Local Transport Plan (LTP) Carbon Assessment (Part 1): Baseline emissions

Briefing Note

March 2025

Contents of this briefing note

This briefing note explains the background to the carbon assessment undertaken to support the new Joint Lancashire Local Transport Plan (LTP).

We are moving forward in developing the new LTP, and one of the key components of our work is understanding the potential carbon impact of the plan.

This briefing note sets out some findings from our work to date, and is structured as follows:

1. Background (Policy context and embedding carbon considerations in transport plan development)
2. Carbon Emissions in Lancashire (Understanding current transport emissions and the root causes)
3. Understanding future baseline emissions and comparing with carbon pathways
4. Detailed carbon baseline analysis (Supported by Appendix A)
5. Conclusions – Carbon emissions in Lancashire

Section 1: Background

Policy context and embedding carbon considerations in transport plan development

National and local policy context

In June 2019, the UK Government made a legal commitment to achieve Net Zero greenhouse gas emissions nationally by 2050 through an amendment to the Climate Change Act 2008 (the Climate Change Act 2008 (2050 Target Amendment) Order 2019). This was followed by sector-specific decarbonisation pathways set out in the Government's Net Zero Strategy: Build Back Greener, published in 2021.

The subsequent Skidmore Review, published in 2023, reiterated the benefits of decarbonisation and achieving Net Zero, including unlocking the full benefits of the future green economy and highlighting the importance of effective place-based approaches.

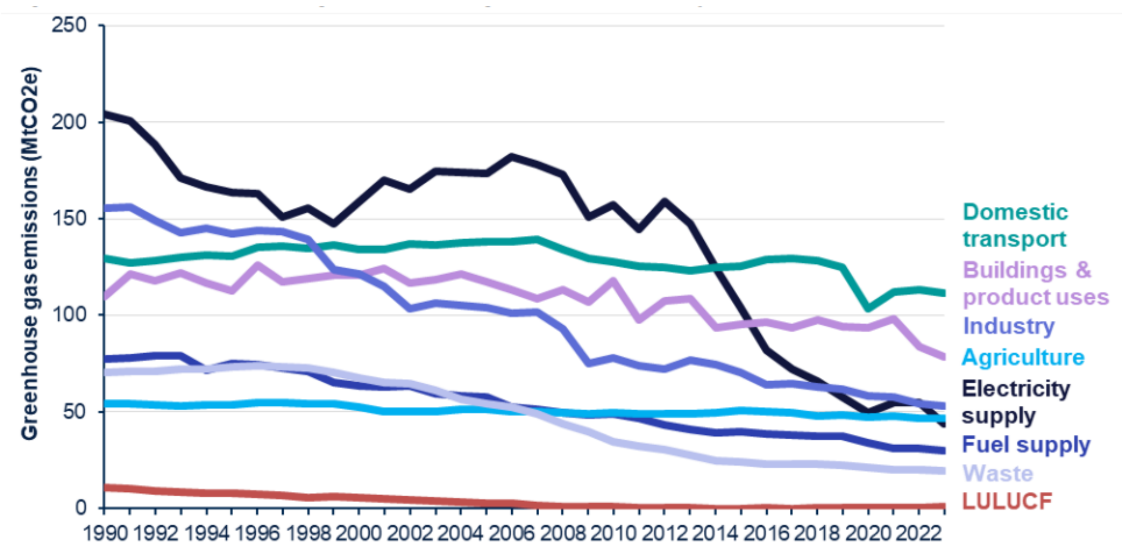
In 2019, 10 out of 12 districts in Lancashire declared a climate emergency, as did Blackburn with Darwen and Blackpool councils. Since then, action plans have been developed across the three authorities, which include:

- Blackpool's Climate Emergency Action Plan (2021)
- Blackburn with Darwen's Climate Emergency Action Plan (2023)
- Lancashire's Environment Strategy (2023)

Why transport matters

It is critical to recognise the overall contribution of the transport sector to the UK's domestic GHG emissions. Figure 1.1 shows that transport has been the largest source of emissions in the UK since 2016 and accounted for 29% of emissions in 2023.

Figure 1.1: Territorial UK greenhouse gas emissions by sector, 1990-2023 ($MtCO_2e$)



Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables
Note: LULUCF is land use, land use change and forestry.

The graph shows that the reduction in emissions from the transport sector over 30 years has been very limited, despite increasing understanding of the need for decarbonisation. Over the same timescale, significant reductions in emissions have been achieved from the industrial and waste sectors and from electricity supply, due to rapid development of renewable energies.

The stubbornly high levels of emissions from the transport sector have been caused by factors including a growing population, and increased car ownership and propensity to travel. Whilst there has been continued investment in technologies to improve vehicle efficiency, this has been largely offset by a sustained move to larger vehicles, particularly Sports Utility Vehicles (SUVs).

Whilst there was a fall in emissions in 2020 due to lockdowns during the COVID pandemic, demand rapidly rose back up towards pre-COVID levels as restrictions were eased from 2021 onwards.

In Lancashire, transport's emissions impact is consistent with national average, with the sector accounting for 29% of territorial (in-county) GHG emissions in 2023. This equated to 1.62 tCO_2e of transport related emissions per person, lower than the national average of 1.66, but higher than the North-West average of 1.59. (Source: UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 - GOV.UK)

Source: 2023 UK Greenhouse Gas Emissions, Final Figures

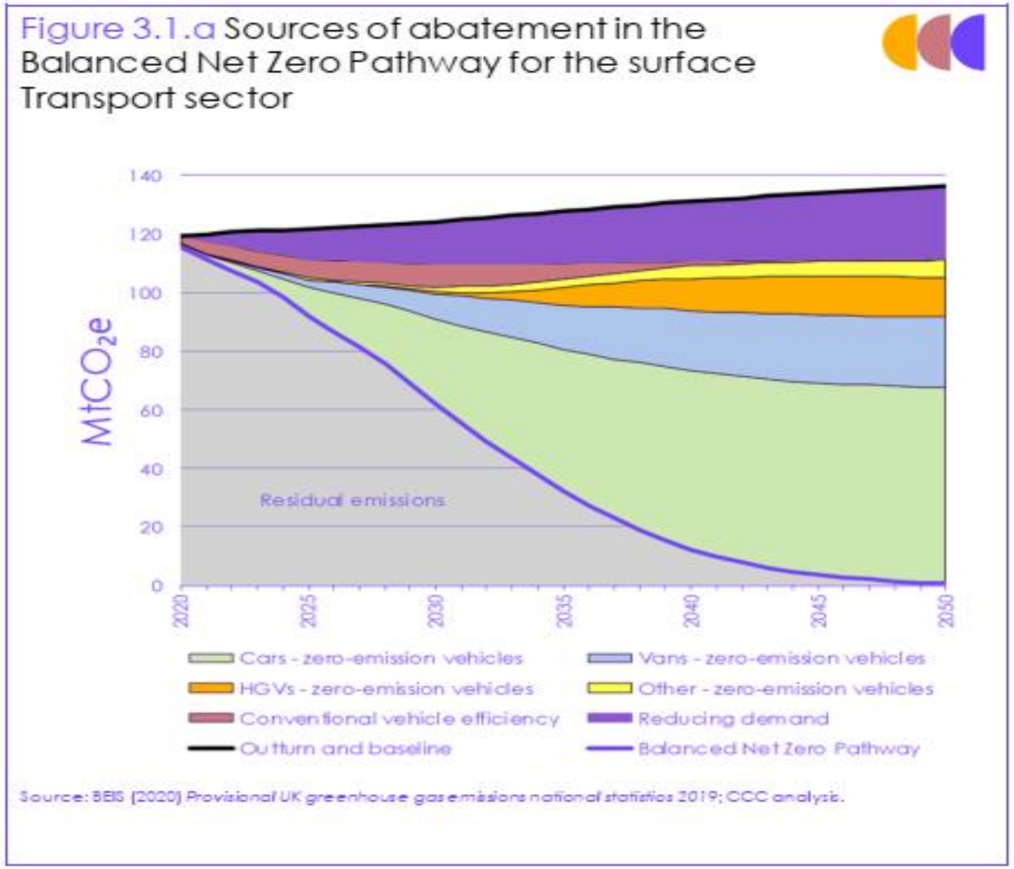
Transport emissions need to fall rapidly

The (previous) Government's Net Zero Strategy and the Climate Change Committee's (CCC) Sixth Carbon Budget Report both highlight the need for rapid reductions in carbon emissions from the UK economy, including the transport sector. Figure 1.2 shows the Balanced Net Zero Pathway for surface transport in the CCC's Sixth Carbon Budget Report (published in 2020).

The pathway shows that the transport sector needs to achieve around a 70% reduction in emissions from 2020, to 32 MtCO2e, by 2035, and a further reduction to only 1 MtCO2e by 2050. Without any further intervention, emissions are forecast to increase by about 15% in the three decades from 2020 to 2050, due to factors including population growth, and increased demand for travel.

The CCC identify that achieving full decarbonisation of transport will require both demand reduction and large-scale deployment of zero-emission technologies. Figure 1.2 shows that decarbonisation measures need to include improving efficiency of conventional vehicles in the shorter term and an immediate acceleration in the roll-out of zero emissions cars and vans, with zero emissions Heavy Goods Vehicles (HGVs) from the early 2030s. The CCC pathway also assumes that 9% of car miles travelled can be avoided or shifted to lower-carbon modes by 2035, increasing to 17% by 2050.

Figure 1.2: CCC Balanced Pathway for surface transport



Source: The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf

Transport Decarbonisation Plan projections

The Transport Decarbonisation Plan (TDP), published by the UK Government in 2021, sets out a similar view of the potential pathway for reduction in transport emissions (see Figure 1.3)

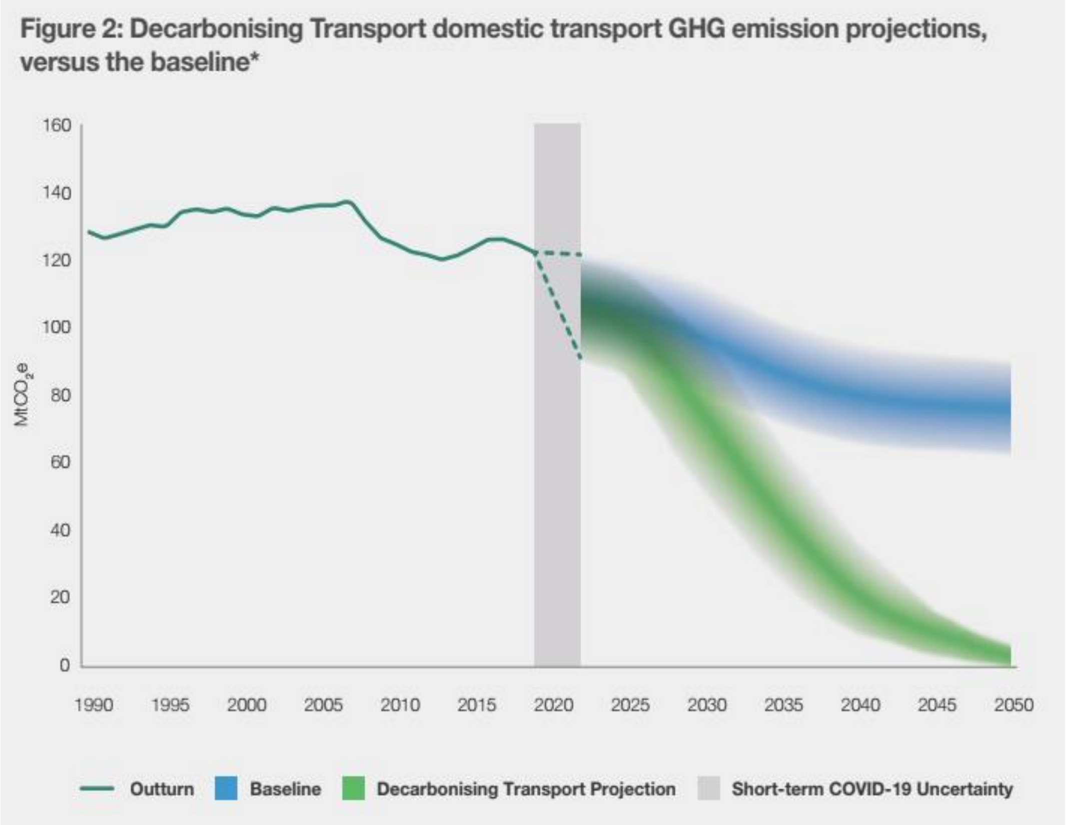
The blue shaded line presents forecast baseline emissions i.e. emissions in the absence of further action beyond committed measures to accelerate transport decarbonisation. The green shaded line shows the forecast emissions reductions, taking account of policies in the TDP. There was considerable uncertainty about the potential future trajectory of traffic patterns (and hence carbon emissions) when the TDP was published. This is reflected in the short-term COVID-19 uncertainty shown in the grey block in the graph, and is carried through into the forecasts of emissions.

Traffic demand has now returned towards pre-COVID levels, so demand is at the top range of the blue and green bands on the graph.

The green projection pathway shows a slower rate of reduction than the CCC Sixth Carbon Budget pathway on the previous page. However, both indicate that transport emissions reductions must rapidly increase.

The measures contributing to the TDP projection include actions to support the transition to zero emissions vehicles (ZEVs) and measures to promote modal shift to low carbon modes of travel.

Figure 1.3: Forecast TDP reductions in emissions



Source: Decarbonising Transport – A Better, Greener Britain (publishing.service.gov.uk)

National and local action is needed

The CCC and TDP pathways show that there is an urgent need to reduce transport GHG emissions. Transport emissions are not currently reducing at the pace needed to tackle the climate emergency, and a step-change will be needed in the future. National government is taking important steps, including encouraging uptake of ZEVs through the ZEV mandate. However, national action is not enough alone and local government must also take a central role in reducing carbon emissions.

Alongside national government actions, the TDP highlighted the importance of local, place-based approaches to transport decarbonisation. Local authorities need to develop tailored strategies for the distinct issues, challenges and opportunities in different areas. For instance, measures for Lancashire need to reflect that it is polycentric county, and highly diverse, with a mix of urban and rural areas. A tailored approach to decarbonization will be required to reflect the needs of different areas.

The Carbon Assessment Playbook (CAP) has been developed by the sub-national transport bodies (STBs) to support local authorities in taking an evidence-based approach to embedding carbon considerations in their local transport plans and strategies. The flow chart on the next page is from the CAP and shows the integration between national and local action required to decarbonise local transport.

Four key steps are identified at the local level, as follows:

1. Understand scale of challenge at a local level (emissions gap and sources)
    - Estimate current and future user emissions
    - Establish a local transport decarbonisation pathway
2. Set vision and objectives (level of ambition)
    - Assess transport outcomes needed to achieve differing levels of decarbonisation ambition
    - Determine types of measure needed to achieve target outcomes
    - Vision and objective setting
3. Estimate carbon impact of strategy and implementation plan
    - Consider carbon in generating long list of interventions
    - Option appraisal to sift the long list to a short list of interventions
4. Estimate carbon impact of strategy and implementation plan
    - Quantify impact of policy package
    - Refine short list and reappraise as needed

The DfT's forthcoming Quantified Carbon Guidance is expected to outline a similar process.

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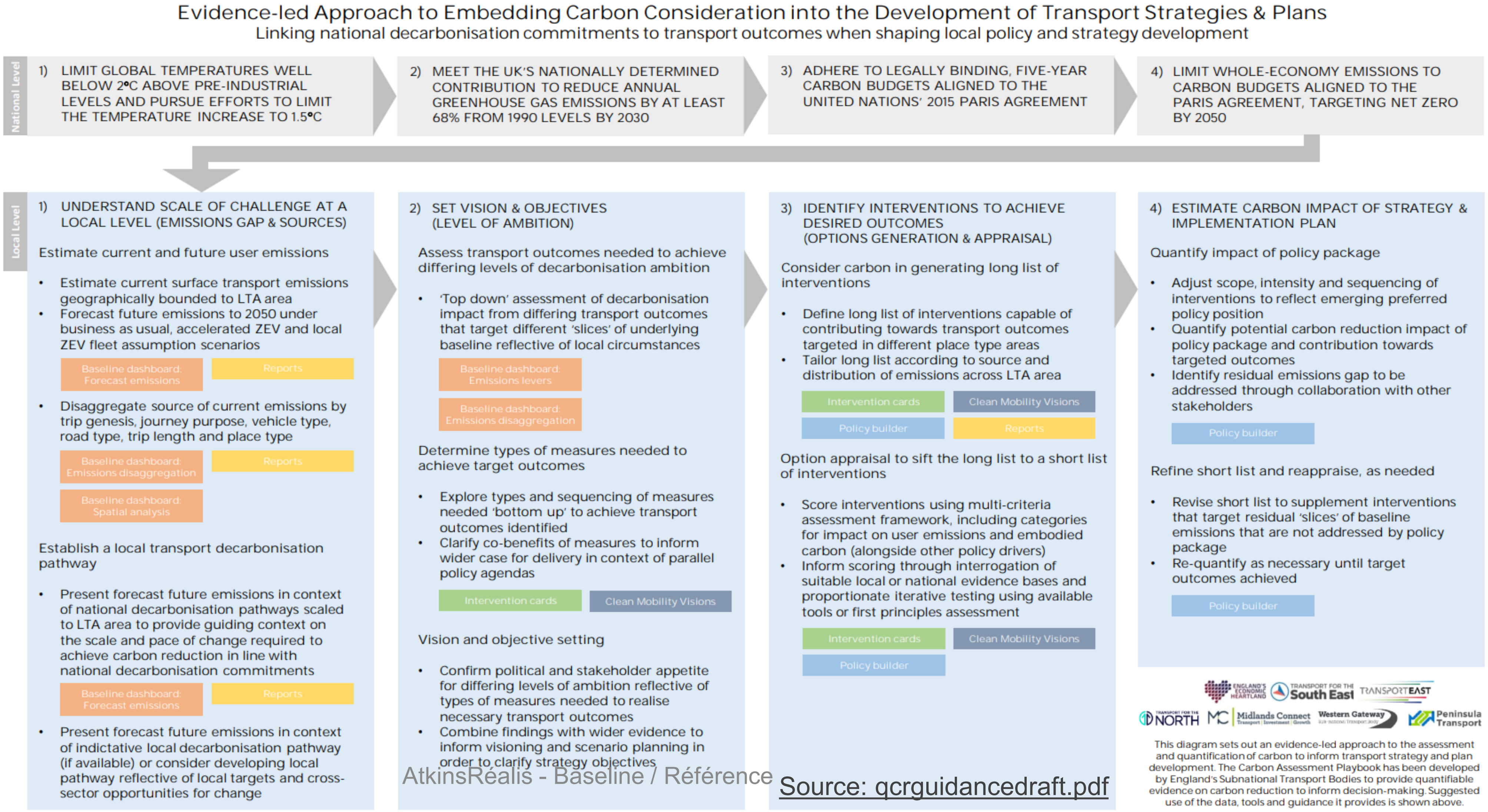
Embedding carbon considerations in the development of LTPs

Figure 1.4: Carbon Assessment Playbook process for embedding carbon considerations into the development of transport strategies and plans



AtkinsRéalis - Baseline / Référence

Source: Carbon Assessment Playbook

Source: qcrguidancedraft.pdf

Understanding the decarbonisation challenge in Lancashire

The remainder of this Briefing Note focuses on the first step in the flow chart. This involves understanding the scale of the decarbonisation challenge at the local level by understanding the source of local emissions and the emissions gap between projected emissions and decarbonisation pathways.

The analysis draws mainly on data from the following three tools:

- **The Place-based Carbon Calculator (PBCC) -** developed by the Centre for Research into Energy Demand Solutions, CREDS and other partners to help local authorities and other organisations to draw together local information (such as emissions from car and van driving per resident) to inform the development of effective decarbonisation solutions to meet the needs of their areas, in line with the place-based strategies, proposed in the Transport Decarbonisation Plan.
- The **Carbon Assessment Playbook (CAP)** - developed by the STBs to help local authorities to embed carbon considerations in the development of transport strategies and plans. The CAP provides a common source of information for authorities nationally, including projections of baseline transport emissions by authority to provide the basis for identifying emissions gaps through comparison with national decarbonisation pathways. The CAP also provides high level information on the impact of different types of decarbonisation measure in different area types.
- **TfN QCR Dashboard -** provides more detailed information on estimated emissions baselined for district level authorities within the TfN area. It provides an overview of current emissions and future projections based on scenarios reflecting different levels of EV uptake and travel demand changes. Key metrics include changes in vehicle kilometres over time. The data is sourced from TfN's decarbonisation strategy, updated with recent data. The complementary **TfN Clean Mobility Tool** provides evidence on the scale of impact of different types of decarbonisation measure.

The remainder of the Briefing Note contains the following sections:

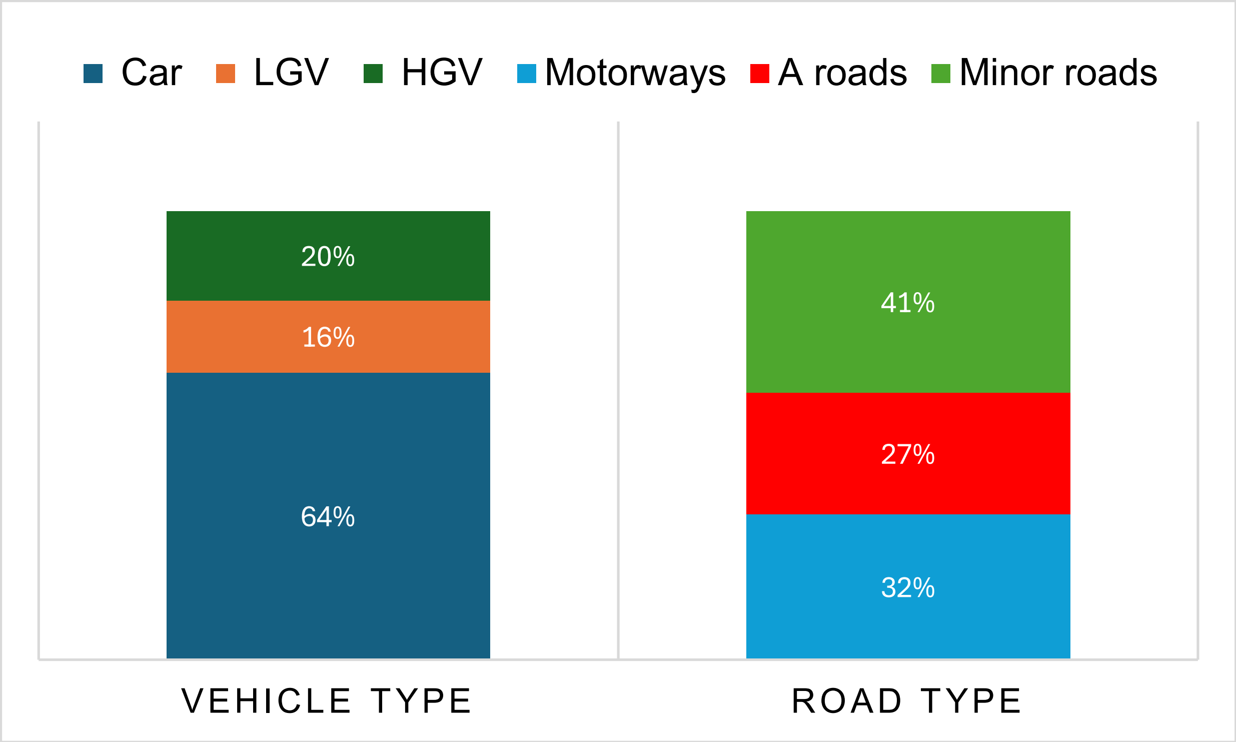
- **Section 2** analyses current transport emissions in Lancashire and root causes influencing emissions levels and patterns, drawing on data from the CREDS PBCC.
- **Section 3** sets out forecast transport emissions by authority and identifies the 'emissions gap' between the forecast and national decarbonisation pathways, drawing on data from the CAP
- **Section 4** provides further detail on the baseline forecast emissions and underlying vehicle kilometre forecasts for a selection of districts, drawing on data from the TfN Carbon Baseline Dashboard.
- **Section 5** provides a short concluding summary.

Section 2: Carbon Emissions in Lancashire

Understanding current transport emissions and the root causes.

Baseline (2018) carbon emissions from transport

Figure 2.1: Road traffic emissions in Lancashire, 2018



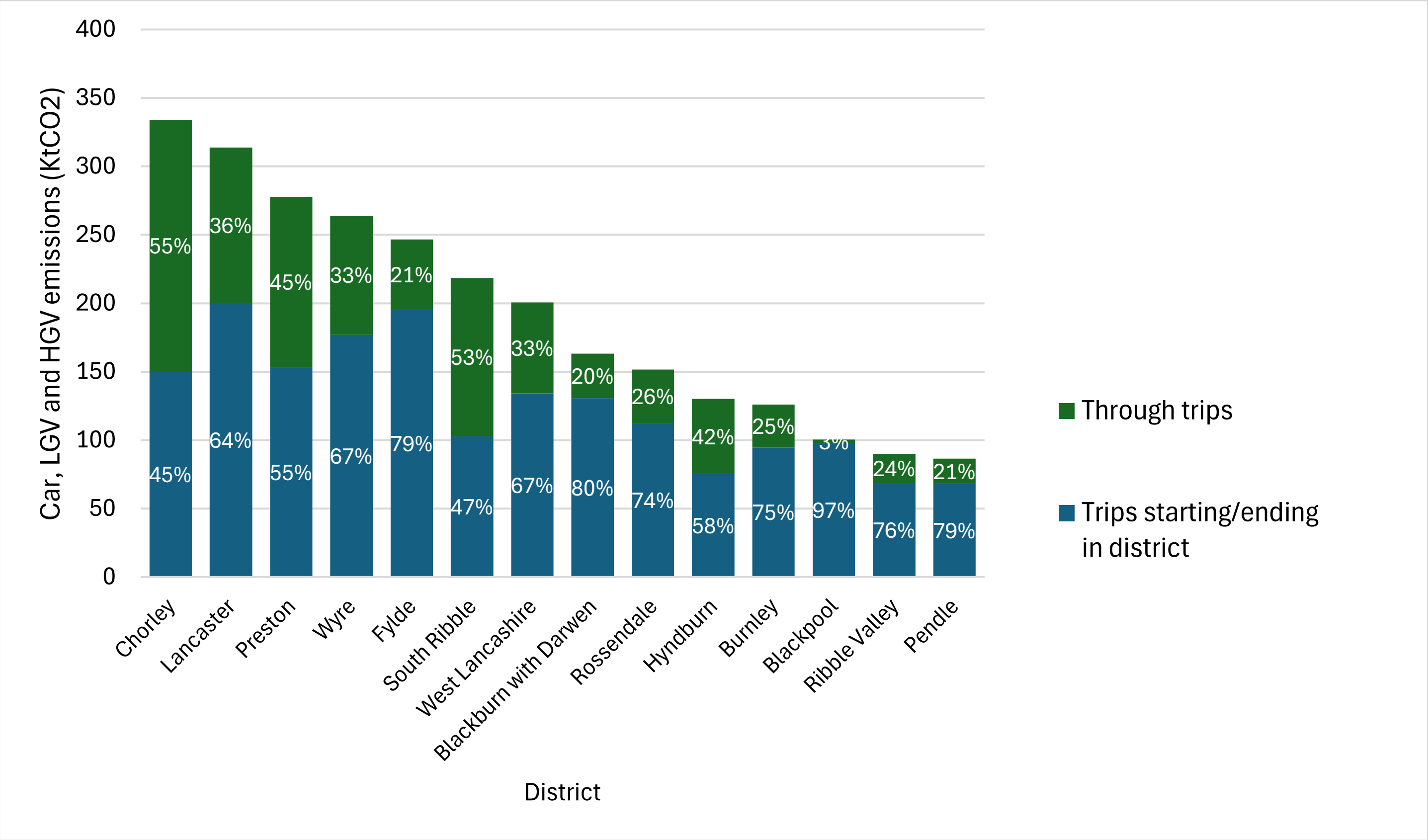
- The TfN Carbon Baseline Dashboard uses 2018 as a baseline year
- In 2018, road vehicles accounted for over 99% of the nearly 3.0 million tonnes of CO_2e transport emissions generated in the LCCA area (with diesel rail accounting for most of the rest) (Source: UK local authority GHG statistics)
- Cars accounted for nearly 65% of the road emissions, light goods vehicles (LGVs) for just over 15% and heavy goods vehicles (HGVs) for nearly 20%, as shown in Figure 2.1.
- Traffic on motorways accounted for nearly a third of road emissions, traffic on A roads for 27% and traffic on minor roads for the remaining 41%.

Sources: Breakdown by vehicle type: TfN Carbon Baseline Dashboard

Breakdown by road type: UK local authority and regional greenhouse gas emissions statistics, 2005 to 2023 - GOV.UK)

Baseline (2018) carbon emissions from road transport

Figure 2.2: Road traffic emissions by district in Lancashire, 2018



Source: [TfN Carbon Baseline Dashboard]

- Total road transport emissions generated within each district vary considerably. For instance, emissions within Chorley and Lancaster in 2018 each accounted for around 12% of total emissions in the LCCA area, around four times the level of emissions generated within Ribble Valley and Pendle
- These variations reflect factors such as district size, populations, levels of activity and the amount traffic passing through the district.
- On average, 65% of road transport-related carbon emissions in each district were due to trips starting or ending within it, and 35% due to through traffic.
- Within both Chorley and South Ribble, over half of estimated transport emissions were generated by through traffic.
- At the other extreme, less than 5% of emissions in Blackpool were estimated to be generated from through traffic. For Blackburn with Darwen, Fylde and Pendle the proportion is about 20%.

Using data to build deeper insights

LCCA is likely to have the greatest influence over trips that start within Lancashire, most importantly trips by residents. This section therefore undertakes an initial 'deep dive' into the carbon emissions that are generated from travel by residents in the county using data from the CREDS place-based carbon calculator (PBCC)

The current (legacy) PBCC estimates the per-person carbon footprint for every Local Super Output Area (LSOA) in England. This includes the carbon emissions generated by car travel and van travel. It also provides supporting information for each LSOA including estimates of distance travelled, together with data on car ownership, and modes of travel to work. Using these datasets, it is possible to build a picture of the causes of the levels of carbon emissions across different areas.

The following pages present a series of analyses, focusing on LSOAs across Lancashire, undertaken to build an understanding of the factors influencing emissions generated by transport use by Lancashire's residents. The analyses are summarised in the following figures:

- Figure 2.3: emissions from cars;
- Figure 2.4: emissions from vans;
- Figure 2.5: distance travelled by car;
- Figure 2.6: level of access to cars;
- Figure 2.7: public transport provision;
- Figure 2.8: public transport accessibility;
- Figure 2.9: propensity for mode shift to public transport;
- Figure 2.10: cycling levels (baseline);
- Figure 2.11: potential for increases in cycling levels

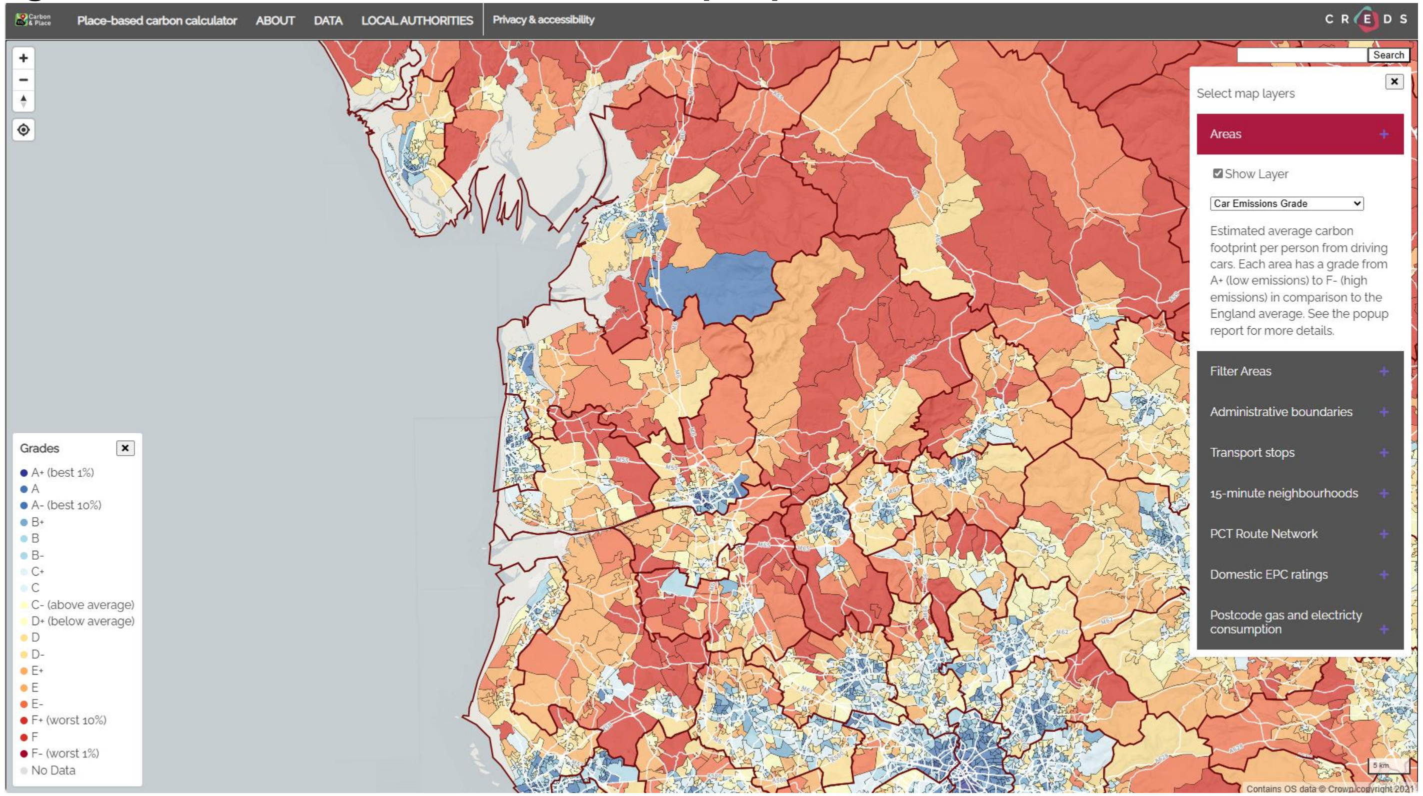
These analyses indicate that the high levels of carbon emissions generated by residents in Lancashire are caused by high levels of car usage. They also show that there are limited travel choices across much of the county, particularly in rural areas.

Figure 2.12 then draws together the evidence on the multi-faceted drivers of high car usage, and Figure 2.13 illustrates the types of actions that will be needed to reduce levels of car usage in Lancashire.

Detailed analysis of car-based emissions

Figure 2.3 maps the average carbon footprint from driving cars per person in each Lancashire LSOA. Each LSOA has a grade identifying emissions levels per person compared to the English average, ranging from A+ (low emissions per person, in blue) to F- (high emissions per person, in red).

Figure 2.3: car-based carbon emissions per person



Source: Place-based carbon calculator

This map shows that average emissions per person from driving cars are relatively high in many parts of Lancashire compared to the national average.

Within Lancashire, lower emissions per person are seen in Pennine Lancashire, the Fylde Coast and Lancaster. Emissions per person are typically much higher in rural areas. For instance, areas such as Bowland, West Pennine Lancashire and the Lune Valley are in the highest 10% nationally.

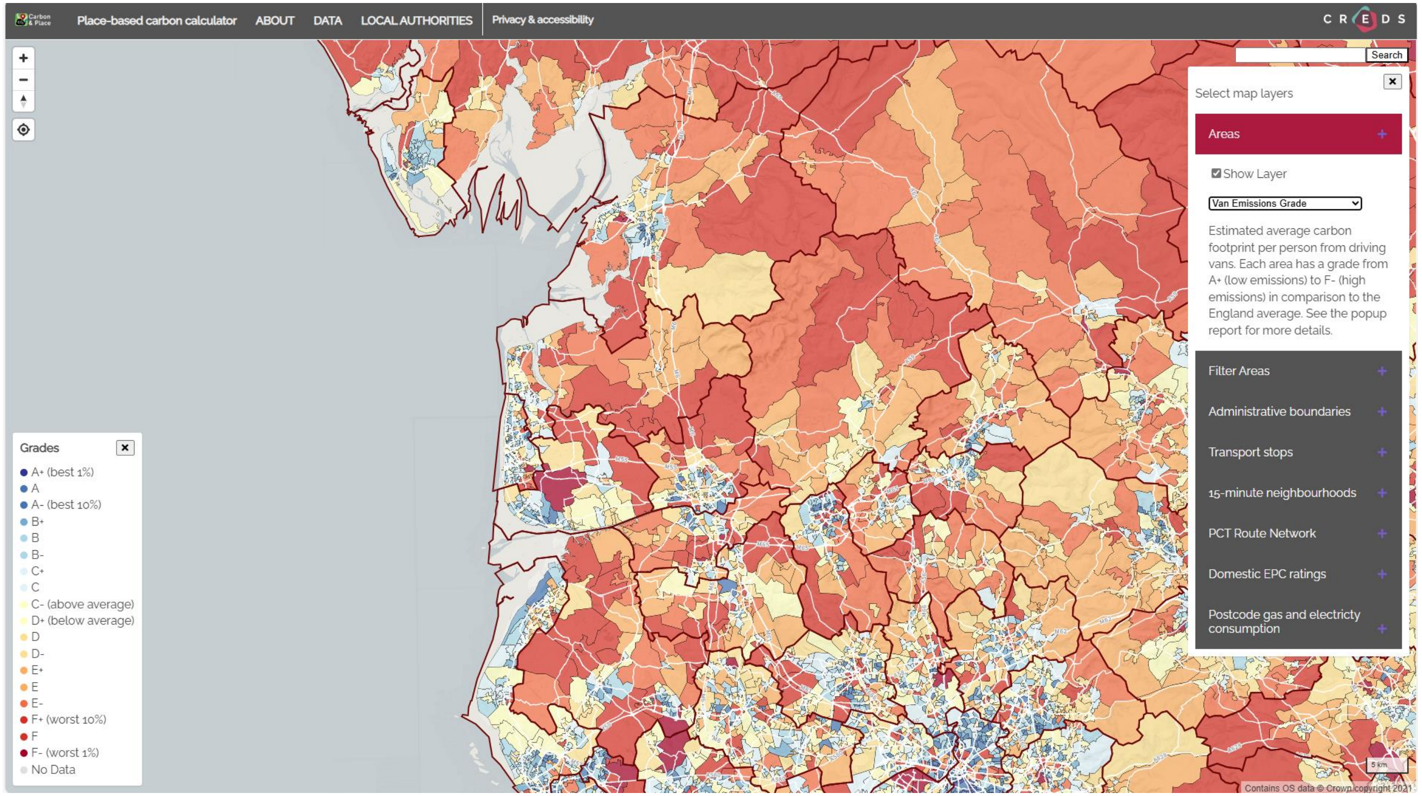
There are clear differences between more urban and more rural parts of the county. The higher emissions in rural areas are, at least in part, because people need to travel further to access jobs and services, and there are fewer travel options. Demographic factors will also play a role, as rural areas often attract wealthier residents who can afford to drive more.

The emissions patterns and challenges seen in Lancashire are consistent with neighbouring authorities, Emissions are also high relative to the national average in much of Westmoreland and Furness (to the north) and Calderdale (to the east).

Emissions from vans

Figure 2.4 maps the average carbon footprint per person from van traffic in each LSOA. Again, each area has a grade identifying emissions levels per person compared to the English average ranging from A+ (low emissions per person, in blue) to F- (high emissions per person, in red).

Figure 2.4: emissions from van traffic per person



Source: Place-based carbon calculator

The figure shows broadly similar patterns to those seen for car emissions on the previous page, although there are some localised exceptions, for instance increased emissions caused by local clusters of economic activity that generate van traffic.

As for cars, there are lower emissions per person in urban areas, and particularly in residential areas of town and city centres.

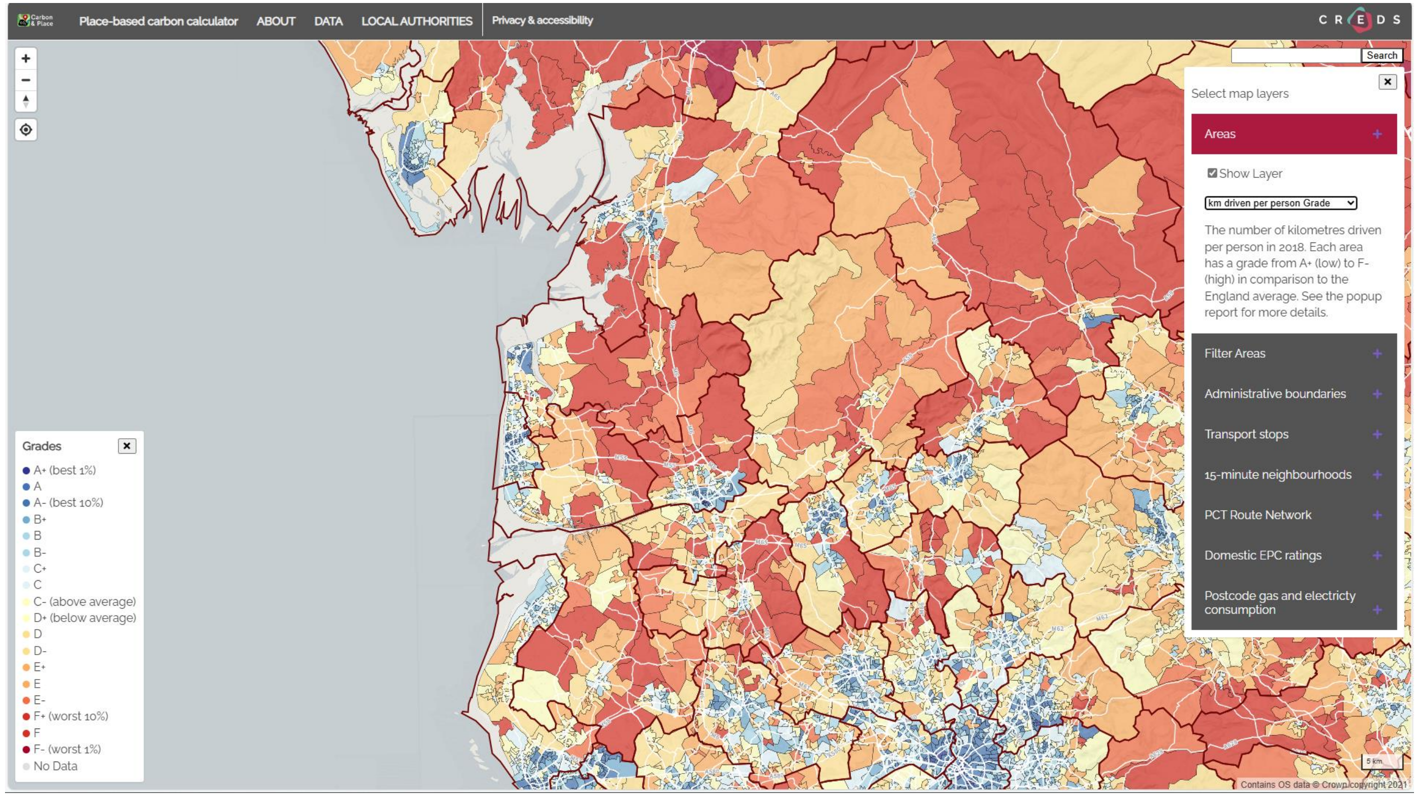
Emissions per person from van use are generally highest in peri-urban areas of Lancashire. Further hotspots in the highest 10% nationally are located in areas with industrial estates, such as Pimbo Industrial Estate to the immediate south of Skelmersdale, and the Blackpool and Fylde Industrial Estate to the immediate southeast of Blackpool.

High emissions levels are also seen in the rural areas of Wyre, Lancaster and Ribble Valley, where around 15% of people in employment work in skilled trades (compared to a national average of 8.9%, ONS, 2021). This employment balance is likely to affect the total levels of van ownership and usage, and therefore, van emissions.

Distances travelled by car

Figure 2.5 maps the average distance travelled by car per person per year. Each LSOA is again graded against the English average, with lower annual distances travelled shown in blue, and higher annual distances shown in red.

Figure 2.5: distance travelled by car per person



Source: Place-based carbon calculator

The figure shows similar geographic variations to the previous maps, reflecting the fact that the average distances travelled by car are the primary driver of carbon emissions from cars.

There are large differences in the average distances travelled by car by residents within Lancashire, varying particularly between towns and the more rural areas.

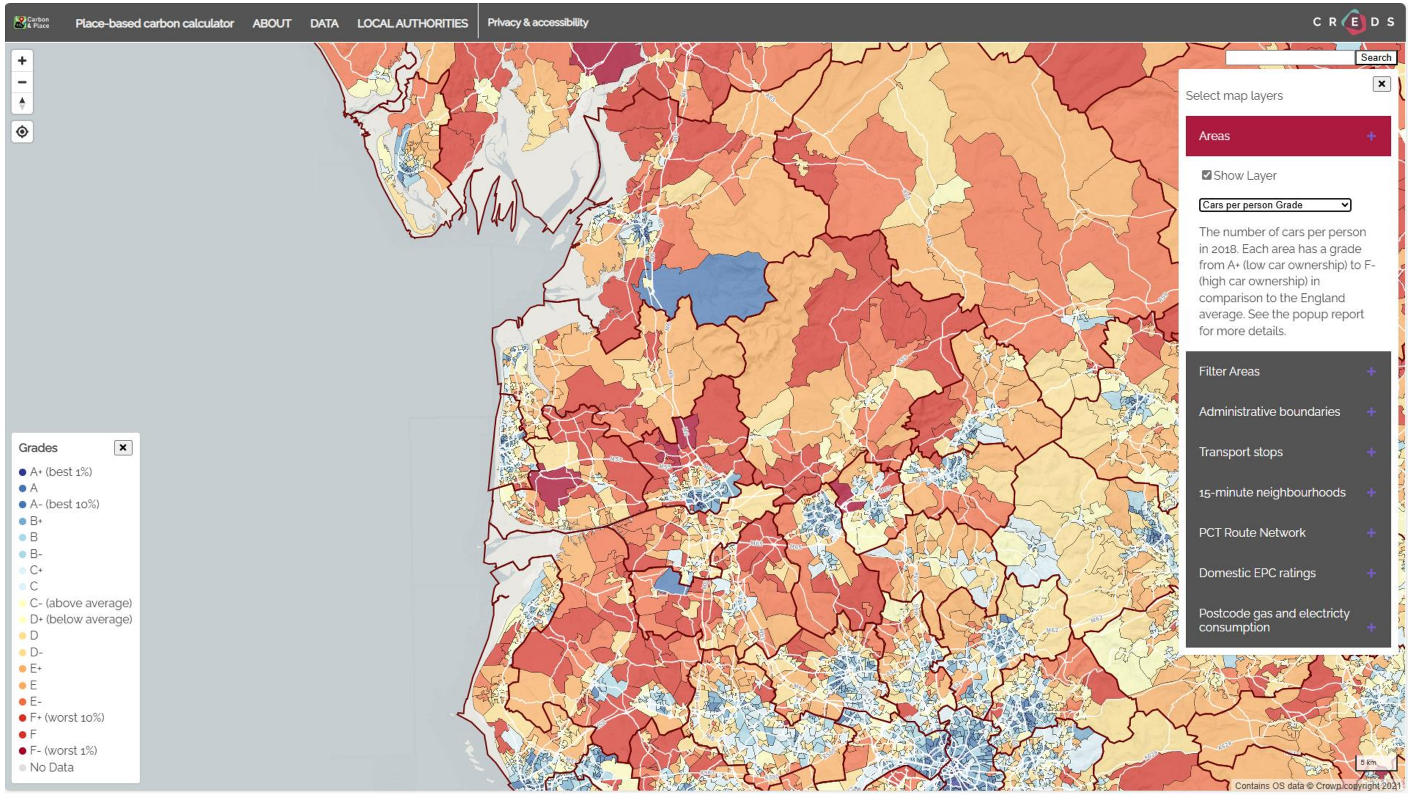
The map gradings show that in the centres of Fleetwood, Blackpool, Preston and Blackburn, distances travelled by car are similar to those travelled in large urban areas such as Greater Manchester. Conversely, distances driven per person in rural Lancashire are comparable with more rural areas such as North Yorkshire.

The greater distances travelled by car by those living in more rural areas are likely to reflect longer distances to jobs and services, and fewer travel alternatives to car. There are also likely to be demographic influences, as rural areas often attract wealthier residents who can afford to drive more.

Levels of car access

Figure 2.6 maps the numbers of cars per person in each LSOA. Each area is again graded against the English average, with lower numbers of cars per person shown in blue, and higher numbers of cars per person shown in red.

Figure 2.6: number of cars per person



Source: Place-based carbon calculator

The figure shows similar variations to the previous maps, indicating that levels of access to a car are a key factor in influencing average distances travelled by car. There are some localised variations, for example at Lancaster University, where there is lower car ownership amongst students. Generally, however, the number of cars per person is lower in Lancashire's urban areas, such as Preston, Blackburn and Blackpool.

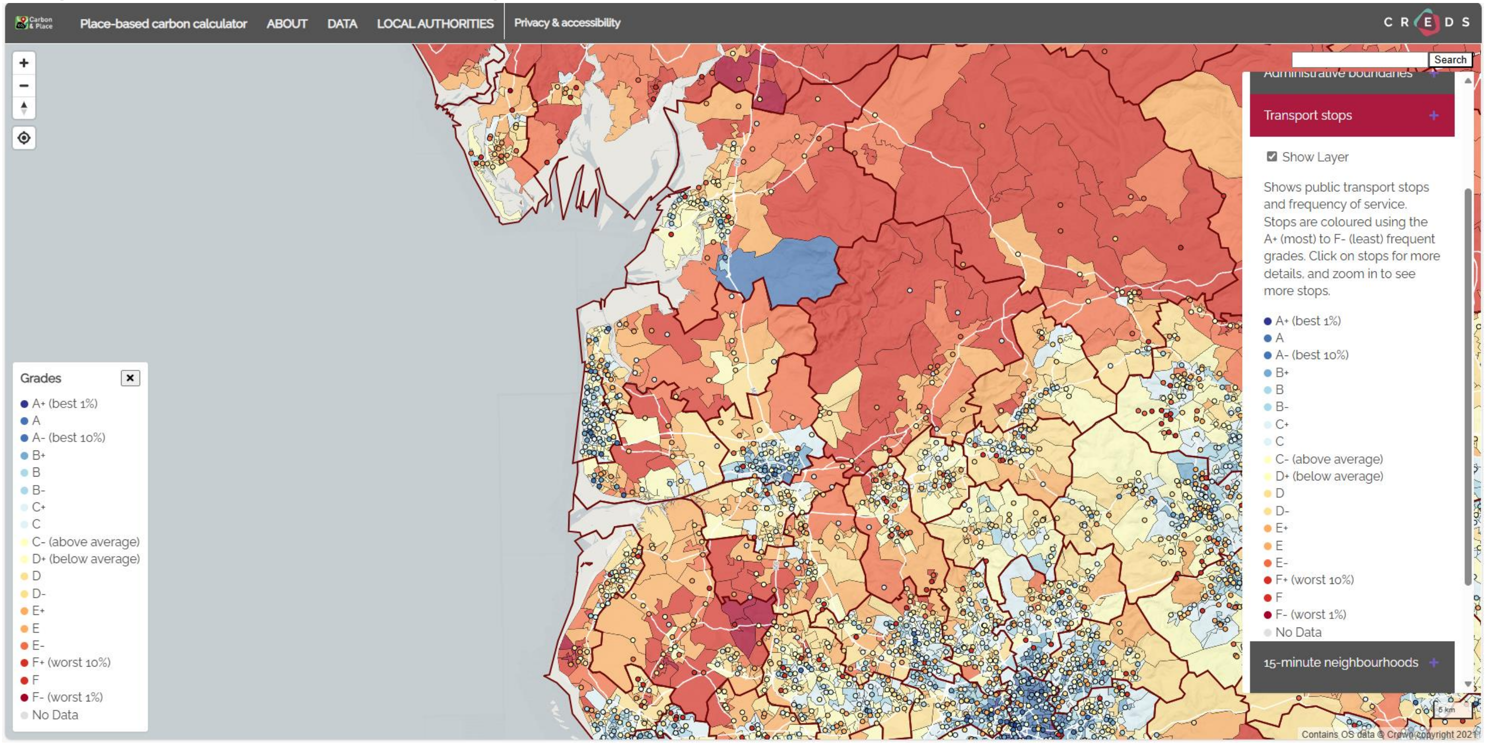
Car ownership per person is high in rural Lancashire, such as in Bowland and Silverdale. High numbers of cars per capita, are also found in rural areas immediately adjacent to Lancashire's largest settlements, such as Broughton (Preston) and Wrea Green (Blackpool) and Aldcliffe (Lancaster)

There is a clear correlation between car availability and distances travelled, with high levels of car usage and ownership in rural areas.

Levels of public transport use

Figure 2.7 maps the proportion of people travelling to work by bus, according to the 2011 census, overlain with the frequencies of buses and trains serving public transport stops and stations. Blue dots show stops where services are most frequent, and red dots show where they are least frequent.

Figure 2.7: travel to work by bus and public transport frequencies



Source: Place-based carbon calculator

Bus and rail services are, unsurprisingly, much denser and more frequent in urban areas, which is evident across not just urban Lancashire, but in more urban neighbouring authorities such as Greater Manchester. This corresponds with a much higher bus mode share for travel to work in these areas.

In Lancashire, the map indicates less commuting by bus than in neighbouring authorities. There are moderate levels of bus use in Blackburn, Burnley and Lancaster, and relatively high levels of bus use in Blackpool and Preston. Levels of bus use are much lower in most rural areas, particularly in Bowland, rural West Lancashire, and Ribble Valley. Some areas have reasonable levels of bus service, but many areas are isolated from the bus network.

Equivalent data on travel to work by train indicates that levels are highest in central Chorley, Preston, Leyland and Lancaster, reflecting availability of train services.

Public transport accessibility

Figure 2.8: public transport accessibility

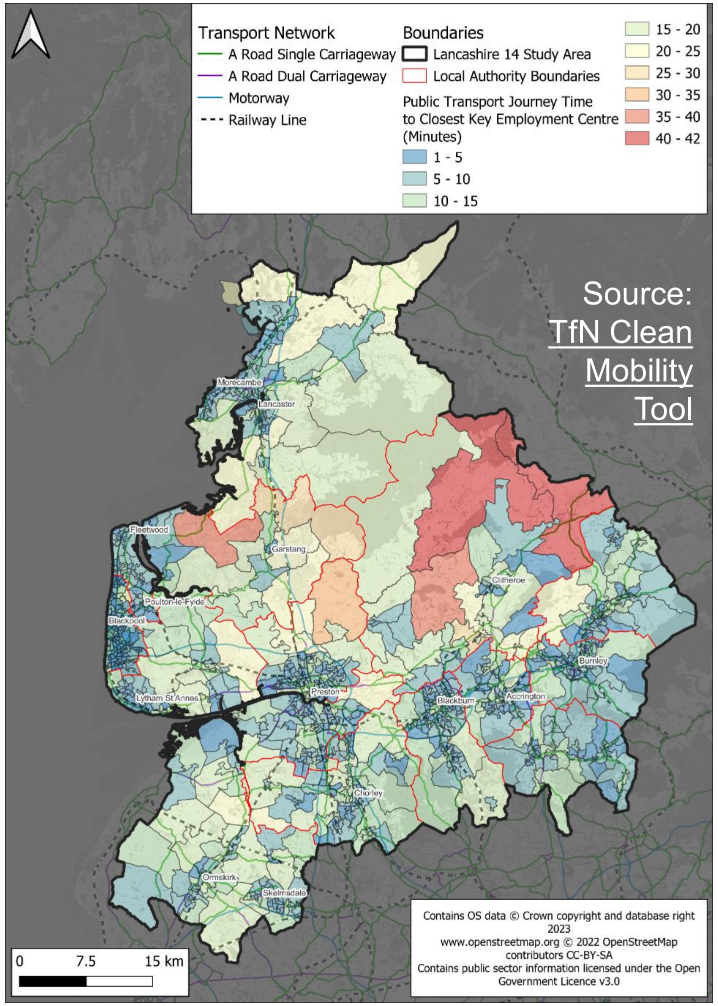


Figure 2.8 illustrates public transport accessibility across Lancashire based on journey times by public transport to the nearest employment centre from each LSOA from the TfN Clean Mobility Tool.

Considerable variations in accessibility by public transport exist across the county.

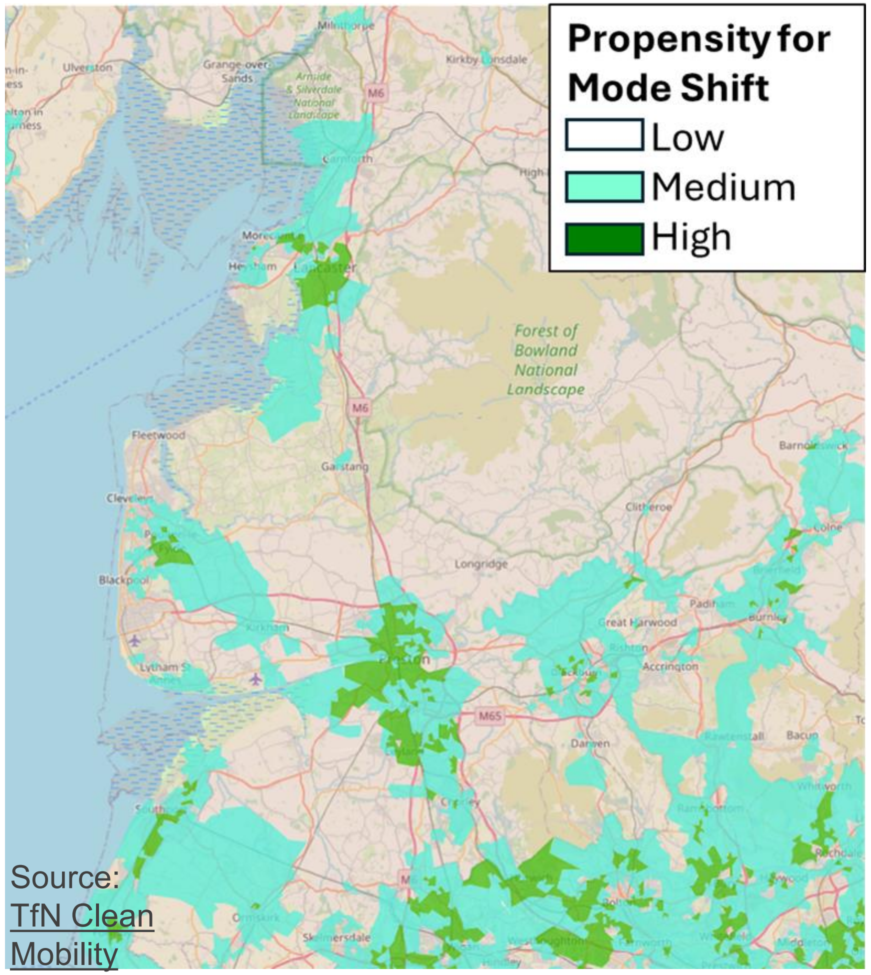
- Lowest levels of accessibility by public transport are seen in the Ribble Valley, eastern Lancaster and north and east Wyre.
- Highest levels of accessibility are seen in the Lancashire central belt, and the Fylde Coast.

These levels of accessibility influence the levels of car use seen in the previous figures as people with poorer accessibility to services, employment, education and destinations by public transport are likely rely on car use (or experience social exclusion if they are unable to drive).

Improving access to public transport in areas with poorer connectivity is foundational for enabling mode shift, either through improved choice for drivers, or reducing the necessity of car uptake for current non drivers.

Propensity for mode shift

Figure 2.9: Propensity for mode shift to public transport



Source: TfN Clean Mobility Tool

Figure 2.9 illustrates the propensity for mode shift to public transport across the county, showing considerable variation countywide.

Propensity to shift is affected by a number of factors. Those with an important impact on achieving mode shift from car (and thereby reducing carbon) include:

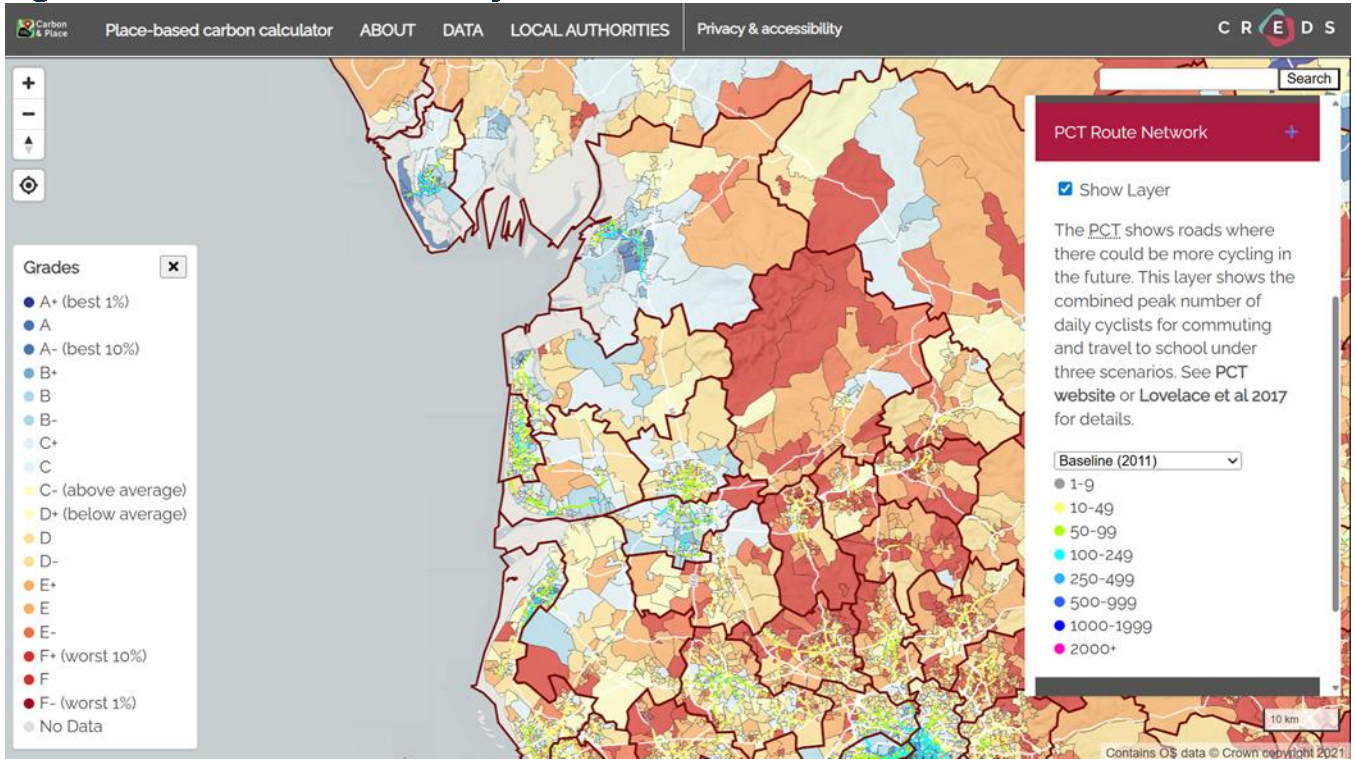
- Population density (a critical mass is needed to provide high quality public transport); and
- Level of access by public transport to key destinations, such as services, amenities and key centres.

Potential for mode shift to public transport is also influenced by levels of income deprivation and health deprivation (people are less likely to have car access if they are in poor health or less affluent). Importantly, this means that some urban areas have a lower capacity for mode shift, namely Burnley, Blackpool, Fleetwood, Skelmersdale and Rawtenstall & Bacup. This will not impact on carbon emissions but has important implications for social objectives.

Levels of cycling

Figure 2.10 maps the proportion of people travelling to work by bike, as recorded in the 2011 Census, used as the baseline in the Propensity to Cycle Tool (PCT). Each LSOA is allocated to a grade representing cycling levels relative to the national average, indicated by the shading on the map. This mapping is overlain by levels of cycling by corridor in the 2011 Baseline as identified in the PCT.

Figure 2.10: travel to work by bike and PCT Baseline 2011



Source: Place-based carbon calculator

The figure indicates key cycle corridors, with blue indicating corridors with the highest combined peak number of daily cyclists for commuting and travel to school.

The baseline gradings show that there were relatively low levels of cycling in much of Lancashire in 2011, although there were local hotspots in Blackpool, Lancaster and Preston.

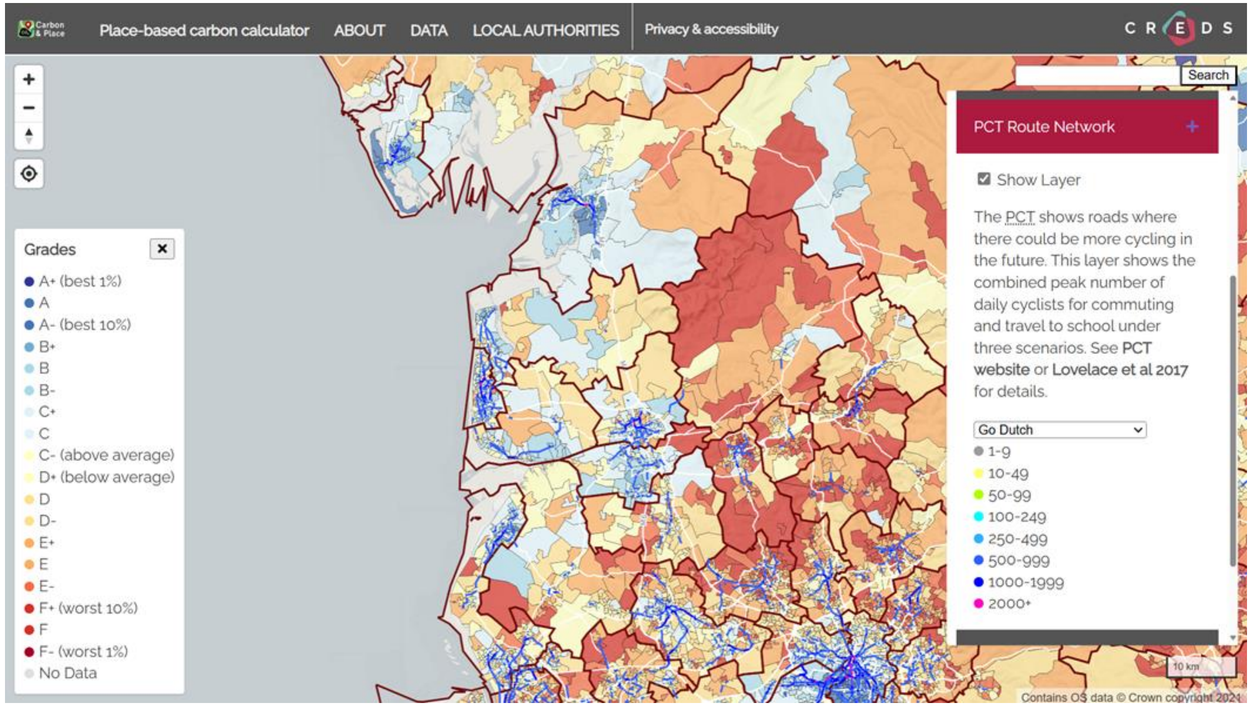
The highest baseline flows for commuting and travel to school are shown in and around the Fylde Coast, particularly central Blackpool, around Preston and South Ribble, and from Lancaster University and Morecambe to Lancaster. For example, the primary route from Morecambe to Lancaster was estimated to have a cycling flow of 250 – 499 on peak days.

The map shows an East-West divide and an Urban-Rural divide for levels of cycling in Lancashire. Whilst Coastal Lancashire and Preston show moderate to high levels of cycling, rural areas such as Bowland show low levels. There are few cycle corridors in East Lancashire that carry more than 50 cyclists per day, with the exception of sections of routes in East Lancashire's town centres. The reasons behind lower levels of cycling for commuting and school can include topographical and infrastructure constraints and trip lengths.

Potential for increased cycling levels

The investment in active travel that has occurred in Lancashire since 2011 is likely to have changed patterns of cycling. The Go-Dutch scenario in the PCT provides an indication of the extent to which cycling levels could increase with improved cycling provision to bring cycling in line with levels in the Netherlands (accounting for topography and physical constraints).

Figure 2.11: travel to work by bike and PCT Go-Dutch scenario



Source: Place-based carbon calculator

Figure 2.11 overlays the 'Go Dutch' scenario on the proportion of people travelling to work by bike in 2011. The blue lines show corridors where there could be the strongest propensity to cycle in the future

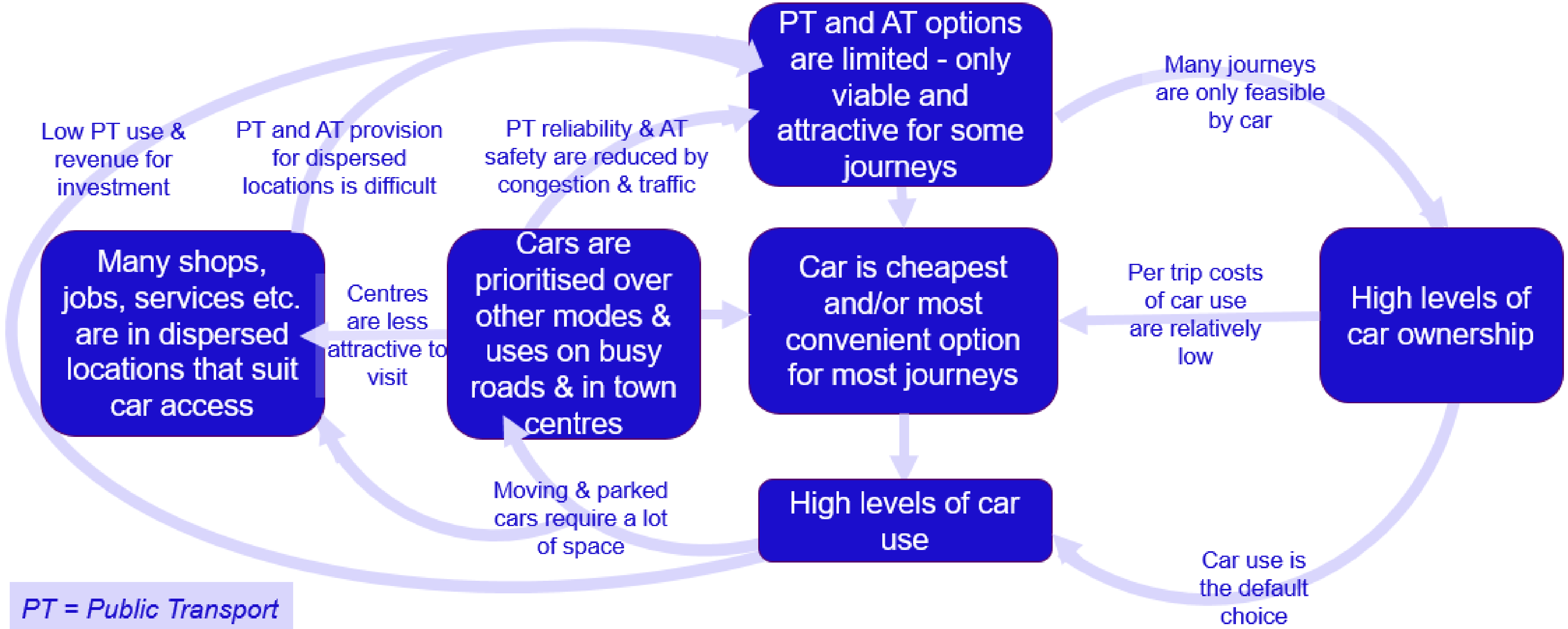
The map shows that the strongest propensity would be in towns, and with much lower propensity in rural areas. Likely due to topographical factors, higher potential demand is projected in the flatter areas of Morecambe Bay, Preston, South Ribble and the Fylde coast.

The PCT also includes a further 'e-bikes' scenario, which explores how cycling could further increase with the widespread adoption of e-bikes across communities. E-bikes enable much longer journeys by bike, and, pertinently for Pennine Lancashire, also make journeys across steeper topography easier. The PCT scenario shows that most bike journeys would still be focused on towns, reflecting the distances that people travel, although e-bikes would enable some longer-distance journeys between adjacent towns.

Why is there such high car use?

Figure 2.12 sets the insights from the previous maps in a wider context to summarise the factors influencing car use in many parts of Lancashire. This shows that there are multiple, self-reinforcing planning and social factors that lead to high car usage and limit mode shift because car is viewed as the most convenient and/or cheapest option for most journeys by car owners.

Figure 2.12: Factors influencing car use in Lancashire



PT = Public Transport
AT = Active Travel

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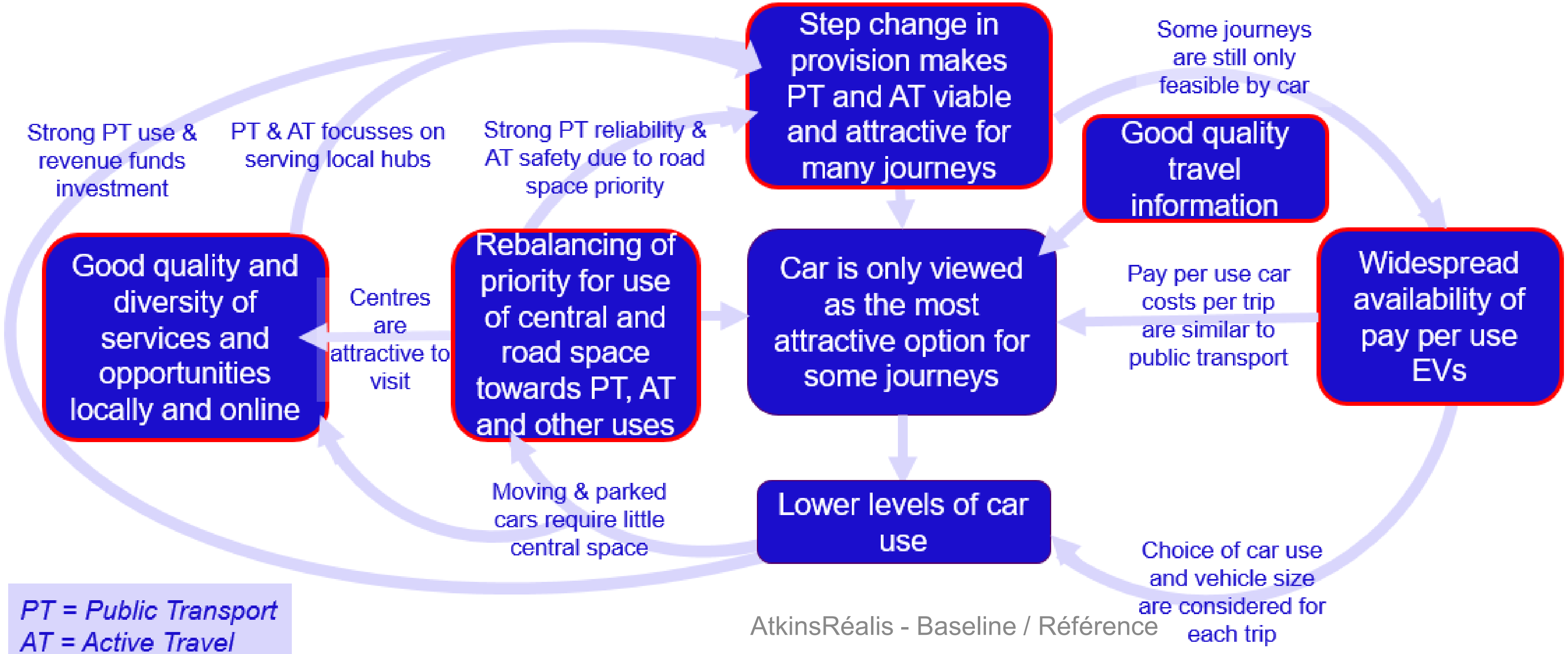
We need to act on all these factors

The number of interacting factors shown in the previous web diagram indicates that intervening with measures that influence only one part of the web will not be enough to encourage mode shift and reduce high levels of car use. **Figure 2.13** shows five types of measure (with red outlines) that are needed to change the balance and influence travel choices to encourage mode shift and reduce car use.

Figure 2.13: System-level intervention is needed



PT = Public Transport
AT = Active Travel

Action will be needed across all these types of measure to improve the attractiveness of the alternatives to driving, and influence attitudes to car use across the county.

These interventions will be needed in addition to measures to support uptake of ZEVs, for instance through supporting charging infrastructure. The transition to ZEVs will not be fast enough to meet the decarbonisation challenge; multi-faceted action is needed.

Section 3: Future baseline emissions and carbon pathways

Understanding future baseline emissions and comparing with carbon pathways

Future Emissions Scenarios and Pathways

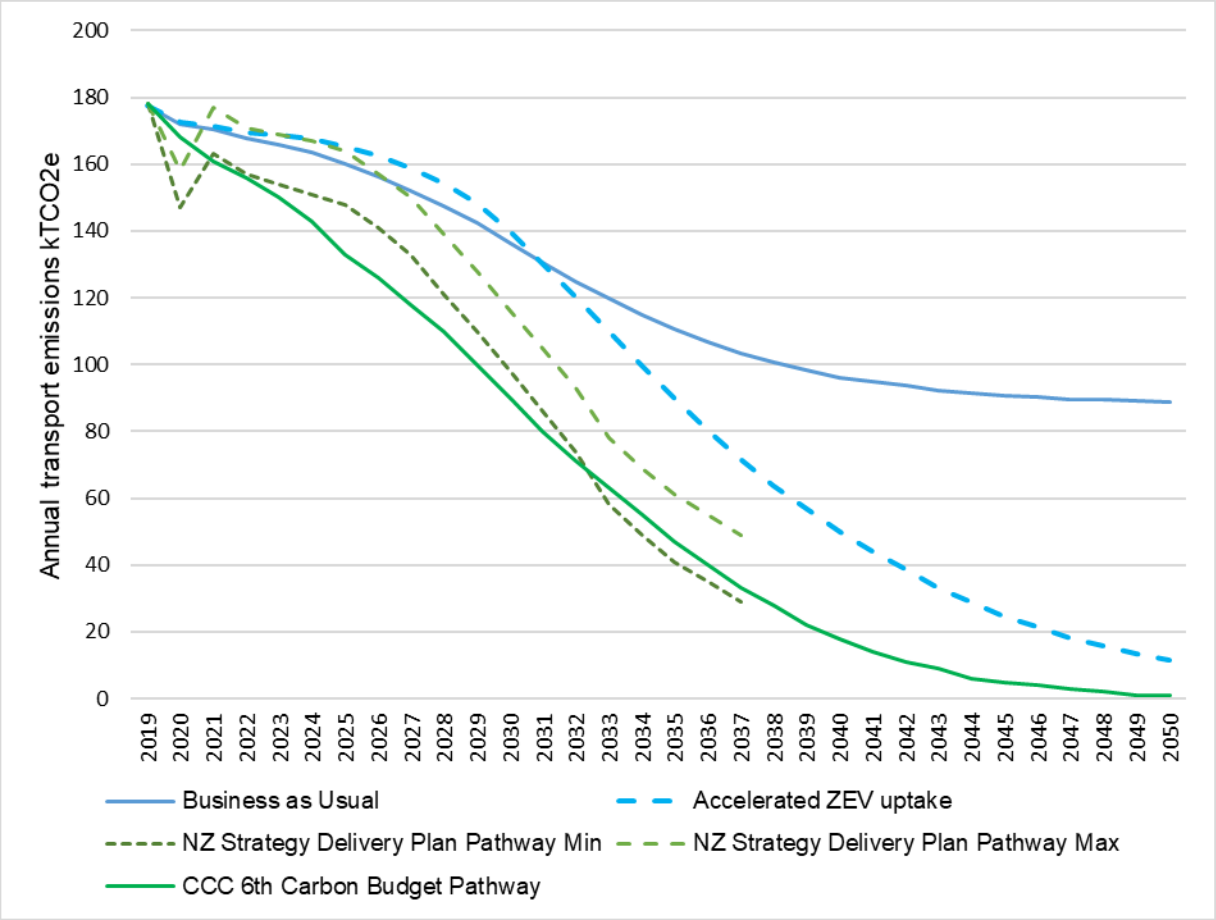
The Carbon Assessment Playbook provides forecast future carbon emissions by local authority to 2050 (the UK's statutory target year for Net Zero emissions) for three scenarios. Each scenario makes the same assumptions on traffic growth, based on the DfT's National Transport Forecasts. The scenarios vary in terms of assumed uptake of ZEVs as follows:

- **Business as Usual scenario** – reflecting uptake based on firm and funded policies in May 2023. This did not include a ban on the sale of new petrol and diesel cars and vans.
- **Local ZEV scenario** - reflecting a more realistic future based on the policy expected when the CAP was developed (e.g. the ZEV mandate) and an assumption that charging provision continues in line with demand. The scenario is localised to each local authority; reflecting how ZEV uptake might differ based on characteristics of each place.
- **Accelerated ZEV scenario** – reflecting a national scenario of ambitious ZEV uptake likely to represent a best-case scenario of ZEV uptake. Further national policies (i.e. more than the ZEV mandate and current phase out dates) would likely be necessary to realise this scenario.

The following pages illustrate each of the three scenarios for Blackburn with Darwen, Blackpool and Lancashire authorities. and how they compare with national decarbonisation pathways produced in the Net Zero Strategy (and Transport Decarbonisation Plan) and the CCC's Sixth Carbon Budget Report.

The final page in the section illustrates the scenarios combined across the LCCA area and the implied emissions gap between projected emissions in each of the scenarios and the national decarbonisation pathways.

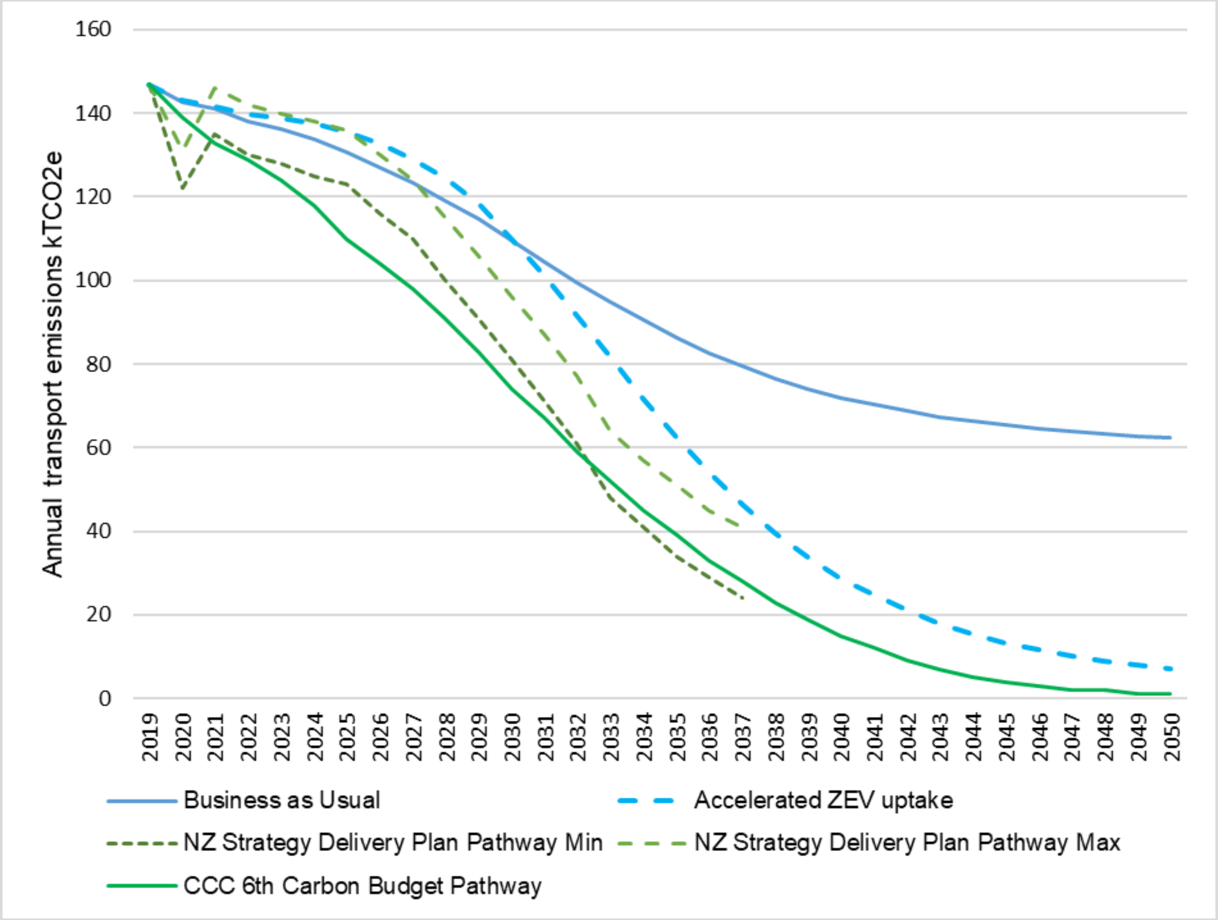
Net Zero Pathways – Blackburn with Darwen



Source: Carbon Assessment Playbook

- The district is a mixture of urban (Blackburn), rural town (Darwen) and rural (south, west and east of the district) place types.
- Emissions are projected to decrease by ~50% by 2050 under BAU.
- Under an accelerated ZEV uptake scenario, emissions are predicted to reduce to 11 ktCO2e per annum by 2050.

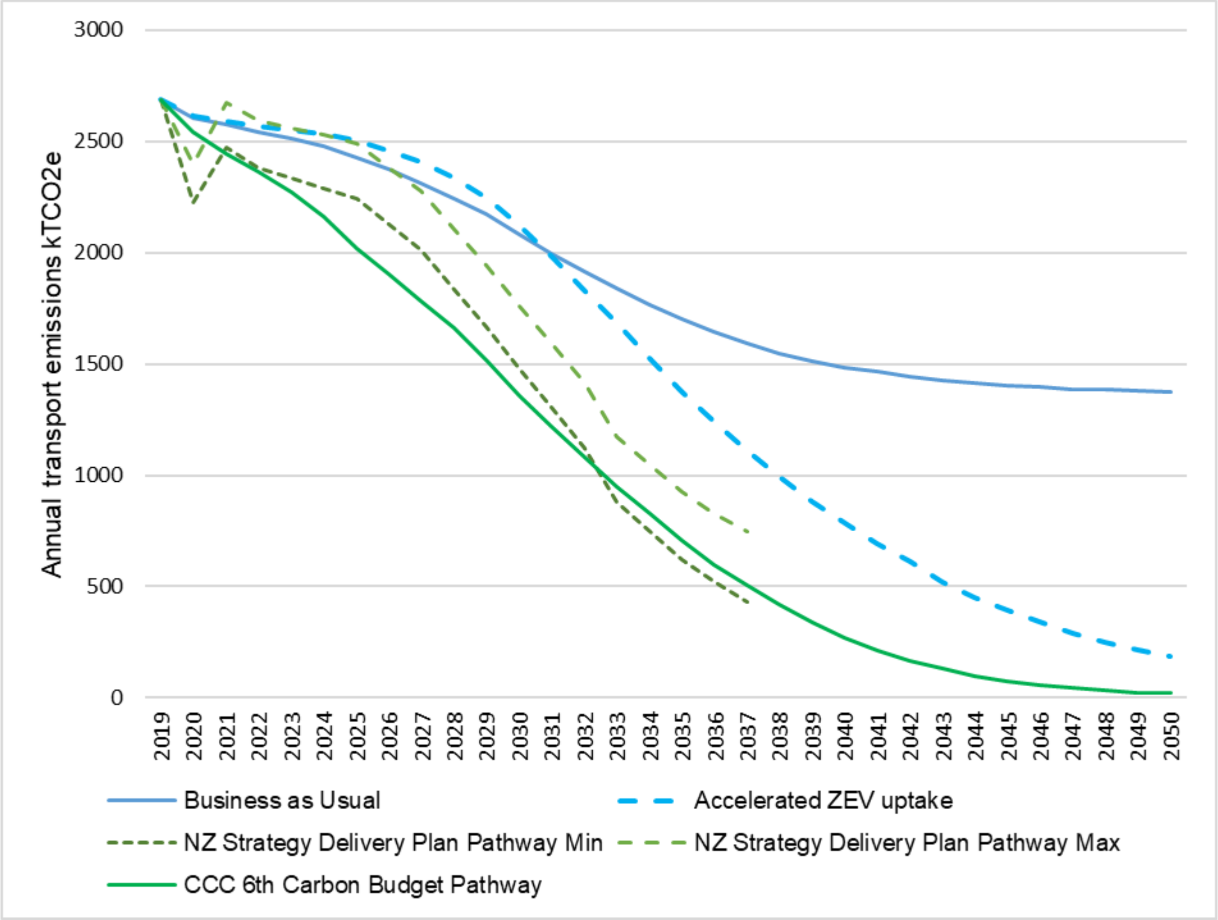
Net Zero Pathways – Blackpool



Source: Carbon Assessment Playbook

- Blackpool is an exclusively urban area
- Emissions are projected to decrease by ~40% by 2050 under BAU.
- Under an accelerated ZEV uptake scenario, emissions are predicted to reduce to 7 ktCO2e per annum by 2050.

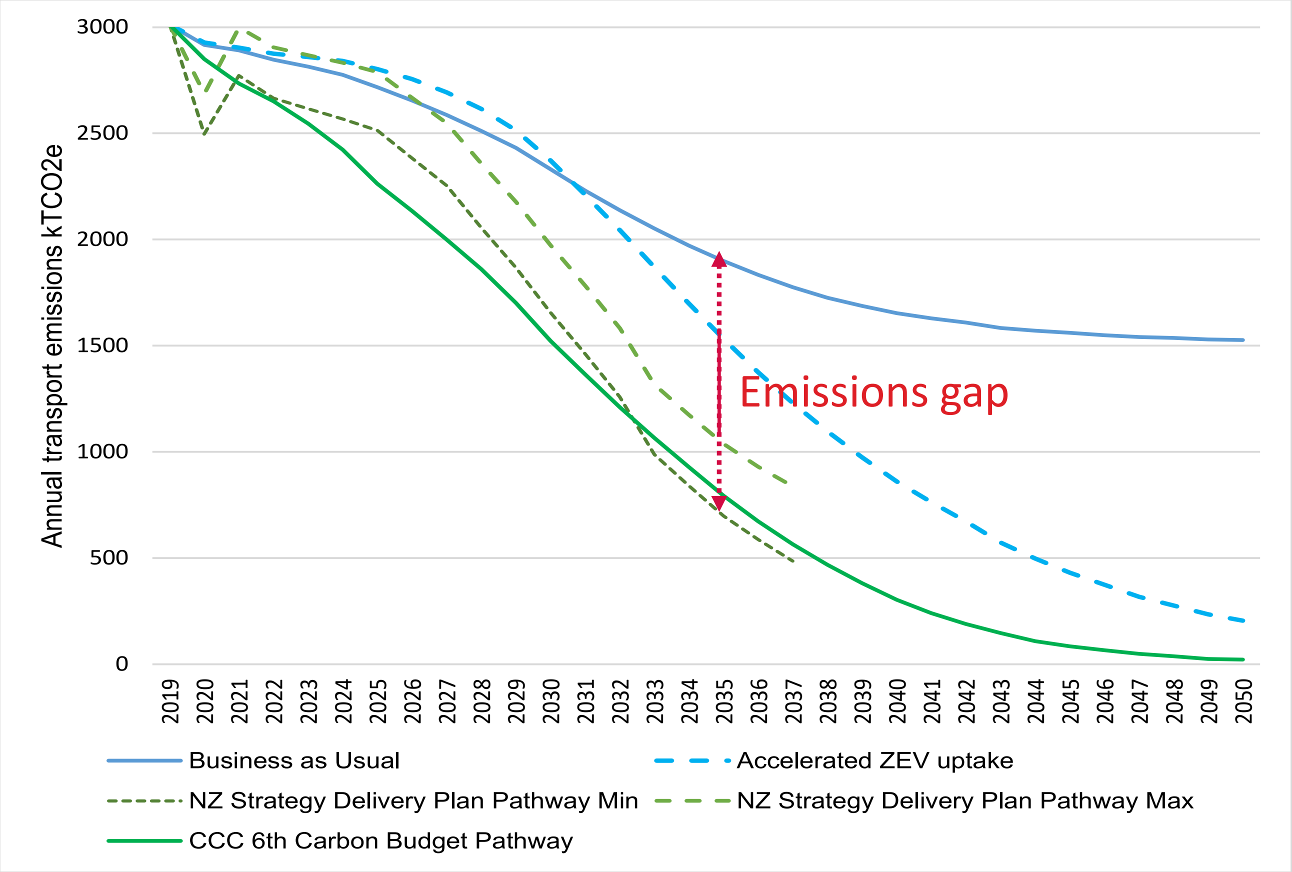
Net Zero Pathways – Lancashire County



Source: Carbon Assessment Playbook

- Lancashire has a highly diverse range of place types.
- As the largest authority, Lancashire generates the highest total MtCO2.
- Emissions are projected to decrease by ~55% by 2050 under the BAU.
- Accelerated ZEV uptake is predicted to reduce total emissions in Lancashire to 185 KtCO2 per annum by 2050.

Net Zero Pathways – LCCA area



Source: Carbon Assessment Playbook

- Combining emissions projections across the LCCA area highlights the scale of the decarbonisation challenge.
- The emissions gap between projected emissions and the national decarbonisation pathways is significant even if ambitious assumptions on ZEV uptake are made.
- In 2035 the estimated emissions gap between the accelerated ZEV uptake projection and the upper end of the NZ Strategy decarbonisation pathway is nearly 0.5 MtCO2e p.a. Closing the gap would require an emissions reduction of over 30%.
- The gap between the BAU projection and the lower end of the NZ Strategy decarbonisation pathway is approximately 1.2 MtCO2e p.a in 2035. Closing the gap would require an emissions reduction of over 60%.

Section 4: Detailed baseline analysis

Further analyses of a selection of districts in Lancashire

Detailed carbon baseline analysis

The previous section showed projections of baseline emissions across Lancashire county, Blackburn with Darwen, Blackpool and the LCCA area as a whole, based on data from the CAP.

The TfN QCR Dashboard provides more detailed information on projected baseline emissions and underlying vehicle kilometre forecasts at the district levels for scenarios reflecting:

- Two different forecasts of vehicle fleet change: Business as Usual (BAU) and accelerated ZEV uptake; and
- Three different forecasts of traffic growth: baseline, high growth and low growth. This allows for consideration of uncertainties in future economic and demographic growth in predictions for future traffic growth.

This combination of variables results in carbon projections for the following six scenarios from 2018 (baseline year) to 2050:

- **SC01:** BAU (baseline)
- **SC02:** BAU (high growth)
- **SC03:** BAU (low growth)
- **SC04:** ZEV (baseline)
- **SC05:** ZEV (high growth)
- **SC06:** ZEV (low growth)

The emissions scenarios used in the TfN dashboard differ from those used by the CAP due to factors including different assumptions on rate of uptake of ZEVs. However, the dashboard provides useful additional insights particularly around the level of vehicle kilometres in each district.

Appendix A provides more detail on the carbon baselines set out in the TfN dashboard for each of the 14 districts of the county, highlighting a number of key points:

- Traffic levels and associated emissions vary considerably by district, reflecting their size and characteristics:
  - In 2018, there were more than 3 times as many vehicle kilometres within Chorley (1.65 bn) than within Blackpool and the Ribble Valley (each < 0.5 bn vehicle kms)
  - Fylde, Lancaster, Preston and Wyre were the next largest districts in terms of traffic volumes each with 1.2 bn to 1.3 bn vehicle kilometres in 2018

Detailed carbon baseline analysis (continued)

- Levels of through traffic vary considerably by district.
  - In both Chorley and South Ribble, over 50% of emissions are estimated to be generated from through trips, reflecting the position of these districts on the SRN.
  - In contrast less than 5% of emissions in Blackpool are estimated to be generated from through traffic, reflecting its coastal position and road layout.
  - Blackburn and Pendle also have relatively low proportions of through-traffic, at approximately 20%.
  - In all other districts, through traffic is estimated to account for between 25% and 45% of emissions, with an average across the districts of 35%.
- Levels of traffic growth vary by district:
  - In the core baseline scenario, the highest growth is projected in Chorley, Lancaster and the Ribble Valley with estimated growth in vehicle kilometres between 2018 and 2050 of 24%, 25% and 26% respectively.
  - Blackburn with Darwen, Pendle, Fylde and Blackpool have the lowest levels projected levels of growth of less than 20% over the same time period (19%, 17%, 16% and 9% respectively).
  - Variation in growth between districts is more significant in the high and low growth scenarios.
- Accelerated EV scenarios are predicted to have a significant impact on decarbonisation,
  - Cumulative emissions produced in the baseline scenario between 2018 and 2050 generally 45% to 55% higher than the cumulative emissions generated in accelerated ZEV uptake scenarios

Section 5: Conclusions

Carbon emissions in Lancashire

- Baseline vehicle emissions vary significantly between districts, reflecting the diverse geography and travel patterns within and through Lancashire.
- Changes in emissions across each area, and future emissions profiles are dependent on:
    - The speed at which EVs are adopted
    - The growth in vehicle kilometres (from forecast growth population and propensity for road travel)
- Accelerated EV scenarios are predicted to have a significant impact on decarbonisation, with cumulative emissions produced in the baseline scenario between the 2020s and 2050 generally over 50% higher than the cumulative emissions generated in accelerated ZEV uptake scenarios.
- Proportions of through traffic as a source of emissions and vehicle kilometres vary significantly by district. The extent to which emissions from through traffic correlate with vehicle kilometres depends on the proportion of through trips that are made by HGVs.
- Growth in housing and jobs has a direct impact on vehicle kilometres in different areas and so spatial planning will be critical in delivering housing and economic growth ambitions whilst meeting carbon ambitions.
- The policy options to decarbonise travel will need to reflect the diverse geography of the county, with variations in factors such as car ownership and availability of public transport

Appendix A: District level analysis

District level analysis

- This Appendix outlines more detailed analysis undertaken for the 14 districts in Lancashire. As outlined in Section 4: Detailed baseline analysis, the district level analysis entailed the use of The TfN QCR Dashboard to outline current and projected emissions and vehicle kilometres across the county.
- The emissions scenarios used in the TfN dashboard differ from those used by the Carbon Assessment Playbook due to factors including different assumptions on rate of uptake of ZEVs (see box). However, the dashboard provides useful additional insights, particularly around the level of vehicle kilometres in each district.
- The following sections provide summary information on transport emissions and vehicle kilometres within each of the 14 districts in the six different scenarios outlined in Section 4: i.e. SC01 to SC06.
- Note that the vehicle kilometre growth assumptions for the accelerated ZEV uptake scenarios (SC04, SC05 and SC06) are equivalent to those for SC01, SC02 and SC03, only assumed ZEV uptake rates vary between the scenarios.

The scenarios used in the TfN dashboard were developed as follows:

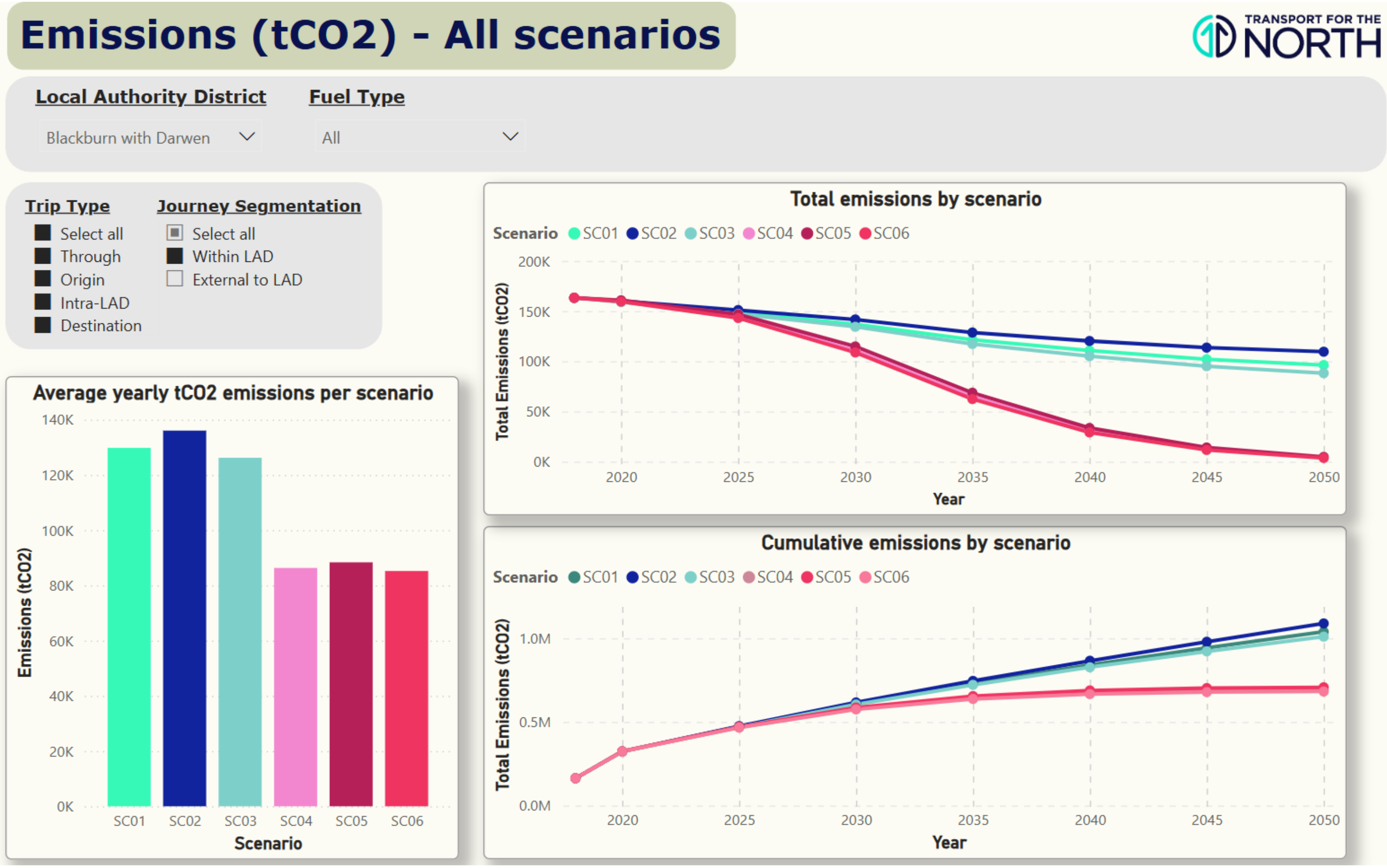
- The fleet scenarios were created from an iterative feedback process between TfN's fleet model and the mileage splits for the Common Analytical Scenarios set out by the Department for Transport.
- The vehicle fleet was adjusted through uptake rates by fuel type until the vehicle kilometre demand matched the corresponding DfT data.
- The highway demand scenarios were based on the corresponding NTEM demand scenarios

Select area analysis

Blackburn with Darwen

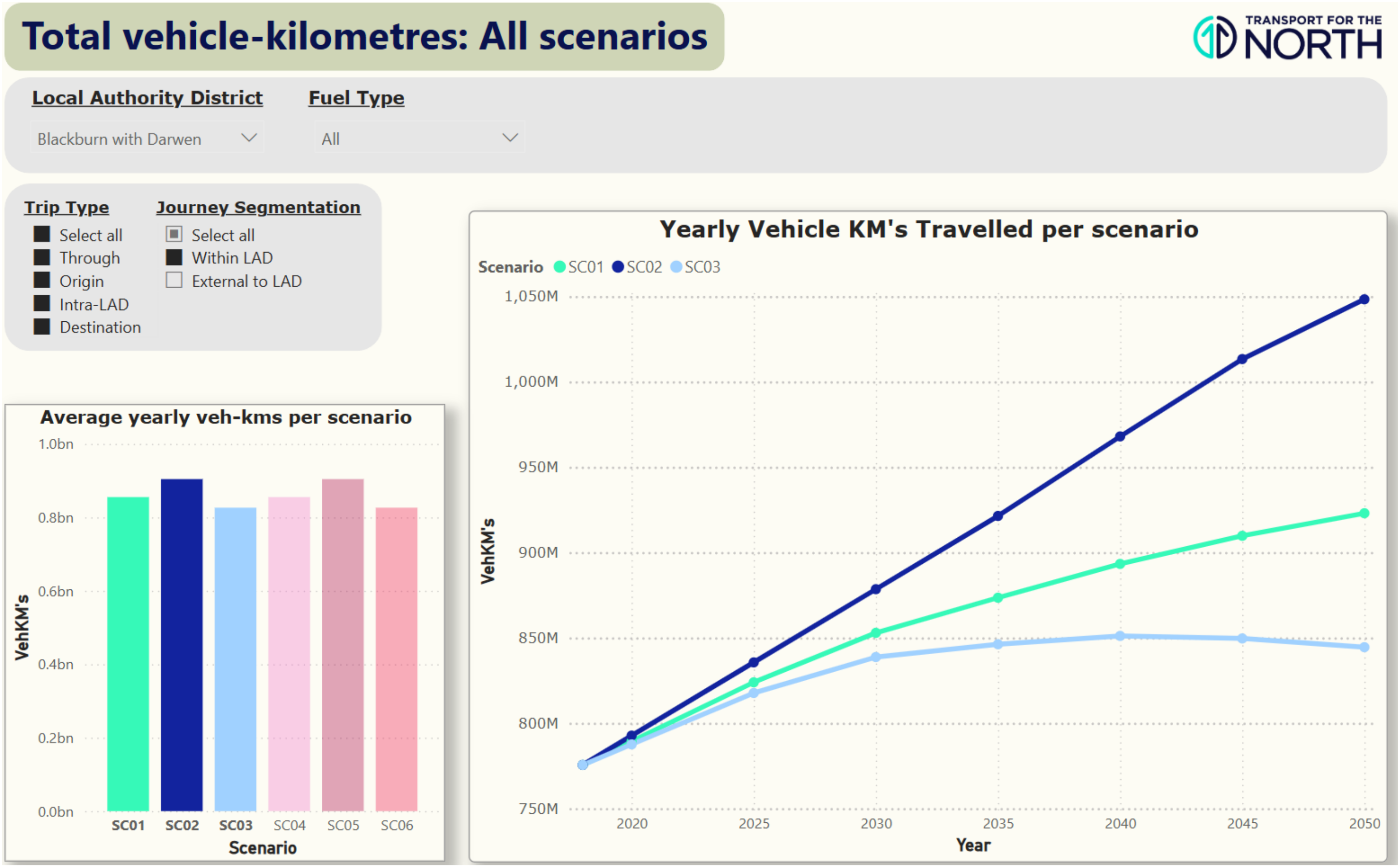
LANCASHIRE COMBINED COUNTY AUTHORITY

Blackburn with Darwen – total emissions



- Around 20% of Blackburn with Darwen's vehicle emissions are from through trips, lower than the LCCA average of 35%.
- Cumulative emissions by 2050 are projected to be 50% higher under SC01 (1.0 $MtCO_2$) than SC04 (0.7 $MtCO_2$).

Blackburn with Darwen – vehicle kilometres

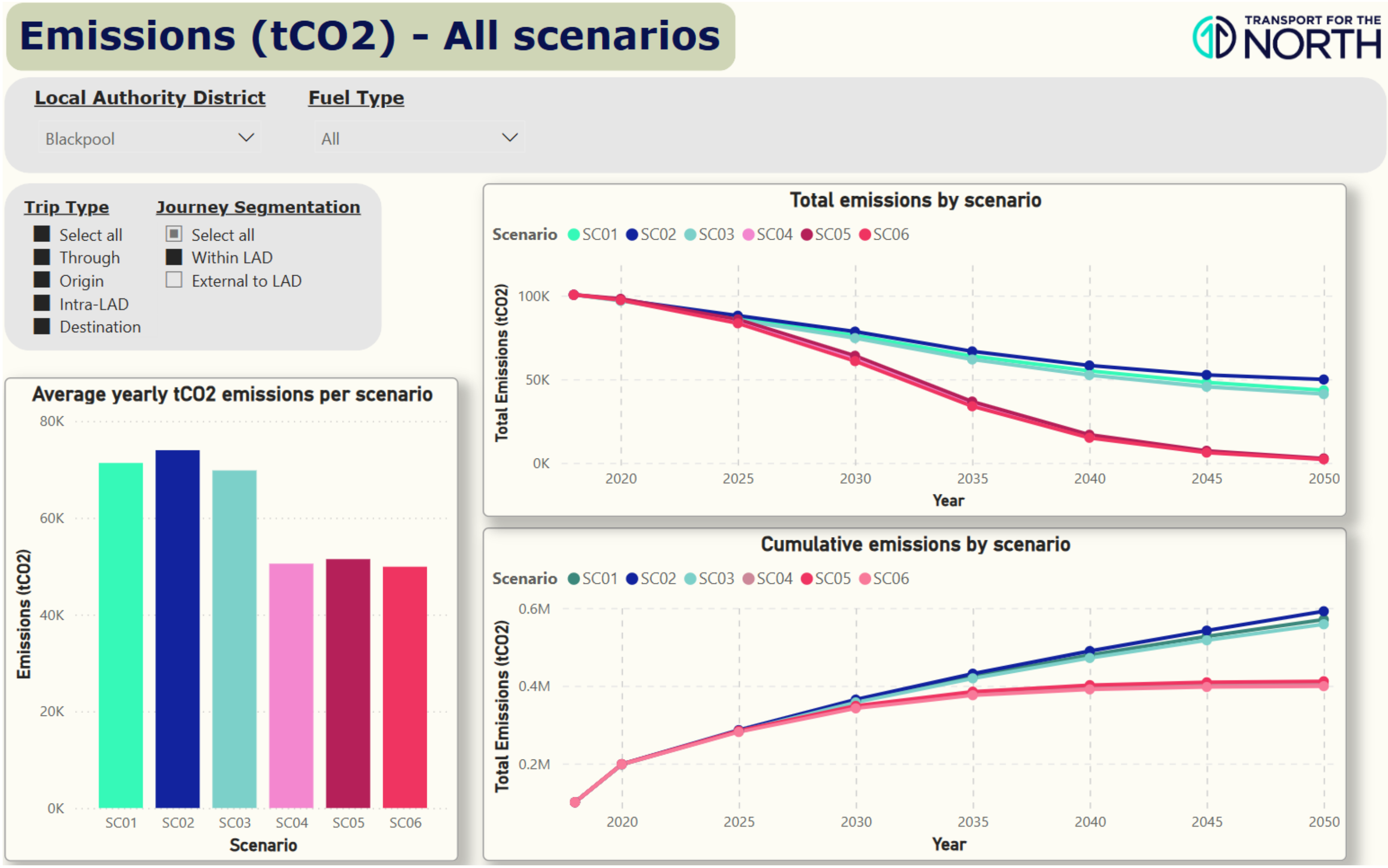


- In 2018, a total of 0.78bn vehicle kilometres were travelled within Blackburn with Darwen.
- Under baseline growth (SC01 and SC04), vehicle kilometres are projected to increase by 19% between 2018 and 2050. The high and low growth scenarios project increases in traffic of 35% and 9%, compared to the 2018 baseline, respectively.
- Under SC03 (and SC06), low growth scenario, a slight reduction in vehicle kilometres is projected between 2040 and 2050.
- 23% of vehicle kilometres in Blackburn with Darwen are estimated to be travelling on through trips.

Select area analysis

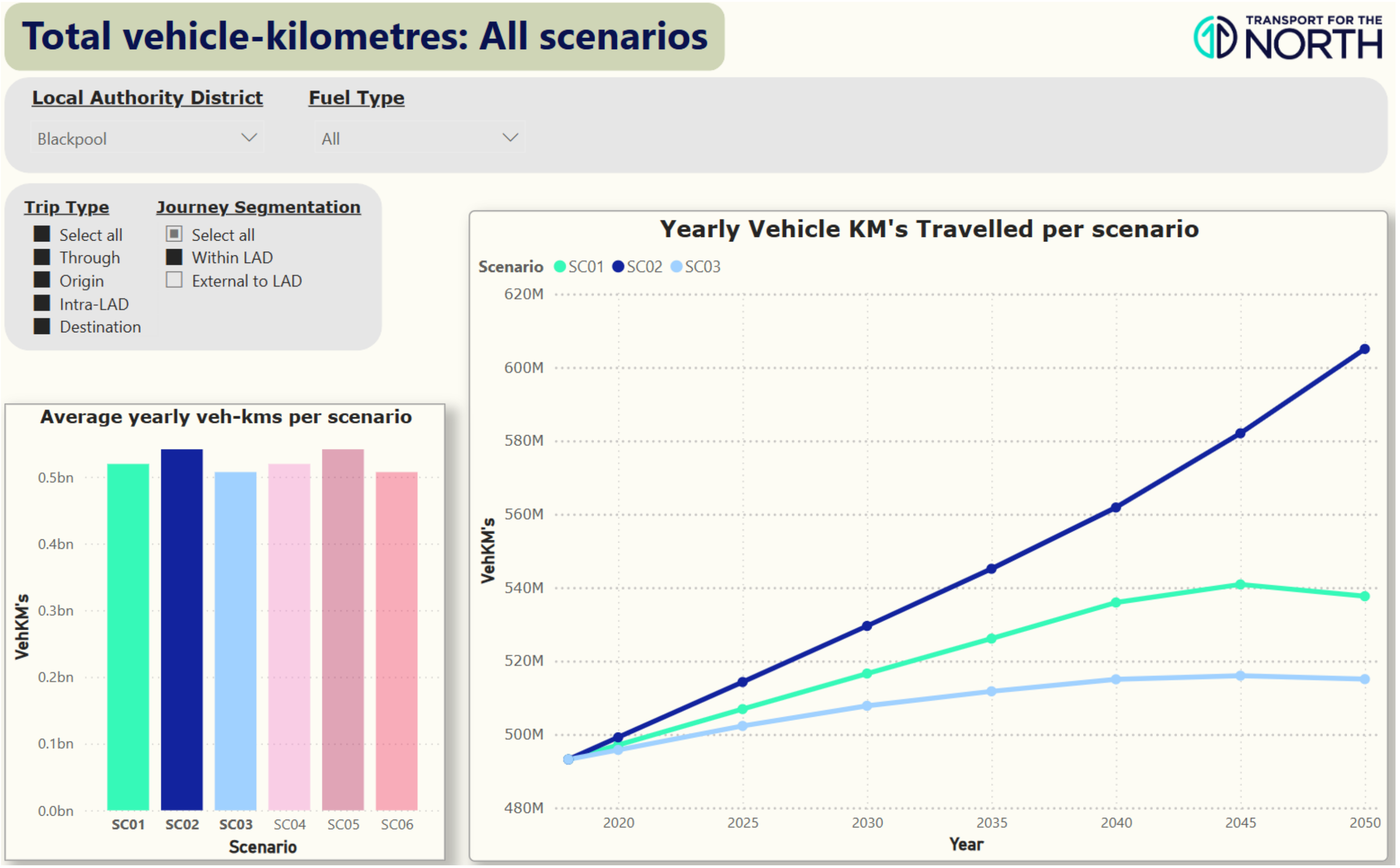
Blackpool

Blackpool – total emissions



- Cumulative emissions under SC01 are projected to be approximately 0.6 $MtCO_2$ by 2050, over 40% higher than emissions under SC04.
- Blackpool shows a steeper projected reduction in emissions under SC01, SC02 and SC03 scenarios than Blackburn with Darwen because projected increases in vehicle kilometres are lower (see next page).
- Blackpool has the lowest proportion of through trips by a significant margin: only 3% of emissions are estimated to be generated by trips that originate and terminate outside of Blackpool.

Blackpool – vehicle kilometres

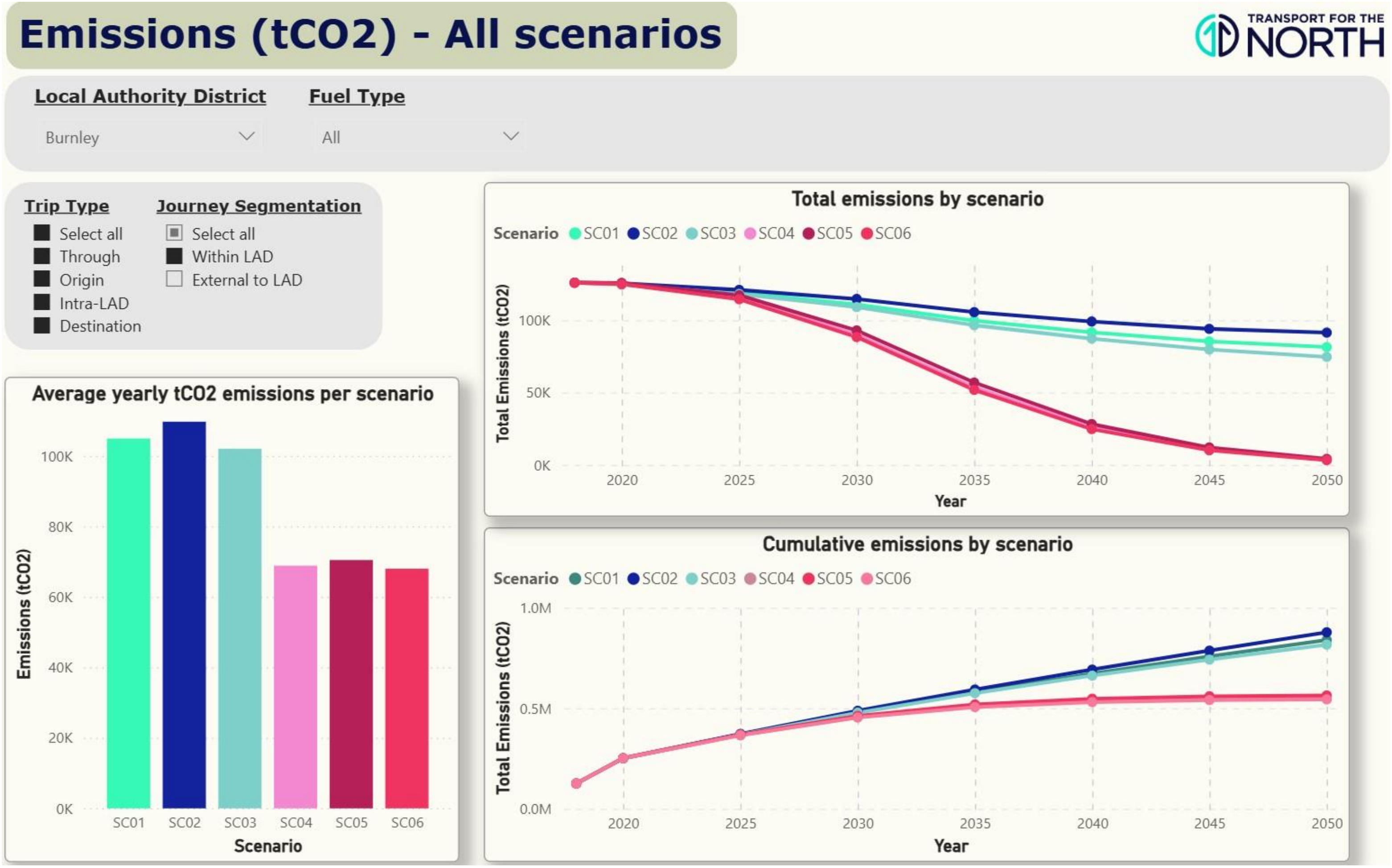


- In 2018, a total of 0.49bn vehicle kilometres were travelled within Blackpool.
- Projected increases in traffic from the 2018 baseline are relatively low, with increases of vehicle kilometres by 2050 of:
  - 9% under SC01 (and SC04)
  - 23% under SC02 (and SC05)
  - 4% under SC03 (and SC06)
- Vehicle kilometres reduce between 2045 to 2050 under SC01 (and SC04).

Select area analysis

Burnley

Burnley – total emissions



- Through trips account for 25% of transport emissions in Burnley, slightly lower than the county average of 35%.
- Cumulative emissions by 2050 are projected to be 50% higher under SC01 than SC04.

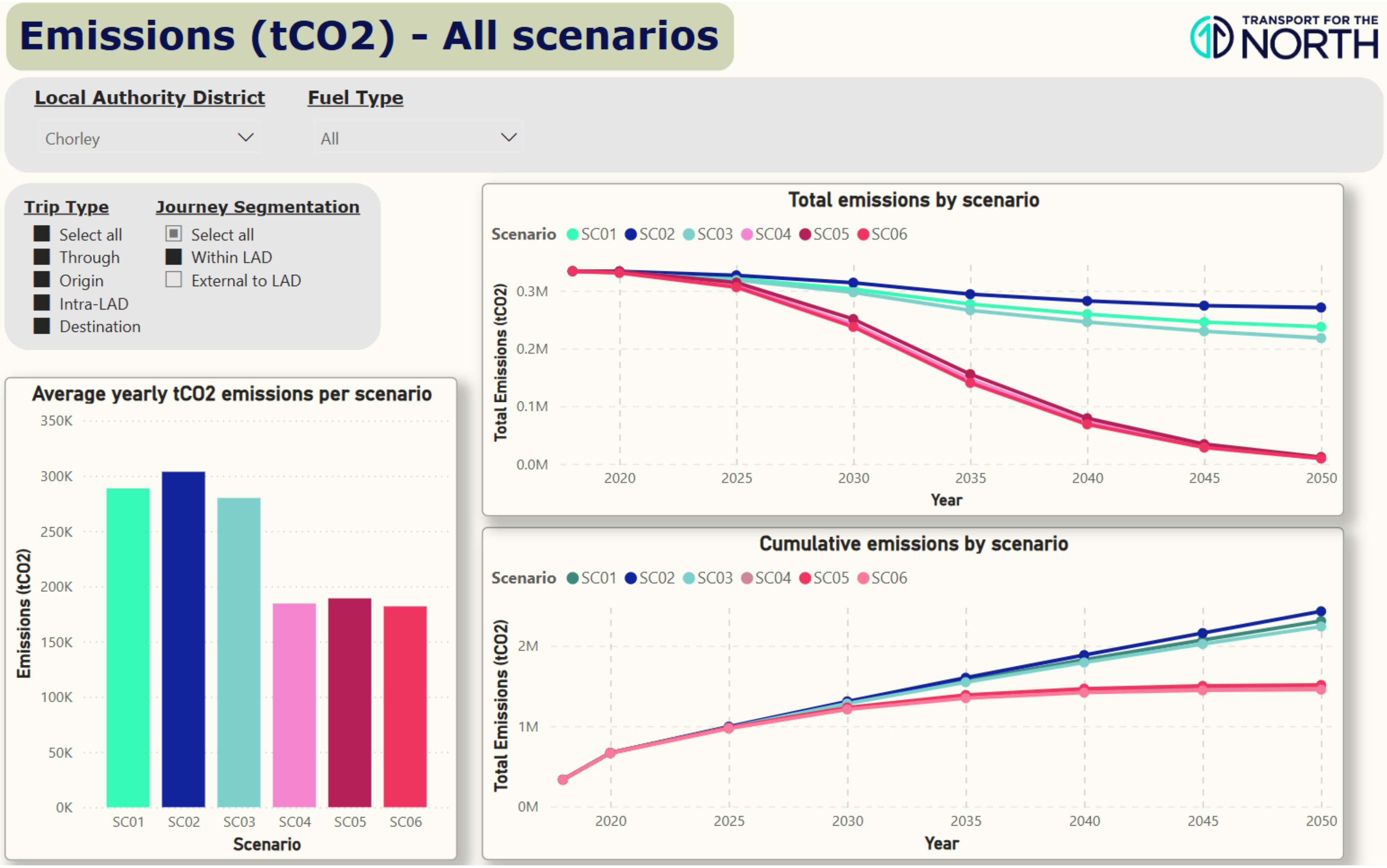
Burnley – vehicle kilometres

- In 2018, a total of 0.6bn vehicle kilometres were travelled within Burnley. Of these, an estimated 27% were on through trips.
- By 2050, vehicle kilometres are projected to increase from 2018 by:
  - 22% under SC01
  - 37% under SC02
  - 11% under SC03

Select area analysis

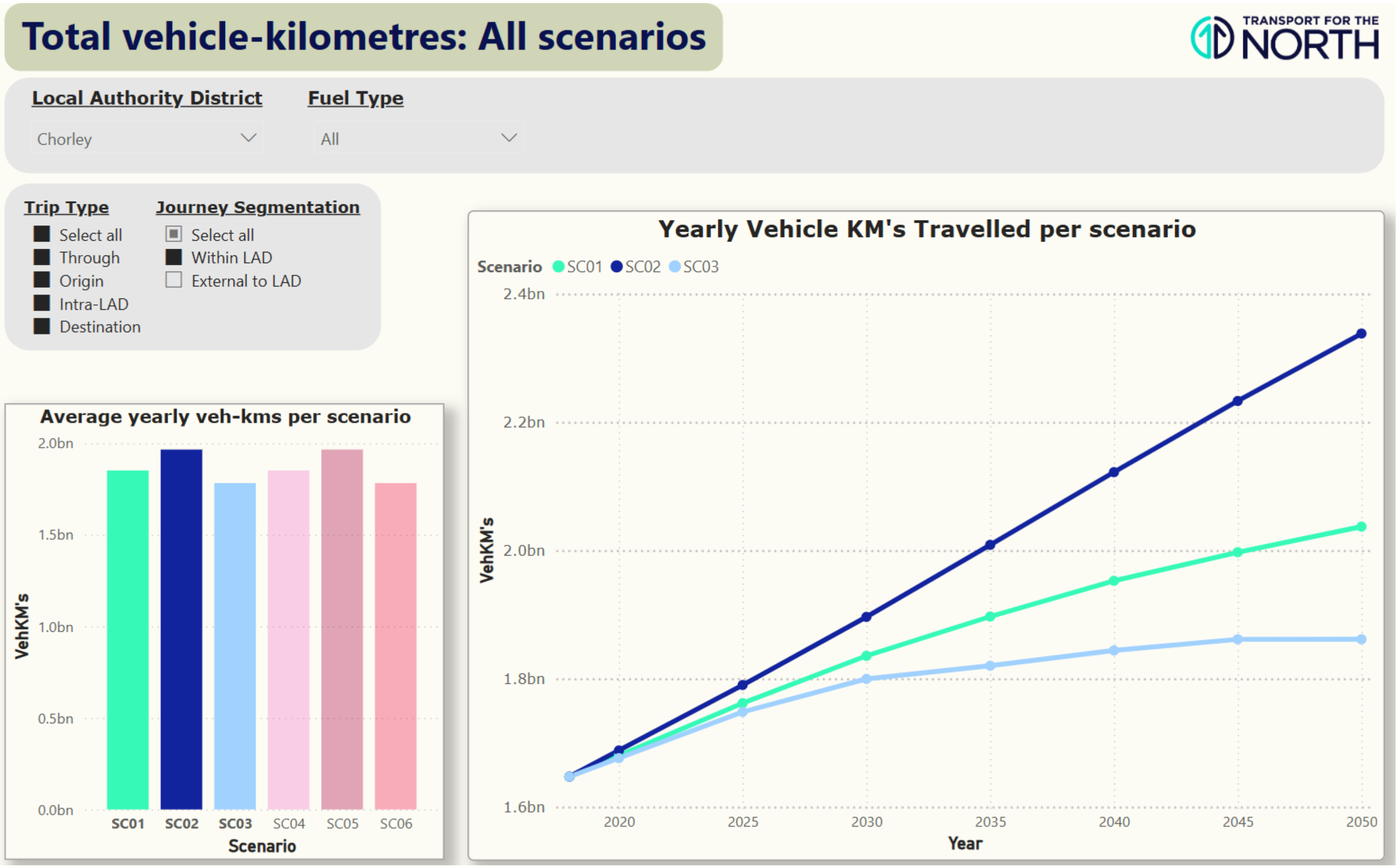
Chorley

Chorley – total emissions



- Through trips account for 55% of transport emissions in Chorley, the highest proportion for all the districts in Lancashire. For comparison, the county average is 35%. This reflects the location of the district on the Strategic Road Network.
- Cumulative emissions by 2050 are projected to be 57% higher under SC01 than SC04.

Chorley – vehicle kilometres

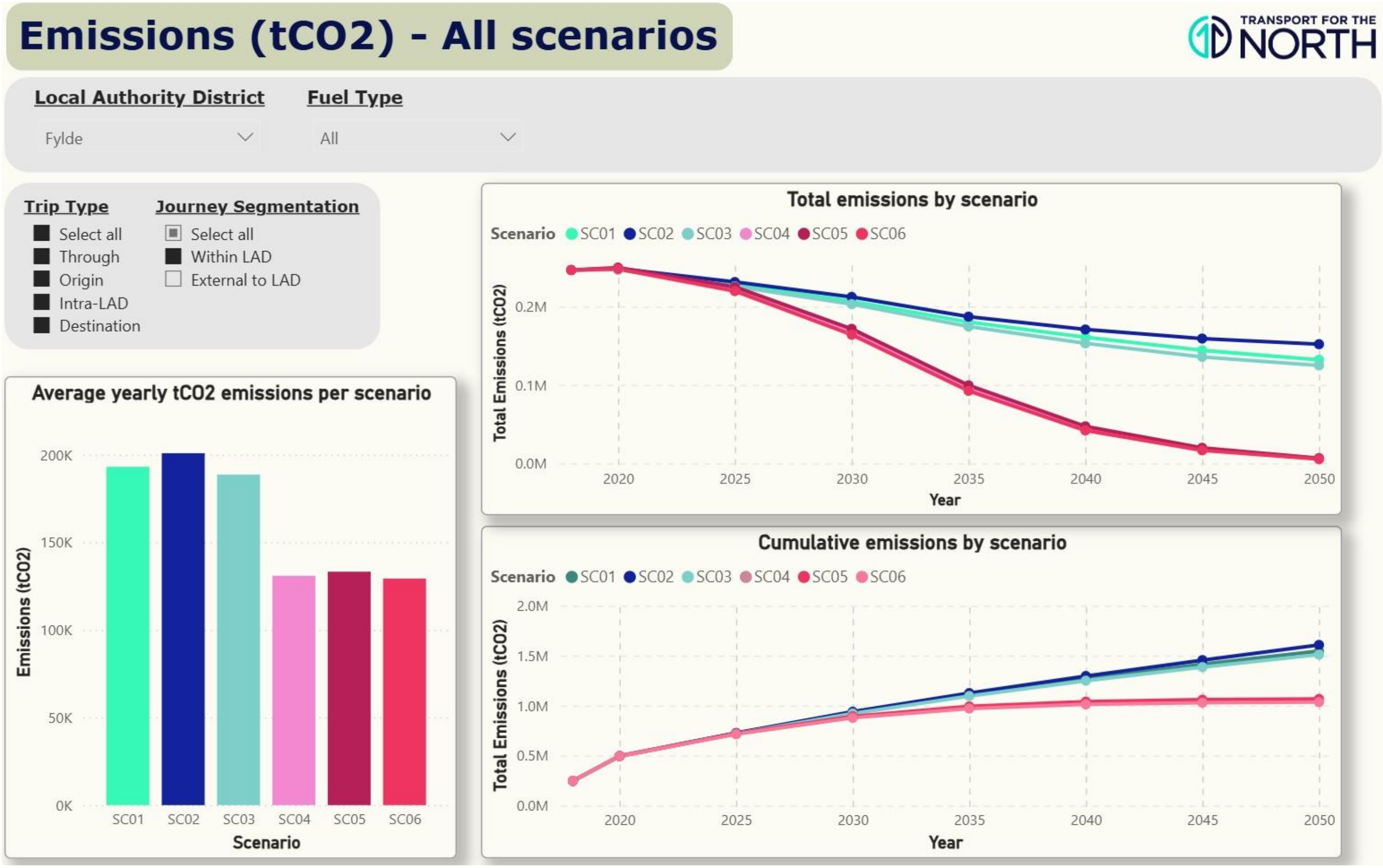


- In 2018, a total of 1.65bn vehicle kilometres were travelled within Chorley, the highest total of the districts in Lancashire. Of these, an estimated 53% were on through trips.
- By 2050, vehicle kilometres are projected to increase from 2018 by:
  - 24% under SC01
  - 41% under SC02
  - 13% under SC03

Select area analysis

Fylde

Fylde – total emissions



- Through trips account for 21% of transport emissions in Fylde, lower than the county average of 35%.
- Cumulative emissions by 2050 are projected to be 48% higher under SC01 than SC04.

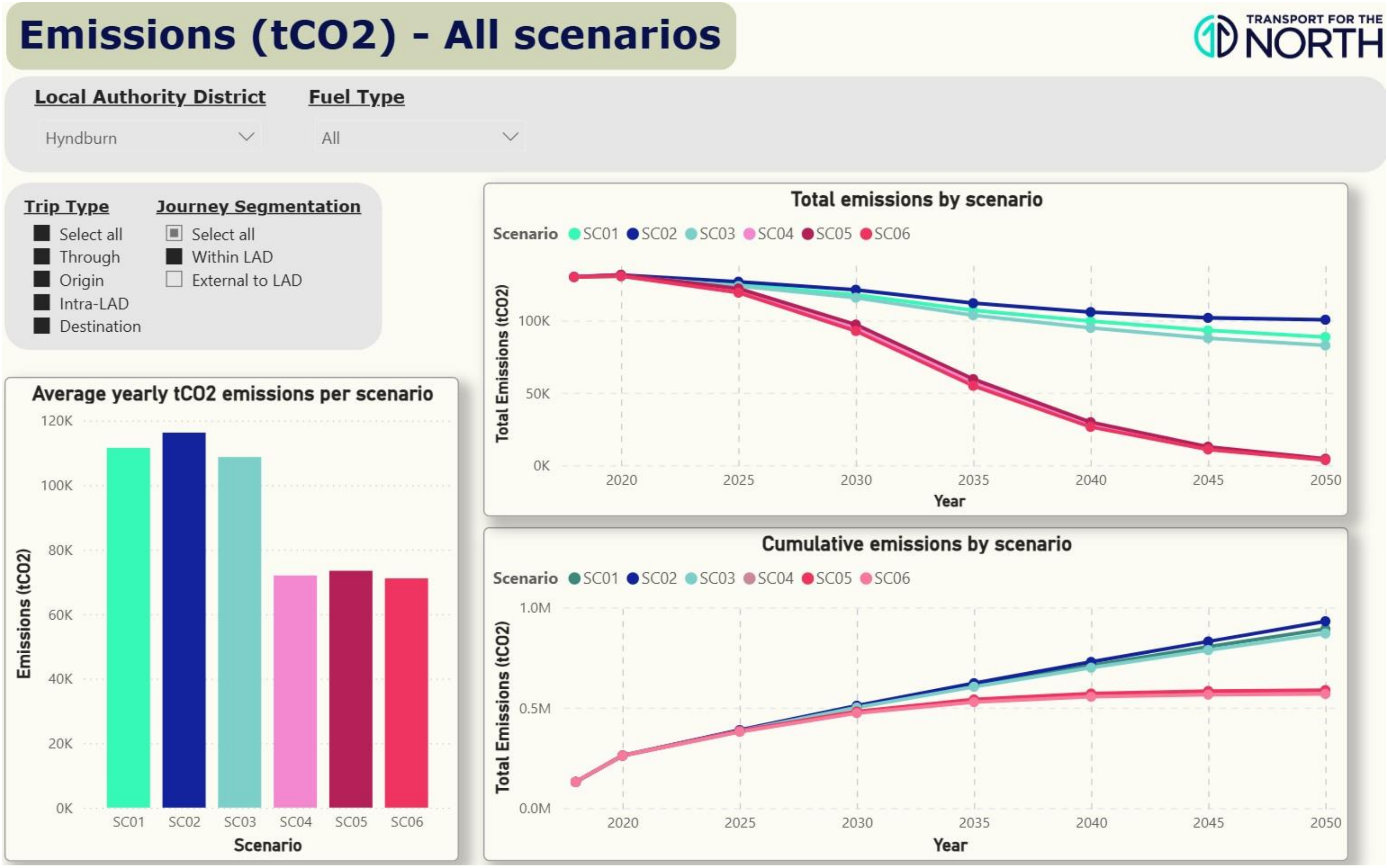
Fylde – vehicle kilometres

- In 2018, a total of 1.2bn vehicle kilometres were travelled within Fylde. Of these, an estimated 21% were on through trips.
- By 2050, vehicle kilometres are projected to increase from 2018 by:
    - 16% under SC01
    - 33% under SC02
    - 11% under SC03

Select area analysis

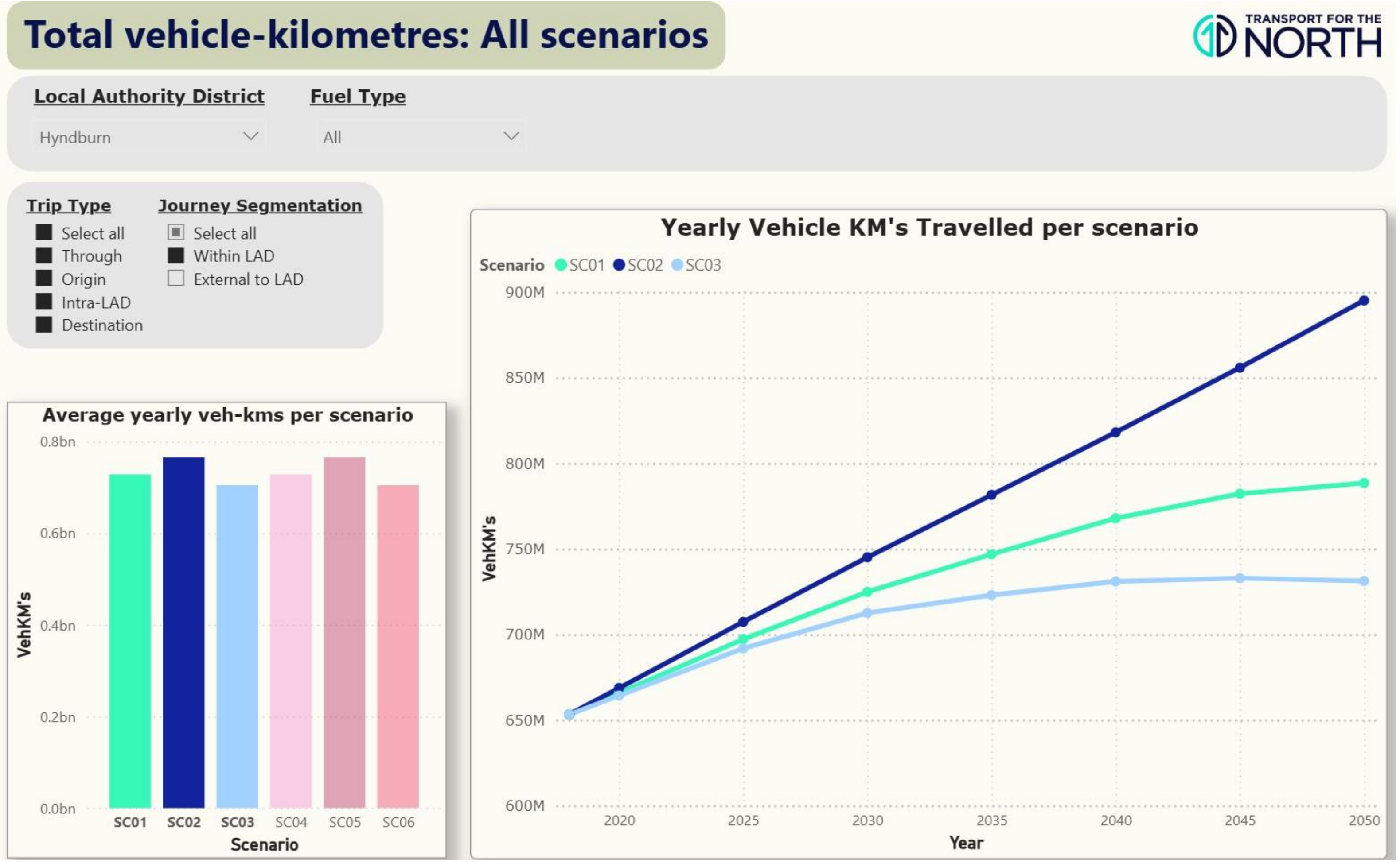
Hyndburn

Hyndburn – total emissions



- Through trips account for 42% of transport emissions in Hyndburn, higher than the county average of 35%. This is likely due to through trips taken on the M65 and A56, which travel East-West and North – South through Hyndburn, respectively.
- Cumulative emissions by 2050 are projected to be 55% higher under SC01 than SC04.

Hyndburn – vehicle kilometres

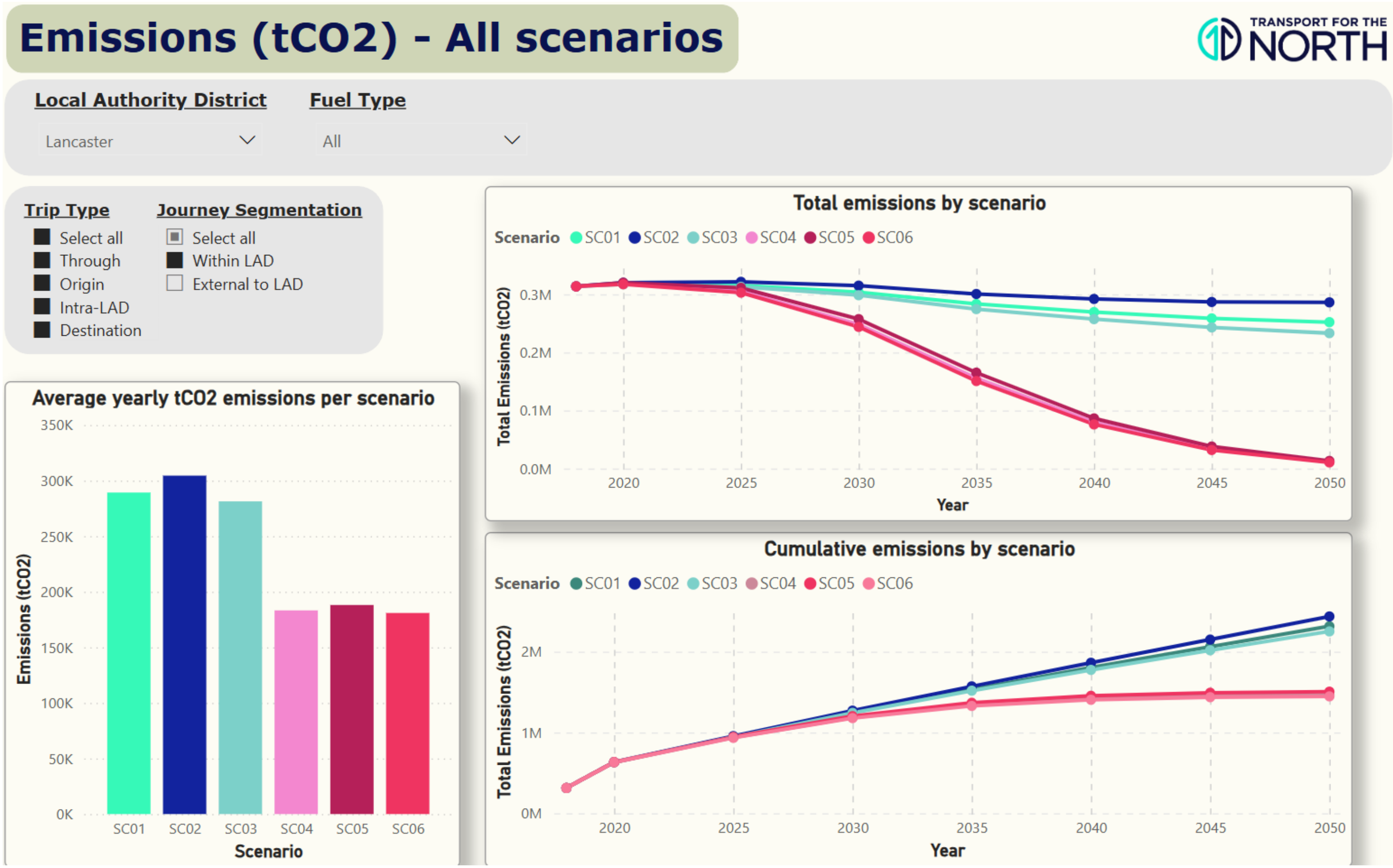


- In 2018, a total of 0.65bn vehicle kilometres were travelled within Hyndburn. Of these, an estimated 43% were on through trips.
- By 2050, vehicle kilometres are projected to increase from 2018 by:
  - 21% under SC01
  - 37% under SC02
  - 12% under SC03

Select area analysis

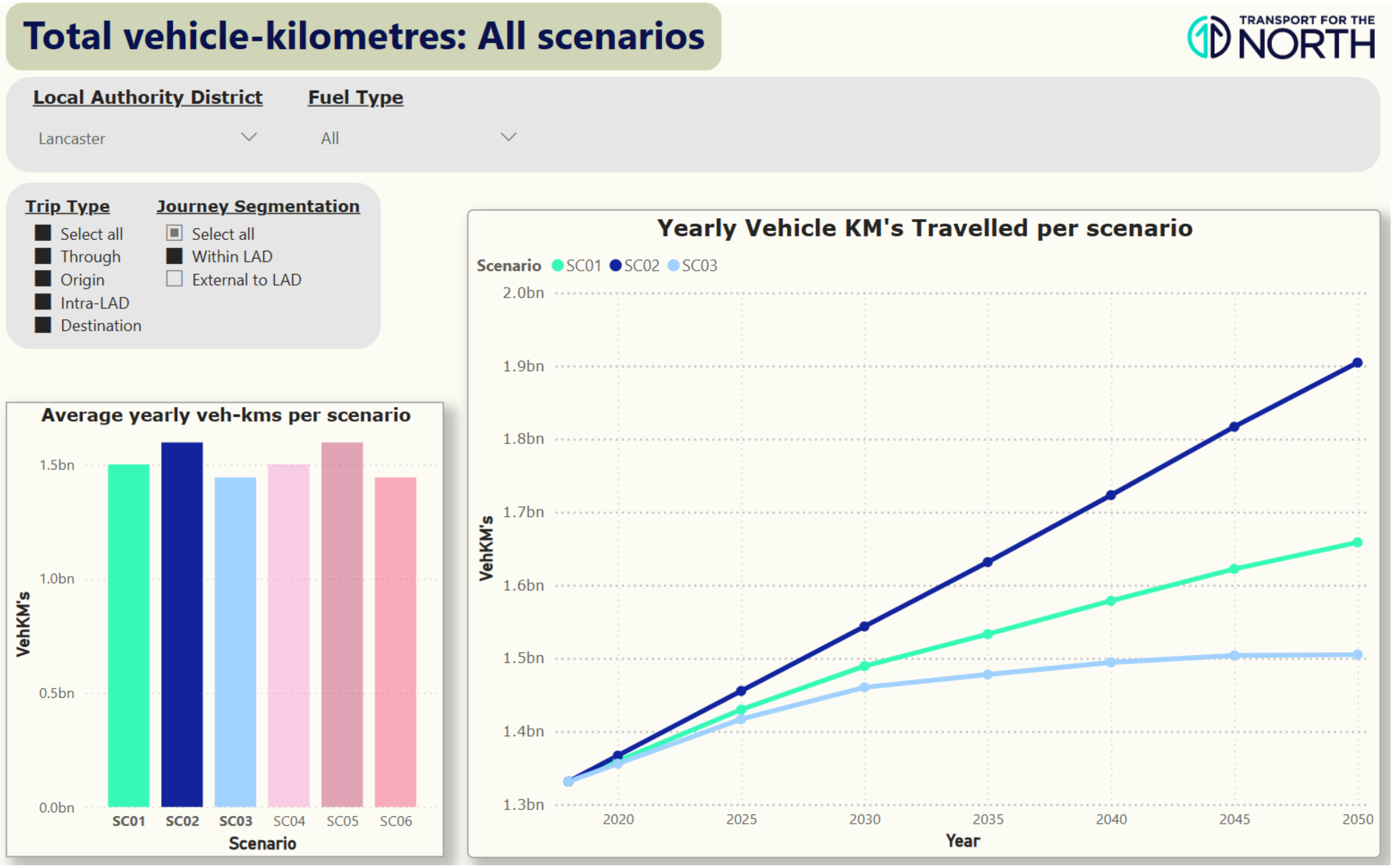
Lancaster

Lancaster – total emissions



- 36% of transport emissions in Lancaster are generated by through trips, which is comparable to the county average of 35%.
- Cumulative emissions by 2050 are projected to be 58% higher under SC01 than SC04.

Lancaster – vehicle kilometres

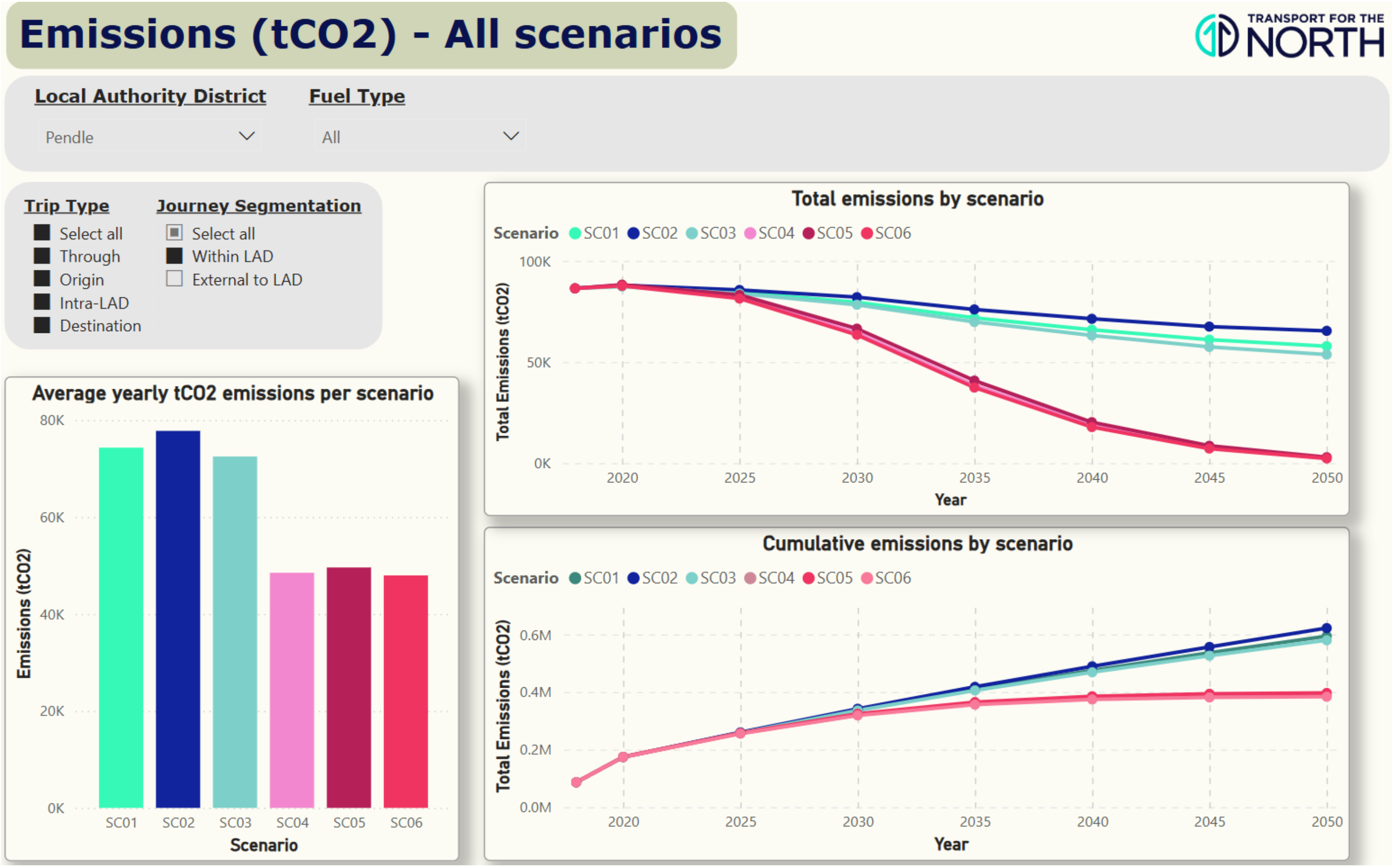


- In 2018, a total of 1.3 bn vehicle kilometres were travelled in Lancaster, of which 32% were on through trips.
- By 2050, vehicle kilometres are projected to increase from 2018 by:
  - 25% under SC01
  - 43% under SC02
  - 13% under SC03

Select area analysis

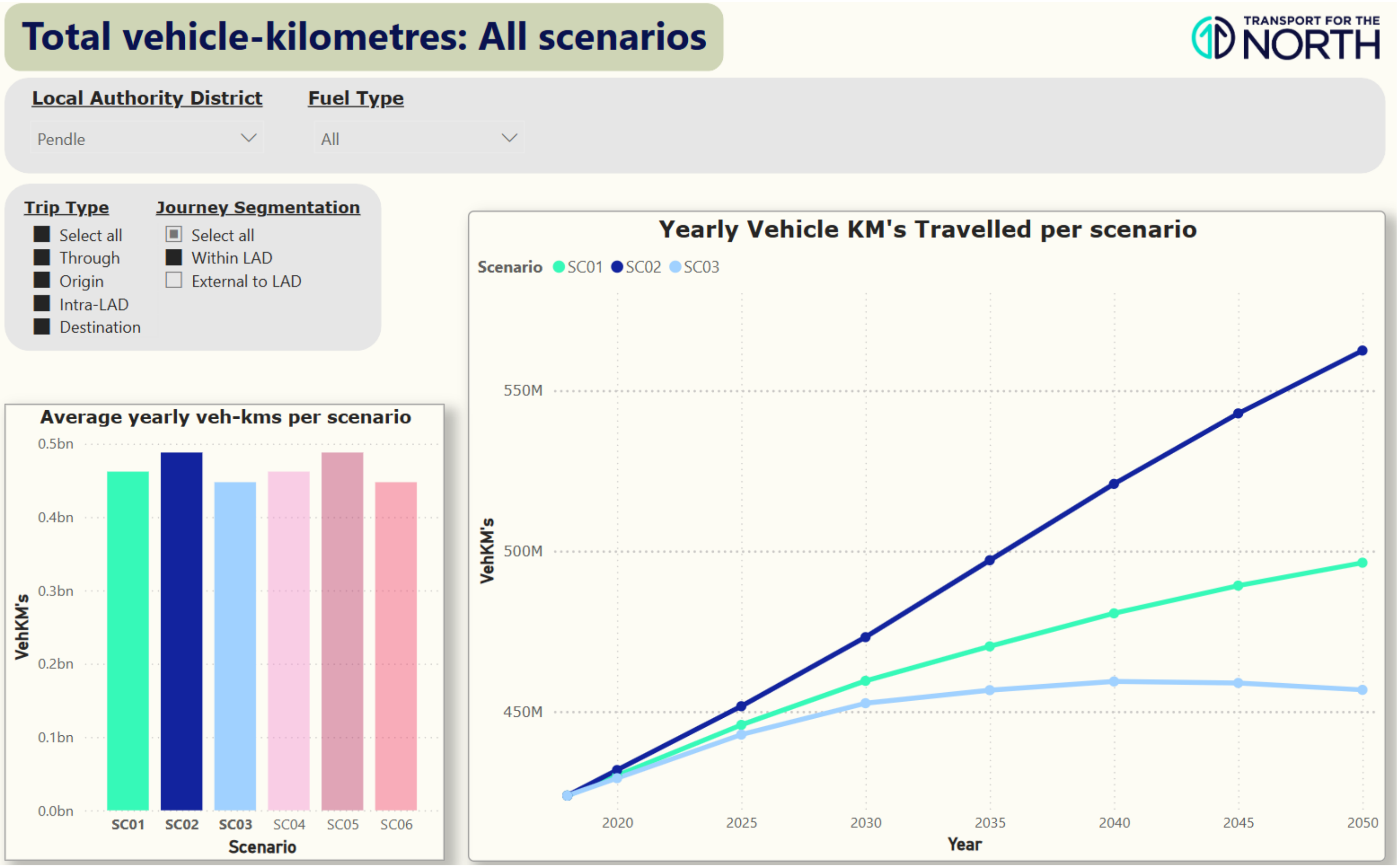
Pendle

Pendle – total emissions



- Pendle has the lowest transport emissions of the districts in the Lancashire 14 area, generating 0.09 $MtCO_2$ in 2018, 24% of which was generated by through trips.
- By 2050, SC01 is projected to lead to 53% more cumulative emissions than SC04 (0.59 $MtCO_2$ vs 0.39 $MtCO_2$).

Pendle – vehicle kilometres

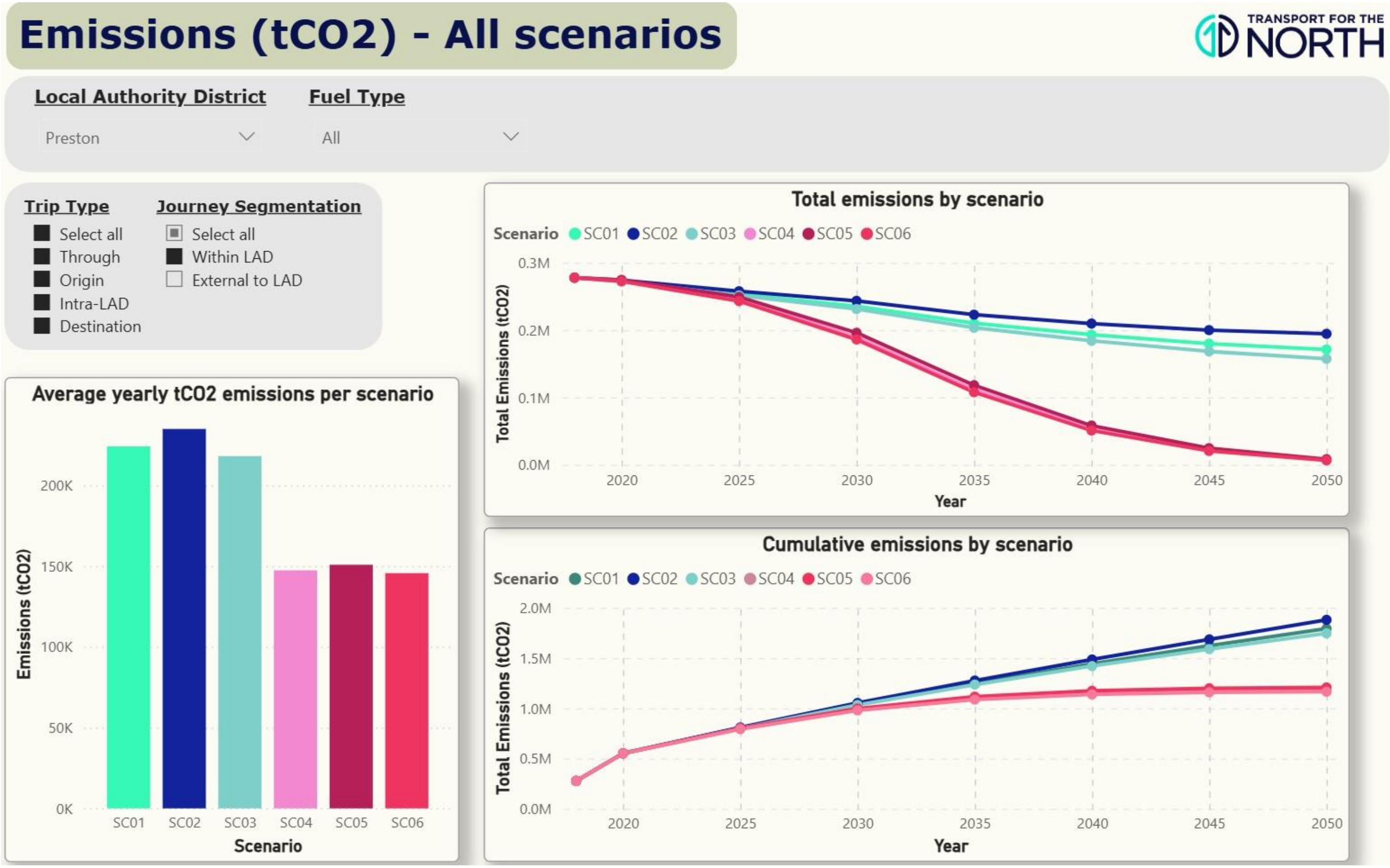


- In 2018, a total of 0.42bn vehicle kilometres were travelled in Pendle, of which 19% were on through trips. After Blackpool, this is the second lowest contribution of through trips of all the districts in the select area analysis.
- By 2050, vehicle kilometres are projected to increase from 2018 by:
  - 17% under SC01
  - 33% under SC02
  - 8% under SC03

Select area analysis

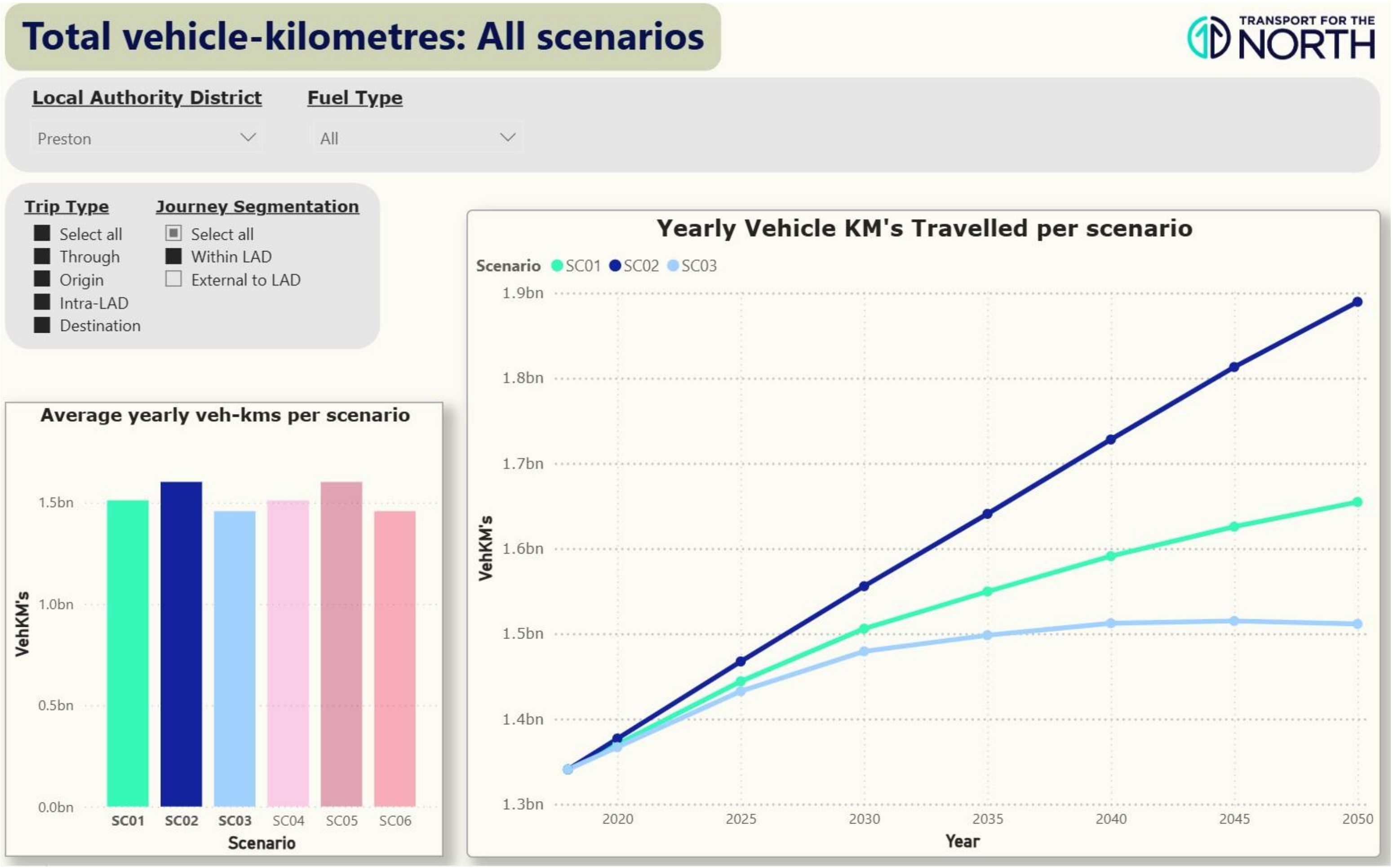
Preston

Preston – total emissions



- Preston generated 0.28 $MtCO_2$ in transport carbon emissions in 2018, 45% of which was generated by through trips, higher than the county average of 35%. This is likely due to the district's location on the strategic road network.
- By 2050, SC01 is projected to lead to 52% more cumulative emissions than SC04 (1.79 $MtCO_2$ vs 1.18 $MtCO_2$).

Preston – vehicle kilometres

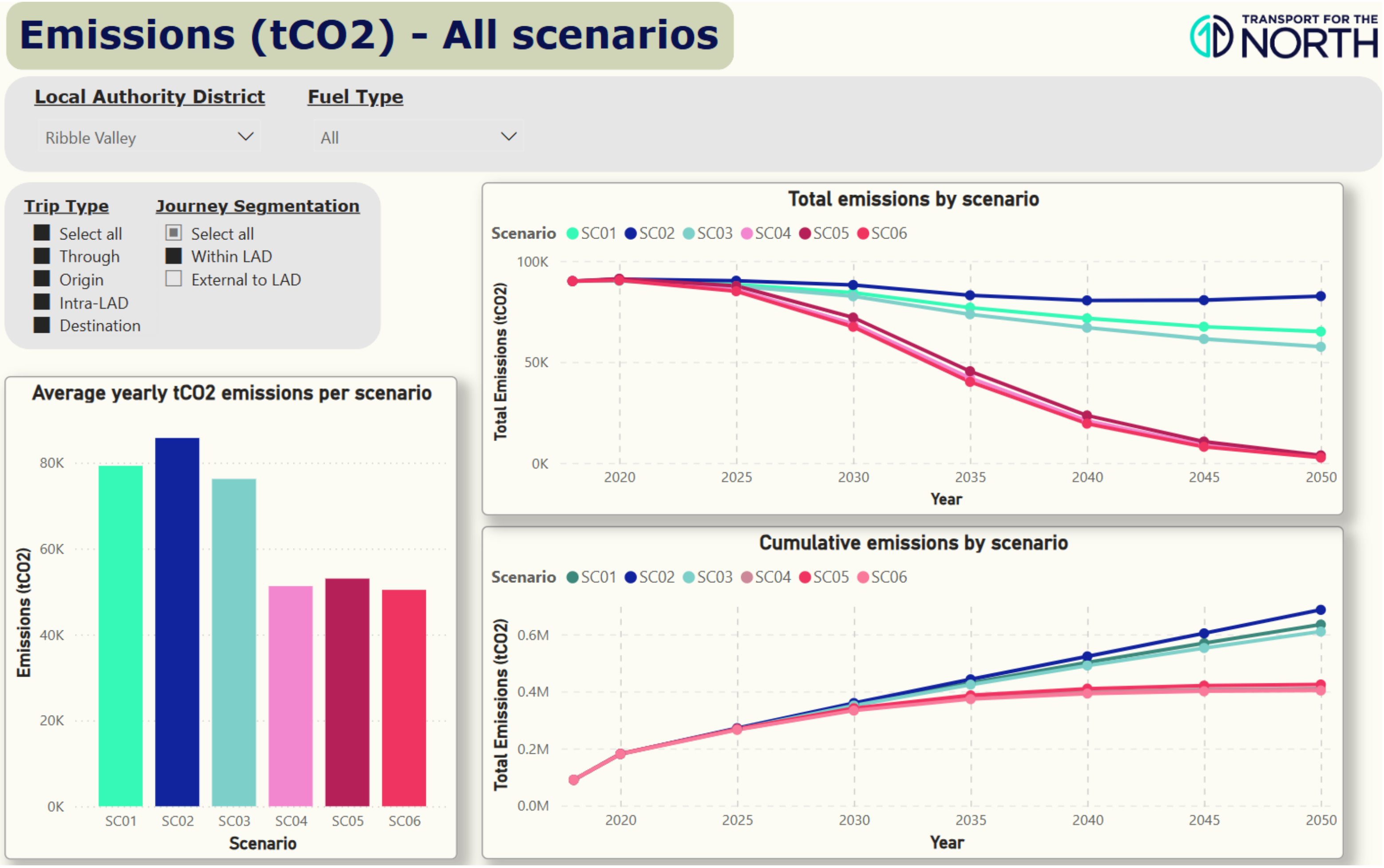


- In 2018, a total of 1.3bn vehicle kilometres were travelled in Preston, of which 46% were on through trips.
- By 2050, vehicle kilometres are projected to increase from 2018 by:
  - 23% under SC01
  - 41% under SC02
  - 13% under SC03

Select area analysis

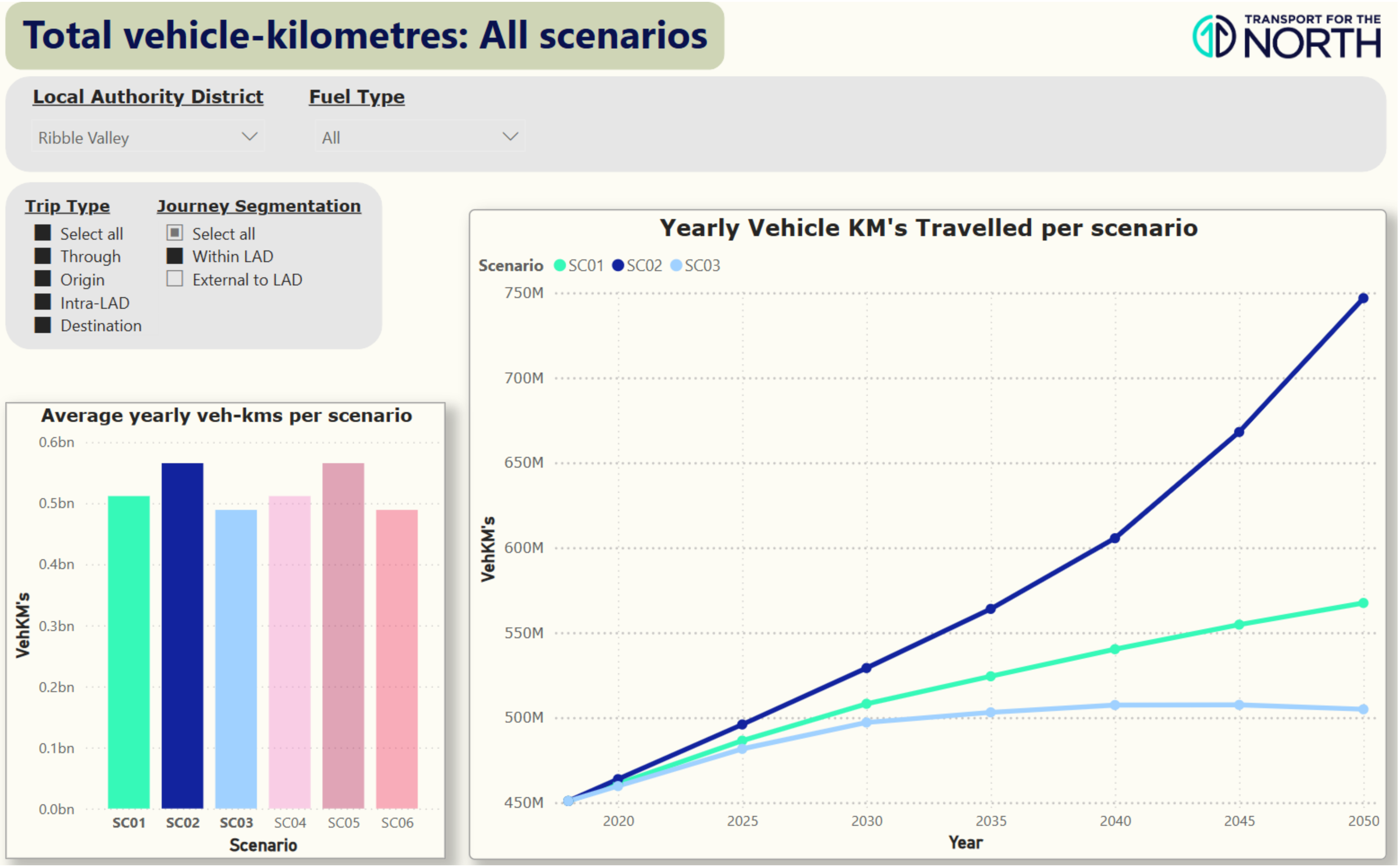
Ribble Valley

Ribble Valley – total emissions



- 24% of vehicle emissions in Ribble Valley were generated from through trips in 2018.
- Under SC02, annual emissions are projected to stop falling after 2040 as traffic growth offsets emissions improvements.
- Cumulative emissions by 2050 are projected to be 55% higher under SC01 than SC04.

Ribble Valley – vehicle kilometres

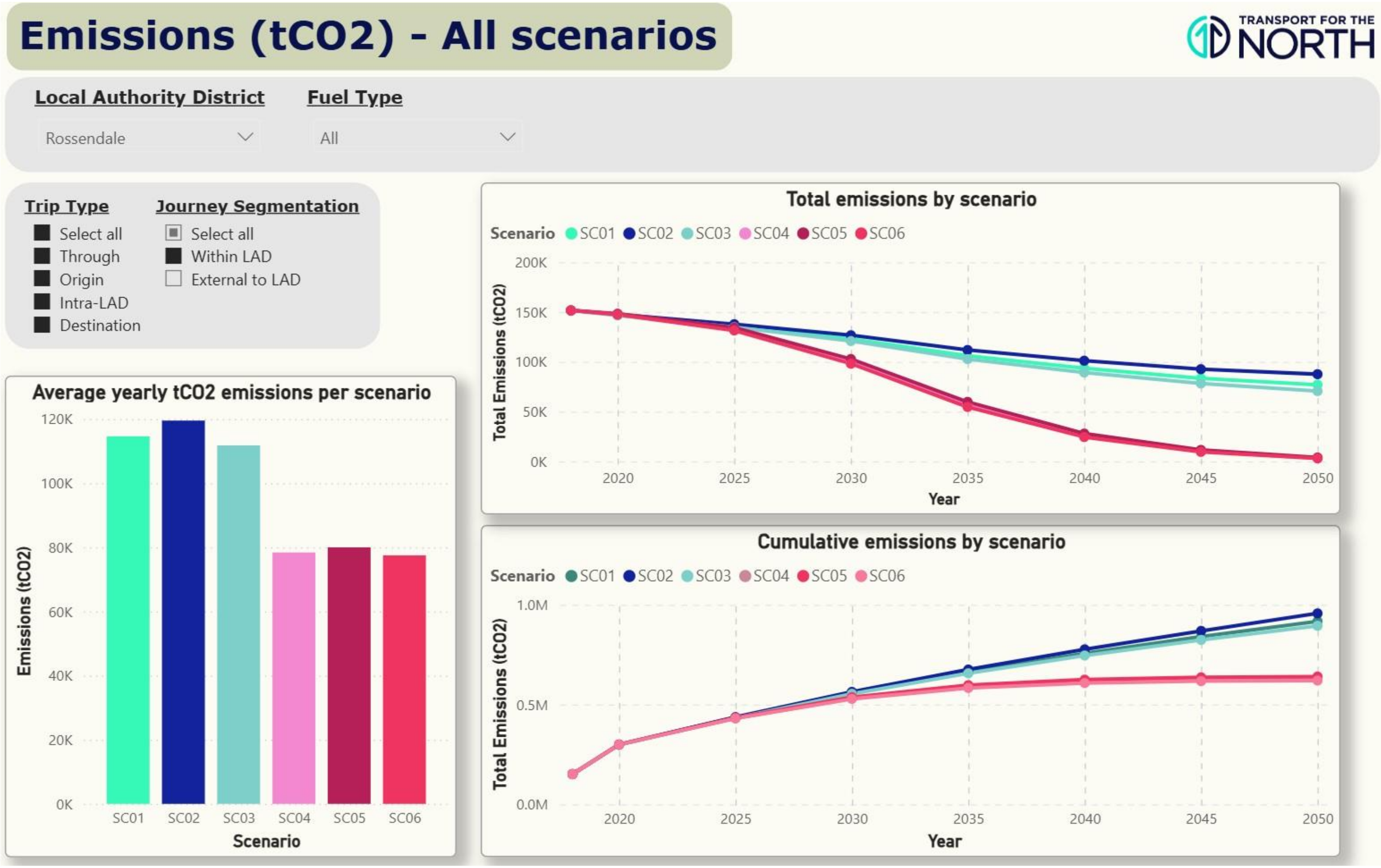


- In 2018, a total of 0.45bn vehicle kilometres were travelled in the Ribble Valley, of which 25% were on through trips. This is lower than the county average of 35% of through traffic.
- By 2050, vehicle kilometres are projected to increase from 2018 by:
  - 26% under SC01
  - 66% under SC02
  - 12%.under SC03

Select area analysis

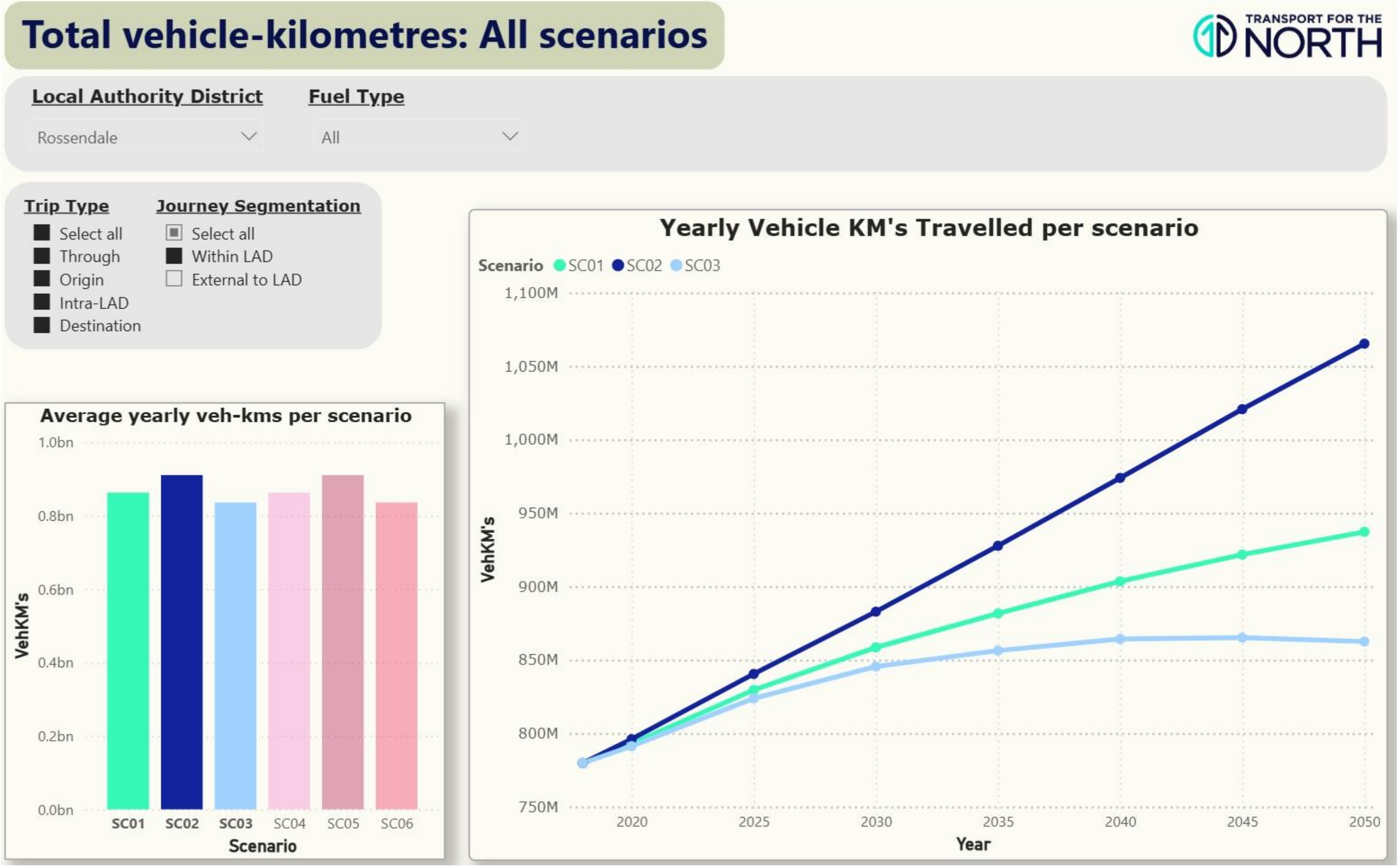
Rossendale

Rossendale – total emissions



- In 2018, Rossendale generated 0.15 $MtCO_2$ in transport emissions, 26% of which was generated by through trips.
- By 2050, SC01 is projected to lead to 46% more cumulative emissions than SC04 (0.92 $MtCO_2$ vs 0.63 $MtCO_2$).

Rossendale – vehicle kilometres

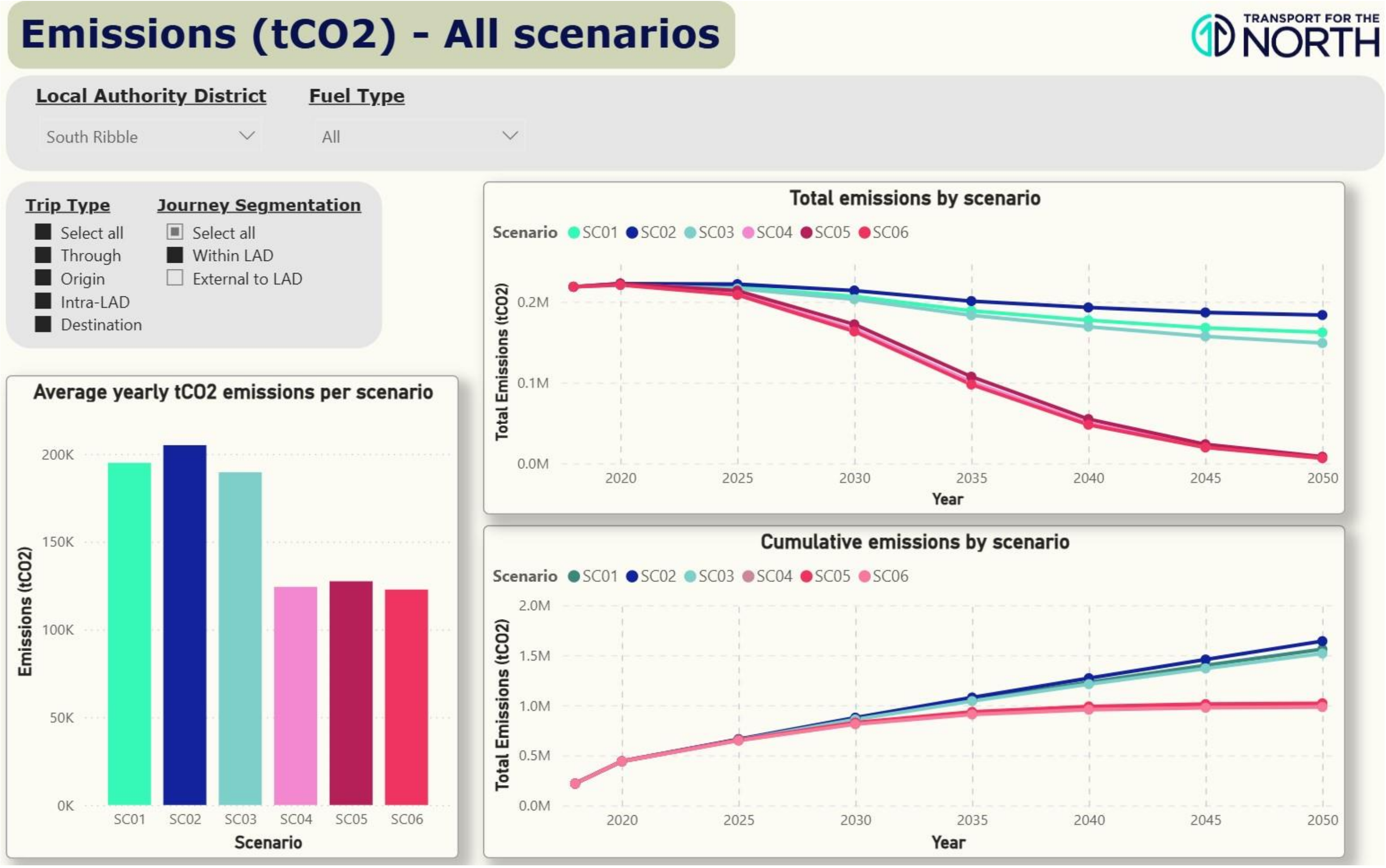


- In 2018, a total of 0.78bn vehicle kilometres were travelled in Rossendale, of which 26% were on through trips.
- By 2050, vehicle kilometres are projected to increase from 2018 by:
  - 20% under SC01
  - 37% under SC02
  - 11% under SC03

Select area analysis

South Ribble

South Ribble – total emissions



- In 2018, South Ribble generated 0.22 $MtCO_2$ in transport emissions, 53% of which was generated by through trips, the second highest proportion after Chorley.
- By 2050, SC01 is projected to lead to 57% more cumulative emissions than SC04 (1.56 $MtCO_2$ vs 0.99 $MtCO_2$).

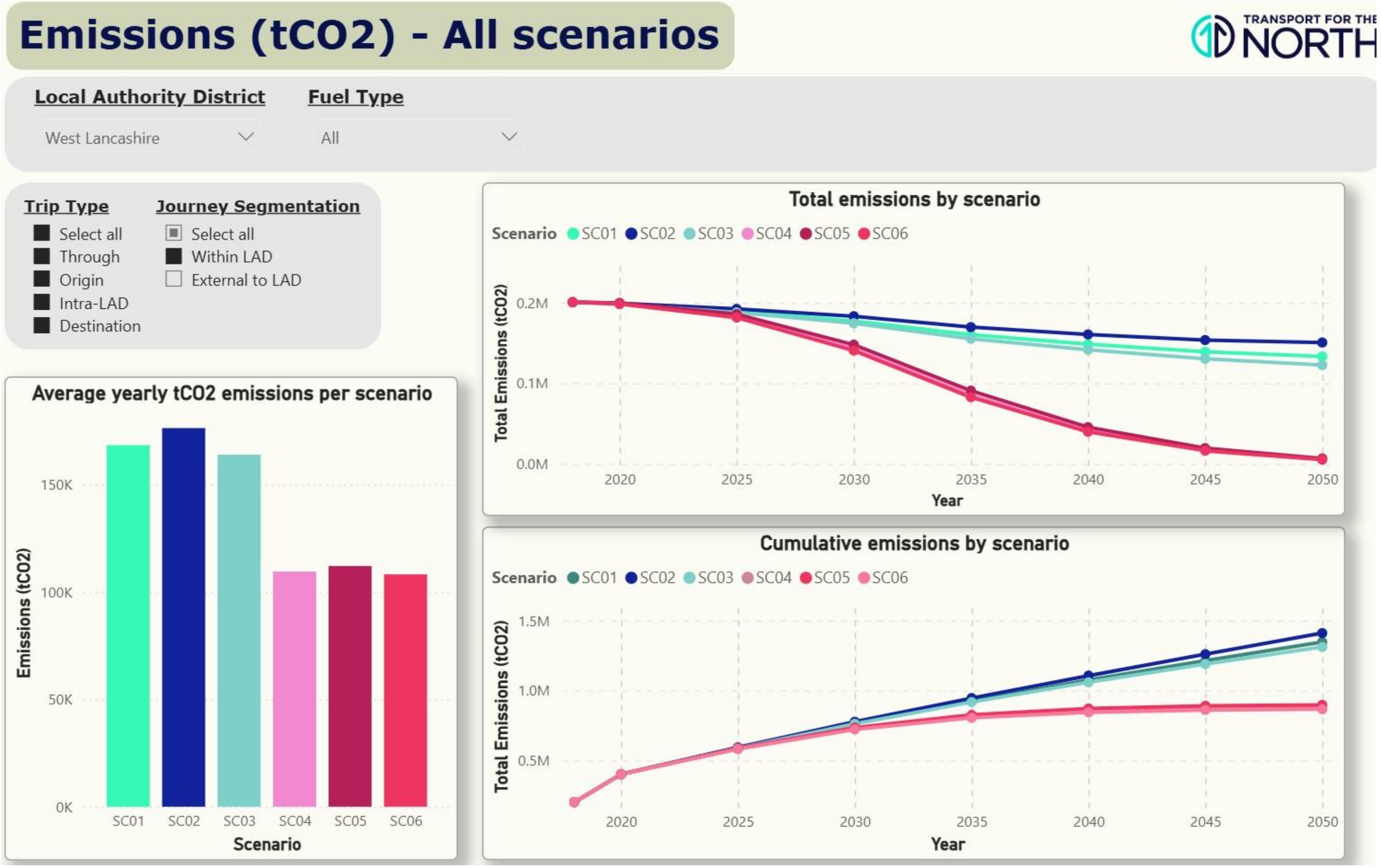
South Ribble – vehicle kilometres

- In 2018, a total of 1.14bn vehicle kilometres were travelled in South Ribble, of which 52% were on through trips. After Chorley, this is the second highest contribution of through trips of all the districts in the district analysis.
- By 2050, vehicle kilometres are projected to increase from 2018 by:
  - 20% under SC01
  - 33% under SC02
  - 9% under SC03

Select area analysis

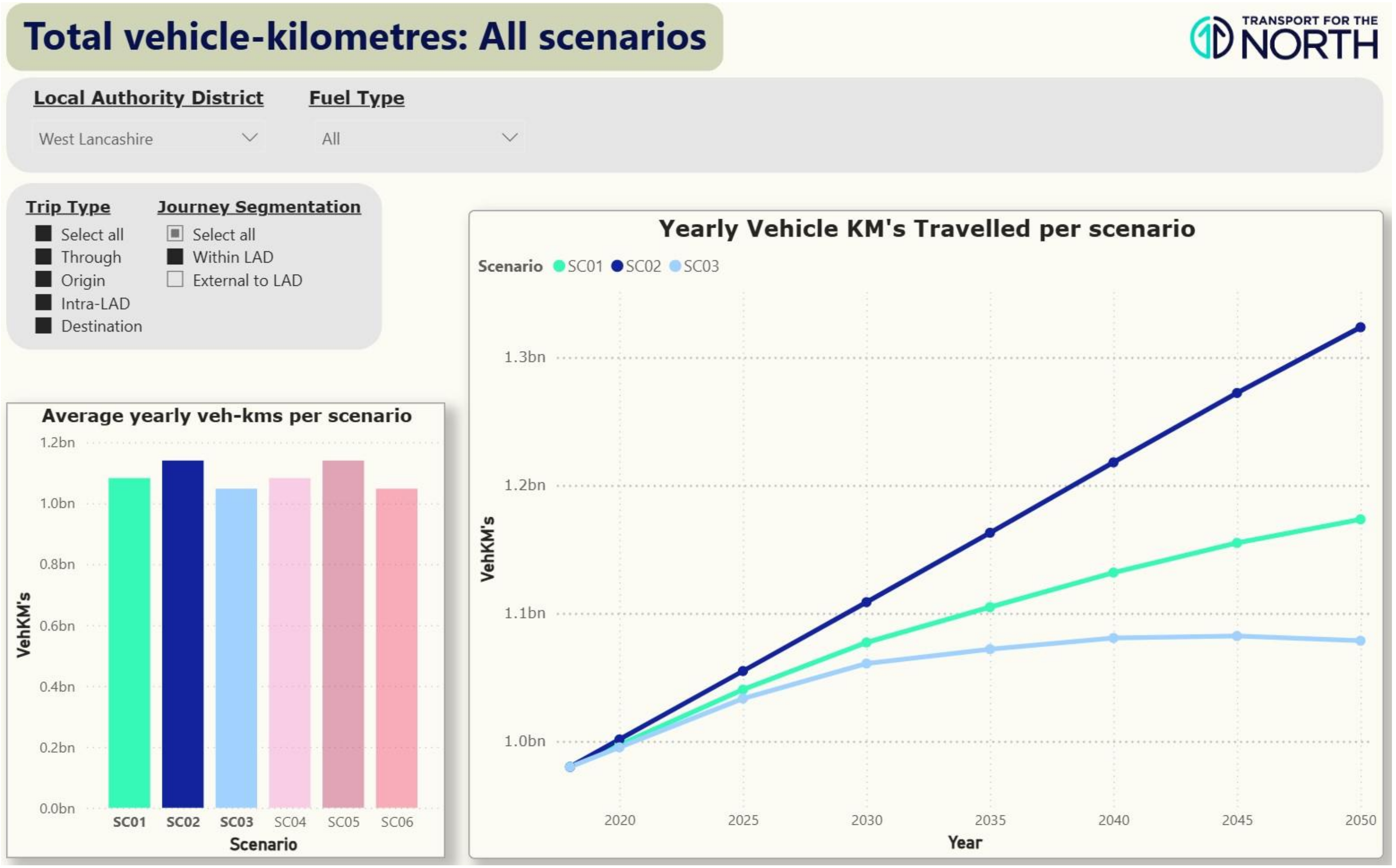
West Lancashire

West Lancashire – total emissions



- In 2018, West Lancashire generated 0.20 $MtCO_2$ in transport emissions, 33% of which was generated by through trips. This is comparable to the county average of 35%.
- By 2050, SC01 is projected to lead to 54% more cumulative emissions than SC04 (1.35 $MtCO_2$ vs 0.88 $MtCO_2$).

West Lancashire – vehicle kilometres

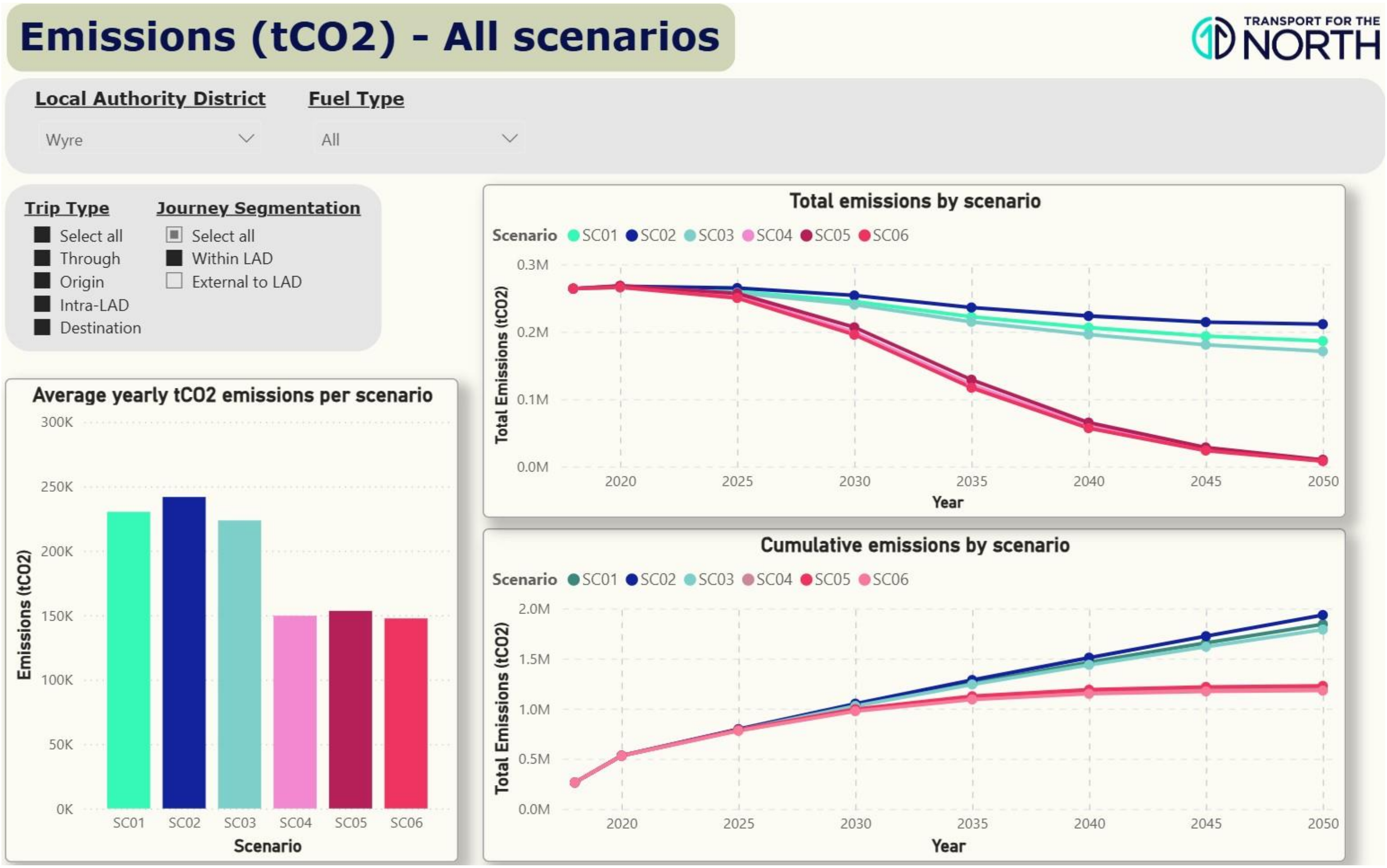


- In 2018, a total of 0.98bn vehicle kilometres were travelled in West Lancashire, of which 33% were on through trips.
- By 2050, vehicle kilometres are projected to increase from 2018 by:
  - 20% under SC01
  - 35% under SC02
  - 10% under SC03

Select area analysis

Wyre

Wyre – total emissions



- In 2018, Wyre generated 0.26 $MtCO_2$ in transport emissions, 33% of which was generated by through trips. This is comparable to the county average of 35%.
- By 2050, SC01 is projected to lead to 54% more cumulative emissions than SC04 (1.84 $MtCO_2$ vs 1.20 $MtCO_2$).

Wyre – vehicle kilometres

- In 2018, a total of 1.2bn vehicle kilometres were travelled in Wyre, of which 30% were on through trips.
- By 2050, vehicle kilometres are projected to increase from 2018 by:
  - 22% under SC01
  - 38% under SC02
  - 11% under SC03