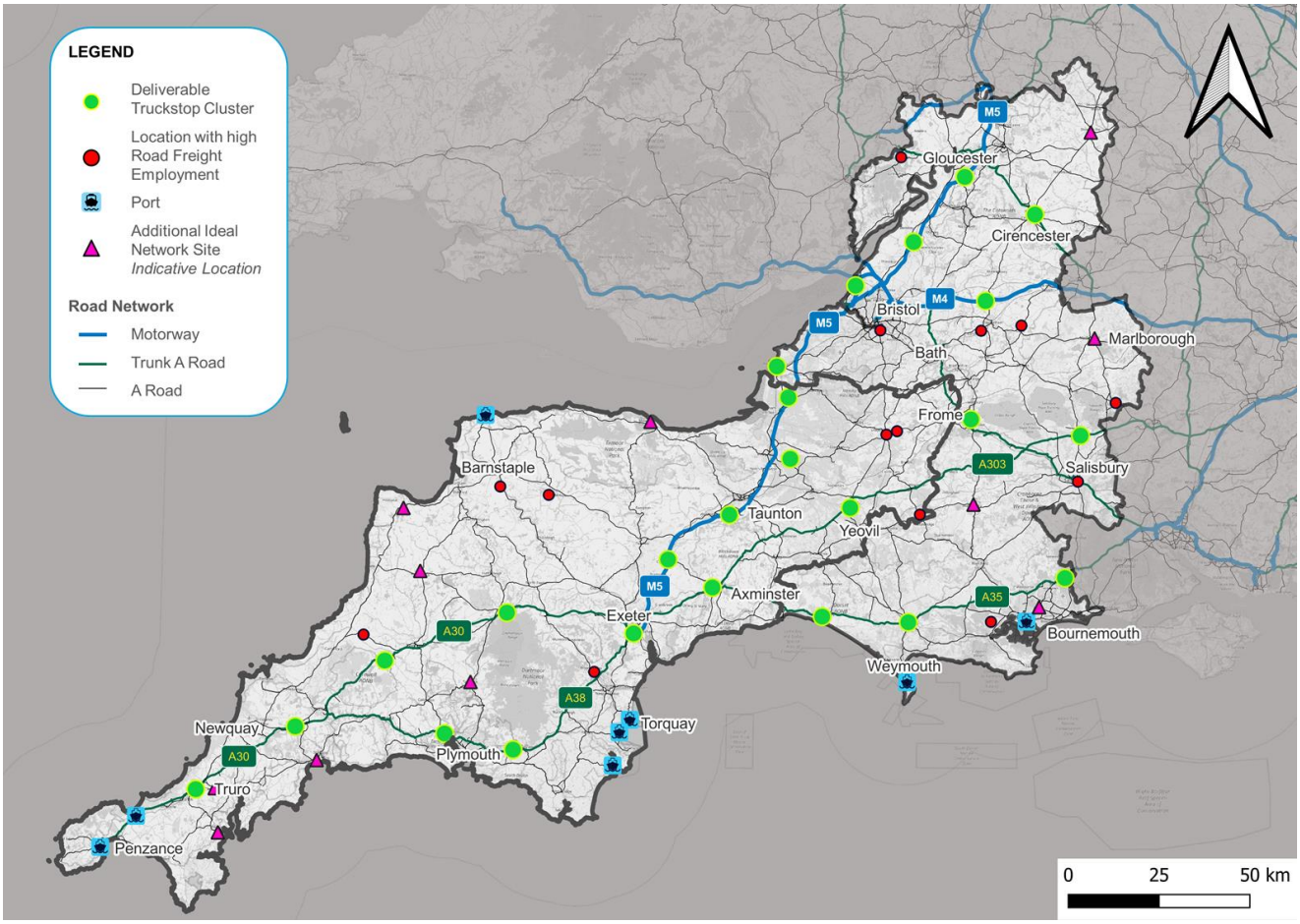
As described in the site identification methodology, Figure 17-7 presents the zoning for the ideal network charger re-distribution. As expected, sparser areas such as North Devon are part of larger zones as the nearest deliverable cluster PT6 is nearer to the bottom of its zone. This zoning system is used as a basis for the following maps showing the ideal network for 50KWh and 150KWh zone-level supply. Note some chargers were manually re-distributed away from high-supply zones to low-supply zones to compensate for demand bias in allocation and to allow enough supply for potential additional ideal sites. Appendix D summarises deliverable and ideal network distributions.

Figure 17-7 - Zoning for ideal network charger re-distribution



Based on the gaps in coverage demonstrated in Figure 17-6, a number of indicative locations that are considered to be suitable for location of future provision of electric charging infrastructure, in addition to the existing deliverable site clusters, have been shown below in Figure 17-8. These sites provide a wider and more complete network of coverage across the PT and WG STB areas. Where possible, congruent sites such as ports and rail freight interchanges have been selected, however where these facilities are not present, but there is a strategic need to provide a recharging or refuelling site, an indicative location has instead been identified. Note, not all ports are displayed on the map, only those where it is required to co-locate HGV refuelling or recharging facilities due to an absence of other suitable sites.

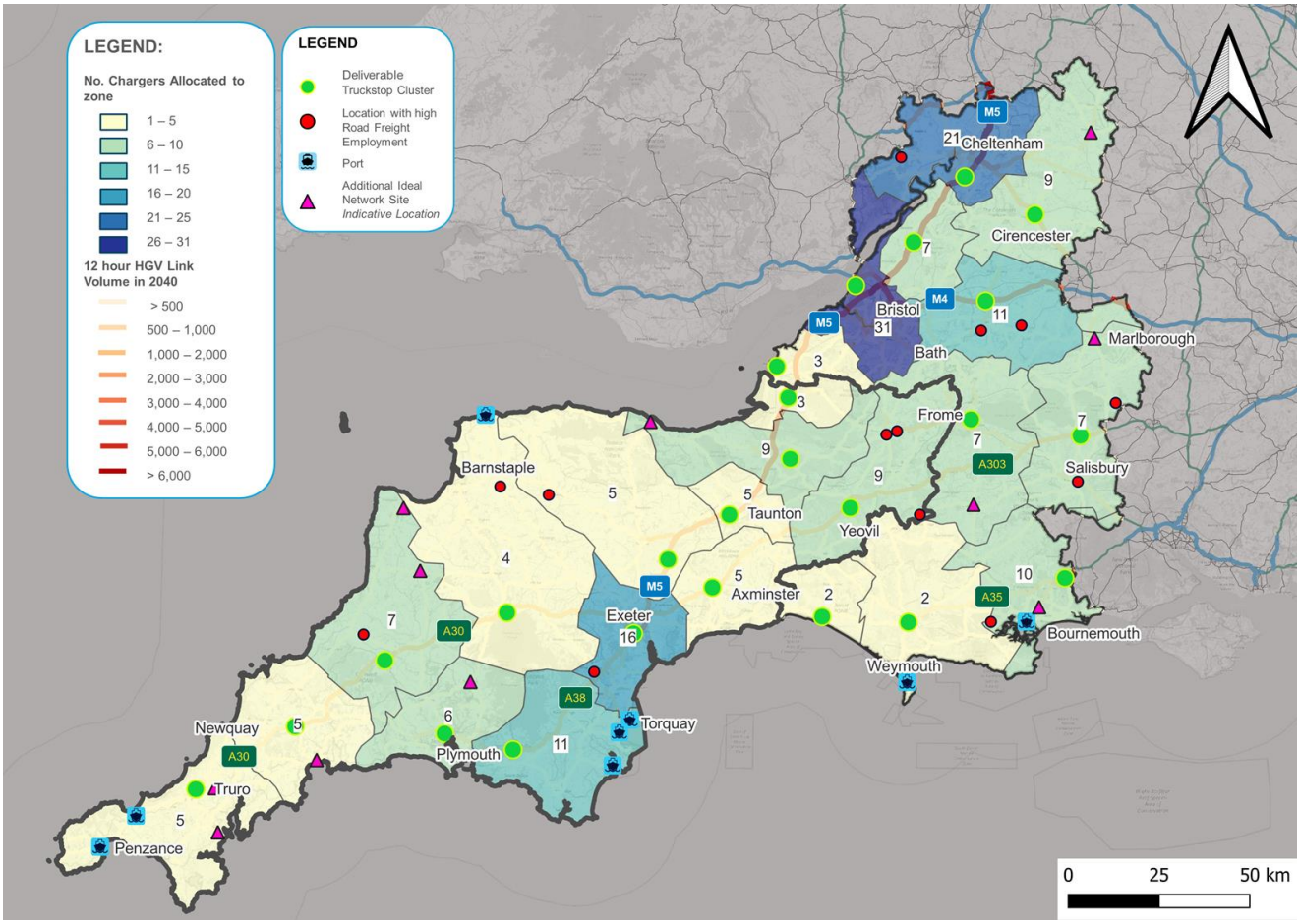
Figure 17-8 – Ideal location of facilities to maximise coverage of electric charing points



17.3.3.2. 50KWh chargers

Figure 17-9 shows the potential distribution of 50KWh charging points across both the deliverable and additional network within Peninsula Transport and Western Gateway. The allocation is presented at zonal level. This distribution model has ensured that each zone contains at least one 50KWh charger, with the exact intra-zonal distribution of chargers to be considered in future work. The distribution of charging infrastructure across the zones is focussed on regions with greater flows, and larger areas and numbers of potential ideal sites. It is estimated that up to 31 50KWh chargers should be provided within the Bristol region zone, with up to 21 chargers provided around Gloucester and Cheltenham. The largest zone allocation in Peninsula covers Exeter, where it is suggested there should be up to 16 50KWh chargers provided.

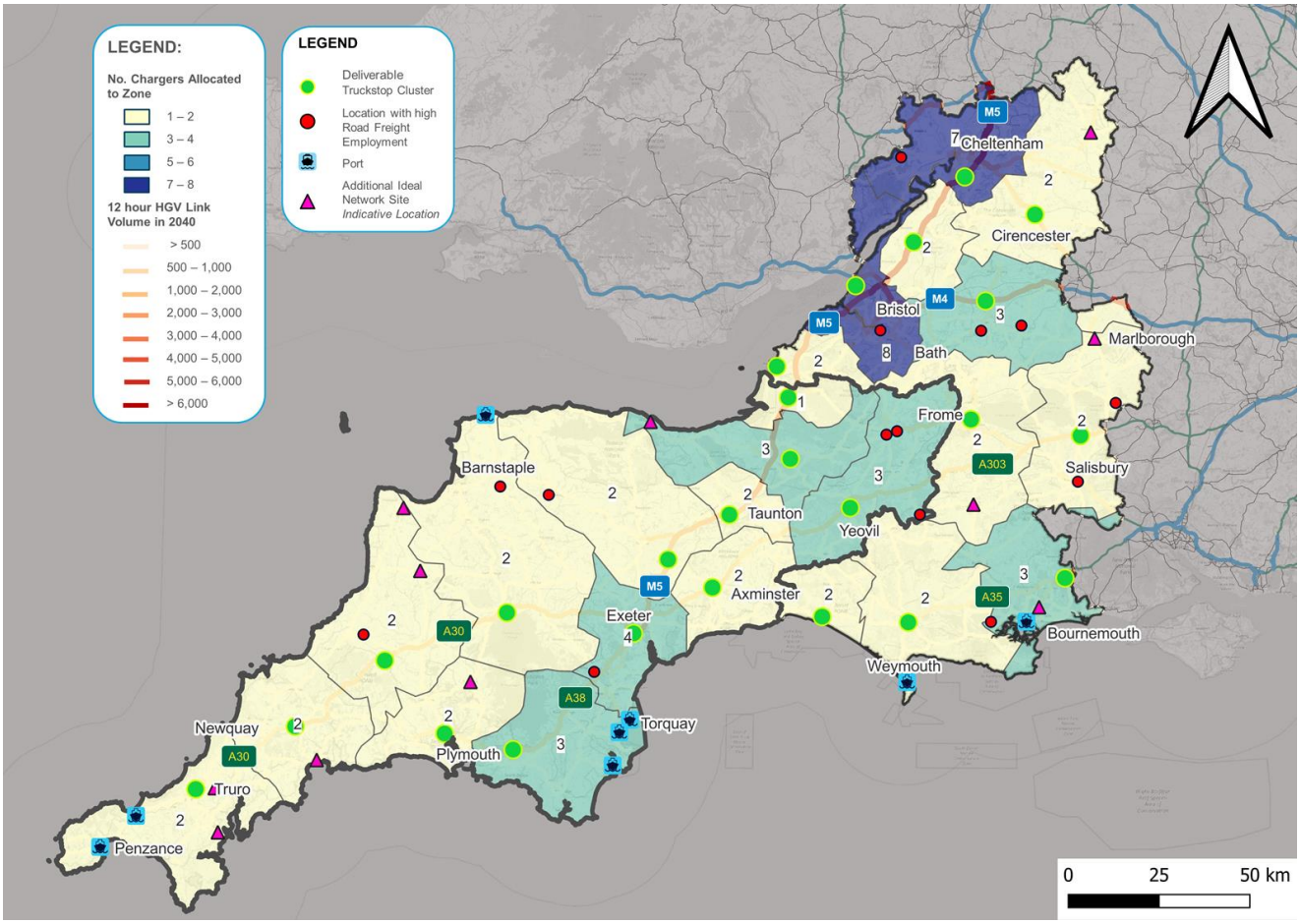
Figure 17-9 - Potential distribution of 50KWh charging facilities across zones for ideal network



17.3.3.3. 150KWh chargers

The distribution of the 150Kwh chargers required in each of the zones is shown in Figure 17-10. As there are a lower number of 150KWh (compared to 50KWh) charging points to be provided, the numbers allocated to each zone is generally less than for the 50KWh chargers. The largest number of chargers would likely be required within the zone around Bristol, with up to 8 chargers needed to meet demand in this ara, similarly there is expected to be a need for up to 7 chargers at the zone around Gloucester and Cheltenham, and up to 4 at the zone around Exeter.

Figure 17-10 - Potential distribution of 150Kwh charging facilities across zones for ideal network

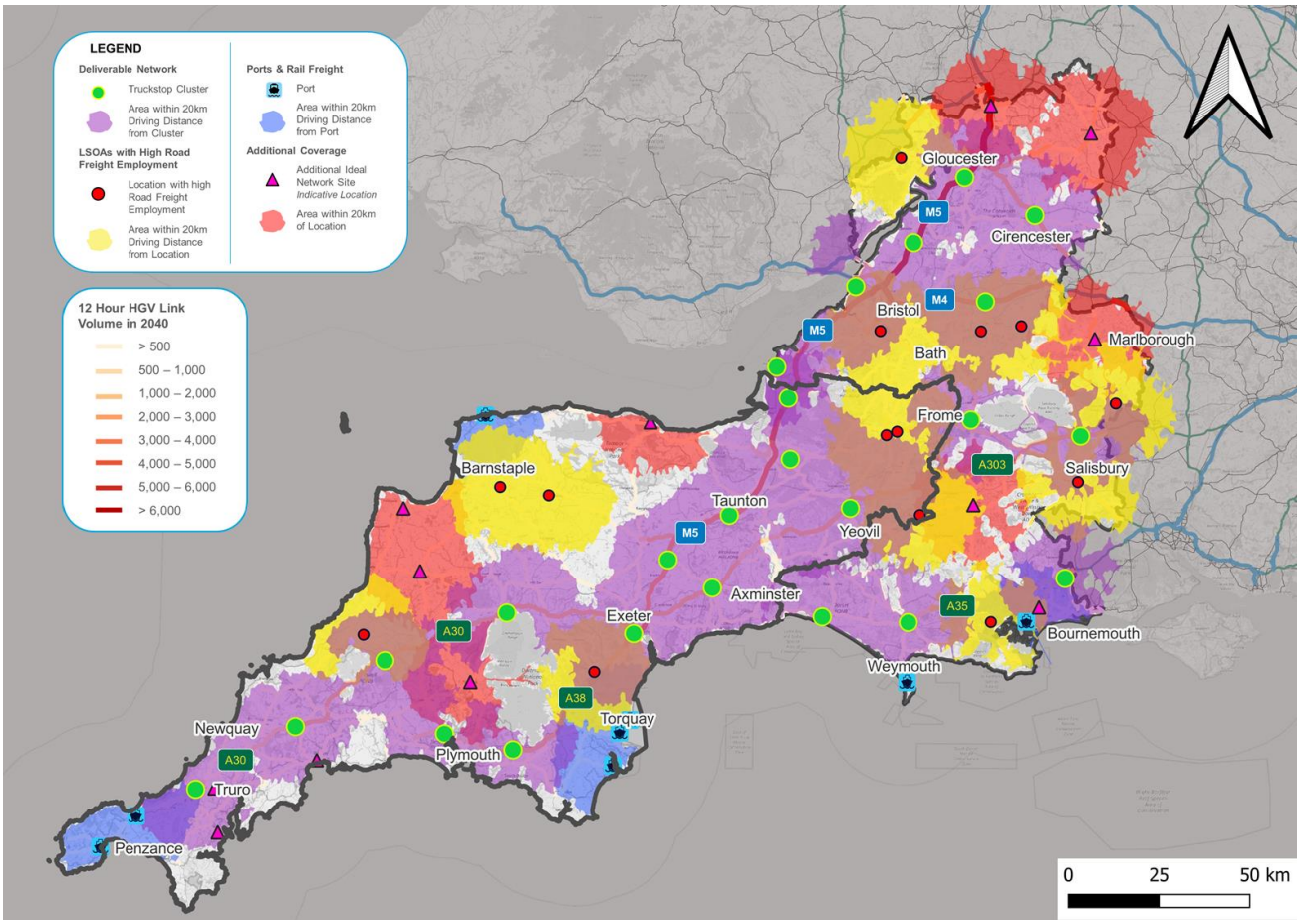


17.3.4. Catchment of electrical recharging equipment – ideal network

The ideal network scenario presented in this section is a sensitivity test for a potential future charger distribution. The test explores the catchment of the ideal network of EV recharging sites identified by this study. To visualise this ideal scenario, Figure 17-11 shows the estimated catchment of both deliverable and ideal charging sites. The catchment is a 20-kilometre HGV driving distance buffer from each site. This also assumes that each ideal site is allocated at least one charger, which is achievable given the zonal supply reallocation described above.

While some small gaps in coverage remain, these are only found in isolated areas such as peninsulas and Areas of Outstanding National Beauty. It is assumed these areas are a low priority for new infrastructure. If desired, it is possible for sites to be amended within a zone, redistributing the forecast infrastructure requirement to new or amended sites, based on the trade off between demand and coverage.

Figure 17-11 - Approximate catchment of freight clusters/sites used for electric vehicle recharging based on ideal network scenario

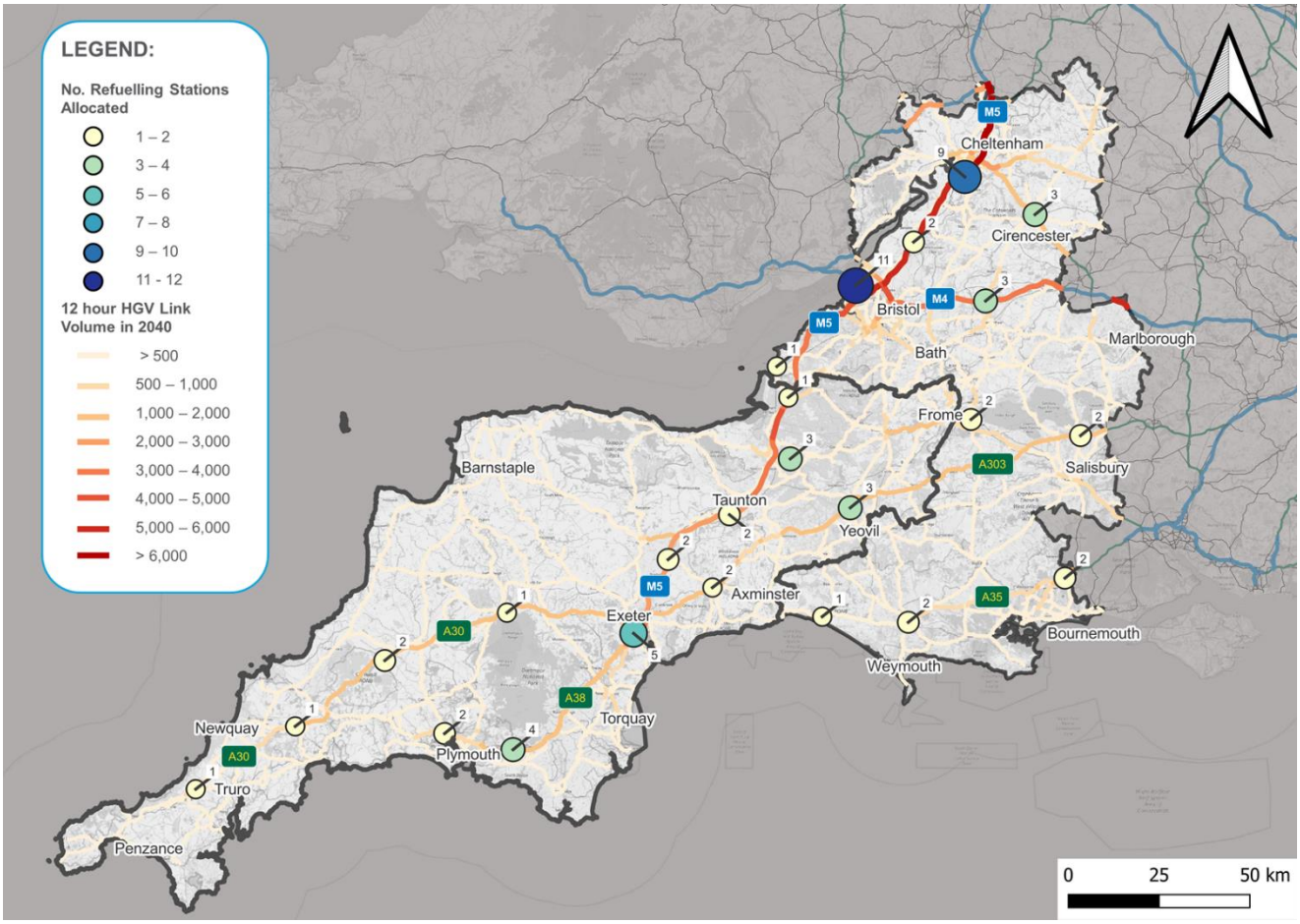


17.3.5. Hydrogen facilities

The potential distribution of Hydrogen refuelling facilities within Western Gateway and Peninsula Transport are shown in Figure 17-12 This figure shows that the majority of hydrogen refuelling facilities should be focused on the core motorway corridors as well as around where the M5 meets the A30 and A38 in Exeter. The largest number of refuelling stations are likely to be required in and around Bristol where it is likely up to 11 refuelling stations will be required. The distribution of these sites meets the requirement for stations to be accessible within 100km, with the largest travel distances from links being to the north of Devon where areas such as Ilfracombe are around 80km from the nearest proposed refuelling site in Exeter. The potential distribution of these sites allows for good access from most links with over 500 HGV movements in the 12-hour period.

Despite the lower number of Hydrogen refuelling facilities provided, the higher range of these vehicles means that all parts of each STB are within the maximum range of a station defined in Table 16-3.

Figure 17-12 - Potential distribution of Hydrogen refuelling facilities



17.3.6. Gas facilities

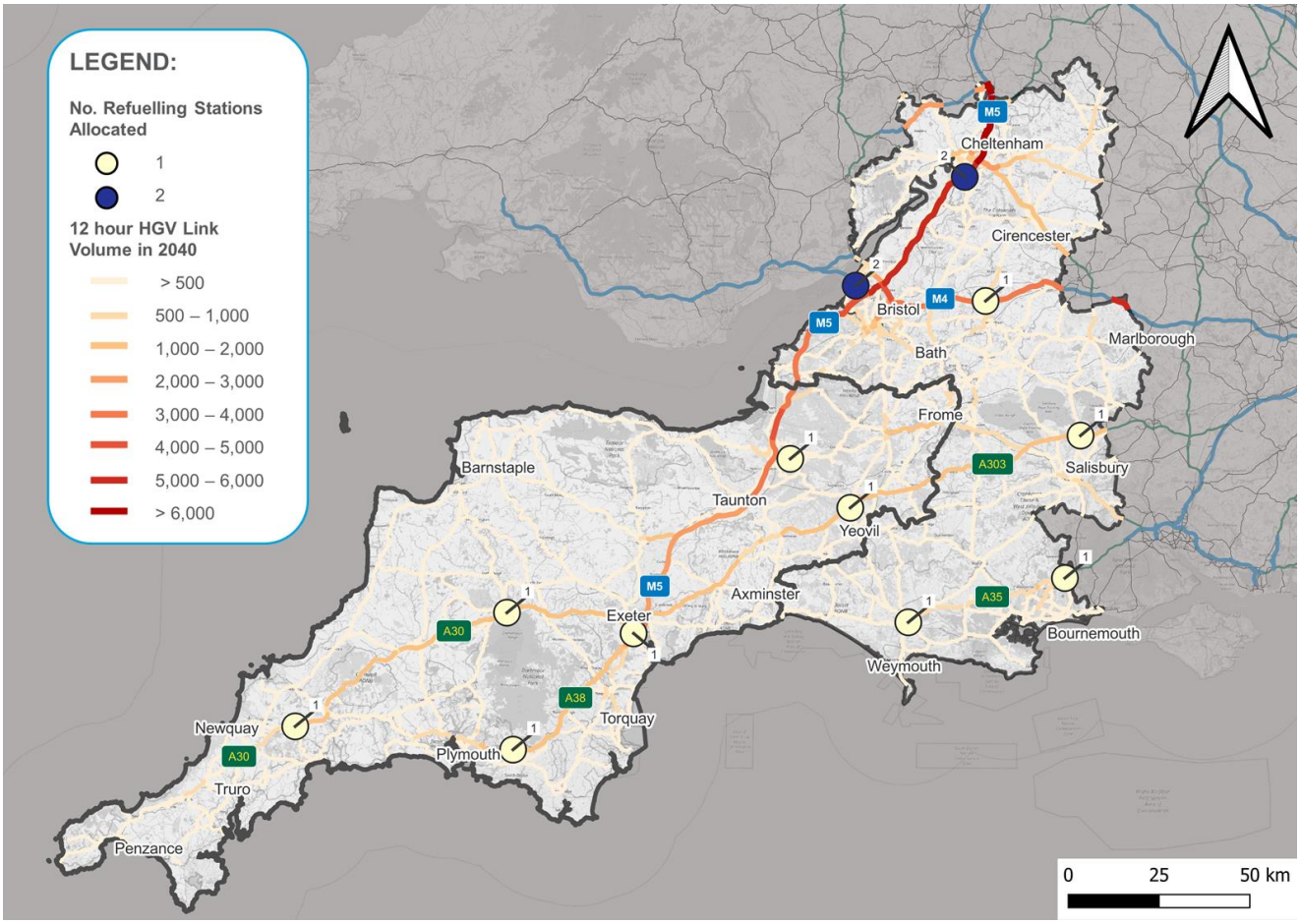
The number of potential gas LNG/CNG refuelling sites within the STBs is significantly lower than the number of electric and hydrogen refuelling sites. As such the suggested distribution of the sites given in the model has required some manual intervention to finetune the distribution of the limited number of facilities.

Figure 17-13 shows the distribution of the proposed sites, showing that all the corridors with over 1,000 HGV movements within a 12-hour period are in close proximity to a refuelling facility. All A road links with HGV movements are within the prescribed upper catchment limit of the gas sites.

Most clusters have been allocated only one facility, however around Bristol where the M4 and M5 meet, as well as around Gloucester and Cheltenham around the M5, it is expected that two sites will be required. These refuelling facilities have between 25-33% of the potential demand allocated to them, with those sites on the south coast of both STBs generally having the lowest level of demand allocated to them.

It is assumed that fuel tankers themselves will be alternatively fuelled. This means that within network development scenarios, the commercial supply chain will be properly resourced to provide services to remote sites as fossil fuel supply chains currently do.

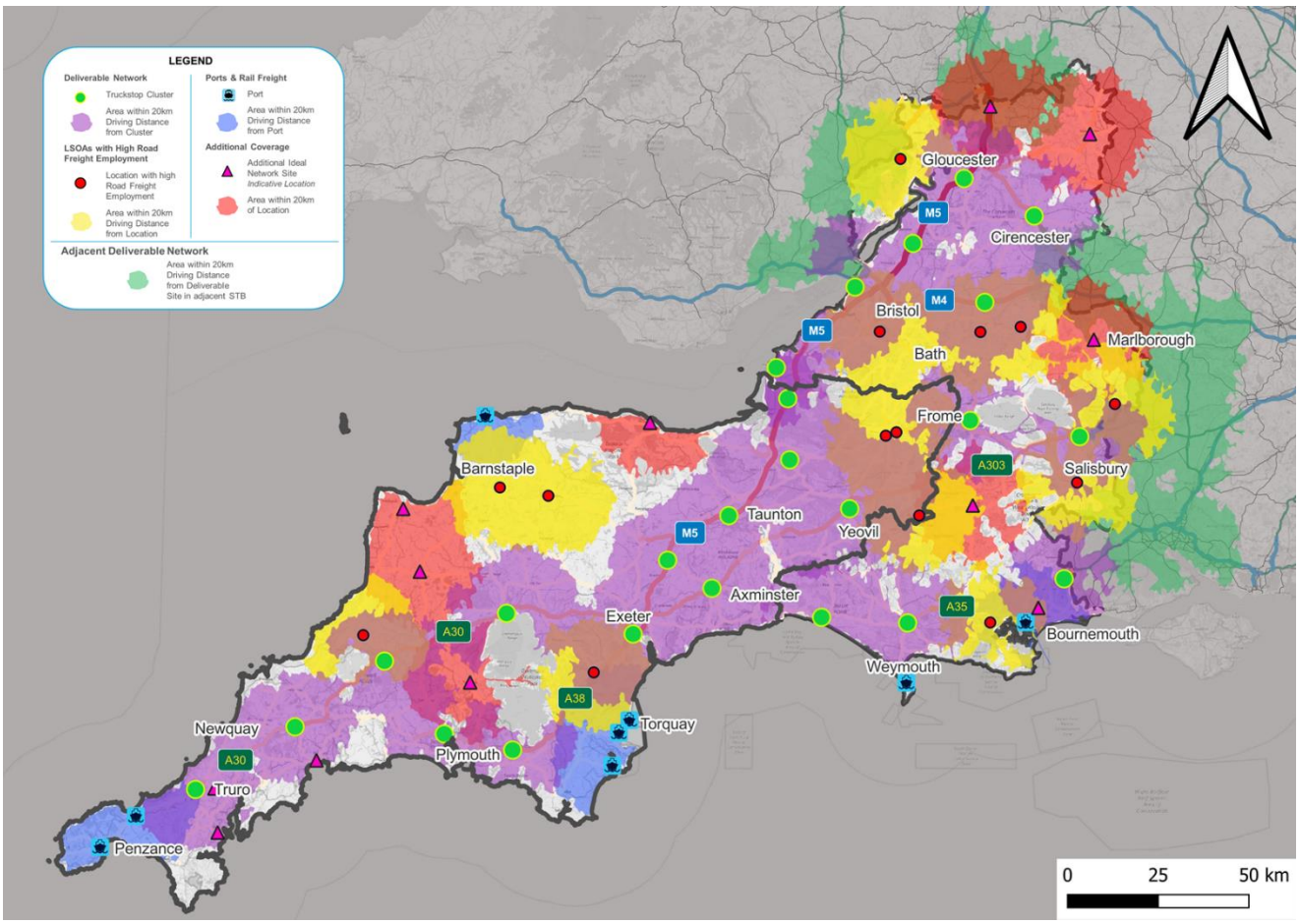
Figure 17-13 - Potential distribution of gas refuelling facilities



17.4. Cross-boundary interactions

This work has considered the refuelling demand and the subsequent requirement for public refuelling infrastructure in both Western Gateway and Peninsula Transport. It has shown that in some boundary areas there are freight and logistic cluster sites which are in close proximity to each other, with an overlapping catchment across STB areas. As freight and logistics movements are not bound by administrative regions, it is important that there is strong cross-boundary communication when delivering new refuelling infrastructure to ensure that there is not under, or over, provision on STB boundaries. For example, engagement between Peninsula Transport and Western Gateway is key for delivery of charging infrastructure on the A303 near Sparkford as well as along the M5 corridor near Weston-Super-Mare. Additionally, it has been highlighted that there is a gap in provision around Marlborough in Wiltshire – this gap may or may not be an issue for refuelling facilities depending on the provisions made by England's Economic Heartland to provide refuelling facilities in proximity to the M4 in Swindon. shows sites located within a 20-kilometre distance of the Peninsula Transport and Western Gateway boundary. For these sites that are in close proximity to another STB, it is recommended that attention is given to engagement with neighbouring authorities to ensure that provision has been applied at these respective bordering points such that all vehicles have consistent access to facilities as they pass on long journeys through multiple different STB areas.

Figure 17-14 - Sites in adjacent STBs within 20km of Western Gateway STB area



17.5. Limitations and Uncertainties of Refuelling Location Identification

It should be noted that there are a range of limitations of this study, and that this is only the beginning of the process to identify and allocate sites which are a strategic and practical fit to deliver alternative fuels refuelling. The main areas of uncertainty associated with this work are as follows:

- Charge point requirements will depend on utilisation rates which, in turn, will be driven by future battery capacities, charging compatibility and prices charged by network operators. At this stage there are no forecasts available for these factors and therefore there is some uncertainty around the number of charge point sockets that will be required in 2040. However, we have a relatively high degree of confidence in the forecasts for power requirements in 2040 and this is arguably more important. Ensuring sites have sufficient power available for the number of plug-in vehicles on the road, including upgrading or building new substations, will allow the deployment of the appropriate number and type of charge points by network operators to match demand from the vehicles on the road.
- For HGV refuelling the largest uncertainty will be the degree to which gas and/or hydrogen will displace diesel, it is becoming clearer that gas is unlikely to be a key player in this transition, but this should still be considered.
- The allocation of deliverable charging/refuelling stations is based on the location of current freight and logistics clusters. This does not account for market factors such as land value, rents competition and current refuelling practices which should be considered at future stages.
- The proposed ideal charging/refuelling stations are based on early desktop research and stakeholder engagement. As such, the locations proposed are approximate, and their requirement and deliverability needs further consideration.
- The utilisation rate of filling stations may also vary depending on demand and marginal cost.

- The expressed demand for charging and refuelling is heavily dependent on the proportions of refuelling and charging occurring at different points of the network. This would likely be sensitive to changes in the charge/fuel capacity of vehicles.
- The locations discussed in this report are from a consistent national dataset, however this only covers sites within 5 kilometres of the SRN – this leaves gaps in potential sites which may be suitable but are in proximity to roads which have lower strategic importance. Wider market research and business engagement would be required to identify specific sites feasible for charging/refuelling stations in areas around the currently identified ideal sites. In addition, the latest 2022 national dataset used for the deliverable network now excludes certain groups of parking sites, resulting in fewer available locations.
- Due to long-term forecasts underpinning the inputs of this work, it may be necessary to re-forecast and re-model in future. This is likely to be needed, for example, if there are changes to factors which drive forecast inputs and assumptions.

18. Conclusions

This section has outlined a proposed method to distribute the estimated charging infrastructure required in Peninsula Transport and Western Gateway based on the high scenario modelling for each fuel type. The report has highlighted that there are 13 freight and logistics clusters in Peninsula Transport and 11 in Western Gateway which should be taken forward to be considered as alternative fuels refuelling sites. The weighting for distributing the refuelling infrastructure has been driven by the HGV traffic on A Road and Motorway links as per the NTM. This has generally resulted in larger numbers of infrastructure being situated around the M4 and M5 near Bristol and in Gloucestershire, as well as around key A roads such as the A30 and A38 around Exeter.

In addition, a less-conservative ideal network scenario is proposed, building on top of the deliverable baseline forecast. The proposed cluster-based, zone-level, reallocated supply presents an alternative future, prioritising coverage and additional desired sites. Given the lack of certainty of these early sites, there is a degree of freedom in terms of how many chargers they should be allocated. Note, however, that desired supply provision will need to balance the need to satisfy demand (on high-flow corridors) as well as coverage (in sparser areas).

Going forward, detailed studies for the sites making up each logistics cluster (and proposed ideal site) are needed to pinpoint the exact sites meeting the technical, planning and commercial requirements of locating a charging/refuelling station, with the assessment needing to consider elements such as those listed below:

- Sites should have enough space for large vehicles, including consideration of turning circles.
- Access to the high-pressure gas grid can reduce installation costs for CNG and LNG refuelling stations and will marginally improve overall GHG emissions performance.
- Sufficient electricity supply is needed to run compressors and other components of gas and hydrogen refuelling stations. Some substations will need to be upgraded to support deployment of rapid charge points and refuelling infrastructure. Individual site surveys will be required to determine what upgrades are needed and to estimate costs.
- Consider planning requirements and the likelihood of securing consent.
- The cost of land is a key component for infrastructure providers when analysing the potential business case for installing a new station.
- Site ownership, location and accessibility should also be accounted for.

There is also a need for further research to be conducted into the need for additional charging sites beyond the SRN network, particularly in those areas in north Devon which are currently around 70-80 kilometres away from the closest deliverable EV charging clusters. Additionally, where any sites are close to the boundary with other STBs, it is important that close engagement occurs with any adjacent authorities to ensure individual plans are consistent and allow for a network approach which is suitable for longer distance journeys which cross administrative boundaries.

To summarise, this section of the report has aimed to develop a framework for identifying freight stop clusters and how the proposed refuelling infrastructure could be allocated across these freight and logistics clusters as a result of potential refuelling demand from links which would travel to a refuelling site. 11 clusters have been identified within Western Gateway, with 13 also identified in the Peninsula Transport STB area. Further work should now be conducted to identify the practicalities around delivering alternative fuels refuelling points at the sites in each of the deliverable clusters and ideal locations, as well as to prioritise any rollout of infrastructure.

Conclusions

19. Overarching Conclusions, Recommendations and Next Steps

19.1. Conclusions and Key Findings

This study has undertaken a comprehensive investigation into alternative fuel technologies and their potential application to road freight and logistics, plus the intersections between road freight and other modes. Battery EVs, Plug-in Hybrid EVs, and Hydrogen vehicles are most likely to be used by freight and logistics operators, either currently or on the horizon for deployment by 2035. This finding, alongside policy announcements during recent COP summits, led to this study focussing on the forecasted uptake of electric and hydrogen powered vehicles.

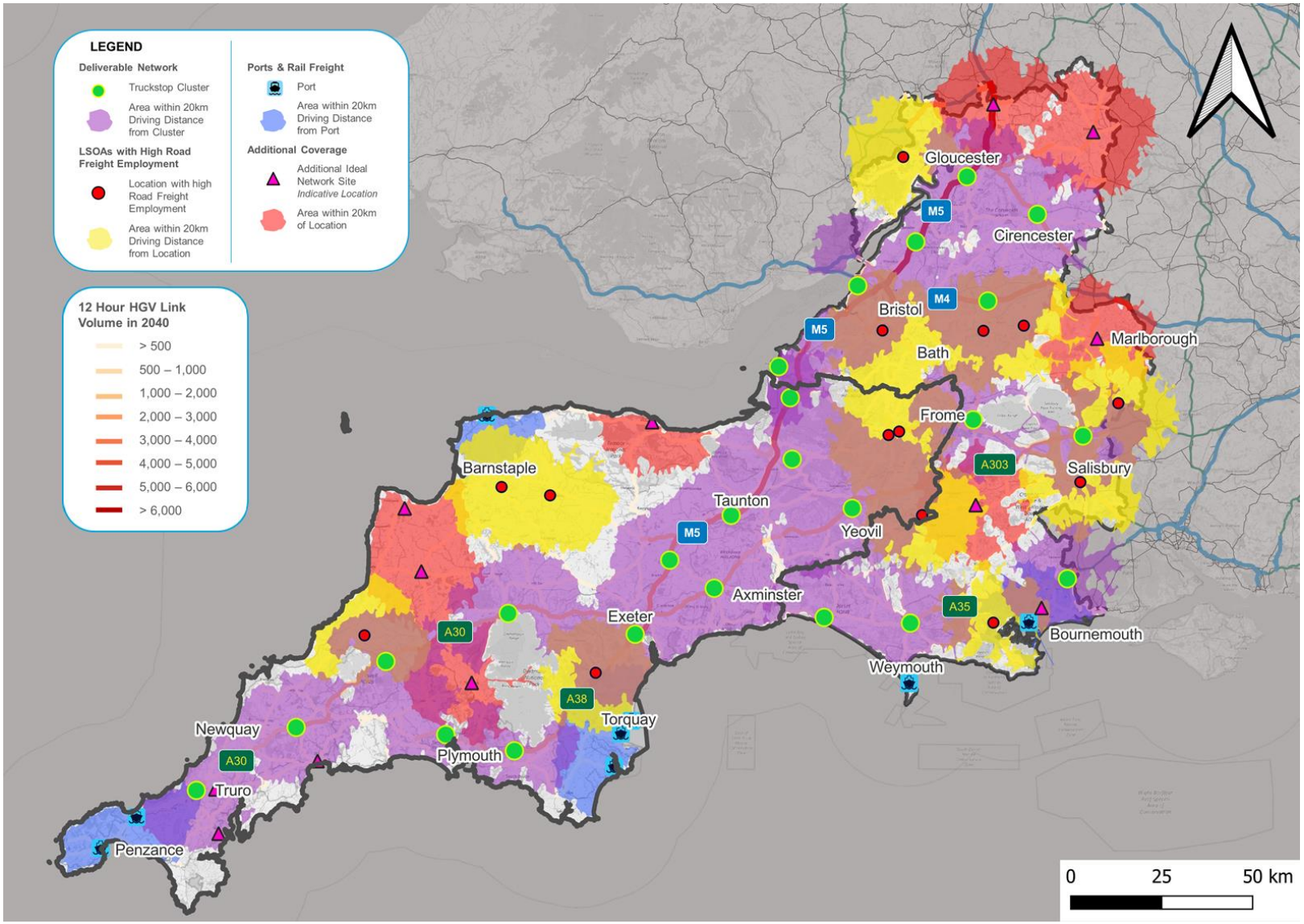
Forecasting of likely demand by 2040, and consideration of existing freight and logistics clusters, led to the identification of 13 potential cluster locations for refuelling infrastructure in the Peninsula Transport area, and 11 potential locations within the Western Gateway area. Across these locations, the estimated refuelling and recharging infrastructure was allocated according to HGV traffic flows on the region's MRN and SRN. Figure 19-1 provides an overview of the identified locations, and the catchment area these sites will provide. These locations were primarily identified from existing freight and logistics service locations to ensure their suitability for HGVs which will require refuelling facilities distinct from those required by LGVs and other smaller vehicles.

Additional sites, comprising the ideal network, were identified through stakeholder engagement and desktop research. Where possible, sites co-located with other modes were suggested, however further investigation and engagement is advised for these sites to ensure their suitability, deliverability and acceptability. When conducting this work, it is recommended that particular focus is placed on the spatial appropriateness and multi-modal aspects of infrastructure deployment, while also managing possible interactions with the regional freight strategy, and the views, needs and aspirations of local authorities, planners, and elected members.

This study has also considered the current policy landscape, and strategies for the decarbonisation of the economy, transport, and freight. This review identified clear plans and policies for the decarbonisation of the economy and transport at a national and regional level, however local level plans and policies were more limited. While national priorities and targets are clear, they are directives, and require implementation and delivery by local and regional authorities. The lack of clarity and certainty regarding ownership and delivery of national level policy is a cause of confusion for local government and end users alike, who are confused regarding their responsibilities and investment decisions.

While stakeholders were positive about the government's decarbonisation targets, they were concerned about the extent of their ambition, especially for the freight and logistics sector. Concerns were also expressed regarding the ability to deploy recharging infrastructure without upgrades to the grid, while confusion remained regarding the ownership of responsibility and funding for the deployment of refuelling infrastructure. While sustainability was a key influence in vehicle acquisition decisions for stakeholders, high costs and poor public infrastructure provision were significant barriers for stakeholders looking to decarbonise their fleets.

Figure 19-1 – Summary of proposed refuelling network – deliverable and ideal scenarios



19.2. Recommendations and Next Steps

The following recommendations and next steps have been identified from the key findings of this report, and are designed to help Western Gateway and Peninsula Transport work with their partners and stakeholders to implement the findings of this study.

Work with other public sector organisations and the freight and logistics industry to identify ownership and key accountabilities for the decarbonisation of the industry, overcoming the current confusion and uncertainty which will delay the transition from fossil fuels. To overcome these barriers, it will be necessary to work with stakeholders to ensure the development of a cohesive refuelling network, which meets the needs of freight and logistic operators. It may also be necessary to support the industry to overcome funding barriers for both refuelling infrastructure and vehicles, and to help influence strategy, vehicle acquisition, and fuel choice in the short-to-medium-term to provide confidence in the long-term viability of vehicle and infrastructure investments.
Engage with partner local authorities to secure their buy in to this strategy, and influence their policy development processes to ensure freight, logistics and decarbonisation are adequately represented, particularly in any electric vehicle infrastructure strategies which they develop or adopt. At present, the local policy and strategy landscape for freight and logistics is mixed; greater consistency across local authority boundaries will be beneficial to the sector as a whole.
Investigate the potential need for upgrades to electricity infrastructure as part of the rollout of EV chargepoints by engaging with distribution network operators to develop and publish capacity maps, helping identify areas where upgrades will be necessary prior to the rollout of charging infrastructure.
Undertake further development work on the additional sites away from the SRN identified by this study. This work should involve discussions with site owners, stakeholders, and local experts to identify and develop business case inputs to secure commercial or government capital funding partners for delivery of the ideal network.
Continue to monitoring the uptake of alternative fuels in the region to ensure rollout remains in line with the forecasts outlined in this report. Depending on the outcome of these activities, it may be necessary to make changes to proposals in line with feasibility and market uptake.
Undertake an assessment of readiness for alternative fuels over the short, medium and long terms, considering the costs, commercial models, grid readiness and partner profiles to see identify gaps in capability and capacity which have the potential to impact the deployment of individual sites.
Undertake further engagement with agriculatural stakeholders to encourage potential decarbonisation synergies with the road freight sector. More specifically, the concept of farm centred “rural refuelling hubs” identified through existing engagement should be explored further as this offers the potential to provide alternative fuel refuelling facilities in rural agricultural areas. These hubs would leverage existing farm infrastructure to reduce costs and diversify farm income, while increasing rural connectivity and creating connected sites for HGVs and other road freight vehicles to refuel when completing rural deliveries.
Develop a regional Strategic Outline Business Case for potential sites/areas intentified by this work. This may include engaging with industry partners, potential commercial funders, and local stakeholders to asses and priorities the optimum framework for delivery of the refuelling network. It may also include the identification of specific technologies and broad site selection for extended network ehancement. Business case outputs may include the initial strategic, economic, commercial, financial and management cases for a commercial or government audience.

Appendices

Appendix A. Literature Review Sources

A.1. National Policies

Number	Title	Date of Publication	Description	Publisher
1.	Better Delivery: The Challenge for Freight	April 2019	A report by the National Infrastructure Commission to provide advice to the Government. on how to ensure an efficient, low carbon freight system	National Infrastructure Commission
2.	The Route to Net Zero: A Manifesto for Logistics	November 2021	A report by Logistics UK setting out the positive steps that should be taken by the Government and policymakers to help logistics transport operators to decarbonise their operations across all transport modes.	Logistics UK
3.	The Road to Zero	July 2018	A Government strategy setting out their plans towards cleaner road transport and to put the UK at the forefront of the design and manufacturing of zero emission vehicles	UK Government
4.	Freight Carbon Review	February 2017	A Government review designed to help the road freight sector reduce its emissions in a cost-effective way that drives efficiency and innovation	UK Government
5.	Net Zero Strategy: Build Back Greener	October 2021	A Government strategy setting out policies and proposals for keeping on track carbon budgets, the Nationally Determined Contribution (NDC), and the vision for a decarbonised economy in 2050	UK Government
6.	UK Plan for tackling roadside Nitrogen Dioxide concentrations	July 2017	A UK Government air quality plan for bringing nitrogen dioxide (NO2) air pollution within statutory limits in the shortest possible time	UK Government
7.	Decarbonising Transport – A Better, Greener Britain	July 2021	A Government strategy presenting the path to net zero transport in the UK, the wider benefits it can deliver, and the commitments and actions needed to decarbonise transport.	UK Government
8.	The Clean Growth Strategy	October 2017	A Government strategy setting out a policies and proposals that aim to accelerate the pace of “clean growth”, i.e. deliver increased economic growth and decreased emissions.	UK Government
9.	Industrial Strategy: Building a Britain fit for the future	November 2017	This white paper sets out a long-term plan to boost the productivity and earning power of people throughout the UK.	UK Government
10.	Industrial Strategy: Automotive Sector Deal	January 2018	A Sector Deal between government and the UK automotive sector.	UK Government

11.	Road Investment Strategy 2 (RIS 2) 2020-2025	March 2020	The Government's five year strategy for investment in and management of the strategic road network from April 2020 to March 2025.	UK Government
12.	Climate Change Act	November 2008	An Act to set a target for the year 2050 for the reduction of targeted greenhouse gas emissions.	UK Government
13.	Clean Air Strategy	January 2019	A Government strategy to set out plans for dealing with all sources of air pollution, making air healthier to breathe, protecting nature and boosting the economy.	UK Government
14.	Clean Air Zone Framework	February 2020	Principles which local authorities should follow when setting up Clean Air Zones in England.	UK Government
15.	Cost of Energy Review	October 2017	Independent review undertaken by Professor Dieter Helm CBE puts forward his proposals on how to reduce costs in the power system in the long-term whilst ensuring the UK meets its climate change targets.	Professor Dieter Helm CBE (on behalf of UK Government)
16.	A Green Future: Our 25 Year Plan to Improve the Environment	January 2018	A plan which sets out what the UK Government will do to improve the environment within a generation.	UK Government
17.	National Infrastructure Strategy 2020	November 2020	The National Infrastructure Strategy sets out plans to transform UK infrastructure in order to level up the country, strengthen the Union and achieve net zero emissions by 2050.	UK Government
18.	The Logistics Growth Review - Connecting People with Goods	November 2011	A review which examines the importance of transport logistics growth, and identifies the actions government can take to address any barriers.	UK Government
19.	National Planning Policy Framework	July 2021	The revised National Planning Policy Framework sets out government's planning policies for England and how these are expected to be applied.	UK Government
20.	Commercial EV Fleet Charging Requirements	October 2021	This report from Zemo Partnership and the Electric Vehicle Energy Taskforce, with the support of the Electric Vehicle Fleet Accelerator (EVFA), the BVRLA and E4Tech, looks at how the electrification of the UK's commercial fleet market can be accelerated in line with net zero objectives.	EV Energy Taskforce
21.	Taking Charge: the electric vehicle infrastructure strategy	March 2022	The vision and action plan for electric vehicle charging infrastructure within the United Kingdom.	UK Government
22.	FTA Electric Vehicle Report	June 2019	A report by the FTA (Freight Transport Association) to understand	Freight Transport Association

			how vehicle operators are responding to policies and regulations that are encouraging the logistics industry to work towards decarbonisation.	
23.	Clean Air Strategy	January 2019	A Clean Air Strategy for how to tackle all sources of air pollution, making the air healthier to breathe, protecting nature and boosting the economy.	UK Government
24.	Net Zero Highways	June 2021	A roadmap for national highways to meet net zero requirements by 2014, both operationally and for stakeholders	National Highways
25.	Traction Decarbonisation Network Strategy (TDNS)	July 202	Strategic justification and pathway for decarbonising UK railways	Network Rail
26.	Rail Environment Policy Statement		Sets out environmental priorities as they relate to the mainline railway network as they relate to TDNS	Network Rail

A.2. Regional Policies

Number	Title	Date of Publication	Description
27.	Western Gateway and Peninsula Transport – South West Freight Strategy	March 2022	A joint freight strategy between Western Gateway and Peninsula Transport which addresses the challenges, opportunities, and priorities for the South West over the next 30 years to 2050, with objectives focussed on the environment, economy, and society.
28.	Western Gateway: Powering a greener, fairer future	January 2022	An introduction into what the Western Gateway is, who is involved, and what their missions and objectives are
29.	Peninsula Transport: Vision	July 2021	An outline of Peninsula Transport, including information on its objectives, challenges and next steps
30.	Peninsula Transport: Regional Evidence Base	July 2019	A document outlining information about current transport schemes in development in the Peninsula area, as well as challenges and opportunities.
31.	Peninsula Transport Economic Connectivity Review	July 2020	The study highlights the importance of our strategic connections – those in and out of our peninsula – in bringing people together, facilitating trade and supporting clean growth in our economy. It also analyses current and future economic activity in the peninsula in relation to transport.
32.	Western Gateway Economic Connectivity Study	July 2019	Identifies key strategic corridors and economic importance of transport
33.	Western Gateway Strategic Transport Plan 2020-2025		Short term Strategic Transport Plan for the Western Gateway area
34.	Travelwest Joint Local Transport Plan 2020-2036	March 2020	The Local Transport plan covering Bath & North East Somerset, Bristol, North Somerset, and South Gloucestershire Councils, effective from 2020-2036.
35.	West of England Combined Authority – Transport Delivery Plan	February 2021	The West of England Combined Authority Transport Delivery Plan sets out the currently funded transport projects (2021 – 2026) that are progressing to delivery over the next 5 years in the West of England region.
36.	West of England Combined Authority – Sustainable Transport Settlement	September 2021	The West of England Combined Authority Sustainable Transport Settlement is a document which sets out the vision and plan for sustainable transport in the West of England area.
37.	West of England Combined Authority – West of England Climate and Ecological Strategy and Action Plan	April 2022	West of England Combined Authority's plan to achieve Net Zero in the West of England by 2030.
38.	Devon Carbon Plan	November 2022	Region wide direction for achieving net-zero with specific reference to regional challenges
39.	West of England rail Plan 10 Year Rail Delivery Plan	November 2020	Regional rail delivery plan, child of "Western Gateway Rail Strategy"
40.	Western Gateway Rail Strategy	November 2020	Regional high level strategic objective and pathway setting focument.

A.3. Local Policies

Number	Title	Date of Publication	Description
41.	Exeter Transport Strategy 2020-2030	November 2020	The Exeter transport strategy, effective from 2020-2030.
42.	Exeter Net Zero 2030 Plan	April 2020	A report by Exeter CityFutures on how the Exeter region could work towards being Net Zero by 2030
43.	Plymouth and South West Devon Joint Local Transport Plan 2014-2034	March 2019	The Plymouth and South West Devon joint Local Transport Plan, effective from 2014-2034.
44.	Devon and Torbay Local Transport Plan 2011 - 2026	April 2011	The Devon County Council and Torbay Council combined Local Transport Plan, effective from 2011-2026.
45.	Bournemouth, Poole and Dorset Local Transport Plan – 2011-2026	April 2011	The combined Bournemouth, Poole and Dorset Councils Local Transport Plan, effective from 2011-2026.
46.	Bristol Transport Strategy 2019-2036	July 2019	Bristol City Council Transport Strategy adopted in 2019, outlying plans until 2036
47.	Salisbury Transport Strategy Refresh 2018 - Wiltshire Council	May 2018	Wiltshire Council's Transport Strategy for Salisbury
48.	Bath and North East Somerset Council – Journey To Net Zero 2014 - 2030	January 2021	Net Zero Plan building on the 2014 Transport Strategy, effective until 2030
49.	Swindon Local Transport Plan 2011 to 2026	April 2011	The Swindon Borough Local Transport Plan, effective from 2011-2026.
50.	Somerset County Council Future Transport Plan 2011-2026	February 2011	The Somerset County Council Future Transport Plan, effective from 2011-2026.
51.	Somerset County Council Freight Strategy	December 2011	A strategy to set out how to improve Freight movement around Somerset. This feeds into the Somerset County Council Future Transport Plan
52.	Cornwall Council Local Transport Plan to 2030	April 2022	The Cornwall Council Local Transport Plan, effective from 2011-2026.
53.	Devon County Council Transport Infrastructure Plan: Delivering Growth to 2030	March 2015	An Infrastructure Plan setting out planned investment in transport infrastructure across Devon covering the period 2014 to 2030
54.	Wiltshire Council Local Transport Plan - Strategy	January 2011	The Wiltshire Council Local Transport Plan, effective from 2011-2026.
55.	Wiltshire Council Local Transport Plan – Freight Strategy	January 2011	The Wiltshire Council strategy for management of Freight, effective from 2011-2026.

56.	Gloucestershire County Council Local Transport Plan	April 2021	The Gloucestershire County Council Local Transport Plan, effective from 2020-2041.

Appendix B. Results from the Mixed Fuel Scenario

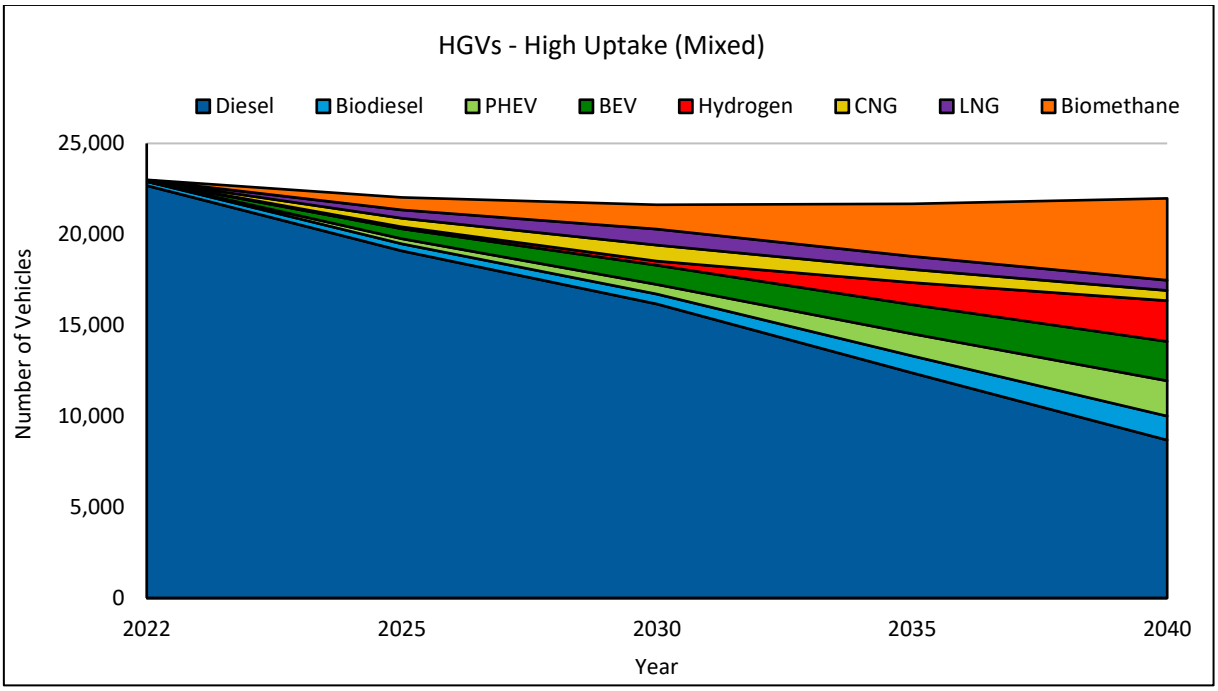
B.1. Forecasting Alternative Fuel Uptake

Tables with the underlying figures can be found in the Excel supplement.

B.1.1. Western Gateway

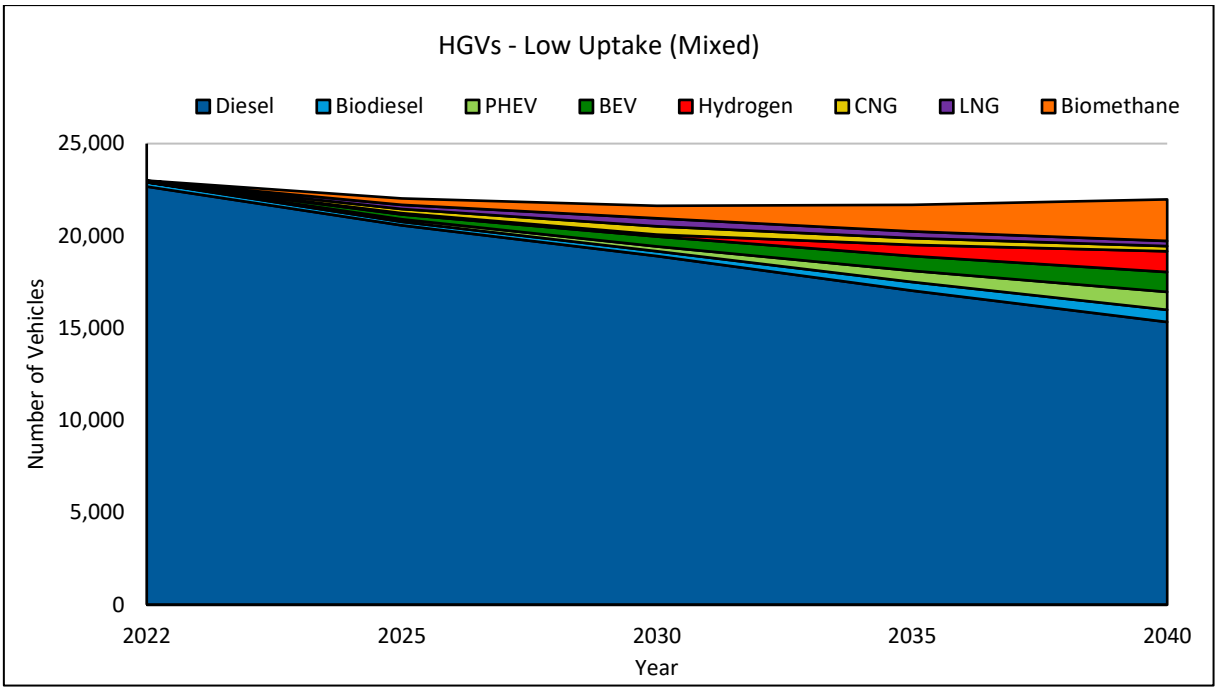
In the high uptake scenario shown below, in 2040 we expect there to be 2,200 hydrogen HGVs, 4,100 BEV and PHEV HGVs, 1,300 biodiesel HGVs, 5,600 gas HGVs, and 8,600 diesel HGVs.

Figure B-1 - Mixed fuel scenario HGVs - High uptake, Western Gateway



In the low uptake scenario shown below, in 2040 we expect there to be 1,100 hydrogen HGVs, 2,100 BEV and PHEV HGVs, 700 biodiesel HGVs, 2,800 gas HGVs, and 15,300 diesel HGVs.

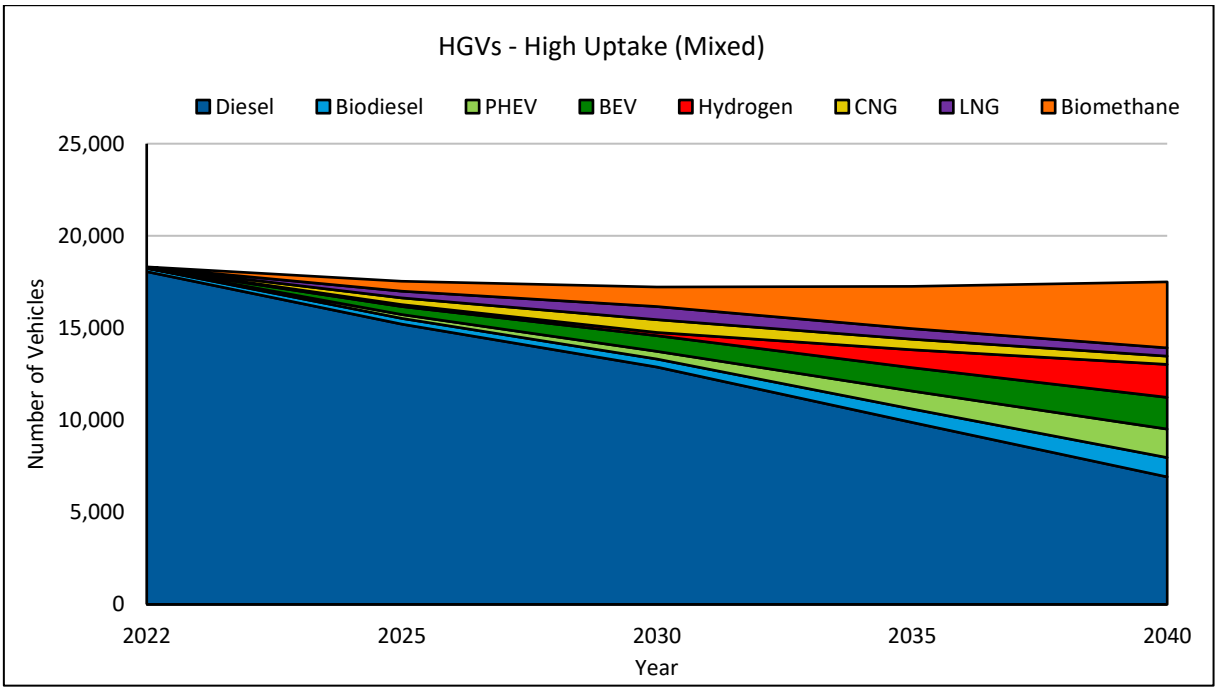
Figure B-2 - Mixed fuel scenario HGVs - Low uptake, Western Gateway



B.1.2. Peninsula Transport

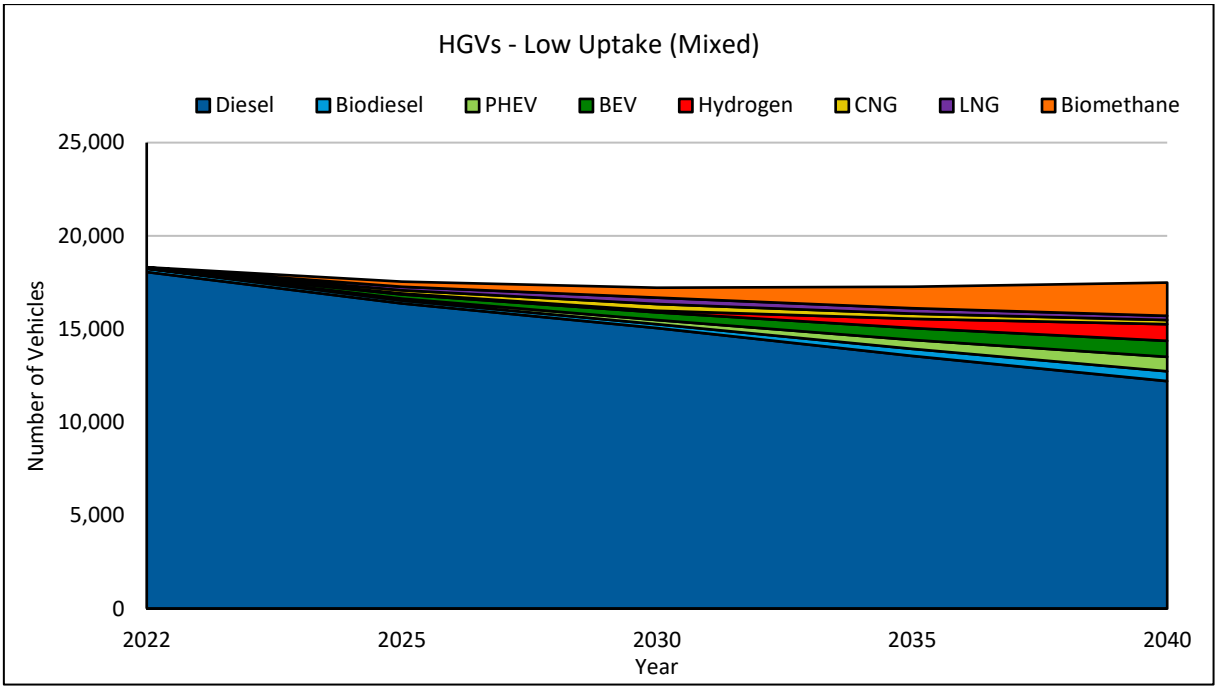
In the high uptake scenario shown below, in 2040 we expect there to be 1,800 hydrogen HGVs, 3,300 BEV and PHEV HGVs, 1,100 biodiesel HGVs, 4,500 gas HGVs, and 6,900 diesel HGVs.

Figure B-3 - Mixed fuel scenario HGVs - High uptake, Peninsula Transport



In the low uptake scenario shown below, in 2040 we expect there to be 900 hydrogen HGVs, 1,600 BEV and PHEV HGVs, 500 biodiesel HGVs, 2,200 gas HGVs, and 12,200 diesel HGVs.

Figure B-4 - Mixed fuel scenario HGVs - Low uptake, Peninsula Transport



B.2. Forecasting Required Infrastructure

Tables with underlying figures can be found in the Excel supplement.

B.2.1. Western Gateway

The below figures display the total energy demand required per day to service the number of vehicles calculated in the previous section.

Figure B-5 - Mixed fuel scenario - High uptake, total energy demand per day for all LGVs and HGVs, Western Gateway

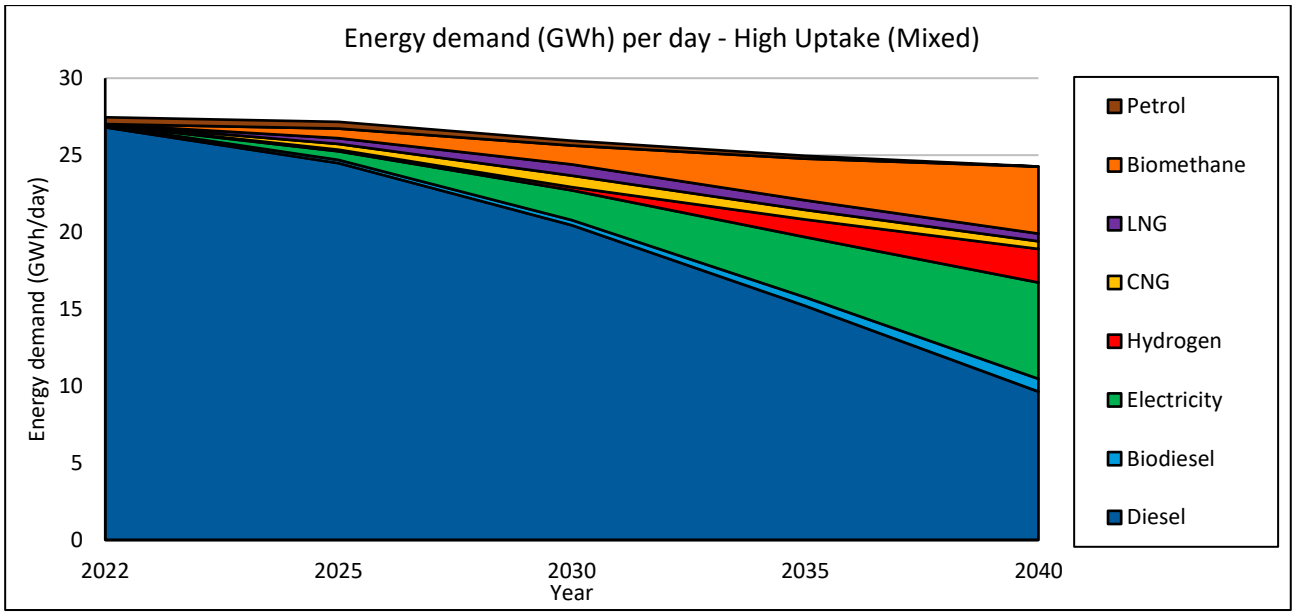
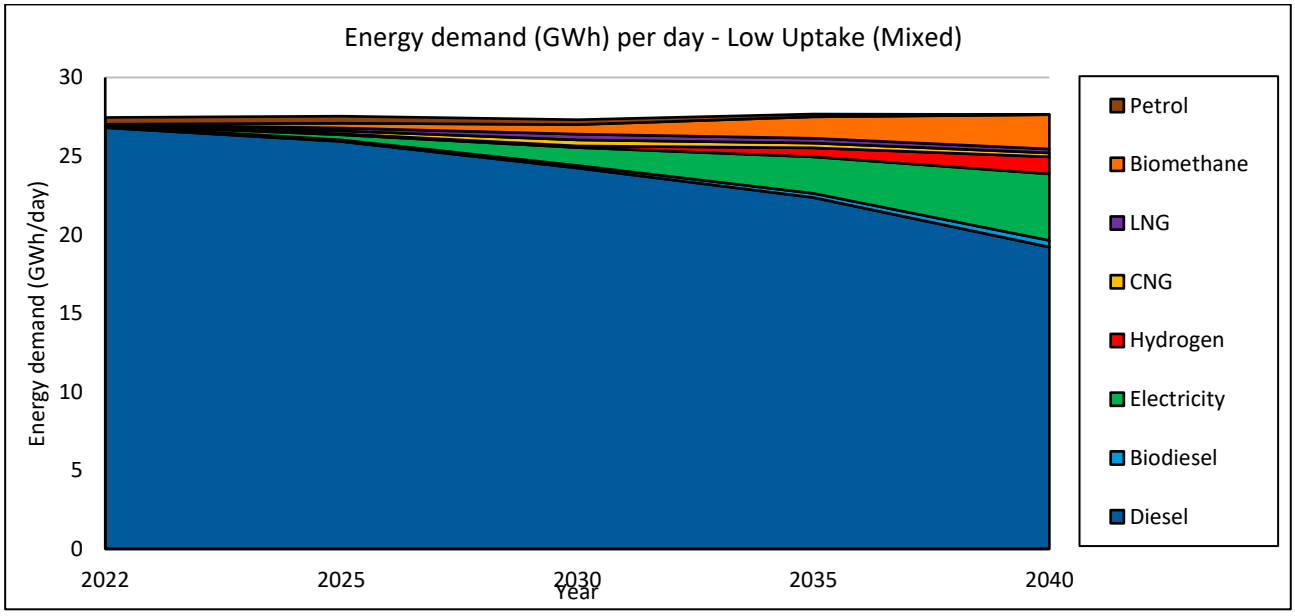


Figure B-6 - Mixed fuel scenario - Low uptake, total energy demand per day for all LGVs and HGVs, Western Gateway



The tables below show the required publicly accessible infrastructure (equivalent to today's petrol and diesel forecourts) for 2030 and 2040 respectively, showing the required growth throughout the next 20 years, for EV chargepoints, CNG and LNG stations (dispensing biomethane), and hydrogen refuelling stations (HRS). Local Authorities and STBs will not have to fund this entirely by themselves, with private industry investment likely to

provide a large proportion of this where economically viable for their business case. The split of infrastructure between rigid and artic HGVs is for indicative reasons and infrastructure specific to these different vehicles is not required. However, LGV and HGV access will differ for chargepoint infrastructure and so a distinction is advised between the infrastructure for these vehicles. The high and low uptake scenarios provide a range of infrastructure requirements and should be observed as a single analysis.

Table B-1 - Publicly accessible chargepoint infrastructure requirements up to 2030, Western Gateway

	Chargepoint requirements - 2030					
	High uptake (Mixed)			Low uptake (Mixed)		
	22 kW	50 kW	150 kW	22 kW	50 kW	150 kW
Rigids	-	11	4	-	6	2
Artics	-	7	3	-	4	2
LGVs	1,053	464	78	632	278	47
Total	***1,053***	***482***	***85***	***632***	***288***	***51***

Table B-2 - Publicly accessible refuelling station infrastructure requirements up to 2030, Western Gateway

	Refuelling station requirements - 2030					
	High uptake (Mixed)			Low uptake (Mixed)		
	H2	CNG	LNG	H2	CNG	LNG
Rigids	1	1	1	1	1	1
Artics	1	2	2	1	1	1
Total	***2***	***3***	***3***	***2***	***2***	***2***

Table B-3 - Publicly accessible chargepoint infrastructure requirements up to 2040, Western Gateway

	Chargepoint requirements - 2040					
	High uptake (Mixed)			Low uptake (Mixed)		
	22 kW	50 kW	150 kW	22 kW	50 kW	150 kW
Rigids	-	25	9	-	13	5
Artics	-	16	6	-	8	3
LGVs	3,504	1,542	257	2,421	1,066	178
Total	***3,504***	***1,583***	***272***	***2,421***	***1,087***	***186***

Table B-4 - Publicly accessible refuelling station infrastructure requirements up to 2040, Western Gateway

	Refuelling station requirements - 2040					
	High uptake (Mixed)			Low uptake (Mixed)		
	H2	CNG	LNG	H2	CNG	LNG
Rigids	3	1	1	2	1	1
Artics	8	3	3	4	2	2
Total	***11***	***4***	***4***	***6***	***3***	***3***

The figures below show the estimated costs of the high and low scenario for the mixed fuel pathway. The high and low uptake scenarios provide a range of costs and should be observed as a single analysis with the high scenario following the Element Energy LowCVP projections exactly and the low representing a slower transition—this could be due to technology maturity not being fully realised or resistance to change from major operators.

Figure B-7 - Total publicly accessible infrastructure costs up to 2030, Western Gateway

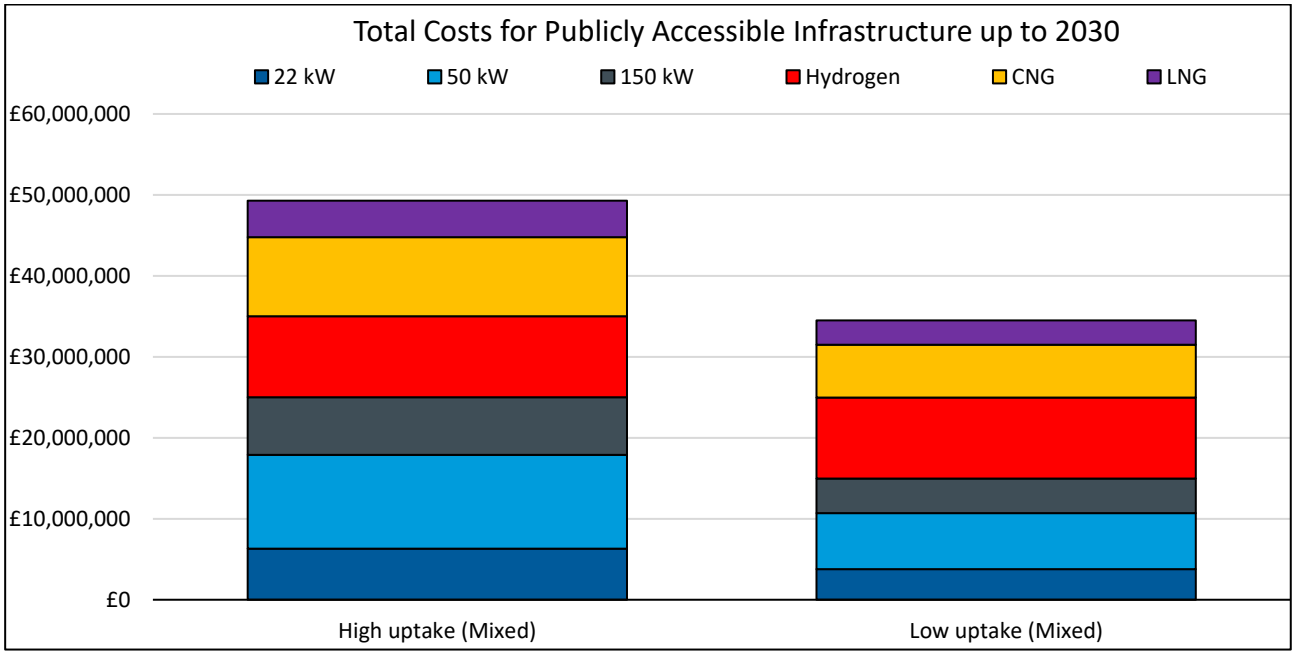
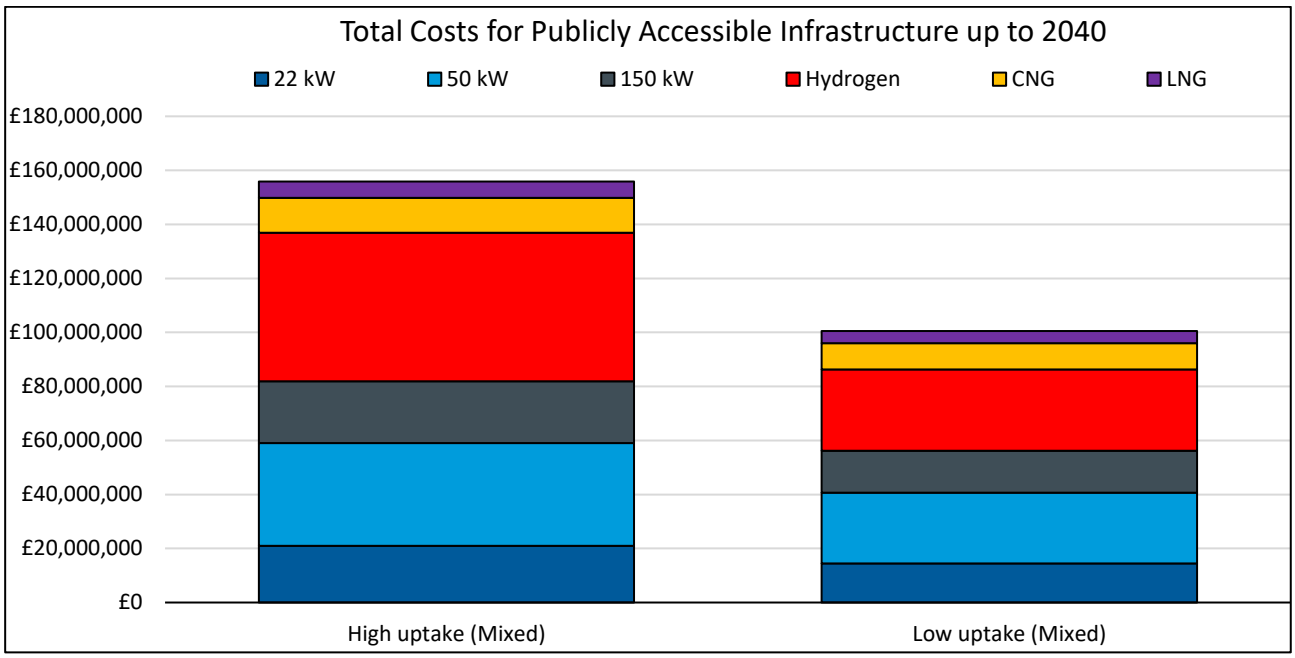


Figure B-8 - Total publicly accessible infrastructure costs up to 2040, Western Gateway



B.2.2. Peninsula Transport

The below figures display the total energy demand required per day to service the number of vehicles calculated in the previous section.

Figure B-9 - Mixed fuel scenario - High uptake, total energy demand per day for all LGVs and HGVs, Peninsula Transport

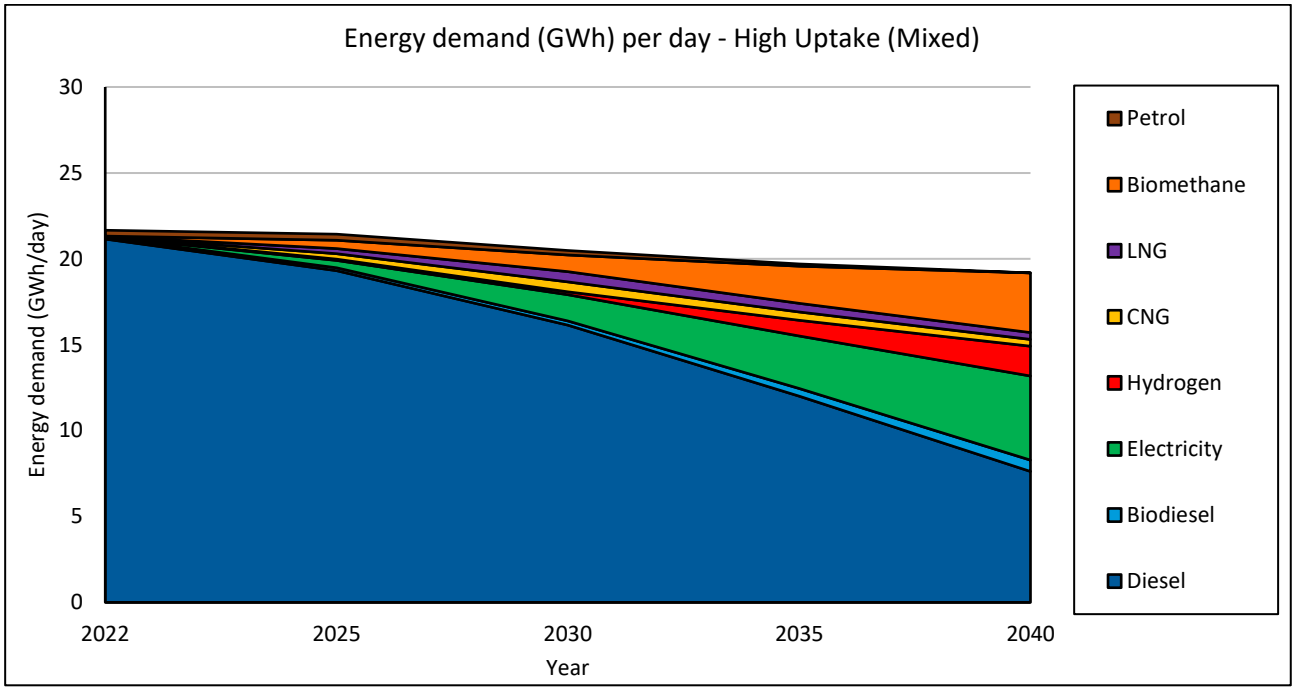
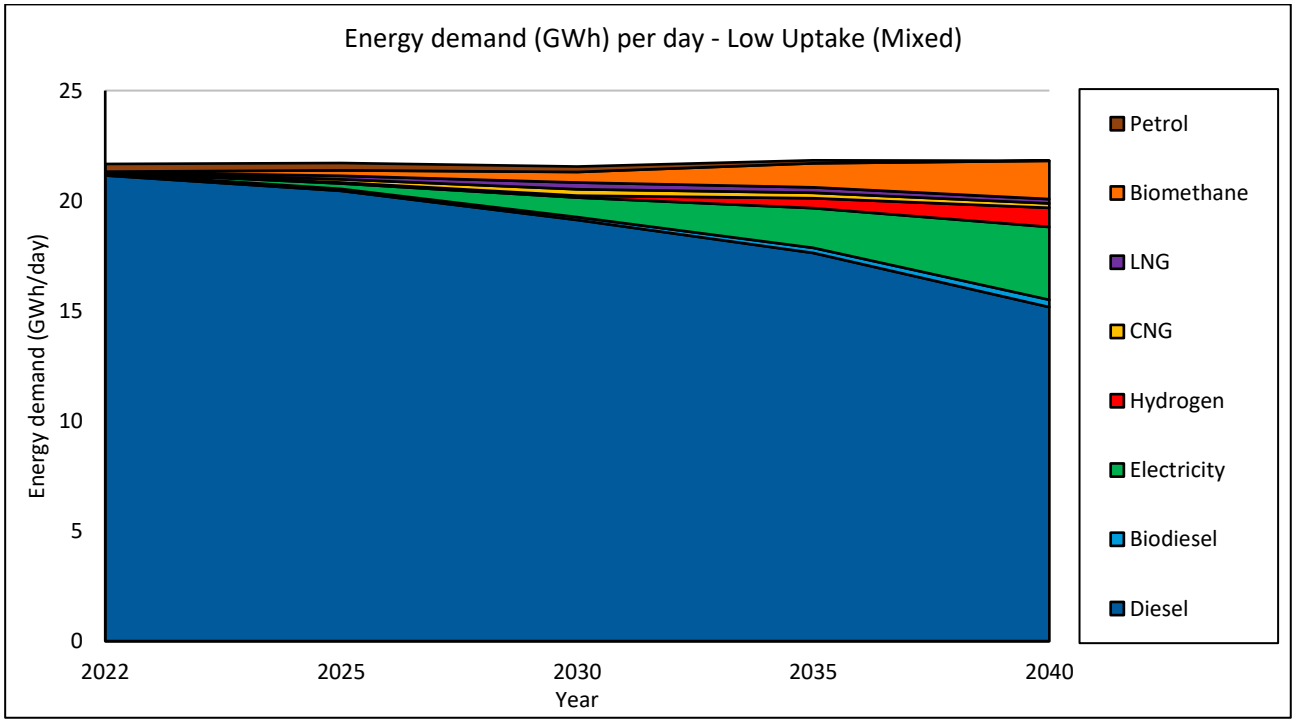


Figure B-10 - Mixed fuel scenario - Low uptake, total energy demand per day for all LGVs and HGVs, Peninsula Transport



The tables below show the required publicly accessible infrastructure (equivalent to today's petrol and diesel forecourts) for 2030 and 2040 respectively, showing the required growth throughout the next 20 years, for EV chargepoints, CNG and LNG stations (dispensing biomethane), and hydrogen refuelling stations (HRS). Local Authorities and STBs will not have to fund this entirely by themselves, with private industry investment likely to provide a large proportion of this where economically viable for their business case. The split of infrastructure between rigid and artic HGVs is for indicative reasons and infrastructure specific to these different vehicles is not required. However, LGV and HGV access will differ for chargepoint infrastructure and so a distinction is advised between the infrastructure for these vehicles. The high and low uptake scenarios provide a range of infrastructure requirements and should be observed as a single analysis.

Table B-5 - Publicly accessible chargepoint infrastructure requirements up to 2030, Peninsula Transport

	Chargepoint requirements - 2030					
	High uptake (Mixed)			Low uptake (Mixed)		
	22 kW	50 kW	150 kW	22 kW	50 kW	150 kW
Rigids	-	9	3	-	5	2
Artics	-	6	2	-	3	1
LGVs	823	377	61	494	218	37
Total	***823***	***377***	***66***	***494***	***226***	***40***

Table B-6 - Publicly accessible refuelling station infrastructure requirements up to 2030, Peninsula Transport

	Refuelling station requirements – 2030					
	High uptake (Mixed)			Low uptake (Mixed)		
	H2	CNG	LNG	H2	CNG	LNG
Rigids	1	1	1	1	1	1
Artics	1	1	1	1	1	1
Total	***2***	***2***	***2***	***2***	***2***	***2***

Table B-7 - Publicly accessible chargepoint infrastructure requirements up to 2040, Peninsula Transport

	Chargepoint requirements – 2040					
	High uptake (Mixed)			Low uptake (Mixed)		
	22 kW	50 kW	150 kW	22 kW	50 kW	150 kW
Rigids	-	20	7	-	10	4
Artics	-	13	5	-	7	3
LGVs	2,737	1,205	201	1,891	833	139
Total	***2,737***	***1,238***	***213***	***1,891***	***850***	***146***

Table B-8 - Publicly accessible refuelling station infrastructure requirements up to 2040, Peninsula Transport

	Refuelling station requirements - 2040					
	High uptake (Mixed)			Low uptake (Mixed)		
	H2	CNG	LNG	H2	CNG	LNG
Rigids	2	1	1	1	1	1
Artics	6	2	2	3	1	1
Total	***8***	***3***	***3***	***4***	***2***	***2***

The figures below show the estimated costs of the high and low scenario for the mixed fuel pathway. The high and low uptake scenarios provide a range of costs and should be observed as a single analysis with the high scenario following the Element Energy LowCVP projections exactly and the low representing a slower transition—this could be due to technology maturity not being fully realised or resistance to change from major operators.

Figure B-11 - Total publicly accessible infrastructure costs up to 2030, Peninsula Transport

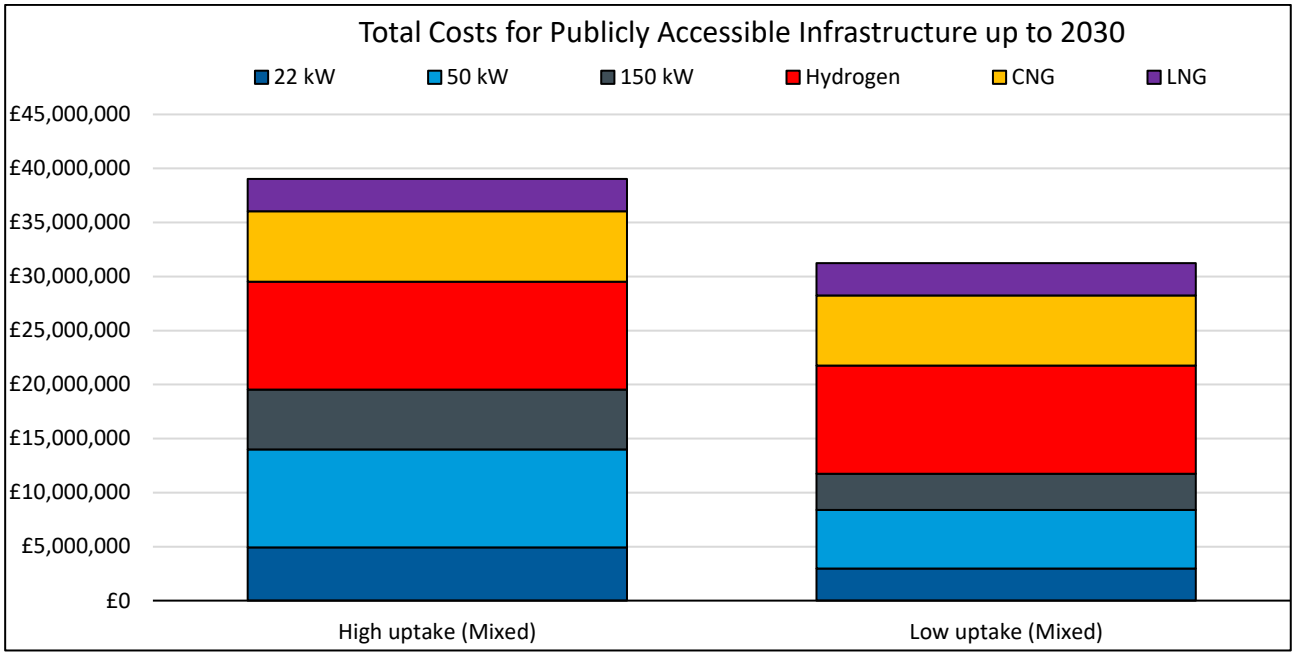
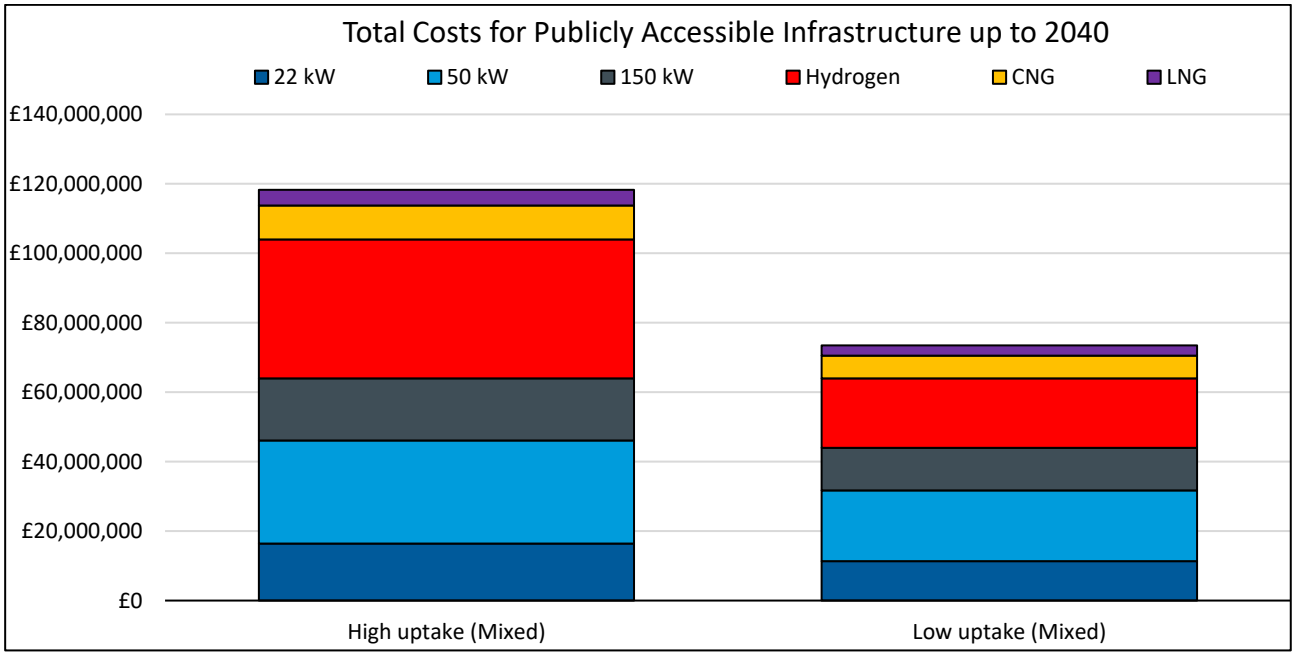


Figure B-12 - Total publicly accessible infrastructure costs up to 2040, Peninsula Transport



Appendix C. List of sites in each freight and logistics cluster

Table C-1 - Sites within site clusters - WG

Cluster	Site Name	Cluster	Site Name
WG1	Locking Road Parking	**WG7**	Moto Warminster
WG2	Eype Bridport - Kabin Café	**WG8**	Moto Leigh Delamere Eastbound
WG3	Welcome Break Gordano Services		Moto Leigh Delamere Westbound
	Avon Lodge		Chippenham Pitstop
	Moto Severn View	**WG9**	BP Burford Road
WG4	Top O Town Car park	**WG10**	Avonheath HGV Park
WG5	Welcome Break Michaelwood Services Northbound	**WG11**	Solstice Park
	Welcome Break Michaelwood Services Southbound		Countess
WG6	Gloucester services northbound		
	Gloucester services southbound		

Table C-2 - Sites within site clusters - PT

Cluster	Site Name	Cluster	Site Name
PT1	Smokey Joes Cafe	**PT10**	Roadchef Taunton Deane Services Northbound
PT2	Cornwall services		Roadchef Taunton Deane Services Southbound
PT3	Esso Bodmin Moor	**PT11**	Moto Bridgwater Services
PT4	Moto Saltash		Albion Inn And Truck Stop
PT5	Lee Mills Services - Westward Transport Cafe		Junction 24 Truck Stop
PT6	Sourton Cross	**PT12**	Welcome Break Sedgemoor Services Northbound
	BP Whitehouse Services		Roadchef Sedgemoor Services Southbound
PT7	Moto Exeter Services	**PT13**	Hazelgrove Services
	American bar and grill		Podimore (Esso)
PT8	Extra Cullompton		Texaco
PT9	Turks Head Honiton		Cartgate lodge picnic area

Appendix D. Breakdown of Refuelling Facilities Required at Each Site

Table D-1 - Distribution of refuelling infrastructure across the freight and logistics cluster sites – Deliverable Network

Site Cluster ID	50KWh Chargers	150KWh Chargers	Hydrogen Refuelling	Gas Refuelling
WG1	3	1	1	0
WG2	2	1	1	0
WG3	36	11	11	2
WG4	2	2	2	1
WG5	7	2	2	0
WG6	26	8	8	2
WG7	6	2	2	0
WG8	9	3	3	1
WG9	8	2	2	0
WG10	7	2	2	1
WG11	4	1	1	1
PT1	3	1	1	0
PT2	5	2	1	1
PT3	7	2	2	0
PT4	6	2	2	0
PT5	12	4	3	1
PT6	4	1	1	1
PT7	18	5	5	1
PT8	5	2	2	0
PT9	5	2	1	0
PT10	5	2	2	0
PT11	9	3	3	1
PT12	2	1	1	0
PT13	9	3	3	1

Table D-2 - Distribution of refuelling infrastructure across the freight and logistics cluster sites – Ideal Network

Site Cluster ID	50KWh Chargers	150KWh Chargers
WG1	3	2
WG2	2	2
WG3	31	8
WG4	2	2
WG5	7	2
WG6	21	7
WG7	7	2
WG8	11	3
WG9	9	2
WG10	10	3
WG11	7	2
PT1	5	2
PT2	5	2
PT3	7	2
PT4	6	2
PT5	11	3
PT6	4	2
PT7	16	4
PT8	5	2
PT9	5	2
PT10	5	2
PT11	9	3
PT12	3	1
PT13	9	3

Appendix E. Stakeholder Workshop Activities

Western Gateway
Sub-national Transport Body

Peninsula Transport

Alternative Fuels for Freight

Stakeholder Workshop

cenex

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Agenda

- Into & Welcome
- Research & study background
- Alternative Fuel Policy (Local, Regional & National)
- Alternative Fuel Vehicles (Current and future uptake)
- Comfort Break
- Alternative Fuel Infrastructure
- Workshop Summary & Conclusion

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Introductions

Chris Cordwell

Matt Smith

Ben Hurt

Matt Fleet

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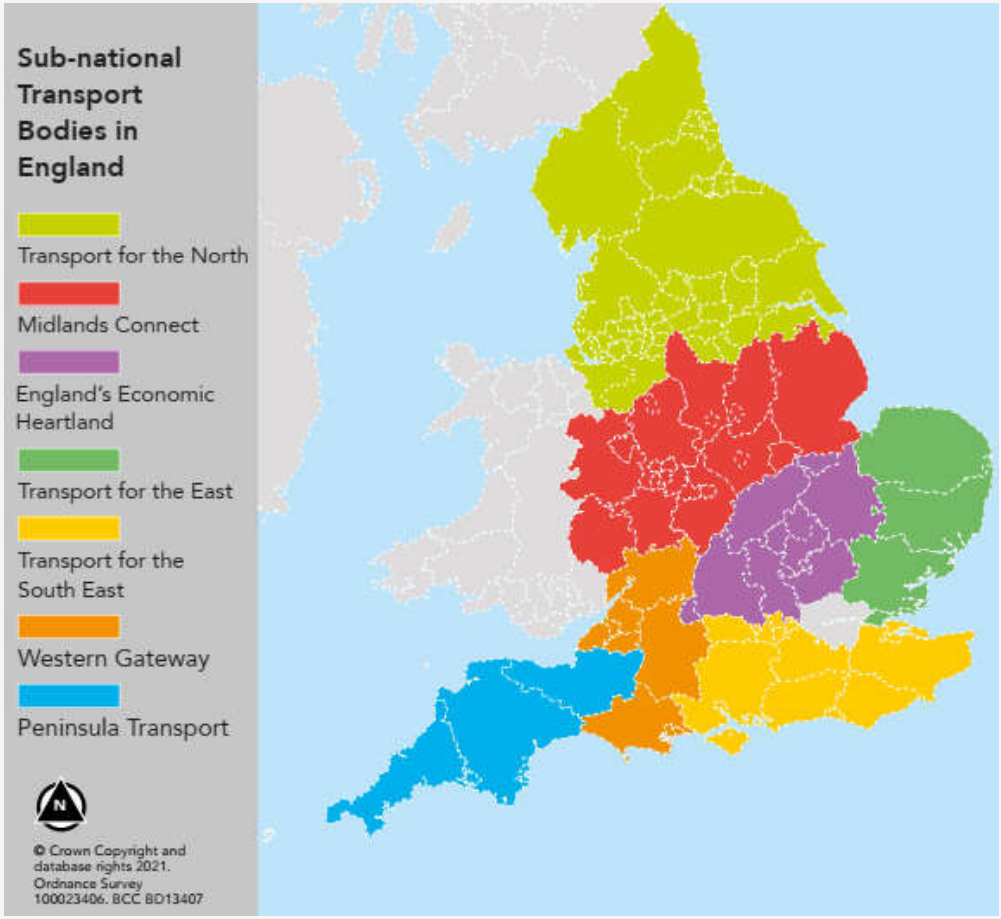
Background to this study

Background

Atkins and Cenex are working with Western Gateway and Peninsula Transport to help:

- Understand the appetite and demand for alternative fuels in the freight and logistics sector
- Develop a baseline assessment of the current and future supply and demand of alternative fuels in the region
- Identify potential locations for the installation of alternative fuels charging/refueling infrastructure suitable for freight vehicles in the region
- Undertake assessment of potential locations for installing refueling stations



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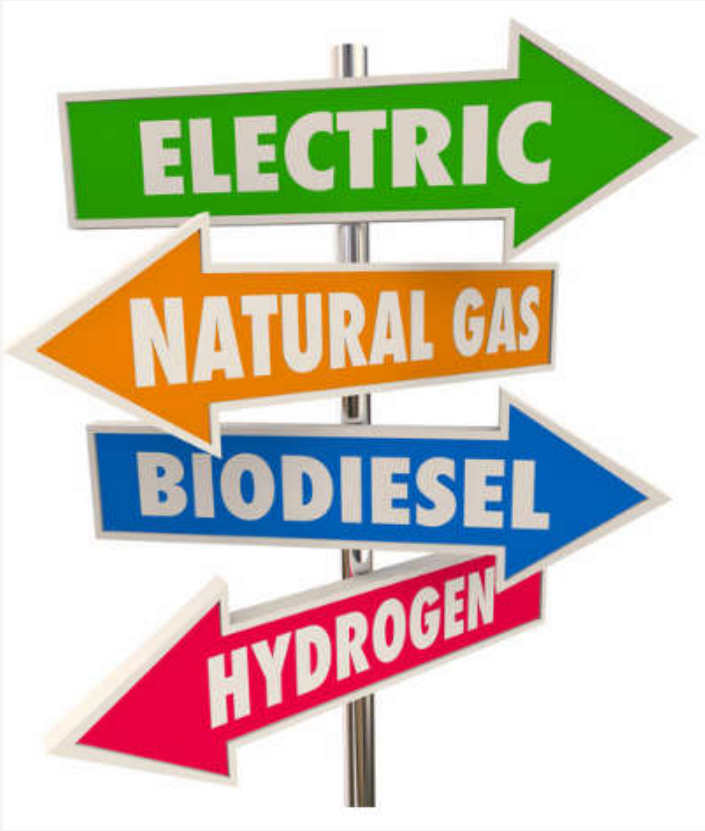
Aims of today's session

- To provide a platform for people to share their thoughts and opinions on freight policy, the transition to alternative fuels, and trends across the freight sector
- To better understand the enabling measures and infrastructure required to support the transition to alternative fuels
- To discuss local context, requirements and aspirations, enabling Western Gateway and Peninsula Transport to assist the freight and logistics sectors with the transition to alternative fuels
- Discuss the opportunities and challenges posed by decarbonisation



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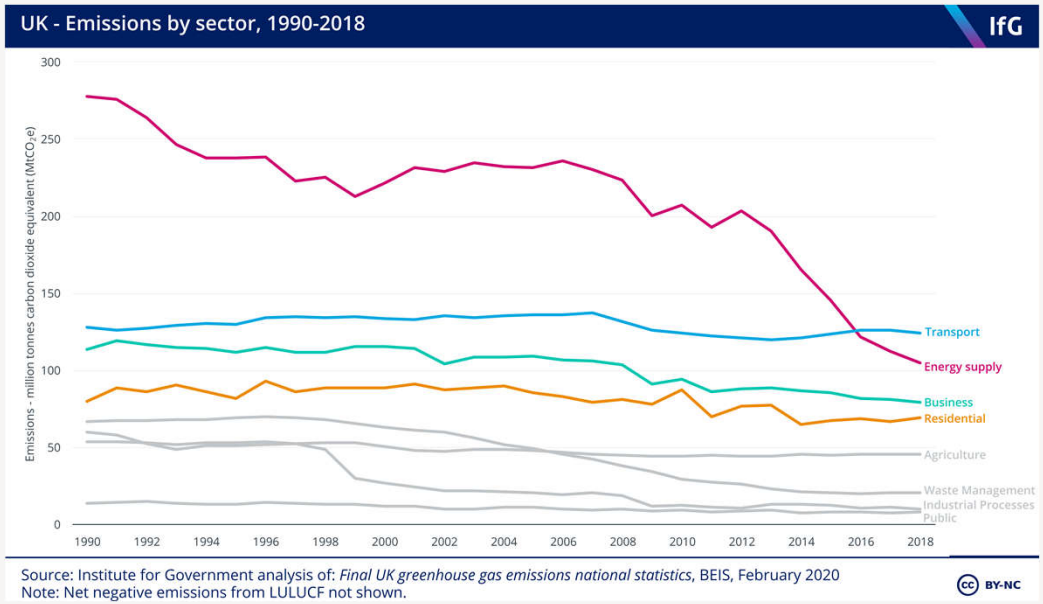
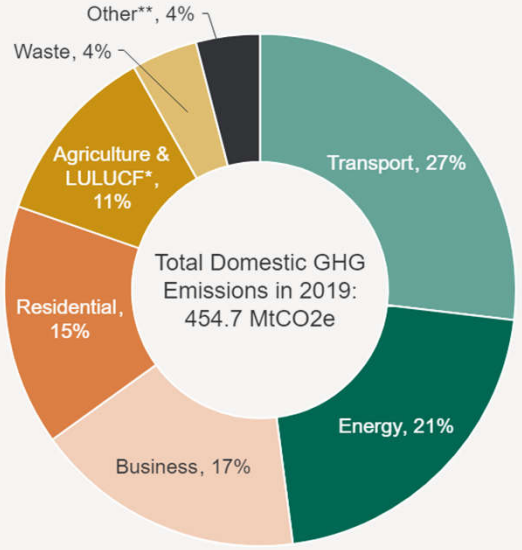
Policy and context

Context

- Road transport greenhouse emissions have fallen just 2% since 1990.





- Transport is now the largest sector for UK emissions (27%), of which road transport accounts for over 90%.
- Heavy goods vehicles (HGVs) are estimated to account for around 17% of UK greenhouse gas emissions from road transport and around 21% of road transport NO_x emissions, while making up just 5% of vehicle miles.

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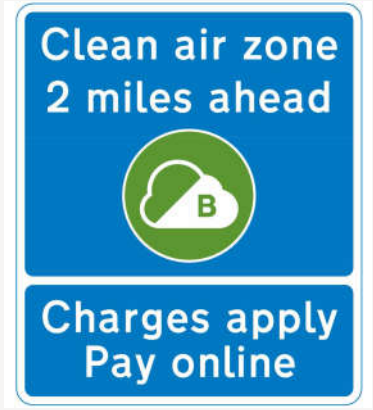
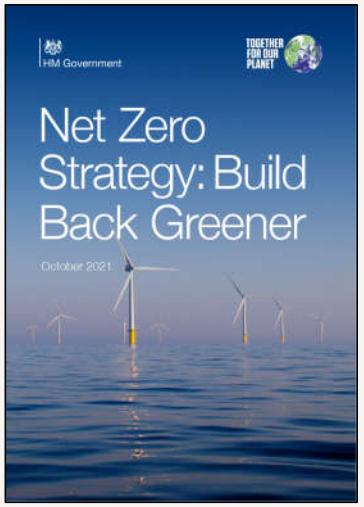
National Policy

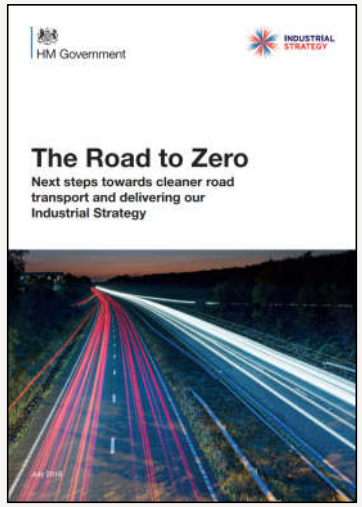
The government has a number of ambitious targets, including:

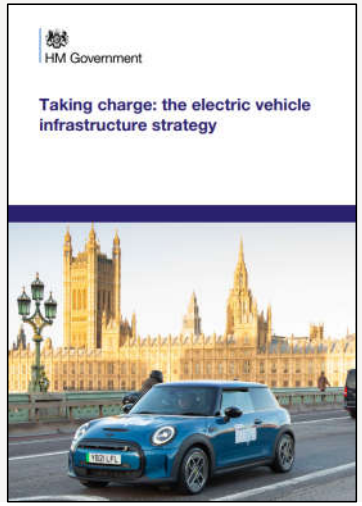
- To reduce UK's emissions by 78% by 2035, compared to 1990 levels.
- All new cars and vans to be effectively zero emission by 2035.



Key national policies include **increased market incentives, investment in charging infrastructure** and **encouraging modal shifts to public transport and active transport**







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Freight Decarbonisation Options

Improving fuel economy through efficient driving and in-cab driver monitoring technologies

Optimising fleet design through retrofit technologies and improved engine efficiency

Reducing road miles through modal shift, longer-semi trailers and further industry collaboration

Reducing emissions through wider use of **alternative fuels**

Shifting the focus to future, more radical, solutions such as electric trucks, ehighways and hydrogen fuel cell technologies

The diverse nature of road freight means that there is not a single industry-wide fuel-based decarbonisation solution – a range of options are required

Freight Carbon Review – Key Themes

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Regional Transport Policy

Key regional transport policy themes:

- Increased connectivity
- Decarbonisation
- Improved health of communities

To deliver sustainable growth by ensuring the area is sustainably connected and provides high quality and value for money travel opportunities for all businesses, residents and visitors.

Western Gateway Strategic Transport Plan Aim

Peninsula Transport Vision Goals

Improve connections between people, business, and places

Enhance the resilience of the transport network

Deliver affordable, zero-emission transport for everyone

Improve the health and wellbeing of communities

Help the area to be a great place to live and work

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South West Freight Strategy – Prioritised interventions

Modal Shift to Rail

- Allocation of sufficient paths for freight services
- Increased use of ‘intermodal’ freight

Modal Shift to Maritime

- Awareness campaign of coastal shipping opportunities for supply chains
- Review of ports in the South West

Decarbonisation

- Diversify ports for renewable energy production and usage
- Network of alternative fuel stations and promotion of existing sites. Development of new sites by private sector

Operational Efficiency

- Support infrastructure improvements and investment
- Review regional suitability of new technologies
- Promote load and vehicle matching exchange to reduce empty running

Strategy Steering Group

- Establish a Freight Steering Group to oversee strategy implementation
- Develop engagement on logistics schemes and partnerships
- Establish a South West Freight Steering Group

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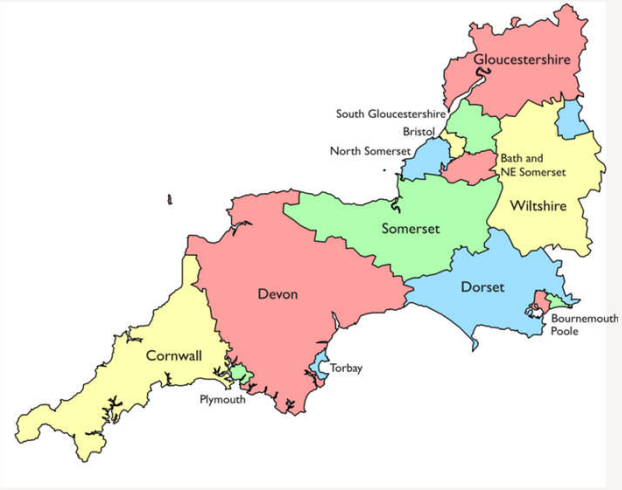
Local Policy

Many Local Authorities within the South West have published Net Zero / Decarbonisation Plans and Local Transport Plans.

Key themes include:



Implementing alternatives to Fossil Fuels – e.g. Electric, Biofuels

Encouraging lower carbon modes of travel for freight

Environmental Impact – sharing loads between routes, smaller vehicles etc.

Reducing Air Quality impacts of freight

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Policy Discussion Session – *'Your Policy Paradise'*

To help address the challenges of climate change and decarbonisation, you have been placed in charge of setting national freight policy.

What action would you take and why?

Think about

- Which features of the current freight policy are realistic? Are elements unachievable or a challenge to your organisation?
- Do rising operational costs impact the ability to meet national targets? Has adequate funding been made available?
- Does the national decarbonisation roadmap suit all organisations? Are aspects more favourable towards certain types of organisation?

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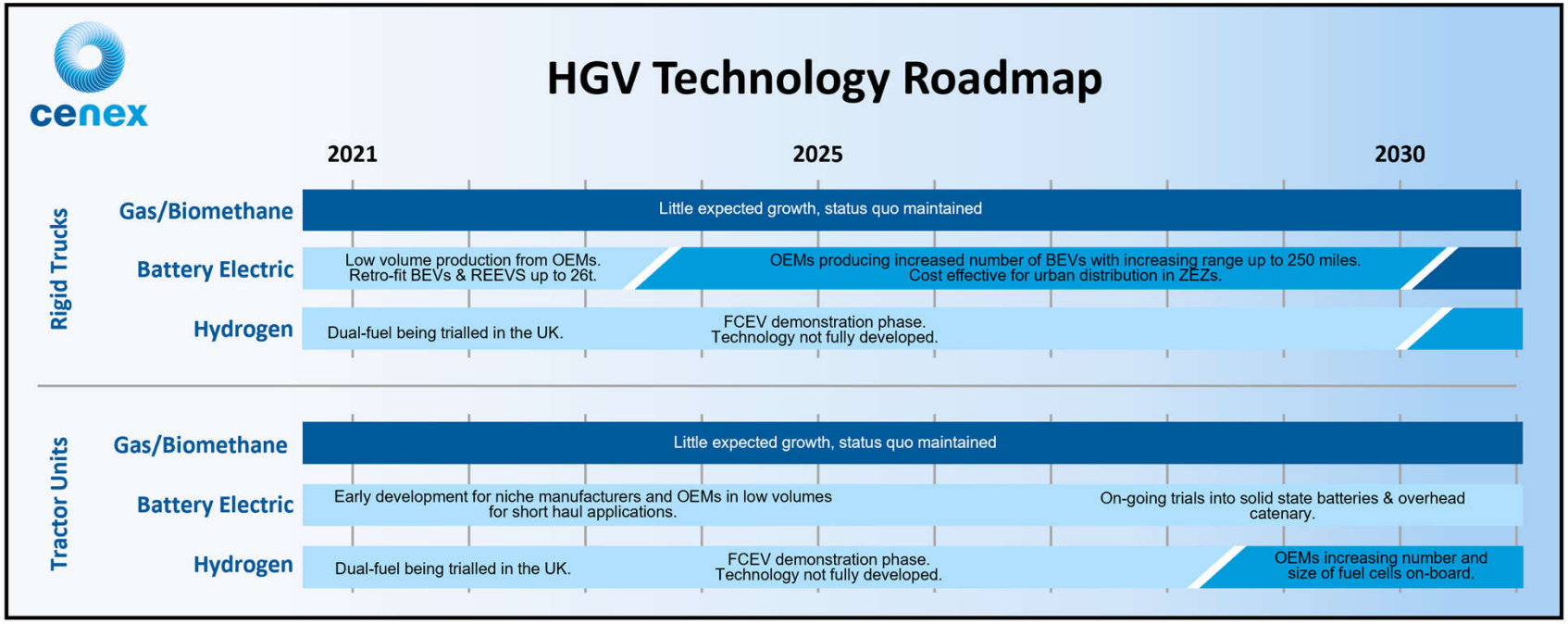
Alternative Fuel Vehicles

	Trial & early stage demonstration
	Transition to main-stream technology
	Commercial/large-scale deployment

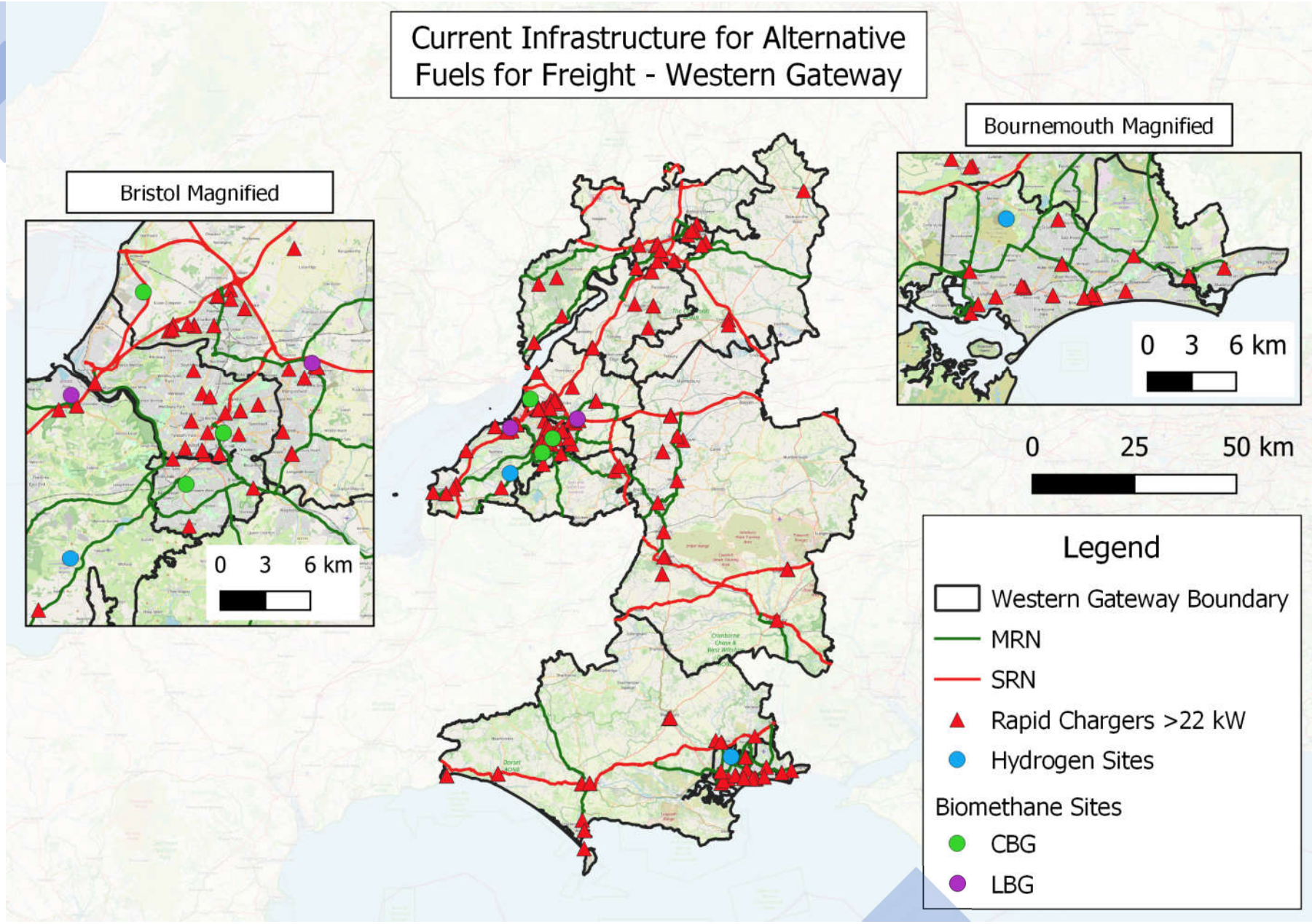


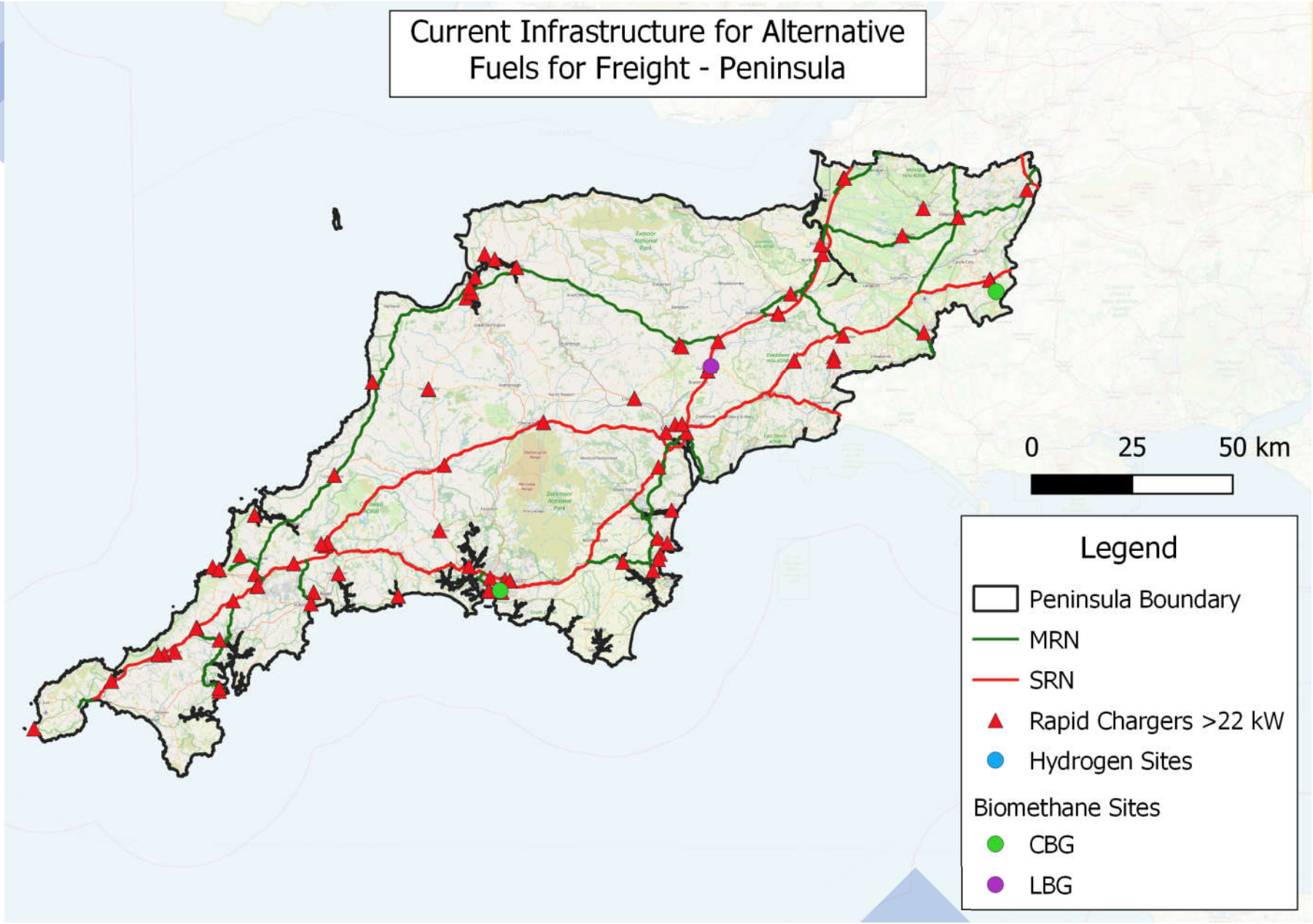
Alternative Fuels Vehicles: Existing and Future Discussion

- **What is the current uptake of alternative fuel vehicles at your organisation:**
  - What are the early impressions, positives & negatives?
  - Has there been some obvious benefits since switching?
- **What does the future picture look like at your organisation:**
  - How do you see your organisation using different types of powertrains in the future?
  - What types of journeys will different types of vehicles be used for?

Comfort Break (5 minutes)

Alternative Fuel Infrastructure


Current Infrastructure for Alternative Fuels for Freight - Western Gateway
Bristol Magnified
0 3 6 km
Bournemouth Magnified
0 3 6 km
0 25 50 km
Legend
Western Gateway Boundary
MRN
SRN
Rapid Chargers >22 kW
Hydrogen Sites
Biomethane Sites
CBG
LBG


Current Infrastructure for Alternative Fuels for Freight - Peninsula
0
25
50 km
Legend
Peninsula Boundary
MRN
SRN
Rapid Chargers >22 kW
Hydrogen Sites
Biomethane Sites
CBG
LBG

Alternative Fuel Infrastructure: Existing and Future Discussion

- **What are you views and experiences of the present day refuelling infrastructure:**
  - Are refuelling stations provided in the correct locations for your drivers?
  - Is the refuelling network suitable for your operations?
- **How should a future refuelling network be designed:**
  - Where should refuelling stations be located?
  - What facilities, fuels and locations should be prioritised?

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Workshop Summary Discussion – Priorities & Pledges

Question Thinking about the progression towards alternative fuelled vehicles, what **two** priorities do you believe are essential if Government targets are to be achieved

Organisations Pledge If you could commit to one achievable pledge for your organisation what would it be?

Close and Next Steps

Appendix F. South West Freight Forum Sub Group Engagement

Work to date

Review of national, regional and local policy related to alternative fuels

Public and private stakeholder engagement with the road freight sector

Type and number forecasting for recharging and refuelling locations needed

High level site identification around the SRN around existing infrastructure

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Next phase of work

Research, Policy and Technology

- Consideration of interfaces with rail, ports and maritime, coach, and agriculture
- Power demand and energy production
- Viability of EVs in light of scarcity of rare earth minerals

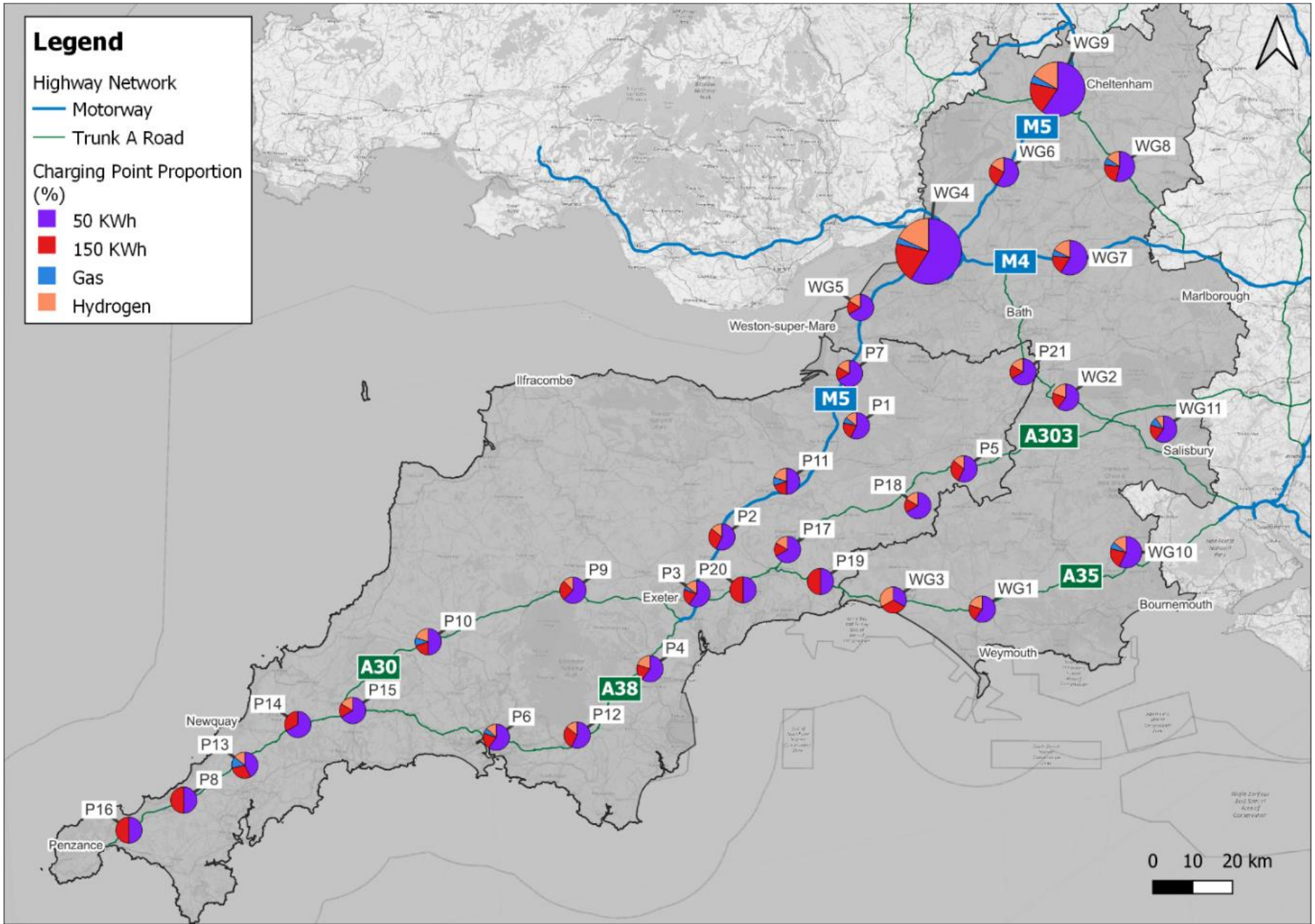
Stakeholder engagement

- Engagement with freight steering sub-groups
- Further engagement with trade organisations, including non road freight bodies
- Identification of opportunities to co-locate refuelling infrastructure with other modes

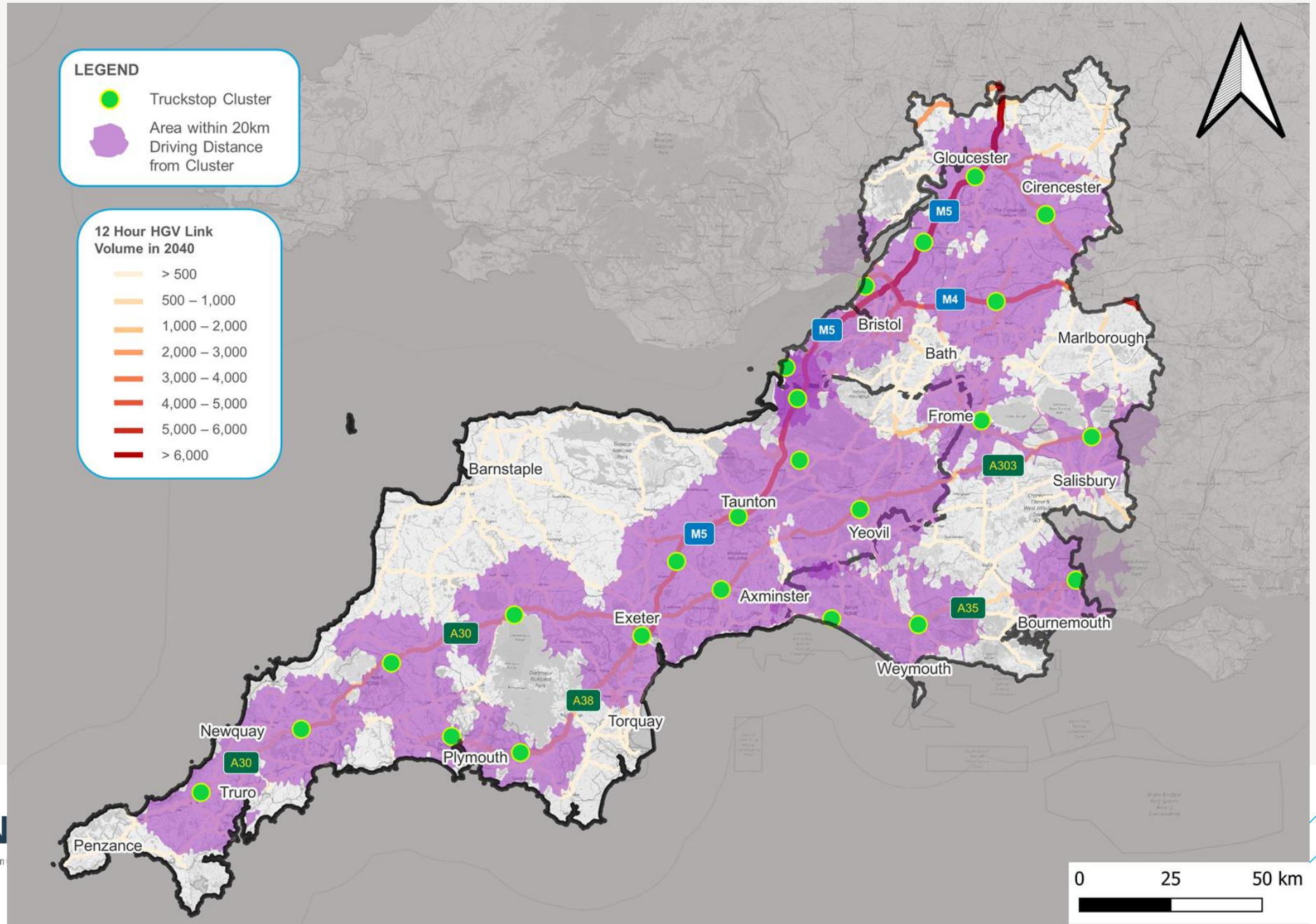
Extension of Site Selection Methodology

- Analysis of driving distances/range to identify gaps in identified provision
- Identification of ‘deliverable’ and ‘desired’ refuelling network
- Updated modelling using 2022 Lorry Parking Dataset, unavailable at time of original study

Initially Proposed Network



Initially Proposed Network – Coverage



Our ask – opportunities to co-locate refuelling

One possible approach to support the rollout of alternative fuels across all industries is the co-location of refueling infrastructure at key multi-modal freight interchanges. This would enable road freight operators to refuel while waiting during on loading/offloading operations, or otherwise utilizing other space/infrastructure.

- What are your thoughts/does this sound suitable?
- What are the barriers or co-dependencies for this approach?
- What would be needed to enable multi-modal refueling?
- What potential locations exist which would be suitable for this approach?

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Consultant

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Consultant

Share your thoughts via this short survey

https://forms.office.com/e/eGRnAAhVwN

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Conversation Prompts

- What alternative fuels are you currently using or planning to use in your operations?
- What motivates your organisation to adopt alternative fuels, and what are the primary drivers of change?
- What are the barriers and challenges you face in the adoption of alternative fuels, and how do you plan to overcome them?
- How do you see the future of alternative fuels in the industry, and what role do you see your organisation playing in this future?
- What is your organisation's investment strategy for alternative fuels and related technologies?
- How does your organisation's alternative fuel strategy align with government regulations and policies?
- How does your organisation educate and engage employees, customers, and other stakeholders about the benefits of alternative fuels?
- What national or regional strategies do you find important in planning or forecasting the use of alternative fuels in your industry?

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