Urban Foresight

ENVISIONING THE FUTURE OF PUBLIC TRANSPORT FOR THE NORTH OF MAINLAND SCOTLAND IN 2030

FOCUS NORTH
DRIVING OPPORTUNITIES THAT SHAPE OUR FUTURE

hub North Scotland

NRS Dounreay

EXECUTIVE SUMMARY

This study explores solutions to develop an integrated public transportation network tailored to the distinctive needs of rural communities in Caithness and Sutherland, Scotland.

The current reliance on private cars due to limited and with reliability issues at time which hinder access to essential services and opportunities. Through research, an extensive public survey with the local population, best practice reviews, and scenario modelling, this report lays the groundwork for realising a new vision for flexible and sustainable rural transport.

A Unique, Reliable, Affordable, Sustainable and Integrated Public Transport Network for the North of Mainland Scotland.

Key findings from the public survey show the desire for increased bus and train services, affordable fares, better connections between modes, and a shift towards sustainability. Challenges include infrequent and unreliable services, long journeys, and poor infrastructure hindering active travel.

The proposed vision focuses on the development of a cohesive system that ensures fair access to public and shared transportation.

This report is designed to tackle the widespread problem of single-use, fossil fuelled private car journeys within the County. Instead of promoting a total shift away from private car usage, which is unavoidable given the remote communities, it focuses on reducing reliance on single-passenger fossil fuel journeys

Several solutions are proposed, as shown in Table 1, including electric community vehicle vans, flexible routing, and mini-mobility hubs with bike sharing, consolidated booking/payment platforms, and a community-led organisation overseeing operations.

A thorough modelling exercise was undertaken to project the impact of the proposed solution on the modal shift up to 2030 and understand how they could impact the share of private car drivers. As seen in the most ambitious scenario in the figure below, the solutions proposed could substantially reduce private car use and expand public/shared transport by 2030. However, collaborative efforts among stakeholders and behavioural change will be vital to drive change.

A set of short to medium-term recommendations was proposed to implement the proposed solutions and try to match the ambition as set in scenario 4 (Table 2).

Figure: Estimate of modal share by 2030 in Scenario 4

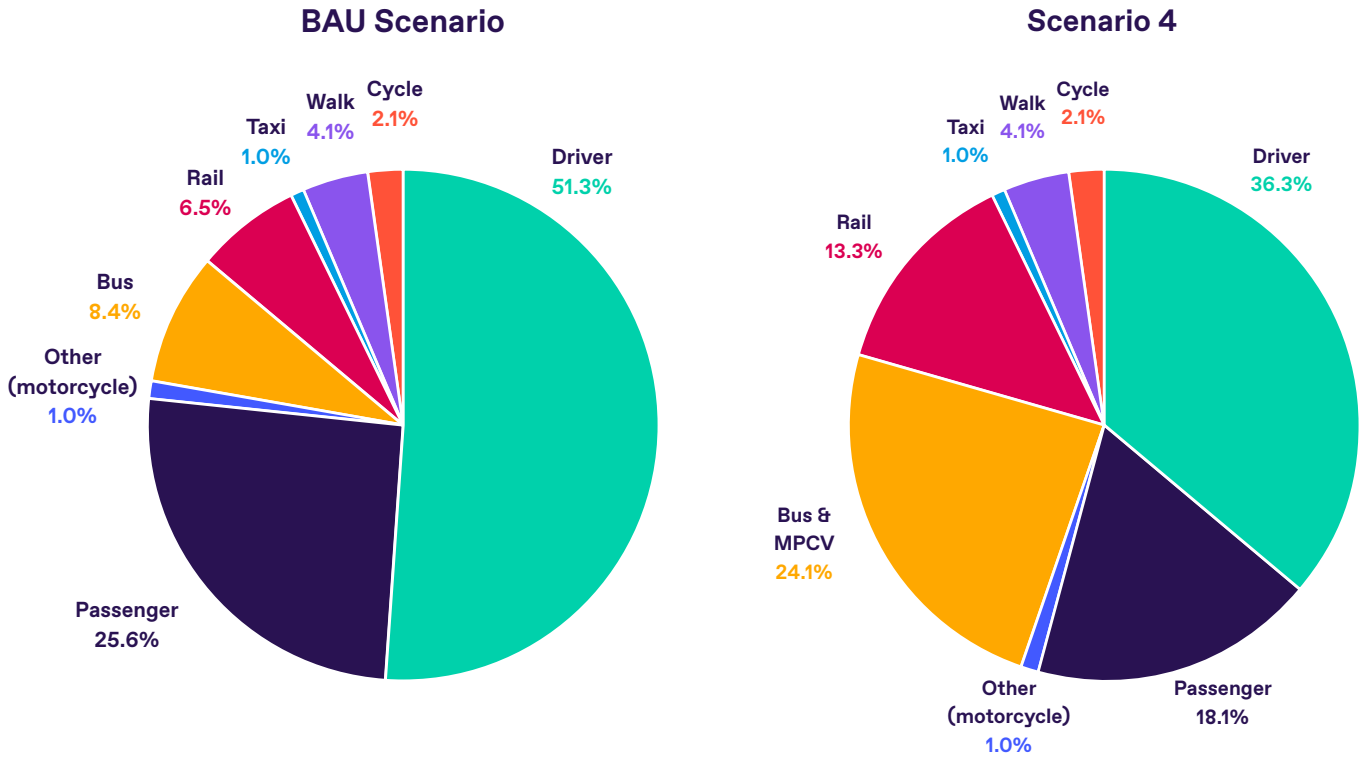

Table 1: Summary of Solutions Proposed

SOLUTION 01 /

Focus on smaller electric Multi-Purpose Community Vehicles (MPCVs) and complete with electric minibuses when needed

SOLUTION 02 /

Implement an area-wide carpooling scheme

SOLUTION 03 /

Explore the shared e-bike / e-scooter opportunity

SOLUTION 04 /

Create an EV charging infrastructure powered by on-site green energy

SOLUTION 05 /

Provide a single platform where customers can find all their transport options, book and pay while viewing transport in real time

SOLUTION 06 /

Create a single organisation to operate the network and ease processes

SOLUTION 07 /

Develop this organisation collaboratively with local transport operators

SOLUTION 08 /

Start with a pilot project

SOLUTION 09 /

Incentivise access to public and shared transport services to reduce the heavy reliance on the private car

Table 2: Summary of Recommendations Proposed

RECOMMENDATION 01 /

Invest in electric vans and the relevant charging infrastructure to deliver the Multi-Purpose Community Vehicles (MPCVs)

RECOMMENDATION 02 /

Adopt a phased approach with the aim of reaching scenario 4

RECOMMENDATION 03 /

Adopt a dockless system for e-bikes and create local green jobs

RECOMMENDATION 04 /

Work with transport software providers to use data to better understand transport patterns and optimise transport

RECOMMENDATION 05 /

Leverage already existing digital solutions – the Go-Hi app

RECOMMENDATION 06 /

Ensure inclusivity for all passengers by keeping various methods of booking, planning and paying

RECOMMENDATION 07 /

For more flexibility and the ownership of vehicles, we would recommend setting up a Community Interest Company (CIC) Limited by Guarantee

RECOMMENDATION 08 /

Build trust and buy-in from existing transport providers through early and continuous engagement

RECOMMENDATION 09 /

Use social marketing techniques tailored to the audience

RECOMMENDATION 10 /

Incentivise behaviour change through pricing, passes and partnerships

RECOMMENDATION 11 /

Introduce a tiered pricing structure that balances affordability for residents while optimising revenue from tourists

Overall, the proposed community-led transport model for Caithness and Sutherland can be summarised as follows ↘

STRENGTHS /

- → Unified branding and coordination improve reliability and convenience
- → Economies of scale from consolidated operations and asset management
- → Leverages community insight through participatory planning
- → The non-profit model focused on service, not profitability
- → Flexibility to fill gaps and adjust to community needs

WEAKNESSES /

- → Could duplicate some existing services instead of truly integrating
- → Potential resistance from entrenched providers fearing competition
- → Significant initial investment needed for vehicles and technology
- → An untested model needs a period of optimisation to realise benefits
- → Governance challenges in equitable stakeholder representation
- → Insurance costs for shared and community vehicles

OPPORTUNITIES /

- → Chance to build a transport network tailored to the local context
- → New funding sources by working with community partners
- → Technology improvements enhance efficiency and experiences
- → Transition to electric vehicles aligns with sustainability goals
- → Service innovations like on-demand and shared mobility

THREATS /

- → Public scepticism of the unproven centralised model
- → Pushback from operators content with status quo
- → Insufficient buy-in from key employers/government agencies
- → Unable to achieve long-term financial sustainability
- → Continued car culture and resistance to behaviour change

This report lights a path towards integrated rural transportation that empowers communities through inclusive mobility. The vision and solutions can progress Caithness and Sutherland towards a future where vibrant public and shared transport options enhance sustainability and provide expanded opportunities. This report is a stepping stone to a new not-for-profit community-led approach that will be further explored in a second phase with the Sutherland Community Partnership to give life to the proposed model.

All transport links to be able to join up with each other.

SURVEY RESPONDENT

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INTRODUCTION

INTRODUCTION

In pursuing a Just Transition, ensuring widespread access to public transport is paramount for all residents in Scotland, irrespective of their urban or rural dwellings (The Scottish Government, 2023). The ability to depend not only on private cars but also on buses, trains, and other communal transportation modes plays a pivotal role in securing people's access to employment, healthcare, education, and recreational activities, particularly for those who lack the means to afford a car or a secondary vehicle or are unable to drive (Jin et al., 2022). In Scotland, where public transport is predominantly privatised, certain regions present notable challenges in providing comprehensive coverage and reliable public transportation, notably in the northern areas such as Caithness and Sutherland.

Rural and remote areas encounter distinctive challenges due to the sparsity of the population, posing difficulties for private bus operators to optimise passenger numbers per ride. Envisaging the future of public transport in Caithness and Sutherland by 2030, this report seeks to ascertain how a Just Transition and equitable access to opportunities, analogous to other Scottish regions, can be ensured while diminishing car dependency.

At present, public transport in the area faces limitations. It strongly depends on volunteers, leading to reliability issues and a mismatch between available transport options and what residents require due to a lack of information.

This joint transport study by Focus North and the Sutherland Community Partnership is designed to investigate prevailing transport challenges to develop innovative solutions to enhance access to employment, healthcare, education, and recreational activities. The study was split into 4 parts as follows:

- **Section 1** initiates by establishing a robust understanding of the context through desk research and stakeholder engagement.
- **Section 2** builds on the groundwork established in Part 1 to craft the envisioned future to avoid proposing antiquated solutions that may prove ineffective. This also includes extensive public involvement with local experts and members of the public. This engagement facilitated a deeper comprehension of existing transport patterns and identified barriers residents face in accessing opportunities.
- **Section 3** amalgamates sections 1 and 2 results to understand the current modal split in the area and explore four potential scenarios to shift away from the private car whilst improving public and shared transport through innovative solutions.
- **Section 4** concludes the study by outlining effective implementation strategies for the proposed solutions to enhance transportation.

The ultimate objective is to develop a public transportation system tailored to the distinctive needs of rural communities, augmenting accessibility to opportunities while shifting away from the private fossil fuel car.

This study aspires to serve as a foundational step for implementing enhanced rural public and shared transport, concurrently offering an inspirational vision for the future of transportation, thereby enhancing the region’s appeal to attract new residents while retaining young adults and working families.

SECTION 1

SETTING THE SCENE

A region reliant on private cars with limited alternatives

THE NATIONAL CONTEXT

Priority for active travel and public transport to reach net zero

The National Transport Strategy 2 (NTS2), introduced by the Scottish government in 2020, articulates an ambitious vision centred on transitioning to low and zero-carbon transportation, endorsing active travel, and enhancing public transport accessibility in alignment with Scotland's 2045 net-zero target. Four pivotal pillars underpin the NTS2:

- Reducing inequalities
- Taking climate action
- Supporting inclusive economic growth
- Improving health and wellbeing

Recognising that 98% of Scotland's land area is rural, the NTS2 acknowledges the distinctive mobility challenges faced by remote communities and delineates potential government interventions.

A fundamental principle of the NTS2 is the recognition that travel facilitates access to opportunities, spanning work, healthcare, education, and social connections. In rural areas, the limited transportation options compound inequalities by restricting access to services and contributing to social isolation, particularly affecting carless young people and the elderly.

The Scottish government prioritises active travel and public transport to manifest its vision for a more sustainable transport system, aligning with the 2045 net-zero target. Two key strategies have been outlined to achieve this goal: **"Decarbonising the Scottish Transport Sector"**, aiming to curtail the environmental impact of transportation, and **"Reducing Car Use for a Healthier, Fairer, and Greener Scotland"**, which maps out a route to achieve a 20% reduction in car kilometres by 2030.

The "Decarbonising the Scottish Transport Sector" strategy delineates targets for various vehicles across Scotland, encompassing rural areas like Caithness and Sutherland. Milestones for the electrification of buses, cars, and vans are set for 2025 and 2030.

Conversely, the route map to reduce car mileage by 20% provides a phased guide, acknowledging the unique challenges of this goal in rural and remote parts of Scotland, where car reliance is pronounced. In 2019, 68% of employed adults in Scotland commuted by car, rising to over 80% in rural areas (Transport Scotland, 2020)[1]. To address this, solutions include reducing and combining car trips as well as technological enhancements such as improved broadband (enabling app-based services and remote working) and Demand Responsive Transport (DRT) to optimise demand and costs.

National policies underscore that the geography, climate, and existing transportation limitations contribute to the overreliance on private cars for longer journeys in northern Scotland. For residents in remote areas like Caithness and Sutherland, the personal car remains the most practical means to access essential services.

However, implementing policies to reduce car dependency in rural contexts poses unique challenges given sparse populations and vast distances. In such regions, cars are often perceived as the most efficient travel option, and concepts like 20-minute neighbourhoods[2] face feasibility constraints due to greater distances between locations. The rural environment necessitates adaptations to sustainable transportation planning principles typically applied in urban settings.

1 Scottish Household Survey, 2019 reported in Transport and Travel in Scotland 2019, Table 1.

2 https://www.gov.scot/publications/local-living-20-minute-neighbourhoods-planning-guidance/

THE LOCAL CONTEXT

Sutherland and Caithness – Navigating Challenges and Opportunities in Changing Times

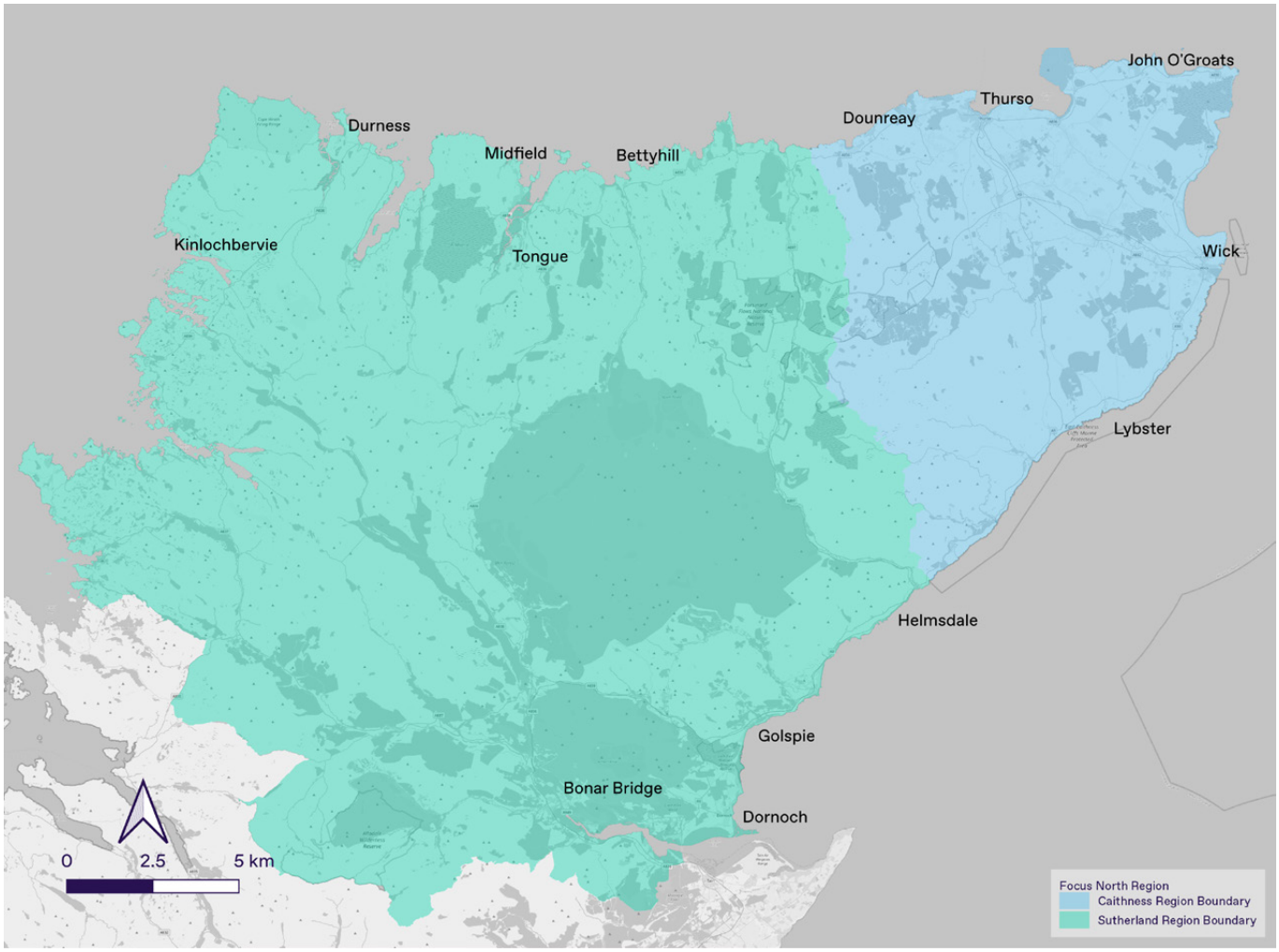


Figure 1: Caithness and Sutherland boundaries

Caithness and Sutherland – area profile

Caithness is the most northerly area of the Scottish mainland, with a population of around 25,347 people as of 2021. The area faces challenges due to its remote rural geography, with 46% of the population living in very remote rural locations. Sutherland is a remote rural area in the far northwest of the Scottish mainland, with a small population of around 13,142 people as of 2021. The entire area is classified as very remote rural (NHS, 2022).

The populations in both Caithness and Sutherland have dropped 3.9% across both areas since 2011 with people being older than the Scottish average. Nearly a third (30%) of Sutherland residents and almost a quarter (24.3%) in Caithness are over age 65. With such proportions of older people, providing appropriate amenities and services is a pressing priority.

Simultaneously, retaining younger demographics is also vital for the region's future. Caithness has a fifth of its total population under 16, while Sutherland has 12% in the same age bracket. Stemming this tide of youth outmigration means creating local opportunities that appeal to young people and families. Recent expansions in aerospace and renewable energy industries may hold promise if the appropriate training and jobs can be fostered regionally. Offering improved transport will also be integral to making Caithness and Sutherland vibrant, economically sustainable areas for residents both old and young in coming years.

While deprivation levels are lower than in Scotland overall, rural poverty is still an important issue, with 11% and 9% of residents in Caithness and Sutherland being income-deprived (NHS, 2022). They also both rank low regarding their Geographic access domain due to their remoteness and a transport infrastructure not as connected as other parts of Scotland (SIMD, 2020).

An issue concerning deprivation that has also worsened due to COVID and Brexit, to which the very remote rural Scottish territories have been more sensitive due to their geographic and economic context. This is due particularly to the nature of businesses in that area, with many micro-businesses representing 88.4% of the private sector across the overall area with a stronger vulnerability to economic downturns and unfavourable tax and regulation post-Brexit (Thompson et al., 2023; Hient, 2020).

Currently, the region is undergoing an economic transition with the nuclear decommissioning at Dounreay, and a shift towards renewable energy and the prospect of the hydrogen economy (Davidson, 2022) is changing the employment landscape. Caithness and Sutherland are now becoming a rural part of Scotland characterised by its renewable energy generation capacity. It has seen many onshore and offshore wind farms flourishing throughout the area (Figure 2 and Figure 3), offering prospects for investment and employment.

Integrated, well timed, network of buses to allow travel between towns/villages

SURVEY RESPONDENT

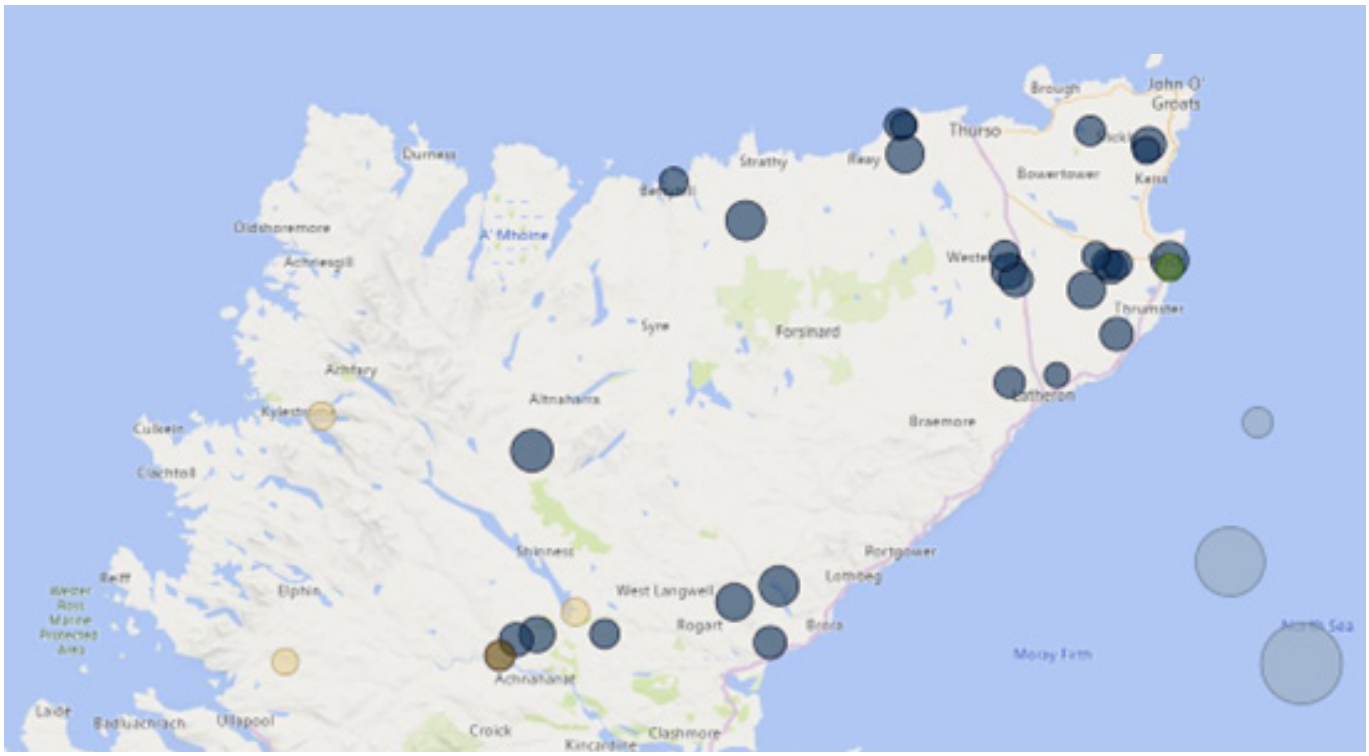


Figure 2: Map of the current renewable energy projects in Scotland. Blue dots represent wind onshore energy generation projects; green dots are for biomass, and brown dots are for pumped storage Hydro. Source: SPICe, Scottish Parliament, 2023.

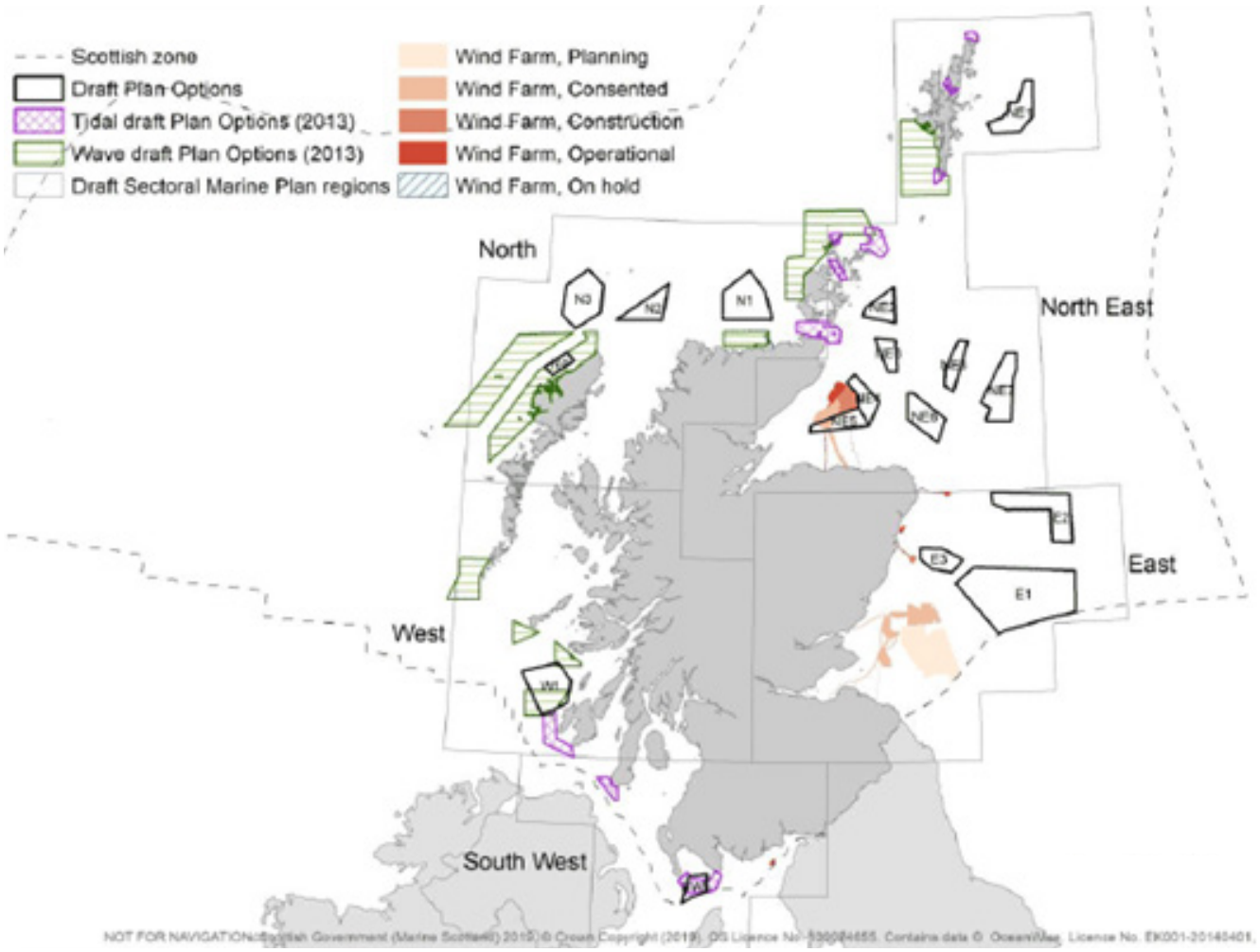


Figure 3: Draft Sectoral Marine Plan for Offshore Wind Energy – Draft Plan Options (2019). Source: Scottish Government, Sectoral marine plan: appropriate assessment.

Nonetheless, Dounreay, the former nuclear power site located near Thurso is decommissioning (see Figure 1) and will remain a major employer for decades, presenting an opportunity as a hub for improved transport links despite uncertainties facing bus operators due to the low patronage in the region with a low-density population.

Regarding Transport, at present, car travel is predominantly found to be the main mode of transport for households in Caithness and Sutherland. This is evidenced by car and van ownership in the region, which is shown in Table 4.

The total number of cars and vans per household in the Highlands, Caithness and Sutherland is found to be much higher than the average Scottish number. A third of households in the area own two or more cars; Sutherland, at 34%, is found to have a higher proportion of households with two or more cars.

In this regional context, the issue with the car is not only related to sustainability. It is, above all, for residents, an issue around equality of accessing opportunities (HITRANS, 2018). To address this issue of the strong reliance on the car, The Highland and HITRANS have delivered goals and strategies specific to the highland area in which Caithness and Sutherland.

Table 4: Car and van availability per household
Source: UK Data Service, 2011, "Car or van availability 2011"

Geography	Car or van availability*	Car or van availability**	Car or vans per household
Scotland	2,372,777	646,289	1.04
Highland	102,091	33,752	1.23
Sutherland	6,518	2,239	1.29
Caithness	12,025	3,723	1.19

*Total\Car or van availability – Unit: Households

** Two or more cars or vans in household – Unit: Households

Regional transport strategies

The Highland Council have a suite of programs and plans that look forward to the future. One of the main documents in the suit is the Highland Council's "Our Priorities" programme for 2022 – 2027. The programme builds and details priorities of creating a fair, accessible and sustainable region party through the development of low-carbon public transport (The Highland Council, 2022). A strong emphasis is put on sustainability by creating hydrogen hubs and better linkage to new housing settlements with the public transport network. On the other hand, HITRANS's regional transport strategy for the Highlands outlines key points of improvement for the region with an emphasis on integration (HITRANS, 2018):

- Need for an integrated regional transport network, ensuring areas remain accessible and connected.
- Reduce the environmental impact of the transport by identifying the need for low-carbon transport.
- Ensuring that the services provided follow a just transition pathway by creating economic growth and prosperity for everyone involved.
- There is a need for integrated technological solutions to provide coordinated journeys and demand-responsive transport to the rural communities in the region.

With specific priorities for Caithness and Sutherland:

- Enhanced road safety and improvements to junctions.
- Promotion of sustainable and low-carbon transport options such as shared public transport, active travel and zero-emission vehicles.
- Improved access to regional points of interest such as airports and harbours.
- Improved connectivity and reduced journey times through important routes such as the A9 for dualling works.[3]

3 A9 Dualling works are already either completed or in preparation, as of now, outwith Caithness and Sutherland area, already improving access to the area

INNOVATIVE RURAL TRANSPORT BEST PRACTICES IN THE WORLD

GERMANY

KombiBus, combining freight and passenger transport

The main objective of KombiBus was to increase connectivity for people and goods. This project started after research showed that between 2000 and 2010, villages more than 40 to 60 minutes away from larger settlements were being abandoned. Studies have shown this is due to various factors, but predominantly the cost of resources and lack of connectivity between settlements. Remote communities have well received the services, and routes have been expanded. The scheme not only improved transport but also supported the local economy, especially with tourism, by improving the delivery of locally produced goods.

The challenges faced by the remote communities in Germany are comparable to those faced in the Scottish highlands. A model similar to KombiBus is already implemented informally via some operators, such as the Durness bus. A structured model across the area could provide an additional revenue stream by working with big transporters and retailers to offer a more economically sustainable service.

FRANCE

Ecov – a new way to do rural carpooling

In France, 40% of the population lacks access to public transport, with 54% living more than a 10-minute walk from a bus stop, disproportionately affecting rural residents (AcoTÉ, 2020; Orfeuil/Observatoire des Inégalités, 2017).

The Ecov rural carpooling project addresses this by integrating carpooling into public transport, focusing on the challenges of rural settlements. Passengers can request rides via a physical panel or a mobile app, with nearby users notified to pick them up. In 2020, the Grand Chambéry to Les Bauges route saw 200 weekly journeys, with a 3 to 6-minute average wait (Ecov, 2020). Some schemes guarantee a traditional taxi if a request goes unanswered for 10 minutes, while others offer financial incentives.

The Ecov model could benefit Sutherland and Caithness by providing connectivity to areas lacking bus routes, potentially more cost-effective than new bus lines. The success of Highland Council's car club, including electric vehicles, signals a cultural shift towards alternative transportation in the region.

SLOVENIA & GERMANY

Rethinking transport interchanges

In Europe, multi-modal interchange promotes e-bike and public transport usage to enhance rural connectivity. In Velenie, Slovenia, a digital tool facilitates booking and payment for Demand-Responsive Transport (DRT) and bike-sharing, with added cycle storage at transport hubs, including e-bikes (Bruzzone, Scorrano, and Nocera, 2021). Similarly, Mettingen, Germany, transformed bus stops into mobility hubs with secure cycle storage and improved road quality, resulting in a 5% increase in cycling trips and a tenfold rise in public transport users (Leistikow, 2019).

For communities, particularly those living in some of the largest towns and settlements, a scheme like Germany's could enable bike commuting between homes and bus stops, creating a seamless door-to-door solution. This approach benefits those distant from bus stops. However, adverse weather conditions, especially wind, should be considered in implementation.

NEW ZEALAND

Integrated rural transport in the Otago Region

In Otago, New Zealand, a region with diverse landscapes and a population of 225,186, approximately 30% are aged 0-14 or over 65, limiting their driving ability. Rural areas' lack of public transport connectivity led to social exclusion and health impacts. The Otago Transport Authority implemented a holistic network, including community transport shuttles, service coordination, and a transport strategy to address this. Expanded bus services now connect rural areas to essential services, resulting in an 18% increase in trip numbers in Dunedin and a 55% increase in Queenstown (Otago Regional Council, Active Transport Committee, 2023)[4].

Key success factors include integrated fare structures and infrastructure upgrades, making public transport more attractive. The holistic approach, combining road improvements, strategic public transport, and supplementary services like Demand-Responsive Transport (DRT), requires ongoing collaboration with local communities to meet their real needs.

4 Comparisons made at the same point in the year, one year apart.

SECTION 2

SHAPING THE FUTURE

Defining our aspirations

Integrated.
Green.
Reliable.
Value for money.

SURVEY RESPONDENT

To create a unique and regionally tailored transport system that avoids replicating current challenges and aligns with future needs, it is imperative to craft a forward-looking vision spanning the next 10 to 20 years. This vision is rooted in a comprehensive review of national and local policies, a study of international examples demonstrating innovation in rural transport (Section 1), and a synthesis of public and stakeholder engagement.

An exhaustive survey was conducted to construct this strategic vision. This survey played a pivotal role in understanding people's expectations and preferences concerning transport and revealing travel behaviour patterns (refer to section 3 for detailed insights).

This dual approach, which combines the insights of local experts and the knowledge of international best practices, ensures a holistic and nuanced vision poised to shape a transport system uniquely attuned to the distinctive demands and aspirations of Sutherland and Caithness for the future.

What do people in Caithness and Sutherland want to see for the future of transport?

When asked about what type of transportation they would look to have more access to, most respondents replied buses (Figure 3), followed by trains and planes. These choices align well with the region's needs. Buses and minibuses are this area's most practical and cost-effective modes of travel, given the considerable distances between some villages, particularly in the northwest. Biking or walking may not be as convenient due to these distances, and the road infrastructure may not be suitable for active travel.

Trains and planes hold significant importance for another crucial reason: providing access to other cities and major hubs (Litman, 2023), such as Inverness, Aberdeen, Edinburgh, or Glasgow, which are not easily reachable from the remote northern areas.

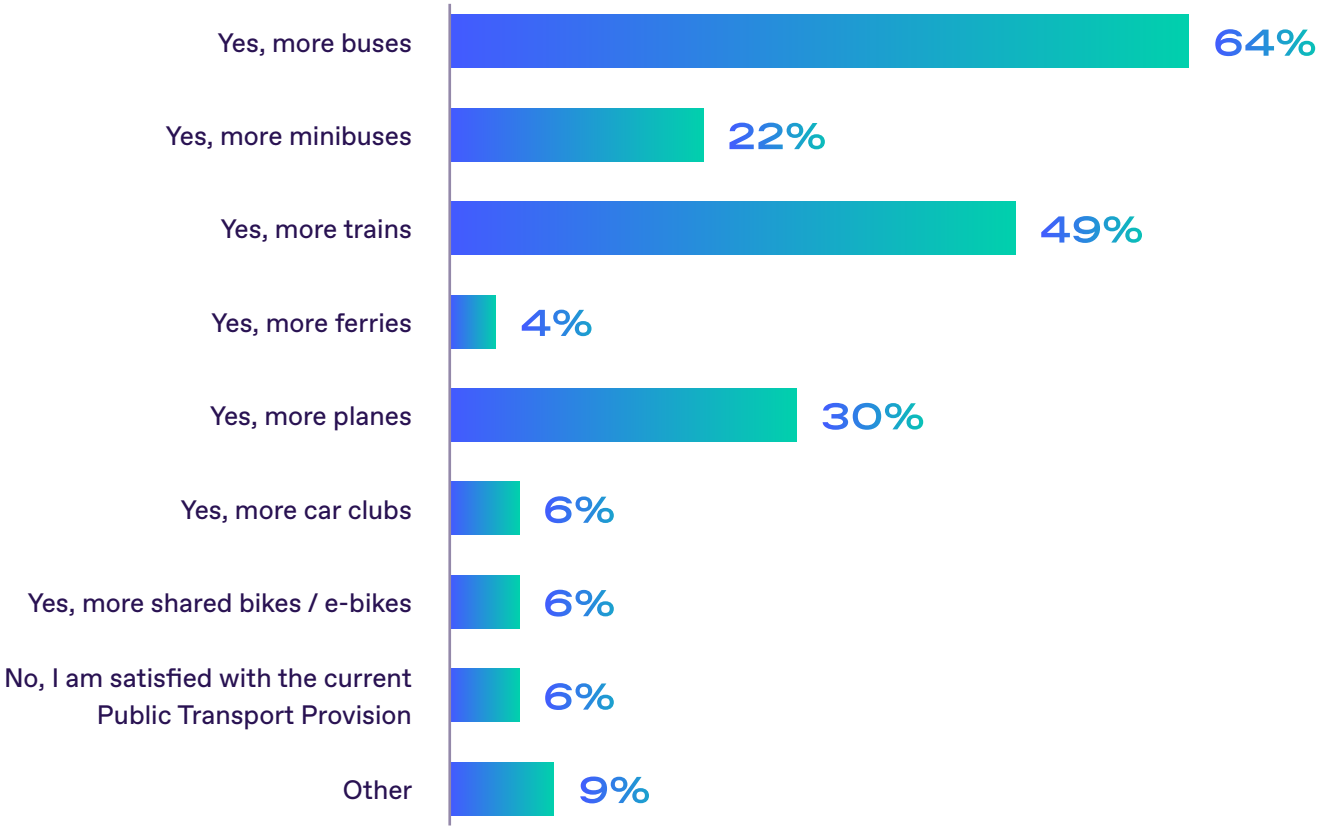
The survey results clearly highlight a significant demand among residents for increased frequency, affordability, and better integration of public transport in the area. Specifically, the top requests from the 318 open-ended responses focused on:

- More frequent bus and train services, including earlier/later trains and buses, to accommodate commuters and those socialising in the evenings
- Lower fares and more affordable options for buses and trains
- Better integration between bus and train schedules/routes

- Improved transportation connections between villages/towns to reduce journey times
- A greater emphasis on sustainability through public transit and active transport options like biking
- Enhanced accessibility through more bus stops, sheltered waiting areas, and sidewalks/bike lanes
- Increased safety measures like lighting, crosswalks, and off-road cycling infrastructure
- More flexibility through on-demand shuttles, ride-sharing, bike rentals, etc.

While high-speed rail was not a priority, respondents desired more direct train routes to reduce overall journey times to Inverness. Shared mobility options like car sharing, e-bikes, and bike rentals have come out as potential for short trips within towns and to access another transport mode, such as the bus or train. However, weather and topography constraints would need to be addressed through greater investment in cycling infrastructure to make these options safer, more accessible and attractive year-round.

Figure 4: Responses to the question 'Is there any public transportation you would like to have more access to than what is currently available?'



Cycling as a commute would be excellent, but not on roads, it's not safe and it's not pleasant. An offroad cycle path connecting village to village would be amazing. The train to Inverness takes longer than to drive, if the train journey wasn't so long I'd switch to it entirely."

SURVEY RESPONDENT

The vision

Taking into account policy, context, and people's responses to the survey, the vision will be to create a network that fosters inclusivity, accessibility, and interconnectivity for residents and visitors, with a focus on ensuring equitable access to essential services. Caithness and Sutherland residents should have access to the same opportunities for employment, healthcare, and social engagement as those residing in larger Scottish cities.

Central to this vision is the active engagement of all stakeholders, including influential employers and community leaders, capable of catalysing significant transformation. Through collaborative efforts among these stakeholders, we aim to shape a transportation landscape that addresses current needs and propels the region toward sustainability and interconnectivity.

Another critical element involves mitigating the proliferation of fragmented and diverse transport models across various communities. The consolidation of transportation services under a unified umbrella organisation will be pivotal. This approach transcends individual solutions, favouring a comprehensive and adaptable strategy accommodating diverse needs.

Ultimately, this vision aspires to create a future marked by parity and amplified opportunities for the younger generation, motivating them to choose to stay in Caithness and Sutherland and play an active role in fostering the region's vibrancy and sustainable development.

This vision is summarised into 1 sentence made up of 5 principles:

A Unique, Reliable, Affordable, Sustainable & Integrated Public Transport Network for the North of Mainland Scotland.

A Unique, Reliable, Affordable, Sustainable and Integrated Public Transport Network for the North of Mainland Scotland.

1 / Unique

A unified transportation authority will consolidate and coordinate all transport options, streamlining operations through integrated scheduling, ticketing, and data platforms. Centralised tendering within the Caithness and Sutherland area of routes fosters a seamless experience for operators and passengers alike.

2 / Reliable

Real-time tracking of vehicles and demand patterns, enabled by advanced analytics, empowers passengers with accurate arrival predictions and intelligent routing options. A data-driven approach enhances reliability.

3 / Affordable

Optimising routes, adopting electric vehicles, and leveraging sponsorships contain costs while delivering quality service. Taking a long-term view on investments in sustainability ensures network viability.

4 / Sustainable

Tapping the region's renewable energy potential powers a green vehicle fleet and transportation infrastructure. Wind farm partners and local actors help finance this eco-friendly network.

5 / Integrated

Closely linked to the reliability aspect, having the right digital infrastructure is crucial to understand needs and improved connectivity and reliability. Consolidated ticketing, scheduling, and passenger data across all modes of transport facilitates optimised operations. Providing both digital and non-digital access caters to all demographics.

SECTION 3

THE IMPROVED NETWORK

Reliable, cost effective and direct links to onward travel to major cities in Scotland

SURVEY RESPONDENT

In order to meet this vision and plan accordingly, it is important first to understand where it starts, i.e., how people currently travel and what their barriers are to using public transportation.

How do people travel?

As per the survey findings[5], the current travel patterns indicate that residents predominantly travel to Inverness, covering distances surpassing the Scottish average (Figure 4). The average annual mileage for inhabitants of Sutherland and Caithness is 7,957 miles[6], contrasting with the Scottish average of 7,232. This disparity can be primarily attributed to the extended travel required for work and access to essential services, often centralised in larger towns like Inverness.

Regarding how people travel, they mainly use their private car (Figure 5) with, on average, 1.6 cars/household, with most respondents answering 2 cars (40%).

5 Details on the representativity of the survey compared to the Highland population can be found in the Annexe 3.

6 This average is based on 354 results from the public survey

Interactive map can be found here ↗

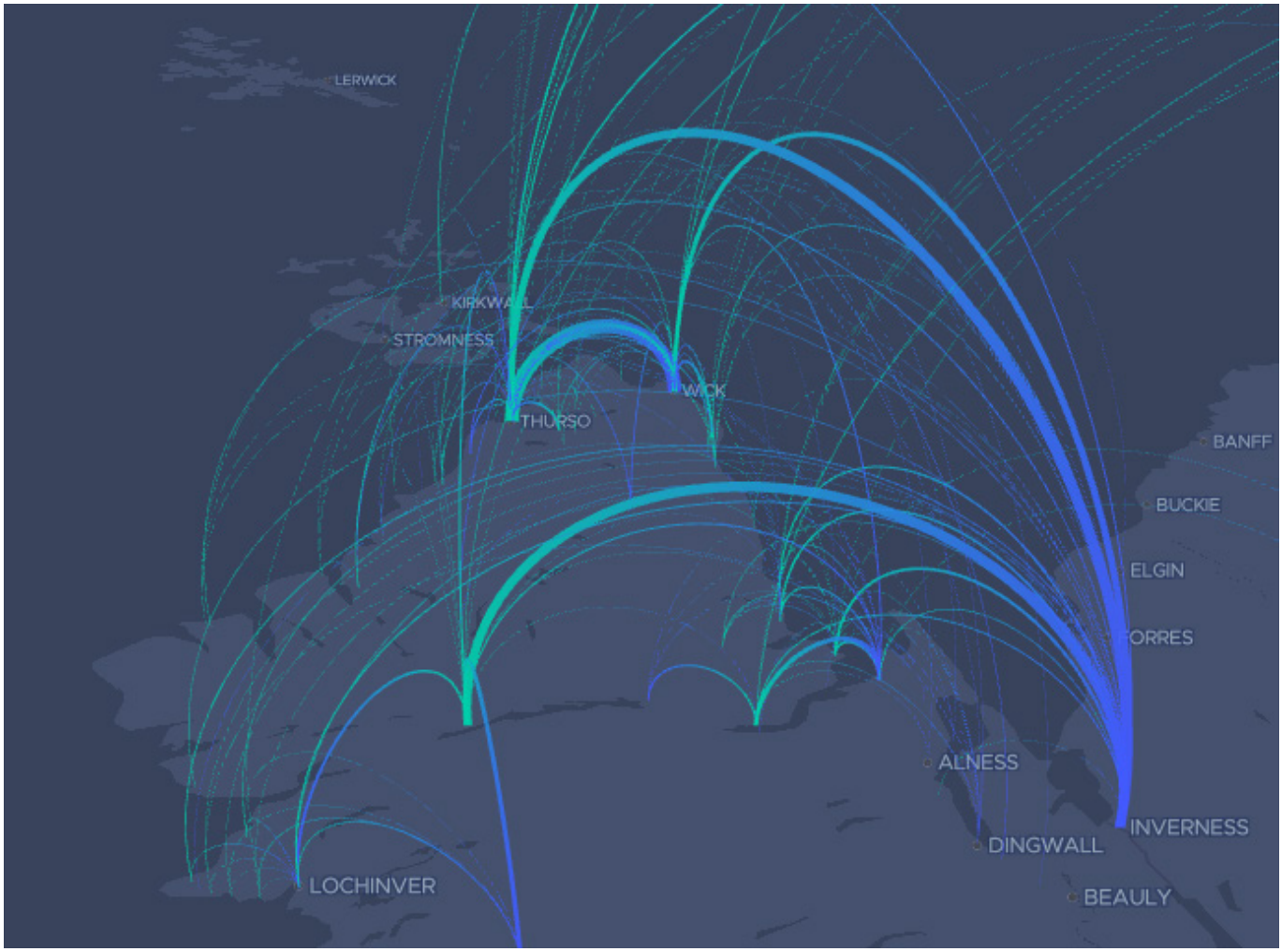
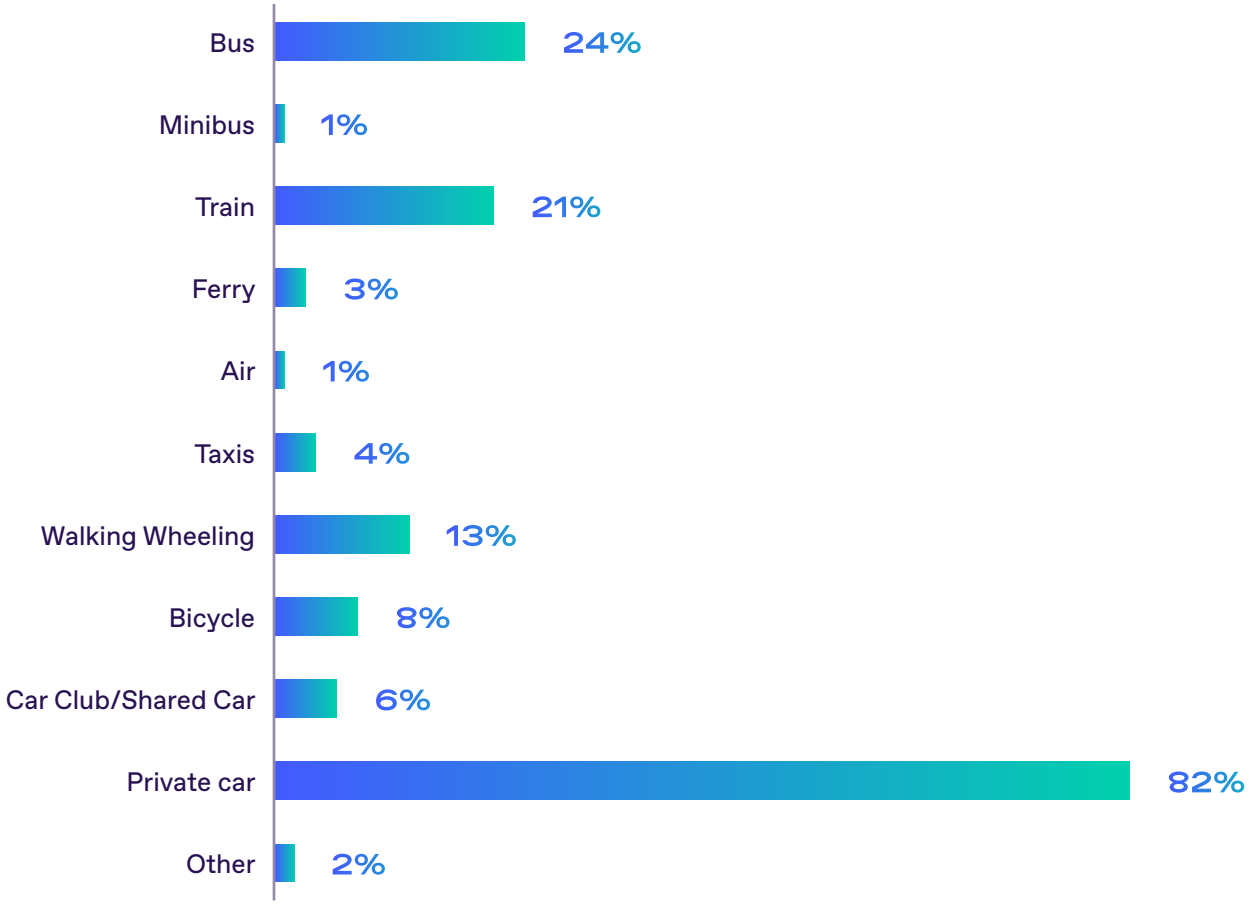


Figure 5: Map illustrating travel patterns based on responses from the public survey, showcasing the origin and destination points for both monthly long-distance journeys and daily commutes. The thickness of the lines on the maps corresponds to the frequency of these travels.
Source: Urban Foresight

Although the private car features prominently in 82% of journeys, when looking at the modal share[7], compared to the rest of Scotland, it is not quite as dominant in the region. Nonetheless, walking accounts for a significantly lower modal share compared to the national average (Figure 6). This may be partly attributed to the long distances and challenging weather/topography conditions that make walking less feasible and preferred by inhabitants in places such as the north of Scotland.

Regarding people's travelling habits, following the Scottish trend (Transport Scotland, 2023)[8], people most often travel for leisure, followed by commuting to work and seeing family or friends (Figure 8).

Figure 6: Which transport mode do you use most often?



7 All results have been brought back to a 100% scale. In the original question people could select multiple choices and have sometime picked

8 "Shopping was the most common reason for travel (24% of journeys), followed by commuting (16%) and going for a walk (13%). [Table TD3 and Figure 3]", source: Transport and Travel in Scotland Results from the Scottish Household Survey 2021 Telephone Survey Experimental Statistics, 2023.

Figure 7: Comparison of Modal share of journeys between Scotland and Sutherland/Caithness area. Sources: Transport Scotland, Transport and Travel in Scotland Results from the Scottish Household Survey 2021 Telephone Survey Experimental Statistics, 2023, Figure 2: Modal share of all journeys, 2021.

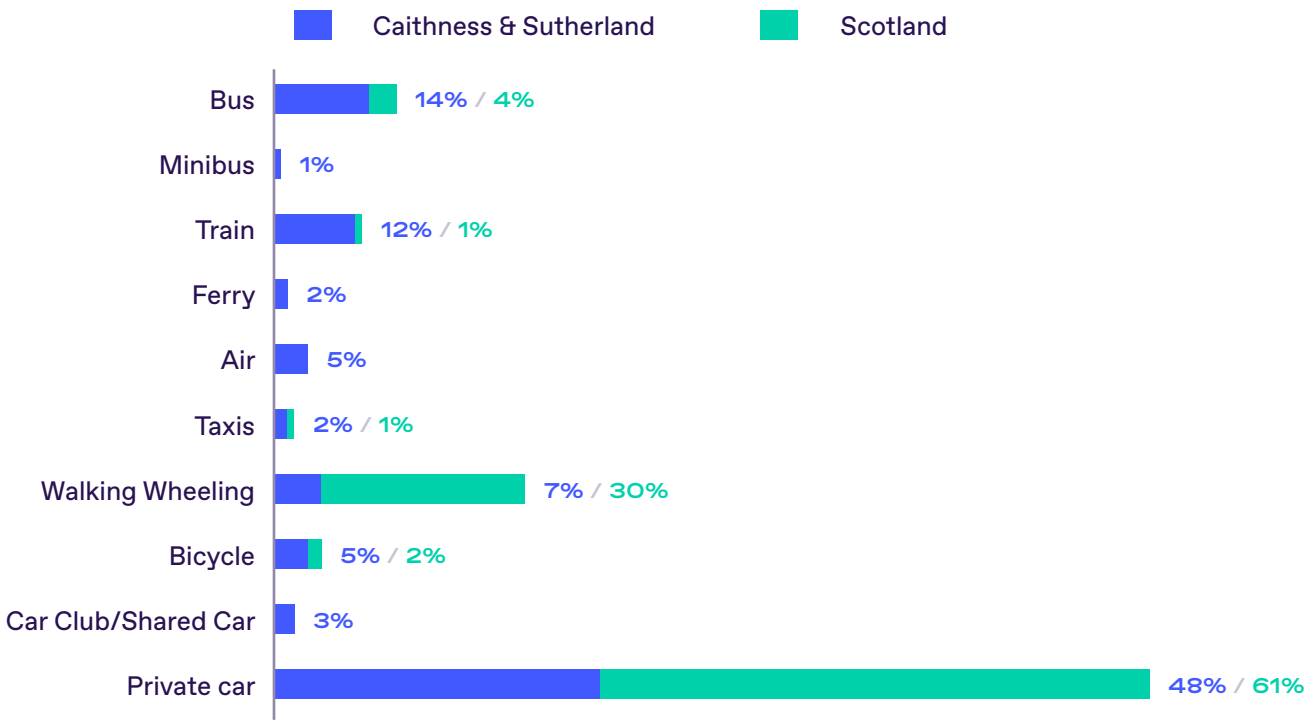
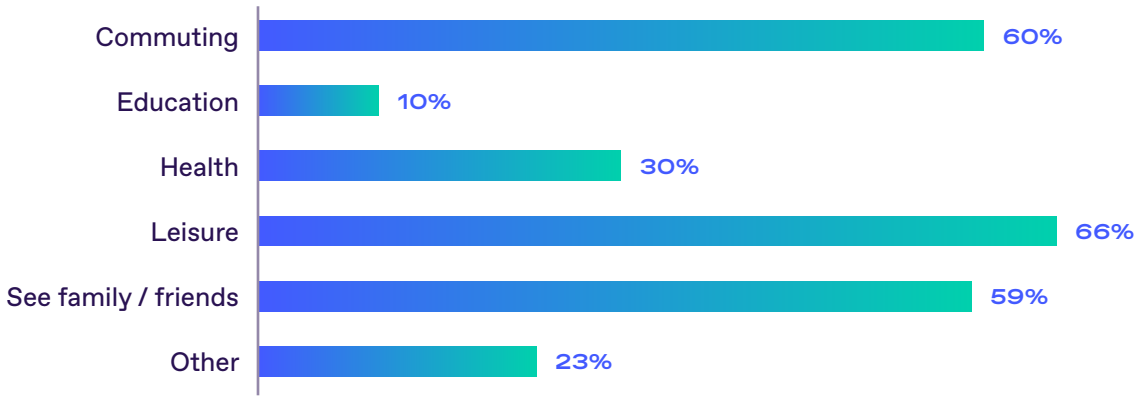
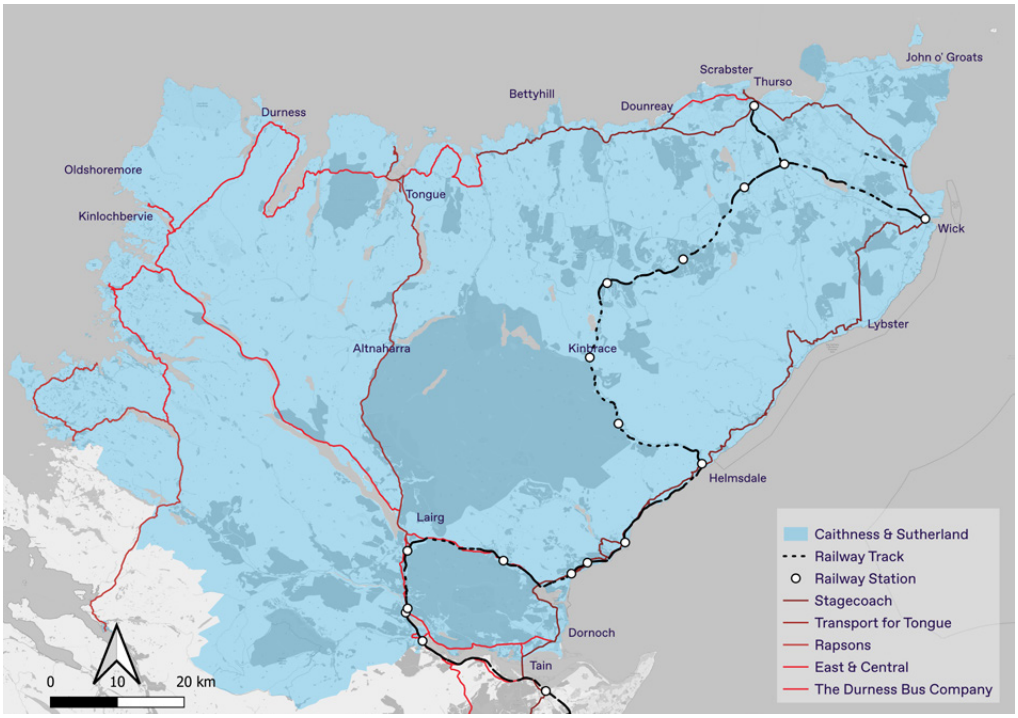


Figure 8: What are your main reasons for travelling?



The issue with the current transport network

The major routes throughout Caithness and Sutherland are currently serviced by buses (Figure 9). While there is potential for enhancing coverage by extending services to smaller roads and reaching more remote areas in the northwest and east parts, the current state appears to be reasonably satisfactory.



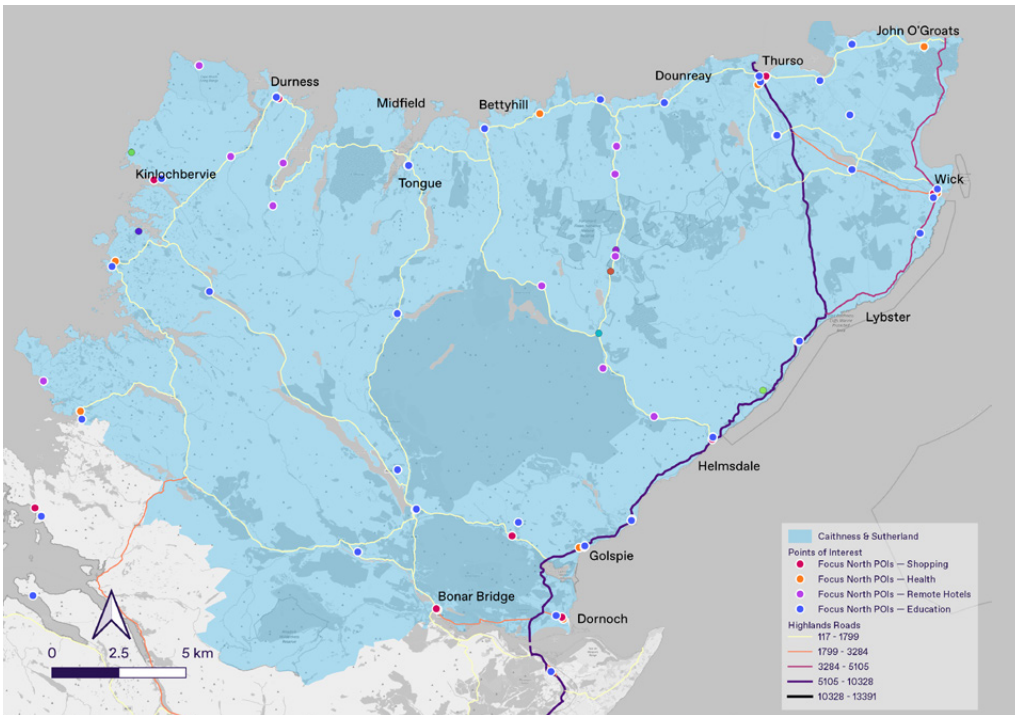


Figure 9: Map of Caithness and Sutherland's current bus and train routes compared to the area's various Points of Interest (POIs).

However, the current bus schedules do not align well with people's travel needs. With long intervals between buses (Figure 10). And sometimes only two buses a day in some villages, or none at all, it is difficult for residents to have access to transport when they need it. As a result, cars often become the preferred option.

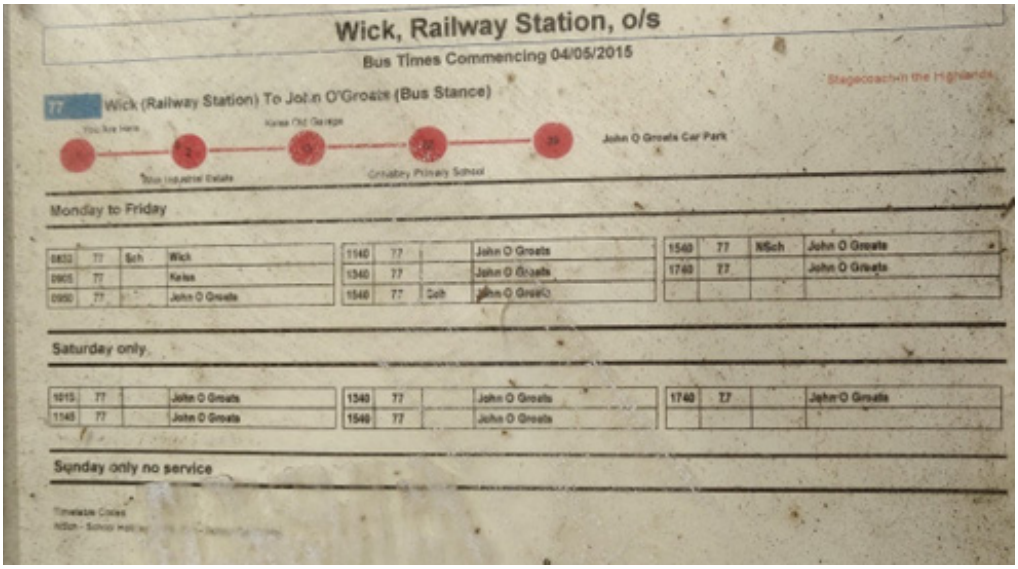


Figure 10: Wick railway station bus timetable

Based on engagement and desk research, current issues with the transport network can be summarised as follows (Figure 11):

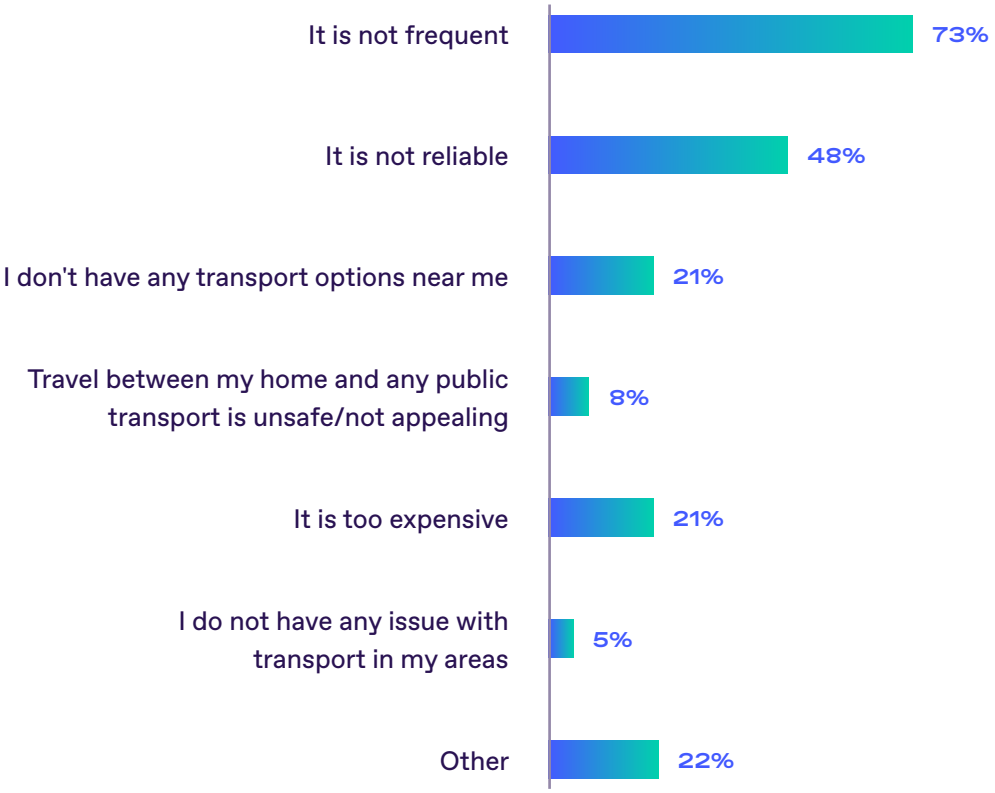


Figure 11: What are the main issues you currently have with the transport network in your area?

In order to counter the lack of frequency, reliability and overall convenience of public transport, people tend to rely on private cars (Figure 5), taking public transport rarely, if ever. Indeed, 47% of respondents never use public transport, while only 3% use it daily (Figure 12).

When looking more into what they could not do due to the state of their current transport provision, respondents highlighted the difficulty of accessing leisure and health services as well as work (Figure 13), echoing the challenges outlined in national and local policies[9].

Figure 12: What are the main issues you currently have with the transport network in your area?

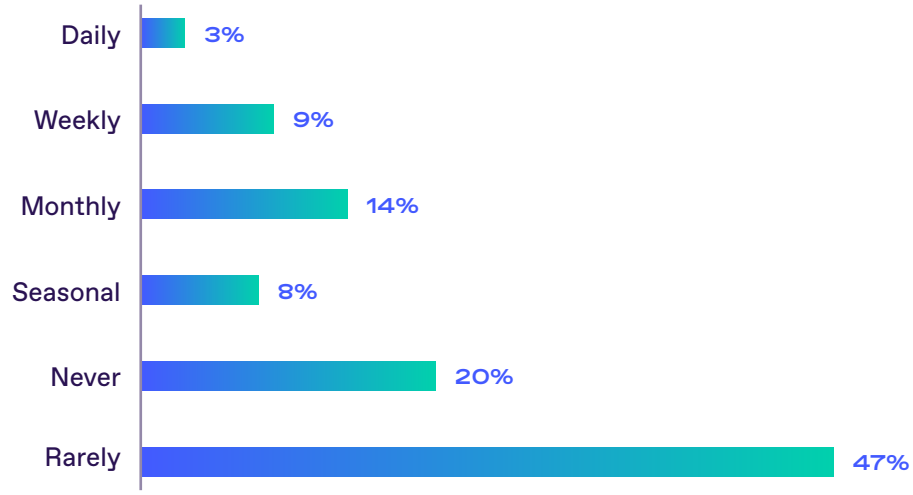
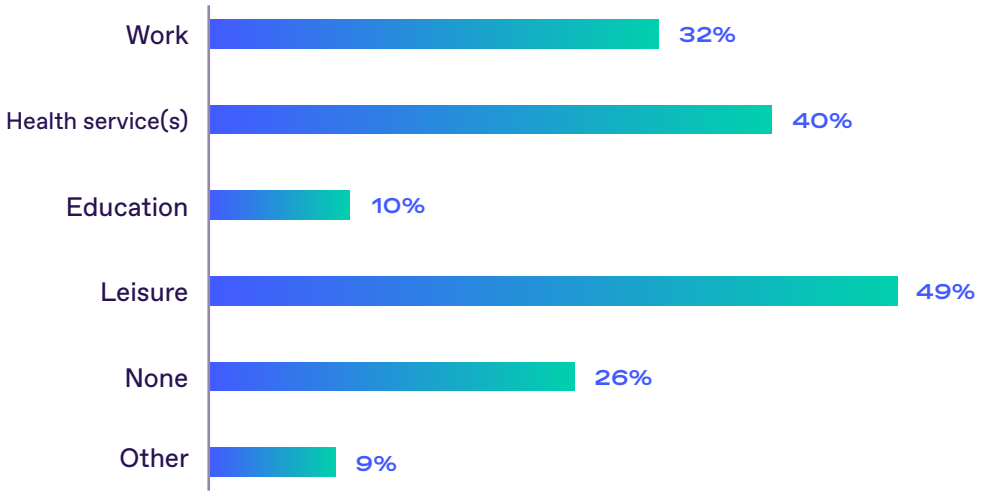


Figure 13: Does the current transport provision negatively affect your ability to access any of these services? (multiple choices)



9 As the respondent for the survey were above 18 years old, young students and pupils couldn't provide their thought regarding how their current access to transport may negatively affect their access to education and leisure for example. However, we have seen through engagement with local stakeholders that socialisation and access to school for children was a crucial challenge in the area as well.

In brief, considering people's opinions and the context of the current transport infrastructure (see Section 1 – the local context), the issue with the current transport provision can be summarised as follows:

Figure 14: Representation of the current issue with transport in Caithness and Sutherland, its causes and consequences, Urban Foresight.

PROJECTING PUBLIC TRANSPORT AND THE MODAL SHARE UP TO 2030

Drawing from the survey data and our analysis of national and local policies as well as international projects, we have developed a comprehensive understanding of a tailored solution for the region, focusing on four key dimensions: vehicles, infrastructure, operations and social factors.

Vehicles

Currently, there is low patronage, with buses often operating under capacity. Even in the case of Dounreay, a potential employment hub, peak ridership never reaches 30 passengers[10]. Given the area's characteristics, increasing bus services would be costly and not the most practical solution.

SOLUTION 1 /

Focus on smaller electric Multi-Purpose Community Vehicles (MPCVs) and complete with electric minibuses when needed.

As emphasised in the roadmap for achieving a 20% reduction in car mileage (detailed in Section 1), optimising transportation within rural areas leans towards maximising the efficiency of trips rather than eliminating private cars altogether. Utilising smaller vehicles, including minibuses, presents a more suitable option regarding passenger capacity, road compatibility, and cost-effectiveness.

For instance, minibuses can be employed for journeys to destinations like the Dounreay site, enhancing efficiency. However, for various villages and settlements spread across Caithness and Sutherland, smaller vehicles such as vans are better suited, preferably electric, to uphold sustainability. The key to optimisation lies in promoting flexibility and structuring informal travel for better efficiency.

Small vans can serve multiple purposes and offer versatile transportation options. They can function as both private and public transport during the week and shared community vehicles on weekends, bookable through an app. During the week, these vehicles can provide various services, including:

- → minibus transportation
- → taxi services
- → demand-responsive transport
- → car club or car-sharing

10 According to information provided by NRS Dounreay

- acting as a second vehicle
- serving as delivery vans (for small packages and food shopping)
- school transport
- non-emergency healthcare transportation to hospitals or GP appointments

The key here is the flexibility and the empowerment of community-driven solutions. These vehicles can be operated by part-time or full-time employed drivers, ensuring accessibility during both daytime and nighttime. The availability of nighttime service responds to the expressed desire for improved public transport, catering to social activities and employment, particularly within the hospitality sector. On weekends, these vehicles transform into shared community cars, bookable through user-friendly apps, enhancing the overall accessibility and utility of the service.

It is important to note that for community car usage during weekends, insurance gets more complicated as multiple drivers will be using the vehicle. Usage will need to be carefully controlled and tracked to ensure drivers are authorized. Driver vetting and licensing checks are important.

SOLUTION 2 /

Implement an area-wide carpooling scheme

Another way to optimise trips is the promotion of carpooling. Carpooling allows people to share rides and split costs, reducing the number of single-occupancy vehicles on the road. An organised carpool system, following the French Ecov model, can help match riders and drivers more efficiently. This solution would build on existing informal carpooling efforts to create a more robust, structured program. A well-designed carpool system can improve convenience and expand transport options for residents in rural areas. It also promotes safety by ensuring proper driver vetting and trip coordination. Overall, an area-wide carpooling program is a promising solution to improve mobility and connectivity in Caithness and Sutherland in an eco-friendly manner. The scheme's success will depend on effectively promoting participation, facilitating matches, and maintaining reliability.

Figure 15: Picture of a Volkswagen ID Buzz in Thurso

Fairer. Better Connected. Affordable. Equitable with service across Scotland. Reliable. Greener.

SURVEY RESPONDENT

Infrastructure

The region's road network is characterised by narrow roads, often featuring single-track routes, particularly in Sutherland. These routes connecting towns and employment hubs such as Dounreay frequently span vast, unpopulated areas, exposing travellers to harsh weather conditions, particularly strong winds. Survey participants expressed concerns regarding the safety of the road infrastructure and the journey from their homes to the bus or train, which hinders both active travel and the use of public transport.

SOLUTION 3 /

Explore the shared e-bike / e-scooter opportunity

Improving door-2-door travel is crucial to increase ridership and improve connection from various transport modes to provide a seamless experience that doesn't require a car. As seen in one of the case studies for rethinking transport in Germany and Slovenia, providing mobility options such as bikes, e-bikes, and e-scooters can greatly improve customer experience. However, weather and topography make it more challenging to implement in a region like the north of Scotland compared to mainland Europe due to harsh wind, rain and hills.

Nonetheless, survey responses and the success of the Highland Hi-Bike e-bike schemes demonstrate local demand. The Highland Council's Hi-Bike project enables e-bike rides averaging 2-8 miles through the Go-Hi app with an average distance of 4.66 miles[11]. As a matter of comparison, the distance between Castletown and Thurso – the town where people can take the train – is 5.6 miles.

Rather than replacing cars outright, e-bikes excel at short trips connecting homes, bus stops, and train stations. This first/last mile role means the focus should be on e-bikes as links in a journey chain, not the primary mode itself. Gradually expanding infrastructure and incentive programs can build acceptance despite climate and topology constraints. An iterative approach starting small is key to a transport network where shared mobility options like e-bikes seamlessly integrate with public transit.

Moreover, sustainability has consistently emerged as an important value in developing the new transport network. Leveraging the abundant wind energy resources, there is a compelling opportunity to power shared vehicles using renewable energy. However, this initiative necessitates the establishment of a comprehensive, accessible and reliable infrastructure network spanning the entire area.

11 Based on data provided by the Hi-bike team from the Highland council during the engagement session.

SOLUTION 4 /

Creating an EV charging infrastructure powered by on-site green energy

Aligning with the Scottish government's green energy targets and capitalising on the on-site renewable energy generation opportunity, it makes sense to establish green EV charging infrastructure to power the public or shared vehicle fleet.

An EV infrastructure powered sustainably in this manner would be a pioneering model for rural transport decarbonisation. It would demonstrate leadership in leveraging natural assets for clean mobility and transition. The charging network could be collaboratively funded through partnerships with wind farm developers.

Careful planning and grid coordination would be required to match EV charging demand with local renewable generation. Smart charging technology enables flexible timing of charging sessions to align with renewable energy output. EV batteries could even provide storage to balance intermittent wind and solar resources.

An eco-friendly EV ecosystem can emerge by tapping into the region's wealth of renewables through local charging stations. This will exemplify sustainability while providing the connectivity needed to phase out petrol and diesel vehicles.

Operations

The area's transportation system faces challenges in terms of both frequency and reliability. The availability of real-time data is paramount to improving the service as it enhances both the passenger experience and operational efficiency.

Real-time information empowers passengers to track vehicle locations, offering clarity on whether they've missed a bus or can still catch it if the service is slightly delayed. Simultaneously, it enables operators to optimise operations, such as bypassing stops when passengers have not booked trips. A game changer in using real-time data will also allow synchronisation between the buses and minibuses with trains, planes, and other buses or coaches to have improved access to major hubs (Peterson, 2016).

Furthermore, the region contends with a distinctive challenge — the presence of numerous small-scale transport operators serving the area. To improve efficiency, adopt a cost-effective approach, and enhance the service without causing adverse effects on these operators, unification is essential. This unification extends to booking and payment, aimed at simplifying the experience for both customers and drivers alike.

SOLUTION 5 /

Provide a single platform where customers can find all their transport options, book and pay while viewing transport in real time

Leveraging technology can offer added flexibility, allowing dynamic adjustments to bus stop locations. Additionally, it can facilitate informal transport solutions like hitchhiking and car sharing by enhancing safety and information dissemination. For instance, individuals sharing the same daily commute could be connected through a platform, reducing information asymmetry and optimising transportation in terms of efficiency and cost-effectiveness.

While it may take the form of a mobile application, the platform transcends its specific configuration. What truly matters is its capability to centralise all information in one accessible location. This information can then be disseminated through various channels, including mobile apps like Go-Hi, websites, or even on screens at bus stops. This multifaceted approach ensures that passengers can access information through their preferred means. Moreover, it remains crucial to maintain the option for booking via phone, recognising that not all travellers may have internet access or a smartphone.

SOLUTION 6 /

Create a single organisation to operate the network and ease processes

The process of collecting and processing data, along with unifying and streamlining operations for the benefit of drivers and passengers, necessitates the introduction of a new administrative layer. This administrative layer is proposed to be managed by an organisation. Ideally, this organisation, likely not-for-profit and community-based due to the context of the area, would be responsible for tendering and overseeing bus routes, initially filling gaps in the network by collaborating with existing service providers. Over the long term, this organisation could expand its role. The overarching objective is to support and retain local operators who currently serve individuals with limited mobility, disabilities, or those who no longer feel comfortable driving due to age-related factors[12], only adding where needed.

In addition to administrative functions, this organisation would also address insurance and legal matters. It may be more practical for a centralised entity to handle these aspects rather than requiring each operator to manage them individually, which could impose additional burdens on already time-constrained operators.

12 According to engagement with the local transport provider Caithness Voluntary Group (CVG)

SOLUTION 7 /

Develop this organisation collaboratively with local transport operators

The introduction of a new organisation can be intimidating for local operators. Altering established practices is seldom easy, and technology integration can further complicate matters. The crucial aspect here is to convey that this initiative is designed to benefit them, not work against them. It is essential to include all stakeholders in the representation and even in forming this organisation to create a system that caters to everyone's needs. This approach ensures a sense of ownership and commitment among all parties involved.

Social Factors

Beyond providing appropriate tools, vehicles or infrastructure, the core lies in people's willingness to embrace change. This acceptance can often be a prolonged process.

Even with a good transport network, the private car symbolises status, success, and independence. Various factors may still prompt individuals to use their cars, even when more cost-effective and better alternatives are available (VIGS, 2021).

SOLUTION 8 /

Start with a pilot project

Adapting to new transport habits can happen at different paces (VIGS, 2021). As such, viewing this transformation as a gradual process with multiple stages is vital. An initial step could be launching a pilot project featuring 1 or 2 MPCVs strategically placed in key locations, such as Dounreay, and collaborating with the NHS to facilitate transportation for individuals attending hospital appointments. This approach allows us to verify that the solution will meet its intended objectives, understand the demand for the best location for MPCVs, adapt to evolving requirements, and ultimately broaden its reach to include more community vans, eventually providing extensive coverage across the entire region.

SOLUTION 9 /

Incentivise access to public and shared transport services to reduce the heavy reliance on private car

Two approaches can be considered to encourage a shift from private car usage: disincentivising private car usage or incentivising public and shared transport use. In this context, a smoother approach is suggested by incentivising public and shared transport.

The preference for private cars is largely influenced by their convenience and reliability, particularly in rural settings (Berg & Ihlström, 2019), two aspects identified in the survey as the most significant challenges confronting the current public transport offer.

Hence, ensuring convenience and reliability is paramount for making public and shared transport competitive with private cars. Simultaneously, measures can be implemented to affect the convenience of private car usage in rural contexts, including:

- Implementing rideshare programs and carpool options through dedicated parking and priority loading areas to increase shared vehicle availability.
- Providing subsidised annual passes for public and shared transport to reduce individual trip costs.
- Stronger policies can be taken as well, such as introducing parking restrictions and permit parking.

Ultimately, competitive pricing, flexibility, and reliability of public and shared transport services must be maintained to incentivise communities to opt for these over private cars where feasible.

MODELLING THE FUTURE

Analysing the impact of solutions on modal shift, public transport, and car dependency

How might these solutions influence the current modal shift, enhance public and shared transport, and ultimately decrease the reliance on and use of private cars?

To address this question, a modelling exercise was undertaken. It started by establishing a baseline: the current modal split. This split was then projected to 2030 to understand the potential outcomes under a first scenario, referred to as the 'Business as Usual Scenario' (BAU).

In the absence of recent data local to Caithness and Sutherland, a range of information sources were reviewed and analysed. Two key national datasets were deemed crucial to influencing this assessment: total road transport and personal miles.

Total road mileage provides a baseline for the total annual miles travelled in Caithness and Sutherland, and personal mileage, applied to the population of Caithness and Sutherland, provides an estimate total miles travelled per person per mode annually.

Acknowledging this analysis provides a national representation of the current modal share, the baseline of personal mileage by mode was adjusted to Caithness and Sutherland using insights from the survey analysis.

This analysis led to the definition of a BAU modal share scenario (Figure 16), which was confirmed by stakeholders involved in this study.

The BAU scenario assumes the current low modal share of bus (8.5%) and rail (6.5%) in Caithness and Sutherland will remain relatively constant until 2030, influenced by a small degree of the national policy to reduce private vehicle mileage.

To illustrate the impact the proposed solutions may have on the modal share in Caithness and Sutherland, four additional scenarios have been assessed. The focus of each scenario is to reduce the share of 'Driver' (and passenger to an extent) as much as possible.

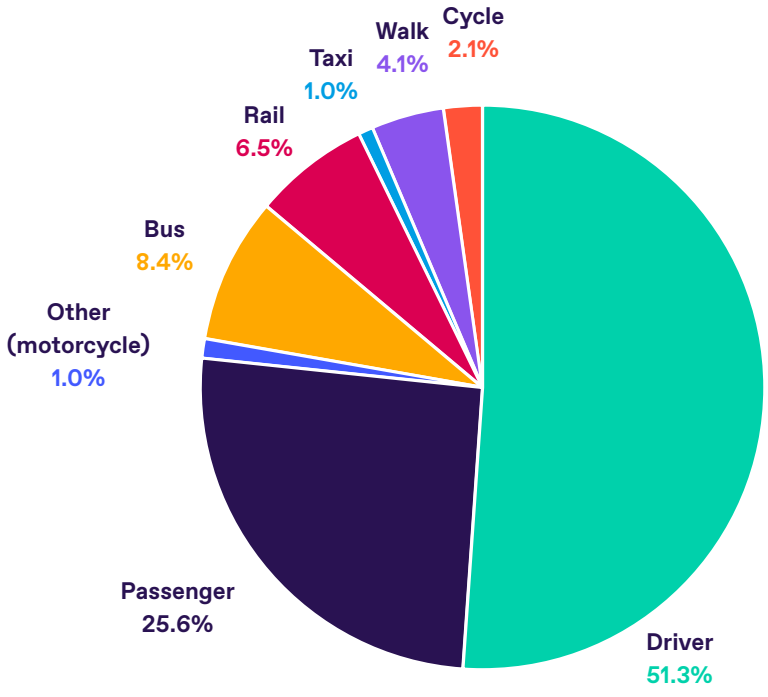


Figure 16: Estimation of the current modal split constituting the Base of the BAU scenario using Scottish governmental datasets and the responses from the survey.

Scenario	Description	Scenario Influence
1 / Headwind	Small change from the BAU – this reflects a pilot-level project in Dounreay of the shared van/Multi-Purpose Community Vehicle (MPCV) model.	→ 7.5% reduction in total car kilometres following Transport Scotland policy → Pilot with one shared vehicle
2 / Widespread Engagement	People's perception of transport and private cars has changed due to public awareness campaigns and workshops throughout the area. People are more prone to car share.	→ 10% reduction in total car kilometres following Transport Scotland policy → Pilot in Dounreay with one MPCV → Pilot in Sutherland with one MPCV → Area-wide carpooling scheme to encourage more passenger journeys
3 / Widespread Innovation	In this scenario, in addition to people's awareness and behavioural change, technological innovation has an impact. This builds on scenario 2, adding the MPCV, other transport modes and a real-time data and booking platform.	→ 15% reduction in total car kilometres following Transport Scotland policy → Pilot in Dounreay with one MPCV → Pilot in Sutherland with one MPCV → Area-wide carpooling scheme → The MaaS app allows everything to be shown and booked in one place
4 / Tailwind	All improvements from previous scenarios, plus an additional e-bike scheme to connect the MPCVs. Other upgrades of the bus system with real-time info at bus stops, plus on the app.	→ 20% reduction in total car kilometres following Transport Scotland policy → 12 operational ID Buzz across C&S → Area-wide carpooling scheme → The MaaS app allows everything to be shown and booked in one place → E-bikes and improved road infrastructure from the house to PT to improve door2door travel

Co-ordinated timetables ensure good connectivity between trains and buses. Smaller communities are linked smoothly to services from larger hubs.

SURVEY RESPONDENT

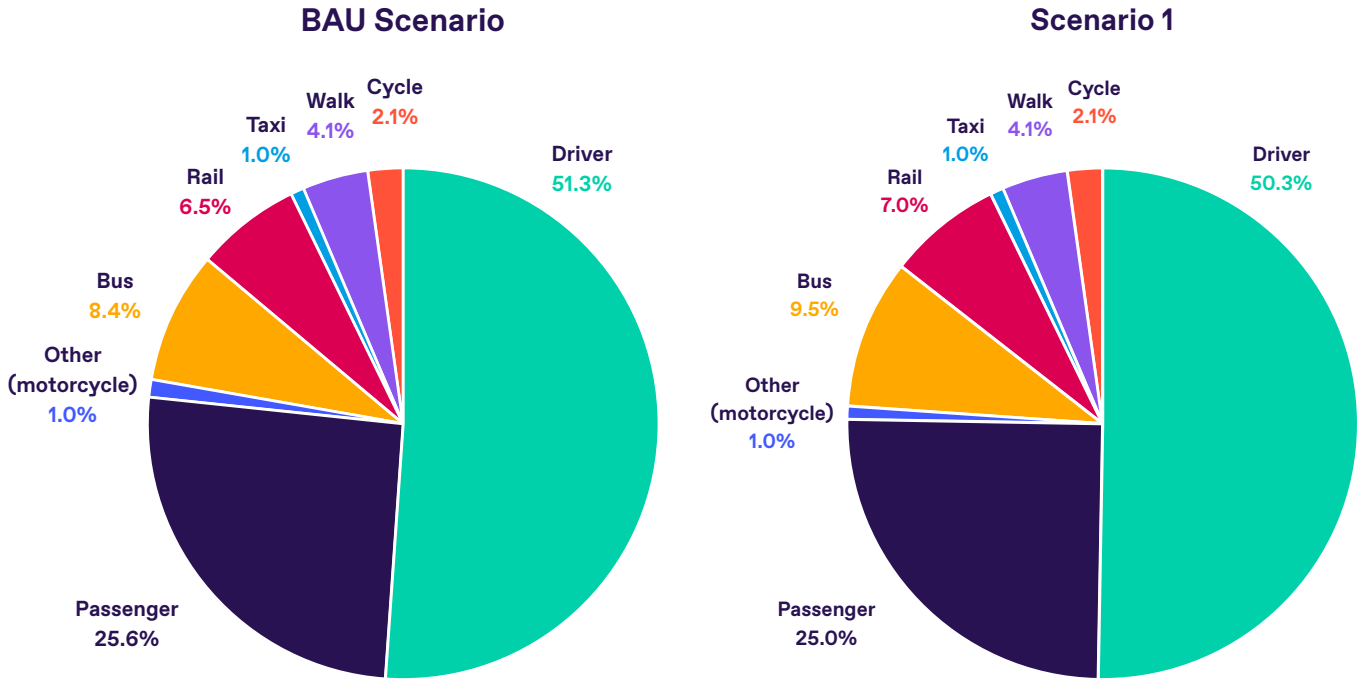
Scenario 1: Headwind

Scenario 1 investigates the impact of a small-scale localised MPCV project on the modal shift in Caithness and Sutherland. The scenario assumes the influence of national policy reduces car miles by 7.5% by 2030, and one pilot MPCV has a relatively small environmental impact, displacing 95,000km of driver miles from the region[13].

National Policy to reduce car miles	Pilot MPCV	Pooling Scheme	Data platform to plan, book and pay	E-bike Scheme
7.5%	1 pilot MPCV = 22 cars replaced	-	-	-

The impact of this scenario is illustrated in Figure 17. A small reduction (1%) in the driver and (0.6%) passenger modal shared is highlighted. The main driver behind this shift is the national policy, reducing total car miles; however, the pilot MPCV project will likely have local social and economic benefits.

Figure 17: Estimate of modal share by 2030 in Scenario 1



13 CoMo UK – Annual Car Club Report (2022) estimates the average car club vehicle in the UK replaced 22 private cars in 2022. In Caithness and Sutherland this equates to ~95,000 kilometres per annum.

Scenario 2: Widespread Engagement

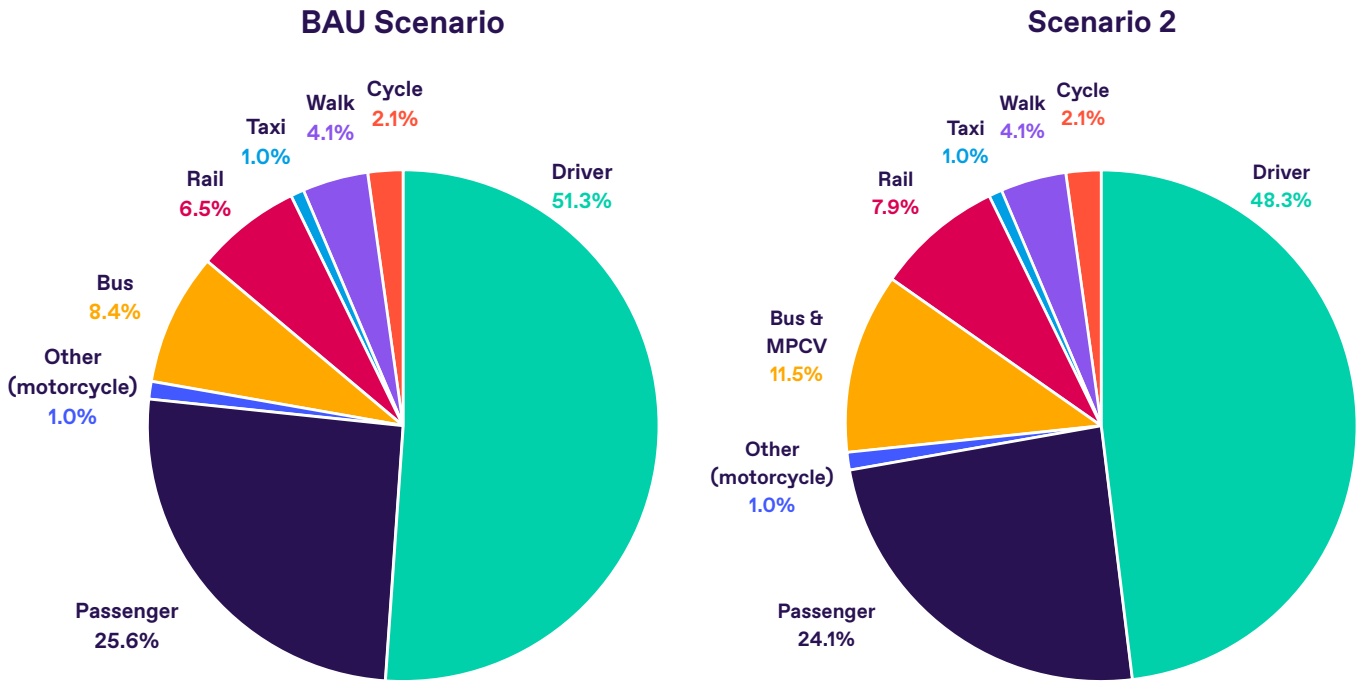
UK Government statistics indicate 37% of miles driven are for business and commuting purposes, of which approximately 85% of these trips are made without any passengers. Scenario 2, therefore, investigates the impact public awareness and workshops would have on carpooling, aligned with two MPCV pilots and national policy influences on total car mileage.

The impact of carpooling on total road mileage can significantly vary based on the number of participants in the carpooling scheme, the frequency of shared trips, and the distances travelled. The scenario, therefore, assumes a modest 1% shift in total private vehicle miles by 2030 due to the pooling scheme alongside two operational MPCVs (displacing a further 190,000km of driver miles).

National Policy to reduce car miles	Pilot MPCV	Pooling Scheme	Data platform to plan, book and pay	E-bike Scheme
10%	2 MPCV = 44 cars replaced	1%	-	-

The impact of this scenario on modal share is illustrated in Figure 18. A more significant displacement in the driver (3%) and (1.5%) passenger modal share is estimated when compared with the BAU and Scenario 1. It is assumed the majority of these displaced miles will shift to the new bus and MPCV modes. However, a small increase will also be seen in rail due to increased transport connectivity.

Figure 18: Estimate of modal share by 2030 in Scenario 2



Scenario 3: Widespread Innovation

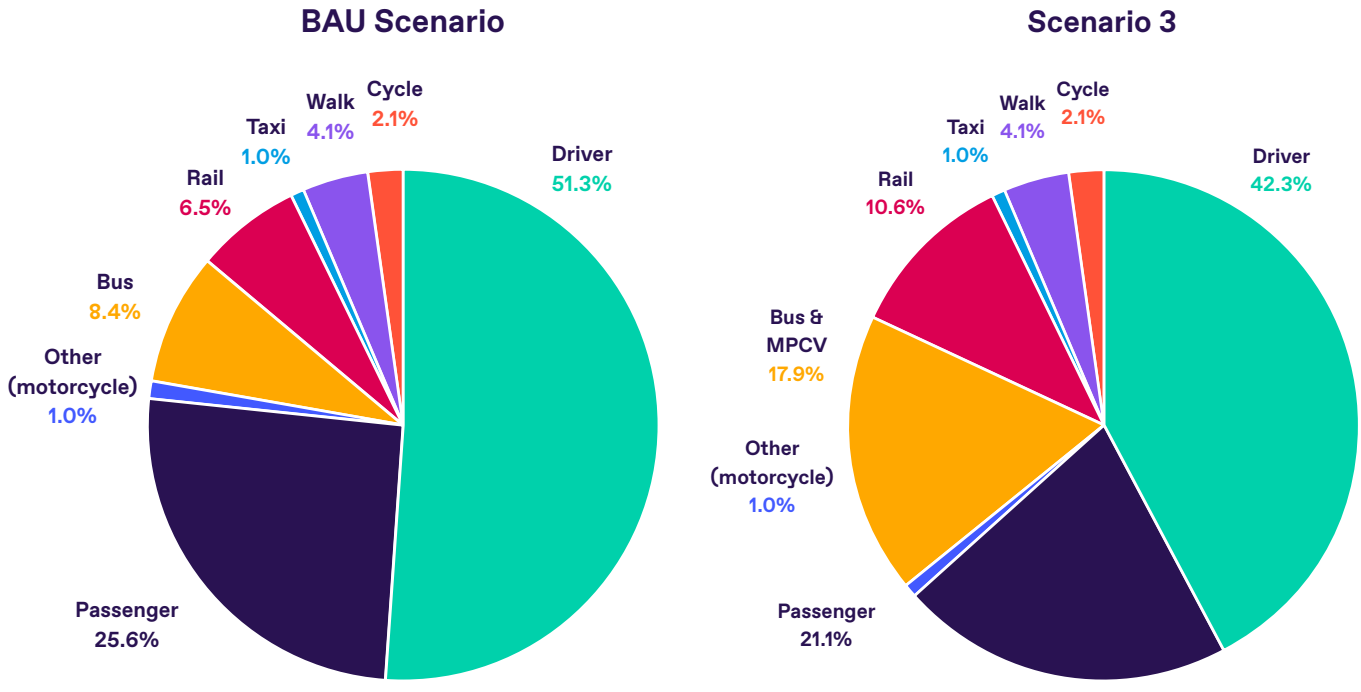
In the next 10 years, it is estimated that the share of total road transport mileage driven by private cars will drop by approximately 15% as a result of new technological interventions, such as MaaS applications.

The third scenario, therefore, investigates the impact of technological innovation across Caithness and Sutherland in addition to people's awareness and behavioural change. This scenario builds on the widespread scenario, adding the MPCV and other transport modes into a real-time data and booking platform. A 1% annual displacement in private vehicle miles has been modelled due to the MaaS application.

National Policy to reduce car miles	Pilot MPCV	Pooling Scheme	Data platform to plan, book and pay	E-bike Scheme
10%	2 MPCV = 44 cars replaced	1%	-	-

The impact of this scenario on modal share by 2030, compared to BAU, is illustrated in Figure 19. A more significant displacement in the driver (3%) and (1.5%) passenger modal share is estimated when compared with the BAU. It is assumed the majority of these displaced miles will shift to the new bus and MPCV modes. Again, a small increase will also be seen in rail due to increased connectivity.

Figure 19: Estimate of modal share by 2030 in Scenario 3



Scenario 4: Tailwind

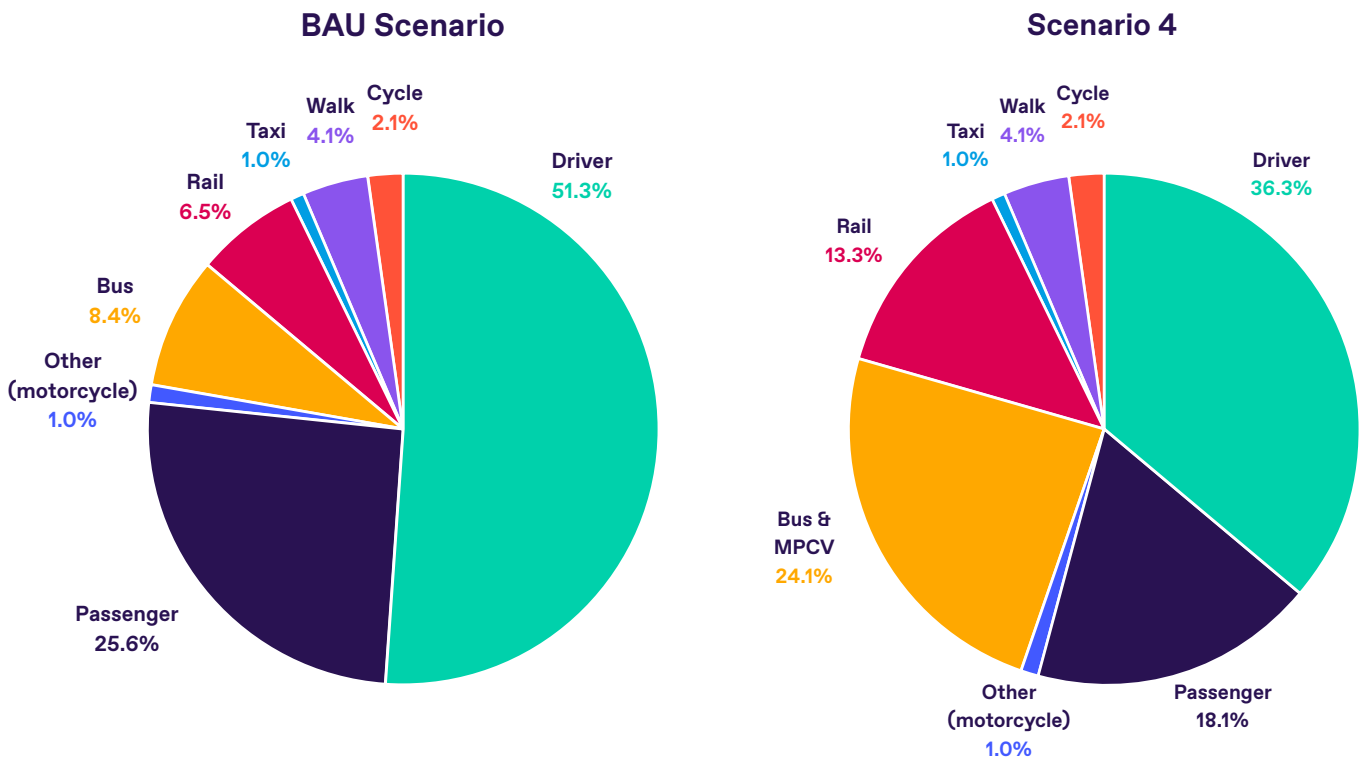
In the next 10 years, it is estimated that the share of total road transport mileage driven by private cars will drop by approximately 15% as a result of new technological interventions, such as MaaS applications.

The third scenario, therefore, investigates the impact of technological innovation across Caithness and Sutherland in addition to people's awareness and behavioural change. This scenario builds on the widespread scenario, adding the MPCV and other transport modes into a real-time data and booking platform. A 1% annual displacement in private vehicle miles has been modelled due to the MaaS application.

National Policy to reduce car miles	Pilot MPCV	Pooling Scheme	Data platform to plan, book and pay	E-bike Scheme
20%	18 MPCV = 396 cars replaced	5% shift	1% shift	50 e-bikes

The impact of this scenario on modal share by 2030, compared to BAU, is illustrated in Figure 19. A more significant displacement in the driver (3%) and (1.5%) passenger modal share is estimated when compared with the BAU. It is assumed the majority of these displaced miles will shift to the new bus and MPCV modes. Again, a small increase will also be seen in rail due to increased connectivity.

Figure 20: Estimate of modal share by 2030 in Scenario 3



In conclusion, encouraging a modal shift in Caithness and Sutherland will involve multiple actions:

- → Policy alignment
- → Behavioural change
- → Bespoke solutions
- → Community-led approaches
- → Integration with existing providers into one platform

A significant modal shift will only be a success if the inter-dependencies of these actions are solved.

SECTION 4

IMPLEMENTING THE SOLUTION

Taking into account the vision as stated in Part 2, coupled with the solutions proposed in Part 3, we can summarise the solution as follows according to each principle set in the vision:

Unique

One Umbrella organisation going to tender to operate routes and capable of:

- Owning vehicles
- Handling data
- Work with various organisations
- Employ staff
- Take responsibility (any accidents)
- Deal with complaints

Sustainable

- Using renewables to power the network
- Economically sustainable, to last in time using a mix of funding and revenue generation

Reliable

Based on the level of integration and real-time data available this solution needs to ensure passengers are aware of what options are available to them and when.

Integrated

- Provide real-time data on passengers and vehicles through one platform owned by the transport authority
- Provide payment through the same platform
- Giving options for less digital savvy people to use the network without access to digital solutions

Affordable

- Ensuring costs are maintained as low as possible to provide a good service and pay wages
- Importance on cutting costs on vehicles with a long term approach (possibility of having savings using EVs)

To implement a community-driven organisation that could fill in the gaps in the area it is important the following aspects have been reviewed: Infrastructure and Vehicles, Operations, the potential organisation to deliver the proposed model and people.

A fully integrated, reliable public transport service able to respond to seasonal visitor demand and improve access to education and work and therefore address rural deprivation.

SURVEY RESPONDENT

Infrastructure and vehicles

RECOMMENDATION 1 /

Invest in electric vans and the relevant charging infrastructure to deliver the MPCVs.

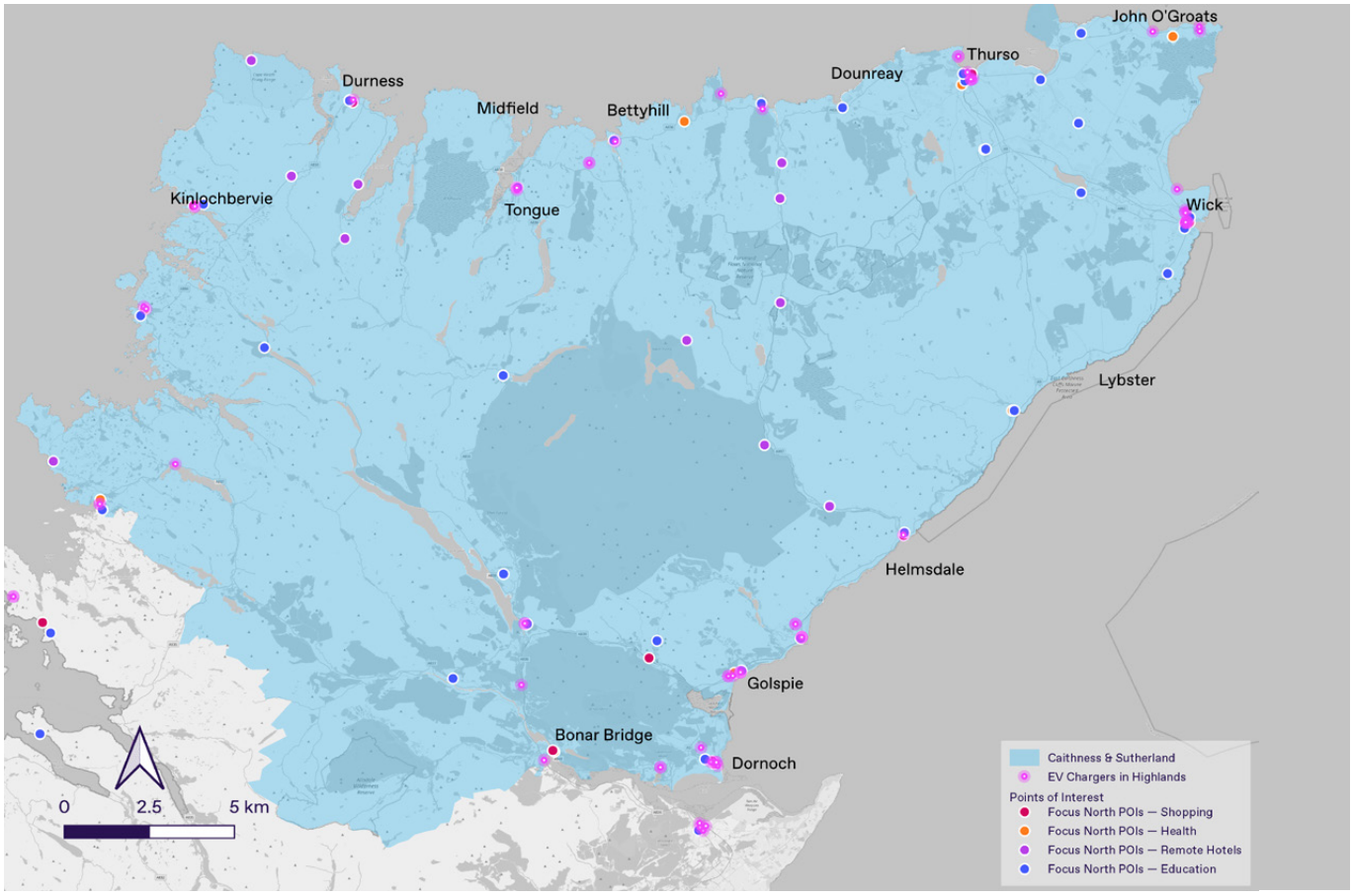
The use of small multi-purpose community vehicles can benefit local rural communities in Caithness and Sutherland. The flexibility of such services can improve mobility and provide catered transport to the community while being a cost-effective solution for the region. CoMo UK[14] reported that each car club vehicle replaced 22 private cars in 2022. Therefore, provisioning for MPCVs can have a substantial impact in reducing the need for private cars or to purchase a second car, in the region.

To examine the need for such vehicles in the region, the points of interest for the general public and charging infrastructure were mapped. These are shown in Figure 21.

Therefore, these MPCV provisions must cater to these points of interest, the towns and villages in the region, and other remote locations which may have a significant population.

A total of 18 locations were therefore chosen for their suitability for MPCV deployment as well as providing a comprehensive network throughout the area. These were primarily selected based on population[15]. Additional sites for MPCVs were identified by locating areas with limited or no public transport options. These gaps were addressed, and key tourist areas like Altnaharra and John O'Groats were included in the expansion.

Figure 21: Point of Interests and Charging Infrastructure



14 CoMo UK, 2022, "Annual Car Club Report"

15 National Records of Scotland, 2022, "Mid-2020 Population Estimates for Settlements and Localities in Scotland"

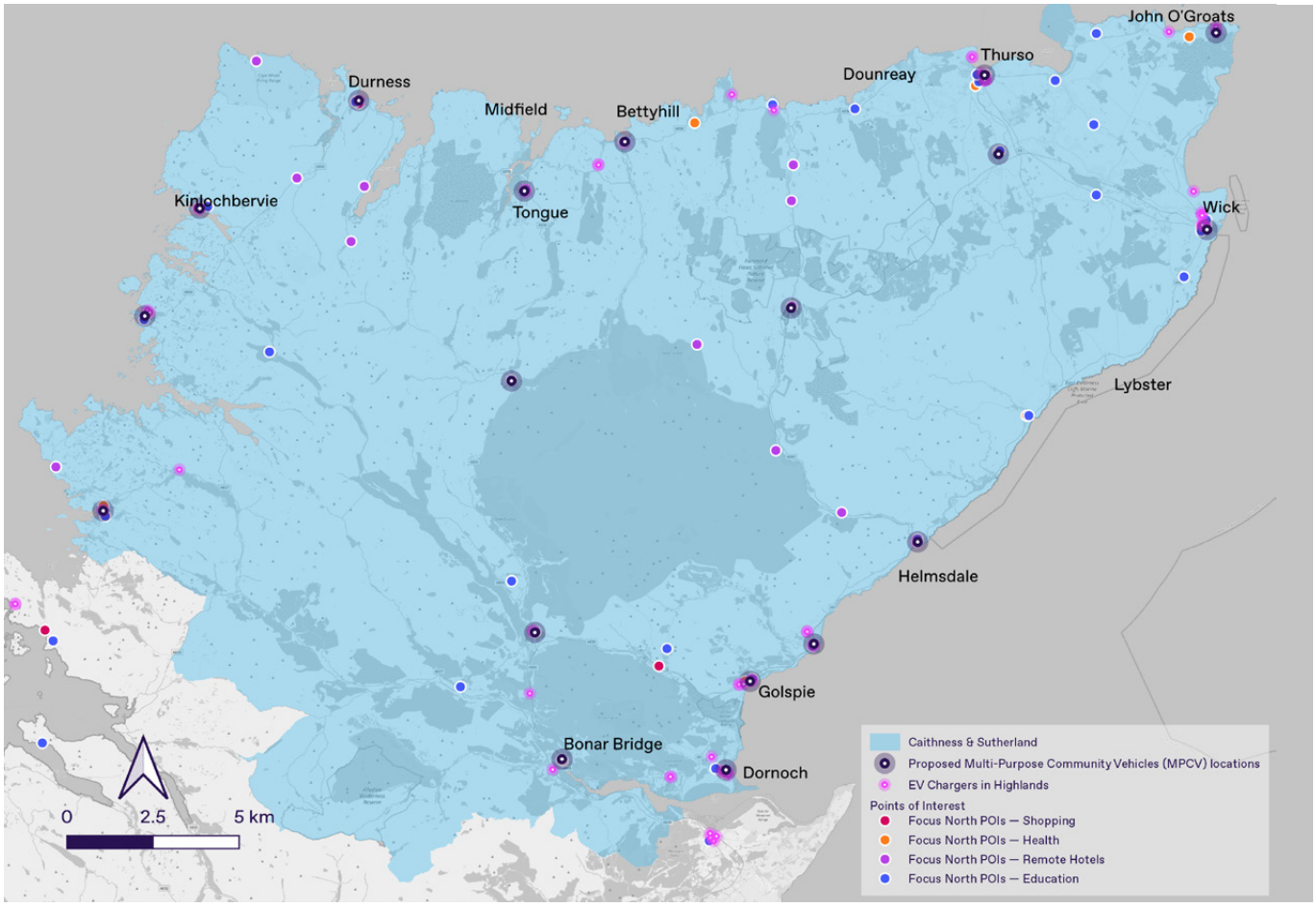


Figure 22: Proposed MPCV locations

Each MPCV location was assumed to provide various services for up to six passengers (with the driver being the seventh passenger).

The proposed MPCV locations are depicted in Figure 22.

This mapping represents the 'best as possible scenario', the Tailwind scenario 4, aiming at depicting what the vision should tend towards by 2030 if every solutions suggested was implemented. A scaled and iterative approach is recommended in recommendation 2.

The costings for the proposed solution were then estimated based on fixed infrastructure costs and recurring operational and maintenance costs were calculated using the electric van Volkswagen ID Buzz. This is shown in Figure 23. Costings provided are all highlevel figures based on industry data that may significantly change in a real context for Caithness and Sutherland.

Figure 23 Image of the inside of a Volkswagen ID buzz.

Source: VWIDTalk

Given the assumptions mentioned in Annexe 3 – MPCV Costs Assumptions pertaining to the costs for leasing an MPCV, the purchase costs for the associated 22kW charging infrastructure and recurring operational, costs for a period of ten years for one vehicle were calculated. These are shown in Table 5. The total costs were calculated by adding the fixed infrastructure costs to the annual recurring costs.

These costs were then compared to costs for buying an MPCV; the purchase costs for the associated charging infrastructure and recurring operational costs for a period of ten years were calculated. These are shown in Table 6.

As seen from the tables, the costs for leasing an MPCV are cheaper until the sixth year of operation, after which purchasing the vehicle outright is deemed to be fiscally responsible.

Ten year costs associated with MPCVs and the associated infrastructure, if all 18 locations were to be progressed, were therefore calculated and have been listed in Table 7.

Table 5: MPCV Costings based on leasing the vehicle – 10 year period

	YEARS									
	1	2	3	4	5	6	7	8	9	10
Fixed Costs	£15,000	£0	£0	£0	£0	£0	£0	£0	£0	£0
Recurring Costs	£49,865	£49,865	£49,865	£49,865	£49,865	£49,865	£49,865	£49,865	£49,865	£49,865
Annual Costs	£64,865	£49,865	£49,865	£49,865	£49,865	£49,865	£49,865	£49,865	£49,865	£49,865
Cumulative Costs	£64,865	£114,729	£164,594	£214,459	£264,323	£314,188	£364,053	£413,917	£463,782	£513,647

Table 6: MPCV Costings based on buying the vehicle – 10 year period

	YEARS									
	1	2	3	4	5	6	7	8	9	10
Fixed Costs	£75,000	£0	£0	£0	£0	£0	£0	£0	£0	£0
Recurring Costs	£39,665	£39,665	£39,665	£39,665	£39,665	£39,665	£39,665	£39,665	£39,665	£39,665
Annual Costs	£114,665	£39,665	£39,665	£39,665	£39,665	£39,665	£39,665	£39,665	£39,665	£39,665
Cumulative Costs	£114,665	£154,329	£193,994	£233,659	£273,323	£312,988	£352,653	£392,317	£431,982	£471,647

Table 7: Costs for 18 MPCVs over a 10 year period

Costs for 18 MPCVs	Buying MPCVs	Leasing MPCVs
Fixed Cost		
Vehicle purchase costs	£1,080,000	-
Vehicle infrastructure costs	£270,000	£270,000
Recurring Cost		
10yr lease costs	-	£1,836,000
10yr driver costs	£6,750,000	£6,750,000
10yr electricity costs	£272,641	£272,641
EV Infrastructure costs – 10 maintenance and warranty	£117,000	£117,000
Total Cost – 10 years	£8,489,641	£9,245,641

RECOMMENDATION 2 /

Adopt a phased approach with the aim of reaching scenario 4

To facilitate the transition to enhanced public and shared transportation, it is recommended to take an iterative, multi-phased approach. As a first step, we propose commencing with a pilot project concentrated in the Dounreay area, serving as a prototype with the vocation to scale up.

Specifically, this pilot would involve:

- Deploying a small fleet of 2-3 electric minibuses and/or shared vans to provide flexible, on-demand transportation. These could be parked and charged at designated points at Dounreay.
- Installing EV charging stations powered by renewable energy to enable electrification of the pilot vehicles.
- Introducing an e-bike sharing scheme with stations at key locations like Thurso and Dounreay. E-bikes provide emissions-free personal mobility while supporting multi-modal journeys.
- Leveraging technologies like real-time tracking, flexible routing algorithms, and integrated booking platforms.

By launching at a concentrated scale, the pilot can demonstrate proof-of-concept and allow for optimisation of operations, vehicle selection, routing, and technology integration based on user feedback. Lessons learned can inform the expansion to Phase 2 with a larger number of electric MPCVs across both Caithness and Sutherland.

The importance of a pilot lies as well in terms of establishing best practices. As the aim is also to create jobs employing drivers, mechanics and other professions, it is important to start small and build good practices from the start to grow organically and in a viable way.

RECOMMENDATION 3 /

Adopt a dockless system for e-bikes and create local green jobs

As it was suggested to explore the e-bike/e-scooter opportunity for door-2-door travel, preference would be in adding as little infrastructure as possible.

Drawing on lessons from the Hi-Bike project, a dockless approach may be more suited to a low-density population area such as Caithness and Sutherland. A dockless e-bike system, where bikes do not need to be returned to fixed stations, can reduce infrastructure and operating costs compared to a docked model. Without installing docking points, savings are achieved on construction and grid connection.

Dockless bikes can be left anywhere within a designated geo-fenced area, tracked via GPS. Users must park responsibly within the set boundaries to end their rental, or fees continue. This flexibility allows for maintaining order whilst allowing the provider to change stations at any time.

Leveraging the Highlands Council's experience managing shared e-bikes, maintenance still requires local mechanics, ideally from bike shops adding this service, to ensure reliable operations. A dockless e-bike scheme minimises capital costs while participating in local economic development.

The same dockless principles could be applied to e-scooter sharing, avoiding fixed docking infrastructure. A dockless model reduces upfront and ongoing costs, enabling affordable access to shared micro-mobility.

Operations

RECOMMENDATION 4 /

Work with transport software providers to use data to better understand transport patterns and optimise transport.

Leveraging real-time data from technologies like Automatic Vehicle Location (AVL) allows public transport services to become more responsive and efficient. This requires significant investment but provides major benefits. Public transport services can be improved through technologies like:

- **Flexible routing:** Using demand prediction algorithms and real-time passenger data, buses and shared vehicles can dynamically route along the most efficient paths needed to pick up and drop off passengers. This allows them to adapt to changing needs instead of following fixed routes.
- **Responsive scheduling:** Buses and trains can modify schedules and frequency based on current ridership data, adding or removing services as passenger volumes fluctuate throughout the day. This enables the right-sizing capacity to fit demand.
- **Adaptive bus stops:** Using booking or sensors to see if passengers are waiting at upcoming stops, buses can skip stops dynamically if no one is there. This avoids unnecessary waiting time and makes journeys faster.
- **Coordinated connections:** Adjusting bus timetables and routes to pulse with train arrival and departure times minimises connection wait times. This makes multi-leg journeys seamless (Peterson, 2016).

- **Passenger information systems:** Displays at stops and in apps providing real-time vehicle locations and predicted arrival times enable riders to plan journeys efficiently and avoid long waits. Open data APIs also allow third-party apps to share this information more widely.

Using real-time data for all the various transport options is one of the best ways to rival private cars. This is because it improves the user experience by creating positive psychological effects, such as reducing perceived wait times uncertainty and increasing the feeling of control, which people currently lack due to the low reliability of the current transport offerings. It also increases customer satisfaction, which, in turn, fosters more loyal attitudes towards public transport, building an increase in steady ridership. However, this is also influenced by the effects of new technologies that enhance the appeal of public transport, making it more progressive (Dziekan & Kottenhoff, 2006). This was also evident in the survey, multiple times, regarding what people wanted from their new transport network.

RECOMMENDATION 5 /

Leverage already existing digital solutions – the Go-Hi app

For this intelligent system to work and ensure a seamless and integrated experience for users, a solution has been recommended by the Scottish Government: MaaS.

In 2018, Transport Scotland committed to investing £2 million over three years to support the real-life testing of the MaaS concept in Scotland (Transport Scotland, 2018). The aim was to "provide people with easy, digital access to travel information so they can be better informed as to the different ways to undertake their journey".

In total, 5 pilot projects were commissioned by Transport Scotland to produce Minimum Viable Products (MVP) MaaS services. Amongst them was the GoHi app. The GoHi app has been expanding and has developed into an app that can take payments, book, and plan journeys for users.

Discussions have been initiated with GoHi Members to understand if what was suggested with the MPCVs and real-time data was feasible. The conclusions for the first part of this project were positive, particularly with enterprises who can provide the software to book the MPCVs using a similar system as their car club, which is already quite popular in the region.

Further investigation with Liftango, the app developer, will be pursued during phase 2 of this project.

RECOMMENDATION 6 /

Ensure inclusivity for all passengers by keeping various methods of booking, planning and paying

Alongside modern digital interfaces like apps and websites for booking, planning, and contactless payment, transport providers should maintain phone booking and on-vehicle cash payment options. This will prevent digital exclusion of populations like the elderly, those without smartphones or bank accounts, and visitors unfamiliar with the local system. In terms of displaying real-time bus location information, it should also be made accessible via signs in each town or at bus stops, for example.

Employing user-centred design, extensive community outreach and multi-lingual communications will further identify and address barriers to access. Maintaining both traditional and technology-driven options while proactively seeking input from underserved groups will prevent inequitable exclusion and ensure the benefits of improved transport reach entire communities.

The organisation

RECOMMENDATION 7 /

For more flexibility and the ownership of vehicles, we would recommend setting up a Community Interest Company (CIC) Limited by Guarantee

To implement the solutions proposed, we need to consider:

- Running a profitable transport organisation while keeping prices affordable for local communities is unlikely.
- The organisation should aim to enhance existing services rather than build from the ground up by collaborating with current transport providers.
- The organisation should serve as a catalyst for change and act as the central hub for network development and expansion.

In addition, this organisation must:

- Employ staff, drivers, maintenance and mechanics, and others for improved reliability and create green jobs.
- Own vehicles and be responsible for any liability.
- Be able to handle data, Process payments and booking.
- Work with local SME transport providers.
- Deal with complaints.
- Deal with any legal matters and insurance of staff and vehicles.

Therefore, to enable this and respect the community-driven approach, the following statuses can be considered:

Status	Description	Pros	Cons
Community Benefit Society	For organisations conducting business for community benefit. Profits must be used for the good of the community.	Designed for community benefit, can raise capital, limited liability.	Less flexible than the company structure.
Community Interest Company (CIC)	Special status or social enterprises which pursue social missions over profits must benefit the community. Asset lock limits the use of assets.	Charitable status tax reliefs, limited liability for trustees, non-profit	Must meet charitable objectives with more oversight than other structures
Community Interest Company Limited by Guarantee	Combines CIC's community benefit purpose with the limited liability of company structure.	Designed for social enterprise, limited liability can have charity-like objectives.	Less flexibility than a company structure.
Company Limited by Guarantee	A standard company where liability is limited to the guarantee amount provided by members. Flexible for any lawful business.	Flexible structure, limited liability for members, can operate as a non-profit.	Not specifically designed for social/community benefit. Not eligible for charitable tax exemptions, must file annual accounts.
Cooperative	A business owned and controlled by members who share profits/benefits. Democratic governance structure.	Democratic control by members, profit sharing, flexible structure.	Less explicit community benefit purpose than other structures.
Registered Charity	Non-profit organisations with formal charitable objectives. Receives tax exemptions and can get donations/grants. Oversight by charity regulator.	Tax exemptions can receive donations/grants, non-profit purpose.	Must prove charitable objectives, oversight, restrictions on trading.
Scottish Charitable Incorporated Organisation (SCIO)	Scottish charity structure that provides liability protection for trustees. Must meet charitable objectives.	Charitable status tax reliefs, limited liability for trustees, non-profit.	Must meet charitable objectives with more oversight than other structures.

A CIC limited by guarantee may be better suited for setting up a rural transport organisation for the following reasons:

- **Flexibility** – A CIC Limited by Guarantee has more flexibility to operate commercial activities alongside social goals. There are fewer restrictions than on a registered charity's trading and operations.
- **Ease of setup** – Forming a CIC Limited by Guarantee is generally simpler than becoming a registered charity with a more rigorous approval process. This suits the locally focused, small-scale nature of the organisation.
- **Taxation** – While a registered charity has tax exemptions, a CIC still benefits from some tax reliefs, like no corporation tax on profits used for community benefit.
- **Control** – Those running a CIC have more autonomy in operating it. A registered charity has oversight from the charity regulator.
- **Liability** – In a CIC Limited by Guarantee, a limited liability structure that limits financial risk for the members while still allowing asset ownership and employing staff. This provides protection while still enabling key operational capabilities.
- **Profit use** – A CIC Limited by Guarantee must use profits for community benefit but has flexibility in how it does this. Charities face more restrictions on the use of profits/assets. The company structure allows it to engage in trading activities to support itself financially rather than relying solely on grants and donations. But profits must be reinvested towards community goals.
- **Purpose** – As a CIC Limited by Guarantee, it has a built-in social purpose focused on community benefit rather than profit maximisation. This aligns with the described mission of providing essential transport services in rural areas.

In summary, the CIC does lose out on some tax exemptions but gains autonomy and ease of operation. The CIC Limited by Guarantee structure balances social benefit purposes with a standard company's flexibility and simplified setup. This makes it well-suited for a rural transport service compared to operating as a registered charity, for example.

People

RECOMMENDATION 8 /

Build trust and buy-in from existing transport providers through early and continuous engagement

Existing transport providers are crucial partners for the success of the new community-driven and not-for-profit transport company. By bringing them into the planning process early and maintaining close collaboration throughout, their concerns can be addressed and their expertise leveraged for optimal route planning and vehicle provision.

They should be invited to actively participate in co-creating the new company, giving input on scheduling, fleet composition, and technology integration. Recognising the benefits of partnership, such as optimising routes and reaching out to untapped customer segments that are heavily car-dependent, can help overcome any reluctance.

An increase in passenger rates for each operator, thanks to improved service and other incentives for partnering, should be explored. This engagement approach avoids harmful competition by filling service gaps rather than duplicating efforts and rallying transport providers around the common goal of improving mobility for the area.

RECOMMENDATION 9 /

Use social marketing techniques tailored to the audience

Targeted messaging that connects to the values and priorities of different audience segments will be key to driving voluntary behaviour change. Social marketing should employ different techniques based on the various target groups. Aspirational messaging on personalised travel planning tools and framing sustainable transport as a status symbol can effectively shift perceptions.

Transport providers can also be reached through co-created marketing content, industry awards or recognition for participation, and emphasising successes. They can also be motivated by messaging related to innovation, efficiency, and serving the public good.

Relatable stories of how diverse community members' mobility has improved, grassroots promotion by enthusiastic users, and community ambassador programs can greatly help convince the general public.

Avoiding one-size-fits-all messaging in favour of tailored value propositions for each group will help maximise voluntary adoption of the new integrated transport options.

RECOMMENDATION 10 /

Incentivise behaviour change through pricing, passes and partnerships

Financial and structural incentives can motivate the voluntary adoption of new transportation options. Discounted multi-ride passes, employer- or school-sponsored transit pass programs, free pilot periods, and promotional discount codes will get people to try services and continue using them. Partnerships with major events, employers, and schools to subsidise or promote usage will be key to expanding ridership. The combination of affordability, institutional backing, and reducing barriers to trial will drive behavioural shifts.

RECOMMENDATION 11 /

Introduce a tiered pricing structure that balances affordability for residents while optimising revenue from tourists

A tiered pricing model is recommended to promote equity in access to the new MPCV and e-bike services for residents while also optimising revenue opportunities from visitor usage.

This type of differentiated pricing could be done via a membership system. Residents providing proof of address could have a monthly or annual subscription that can allow them to use the service or a certain amount of fixed trips or miles. On the other hand, tourists could pay a higher, non-subsidised fee for a limited amount of time, daily or weekly.

If e-bikes are implemented, residents can pay an annual membership fee for unlimited 30 to 60-minute rides. Additional time is £1 per 15 minutes. Non-members pay £5 per hour. Tourist passes for e-bike sharing could be £10 for 24 hours or £20 for 72 hours. Standard hourly rates apply thereafter.

Differential pricing helps balance equity for locals with profitability from visitors. Annual membership options, discounts for multi-ride packages, and mobility subsidies for low-income residents and concessionary pass holders can further improve affordability.

The tiered structure allows residents, especially frequent users, to pay affordable rates thanks to membership subscriptions. Tourists with a higher ability to pay are charged premium rates in a transparent model. According to the latest Visit Scotland survey, tourists, mostly from wealthy developed countries（USA, Germany, France, Australia and Spain）, have spent £706m during their visit. This substantial influx of funds should be harnessed to support community services like this transport model while simultaneously promoting environmentally sustainable travel options. This approach also provides an attractive alternative to tourists who may not have the option of renting a car, further enhancing the accessibility and appeal of the service.

CONCLUSION

This report lays the groundwork for realising a brighter, more connected future for public and shared transportation in the rural communities of Caithness and Sutherland.

A vision has emerged through extensive research and engagement: a unique, reliable, affordable, sustainable and integrated public transport network tailored to local needs, leveraging technology to enable flexibility and sustainability.

The model proposed, from multi-purpose community electric vehicles to unified booking platforms, can transform mobility in Caithness and Sutherland. By filling gaps, facilitating connections, and putting people's needs first, the reimagined system aims to grant expanded access to opportunities. It flips the script on car dependence by proposing a solution focused on reducing single-car trips and harnessing the potential of shared transport and community services to make it the most convenient and appealing option over buying a second car.

Collaborative efforts among stakeholders can propel this shift, sustained by inspiring global innovations adapted to the local context. This report lights a path toward that future – one where vibrant communities are empowered by inclusive mobility.

With this vision as a guideline, integrated rural transportation can progress from fragmented and unreliable to unified and empowering. This paves the way to an interlinked, equitable network where mobility facilitates access for all, attracts new residents, and sustains thriving communities in Caithness, Sutherland and rural areas beyond.

Image: Piotr Musioł / Unsplash

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ANNEXE I: WORLDWIDE BEST PRACTICES

Image: https://innovatives-brandenburg.de/en/cluster-stories/kombibus-its-big-tour

GERMANY

KombiBus, combining freight and passenger transport

The main objective of KombiBus was to increase connectivity for people and goods. This project was started after research showed that between 2000 and 2010 villages more than 40 to 60 minutes away from larger settlements were being abandoned. Studies have shown this is due to a range of factors but predominantly the cost of resources and lack of connectivity between settlements.

KombiBus was introduced to improve connectivity while fostering enterprise by making the transportation of goods easier. The project works by combining light-freight services with passenger transportation. Similar to the passenger model, businesses can book the bus for parts or full routes to transfer products to customers or goods between businesses in rural areas (Innovative Brandenburg, 2022)[16]. KombiBus is an innovative, last-mile solution to lower-density areas while providing flexible and integrated transport services for residents in the community. The bus also aids long-distance cyclists with the transportation of their luggage (Zeebroeck, 2019)[17]. Remote communities have well received the services, and routes have been expanded. The scheme not only improved transport but also supported the local economy, especially with tourism, by improving the delivery of locally produced goods[18].

The challenges faced by the remote communities in Germany are similar to those faced in the Scottish highlands. A model like KombiBus is already implemented informally via some operators, such as the Durness bus. A structured model across the whole area could provide an additional revenue stream working with big transporters and retailers to provide a more economically sustainable service in the area.

16 Innovative Brandenburg. 2022. "Kombibus on Its Big Tour". Accessed August 31, 2023. https://innovatives-brandenburg.de/en/cluster-stories/kombibus-its-big-tour.

17 Zeebroeck, Bruno Van. 2019. Rural Shared Mobility: Germany Insight Paper. Accessed August 31, 2023. https://ruralsharedmobility.eu/wp-content/uploads/2019/08/SMARTA-IP-DE.pdf.

18 https://www.interregeurope.eu/good-practices/supporting-rural-mobility-infrastructure-through-innovative-transport-solutions-the-kombibus

Image: https://www.ecov.fr/en/story/instant-carpooling-solution-in-vercors-and-grenoble-metropolis

FRANCE

Ecov – a new way to do rural carpooling

In France, 40% of the population is not connected to public transport (AcoTÉ, 2020)[19]. 54% of the French population are more than 10 minutes' walk away from a bus stop, which again disproportionally affects those living in a rural setting (Orfeuil/Observatoire des Inégalités, 2017)[20]. The Ecov rural carpooling project sets out to integrate carpooling into the public transport mix. In this case, the specific focus of the model was to combat the challenges facing the most rural settlements.

Passengers can request a carpooling service via a physical panel as a designated stop or through a mobile application. A user nearby will receive a notification that someone has requested the service, pick up the passenger and drop them off at the requested stop. In 2020, journeys taken between Grand Chambéry and Les Bauges peaked at 200 per week, with an average waiting time of 3 to 6 minutes (Ecov, 2020)[21]. Some of the schemes have a guarantee that a traditional taxi will automatically be called if the request is not picked up within 10 minutes. Other schemes utilise financial incentives for both drivers and passengers to encourage usage.

A carpooling system like the Ecov model could benefit Caithness and Sutherland by providing connectivity to areas with limited or no bus routes. As a flexible system, carpooling has the potential to be more cost-effective than implementing new bus lines. The successful adoption of the Highland Council's enterprise car club, including electric vehicles, indicates a growing acceptance of alternatives to personal car ownership in the region – an important cultural shift.

19 International Transport Forum, Innovations for Better Rural Mobility. Accessed March, 2024.

20 "Ecov, Operator of Carpooling Lines for Daily Trips." Ecov. Accessed August 31, 2023. https://www.ecov.fr/en.

21 "Ecov, Operator of Carpooling Lines for Daily Trips." Ecov. Accessed August 31, 2023. https://www.ecov.fr/en.

SLOVENIA & GERMANY

Rethinking transport interchanges

In various countries in Europe, multi-modal interchange is being used as a method of increasing e-bike and public transport patronage. The aim of an improved interchange was to connect rural areas with increased transport options.

In the Slovenian municipality of Velenie, a digital tool was developed to provide a platform for booking and paying for DRT services and bike-sharing schemes. This provision also included the introduction of cycle storage at transport interchanges. The storage is open to private bicycles but also includes ebikes that are part of the bike-sharing scheme (Bruzzone, Scorrano and Nocera, 2021)[22].

In the rural municipality of Mettingen Germany, bus stops have also been adapted into small mobility hubs with the inclusion of secure cycle storage. In addition to this, the road quality connecting these small hubs was also improved. Through the scheme, there was a 5% increase in cycling trips among the households within the study area. Within the first year, the scheme also saw a 20% increase in fast bus lane ridership due to the increase in transport accessibility. In the years of 2012 to 2019, public transport users have increased tenfold between Mettingen and the surrounding communities (Leistikow, 2019)[23].

When considering the option of bike commuting to and from the Dounreay site, employees may benefit from a scheme such as the one deployed in Germany. Employees could complete part of their journey by bike between their house and the bus stop. This would especially help those located further away from the designated bus stops by essentially creating a joined-up door-to-door solution. However, harsher weather conditions particularly wind must be considered in implementing these type of solutions.

22 Bruzzone, Francesco, Mariangela Scorrano, and Silvio Nocera. "The Combination of E-Bike-Sharing and Demand-Responsive Transport Systems in Rural Areas: A Case Study of Velenje." Research in Transportation Business & Management, September 29, 2020. https://www.sciencedirect.com/science/article/pii/S2210539520301085.

23 Leistikow, Andreas. Mobilstationen im Ländlichen Raum – nachhaltige mobilität ... – WVG. Accessed September 4, 2023. https://www.wvg-online.de/fileadmin/startseite_wvg/publikationen/28076165-lr0119-dr.-andreas-leistikow-mobilstationen-im-lndlichen-raum.pdf.

Image: https://www.velenje.si/en/about-velenje-en/mobility/

NEW ZEALAND

Integrated rural transport in the Otago Region

The region of Otago New Zealand is home to a diverse landscape of mountains, lakes and rugged coastlines. It has a population of 225,186[25] and of that around 30% are aged 0-14 or over 65. Due to these age ranges, a large proportion of the population is unable to drive. This population plus other non-drivers from the wider population rely on public transport. A major problem with the Otago region was the lack of public transport connectivity in the rural parts of the region resulting in social exclusion, lack of independence and negative health impacts. Many rural communities in the region were severely underserved by public transport. This was either due to complex geographies or significant distances to the next major settlement and due to this there was a significant reliance on private vehicles. To tackle these issues the Otago Transport Authority sought to introduce a holistic, connected network and introduced initiatives such as community transport shuttle, service coordination and a transport strategy.

The expanded bus services now connect the rural settlements with employment opportunities, tourist locations and essential services. A greater proportion of the population had access to supermarkets, healthcare, education and employment[26]. Following the release of the transport strategy and associated services, bus patronage data showed an 18% increase in trip numbers in Dunedin and a 55% trip increase for Queenstown (Otago Regional Council, Active Transport Committee, 2023[27,28]). The success factors hinged on two central themes:

- **Integration.** Otago has introduced integrated fare structures that allow passengers to use multiple modes of transport (bus, train) within a single fare, making the public transport system more attractive and convenient.
- **Infrastructure upgrades.** Investments in transport infrastructure, including bus stops, shelters, and information kiosks, have contributed to a more user-friendly experience for passengers.

A holistic approach to the rural transport mix requires a comprehensive integration of various transport modes, infrastructure developments and community engagement. The Focus North region has the opportunity to take this approach by combining well-planned road improvements, and strategic public transport systems and rethinking the use of supplementary services such as DRT. This holistic approach needs continuous collaboration with the local communities to adequately meet the real needs of the residents there.

25 "2018 Census Place Summaries: Stats NZ." 2018 Census place summaries | Stats NZ. Accessed September 4, 2023. https://www.stats.govt.nz/tools/2018-census-place-summaries/otago-region.

26 2021-2031 Otago Regional Public Transport Plan. Accessed September 4, 2023. https://orc.govt.nz/media/10128/orc_rtp_document_final-july-2021_online.pdf.

27 "Bus Trip Numbers Continue to Rise." Otago Regional Council. Accessed September 4, 2023. https://www.orc.govt.nz/news-and-events/news-and-media-releases/2023/august/bus-trip-numbers-continue-to-rise.

28 Comparisons made at the same point in the year, one year apart.

Image: https://www.orc.govt.nz/news-and-events/news-and-media-releases/2019/february/find-out-more-about-orbus

Image: https://www.facebook.com/BorgerRingsted/photos/a.152753227087429 2/2728235364137304/?type=3

DENMARK

Flextur, Plustur and the Transport Authority of Northern Denmark

In 2003, the Flextur service was introduced in Northern Denmark. The service was introduced to focus on responsive transport solutions in rural areas for the elderly and others who may need slightly different services to the traditional modes. In 2018, the Transport Authority of Northern Denmark developed a MaaS app called "MinRejseplan" which Flextur was integrated into. As well as this integration, a new service was introduced called "Plustur" with the specific function of last mile capabilities. Plustur takes passengers from their homes to the nearest bus or train stop and vice versa (Beecroft etal, 2019)[29].

A further integration was made to the MinRejseplan application when GoMore was added. GoMore is a ride-sharing platform allowing for passengers and drivers upload the journeys they are taking or that they need. Since their inception, the Flextur and Plustur services have been expanded to any address within the Northern Denmark Region. The Danish Hospital Service now subsidise the journeys taking patients to a hospital or health appointment. Typically, the Danish Hospital Service would provide a shuttle for patients to get to appointments, however, this would be a paid-for-service (Hybel and Mulalic, 2022; Hildestrand, 2018)[30,31].

Similar issues are being experienced in the focus north area. Communities have expressed difficulty getting to hospital appointments, food shops and recreational activities. Integrating multiple transport options including DRT and ride-sharing could help tie settlements to essential services or to onward travel options.

29 Beecroft, et al. 2019. Rural Shared Mobility. Accessed September 4, 2023. https://ruralsharedmobility.eu/wp-content/uploads/2019/08/SMARTA-IP-Denmark-2.pdf.

30 Hybel and Mulalic. "Transportation and Quality of Life: Evidence from Denmark." Transportation Research Part A: Policy and Practice, February 1, 2022. https://www.sciencedirect.com/science/article/pii/S0965856421003177.

31 Hildestrand, Asa. MinRejseplan and Plustur two ways to maximise mobility in rural ... Accessed September 4, 2023. https://www.mambaproject.eu/wp-content/uploads/2018/07/WP2_good-practice-cases_-MinRejseplan-and-Plustur-FINAL.pdf.

ANNEXE II: SURVEY REPRESENTATIVITY

Profile of participants compared to the 2011 census

When comparing the demographic results of the Caithness & Sutherland – "The Future of Public Transport Survey, the survey appears to be fairly representative of the Highland region.

Table 8 provides a comparison between the Highland regional demographic and the response demographic.

Table 8: Survey Response Demographic comparison

Survey Question	Survey Response Majority (%)	Highland Region (%)[32]
What age group are you in?	40 to 60 (49%)	45 to 59 (22%)
How many people in your household?	2 (46%)	2 (36%)
How many vehicles are in your household?	2 (40%)	1 (46%)
Employment status*	Retired (22%)	Retired (16%)
Do you have a physical condition lasting or expected to last 12 months or more?	No (76%)	No (70%)

The majority of people living per household is consistent between the survey respondents and the regional average of 2 people per household. Most respondents said they have 2 cars per household, whereas the highland average states 1 vehicle per household.

The vehicle variance could pertain to the rural-urban split of the Highlands versus the Caithness and Sutherland areas. The Caithness and Sutherland area consists of far few densely populated areas, with most of the landscape being classified as remote rural areas by the Scottish Government[33]. The highland region includes Inverness (Classed as an "Other Urban Area") and so has higher connectivity to public transport, shorter distances to amenities, and greater active travel infrastructure potentially placing less reliance on a second private car. The inclusion of urban areas and large settlements may create variances, such as the vehicles per household.

24% responded "yes" to living with a physical condition lasting or expected to last 12 months or more, which is slightly lower than the 2011 census results of 29.9%. Regarding age, the biggest age bracket in the highlands was 45-59 years old (22.7%); in the survey, the 40-60 years old category represented 49%. This difference may be due to the absence of a response from anyone under 18 years old due to GDPR constraints.

32 Scottish Government, 2011. The Scottish Census 2011.

33 Scottish Government, 2022. Scottish Government Urban Rural Classifications 2020.

However, 'Students' accounted for 3.9% of the survey, and their proportion was 3.2% in the Highlands.

Although the largest single response was retired, the collective other responses were spread across various professions and industries. The highest gaining employment answer was within healthcare, with 13% of the respondents selecting this option.

To assess the representativeness accurately, further investigation into the surveyed population's demographics and methodology is necessary. The survey results may also be measured against the 2021 census reports when data per local authority and area becomes available.

ANNEXE III: MPVC COSTS ASSUMPTIONS

Table 9: Cost Assumptions for MPCV deployment

Assumptions used when calculating the costs for the MPCV deployment have been listed in Table 9. Sources and any notes have been included herewith while making the necessary assumptions to calculate vehicle efficiency and electricity usage.

Cost Assumptions	Value/Details[34]	Notes/Source
Vehicle details		
MPCV considered	ID Buzz	7-seater ID Buzz was deemed to be ideal for deployment as an MPCV
Vehicle kWh	77	Manufacturer specification
Vehicle range/assumed daily range (km)	386	Manufacturer specification is assumed to be the same as the daily range
Summer efficiency (km/kWh)	0.199	UK – EV database
Winter efficiency (km/kWh)	0.266	UK – EV database
Fixed costs		
22kW unit – infrastructure costs (£)	£13,510	Urban Foresight figures based on industry experience
Purchase costs	£60,000	ID Buzz purchase costs
Recurring costs		
Annual lease costs (£)	£10,200	Nationwide Vehicle Contracts – ID Buzz leasing
Annual driver costs (£)	£37,500	Assumed annual salary of £30,000 and 25% employer costs
Annual electricity costs (£)	£1,515	Calculated using SSEN statement of charges – using separate efficiencies for summer and winter months
EV Infrastructure costs – annual maintenance and warranty (£)	£650	Urban Foresight figures based on industry experience

34 Costs provided are indicative and may change significantly according to industry costs, type of purchase and actual contract

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