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Transport for the North Board Agenda

Date of Meeting	**Wednesday 24 November 2021**
Time of Meeting	**11.00 am**
Venue	**The Queens Hotel, New Station Street, City Square, Leeds, LS1 1PJ**

Filming and broadcast of the meeting

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Item No.	Agenda Item	Page
1.0	**Welcome & Apologies** The Chair to welcome Members and the public to the meeting.	
2.0	**Declarations of Interest** Members are required to declare any personal, prejudicial or disclosable pecuniary interest they may have relating to items on the agenda and state the nature of such interest.	Verbal Report
3.0	**Minutes of the Previous Meeting** To consider the approval and signature of the minutes of the meeting held on 29 September 2021 as a correct record and to consider any requests for updates on matters contained therein.	3 - 14
4.0	**Integrated Rail Plan Review and Response Plan** To consider the report of the Northern Powerhouse Rail Director.	15 - 16
5.0	**Budget Revision 2** To consider and agree Budget Revision 2	17 - 26
6.0	**Business Planning Update** To provide Members with a progress update/Business Plan guidance.	27 - 46

7.0	**Approval of the Decarbonisation Strategy** To present for approval the Decarbonisation Strategy incorporating changes arising as a consequence of the consultation.	47 - 222
8.0	**Major Roads Report** To present for approval the update Major Roads Report.	223 - 262
9.0	**Rail Reforms** To present for consideration initial proposals for implementing the Williams-Shapps Plan for Rail in the North.	263 - 270
10.0	**Appointment of the Transport for the North Board and Partnership Board Chair** The purpose of this report is for Members to consider and resolve upon the appointment of a Chair for the Transport for the North (TfN) Partnership Board and TfN Board.	To Follow
11.0	**Governance Report** To provide Members with an update on governance issues.	271 - 296

Transport for the North Board Minutes

Wednesday 29 September 2021

Present:

Cllr Louise Gittins, Cheshire West & Chester (Chair)

Attendee	Local Authority
Cllr Craig Browne	Cheshire East
Cllr Keith Little	Cumbria
Cllr Daren Hale	Hull
Cllr Charlie Edwards	Lancashire
Cllr Liam Robinson	Liverpool City Region
Cllr Martin Gannon	North East Combined Authority
Cllr Richard Hannigan	North Lincolnshire
Mayor Jamie Driscoll	North of Tyne Combined Authority
Cllr Don Mackenzie	North Yorkshire
Cllr Heather Scott	Tees Valley
Cllr Hans Mundry	Warrington

Co-Opted Members

Cllr Charlotte Cupit	Derbyshire

Local Enterprise Partnership (LEP) Attendees

Mark Rawstron	Lancashire LEP
Matthew Lamb	North Yorkshire LEP
Peter Kennan	South Yorkshire Mayoral Combined Authority LEP

Partners in Attendance:

Ben Smith	Department for Transport
Lorna Pimlott	HS2
David Stones	National Highways
Jon Clee	Network Rail

Officers in Attendance:

Name	Job Title
Martin Tugwell	Chief Executive
Iain Craven	Finance Director
Paul Kelly	Financial Controller
Stephen Hipwell	Head of HR
Julie Openshaw	Head of Legal
Peter Molyneux	Major Roads Director
David Hoggarth	Strategic Rail Director
James Lyon	Legal Assistant

Item No: **Item**

1. Welcome & Apologies

1.1 Cllr Louise Gittins introduced herself as the Acting Chair for Transport for the North Board.

1.2 This was the first in-person meeting of Transport for the North Board since March 2020.

1.3 Members introduced themselves and apologies were noted, the Chair adding that many Labour Members were at the Labour Party Conference in Brighton.

2. Declarations of Interest

2.1 There were no declarations of interest.

3. Minutes of the Previous Meeting

3.1 The minutes of the last Transport for the North Board call under the temporary legislation to allow such formal meetings to be held virtually on 16 April and the two Chief Executive Consultation Calls on 9 June and 27 July were considered.

3.2 The Chair added that due to an issue with MS Teams, the attendees on 27 July had not been recorded and asked Members to advise on their attendance status if they wished it to be recorded.

3.3 There were no comments on the Minutes and Cllr Hans Mundry proposed their acceptance, seconded by Cllr Craig Browne.

Resolved:

That the minutes of the Transport for the North Board held virtually on 16 April and the Chief Executive Consultation Calls on 9 June and 27 July be approved as a correct record.

4. Governance

4.1 The primary matter of Governance was the election of a Chair and Vice-Chairs for TfN Board. Board was advised that the only nominee for Chair was Cllr Louise Gittins and that in order to proceed with the nomination, she would be required to temporarily vacate the Chair during her nomination. Cllr Gittins proposed Cllr Keith Little as the temporary Chair for this item and this was unanimously agreed.

4.2 Cllr Keith Little proposed Cllr Louise Gittins as the Chair for both Transport for the North Board and Partnership Board and this was unanimously agreed. Cllr Gittins also takes on the substantive Majority Vice-Chair position, a role which will continue after the appointment of an Independent Chair.

4.3 There had been no advance nominations for the position of Minority Vice-Chair, but Cllr Charles Edwards nominated himself commenting that it was important the role was filled immediately, and that the Board operated on a cross-party basis. His election was proposed by Cllr Hans Mundry, seconded by Cllr Don Mackenzie, and agreed unanimously by the Board. The Chair welcomed Cllr Charles Edwards to the role of Minority Vice-Chair.

4.4 The remaining matters were to be taken en bloc and Head of Legal covered the topics:
- the appointment of a fourth Independent Member to the Audit & Governance Committee. After a public recruitment process, Graham Bell had been identified as the preferred candidate and the Board was invited to approve his nomination.

- the appointment of two further Board Members to the vacancies on Audit & Governance Committee and to approve the membership of Transport for the North's Boards and Committees.

- the approval of the Constitution subject to the amendments set out in Appendices 3, 4 and 5.

- to approve the annual calendar of meetings for the forthcoming year as required by the Constitution.

4.5 The comprehensive overview of the Governance matters was noted, and the Chair invited comments in order.

4.6 Cllr Daren Hale advised that both Hull and East Riding of Yorkshire would not approve the current representatives of the Rail North Committee

advising that there had not been a vote for 5 years within the Humber Unitary Authority as to who should represent the Humber which had resulted in both Humber and East Riding having no representation regarding train services in their areas.

He advised that, with no prospect of a devolution deal across the North and South banks of the Humber, a request had been made in writing to TfN for a separate Rail North representative for North and South and had been advised that this was not possible. He requested a review of this decision noting that both the Conservative-run East Riding authority and the Labour-run Hull authority were in agreement on this point.

4.7 Cllr Craig Browne requested a point of clarification on item 2.8, the appointment of an Independent Chair querying the exact wording used. It was clarified that the requirement for an Independent Chair of the Partnership Board is being waived until such time as the appointment is made, permitting Cllr Louise Gittins to take the role as Interim Chair.

4.8 Cllr Heather Scott raised the issue of Board and Committee meeting venues commenting that the use of Manchester and Leeds venues was challenging for those Members coming from further afield and requesting that TfN consider venues around the north. Mayor Jamie Driscoll agreed with this and the Chair added that the start times of the meetings be considered too for maximum accessibility.

Resolved:

1) The Cllr Louise Gittins appointment as Interim Chair and as Majority Vice-Chair be approved.

2) That Graham Bell's appointment to the Audit & Governance Committee be approved

3) One of the vacancies on Audit & Governance Committee be filled by Cllr Hans Mundry. Two of the vacancies on General Purposes Committee be filled by Peter Kennan and Cllr Liam Robinson.

4) That the Rail North Committee representation be deferred until a review had been done into Cllr Daren Hale's request.

5) That the calendar of meetings be approved with the proviso that the locations of the meetings be considered.

5. Recruitment of the Transport for the North Board and Partnership Board Chair

5.1 Stephen Hipwell covered the report which advised Board that Member Working Group had endorsed the approach to appoint a single Chair for both TfN Board and Partnership Board.

5.2 The Board was also asked to approve the recommendation that the rule in the Constitution precluding previously elected Members of the Board applying for the role of Chair be removed.

5.3 The role profile and remuneration for the Chair role was discussed with the note that the number of days assigned to the role would rise from 45 days per year to 60 days per year with a commensurate increase in salary.

5.4 The proposed Terms of Reference for the appointment panel were noted as being broadly similar to the Terms of Reference used for the appointment panel who managed the recent Chief Executive recruitment process. Nominations for individuals to sit on the Chair appointment panel had already been sought in advance of the Board meeting.

5.5 Stephen Hipwell thanked the Board for their approval and advised that the recruitment process would begin week commencing 11 October with the aim to recruit a new Chair in time for the January 2022 meeting of the Board.

Resolved:

1) That TfN Board approves the recommendation for a single Chair to be appointed, covering both Transport for the North Board and Partnership Board.

2) That TfN Board approves the amendment to the Constitution stated.

3) That TfN Board approved the profile, the time and the salary allocated to the role of TfN and Partnership Board Chair.

4) That TfN Board approved the Terms of Reference for the Chair appointment panel.

6. Annual Governance Statement, Statement of Accounts Approval and Audit Opinion 2002/21

6.1 The context of the Governance and the finance reports was set out by Paul Kelly who noted the extended deadline of 30 September for signing off the accounts; this was expected to revert to the normal deadline of 31 July in 2023.

6.2 The Annual Governance Statement is part of the statutory accounts and requires approval as a standalone item. The accounts were published for public inspection on 7 July and no enquiries received. The accounts are subject to regular monitoring by Audit & Governance Committee with a final audit from Mazars, TfN's external auditors who have provided an unqualified draft audit report.

6.3 The September meeting of Audit & Governance Committee scrutinised the accounts and recommended, in its Annual Progress Report, that Board approve the Statement of Accounts for 2020/21. Following Board approval, the accounts would be formally signed off and published on the Transport for the North website.

6.4 The Chair asked Chris Melling, Chair of the Audit & Governance Committee to take Board through his report of the Committee's activities throughout the year.

6.5 Chris Melling described the contents of the report noting the Committee's composition, its Terms of Reference, and its activities. Standing items at the Committee and the areas of TfN's business that were subject to internal audit over the year were noted as per the report.

6.6 Chris Melling further advised that the Committee was providing assurance to the Board, via its own work and the reports from RSM, Internal Auditors and Mazars, (TfN's External Auditors), that the necessary core controls expected of a public body are in place and functioning well.

6.7 The schedule for the 2021/22 internal audit programme was also set out.

6.8 Chris Melling concluded the report with the recommendations:
- The members of the Audit & Governance Committee have indicated that they are content for the Board to approve the corporate governance review and the Annual Governance Statement.
- The members of the Audit & Governance Committee have indicated that they are content for the Board to note the recommendation in the Annual Progress Report of the Audit & Governance Committee to approve the Statement of Accounts for 2020/21.
- The members of the Audit & Governance Committee have indicated that they are content for the Board to approve the Statement of Accounts for financial year 2020/21.

6.9 Cllr Keith Little, Vice-Chair of the Audit & Governance Committee, added his support for the work done by the Committee and his thanks to the Chair.

Resolved:

1) That the Corporate Governance Review and the Annual Governance Statement be approved.

2) That the recommendation to approve the Accounts be noted.

3) That the 2020/21 Accounts be approved.

7. Comprehensive Spending Review Submission

7.1 Martin Tugwell referenced both the report and the copy of the letter sent to Department for Transport in advance of their internal deadline to get Spending Review submissions to Government. The focus of the submission was on obtaining a multi-year finding settlement and the work that could be achieved through this.

7.2 The submission would form the basis of Transport for the North's 3-year plan which would be brought to Board in November for discussion and debate.

7.3 Martin Tugwell further highlighted the increased liaison between all the Sub-national Transport Bodies (STBs) and the Department for Transport commenting that DfT were very supportive of the work being done and a further in-year funding grant had been made available to STBs to aid some of the short-term work in progress.

7.4 Iain Craven added that the financial ask within the letter was broadly aligned to the previous year and considered both the ambitions of the Members and the overall financial situation.

7.5 Extra comment was given to the NPR funding which initially appeared to be considerably lower than the previous year. It was explained that this was a technical point relating to the previous figure which was based on a 4yr period whereas the current ask was based on a 3yr period.

7.6 Cllr Hans Mundry highlighted the importance of the ambitions for the north and the funding necessary to deliver them and strongly backed the request for a 3yr funding settlement as critical to setting out a defined work programme as early as possible.

7.7 Peter Kennan noted that the initial spending review could be quite restrictive, and he welcomed the ongoing engagement with DfT and their recognition of the importance of STBs. He also suggested that TfN prepare a public statement of their abilities and strengths and the One North message.

7.8 Cllr Liam Robinson expressed some disappointment that Liverpool stations were not referenced alongside Manchester, Leeds, and Sheffield in highlighting the importance of rail infrastructure investment and modernisation across the North. He expanded on Peter Kennan's point about One North by commenting on the vital importance that all the Constituent Authorities work together and with TfN to champion the work being done across the north and avoid siloed thinking and working.

7.9 Martin Tugwell agreed and commented on the Northern Transport Charter, launched at TfN's Conference the previous week focussing on transport as an enabler in economic regeneration rather than looking at individual schemes. He added that the close work with Network Rail and

National Highways was bringing further benefits in shaping investment plans. Ben Smith offered the support of DfT in ensuring that all relevant departments of Government were engaged in the ongoing work not just of Transport for the North but all the STBs. He further confirmed that DfT had received TfN's Comprehensive Spending Reviews proposals and Treasury would be conducting their appraisals throughout October.

7.10 Cllr Daren Hale asked about the possibility of including some early win schemes particularly referencing electrification of rail lines within the Hull corridors. He commented that the levelling-up agenda was not solely concerned with the north-south divide but must include all areas of the North being given fair share as well.

7.11 Martin Tugwell acknowledged the comments received and noted TfN's established record of challenging costs and focussing on the outcomes, working with all partners to deliver with the best value for money.

Resolved:

1) That TfN Board notes the submission of the Comprehensive Spending Review.

8. Strategic Transport Plan Road Map Development Programme

8.1 Martin Tugwell introduced the paper which covered the statutory process of preparing and producing a Statutory Transport Plan. The inaugural plan, produced in 2018, was due a refresh and it was noted that this would be done in parallel with the Independent Economic Review.

8.2 Changes due to both external factors such as Covid and new areas of importance such as decarbonisation would shape the revision of the Plan. The key principles behind the plan were outlined in the report and Members were invited to comment on this throughout the process of revising the plan.

8.3 Cllr Liam Robinson again referenced his previous point of working across authorities to ensure that the Local Transport Plans tied into TfN's overarching STP and added that the timeline for production in 2024 seemed excessively lengthy, asking if it could be brought forwards. The Chair agreed, asking that November Board consider the timings more closely.

8.4 Mark Rawstron commented on the importance of including the business communities, noting that even relatively small transport projects locally could have a big influence on businesses. He requested clarification on the note in the report mentioning the decoupling od decarbonisation from the wider transport agenda adding that he felt this was not a desirable approach. Martin Tugwell explained that, post-Covid, there was a change in travel patterns and there was a need to understand that change in order to best direct resources when building back and looking at

economic regeneration.

8.5 Cllr Charlie Edwards welcomed the refresh commenting that the significant changes after the 2019 general election, Brexit and Covid and with the added issue of decarbonisation would require a fresh look at the transport challenges. He asked if it would be possible to map the levelling up and active travel bids from northern councils to align TfN's aspirations with those of authorities and also a list of achievements from the first STP in order to measure the impact of authorities asks of TfN and the deliverables.

8.6 The discussion moved onto freight with both Cllr Charlie Edwards and Cllr Daren Hale noting the importance of unified freight links to ports and the importance of these in the decarbonisation agenda. Martin Tugwell referenced TfN's Freight & Logistics Strategy which had been discussed at the previous consultation call and again, the synergy between local authority plans and TfN's overall view was heavily referenced; while TfN might not be a lead partner in delivery, it could provide a linkage and an evidence base when looking at the broader picture across authorities.

8.7 Ben Smith agreed that the setting of strategic transport plans remained the top priority for STBs and noted DfT's willingness to work with STBs to facilitate this adding that STBs were in an excellent position to both advise Ministers on local priorities and support local authority capabilities.

Resolved:

1) The Board agreed the proposed programme to develop a new STP but requested that the completion date of 2024 be re-examined with the possibility of bringing it forward to 2023. An update on this to be provided at the November Board meeting.

9. Rail Review Reform Matters – Responding to the White Paper

9.1 David Hoggarth reminded Board that at the previous discussion on this matter in June 2021, Board had asked TfN to work up a more detailed response to the paper and a case for how the change could be implemented and would work.

9.2 The case for change was presented to Board and David Hoggarth advised that it had been reviewed by both Rail North Committee and Scrutiny Committee who had approved the broad approach as set out.

9.3 The June meeting of Board had commented on the lack of positive reference in the White Paper to the role of STBs in the future of the rail industry. However, since that meeting, TfN had held constructive discussions with Network Rail and DfT about building on the existing function of Rail North Partnership.

9.4 TfN's response had set out the work in four key areas concentrating on TfN's role as a strategic partner in the North of England able to draw on its current and evolving evidence base and as a unified voice for the northern authorities and businesses by combining the views of Members and LEPs.

9.5 The previous work and related experience of Rail North Partnership in managing the fallout of the May 2018 timetable change and during Covid was again highlighted as well as aspirations including Smart Ticketing for the north.

9.6 Transport for the North presented its vision of working collaboratively with the transition team as Network Rail was absorbed into the new Great British Railways organisation to embed the key aims of the response into the programme of work from its inception and a joint report from Network Rail and TfN as to how this would work was intended for the November meeting of the Board.

9.7 Martin Tugwell commented on a recent meeting with senior representatives of Network Rail where they had agreed with this proposal citing the opportunities for earlier completion of some upgrades as a result of TfN's evidence gathering. He further referenced the success of MerseyRail as an example of rail devolution at a local level that had given positive results.

9.8 Mayor Jamie Driscoll agreed with the points made noting TfN's ability to bring the issues together in a coherent manner across authorities and he added that connectivity beyond that into Scotland should not be overlooked either.

9.9 Mark Rawstron and Peter Kennan picked up on the matter raised in 9.4 asking that TfN's four pillars specifically referenced business more explicitly and the amendment was noted.

9.10 Cllr Liam Robinson expanded on the devolution point made in 9.7 asking that the benefits of that be referenced more strongly and also pursued more widely across the north. He expressed concern that the greatest cost to the railways, the leasing of rolling stock, was not referenced in the white paper for potential reform and noted that MerseyRail's practice of direct procurement was a third cheaper and represented far better value for the travelling public.

9.11 Cllr Charlie Edwards enquired as to the governance structures within the new GBR organisation and how TfN would fit into that; David Hoggarth replied that this was not currently know but positive dialogue continued with the transition team setting up GBR and that further information would be made available as and when known.

Resolved:

1) The recommendations as outlined in the report were agreed by the Board.

10. Rail North Committee Feedback

10.1 David Hoggarth updated on the other matters discussed at the recent Rail North Committee meeting including the Manchester area services and infrastructure where good progress had been made on the timetable proposals and the oversight of improvements proposed for the area.

10.2 The train operators will be beginning a Phase 2 consultation in autumn 2021 following on from the initial Phase 1 work due to be published imminently and which will focus on the more detailed aspects of the timetable to ensure both reliability and good service levels.

10.3 The return to normal service levels following Covid remained under review with service levels and ridership being monitored to assess and respond to demand as it increased. The timetable originally proposed for introduction in May 2022 which would have seen some reductions in service was on hold, potentially until May 2023 while other options were worked through to address the infrastructure issues in the area. Cllr Don Mackenzie thanked TfN for their assistance in this noting that the proposed changes would have meant considerable disadvantage for travellers along the East Coast Main Line especially around Northallerton.

10.4 Cllr Daren Hale again referenced the point he made in 4.6 that Hull and the wider Humber and East Riding areas had no representation on the Rail North Committee adding that the authority had found out about some proposed reduction in services purely by chance without any consultation. Cllr Richard Hannigan agreed with the points made adding that the loss of services in the Hull – Bridlington area impacted North Lincolnshire too and was unacceptable.

10.5 Cllr Hans Mundry commented that the fixation on the timetable issue was detracting from the major cause of the rail problems in the North, the lack of investment in infrastructure. He acknowledged the short term fixes the timetable changes were designed to address but added that without investment in infrastructure, this situation would continue indefinitely. David Hoggarth noted the points and added that some of the rail service issues were still related to Covid rather than infrastructure; meanwhile the pipeline of proposed infrastructure developments was addressing the investment in facilities.

Resolved:

1) That the report of the Strategic Rail Director be noted.

11. Corporate Risk Register Report

11.1 Iain Craven presented the Risk Register, taking the report as read and reminding the Board that this was presented twice-yearly at Board but reviewed as a standing item at every meeting of the Audit & Governance Committee. He further noted the change in format since TfN Board had last reviewed the document.

11.2 Some of the changes to the risks were highlighted and Mayor Jamie Driscoll picked up on the Very High rating of the NPR and IRP risks with a plea to all members to work together and cross-party through political parties in making the case for the best possible outcome to the IRP that served the needs of the whole north.

Resolved:

1) That the Corporate Risk Register be noted.

The meeting concluded at 12.45pm.

TRANSPORT FOR THE NORTH

Meeting: Transport for the North Board

Subject: IRP Review and Response Plan

Author: Louise Heywood

Sponsor: Tim Wood

Meeting Date: 24 November 2021

1. Purpose of the Report:

1.1 This report sets out the arrangements for consideration of the Integrated Rail Plan (IRP) if it is published prior to House of Commons rising for Christmas recess.

2. Recommendations:

2.1 The Board is invited to:

- Note the arrangements for consideration of the IRP
- If published, consider the implications of the IRP and agree on next steps in response to the IRP.

3. Main Issues:

3.1 We continue to await publication of the Government's Integrated Rail Plan, originally due to be published before the end of 2020.

3.2 Allowing for parliamentary recess periods, the next window for publication is between 15 November and 16 December 2021.

3.3 At the time of the publication of the TfN Board papers, there remains no confirmed publication date, but Ministers have indicated that the IRP may be published very soon.

3.4 If publication occurs prior to the Board considering this paper, then the TfN Executive team will present their initial read out on the IRP to the Board as a presentation on the day of the Board followed by a discussion agreeing next steps.

3.5 If publication occurs following this Board meeting, we will convene an additional Board meeting to discuss our response to the IRP.

4. Corporate Considerations

Financial Implications

4.1 Budget revision 2 has captured the decrease in the committed budget and removal of contingency as a consequence of delay in publication of the IRP. The financial impacts of further delay will be addressed in the Revision 3 Budget that will be compiled in the final quarter of this financial year.

Resource Implications

4.2 Following the publication of the IRP resource implications will be fully worked through and considered. The organisation recognises UNISON, should changes to our delivery model subsequently be required, full and proper consultation will be undertaken with UNISON and any employees potentially affected.

Legal Implications

4.3 There are no apparent legal implications arising from this report.

Risk Management and Key Issues

4.4 The risk implications are included within the report.

Environmental Implications

4.5 There are no apparent environmental implications arising from this report and this report does not constitute or influence a plan or programme which sets the framework for future development consents of projects listed in the EIA Directive and therefore does stimulate the need for SEA or EIA.

Equality and Diversity

4.6 There are no equality and diversity issues to consider at this point.

Consultations

4.7 There are no consultations required at this point.

Glossary of terms, abbreviations and acronyms used	
a) IRP	*Integrated Rail Plan*
b) TfN	*Transport for the North*

Meeting:	Transport for the North Board
Subject:	Budget Revision 2 Reforecast
Author:	Paul Kelly – Financial Controller
Sponsor:	Iain Craven – Finance Director
Meeting Date:	Wednesday 24 November 2021

1. Purpose of the Report:

1.1 This report sets out the financial performance of Transport for the North ("TfN") over the first seven months of the financial year 2021/22 and provides the Budget Revision 2 reforecast through to the end of the year.

1.2 It also formally captures the feedback from the Scrutiny Committee meeting of 4th November 2021 in relation to the Budget Revision process.

1.3 The Board is also asked to note the bid for incremental funding submitted by TfN in response to a request from DfT.This claim is incremental to our current budget and any grant received will be ring fenced to deliver specifically approved activities.

1.4 Detail is also provided with regard to TfN's performance against its Treasury Management Strategy as required by the TfN Constitution.

1.5 The Board is requested to approve the proposal to continue opting into the Public Sector Audit Appointments (PSAA) regime through which our external auditors are appointed.

2. Recommendations:

2.1 Consider and note the financial performance in the seven-month period to October 2021.

2.2 Approve Revision 2 Budget.

2.3 Note the submission for incremental grant and that the budget may need to be increased once the additional funding request to DfT has been confirmed.

2.4 Note the compliance with Treasury Management Strategy.

2.5 Approve the proposal to continue to opt in to the PSAA regime through which TfN's external auditors are appointed.

3. Executive Summary

3.1 Over the seven-month period to October 2021, TfN incurred expenditure of £30.91m, which was £2.95m (9%) below budget. The key elements that make up this variance are set out in section 4.

3.2 The following table summarises the 2021/22 Budget Revision 2 reforecast compared to Budget and Revision 1.

Forecast Expenditure	2021/22 Budget £m	Variance £m	2021/22 Revision 1 £m	Variance £m	2021/22 Revision 2 £m
Programmes:					
Northern Powerhouse Rail	48.48	0.00	48.48	2.86	45.62
Integrated & Smart Ticketing	1.52	0.00	1.52	0.29	1.23
IPBA	0.89	0.00	0.89	0.04	0.86
	50.90	**0.00**	**50.90**	**3.18**	**47.71**
Rail Operations	3.16	(0.03)	3.19	0.09	3.10
Operational Areas (net)	6.13	0.03	6.10	(0.13)	6.23
Committed Budget	**60.18**	**0.00**	**60.18**	**3.15**	**57.03**
NPR Contingency	18.52	14.43	4.09	4.09	0.00
Total	**78.70**	**14.43**	**64.27**	**7.24**	**57.03**

3.3 TfN approved its 2021/22 Budget at the TfN Board meeting on 24 March 2021. The net budget, against which TfN monitors performance, was set at £60.18m. This net budget envelope was confirmed in the Revision 1 reforecast approved by the Board in July. However, a slowdown in NPR expenditure caused by ongoing delays to the publication of the Integrated Rail Plan (IRP), combined with savings on the winding up of the IST programme, mean that the proposed Budget Revision 2 net forecast will be £57.03m, a reduction of £3.15m.

3.4 The addition of NPR contingency of £18.52m produced an original gross budget of £78.70m. It was noted in the budget report that the ongoing uncertainties around the IRP and the normal departmental approvals required for any commitment, meant that it was not possible to be certain as to the extent of any draw down on these contingent funds. Ongoing delay to the publication of the IRP led to the contingency sum being reduced by £14.43m to £4.09m in Revision 1. Further delays to the IRP, which was most recently expected to be published in October, means that it is no longer considered likely that any element of that contingency will be utilised, and it has therefore been reduced to zero.

3.5 The programme team has produced estimates of the impact of the further delays to the IRP. These are dependent on both the timing and the content of the document – the former because that impacts upon the amount of time left in the financial year to act upon its direction, -the latter because of the potential time it takes to review the document and agree a course of action based upon its recommendations. The current estimate indicates a reduction in the NPR budget of £2.86m for the full year. This is less than the estimate of c.£5m included in Budget Revision 1, but the year-end position still remains subject to significant uncertainty.

3.6 The challenges faced in the preparation of the Budget Revision were shared with the Scrutiny Committee at its meeting of 4 November. The committee wanted to formally note that the Chair and members urged that the IRP was published as soon as possible.

3.7 In the summer, DfT invited all STBs to submit requests for an incremental grant claim to support a number of DfT initiatives, i.e.

- Local Authority Capacity and Capability
- Decarbonisation
- Electric Vehicle Charging Infrastructure
- Planning for local bus services
- STB Common Analytical Framework

A bid, developed with input from TfN partners, for £0.75m was submitted on 20 October 2021 covering these activities in the current and next financial years. At the

time of writing, we are awaiting confirmation of any allocation. Any agreed allocation will be ring-fenced for the specifically agreed activities.

3.8 TfN has operated within the parameters set out in its Treasury Management Strategy.

3.9 In August 2018 TfN elected to opt in to the PSAA scheme for a period of 5 years covering 2018/19 to 2022/23. This scheme acts as an independent entity to appoint and manage the external audit appointments. We are proposing to continue with this scheme for the next five-year period from 2023/24 to 2027/28. To allow sufficient time to deliver the services the scheme administrator requires early confirmation of our intention to opt in. The decision to opt in requires Board approval.

4. Main Issues:

Year-to-date monitoring

4.1 The table below summarises the seven-month period ending October 2021. As noted in para 3.3, TfN monitors performance against its committed (net) budget.

	2021/22 YTD Budget £m	2021/22 YTD Actual £m	Var £m	Var %
Programmes:				
Northern Powerhouse Rail	26.85	24.44	2.41	9%
IPBA	0.62	0.52	0.10	16%
Integrated & Smart Ticketing	1.05	1.01	0.03	3%
	28.52	**25.97**	**2.55**	**9%**
Rail Operations	1.68	1.52	0.16	10%
Operational Areas	3.67	3.42	0.25	7%
Total	**33.86**	**30.91**	**2.95**	**9%**

4.2. Over the first seven months of the 2021/22 financial year TfN has incurred expenditure of £30.91m. This level of expenditure is £2.95m behind the Budget Revision 1 reforecast that was approved by the Board in July.

Programme Areas

4.3 Most of the underspend relates to TfN's programme areas (£2.55m), the majority of which in turn falls within the NPR programme (£2.41m). The underspend has arisen as the programme has slowed due to uncertainty around the publication and content of the IRP.

Northern Powerhouse Rail (NPR)

4.4 Year-to-date expenditure of £24.44m is £2.41m (9%) below budget. Programme expenditure has continued to fall behind the Revision 1 profile due to further delays to the publication of the IRP. Modelling work is ahead of budget due to additional requirements requested by the DfT.

Investment Programme Benefit Analysis (IPBA)

4.5 Year-to-date expenditure of £0.52m is £0.1m (16%) behind budget. Underspend to date is due to modelling work, which has taken longer than expected. The original budget contained an envelope for additional tasks outside of the initial remit. Although some of this expenditure has been deferred, £0.04m has been identified as a saving and is reflected in the Revision 2 forecast.

Integrated and Smart Travel (IST)

4.6 The year-to-date costs incurred to close down the IST programme are £1.01m, £0.03m (3%) behind budget. Underspend relates to the final Customer Insights work, which started later than forecast, but is now in progress.

Operations

Rail Operations

4.7 Year-to-date, Rail operations is £0.16m under the Revision 1 Budget. This mainly falls within the Strategic Rail team and represents activities that have slipped into future periods, including a discrete contribution to capacity analysis on the East Coast mainline of £0.07m, delayed reliability work and paused work at Leeds station due to delay in IRP publication. This work is expected to be completed during this financial year.

Operational Areas

4.8 Year-to-date, operational areas are £0.25m below the Revision 1 Budget. This mainly falls within the Strategy & Policy area, where expenditure is £0.22m behind. However, expenditure in October increased by 35% as four new contracts commenced and a further four tenders are currently out to market or at evaluation stage, meaning expenditure is expected to increase significantly in the remaining months of the year.

5. Budget Revision 2

5.1 The table below summarises the reforecast of committed (net) budgets, with contingency separately disclosed. The overall committed budget will be reduced to £57.03m principally reflecting the effect of IRP delay on NPR programme activity.

Forecast Expenditure	2021/22 Budget £m	Variance £m	2021/22 Revision 1 £m	Variance £m	2021/22 Revision 2 £m
Programmes:					
Northern Powerhouse Rail	48.48	0.00	48.48	2.86	45.62
Integrated & Smart Ticketing	1.52	0.00	1.52	0.29	1.23
IPBA	0.89	0.00	0.89	0.04	0.86
	50.90	**0.00**	**50.90**	**3.18**	**47.71**
Rail Operations	3.16	(0.03)	3.19	0.09	3.10
Operational Areas (net)	6.13	0.03	6.10	(0.13)	6.23
Committed Budget	**60.18**	**0.00**	**60.18**	**3.15**	**57.03**
NPR Contingency	18.52	14.43	4.09	4.09	0.00
Total	**78.70**	**14.43**	**64.27**	**7.24**	**57.03**

5.2 TfN has continued to make good progress on the delivery of its Core funded activity and whilst work remains to be done, it is expected that the major part of the Core underspend as at the end of October will be made up by the end of the year. This view is predicated on projected activity levels through to the end of the year, supported by the recently adopted review process has led to an increased level of virements.

5.3 The sole contingency within Budget Revision 1 of £4.09m was held within the NPR programme. Due to the delay in publication of the IRP, the contingency has been removed in its entirety for Budget Revision 2.

5.4 TfN currently lacks any funding certainty with regard to either its Core operations or its programmes. At the time of writing no confirmation had been received regarding

the levels of Core funding for 2022/23 and the future structure of the NPR programme is likely to hinge on the recommendations in the IRP.

5.5 This uncertainty regarding funding beyond the end of 2021/22 has required action to taken within TfN to limit the organisations exposure to new long-term commitments. This has included a recruitment freeze until such time as the new funding arrangements are clearer.

Northern Powerhouse Rail

5.6 The main element of this overall budget reduction is the £2.86m decrease in the NPR programme, reflecting ground already lost as a result of uncertainty around the content and timing of the IRP. It is hoped that the IRP may now be released in November. However, further delays to publication increase the risk of further reductions in activity through to the year end.

IST Programme

5.7 The IST programme has been reduced by £0.29m to £1.23m for Budget Revision 2. This reduction essentially reflects the earlier demobilisation of the IST team than was originally forecast. The budget is rig fenced and any residual funding will be returned to DfT.

5.8 The residual IST grant funding that had been provided to support the original IST programme has either been repaid or, with the agreement of DfT, rebadged as core grant. This, in conjunction with any final repayments relating to this year's budget, will eliminate all the IST earmarked reserves.

Operations

5.9 The remaining budgets, which are predominantly core funded, have been, at an aggregate level, held at the same level as Budget Revision 1. There have been minor movements between IPBA, Rail Operations and other Operational areas.

5.10 The delivery of activity in line with the Core budget has been supported by the revised virement process that was introduced at the start of the year. This has allowed new activities (which support the business plan) to be brought forward to be delivered during the year, usually in place of activity that has been delayed. This has resulted in some acceleration of activities from future years, where these are integral to a long-term programme (i.e. the development of the STP).

Virement / expenditure control

5.11 Through the monthly budget virement process, new opportunities identified as supportive of the delivery of the 2021/22 Business Plan are reviewed by OBT. In October the following activities were approved:

- NPIRER Prime and Enabling capabilities data
- Legal advice for data sharing in TAME
- Developing metrics to establish our carbon footprint "base"
- STP Preparation – review, strawman & objectives
- Developing a TfN combined rail services specification
- Business planning support

5.12 To date, £0.50m of new activities have been approved, these are funded from a combination of the strategic risk allocation, realised savings and reserves.

Funding

5.13 The Revision 2 budget of £57.03m will be resourced as follows.

Funding	2021/22 Budget £m	Variance	2021/22 Revision 1 £m	Variance £m	2021/22 Revision 2 £m
Core Grant	6.00	0.00	6.00	0.00	6.00
IST Grant	1.52	0.00	1.52	(0.29)	1.23
NPR - TDF Grant	48.48	0.00	48.48	(2.86)	45.62
Rail Operations Grants:	1.65	0.12	1.76	(0.07)	1.70
Esk Valley	*0.06*	*0.00*	*0.06*	*(0.00)*	*0.06*
DfT Grant	*0.69*	*0.12*	*0.81*	*0.00*	*0.81*
Local Contributions	*0.63*	*0.00*	*0.63*	*0.00*	*0.63*
Network Rail (TRU)	*0.27*	*0.00*	*0.27*	*(0.06)*	*0.21*
Total In-Year Grant	**57.65**	**0.12**	**57.76**	**(3.21)**	**54.55**
Use of Reserves	2.54	(0.12)	2.42	0.07	2.48
Total Resource	**60.18**	**0.00**	**60.18**	**(3.15)**	**57.03**

5.14 A reduction in the NPR committed budget, in addition to the release of the full NPR contingency amount, means that the overall funding envelope for NPR activity has been reduced to £45.62m.

5.15 The virement of budgets between Rail operations and Core operations means a forecast draw on reserves of £2.48m, an increase of £0.06m compared to Revision 1 budget, but a reduction of £0.06m against base budget. The adjusted draw on reserves for 2021/22, combined with the increase in reserves of £0.13m due to actual draw on reserves in 2020/21 being lower than forecast, gives a forecast year-end Core cash reserve to £4.19m.

Feedback from Scrutiny Committee - 4 November 2021

5.16 Members received a report including financial performance for the six months to September and the progress towards and challenges faced in preparing Budget Revision 2.

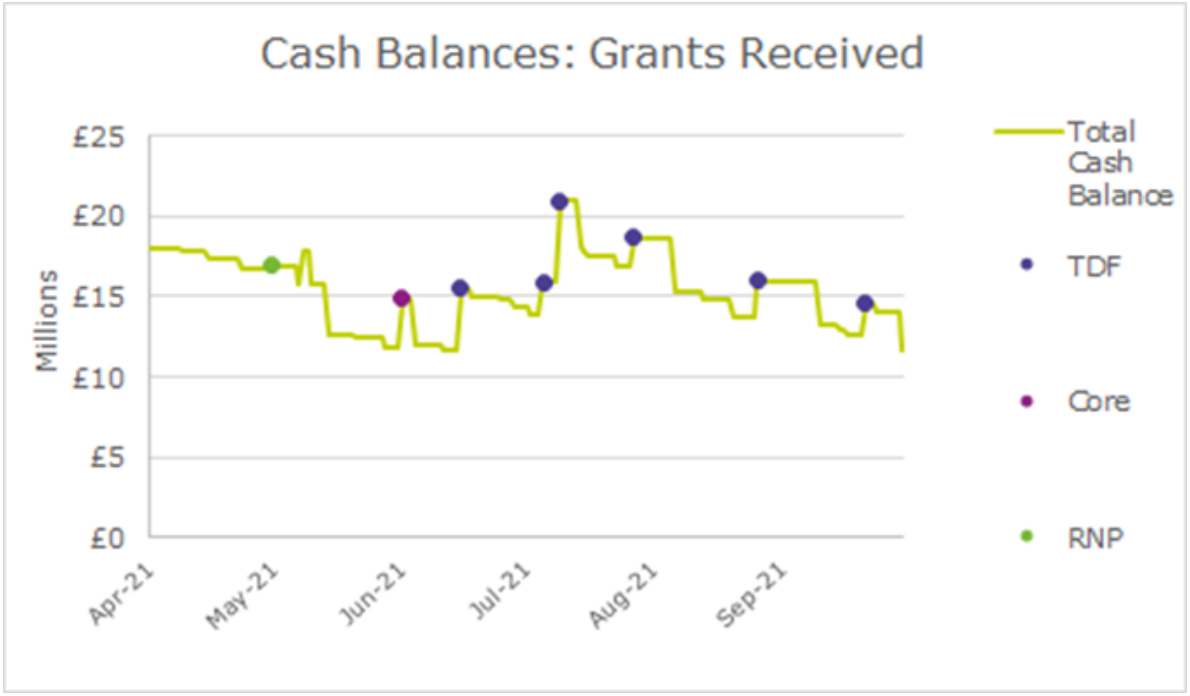
5.17 Members expressed their concerns over the delayed IRP and considered what they might be able to do in order to speed up its publication.

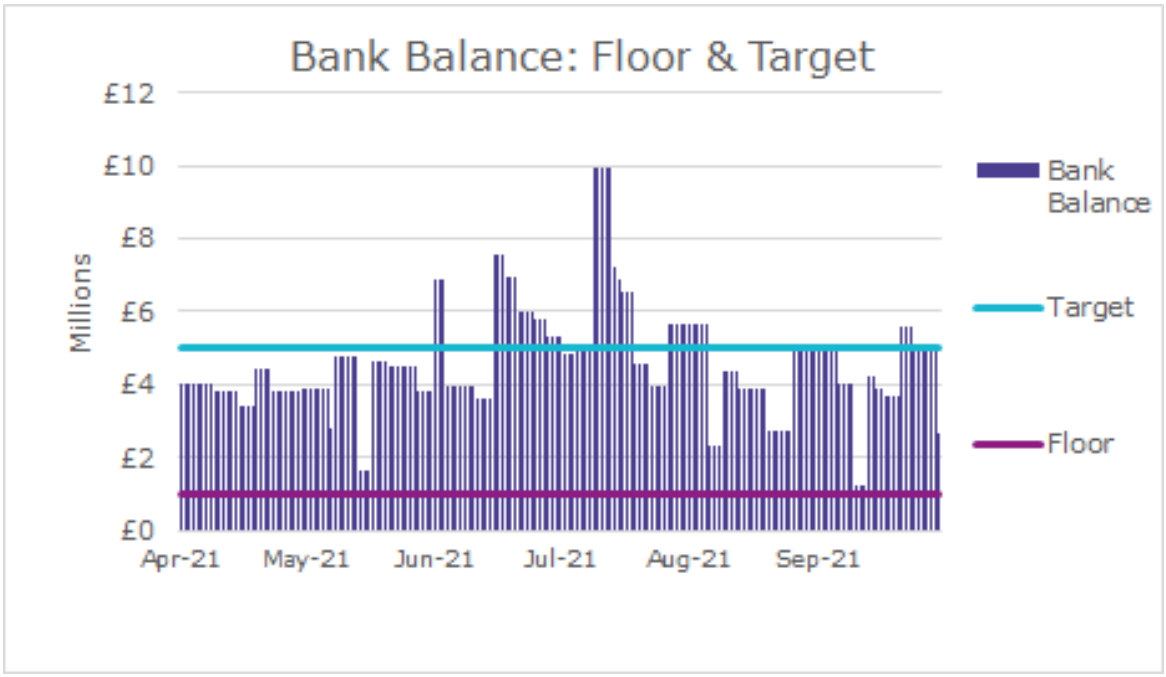
5.18 The Chair and committee members urged that the IRP be published as soon as possible.

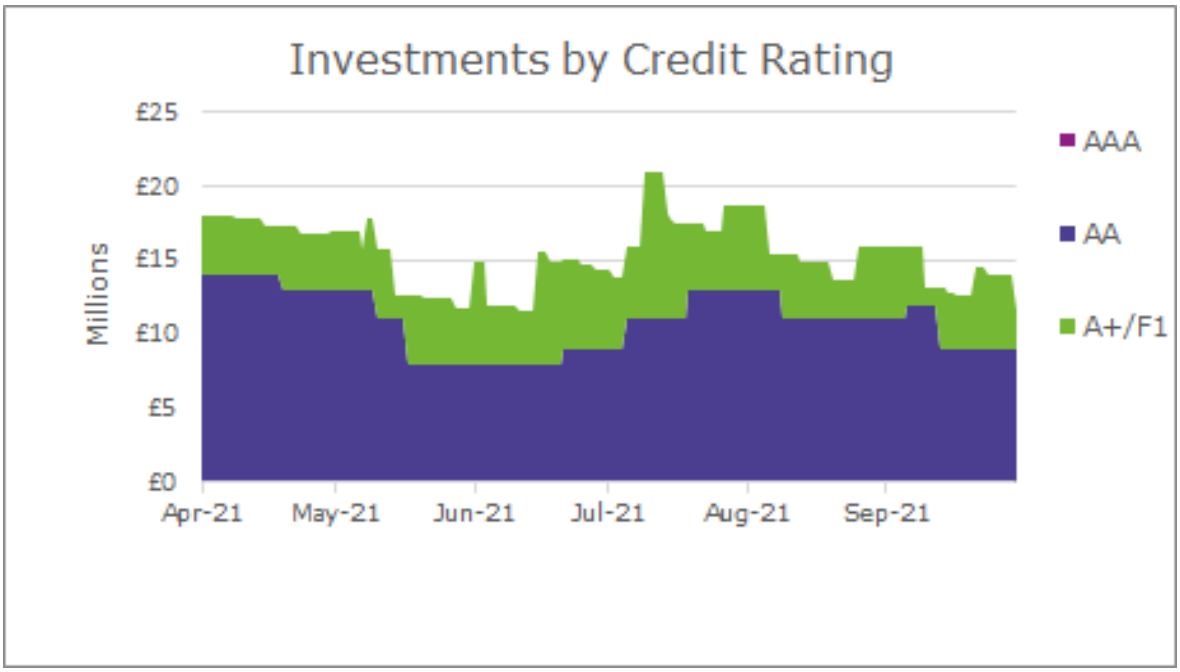
6. Mid-Year Treasury Management Update

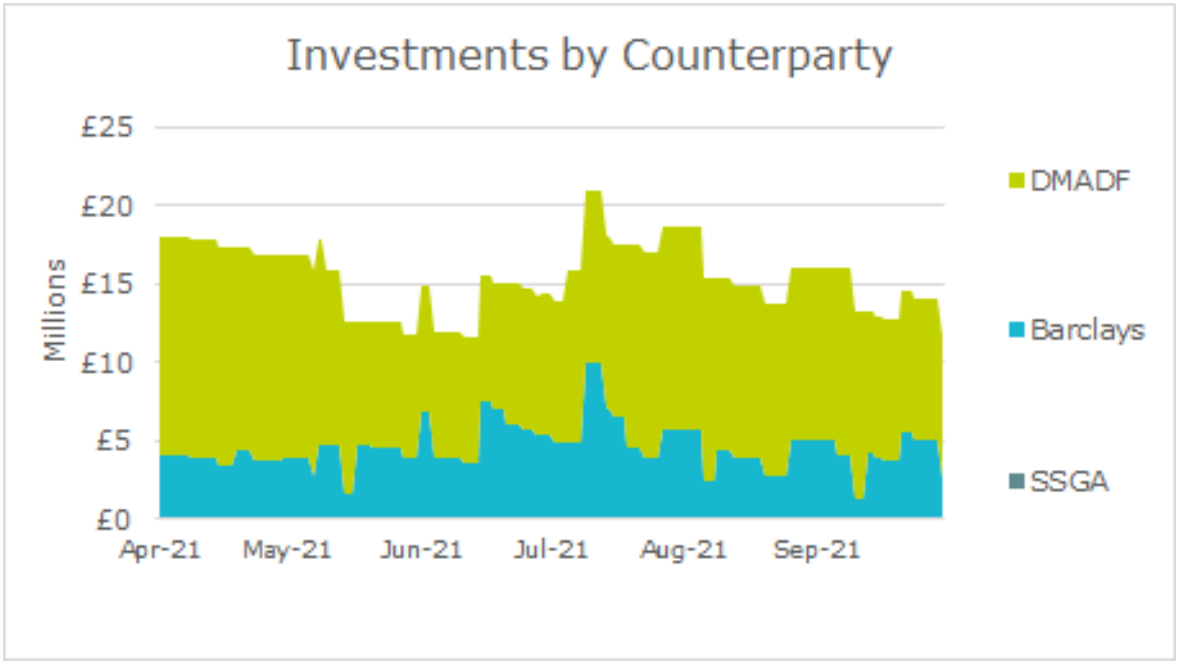
6.1 TfN's constitution obliges officers to report to Board at the mid-year mark on performance against the Treasury Management Strategy. This strategy prescribes how TfN will manage cash and investments. Unlike partner bodies, TfN is prohibited from accessing credit, so no rules are set around borrowing.

6.2 The following charts showing performance against key parameters. It shows that TfN has managed cash and investments within its counterparty criteria, placing cash deposits with secure bodies and institutions on liquid terms.


Cash Balances: Grants Received
£25
£20
£15
£10
£5
£0
Millions
Apr-21
May-21
Jun-21
Jul-21
Aug-21
Sep-21
Total Cash Balance
TDF
Core
RNP


Bank Balance: Floor & Target
£12
£10
£8
£6
£4
£2
£0
Millions
Apr-21
May-21
Jun-21
Jul-21
Aug-21
Sep-21
Bank Balance
Target
Floor





6.3 In October we reimbursed DfT £1.27m relating to capital funding for the IST programme and agreed to reallocate the remaining revenue grant of £2.21m as a partial settlement of the remaining 2021/22 core funding of £3m. The balance of £0.79m will be remitted by DfT in due course.

6.4 It is worth noting that the interest rate environment that currently persists is resulting in very low returns on cash invested (in some investments we had negative yield). Whilst TfN will continue to keep the position under review there is no intention at present to change the focus of our Treasury Management Strategy and its prioritisation on security and liquidity over yield.

6.5 TfN has operated within the parameters set out in its Treasury Management Strategy.

7. <u>Appointment of Public Sector Audit Appointments ("PSAA") to appoint our External Auditors</u>

7.1 The PSAA is an entity set up to appoint auditors to local public and government bodies. They also set fees and oversee the delivery of consistent, high-quality and effective external audit services.

7.2 In August 2018, TfN elected to utilise the services of the PSAA, ie become an opted-in authority for the purposes of the appointment of our external auditor under the provisions of the Local Audit and Accountability Act 2014 and the requirements of the Local Audit (Appointing Person) Regulations 2015 (the Regulations).

7.3 This was a national scheme and covered the 5 years from 2018/19 to 2022/23.

7.4 It is proposed that TfN continues with this arrangement for the next five years (2023/4 to 2027/28). The PSAA requires that this decision be taken at a full meeting of the authority, and it is therefore the intention to seek the required approval at today's TfN board meeting.

8. Corporate Considerations:

8.1 ***Financial Implications***

The financial implications are included within the report.

8.2 ***Resource Implications***

The HR implications are covered within this report.

8.3 ***Legal Implications***

The Legal implications are covered within this report.

8.4 ***Risk Management and Key Issues***

The risk implications are included within the report.

8.5 ***Environmental Implications***

There are no environmental implications.

8.6 ***Equality and Diversity***

There are no quality and diversity matters.

8.7 ***Consultations***

No consultation is required.

9. Background Papers

9.1 2021/22 Budget

Budget Revision 1

Treasury Management Strategy

DfT incremental funding request of 20 October 2021

10. Appendices

There are no appendices to this report.

Glossary of terms, abbreviations and acronyms used *(if applicable)*	
a) IRP	*Integrated Rail Plan*
b) NPR	*Northern Powerhouse Rail*
c) *PSAA*	*Public Sector Audit Appointments*

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TRANSPORT FOR THE NORTH

Meeting: Transport for the North Board

Subject: Funding & Business Planning 2022/23 Update

Author: Iain Craven, Finance Director

Sponsor: Martin Tugwell, Chief Executive

Meeting Date: Wednesday 24 November 2021

1. Purpose of the Report:

1.1 For the Transport for the North Board to be briefed on and discuss the current funding position and business planning process for 2022/23.

2. Recommendations:

2.1 That the Board notes the challenges and approach to the 2022/23 Business Planning process.

3. Funding:

3.1 TfN continues to face uncertainty on a number of fronts, principally related to the intentions of Government and the impact of Governmental decisions upon TfN's operations and funding. This includes policies that are either yet to be announced (at the time of writing, the Integrated Rail Plan, and the Levelling Up White Paper), or where the impact of policy upon TfN is not yet fully understood (such as the re-shaping of the railway following the Williams-Shapps Review).

3.2 Dependent on these and a number of other policy decisions, TfN could see its remit change in a number of areas. This could provide opportunities for increased responsibilities / funding for TfN, in line with the preference of TfN's Board, but also has the potential to result in a reduced role for the organisation.

3.3 The position with regard to the IRP is particularly critical. Any change to the current delivery model could have significant implications for TfN. Not only does NPR form a key part of TfN's purpose, but the programme currently constitutes over 80% of our ongoing expenditure, meaning that the organisation has been shaped and scaled to support it.

3.4 These challenges were reflected in the decision of TfN in June to temporarily pause permanent recruitment (instead filling vacancies through fixed term or temporary arrangements) until September 2021 at the earliest, when it was hoped that greater clarity regarding some of these issues will be available. Such clarity has not been forthcoming and therefore the pause on permanent recruitment remains in place.

3.5 The submission for the 2021 Spending Review (SR) process (Appendix 1) provided an opportunity to reconfirm with members the vision and objectives of TfN. Further, the approach to developing the SR submission that was adopted means that officers have clear and current insights into the priorities of TfN members at the point at which the planning process is initiated in earnest following receipt of the funding allocation.

3.6 The importance of receiving earlier notification of our funding allocation was set out in TfN's SR submission. As part of TfN's regular business planning cycle we would normally seek to reference our funding allocation at the November / December Board meeting. This was not possible last year as we did not receive notification until early January, which had a number of negative consequences for TfN. It was hoped, given the timing of the SR in October that DfT would be able to provide earlier communication of TfN's funding position this year.

3.7 However, discussions with senior DfT officials have indicated that TfN will not receive notification of its funding allocation until January, nor can any indication be provided as to quantum of funding that will be allocated. Combined with the continued delay to the IRP (at the time of writing expected to be released in mid- to late-November), this ongoing uncertainty exposes TfN to a broad range of risks including the ability to robustly business plan and budget, continuity of workstreams, resource management and staff morale. These risks could be exacerbated significantly by the substance of the IRP publication and funding notifications once they have been received.

3.8 In those discussions it has been made clear to officials that the ongoing lack of clarity regarding NPR funding or delivery arrangements into 2022/23 is likely to impact the programme as a result of delays to resourcing and procurement activity. This has been mitigated to date by "in principle" commitment to individual procurements from the department, but this will become less sustainable as we approach the new financial year. In the best case this will lead to delays in 2022/23 as the procurement and resourcing "lag" is made up – in the worst case it could lead to the loss of critical embedded knowledge.

3.9 Further, it has been made clear to officials that any change to the organisational arrangements for NPR will have consequential implications for the rest of TfN. As has been previously noted at the board, there are significant linkages between our core funded activity and the NPR programme. This was recognised explicitly in the £1.5m allocation into the NPR programme budget to cover its share of central costs that was agreed for this financial year, and the extent of direct recharges that exist, particularly in relation to TAME support for NPR. A change in the NPR working arrangements would therefore require a reconsideration of the extent and structure of TfN's Core funded operations.

4. Business Planning Challenges and Approach:

4.1 As noted above, the key challenge that TfN faces is the level of uncertainty that exists across its business areas.

4.2 This includes:

1) The level of Core Funding that will be received.
2) The delivery model that will be adopted for NPR as well as the funding that will be allocated.
3) The delivery model that will be adopted for Rail Operations arising from the Williams-Shapps review.

This means that TfN faces uncertainty across all areas of both its operational and programme expenditure.

4.3 Moreover, once the allocations are received, TfN should have a much greater level of certainty regarding its medium-term financial position than it has had from the one-year settlements in 2020/21 and 2021/22. TfN will therefore need to be mindful of its forecast level of General Reserves at the end of year-three (2024/25) when considering fundable activity levels in 2022/23.

4.4 In addition, as noted in 3.2 and 3.3, some of the potential delivery options for NPR could have fundamental implications for TfN, not least because the corporate

functions are scaled in line with the programme and in turn funded through recharges into the programme.

4.5 Transport for the North therefore currently has no basis upon which to make meaningful planning assumptions in relation to either the Core activity or our programmes. This in turn will make it impossible to complete the business planning process to the usual timelines. However, there is still a requirement upon TfN to adopt a balanced budget by the start of the next financial year.

4.6 Given these challenges and the interaction with the development of the Spending Review submission, the 2022/23 business planning process, focusing on prioritisation in the first instance, commenced at the beginning of October.

4.7 This prioritisation exercise will require teams to classify activity under one of the following three categories:

Required to fulfil or support a statutory function or fulfil a statutory requirement (i.e. the renewal of the STP).
Activity to which we believe TfN is committed or that we consider critical to achieving its objectives.
Activity that we would like to undertake.

This information will then be used to expedite the planning process once the current uncertainty is resolved.

5. Objectives:

5.1 Regardless of the challenges that we face, the overall aim of the business planning process will be to produce a document that can be the basis for a robust budget for 2022/23 and beyond.

5.2 This will require TfN to produce a high-level output plan for 2022/23 that includes both external deliverables and internal development. Additionally, as per 4.3 above, we will need to consider plans for 2023/24 and 24/25. The level of detail required at this stage for the later years will be dependent on the level of Core settlement that TfN receives and the period over which it is confirmed.

5.3 Consistent with the 2021/22 process, this will provide the framework for programme and corporate planning, including the development of detailed activity which in turn will drive team and individual objectives and measures. These plans will allow effective workforce planning and a budget to be produced while monthly and quarterly financial performance reporting will continue as normal. Budget Revision 2 will form the 2021/22 outturn upon which planning for 2022/23 will be based.

5.6 The target output from the business planning process is a fully resourced and costed workplan that will provide a framework within which TfN will operate during 2022/23 and an associated operating budget.

5.7 We need to acknowledge that any significant move away from current funding levels for either core activity or programmes will significantly increase the challenge that Transport for the North faces and may indicate the need for additional processes to be put in place.

6. Scrutiny Committee

6.1 The TfN Scrutiny Committee considered an earlier version of this report at its meeting on 4 November. The Committee recorded its concern that TfN planning for 2022/23 is being hampered by delays to both funding allocations and the IRP, and that continued delays would result in increased costs to TfN.

7. Corporate Considerations:

7.1 ***Financial Implications***

The financial implications have been considered and are included in the report.

7.2 ***Resource Implications***

The resource implications have been considered and are included in the report. The organisation recognises UNISON; should changes to delivery model be required, full and proper consultation will be undertaken with UNISON and any employee affected.

7.3 ***Legal Implications***

The legal implications have been considered and are included in the report.

7.4 ***Risk Management and Key Issues***

The key risks are identified within the report.

7.5 ***Environmental Implications***

As this is an internal planning document, a full impact assessment has not been carried out.

7.6 ***Equality and Diversity***

Equalities considerations have been included in the report.

7.7 ***Consultations***

A consultation has not been carried out because this is an internal planning report.

8. Background Papers:

8.1 None.

9. Appendices:

9.1 Appendix 1 - Transport for the North Spending Review submission to DfT.

Date: 9 September 2021

Emma Ward
Department for Transport

Sent by e-mail to:
Emma.Ward@dft.gov.uk

Martin Tugwell
4 Piccadilly Place
2nd Floor
Manchester
M1 3BN

Tel: [redacted]

Dear Emma,

Spending Review 21: Transport for the North

Following the Chancellor's confirmation that the Spending Review has now commenced, I am writing to set out our vision for Transport for the North for the next three fiscal years. We are committed to harnessing the investment made in Transport for the North over successive years to support and enable economic recovery and the delivery of planned growth. The capacity and capability held by TfN provides Government and our partners with the ability to develop business cases, challenge costs and accelerate delivery. In setting out our requirements in advance of the department's submission to Treasury we set out an ambitious but affordable agenda.

In the short time since our inception, TfN has established a clear role working alongside government, our member bodies and the wider transport sector to deliver improved outcomes for our residents and businesses. At the heart of our work is the need to bring forward credible and affordable long-term proposals for transforming the North of England's transport network. This submission sets out how we will use the certainty provided by a multi-year funding settlement to accelerate delivery, working with Government and our partners to reduce duplication, speed up processes and realise efficiencies. It builds on the constructive discussions we have held with officials across DfT (both as TfN and as part of the STB7 group), and the welcome recognition of the key role for STBs set out in the Transport Decarbonisation Plan.

Our funding ask is realistic and mindful of the fiscal challenges created by the pandemic, as well as the urgent need to support both government and our local partners to respond to both the economic consequences of the pandemic and the urgent need to decarbonise our transport network. We have therefore focused on piloting new activities which could be scaled over time, both to minimise additional costs to the exchequer and mindful of the need to demonstrate capability. We continue to work closely with the Department's Acceleration Unit in order to ensure that the learning gathered to accelerate the delivery of infrastructure proposals is applied more widely.

We would welcome further dialogue on the substance of these proposals and how we might work together to deliver them, as soon as possible. I anticipate that the Board will want to make additional representations to ministers as part of the SR21 process announced by the Treasury.

In themselves, these proposals represent an ambitious and progressive agenda for the organisation over the next three years, one that will deliver tangible benefits for the North.

In our view, we could – and should - go further. The pandemic challenged us to think differently about connectivity and the future of the transport system in the round. We face a collective challenge to meet the needs of the t]ravelling public, decarbonise our transport networks and create new funding models that can support investment and level up opportunity.

These issues require strategic leadership by both national and regional bodies. We believe that to deliver place-based outcomes it is essential that we adopt a systems approach to infrastructure planning. The potential of innovation within the transport system is dependent upon the availability of ubiquitous digital connectivity as the driver behind wider changes in society that creates opportunity for changing the transport system. In addition, the focus on electric and hydrogen powered solutions increases the importance of investment in power generation and distribution services.

We need a systems approach that can align investment decisions in these areas, one that is focused on delivering place-based outcomes. This is the core strength of TfN, enshrined in our STP and the Northern Powerhouse Independent Economic Review critical to achieving a de-carbonised transport system.

We continue to work closely with the other Sub-national Transport Bodies where there is added value from a co-ordinated approach. And we continue to support their own programme of works by sharing our accumulated knowledge and experience. This approach maximises the benefit of the investment made by TfN and enables the other STBs to deliver their programmes in a timely and cost-effective manner.

I believe that TfN is well placed to help realise the Government's commitment to levelling-up and achieve a step change in terms of delivery. I would welcome the opportunity to discuss these thoughts further.

Yours sincerely,



Martin Tugwell
Chief Executive

Transport for the North Spending Review Submission

Summary

This paper sets out Transport for the North's funding requirements from DfT for the next three fiscal years (to 2024/25). In the short time since our inception, TfN has established a clear role working alongside government, our constituent members and the wider transport sector to deliver improved outcomes for our residents and businesses. At the heart of our work is the need to bring forward credible and affordable innovative long-term proposals for transforming the North of England's transport network. This submission sets out how we will use the certainty provided by a multi-year funding settlement to accelerate delivery, working with Government and our partners to reduce duplication, speed up processes and realise efficiencies.

Our funding ask is realistic and mindful of the fiscal challenges created by the pandemic, as well as the urgent need to support both government and our local partners to respond to both the economic consequences of the pandemic and the urgent need to decarbonise our transport network.

Our focus now is to deliver on our core statutory functions, including the delivery of a new Strategic Transport Plan by 2024, bringing forward clear proposals for investment, and playing an active role in establishing Great British Railways in order to realise the benefits at the earliest opportunity.

We will, continue to make the case for further devolution of budgetary control as set out in the Northern Transport Charter, in particular setting out how our unrivalled evidence base provides regional decision makers with the information that allows them to make informed choices. We see clear opportunities to harness TfN's current powers and funding and, with some investment, to realise a step change in our offer to local authorities, the department and our colleagues in the other sub-national transport bodies.

As in previous years, we are clear that a **multi-year settlement** is critical as it would allow TfN to more effectively and efficiently deliver the objectives of its members, government and its wider group of stakeholders. Our funding asks are as follows:

- TfN's core funding requirement over the next three years is **£8.5m** per annum, based on the assumptions set out in section 6.

- Continuation of the contractual arrangements that fund our rail co-clienting requirement (**£1.3m** per year (indexed)) which covers the costs of the Rail North Partnership and part of the cost of TfN's own strategic rail team.

- An additional **£2m** per annum for development funding enabling TfN to significantly strengthen our offer of support to local partners, our STB colleagues and to help NTAC accelerate Northern scheme development.

- Ahead of the publication of the Integrated Rail Plan, we currently estimate that around **£106m** funding will be required for Northern Powerhouse Rail in the next financial year 2022/23. This includes the c.**£1.5m** annual recharge for TfN services which we assume will continue.

1. Context

1.1 Our transport system is at the heart of our economy and central to the future success of our communities: it is the means by which people and places connect with services and opportunities.

1.2 Investing in the transformation of our transport system is key to realising the economic potential first identified in the Government's Northern Transport Strategy and the Independent Economic Review. Enabling our residents and businesses to realise their potential within their communities is the manifestation of the Government's commitment to 'levelling up'. The strength of that economic vision is at the heart of TfN's work from the Strategic Transport Plan through to the transformational project that is Northern Powerhouse Rail.

1.3 It is also key to ensuring that economic growth is sustainable in the longer-term. At the heart of this is ensuring the choices we make, and the investment we deliver, meets the needs of everyone: we need to address the reality that for some the cost of transport, or indeed the lack of any transport option, acts as a barrier. This has become more urgent in the wake of pandemic that has fundamentally changed how we view our relationship with our work, our places and our communities.

1.4 If we are to indeed decarbonise our transport system, we must change the way we plan and then deliver investment in our transport system. Our award-winning Strategic Transport Plan – vision-led, evidence-based – anticipated the need for such change and has demonstrated the North's strategic and thought leadership. Our innovative approach and willingness to tackle challenging issues head on has created an ambitious agenda for the North of England and can provide a strong foundation for the Plan for Growth.

1.5 As the North's statutory regional transport body, our focus remains on working with Government, our partners, and the wider community to deliver the Strategic Transport Plan. This submission sets out how we will use the certainty provided by a multi-year funding settlement to accelerate delivery, working with Government and our partners to reduce duplication, speed up processes and realise efficiencies.

2. Ambitious in our Purpose

2.1 TfN is the only statutory Sub-national Transport Body in the UK. Our overarching objective is to facilitate inclusive and sustainable transformational economic growth in the North of England. In doing so it is well aligned with the objectives of both central government, the 20 Transport Authorities that make up its membership, the 11 northern Local

Enterprise Partnerships that are represented on the Partnership Board and our delivery Partners including Network Rail, Highways England and HS2.

2.2 As the only STB with statutory status, our role is clearly defined in legislation and directly linked to the department's *strategic objectives:*

- Growing and levelling up the economy
- Improving transport for the user
- Reducing environmental impacts
- Increasing our global impact

2.3 In April 2018 Transport for the North came into being as a statutory body. Per the Sub-national Transport Body (Transport for the North) Regulations 2018, the organisation has the following general functions:

a) to prepare a transport strategy for its area;
b) to provide advice to the Secretary of State about the exercise of transport functions in relation to its area (whether exercisable by the Secretary of State or others);
c) to co-ordinate the carrying out of transport functions in relation to its area that are exercisable by different constituent authorities, with a view to improving the effectiveness and efficiency in the carrying out of those functions;
d) if TfN considers that a transport function in relation to its area would more effectively and efficiently be carried out by TfN, to make proposals to the Secretary of State for the transfer of that function to TfN;
e) to make other proposals to the Secretary of State about the role and functions of TfN.

In addition, the Regulations set out a number of additional functions including in relation Franchise Management and specific functions to be exercised jointly either with the Secretary of State, Constituent Authorities or Highways Authorities.

2.4 The Explanatory Memorandum which accompanied the Transport for the North Regulations when they were laid before Parliament set out Transport for the North's role at clause 7.7:

"Their role as a 'bridge' between local and national government will provide people with a greater say on transport in their area and greater input into national level decisions because they are collectively speaking with 'one voice'."

It is in this "bridging" role where TfN continues to play a key role in translating the needs and requirements of the North of England into clear and credible proposals and worked collaboratively with government to identify the right solutions for transport users. It is this in this role that we see clear opportunities to further support the government and our Members commitment to achieve an improved offer for transport users as part of the next phase of TfN's development.

3. Putting transport users first

3.1 Our Strategic Transport Plan is our call to action – it's the North's Plan, prepared by the North for the North.

3.2 At the heart of our Plan is the importance of a user centred approach – understanding 'why' people chose to travel, what factors influence their choice and how connectivity can unlock the full economic potential of the North as set out in the Northern Powerhouse Independent Economic Review.

3.3 At the same time our experience through the pandemic has served to emphasise the scope for doing things differently and the potential for changes in travel demand to happen very quickly.

3.4 Our award-winning Future Travel Scenarios and work on our decarbonisation strategy enables us to work with partners to identify the measures that will effect the changes in travel behaviour required, whilst preparing for a more uncertain future.

3.5 The insight provided through the application of our Analytical Framework ensures that our approach reflects the needs of our communities and businesses right across the North – whether in better connecting our city regions, providing transport solutions for our rural communities or connecting our ports and airports to global markets. The quality of our evidence base has meant we can reflect the diversity of our communities, their characteristics and diverse travel needs in our strategies and decision making (for example in taking crucial decisions on NPR).

3.6 We have developed and agreed a clear investment pipeline for the North, provided concrete proposals for how key projects can be accelerated through the Economic Recovery Plan, and demonstrated how this is what is required to support the delivery of planned growth (economic and housing) and realise the economic potential set out in the Independent Economic Review.

3.7 Our analytical framework, designed and developed in collaboration with DfT analysts is now fully operational and producing the evidence for both the investment programme and Northern Powerhouse Rail. Our analysis is unique in being able to assess modal shift between road and rail; impacts on passengers and freight; conventional as well as transformational growth and a wide range of social, environmental and economic benefits. We are using that evidence to go further in sequencing priorities and strengthening decision making, based on evidence that fully reflects the complexity of the difficult decisions we face, as well as the full economic and social opportunities offered by a transformed North.

3.8 Our approach to prioritisation continues to be grounded on strong evidential foundations and in the expectation of a devolved, multi-modal transport budget and supporting financial framework. The Northern Transport Charter sets out a clear blueprint for how clear prioritisation decisions could be taken within such a framework. We now want to build on the experience of national agencies who have worked within 5-year investment programmes, to agree a rigorous approach that works for the North and government. We

see potential to draw on our work with the Acceleration Unit to pilot such an approach as a precursor to further devolution.

3.9 There are a number of specific areas where a pilot approach could be tested, including the development of CP7 or RIS3 priorities, or focusing on specific key bottlenecks or corridors of the North of England and agreeing an investment pipeline over a number a future Parliaments. These could include:

- The Southern Pennines corridor between Sheffield and Manchester City Regions, where major multimodal decisions are required and TfN is already developing plans for NPR and is a key stakeholder in the Trans Pennine Tunnel being led by Highways England.

- Prioritising investment in our key station hubs – particularly Leeds Sheffield and Manchester where NPR and HS2 decision making urgently needs to be integrated into the needs of local connectivity as well as through-passengers.

- Developing multi-modal connectivity solutions for rural areas in partnership with our county councils, building on the work TfN is already doing to support rail investment in Cumbria, Northumberland and North Yorkshire.

3.10 We would welcome the opportunity to discuss this approach further with officials, but would envisage a pilot as a means of demonstrating our ability to develop clearly agreed long term investment priorities (eg for a particular geographical area), as well as demonstrating TfN's decision making and governance capabilities in preparation for taking on wider responsibility prioritisation and budgets in future. A prioritised investment programme (determined by a devolved budget) will allow us to:

- Give confidence to investors that the infrastructure required to support planned growth will be there.
- Enable local partners responsible for delivering infrastructure to plan their resources more efficiently and effectively – reducing the cost of delivery and enabling benefits to be realised sooner.
- Accelerate the delivery of investment by reducing/removing bureaucracy.

The Investment Programme Benefits Analysis (IPBA) programme currently underway will provide the first quantified evidence of the benefits of such an approach. We will continue to work with the DfT's Acceleration Unit to agree an approach to further sequencing and prioritisation activity.

4. TfN: Focused on Delivery

4.1 Since it was created, Transport for the North has demonstrated its credibility as the single voice of Political and Business leaders on issues of genuine strategic importance.

4.2 The TfN Board – and associated groups – have provided strong leadership on strategic issues: preparing an evidenced-based programme of investments

that will facilitate transformational, inclusive and sustainable economic growth.

4.3 This is now of intrinsic value to the North of England's economy, and that of the United Kingdom as a whole, and supports the core components of what has become the Government's 'levelling up' agenda – including tackling the productivity gap.

4.4 Transport for the North has carved out a proactive and multi-faceted role - providing a single, clear voice from North, as well as driving forward its own projects with a clear focus on transformation, innovation and securing value for money. This has seen Transport for the North flourish within its first two years as a statutory authority – tackling large, complex problems whilst in organisational infancy. This has been built on its truly collaborative work to measure the significant impact transport investment will have on the North's productivity and collective economy. For example, our collaborative work on NPR has produced clear credible proposals that meet the transformational ambition of the North at significantly reduced cost compared to the original vision, and we continue to actively drive down costs with a clear focus on value for money.

4.5 Transport for the North's success has been in uniting its civic and business leaders as 'one voice' for the North. It has clearly communicated the North's priorities for future investment, as well as providing recommendations during challenging times on the transport network. Transport for the North's ability to deliver its objectives has always been dependent on building and managing open and honest relationships with our members, partners and stakeholders across the region.

5. Maintaining Momentum: Accelerating Delivery

5.1 We have a clear vision for the next phase of development and the remainder of this parliament. Our core objective will be to produce and agree a new Strategic Transport Plan by 2024 – our central statutory function. The new STP will build on the ambitious and progressive agenda established by the first STP, addressing head-on both the opportunities for decarbonisation and the challenges of transport related social exclusion.

5.2 Alongside the STP programme, we will update the Northern Powerhouse Independent Economic Review (NPIER) as an essential part of refocusing our economic objectives, working with the NP11 to establish a new pan-Northern programme of research and analysis to support broader economic development and drive cleaner, greener and more inclusive growth.

5.3 Both the STP and the new NPIER will set out the importance of understanding the implications of trends in wider society (many of which have been accelerated by the pandemic), climate emergency and technological change. Building on our future travel scenarios, we envisage that our policy development programme will need to tackle a broader set of challenges around transport related social exclusion, rural mobility and strategic local connectivity. We will test and implement new forms of decision making (eg the development of a Citizens' Panel, and implementing

Independent Assurance Arrangements) that will support strengthened decision making within our governance arrangements.

5.4 Secondly, we will sharpen our focus on strategic prioritisation and delivery by:

- Producing an updated TfN Investment Programme in 2023, setting clear, sequenced investment priorities for the North of England for the next Parliament and specifically the North's requirements for CP7 and RIS3.
- Progressing the development of Northern Powerhouse Rail toward construction – including accelerating work on key stations, design development and consents to enable delivery to start by the middle of this decade.
- Continue our support for rail services through the Rail North Partnership. Supporting the rail industry to build back from the covid pandemic is essential in cementing the recovery of the North's rail market and reduce subsidies in the longer term, thereby delivering better value for money for government and passengers. TfN will continue to provide strong leadership to resolve key service infrastructure challenges in an integrated and collaborative way through Rail North.
- Smart ticketing remains a priority for the North. Transport for the North is drawing on knowledge and experience from the previous Integrated and Smart Travel Programme to work with operators and local authorities to identify pilot projects and opportunities to integrate rail products with other modes including buses. In particular, TfN would support a rail-operator led pilot of Pay as You Go ticketing in the North of England as part of the national roll-out.
- On decarbonisation we will work with our partners to accelerate the transition to net zero on our transport network, in our towns, cities and rural areas, whilst working with the NP11 and business organisations to maximise the opportunities for clean growth, building on our existing work on EV charging networks and partnership working on Hydrogen.

5.5 Thirdly we want to strengthen our role in shaping national programmes, building on Northern Powerhouse Rail, the Rail North Partnership and our roles with Highways England and Network Rail. We want to continue as an active and valued partner to delivery bodies and contribute to the national policy debate, providing technical expertise together with expert local knowledge and extensive partner and local stakeholder networks. Our priorities as follows:

- Williams-Shapps Plan for Rail and the creation of Great British Railways, working at pace with the transition team and drawing on the knowledge and experience of RNC and Rail North Partnership to set out a proposal for how to implement GBR (and to help accelerate the transition), with a clear role for TfN and partners in the new structure and setting the strategic direction for the North's rail network.
- Building on our Major Roads evidence base, working with the department to shape the strategic northern priorities for the next Road Investment Strategy, the Major Road Network investment programme building on our Major Roads Programme and supporting the debate on the future of motoring funding.

- Agreed approach with DfT on major transport decisions, building on the collaborative approach we have demonstrated in NPR and pursued on the Manchester rail network.
- Work with the DfT chief analyst and economists across government to support the implementation of the new Green Book and revised TAG guidance, building on our industry leading capability, models and innovation and existing collaborations on NPR, Freight and Spatial Planning (also with MHCLG).
- We will support the National Infrastructure Commission to develop the next National Infrastructure Assessment and would welcome a strengthened role for TfN and our STB colleagues in ensuring that the National Infrastructure Plan has a strong regional focus.
- Work with, and support, the Department in the development of the updated National Networks National Policy Statement

5.4 Fourthly we will work with government, partners and our STB colleagues to build capability and accelerate delivery at regional and local level, including:

- Continuing the development and sharing of the analytical framework – including the creation of a common analytical framework across the STBs (representing a significant return on the investment by government in TfN analytical capability).
- Sharing best practice and capability with others, leading on key transport planning themes on behalf of the STB group – particularly building on our existing leadership on freight, decarbonisation and EV charging. TfN is supporting the inaugural STB7 conference in spring ’22 as an opportunity to share knowledge and share best practice.

We want to accelerate local planning and delivery, preparing strategic business cases at a programme level and supporting delivery partners (both national agencies and local partners) to prepare individual business cases. A piloted approach, developed by DfT and TfN, could be quickly rolled out across the English regions by the end of the next SR period.

5.6 By the end of the Spending Review period TfN will have:

- Delivered on our statutory commitment to provide a new Strategic Transport Plan
- Established a clear role for the North in the strategic oversight of transport infrastructure planning on road and rail.
- played an active role in the management of services through Rail North and guided NPR development through to the early phases of delivery.
- Enhanced our reputation and role as the leading sub-national transport body with a clear framework for supporting regional, national and local partners.
- Prepared and ready to assume additional responsibilities for prioritisation and sequencing of a devolved northern infrastructure budget.

In this way the programme of work set out in this submission will deliver improved outcomes as a result of investment in transport infrastructure and services, to the benefit of all transport users.

6. Funding requirement

6.1 Transport for the North is funded via DfT and as a consequence it will be subsumed into the DfT submission for CSR purposes. This document sets out the funding that Transport for the North will require during the CSR period to discharge its statutory functions, support the delivery of Government policy and deliver upon the aspirations of its members.

6.2 Since the start of FY2018/19 TfN has *de facto* been operating on the basis of one-year settlements. As in previous years, we are clear that a multi-year settlement is critical as it would allow TfN to more effectively and efficiently deliver the objectives of its members, government and its wider group of stakeholders. A multi-year settlement would support TfN's ability to deliver value for money as it would allow:

i) work programmes, such as the revision of the STP, to be properly planned and sequenced over a number of financial years.
ii) better management of the procurement pipeline with suppliers and the ability to drive better pricing based on certainty of activity.
iii) the recruitment of staff on permanent or long-term FTC basis, rather than a reliance on interims and consultants – this would lead to a more stable and resilient resourcing base at a lower cost than the current approach.
iv) TfN to retain its capacity and capability protecting the investment made in TfN to date, as well as enabling TfN to support the work of other STBs in a cost effective and timely manner.

6.3 **Core Funding for 2022/23 to 2024/25**

Per annum	**£'m**
Cost of TfN Core functions	10.5
Reserve releases	(0.5)
Recharges to NPR	(1.5)
Core funding requirement	**8.5**

6.4 TfN's core funding requirement over the next three years is **£8.5m** per annum, based on the assumptions set out in paras 6.5 and 6.7. This will allow TfN to deliver upon a range of strategy, analytical and policy development to which it is committed, maintain its contribution to operational rail activity, discharge its statutory functions (including the revision of its statutory Strategic Transport Plan in 2024/25) and fulfil all of its regulatory and governance obligations.

6.5 This requirement includes the ongoing management of TfN's reserves down to the £2m minimum level agreed with DfT in the 2018 MOU. It also assumes that the current recharge of £1.5m to the NPR programme

continues. Should this not be the case the overall requirement will increase to **£10.0m**.

6.6 **Rail Co-clienting (£1.3m, indexed)**

6.7 The costs of the Rail North Partnership and part of the cost of TfN's own strategic rail team are funded through a contract with the Secretary of State. Given the requirement for TfN to support the effective implementation of the Williams-Shapps recommendations in the North, the assumption is that it will continue through the spending review period. The revenues that TfN receives / allocates to resource its own strategic rail team and the Rail North Partnership team that it hosts, are set out in the table below:

	TfN Strategic Rail team £'m	**Rail North Partnership £'m**	**Total funding £'m**
Rail Administration Grant (via PTEs)	0.2	0.3	0.5
Rail North Partnership Grant	-	0.8	0.8
Rail Specific funding from DfT	**0.2**	**1.1**	**1.3**
TfN Core funding	1.4	-	1.4
Rail North partner contributions	0.1	-	0.1
Contracted Income (NYCC & NR)	0.1	0.3	0.4
Total	**1.8**	**1.4**	**3.2**

Any changes to the specific rail funding arrangements would place additional pressure on TfN's core funding. In addition, further to discussion with the Rail North Partnership team, it is assumed that any incremental activity in RNP will only be taken forward where additional funding is made available.

6.8 **Development funding £2m per annum**

6.9 As government seeks to accelerate delivery of schemes through a range of initiatives including DfT's Acceleration Unit and NTAC, this places an additional premium on there being a pipeline of projects that can be brought forward as funding is made available.

6.10 A separate allocation of development funding would allow TfN to develop and prioritise the pipeline of rail investments through our statutory partner role, assist in the development of road projects and provide hands on support to local authorities to expedite schemes. This would support the delivery of government policy agendas, accelerate scheme design and implementation and build capability at local level. Further, it would allow TfN to ensure consistency of approach, provide an assurance role and demonstrate the delivery of its STP.

6.11 This level of funding would allow direct support to up to three schemes, and to pilot some strategic prioritisation activity in particular areas as outlined in Section 3. We would agree a number of candidate schemes with DfT and our partners, based on clear criteria. In time, and with clear evidence of impact, this approach could also be scaled to:

i) Increase the volume of potential rail and road projects that are within the Northern infrastructure pipeline that could be developed through to viability stage;
ii) commence development to strategic outline case of a small number of strategic freight interventions;
iii) Adopt a more structured approach to the work already being undertaken to develop short-term reliability enhancements on the North's rail network that can be delivered quickly in partnership with Network Rail / TOCs.

6.12 **Northern Powerhouse Rail**

	2022/23 £'m	**2023/24 £'m**	**2024/25 £'m**
RDEL	106.7	163.9	249.2
Of which:			
• ***TfN***		***76.6***	***132.9***	***218.2***
• *HS2*		*31.0*	*31.0*	*31.0*
CDEL	-	14.9	62.0

6.13 TfN has considered the funding requirement for the NPR programme in the absence of the IRP. The following assumptions have therefore been adopted:

i) In the absence of an alternative, it is assumed that the current co-client arrangement, hosted by TfN, will continue and that there will continue to be a £1.5m recharge to fund the ongoing support of other TfN functions necessary to deliver NPR;
ii) That the costs of the programme, including the committed costs to TfN (ie NPR team, TAME and other directly charged staffing costs, and accommodation and business infrastructure costs) and anticipated NPR delivery partner costs will be broadly similar regardless of the network choices and delivery model adopted;
iii) The RDEL and CDEL forecasts assume that the NPR programme that emerges from the IRP will be of a significant scale and timed to be delivered in the medium-term. As the IRP will set out the preferred timescale for the delivery of NPR, and as that remains yet to be published, our assumption is that the phasing remains as that presented by TfN to government – commencing with construction of key stations and a small number of route upgrades from the middle of this decade through 2040 when the whole NPR network will be

operational. Whilst consistent with the forecast provided in 2020, the delay to the IRP has resulted in the consequential slippage of both the RDEL and CDEL forecast by one year, meaning that in the case of the latter the £336.5m that was previously forecast for 2024/25 now falls into 2025/26 and is therefore outside the scope of this submission.

iv) That it will take time to gear-up programme activity, and that this may operate as a limiting factor on activity levels that can be achieved during the early part of 22/23.

6.14 Further to 6.2(ii) above, a multi-year funding settlement is of particular importance to TfN as it would give the supply chain confidence to support the scaling up of activity required to enable work for the delivery of key stations and the first route upgrades to be accelerated. In anticipation that the IRP will confirm delivery of NPR over the medium term, a significant scaling up of activity will be required independent of the network choices made. A continuation of short-term settlements will have the de facto result of causing delays to NPR, which is at odds with the drive to accelerate delivery of major infrastructure through initiatives such as Rail Project SPEED. Inevitably, it would delay potentially the most significant contributor to this government's levelling up agenda.

6.15 Co-clienting NPR with DfT has led to a great number of successes. TfN's involvement has meant that local knowledge of the challenges and opportunities has informed shaping our preferred NPR solution. In turn, this has ensured widespread political and business support for NPR across the North which will be beneficial as NPR progresses toward delivery. This joint working means that NPR benefits from other areas of TfN expertise, including the analytical framework to help articulate the wealth of benefits NPR will deliver for communities and businesses in the North as we build our business cases.

6.16 As co-client, TfN has been instrumental in realising efficiencies – through challenging costs and scope reductions of over £4bn have already been agreed with Network Rail on our preferred network. A further c.£5bn of reductions on this network have also been identified and are under review. To ensure that NPR delivers for the North in an efficient way, it is imperative that as NPR moves beyond the Strategic Outline case that TfN remains a core part of the project team as co-sponsors.

6.17 **Implementation**

6.18 TfN receives virtually all its revenue from central Government via the DfT. Given likely timings around the spending review, any business planning activity that can be undertaken in the autumn would be absent of any certainty with regard to the level of funding that will be available to it. This will of necessity limit the extent of any work that can reasonably be carried out prior to the funding allocation being made. The legal requirement for TfN to set a fully funded budget before the start of the new financial year will remain.

6.19 Clearly, any significant move away from current funding levels for either core activity or programmes will significantly increase the challenge that Transport for the North faces and may indicate the need for a "holding" budget to be put in place supported by a business planning process and revised budget to be completed in Q2 of 2021/22, once the NPR SOC and year end accounts processes had been finalised.

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TRANSPORT FOR THE NORTH

Meeting:	Transport for the North Board
Subject:	Approval of the Decarbonisation Strategy
Author:	Peter Cole, Principal Environmental and Sustainability Officer
Sponsor:	Tim Foster, Strategy and Programme Director
Meeting Date:	Wednesday, 24 November 2021

1. Purpose of the Report:

1.1 Approval of the TfN Decarbonisation Strategy following the public consultation.

2. Recommendations:

2.1 The Board is asked to consider the content of this report in relation to the outcomes of the public consultation and endorse the updates made to the Strategy.

2.2 The Board is asked to approve TfN's Decarbonisation Strategy.

3. Main Issues:

3.1 TfN's draft Decarbonisation Strategy for consultation was agreed by TfN Board at the end of March 2021. The 12 week public consultation period launched at the beginning of June and ran till the 31st August.

3.2 The public consultation was supported by a dedicated consultation website and a series of roundtables and webinars.

3.3 The consultation received 240 responses, 140 of which were received from the general public which reflects the high level of interest and awareness in relation to climate change and decarbonisation within our local communities. Remaining responses were fairly evenly split between business groups, public bodies and environmental groups.

3.4 The consultation responses have been collated, coded and analysed by a specialist independent consultancy. The main findings are presented within this report.

3.5 TfN has updated the Decarbonisation Strategy to reflect, where possible, the main themes emerging from the public consultation.

3.6 Updates include:

- Adding further detail / clarifications where requested.
- The identification of those polices and activities of greatest priority to respondents.
- Where gaps in our approach have been identified, we have set out the actions we intend to take to address this ahead of the next Decarbonisation Strategy Update (2025). This has led in some cases to the identification new priority activities within Chapter 9.

3.7 Where appropriate and feasible, we have updated our modelling assumptions and approach to take into account both feedback from the public consultation and also the policies and aspirations of DfT's transport decarbonisation plan, which was published after TfN's Draft Strategy was launched for consultation.

3.8 The main updates are signposted and explained within this report. Appendices 1a to 1c of this report are the final versions of the updated Strategy and its annexes

(n.b. annex 1c is still to be revised following a detailed proof-reading process). Appendix 2 of this report presents the draft Consultation Analysis Report.

3.9 The updates were presented to TfN's Scrutiny Committee on the 4th November 2021. The three key themes that emerged from the resulting discussion were:

- The need to ensure that when turning to the actions and activities defined within the Strategy, due focus was needed on the specific challenges to transport decarbonisation found in rural areas.
- The importance of promoting public transport as an attractive travel choice by increasing it's quality, variety and reliability, whilst also ensuring that journeys by public transport are competitively priced when compared to the same journey by private car.
- The need to consider and avoid potential wider adverse impacts related to Transport Related Social Exclusion resulting from transport decarbonisation measures.

4 TfN's Draft Decarbonisation Strategy Consultation

Due to the nature of public consultation, respondents were self-selecting. Going forward, it will be important that any engagement required as part of the activities proposed, is focussed on those groups likely to be most affected by transport decarbonisation measures, including those at risk of existing, or potential future, transport related social exclusion, and those living in our rural areas and dispersed communties.

4.1 *TfN's Approach and Trajectory – Support and Concerns*

Approximately 65% of respondents either strongly agreed or agreed with TfN's approach to the development of its Strategy and Decarbonisation Trajectory, with just under 20% either disagreeing or strongly disagreeing.

4.2 Common sentiments included support for the quality and depth of the Strategy, the potential for levelling up, the importance and urgency of meeting net-zero targets and a call for immediate implementation.

4.3 Some respondents also raised concerns around the ability of TfN to implement the policies and activities described within the Strategy, the risk of duplication in some areas, concerns regarding the costs of decarbonisation and the wider environmental impacts of decarbonisation.

4.4 *Respondent Priorities for Urgent Action up to 2025 and the Role of TfN*

Chapter 9 of the Draft Decarbonisation Strategy proposed 30 potential activities that TfN could lead or support in near-term up to 2025. Recognising that it will not be possible for TfN to undertake all these activities, we asked respondents to identify the three activities that they considered to be top priority for urgent action.

4.5 The four proposed activities most commonly selected by respondents for urgent prioritisation were:

- SD1: Developing a regional route map for transport decarbonisation (by place typology, including rural areas as a priority).
- PGA4: Supporting Government and Network Rail, utilising the NPR project, in identifying appropriate routes for electrification and associated implementation.
- PGA8: Develop schemes and infrastructure to improve the regional public transport network, e.g. Northern Powerhouse Rail.

- CGA1: Develop a regional EV charging infrastructure framework.

It should be noted that support for these activities was 'stand-out' with all four activities receiving about twice the level of support than the remaining proposed activities. For all these activities, there was strong support for TfN taking a leading role.

4.9 ***Respondents Views on the Importance of Different National and Local Policy Recommendations***

In terms of **national policy prioritisation**, respondents expressed strongest support for: (1) 'the provision of a substantial and consistent funding stream to Local Authorities to improve public transport and active travel networks', and for national government to (2) 'identify and fund a core network for rail electrification'.

4.11 In terms of **local policy prioritisation**, respondents expressed strongest support for: (1) 'the need to develop models for delivery and maintenance of local EV charging infrastructure, covering rapid hubs, on-street charging, public parking spaces and council fleets', and for local authorities (2) 'to invest in bus and light rail networks (subject to Government funding) to offer improved journey quality, accessibility and cheaper fares to passengers'.

4.13 ***Key Themes Emerging from Open Question Responses***

Several key themes have been identified from the open format responses received through the consultation and the engagement events hosted by TfN. The general sentiments expressed in relation to these themes have raised our awareness to a number of key future challenges and also allowed us insights into the perceptions and preferences of respondents.

4.14 **Modal shift policies** stood out as the most popular mechanism for achieving vehicle reduction targets, with public bodies and environmental groups more likely to favour these types of measures whilst business group in general expressed a preference for technology focused measures. Many responses inferred fiscal measures such as road pricing would be more palatable if suitable alternatives were already in place.

4.15 Some respondents expressed concerns around the adequacy of **electric vehicle charging infrastructure** in the North, and whether it would meet demand and therefore restrict uptake.

4.16 Freight was bought up by many respondents, some expressed support for a **shift of road freight to rail**, particularly as this would also reduce congestion on roads. Further to this, some business group representatives expressed general support for **improving road freight efficiency** and the role this could have in decarbonising emissions from HGVs.

4.17 Generally, respondents **supported the clean growth opportunities** set out by TfN. Respondents, largely public body representatives and members of the public expressed **concerns relating to hydrogen**, such as the high costs, inefficiencies, production issues and suitability.

4.18 Emissions from aviation was raised as a theme of concern, with many respondents supportive of **aviation and shipping** being included in TfN's emissions baselines. Notably, there was less support for TfN to take a lead role in this area with some respondents questioning the extent to which TfN could influence aviation emissions reductions.

4.19 Respondents were concerned about the **potential for decarbonisation to marginalise certain socio-economic groups and rural communities**.

4.20 TfN will consider these key themes and the main sentiments expressed around them, when prioritising, and embarking on the more detailed scoping of its activities going forward.

5. Update of TfN's Decarbonisation Strategy

5.1 ***Increased emphasis on the importance of reducing vehicle mileage***

At several points in the document we have made changes or added supplementary text to increase the emphasis on the need to reduce private vehicle usage and the essential part that modal shift will play in decarbonising transport in the North, particularly in order to satisfy our carbon budgets pre-2030.

5.2 ***Further clarity on our approach to aviation and shipping***

We have included some initial findings and insights in relation to the North's emissions from aviation and shipping. We also set out in more detail than previously, how we intend to work with Partners and an independent expert advisory group to (1) agree TfN's role in relation to aviation and airports, (2) investigate the approach that could be taken as a region to reduce emissions from aviation (alongside what has been proposed by Government within its Jet Zero Strategy consultation[1]) and capture the economic benefits that net zero aviation could bring to the North.

5.3 ***Further clarity on our approach to the appraisal of our Investment Programme (IP)***

We have added text to explain in more detail how we intend to use our analytical framework to model operational carbon emissions. We have also removed text related to the project level appraisal of carbon on schemes within the IP (where **not led** by TfN), recognising that TfN is best placed to influence at the strategic level and will only be involved as a stakeholder when schemes come forward for delivery.

5.4 We have, however, retained the commitment to work with individual scheme sponsors to embed the consideration of the TfN's Decarbonisation Trajectory within the business case development processes for those projects.

5.5 ***Introduced the need to understand the full costs of our travel choices and acknowledged the relationship between increased highways capacity and increased car use***

We've introduced text with the aim of initiating further discussion on how a fairer pricing system for public transport relative to car travel could be achieved. We have also acknowledged the need for appropriate scrutiny of schemes that increase or release highways capacity, cross referring to the Climate change Committees' recommendation that investment in roads needs to be accompanied by proportionate investment in EV charging infrastructure, active travel and public transport.

5.6 ***Support for the role of HS2 and NPR in achieving mode shift, and for shifting freight from road to rail***

Reflecting sentiments picked up during the consultation, we've added text to acknowledge the role that rail must play in shifting long distance car trips and also

[1] https://www.gov.uk/government/consultations/achieving-net-zero-aviation-by-2050

the need to shift more road freight onto rail (cross-referring to TfN's upcoming Freight and Logistics Strategy in that respect).

5.7 ***Updated future baseline emissions trajectories***

We have updated our future baseline trajectories to take into account the policy ambitions as set out in the Government's transport decarbonisation plan. The most notable impact of this is that the residual emissions have dropped to close to zero under all our future baseline scenarios, by 2050. This is primarily due to the proposal of ambitious non-zero HGV sales phase out dates by the Government. Even with these new ambitious dates, the cumulative emissions accrued under all our baseline scenarios still exceed the maximum budget allowed by our trajectory by 2030 or shortly after.

5.8 ***Commitment to a strategic embodied carbon footprint study of schemes within IP up to 2033***

We have included this as an additional TfN activity (**SD13**), with the aim of allowing us to benchmark the potential maximum and minimum embodied carbon footprints against our trajectory.

5.9 ***Addition of new activity to work with LEPs to support SME's in their green transitions***

Responding to the outcomes of the consultation, we have included an additional stakeholder defined activity (**SD14**) to work with LEPs to consider how we can more directly support SMEs to both adopt and take advantage of the opportunities from, the transition to clean green transport. How this would be implemented is still to be defined.

5.10 ***Signposting of stakeholder priorities from consultation***

We have signposted both policy recommendations (national and local) and potential TfN activities that were identified by respondents through the consultation as the highest priority and most urgent.

5.11 ***No-Carb modelling updates***

We are in the process of making a number of updates to TfN's carbon modelling tool (No-Carb), as a result of both general sentiments and specific comments received through the consultation on TfN's Draft Strategy and also the publication of DfT's transport decarbonisation plan.

5.12 ***The Challenge of Rural Decarbonisation***

Acknowledging the unique and challenging context of transport decarbonisation in rural areas, we have included wording to show the need for explicit application of a number of activities to the rural context as a priority, for example our Clean Mobility Vision workstream and when developing a regional routemap for decarbonisation.

5.13 Changes include:

- NoCarb now factors in biofuel proportions in petrol and diesel.
- Other greenhouse gases other than carbon dioxide are now included in the analysis, such as methane and nitrous oxide, and emissions are reflected as CO_2 equivalent, rather than just CO_2.
- We have improved the accuracy of our van and HGV analysis.
- We have updated some of the input values used in our modelling, particularly around the phase out dates for sales of non-zero HGVs.

Preliminary analysis on aviation and shipping emissions has been incorporated.

6. Next Steps

6.1 Whilst the intention is to publish the final Strategy in late November or early December, it is imperative that we rapidly turn from strategizing to action. TfN has already commenced a number of high value activities detailed within the Strategy, including:

- **Developing Clean Mobility Visions for the North**: we've started the evidence gathering associated with this activity, which will underpin the development of a number of policy packages for different typologies in the North, aimed at achieving **reduced private vehicle usage** and **increased public transport and active travel**; illustrating the emissions reductions and wider environmental and societal benefits of doing so. Local Transport Authorities will be able to use this robust evidence in the development of their Local Transport Plans, which will need to achieve quantified emissions reduction targets.
- **Regional Electric Vehicle Charging Framework**: TfN is approaching the end of phase 1 of this project, which brings together TfN's transport and land use data with the Distribution Network Operators to optimise locations for EV charging on the North's major road network. The next phase will include provision of local data for use by our Partners and also the consideration of wider social and environmental implications.
- **Strategic Hydrogen Refuelling Infrastructure Analysis:** TfN is facilitating a study, led by Durham and Herriot Watt Universities to establish refuelling demands for HGVs along strategic corridors in the North, and then to establish the optimised number and locations of hydrogen refuelling stations. The project is due to conclude in January 2022, and TfN is currently seeking funding, alongside project partners, to expand the study to become multimodal and include generation, hydrogen transport and storage considerations.

6.2 The outcomes from the public consultation on the Strategy and extensive pre-consultation engagement with Partners and other stakeholders have also helped us define a number of other priority activities which we are now planning for the remainder of this business year and into 2022-2023:

- **Programmatic Appraisal of Carbon in TfN's Investment Programme:** to include consideration of both operational and embodied carbon and benchmarking this against our agreed Decarbonisation Trajectory.
- **Aviation and Shipping Emissions**: incorporation of the North's emissions from aviation and shipping in our future emission baselines and consideration of TfN and Partners potential role in shaping emissions from these sources in the future.

6.3 Responses from the consultation suggest that along with a rapid transition to practical actions, **ensuring buy-in from the wider socio-economic spectrum** that exists within our communities is fundamental in terms of next steps. In relation to this, TfN will:

- Ensure the findings of TfN's two major Transport Related Social Exclusion (TRSE) research projects are explicitly considered in all our decarbonisation activities.
- Focus, first and foremost, on decarbonisation measures that help to reduce car dependence and increase viable public transport choices.

- Focus future engagement on those socio-economic and demographic groups that will be most affected by transport decarbonisation measures in the North and those who will be most vulnerable to the effects of climate change itself.
- Consider how TfN's TRSE work might be extended to include consideration of the wider benefits and impacts of specific transport decarbonisation measures in different population contexts, and provide this evidence for use by our Partners in their local transport plan development.
- Develop specific activities to understand and support the societal readiness within our communities for the changes that are needed.

7. Corporate Considerations:

Financial and Resource Implications

7.1 There are no direct finance and resource implications as a result of this report.

Legal Implications

7.2 There are no apparent legal implications as a result of this report.

Risk Management and Key Issues

7.3 A risk assessment is not required for this stage, however, TfN's risks relating to decarbonisation can be found in TfN's Corporate Risk Register.

Environmental Implications

7.4 This report does not constitute or influence a plan or programme which sets the framework for future development consents of projects listed in the EIA Directive and therefore does stimulate the need for SEA or EIA. The Decarbonisation Strategy fulfils an undertaking made within the existing Strategic Transport Plan (2019), to develop a pathway to net zero for surface transport in the North by 2050 and as such is supplementary document to that STP which was subject to a full Integrated Sustainability Appraisal.

7.5 The Decarbonisation Strategy, the data that underpins it and certain activities that stem from it, will also form an important part of the evidence base for the upcoming Strategic Transport Plan update in 2024. As such, it will be a consideration within the Integrated Sustainability Appraisal which will accompany that plan making process.

7.6 The consultation responses reported within this paper support the aims and objectives of TfN's Draft Decarbonisation Strategy.

Equality and Diversity

7.7 Transport decarbonisation policy measures have the potential to lead to uneven distributional impacts. As part of the activities flowing from TfN's Decarbonisation Strategy - the results of the current Transport Related Social Exclusion workstream being undertaken by TfN will be built upon to include consideration of how decarbonisation measures might reduce existing social exclusion (and certainly not exacerbate).

7.8 The Decarbonisation Strategy, the data that underpins it and certain activities that stem from it, will also form an important part of the evidence base for the upcoming Strategic Transport Plan update in 2024. As such, it will be a consideration within the Equality Impact Assessment process which will accompany that plan making process.

Consultations

7.9 The consultation responses reported within this paper support the aims and objectives of TfN's Draft Decarbonisation Strategy.

8. Background Papers

8.1 No background paper.

9. Appendices

9.1 Appendix 1a – Updated TfN Decarbonisation Strategy.

Appendix 1b – Updated TfN Decarbonisation Strategy Annex A

Appendix 1c – Updated TfN Decarbonisation Strategy Annex B. Please note that this annex still requires minor updates following a detailed proof reading exercise.

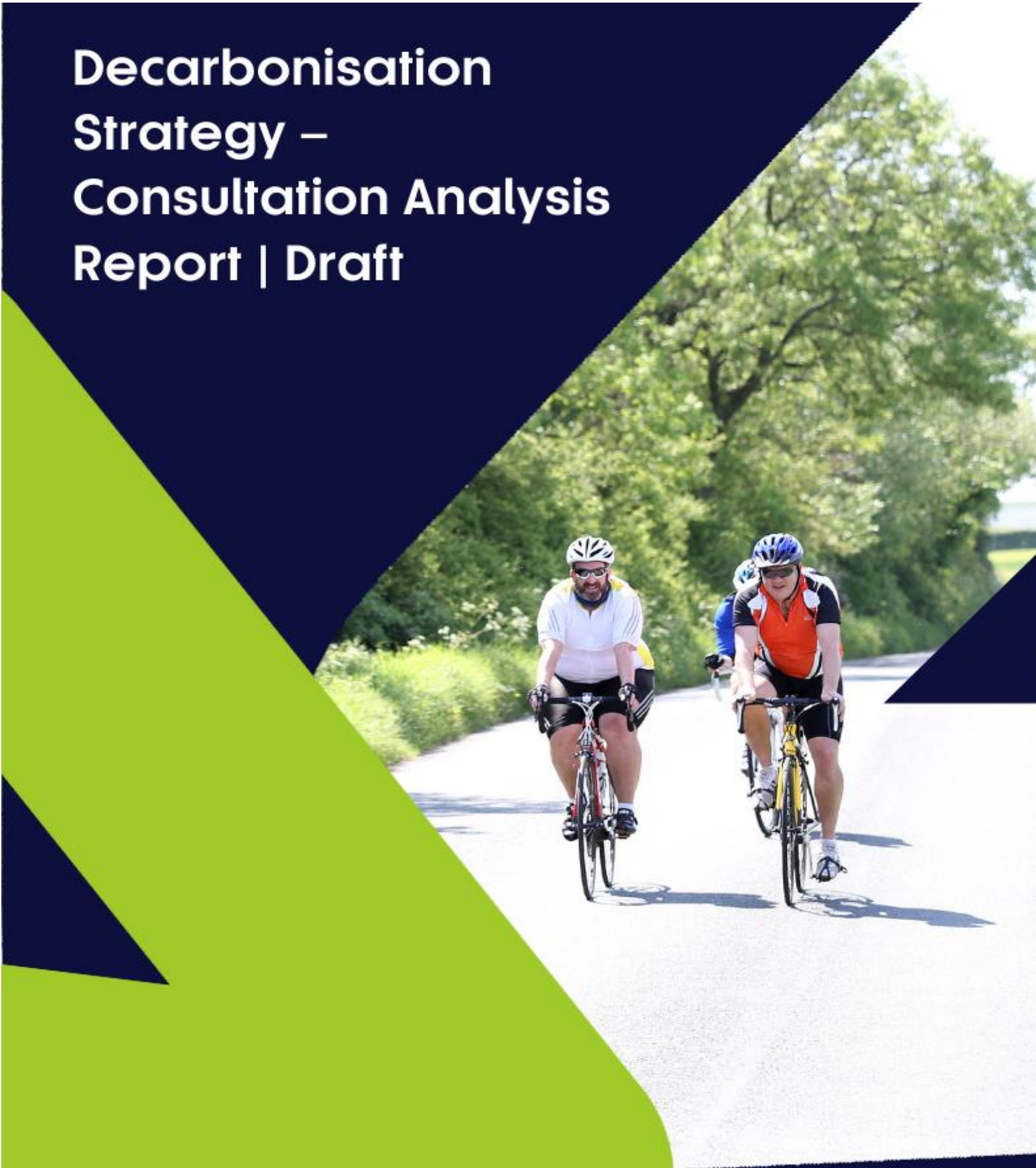
Appendix 2 – Draft Consultation Analysis Report

Glossary of terms, abbreviations and acronyms used *(if applicable)*

a) ZEV Zero Emission Vehicle
b) ICE Internal Combustion Engine
c) EV Electric Vehicle
d) CCC Climate Change Committee
e) HGV Heavy Goods Vehicle
f) TDP Transport Decarbonisation Plan
g) SME Small to Medium-sized Enterprise
h) SEA Strategic Environmental Assessment
i) EIA Environmental Impact Assessment
j) TRSE Transport Related Social Exclusion

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Decarbonisation Strategy – Consultation Analysis Report | Draft



November 2021

TRANSPORT FOR THE NORTH

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2. Introduction

2.1 Purpose of this report

This report summarises the findings of the public consultation on TfN's Decarbonisation Strategy – draft for consultation. It sets out the responses received through the consultation exercise and identifies the key themes and sentiments emerging.

The consultation was run by TfN with the assistance of an independent consultancy team led by Traverse, a stakeholder engagement specialist who advised on the design of the response form, consultation website and managed the response channels. The Traverse team were then contracted to collect, process and provide a high-level analysis of the consultation responses. This independent high-level analysis has been used as the basis for this report.

The results of the consultation have primarily been used by TfN to refine and prioritise activities as they move forward from strategy to action. The responses from the consultation have been considered by TfN when updating and finalising the strategy, ahead of its adoption.

The Local Transport Act 2008 requires the Decarbonisation Strategy, as part of TfNs Transport Strategy to be subject to a public consultation. Through the consultation, TfN sought to understand the extent of support for, and any concerns around, TfNs proposed strategy and decarbonisation trajectory. TfN also intended to gain a better understanding of respondent's views on how TfN should move forward following the publication of the strategy. In particular views on short-term priorities (up to 2025) for both policy actions, and the role TfN should play in delivering these.

2.1.1 The role of TfN

Transport for the North are a Sub-National Transport Body, representing 20 transport authority members from across the North. TfN's work complements that of existing local transport authorities, and its powers are devolved down from central government, rather than up from local government.

While most of the responsibility for policy implementation lies with national and local government, TfN operates at a geographical and institutional level that allows them to facilitate a regional approach to decarbonisation measures and research. TfN's draft Decarbonisation Strategy sets out this role in more detail, identifying three key pillars to TfN's involvement:

- **Demonstrating**: Evidence-building, running pilots and collating and sharing best practice.
- **Facilitating**: Working for consensus, ensuring consistency, co-ordinating cross-sectoral partnerships and representing TfN's partners as a single, strong unified voice in national forums.
- **Supporting**: Developing regional strategy to support local objectives and provide a basis for effective and co-ordinated influencing of government.

2.1.2 TfN Decarbonisation Strategy

TfN is committed to developing and implementing a 'Pathway to 2050' within its Strategic Transport Plan, published in 2019. TfN's draft Decarbonisation Strategy, published in June

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2021, identifies decarbonisation pathways to align with TfNs Decarbonisation Trajectory for surface transport in the North of England by exploring four future travel demand scenarios, considering climate resilience, embodied carbon and opportunities for clean growth.

In order to achieve the goal of aligning the North's surface transport emissions with the Decarbonisation Trajectory, TfN have proposed 30 potential priority decarbonisation activities that could be undertaken before 2025. These activities are listed within the draft Decarbonisation Strategy and typically, these actions;

- recognise the transboundary nature of the North's surface transport system and tackle those challenges and emissions that fall between the gaps when employing a local or combined authority governance approach;
- generate evidence that can be applied usefully across a range of places by TfN's partners (i.e. are not 'place specific');
- reflect preferences expressed by TfN's partners and other stakeholders.

It is these proposed future activities, upon which TfN were keen to gather stakeholders views during the consultation process.

TfN has committed to reviewing and updating the Strategy at each milestone along the Decarbonisation Trajectory, the next being in 2025. As part of this process, it will be important to re-model the North's transport carbon footprint **ahead** of each milestone to strengthen policy commitments or adjust focus. These changes will be incorporated into strategy updates. TfN will also review its list of priority decarbonisation activities **annually**, with its partners, as part of TfN's yearly business planning process.

2.2 Structure of this report

This report is structured as follows:

- Section 2 sets out the purpose of this report, the role of TfN and TfNs Decarbonisation Strategy.

- Section 3 covers the consultation process, including how the consultation was run, who responded and how responses were interpreted.

- Section 4 intends to help shape TfN's priorities for action and define TfN's policy focus in the near-term. It also identifies actions which are important for the government to undertake.

- Section 5 includes key themes that emerged from the open format responses and engagement events hosted by TfN in order to shape TfN's understanding.

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3. The Consultation Process

3.1 Taking part in the consultation

Over the 12 months, prior to the launch of the public consultation, TfN engaged with its partners and key external stakeholders in reference to the general proposed content and structure of the strategy document. Stakeholders were invited to comment, and were involved in developing TfNs future scenarios, carbon modelling approach and agreed decarbonisation trajectory upon which the strategy could be based. Furthermore, a number of focused pre-consultation workshops were undertaken with partners to better define the proposed priority activity list presented within Chapter 9 of the draft Decarbonisation Strategy document.

This initial feedback helped the Strategy during its development. During the consultation, TfN managed a series of well-attended virtual public consultation webinars and targeted roundtables which complemented a dedicated virtual exhibition website developed and hosted by an independent communications consultancy.

The draft Decarbonisation Strategy consultation ran from the 7th June for 12 weeks, closing on the 31st August 2021. Taking part in the consultation could be done online via the dedicated consultation website and online response form. The form could also be downloaded and sent directly to TfN by email or submitted via freepost.

3.2 Who responded?

In total 240 responses were received. Of these, 140 were from members of the public reflecting the level of interest and awareness within local communities. 30% was fairly evenly split between Public bodies, Businesses and Environmental groups. The remaining 11% came from respondents categorised as 'Other', which reflected responses from stakeholder organisations, interest groups and professional bodies whose primary functions were not environmental, or business related. Figure 1 below shows the breakdown of the responses received by stakeholder type. A full list of stakeholder organisations can be found in Appendix 1.

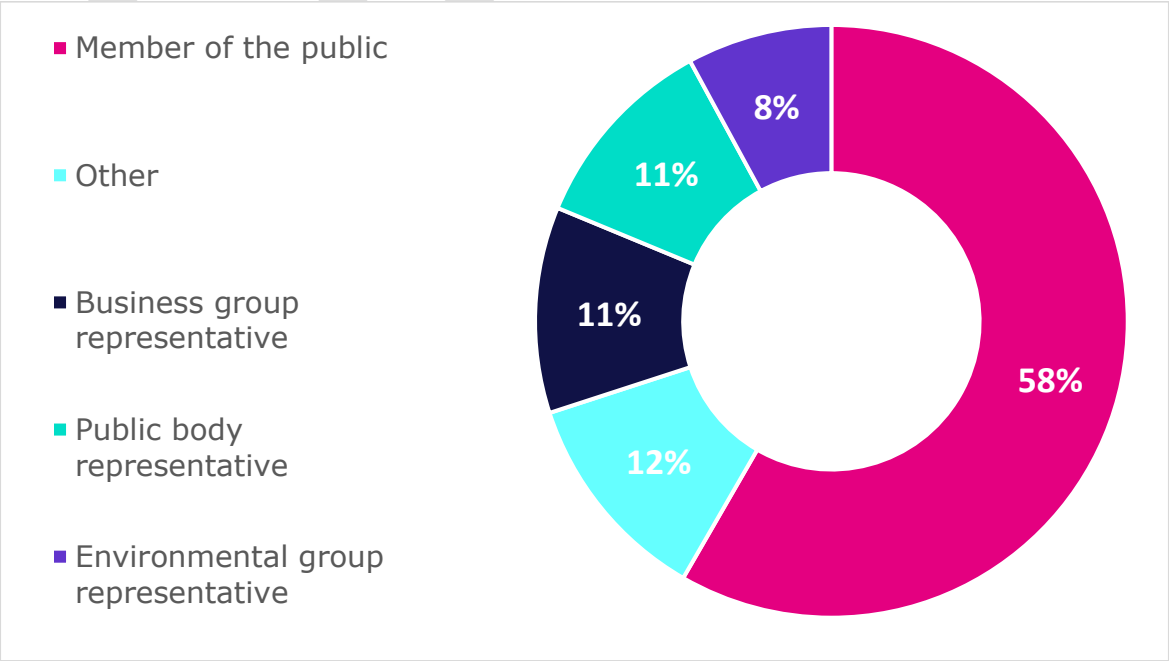


Figure 1: Overview of Respondents

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3.3 What we asked?

- The consultation included several 'closed' and 'open' questions.
- In total there were nine 'closed' questions which allowed respondents to select answers from a set number of pre-defined options.
- Closed questions were posed by TfN, in order to understand:
    - The extent to which respondents agreed with TfNs Decarbonisation Trajectory.
    - Which urgent actions related to decarbonisation respondents felt TfN should prioritise.
    - Priorities for both local and national government in relation to a range of policies connected to modal shift, demand reduction and zero emission vehicles (ZEVs).
    - TfN's role in relation to a number of pre-defined activities (.i.e respondents able to express whether they think TfN should lead, or support an activity or whether an activity was not a role for TfN).
- 'Open' questions, which allowed participants to respond in their own words, were used to supplement these responses and understand respondents reasoning.
- Additionally, more than half of respondents chose not to use the online questionnaire and provided their responses in an open format. These responses were coded and used to identify key themes and augment the responses to the closed questions where appropriate.

3.4 Interpreting the consultation findings

While a consultation is a valuable way to gather opinions about a topic, there are several issues to consider when interpreting responses. Responses can never be representative of the population as a whole, as would be the case with a sample survey. When considering results, TfN were aware that the consultation was self-selecting and consequently certain types of people, with certain views were more likely to contribute than others.

Typically, there can be a tendency for responses to come from those motivated to express their views, often because they consider themselves affected. Responses also tend to be biased towards people who have particularly polarised views, in favour or opposition of the draft Decarbonisation Strategy. The consultation can only reflect the views and opinions of those organisations/individuals who have chosen to respond. This report can never express the full extent, and diversity, of opinions on the topic, nor the strength of a particular concern.

Furthermore, the consultation was used by the public to express their views on a wide variety of topics, that were considered outside of the scope of this particular consultation, by TfN. Where appropriate these responses have been collated and passed on to the relevant teams within TfN and other partner organisations, yet do not feature in this report.

This report draws out issues which were raised by a significant number of participants, but also aims to reveal single issues which are considered are of interest and value to the scope of the consultation. The report also acknowledges that responses were based on differing levels of knowledge and awareness across different stakeholder groups.

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4. PRIORITIES FOR ACTION

4.1 Introduction

The primary focus of the consultation was to help shape TfN's priorities for action. Respondents were asked to prioritise, from a list of potential actions, which they felt TfN should focus on in the near-term (until 2025) and to help define TfNs policy focus throughout the Decarbonisation Strategy. Respondents were also asked to identify which actions were most important for government to undertake and express their views on responsibilities for the leadership of different policy actions. This will help TfN to further define their role and those of our key partners in developing a pan-northern approach to transport decarbonisation.

4.2 Priorities for TFN

There are three types of 'actions' identified that together represent TfNs proposed priority decarbonisation actions. These are shown in the table below.

Policy Gap Actions (PGAs):	Specific areas of policy generated by our policy analysis work, through which the most challenging emissions reductions must be achieved.
Clean Growth Actions (CGAs):	Those activities which can provide the greatest potential for clean, green growth in the North.
Stakeholder Driven Actions (SDAs):	Activities identified as priorities and refined through engagement with partners, industry, research networks and other sub-national transport bodies.

Table 1: Types of Priority 'Actions'

TfNs proposed priority actions are those activities which TfN believe need to happen in the short-term (i.e. up to 2025) and are most effectively delivered at a pan-Northern level. In total, there were 30 proposed policy actions spanning across eight key policy areas. Given the enormity of the decarbonisation challenge and the risks associated with failing to achieve the required emission reductions, most activities are classed as 'high priority'. The activities present different levels of opportunity for TfN influence, whether their role is to lead or support and whether this support is continuous or 'as and when' required.

4.2.1 Urgent Action & Taking the Lead

Chapter 9 of the Draft Decarbonisation Strategy proposed 30 potential activities that TfN could lead or support in the near-term up until 2025. Recognising that it will not be possible for TfN to undertake all these activities, TfN asked respondents to identify the three activities that they considered to be top priority for urgent action (up to 2025).

The four proposed activities most commonly selected by respondents for urgent prioritisation were:

- SD1: *Developing a regional route map for transport decarbonisation (by place typology, including rural areas as a priority).*
- PGA4: *Supporting Government and Network Rail, utilising the Northern Powerhouse Rail (NPR) project, in identifying appropriate routes for electrification and associated implementation.*
- PGA8: *Develop schemes and infrastructure to improve the regional public transport network, e.g. (NPR).*
- CGA1: *Develop a regional EV charging infrastructure framework*

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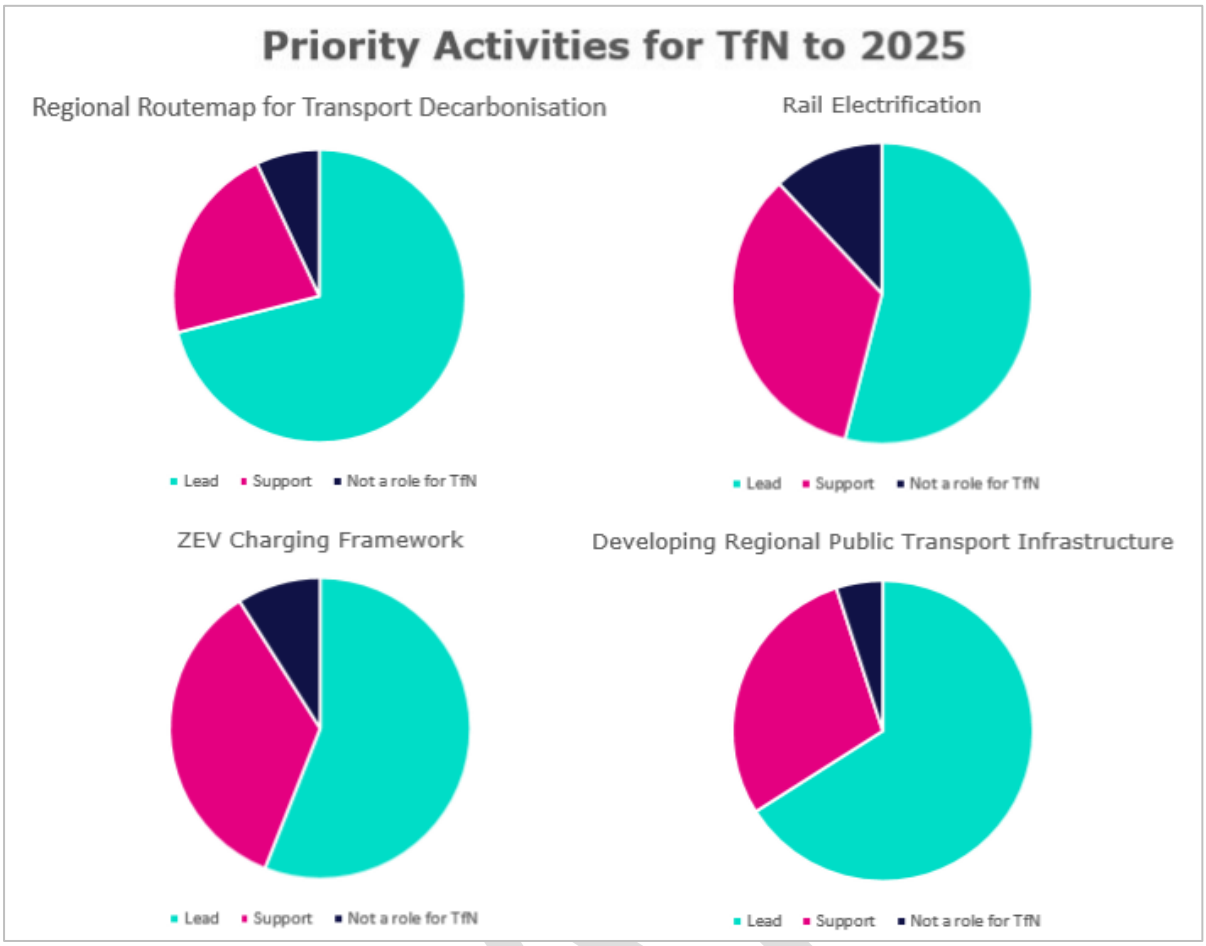


Figure 2: Priority Activities for TfN to 2025

All four activities received approximately twice the level of support than other proposed activities (37 to 40 preference votes). Additionally, over half of respondents thought TfN were best placed to lead these four priority activities, the majority of others believing TfN should act in a supporting capacity.

Notably, the two top priorities for public body stakeholders included PGA4 (rail electrification), but also SD2: *Developing place-based decarbonisation pathways for rural typologies*. The activities associated with SD2 comprise a subset of the activities that are connected to SD1 and give us some guidance as to where the focus SD1 activities.

"We are a member of TfN's EV Steering Group that is overseeing work on a range of actions to support EV roll-out across the north and will continue to share our experience and draw on the findings of work commissioned by TfN. Groups of this kind represent a practical demonstration of how TfN can use its pan-regional resource and remit to enhance the work of local partners and could provide a model for similar action in other policy areas."
Transport North East

Of those activities that received less support for respondents in terms of being a top priority for urgent action, a number were nonetheless highlighted by respondents as activities that TfN should **lead** (as opposed to 'support' or being identified as 'not a role for TfN'). Most notably, these included:

- SD3: *Formation of decarbonisation working groups with Partners (9 preference votes).*
- SD6: *Programmatic assessment of TfN's Investment Programme against TfN's Decarbonisation Trajectory (8 preference votes).*

- CGA5: *Supporting Clean Mobility Visions for the North (16 preference votes).*

Of those activities that received less support for respondents in terms of being a top priority for urgent action, but were highlighted by respondents as activities that TfN should **support or facilitate**, the most notable included:

- CGA2: *Supporting local partners in the development of local ZEV charging infrastructure (17 preference votes).*
- SD8: *Supporting the development of scalable digital solutions for incentivising greener, shared and active mobility in rural areas (15 preference votes).*
- CGA8: *Supporting our partners to attract testing and pilots of new low emission train technologies (20 preference votes).*
- CGA3: *Undertake or support a pan-northern hydrogen transport refuelling study (19 preference votes).*

Additionally, respondents identified a few activities where there was little support for TfN taking an active role in either lead or supporting those activities, including:

- PGA14: *Increase awareness of fuel-efficient driving styles (6 preference votes).*
- PGA9: *Research on the effects of home-working upon productivity and agglomeration (4 preference votes).*

4.2.2 Policy Focus

To achieve the reduction in car mileage, required under TfN's decarbonisation pathways, a number of different packages of policy interventions could be employed. Potential inventions fall into those related to accelerating technological change, reducing demand for car travel and those focussed on shifting car journeys to other, more sustainable, modes. TfN wanted to understand where respondents felt the focus should lie when packaging up policy interventions to achieve reduced car mileage.

Within the consultation questionnaire, respondents were asked: 'To achieve the required demand management targets, where do you feel the policy focus should lie?'. For each policy category (i.e. technology focused, demand reduction focused and mode-shift focused), respondents were asked to choose from five possible answers, ranging from 'Entirely focussed' to 'No focus'.

Modal shift was deemed the most popular policy focus. Over two thirds of respondents thought that policies intended to achieve the required demand management should be 'entirely focussed' or 'more focused' on modal shift. All stakeholder groups were generally supportive of a focus on modal shift policy measures.

"RTPI would therefore welcome a greater focus on demand reduction and mode-shifting, though we do acknowledge the importance of moving away from petrol and diesel fuels."
Royal Town and Planning Institute (RTPI)

"More modal choices would reduce rural and social isolation issues, provide opportunities for people to travel further and wider, increase worker mobility, help address access to education and training and other key services."
Cumbria County Council and Local Enterprise Partnership

Although less respondents supported an entirely demand reduction focused approach, 80% of respondents still supported a 'more focused' or balanced approach related to

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demand reduction to achieve the required demand management targets. Public body representatives and environmental groups were most supportive of demand reduction measures, with those less supportive or not supportive coming primarily from business group representatives and members of the public. Demand reduction had the largest proportion of those not supportive overall but only 13% of respondents believed it should be less of a focus, and 7% believed it should not be a focus at all.

"We would like to see full consideration of the well-established toolbox of 'sticks', including parking charging, road and congestion pricing, clean air zones and other restrictions, as well as the 'carrots' of promotional campaigns and investment in excellent public transport and active travel options."
Manchester Friends of the Earth

The most popular response in reference to technology focused measures (i.e. policies focussed on stimulating the development and uptake of low and zero carbon vehicle, or fuel, emissions technologies) , attracting over 45% of respondents was 'balanced'. Although technology was less likely to attract 'entirely focussed' or 'more focus' responses than modal shift or demand reduction, technology received less opposition ('less focus'/'no focus') than demand reduction too. The majority of respondents believed that technology was integral to whichever approach adopted but could not achieve the demand management targets independently. Business group representatives were most supportive of technology focused measures overall.

4.3 Priorities for government

As part of the preparation of the Strategy, TfN carried out an analysis of the packages of policy measures that were likely to be needed to achieve the policy commitments laid out within its decarbonisation pathways identified in Chapter 4. Recognising the limited powers that TfN is able to exercise in terms of policy development and implementation, these policy packages are expressed as recommendations for national government and guidance for local authorities. Although it is likely that the majority of these policy recommendations will ultimately be needed over time, TfN wanted to understand respondents' views on which recommendations should be prioritised by each level of government. Within the consultation questionnaire, respondents were asked to choose the three recommendations for national government, and the three recommendations for local government, that they felt were of the most importance.

4.3.1 Priorities for National Government

In terms of national policy prioritisation, respondents expressed strongest support for:

- *the provision of a substantial and consistent funding stream to Local Authorities to improve public transport and active travel networks*;
- and for national government to identify *and fund a core network for rail electrification*.

Other policy priorities with strong support included:

- *developing a coherent plan for taxing and pricing car travel that accounts for reduced Fuel Duty and incentivises key outcomes*;
- *developing a comprehensive strategy for charging infrastructure, defining a role for local and regional bodies*;

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- and for national government to *work with Train Operation companies to implement a targeted reduction in rail fares and an increase in the integration and flexibility of ticketing systems*.

This was reflected in the responses from public body stakeholders, where the recommendations to government in relation to the need for a consistent funding stream for public transport and active travel, along with the need for government to develop a plan for taxing and pricing car travel more proportionately, were felt to be the two most important.

4.3.2 Priorities for Local Authorities

In terms of local policy prioritisation, respondents expressed strongest support for:

- local authorities to invest in bus and light rail networks (subject to government funding) to offer improved journey quality, accessibility and cheaper fares to passengers.
- the need to develop models for delivery and maintenance of local EV charging infrastructure, covering rapid hubs, on-street charging, public parking spaces and council fleets.

There was also strong support for local authorities to:

- engage with bus operators to set targets and standards for the rapid roll-out of ZEV buses.
- develop charging infrastructure servicing rural tourist spots to counter range anxiety.
- implement policies to enhance cycle networks and promote active travel.
- local authorities to use local planning policies to promote 15 or 20 minute neighbourhoods, prioritise development close to public transport hubs and encourage car-free or car-lite development.

This was reflected in the responses from public body stakeholders, where the recommendations for local authorities to in relation to the need to develop models for the delivery of local EV charging infrastructure, along with a focus on enhancing cycling infrastructure, were felt to be the two most important.

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5. SHAPING TfNs UNDERSTANDING

5.1 Introduction

Whilst TfN's Decarbonisation Strategy document represents the culmination of an intense period of evidence collation, data analysis and stakeholder engagement, in many ways the Strategy also marks the start of the decarbonisation challenge for TfN.

Evidence base and government policy will continue to evolve, and it will be important that TfN regularly updates its Strategy, strengthening and adjusting its focus where necessary. It is essential, however, that TfN now moves from strategising to implementing the actions within the Strategy, building capacity and capability within partner organisations, and asks for sufficient powers and resourcing from government to do this.

A key aim of the consultation on TfN's Decarbonisation Strategy was to draw on the valuable experience and opinions of their stakeholders and communities from across the North, to help shape TfN's immediate actions going forward and better inform TfN's recommendations to national government.

The following sections signpost the key themes emerging from the open format responses received through the consultation and the engagement events hosted by TfN. Within each theme, comments of support, concerns and suggestions are summarised. Quantifiers including few (0-20 respondents), some (21-100 respondents) and many (more than 100 respondents) have been used to provide an indication of the number of respondents whose comments express a specific sentiment. TfN will consider these key themes and the main sentiments expressed around them, when prioritising, and embarking on the more detailed scoping of its activities going forward.

5.2 Draft Strategy

The draft strategy was generally well received with support from a wide range of stakeholders taking part in the consultation. Many respondents from all the main stakeholder groups (members of the public, businesses, public bodies and environmental groups) expressed their support for the decarbonisation strategy, and the policies and actions proposed in it and welcomed the scope and depth of analysis brought together by TfN and its partners.

"The approach set out in the draft decarbonisation strategy represents a potential blueprint that could be adopted by other STBs to help them fulfil this role through the development of regional trajectories that can then be disaggregated to steer local action."
Transport for the South East

"TfN's plans align well with our own ambitions. We believe the strategy gives a good representation of the activities needed to support the decarbonisation of the North's transportation infrastructure and gives a good view as to where TfN believe they can deliver, support, and guide the different activities required."
Electricity North West

Overall, there was a recognition of the urgency of meeting net zero targets, with many respondents identifying the need to accelerate the implementation of the strategy in order to influence and direct investment at all levels. The extent to which the strategy seeks to

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address both operational and embodied carbon impacts was also welcomed and a number of respondents highlighted the need to ensure that decarbonisation is a golden thread that runs through the delivery of wider national policy objectives, particularly the need to level-up areas across the North of England.

"We are particularly pleased to see the emphasis on embodied carbon within TfN's strategy document, and the recognition that it is not operational carbon alone which should be given consideration in any future infrastructure projects."
Royal Institute of Chartered Surveyors (RICS)

Within this, respondents highlighted a number of challenges for the strategy and its implementation. Many of these reflect the sheer scale and complexity associated with achieving net-zero as a society and the contribution that the decarbonisation of transport needs to make to this. They also reflect the extent to which it requires the development of a shared approach nationally which reflects the nuances of local geographies and communities.

"While the ambition to move faster is appreciated; it is important that acceleration is realistic. In particular decarbonisation will require significant investment from Treasury which will inevitably align to DfT's 2050 horizon and could compromise TfN's ability to realise its ambition."
Cumbria County Council and Cumbria Local Enterprise Partnership

The challenges expressed by respondents fell into three linked themes: coordination, capacity/resources, and effectiveness. "Is everybody joined-up" was a common message throughout the consultation, particularly at a national level in Government but also across local government, where different areas have set different trajectories and placed different emphasis on different interventions.

Whilst respondents recognise the role of TfN in demonstrating, facilitating and supporting decarbonisation, as well as providing strategic oversight, many felt the need for more direct intervention and mediation across partners and sectors to drive change, but were unclear where this might come from or whether this might require more formal compliance measures for example through the planning process or national legislation.

"Rather than aligning the TfN strategy with that of DfT we urge TfN to strengthen it, and continue to lobby for more powers, responsibility and resources with which to achieve it."
CPRE Peak District and South Yorkshire

The challenge of organisational capacity and capability was highlighted by many respondents, particularly in respect of the fiscal constraints under which local authorities are operating and the pressures arising from responding to the Covid-19 pandemic. Understanding the cost of decarbonisation is recognised as a major uncertainty across all the stakeholder groups consulted - costs to both individuals and to organisations - and how this would be met and from what sources.

In terms of effectiveness, the responses reflect the fact that practical and deliverable solutions to the decarbonisation of transport are for the most part in their early stages of development or are yet to be widely and consistently adopted by a critical mass of stakeholders. Within this context, the issue of solutions that can be applied in differing economic geographies, particularly the more rural areas, was a concern flagged during the consultation. The need for TfN to regularly review, monitor and evaluate decarbonisation

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targets and outcomes presented in the strategy was also flagged, in order to ensure that the effectiveness of interventions is more widely understood.

Respondents to the consultation provided a range of suggestions and insights for further consideration by TfN and its partners. Many of these focused on the themes of engagement, knowledge sharing, inclusivity and empowerment, particularly at a local, community level.

"We see a valuable role for TfN in bringing together such areas to share best practice, support joint research and implement local pilot schemes - for example, the Decarbonisation Strategy suggests that TfN develop evidence and data to explore the case for Mobility as a Service provision and mobility hubs in rural areas."
Transport North East

The need for TfN to 'continue the conversation' was widely expressed, recognising that one of the biggest challenges for engagement around transport decarbonisation (and net-zero in general) is the lack of a consistent and widely understood 'common language.' The combination of often highly technical terminology and low levels of general awareness will make it more difficult to empower communities to participate in the debate and develop local/place-based initiatives responsive to their specific needs.

Many respondents felt there needed to be a greater focus on behavioural change and less reliance on technology as a route to decarbonisation, and with that a focus on long term gains rather than unsustainable short term or quick-fix solutions.

5.3 Decarbonisation Trajectory

The development of a decarbonisation trajectory and associated scenarios as an evidence base to underpin the strategy was also well received during the consultation. When asked "*To what extent do you agree with TfN's approach to developing a Decarbonisation Trajectory*" over two-thirds of respondents agreed or strongly agreed, with many welcoming the addition of valuable data and analysis to support further debate and policy interventions at all levels. The development of scenarios was seen as particularly helpful as a means of assessing the potential impact of these interventions.

"The proposed strategy and its emissions reduction pathway to NetZero2045 is based on robust evidence from four modelled future travel scenarios, presents a credible quantified trajectory to 2045, emphasises the cumulative impacts of carbon emissions, demonstrates the profound policy gap necessary to meet that target and aims to monitor compliance."
CPRE Peak District and South Yorkshire

Whilst some respondents, mainly individual members of the public, didn't agree with TfN's analytical approach, this tended to be linked to localised concerns that were not covered directly in the analysis – for example a specific road scheme or a particular geography. This also reinforces the point made in regard to the strategy as a whole in terms of the need to raise general awareness and support the development of a common language around the decarbonisation of transport.

Respondents provided a range of suggestions for strengthening and developing the analytical framework on which the strategy is based, including further analysis of the range of factors affecting transport related emissions and other areas for further focus. The need for consistency was a common theme, particularly across areas and sectors. Many respondents noted the importance of aligning climate change commitments across the

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north of England and highlighted the disparity between some existing decarbonisation commitments - particularly specific timeframes for reaching net-zero.

A number of respondents highlighted the need for a core set of 'universally' agreed indicators for measuring decarbonisation that is agreed at all levels of Government and across all the different transport sectors, allowing a more equitable approach to determining policy interventions. This perhaps reflects a more general view that some areas and sectors are more advanced in their thinking/approach than others and that there needs to be a levelling up of recognition of the urgency of the situation and the need for coordinated actions.

Overall, there is support for developing the trajectory work further as a means of understanding the issues and directing and assessing the impact of policy interventions. Some interesting suggestions included analysing the direct link between emissions and particular patterns of travel behaviour, such as travel for leisure as well as business/commuting and for accessing education, as well as the impacts of specific congestion hotspots. As with the wider strategy the need to share and learn from international best practice was also highlighted in many of the responses.

5.4 Demand Management

Modal shift policies stood out as the most popular mechanism for achieving vehicle reduction targets, with public bodies and environmental groups more likely to favour these types of measures whilst business groups in general expressed a preference for a technology focused approach. Whilst there was still more support for demand reduction measures than against them, the proportion of respondents who felt it should have *less focus* was noticeably bigger than for the two other approaches, which may reflect a hesitance around the subject of road user charging. Many responses inferred fiscal measures such as road pricing would be more palatable if suitable alternatives were already in place.

Other measures, which a significant number of respondents supported, included those targeted at reducing car usage through a combination of road pricing and changes to car taxation. Another well-supported measure was to use parking levies to manage demand and reduce car use. Increases to fuel duty were highlighted by some respondents as an effective means to discourage car use, while also achieving the additional benefit of encouraging modal shift towards low emission vehicles. Finally, there was some support for proposals to reduce road space, for example through road space reallocation to other modes.

Most respondents were in favour of demand management and highlighted the need to reduce car use and ownership. Respondents suggested that there should be a strong focus on doing so. However, some members of the public were concerned that demand management would infringe upon their rights to choose their preferred mode of travel and effectively limit individual mobility. If suitable alternatives were put in place before the introduction of demand management measures respondents would feel more at ease. Otherwise respondents feared journeys would become more difficult and inconvenient.

Businesses in particular highlighted the potentially negative impacts on businesses as a result of parking levy proposals. They stressed the economic importance of tourist and leisure trips for many areas. Respondents thought rural areas where alternative options are limited could be negatively affected.

"We will not get away from the point that cars carry prestige and people are enthusiastic about them. People will not change behaviour in most cases but might change jobs if their existing journey becomes too onerous."
Sheffield Chamber of Commerce

Greater integration of transport with spatial planning was also considered by many respondents to be an effective means to manage demand, facilitating integrated initiatives such as 15/20-minute neighbourhoods. Many respondents encouraged the use of spatial planning and the planning process to guarantee that services are made accessible by public transport or active travel.

5.5 Public Transport

There was strong support for further electrification of the rail network and a number of specific rail corridors were identified where this was required such as the Durham Coast, Midland Main Line and Cumbrian Coast routes. Further commitment to electrification was considered to be integral to supporting decarbonisation, together with better and more frequent rail services as a means to encourage modal shift from road to rail.

There we a number of reasons given for supporting rail network improvements including the need to increase freight capacity to reduce road-based freight movements, as well as reducing commuter journeys by private car and supporting sustainable leisure travel options.

"TfN should clearly seek to shift longer journeys to rail, making rail the natural first choice for longer distance travel, using forward looking forecasts, ambitious targets and the infrastructure built to supports this."
High Speed Rail Group

Alongside this, the responses highlighted the need to consider energy efficiency when looking at fuel sources, such as utilising hybrid locomotives, converting lines to tram-train operation, and the expansion of existing tram networks.

Capacity concerns we raised by many respondents, mainly centred upon whether the rail network could accommodate additional trips shifted from the road network and the impact of additional services on existing capacity constraints which, could reduce the quality of services. A number of respondents made suggestions for new routes/services, such as Bradford to Sheffield and reopening the Colne to Skipton and Penrith to Keswick rail routes Some respondents added that they felt that existing services were a considerable barrier to rail use, including poor rolling stock, unreliable journey times, expensive rail fares, a confusing ticketing structure and inadequate services.

Along with rail, there was a wider recognition of the role of public transport in decarbonising the transport system, generally made by members of the public, and this inclusion within the draft strategy was welcomed by many respondents. Members of the public in particular expressed considerable support for prioritising bus and coach travel, and it was felt that a strong commitment in this area could help to deliver significant reduction in carbon emissions and have the added benefit of reducing congestion. However, many highlighted that public transport is not considered to be an appealing method of travel and does not respond effectively to people's transport goals.

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"We were surprised and disappointed to see there was no mention of coach travel in the strategy. Coach is one of the most sustainable and environmentally friendly ways to travel, with one fully loaded coach able to remove 50 cars off the road."
Confederation of Passenger Transport UK

Others suggested that public transport may not be able to act as a realistic alternative to car use, particularly due to cost and reliability, highlight a culture of car use and ownership will make it difficult to encourage a major modal shift to public transport, suggesting more ambitious interventions will be necessary to encourage a step-change in the use of public transport

The most frequently suggested improvements needed to public transport were service frequency, reliability, accessibility and affordability and it was felt that these would need to be considered together to make public transport more appealing and encourage modal shift

5.6 Active Travel and Micro Mobility

Most respondents expressed support for the strategy's approach to active travel and micro mobility. They recognised the importance of active travel in reducing carbon emissions, improving public health and reducing reliance on car use.

However, some business group representatives, voiced concerns that active travel proposals could increase journey times for motorised vehicles by reducing road space, thus increasing emissions. Respondents thought freight would be negatively impacted by an increase in active travel infrastructure. Business group representatives were also more likely to stress the importance of L-category vehicles (such as motorcycles, electric bikes and e-cargo bikes) in encouraging modal shift, reducing congestion, and improving air quality.

Responses from members of the public tended to focus on the lack of adequate cycle infrastructure across the North of England and felt the strategy should focus more on cycling and prioritise active travel over road, and public transport. There was a call for more investment in cycling infrastructure and implementing measures which encourage cycling, such as inter urban cycle routes, safer infrastructure and stricter penalties for dangerous driving and promoting cycle to work schemes and road cycling courses.

"There is a very strong focus on shifting to Zero Emissions Vehicles (ZEVs) which includes the suggestion of incentives such as free parking for such vehicles to accelerate the transition to this mode of transportation. However, we would prefer to see a principal focus on delivering active travel networks, reducing congestion and thereby creating liveable streets."
Royal Town and Planning Institute (RTPI)

5.7 Zero Emissions Vehicles and Road Infrastructure

There was general support for the decarbonisation of road-based travel and most respondents recognised the value of electric vehicles (EVs) in reducing carbon emissions, and consequently supported plans to phase out internal combustion engine vehicles (ICEVs).

The main concern, across all stakeholder groups, relates to a perceived lack of charging infrastructure across the North of England. Respondents felt users' needs were not being met by current charge point provision, and that a substantial increase in charging

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infrastructure would be required to facilitate the widespread adoption of EVs. Respondents expressed their reluctance to switch to an EV until a comprehensive network is established. They also raised concerns that current charge points could become obsolete, and outdated due to rapid technological advances.

"……EV charging infrastructure presenting a particular barrier. TfN can take a key role in addressing market failure in rural communities by working with the LTAs to establish and drive forward programmes of investment."
Cumbria County Council and Cumbria Local Enterprise Partnership

Affordability of EVs was also referred to frequently by respondents who felt high upfront costs prevented themselves, or others switching to an EV. They supported the use of grants and subsidies to encourage uptake of EVs, and the development of a second-hand market to benefit lower income households. Some respondents suggested the need for more general awareness raising to support EV uptake.

They also acknowledged that the shift to EVs needed to be considered in the context of the emissions associated with maintaining and improving the existing road network, suggesting that all new road plans should undergo a comprehensive assessment of potential embodied and operational carbon impacts before public investment decisions are made.

"Although the TfN strategy is explicitly clear about the contribution that road mode makes to transport emissions2 the strategy's principal weakness is that it does not disclose or analyse how it intends to deal with the issue of the pressures to expand road capacity."
Member of the public

5.8 Freight and Logistics

When respondents were given the opportunity to identify policy actions, recommendations and activities which should be considered, and could be delivered by TfN, freight featured frequently. Many respondents expressed concerns about freight, and more specifically HGV-related emissions. They thought that the strategy should focus more on decarbonising HGVs and limiting HGV access. Furthermore, respondents suggested that TfN should support the creation of more freight hubs and consolidation centres to reduce freight-related traffic. A few respondents expressed concern about the technological readiness of refuelling solutions and the ability to deliver the increased energy supply to commercial fleet premises, and hence the potential consequences of bringing forward non-zero carbon HGV sale phase out dates.

"Energy infrastructure, including costs connected to supplying increased power to commercial fleet premises, must be addressed before strengthening the existing policy to phase-out ICE car and van sales by 2030 to include hybrids…… Including hybrid vehicles in the 2030 new ICE car and van sales phase-out date could have negative impacts on the objectives of the proposals as many operators will simply retain older ICE vehicles for longer."
Logistics UK

On the other hand, some respondents felt that developing zero-emission HGVs could distract from more urgent actions which aim to switch road freight to alternative modes.

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Respondents, across all stakeholder groups, expressed support for a shift of road freight to alternative modes such as rail, aviation and shipping to reduce congestion across the road network. They felt TfN could help facilitate these changes by supporting the expansion of freight infrastructure, improving facilities and introducing more freight rail terminals.

5.9 Clean Growth

Respondents generally supported the clean growth opportunities outlined in TfN's Decarbonisation Strategy. Respondents' expressed support for the inclusion of low carbon hydrogen vehicles, refuelling infrastructure, freight decarbonisation, and port expansion.

"Clean growth opportunities have the potential to help level up towns and cities across the region by providing new high skilled employment opportunities. This in turn have the potential to revitalise local communities and town and city centres."
ADEPT

A few respondents were keen to emphasise that that discussions around clean growth should be anchored in climate change science and that alternative economic models may be required to achieve decarbonisation objectives and a just transition.

Terminologies referencing 'clean growth' are problematic: an implication of the overriding 'imperative' of increasing GDP remains. Instead, an economic model that delivers social value, as agreed by involved communities, should be substituted.
Liverpool Friends of the Earth

Several respondents highlighted concerns about the use of hydrogen, including high production costs, safety and operational efficiency. Many respondents urged TfN to collaborate with the North of England Hydrogen Policy Forum, and raise awareness of hydrogen initiatives at a local, and national level.

Overall respondents praised the level of ambition the clean growth opportunities represent and generally actions related to these themes were well received. In fact, respondents from every stakeholder group, with the exception of members of the public, comment that there are no clean growth opportunities that TfN have failed to consider. Many of the suggestions made have already been addressed by TfN and included in the draft strategy. Others relate to carbon capture, offsetting, and microgeneration.

5.10 Aviation

Emissions from aviation were a concern for a few respondents, who suggested, and supported the intention to include it in TfNs baseline emission scenario and future baseline trajectories. Some Respondents felt that decarbonising aviation was not sufficiently addressed within the draft Decarbonisation strategy and thought that actual measures to decarbonise aviation needed further consideration. A few respondents were concerned about the high emissions currently being produced by aviation and believed that net zero was unattainable for this subdivision of transportation.

Whilst most respondents acknowledged TfN would not lead decarbonisation of the aviation sector, nor be able to influence emission reductions significantly, some respondents did identify a role for TfN in reducing emissions related to airport commuting and improving links to airports via sustainable modes. The role of TfN in relation to aviation and airports must be investigated further, and those actions which can be taken at a regional level

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understood. Responses suggest the need for a national/international approach to decarbonising aviation, a suggestion which will be expressed by TfN on the behalf of stakeholders when engaging with partners and independent advisory groups.

We would encourage TfN to engage with UK Government's Jet Zero Council and UK Sustainable Aviation to identify any potential areas of support and collaboration.
Electricity North West

5.11 Impacts, Risks & Benefits

Generally, respondents felt that they could support the strategy's impact on people, on the basis that it would accelerate the development of a more integrated and accessible transport system, which would enhance social equality. If correctly applied, it was felt that there should be no adverse impacts on the population.

Concerns were expressed as to whether the decarbonisation strategy could result in economic exclusion particularly in and amongst vulnerable groups. Some respondents felt low-income groups could be subjected to increased financial penalties unless concerted efforts were made to ensure low-emission vehicles are affordable and accessible charging options are in place.

Any additional taxation on internal combustion engine vehicles is likely to disproportionally impact low income groups who cannot afford to switch to a ZEV. Low income groups could be disproportionally impacted by demand management policies that disincentivise car travel……
ADEPT

Concerns were also raised in relation to rural communities who often lack frequent public transport services and are more likely to suffer from a deficit of charge points in the short-term due to lower demand. Many groups including young people, women and people with disabilities were considered to be at risk of exclusion. For example, people with disabilities may be unable to travel by public transport, engage in active travel or make use of car sharing initiatives.

We consider it important that any measures adopted take account of the financial challenges faced by some groups, such as low-income car users in rural areas or small tradespeople who rely on cars/small vans for their business needs. Measures which are seen to drive up costs or penalise people on low incomes could result in a loss of support for essential action to address decarbonisation.
Transport North East

Members of the public made suggestions about how the impact of the strategy on certain population groups could be managed. This included carrying out detailed equality impact assessments to target resources at less advantaged communities, the elderly, and people with disabilities. A wider point made was that efforts should be made to reduce community severance, by providing infrastructure such as bridges and underpasses to link communities.

Respondents also reflected on what they considered to be the main benefits arising from transport decarbonisation more generally. This included improvements to health as a result of improved air quality, increased physical activity, safer roads as a result of fewer motorised vehicles and reduced noise pollution.

6. Further Development of Strategy

Whilst the results of the consultation have primarily been used by TfN to refine and prioritise its activities as TfN moves forward from strategy to action, the outcomes have also been considered when updating the Strategy document.

The majority of updates fall under the following three categories:

- Adding further detail / clarifications where requests to do so represented a common theme amongst respondents.
- The identification of those polices and activities of greatest priority to respondents.
- Where gaps in TfN's approach were identified, the actions needed to address these gaps ahead of the next Decarbonisation Strategy Update (2025) have been set out. This has led in some cases to the identification new priority activities within Chapter 9.

Responding to the consultation and wider engagement activities, the Strategy has been updated in the following areas:

Increased emphasis on the importance of reducing vehicle mileage

At several points in the document changes have been made or supplementary text added to increase the emphasis on the need to reduce private vehicle usage and the essential part that modal shift will play in decarbonising transport in the North, particularly in order to satisfy TfN's carbon budgets pre-2030.

Further clarity on TfN's approach to aviation and shipping

Initial findings and insights in relation to the North's emissions from aviation and shipping have been included. The Strategy now sets out in more detail than previously, how TfN intends to work with Partners and an independent expert advisory group to (1) agree TfN's role in relation to aviation and airports, (2) investigate the approach that could be taken as a region to reduce emissions from aviation (alongside what has been proposed by government within its Jet Zero Strategy consultation[1]) and capture the economic benefits that net zero aviation could bring to the North.

Further clarity on TfN's approach to the appraisal of its Investment Programme (IP)

Text added to explain in more detail than previously, how TfN intends to use its analytical framework to model operational carbon emissions. Text related to the project level appraisal of carbon on schemes within the IP (where **not led** by TfN) has been removed, recognising that TfN is best placed to influence at the strategic level and will only be involved as a stakeholder when schemes come forward for delivery. The commitment to work with individual scheme sponsors to embed the consideration of the TfN's Decarbonisation Trajectory within the business case development processes for those projects has however been retained.

Introduced the need to understand the full costs of peoples travel choices and acknowledged the relationship between increased highways capacity and increased car use

Text introduced with the aim of initiating further discussion on how a fairer pricing system for public transport relative to car travel could be achieved. Text has also been added to acknowledge the need for appropriate scrutiny of schemes that increase or release

[1] https://www.gov.uk/government/consultations/achieving-net-zero-aviation-by-2050

highways capacity, cross referring to the Climate change Committees' recommendation that investment in roads needs to be accompanied by proportionate investment in EV charging infrastructure, active travel and public transport[2].

Support for the role of HS2 and NPR in achieving mode shift, and for shifting freight from road to rail

Reflecting sentiments picked up during the consultation, text has been added to acknowledge the role that rail could play in shifting long distance car trips and also the need to shift more road freight onto rail (cross-referring to TfN's upcoming Freight and Logistics Strategy in that respect).

Updated future baseline emissions trajectories

The future baseline trajectories presented within the Strategy have been updated to take into account the policy ambitions as set out in the Government's transport decarbonisation plan: 'Decarbonising transport: a better, greener Britain'[3]. The most notable impact of this is that the residual emissions have dropped to close to zero under all future baseline scenarios, by 2050. This is primarily due to the proposal of ambitious non-zero HGV sales phase out dates by the Government. Even with these new ambitious dates, the cumulative emissions accrued under all of TfN's baseline scenarios still exceed the maximum budget allowed by TfN's Decarbonisation Trajectory by 2030 or shortly after.

Commitment to a strategic embodied carbon footprint study of schemes within IP up to 2033

This commitment has been included as an additional TfN activity (**SD13**), with the aim of allowing TfN to benchmark the potential maximum and minimum embodied carbon footprints against TfN's Decarbonisation Trajectory.

Addition of new activity to work with LEPs to support SME's in their green transitions

Responding to the outcomes of the consultation, an additional stakeholder defined activity (**SD14**) has been included, to work with LEPs to consider how TfN can more directly support SMEs to both adopt and take advantage of the opportunities from, the transition to clean green transport.

Signposting of stakeholder priorities from consultation

Policy recommendations (national and local) and potential TfN activities that were identified by respondents through the consultation as the highest priority and most urgent have been signposted within the document.

No-Carb modelling updates

Where appropriate and feasible, the modelling approach taken and the assumptions used, have been updated to take into account both feedback from the public consultation and also the policies and aspirations of the Government's transport decarbonisation plan, which was published after TfN's draft Decarbonisation Strategy was launched for consultation.

Changes include:

- NoCarb now factors in biofuel proportions in petrol and diesel.

[2] Progress in Reducing Emissions 2021 Report, Climate Change Committee, Jul 2021, Table A6
[3] https://www.gov.uk/government/publications/transport-decarbonisation-plan

- Other greenhouse gases other than carbon dioxide are now included in the analysis, such as methane and nitrous oxide, and emissions are reflected as CO_2 equivalent, rather than just CO_2.
- The accuracy of the van and HGV analysis has been improved.
- Some input values to TfN's modelling have been updated, particularly around the phase out dates for sales of non-zero HGVs.
- Preliminary analysis on aviation and shipping emissions has been incorporated.

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7. Appendix

Appendix 1: List of Stakeholder Organisations

Stakeholder Organisations
Selby and District Rail User Group
SPACE for Gosforth
HADRAG: The Halifax & District Rail Action Group
CONFEDERATION OF PASSENGER TRANSPORT UK
Yorkshire and the Humber Regional Green Party
North Yorkshire County Council
West Yorkshire Combined Authority
Sheffield Green Party Transport Policy Group
MAG
Peel NRE Limited
Association of Directors of Environment, Economy, Planning & Transport
Stagecoach
CPRE North Yorkshire (CPRENY)
York Civic Trust
Avanti West Coast, TPE and First Bus (collated ideas)
Logistics UK
TravelWatch NorthWest
Network Rail
The CILT North West Region Policy Committee
Manchester Climate Change Agency
Anglo American
Royal Town Planning Institute (RTPI)
Warrington Borough Council
Grimsby West Objections
Skipton East Lancashire Rail Action Partnership (SELRAP)
Lake District National Park Authority
Liverpool Friends of The Earth c/o Faiths4Change
Jacobs
Institution of Civil Engineers Northern English Regions - North West
Campaign Group "Keep Bee Lane Rural"
Royal Mail Group
Powerhouse Energy
North West Leeds Transport Forum (representing 10 resident groups in north west Leeds)
The Wildlife Trust for Lancashire, Manchester & North Merseyside
CPRE Peak District and South Yorkshire
Mott MacDonald
Institution of Civil Engineers Northern English Regions - Yorkshire and Humber
Transport Action Network
Sheffield City Region Mayoral Combined Authority
Chartered Institute of Logistics & Transport
Community Rail Network
Hull Carbon Neutral 2030
Friends of the Lake District

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Alstom UK and Ireland
City of Durham Trust
Keswick Town Council (KTC)
Northern Trains
Co-operative Executive Member for Climate Change, Environment and Transport, Sheffield City Council
DecarboN8
High Speed Rail Group
CrossCountry - XC Trains Limited
City of York Council
Allerdale Borough Council
Diocese of Sheffield
CPRE PDSY
Friends of the Earth Manchester
Airturb.com and Trailar.com
Sheffield Climate Alliance
Cumbria County Council and Cumbria LEP
Railfuture
Regional Network Strategy (North) Strategy & Planning Highways England
Zero Carbon Yorkshire
Hull City Council
Transport for the South East
Peak District National Park Authority
ConnectedCities Ltd
Rotherham Metropolitan Borough Council
Rimrose Valley Friends
Sheffield Chamber of Commerce
Motor Cycle Industry Association Ltd (MCIA)
Mineral Products Association Limited
Action for Yorkshire Transport
Zero Carbon Harrogate
Institution of Civil Engineers Northern English Regions - North East
Kendal Futures
Friends of Carrington Moss
The Friends of Reddish South Station
Royal Institution of Chartered Surveyors (RICS)
Ryze Hydrogen and Wrightbus
[Editor's note: anonymised at request of client]
Rock Rail Holdings Limited
Tees Valley Combined Authority
York and North Yorkshire Local Enterprise Partnership
CPRE Peak District and South Yorkshire
Transport North East
Institution of Civil Engineers - North East, North West and Yorkshire and Humber Regions
Penrith Town Council
Sustainable Brampton
Cadent Gas Limited
Force Rail
Electricity North West

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Decarbonisation Strategy

Annex A: Detailed policy recommendations



TRANSPORT FOR THE NORTH

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Glossary

Term	Description
CAV	Connected and autonomous vehicles
E-bikes / e-scooters	Electric bikes / scooters
EV	Electric vehicle
ICE	Internal combustion engine vehicles
MaaS	Mobility-as-a-Service
PGA	'Policy gap action': Actions and activities identified through analysis that are likely to be needed to bridge the policy gap between baseline scenarios and the Decarbonisation Trajectory
TDM	Travel Demand Management
TfN	Transport for the North
UTMC	Urban Traffic Management Control
ZEV	Zero emission vehicles

Table of recommendations

The tables below outline policy measure recommendations and actions for Transport for the North (TfN), National Government and TfN Partners to reduce surface transport emissions in line with TfN's Decarbonisation Trajectory. The tables provide a more comprehensive (although not exhaustive) set of recommendations adding to key recommendations outlined in Chapter 5 of the Decarbonisation Strategy.

1.1 Zero Emission Vehicles (ZEV)

Ref	Responsibility	Sub-area	Recommendation
1	TfN	Road vehicles	**PGA 1:** Develop a pan-northern ZEV infrastructure plan to ensure trans-boundary road trips are considered, factoring in interoperability across the region and optimal locations for high-power charging hubs on the Major Road Network, with input from Local Authorities and the Distribution Network Operators (DNOs).
2	TfN	Road vehicles	**PGA 2:** Work with Local Authority partners and Highways England to facilitate large ZEV truck trials in high traffic corridors in the North.
3	TfN	Road vehicles	**PGA 3:** Work with Local Authorities and freight stakeholders to help aggregate large orders of ZEV vans and trucks across the North and overcome demand shortages.
4	TfN	Rail	**PGA 4:** Through the Northern Powerhouse Rail programme, support the government and Network Rail in identifying appropriate routes for electrification and associated implementation.
5	TfN	Rail	**PGA 5:** Work with Network Rail and train operating companies to: • ensure service patterns are based around the progression of electrification and minimising the use of diesel-only trains; and • optimise timetables to maximise benefits of frequency and reduce flighting of services.
6	TfN	Rail	**PGA 6:** Influence Government to trial alternative technology freight locomotives in the North.
7	TfN	Rail	**PGA 7:** Work with Network Rail to ensure there is sufficient capacity to allow freight traffic to run directly and with minimal dwell times, reducing emissions from existing diesels.
8	National Government	Road vehicles	Strengthen the existing policy to phase-out ICE car and van sales by 2030 to include hybrids.

Ref	Responsibility	Sub-area	Recommendation
9	National Government	Road vehicles	Increase taxes on new ICE vehicles from the early 2020s, with rates escalating in line with emissions intensity. • Increase Benefit-in-Kind and Vehicle Excise Duty rates on all ICE vehicles from 2023. • Fiscal policy should shift towards substantially increasing the cost of new ICE vehicles, with rates escalating in line with emissions intensity. • Taxes should initially target new ICE vehicles, as they will impact low-income consumers the least. Once there is a significant second-hand ZEV market, taxes on running costs should be increased.
10	National Government	Road vehicles	Develop a coherent and comprehensive strategy for charging infrastructure, defining a role for local and regional bodies, providing public funding where appropriate and developing a regulatory regime that enables the private sector to invest and ensure interoperability.
11	National Government	Road vehicles	As more ZEV HGV models become available in the 2020s, introduce a system of strong grants and tax incentives.
12	National Government	Road vehicles	Fund large ZEV HGV trials in high-traffic corridors in the North. Instruct Highways England to facilitate these trials on the Strategic Road Network.
13	National Government	Road vehicles	Implement measures to rapidly increase supply of ZEV models. This could include measures that stimulate domestic manufacture, which also have the potential to drive green growth in the North.
14	National Government	Rail	In partnership with Network Rail, identify and fund a core network for electrification with the highest traffic density, then prioritise secondary, lower density routes where alternative technology will be the permanent solution.
15	National Government	Rail	For routes where alternative technology (battery and hydrogen) is the long-term solution, provide funding to procure new rolling stock based around the residual life of existing diesel trains.
16	National Government	Rail	In partnership with delivery bodies, work with freight operating companies to understand the need for incremental electrification of freight.
17	National Government	Rail	Support freight operating companies and rolling stock builders in the development of alternative technology freight locomotives.

Ref	Responsibility	Sub-area	Recommendation
18	National Government	Rail	In partnership with delivery bodies, work with freight and train operating companies and TfN to ensure there is sufficient capacity to allow freight traffic to run directly and with minimal dwell times, reducing emissions from existing diesels.
19	TfN Partners	General	Develop a model for delivery and maintenance of electric vehicle charging infrastructure, covering rapid hubs, on-street charging, public parking spaces, and council fleets. Initially proactive bidding for Government funds will be needed, but over time private sector investment will support this, subject to an effective national and local regulatory regime. • Facilitate the early delivery (pre 2025) of highly visible, fast and rapid charging infrastructure in publicly-owned car parks. • Deliver on-street, or 'nearby', residential charging infrastructure in areas with limited off-street parking and high car usage. Complement this with policies to encourage EV car-club provision and charging price caps to ensure that prices for on-street charging are no more than for those with off-street chargers. • Implement Parking Standards to ensure ongoing and increasing retrofit of existing parking spaces in car parks and leisure and retail venues to EV priority spaces (with charging infrastructure). • Early conversion of council fleets (pre 2025). • Policies to ensure that opportunities to install passive provision for EV infrastructure during road improvements are taken. • Consistent and high maintenance standards on all public charging infrastructure to allay potential user anxiety around this issue. • Implement early, but time limited, 'soft' incentives to encourage EV uptake in town centres, such as reserved/discounted parking.
20	TfN Partners	General	Implement a common procurement framework for infrastructure across administrative areas to encourage economies of scale and interoperability across the region and attractiveness to private investment.
21	TfN Partners	General	Carry out community engagement to increase understanding and buy-in of EVs and EV infrastructure. • This could include local awareness initiatives including telematic diagnostics

Ref	Responsibility	Sub-area	Recommendation
			and 'try before you buy' schemes. It could also be an opportunity to consult on optimum locations for EV charging).
22	TfN Partners	General	Implement policies to prioritise ZEV shared transport, such as car share and car clubs, supported through prioritised public parking and rapid charging infrastructure. **This is likely to be needed most urgently in a Digitally Distributed scenario, which sees a move towards higher car ownership and usage due to the popularity of low-emissions vehicles and the accessibility of CAVs.**
23	TfN Partners	General	Collectively adopt taxi licensing policies that require new vehicles to be zero-emission. This will need to be coupled with provision of charging infrastructure at taxi ranks.
24	TfN Partners	General	Aggregate purchases of ZEV vans and trucks across the North (supported by TfN).
25	TfN Partners	General	Commit to contractual requirements with public transport and shared vehicle operators to accelerate the transition to zero-emission vehicles within a defined timeframe. • Engage with bus operators to set targets and standards for rapid roll-out of ZEV buses.
26	TfN Partners	General	Designation of CAV drop off and pick up bays to allow vehicles to vacate city and town centres when not in use, freeing up public realm from charging infrastructure and releasing real estate (current car parks) for other uses. **This will be most important under an Urban Zero Carbon scenario and should be implemented alongside other policies to stagger commuting times avoid congestion issues.**
27	TfN Partners	In smaller towns, villages and dispersed communities	Incentivise EV uptake (including electric bikes) and development of home charging infrastructure through direct funding and awareness raising (e.g. telematic tests, EV trials).
28	TfN Partners	In smaller towns, villages and dispersed communities	Develop charging infrastructure at rural tourist spots to counter range anxiety. These should be developed in such a way to avoid unsustainable traffic levels within protected rural areas (e.g. National Park park & ride schemes).

1.2 Demand management

Ref	Responsibility	Sub-area	Recommendation
29	TfN	Mode-shift	**PGA 8:** Develop and implement comprehensive plans for the regional public transport network, such as Northern

			Powerhouse Rail and wider improvements to the rail network.
30	TfN	Reducing car travel	**PGA 9:** Develop an evidence base on the extent to which less work-related travel has a detrimental effect on productivity and agglomeration to understand whether home-working can be consistent with TfN's vision for a transformed Northern economy.
31	TfN	Shared mobility	**PGA 10:** Use our role on within the Rail North Partnership to promote shared mobility at train stations, including car share, car club, cycle hire and e-scooter schemes.
32	TfN	Shared mobility	**PGA 11:** Provide evidence and strategic support to partners to identify opportunities for shared mobility. • For example, in relation to transport-related social exclusion and where cycle hire and e-scooter schemes would deliver maximum environmental benefit alongside wider social, health and economic benefits.
33	TfN	Freight efficiency	**PGA 12:** Work with Government to support regional coordination of measures to improve logistics efficiency, including consolidation centres, mode shift to rail and information democratisation schemes.
34	TfN	Planning policies	**PGA 13:** Influence government to develop appraisal guidance that includes the full impacts of transport projects on carbon.
35	National Government	Mode-shift	Work with train operating companies to implement a targeted reduction in rail fares and increase integration and flexibility of ticketing systems.
36	National Government	Mode-shift	Provide a substantial and consistent funding stream to Local Authorities to improve active travel networks and public transport (e.g. subsidise bus and light rail networks to deliver new vehicles, offer cheaper fares to passengers and deliver service improvements).
37	National Government	Reducing car travel	Develop a coherent plan for taxing and pricing car travel that accounts for reduced Fuel Duty revenues and incentivises key outcomes such as reduced overall car travel, more efficient road network operation and uptake of ZEVs.
38	National Government	Reducing car travel	Support employers to roll-out home working, flexible working and remote working hubs.
39	National Government	Shared mobility	Ensure Local Authority funding and planning regimes support shared mobility solutions alongside traditional public transport options.
40	National Government	Shared mobility	Require employers to report on emissions from all employee travel to encourage a shift towards vehicle sharing.

41	National Government	Freight efficiency	Require shippers to provide consumers with information on emissions from different shipping options and encourage uptake through information and pricing.
42	National Government	Freight efficiency	Fund a project to develop common data collection methods, formats and sharing platforms that overcome competition and privacy barriers and enforce data reporting to government.
43	National Government	Freight efficiency	Establish a framework for consolidation centre planning as well as funding and support for Local Authorities to perform local area assessments.
44	National Government	Freight efficiency	Support the licensing of high capacity vehicles on specific roads (major motorways) for specific users where the benefits are clear.
45	National Government	Planning policies	Use the National Planning Framework to promote '15/20-minute neighbourhoods' within the planning process and plan transport investments accordingly.
46	National Government	Planning policies	Develop appraisal guidance that includes the full impacts of transport projects on carbon and air quality.
47	TfN Partners	Mode-shift	Use marketing policies to re-build confidence in the safety and value of public transport.
48	TfN Partners	Mode-shift	Subject to Government funding, invest in bus and light rail networks to and offer improved journey quality, accessibility and cheaper fares to passengers. • Subsidise the bus network to deliver new buses and offer cheaper fares to passengers. • Invest in bus priority measures to deliver improvements to overall journey times and reliability.
49	TfN Partners	Mode-shift	Implement policies to enhance dedicated cycle networks, low-traffic neighbourhoods, and activities to promote behaviour change. • Invest in cycling infrastructure using a two-tier approach: delivering a network of fast / direct cycle superhighways and quieter (possibly less direct) routes. • Support the delivery of Travel Demand Management (TDM) behaviour change programmes including travel plan support for workplaces, schools, residential and area-based travel plans.
50	TfN Partners	Mode-shift	Implement policies to promote safe and accessible use of e-bikes and e-scooters, especially for longer or more challenging commutes.
51	TfN Partners	Mode-shift	Implement policies to increase the safety, convenience and safety of active travel. • Implement development management policy to increase the comfort and convenience of active

			travel users of new or retrofitted offices (e.g. showers, drying facilities, secure cycle storage). • Implement policies to protect pedestrian use of pavements. Micro-mobility solutions should not be at the expense of walking and disabled access quality or experience. • Improve the climate resilience of active travel infrastructure, increasing comfort and safety levels in all weather types. • Policies to limit vehicle speeds on main rural cycling/walking routes.
52	TfN Partners	Mode-shift	Plan for coach friendly measures, particularly in tourist areas, both urban and rural, ensuring coach operators have safe and sufficient access to local sites.
53	TfN Partners	Reducing car travel	Roll out parking policies to reduce congestion and make space for sustainable infrastructure. • Develop and/or refresh urban public parking controls, standards and pricing strategies to strengthen parking as a TDM measure, including EV parking strategies and targeted removal of on-street parking. As part of this, on-street parking in city and town centres should be more expensive than off-street parking to discourage cruising whilst waiting for spaces. • Seasonal (or permanent) freeing up of parking spaces to be used as 'parklets' or additional cycle storage. • Provision of reserved delivery parking spaces on residential roads.
54	TfN Partners	Reducing car travel	Consider charging policies such as clean air zones or congestion charging, particularly where and when sustainable transport modes are a viable alternative option.
55	TfN Partners	Reducing car travel	Utilise urban traffic management control (UTMCs) and Regional Control Centres to proactively manage residual vehicle demand and maximise available road capacity.
56	TfN Partners	Shared mobility	Utilise planning contributions from new developments to enable shared vehicle provision.
57	TfN Partners	Shared mobility	Develop mobility-as-a-service (MaaS) platforms and mobility credit systems to link public transport journey stages and improve accessibility and reliability. • Implement policies to incentivise the development of MaaS capability. • Direct mobility credit systems at certain geographies or communities where uptake may require greater support or is most crucial, including for low-income groups and those living in areas of low EV home-charging capability.

58	TfN Partners	Shared mobility	Support the provision of demand-responsive bus services to complement existing networks.
59	TfN Partners	Shared mobility	Trial and roll out cycle hire / e-scooter sharing schemes. • Identify locations where cycle hire / e Scooter schemes would deliver maximum environmental benefit alongside wider social, health and economic benefits. • Support and facilitate introduction of such schemes (subject to Government position following UK wide e-scooter trials).
60	TfN Partners	Shared mobility	Introduce wider TDM and travel planning measures to promote shared mobility. • Consider allowing policy to include docking stations as an alternative / addition to standard cycling parking. • Implement policies that prioritise shared transport options, such as taxis, car sharing and car clubs, through dedicated public parking, discounted and designated charging infrastructure for taxis, and use of bus lanes for shared modes / high occupancy vehicles. • Embed car club parking within car parking standards for new development.
61	TfN Partners	Shared mobility	Implement softer measures to encourage the uptake of MaaS. • Discounted and designated charging infrastructure for taxis. • Workplace parking levies and 'cash out' schemes that reward employees who choose not to use a workplace parking space. • ZEV pricing exemptions.
62	TfN Partners	Planning policies	Use local planning policy to promote '15/20-minute neighbourhoods', prioritise development close to public transport hubs and encourage car-free or car-lite development.
63	TfN Partners	Planning policies	Consider introducing a Workplace Parking Levy, utilising lessons learnt from Nottingham.
64	TfN Partners	Planning policies	Support and facilitate the roll out of car-free zones and streets. • In relation to new housing and commercial developments, implement development management policy to ensure active travel modes and public transport are always more convenient than private car use for local trips. • Implement planning policies that encourage the 'unbundling' of the cost of parking from new housing prices to incentivise the take up of car-free or car-lite development.

65	TfN Partners	Planning policies	Develop park-and-ride sites with integrated EV charging infrastructure and cycle parking. This is likely to be less effective in smaller towns **(which will see most of the population and jobs growth under the *Priority Places* scenario).**
66	TfN Partners	Planning policies	Implement planning policies that support the development of freight consolidation centres.
67	TfN Partners	Planning policies	Support the delivery of TDM behaviour change programmes including travel plan support for workplaces, schools, residential and area-based travel plans.

1.3 Improvements to vehicle efficiency

Ref	Responsibility	Sub-area	Recommendation
68	TfN	General	**PGA 14:** Work with partners to increase public awareness of fuel-efficient driving styles and the associated environmental and financial benefits.
69	National Government	General	Ensure an ambitious post-Brexit regulatory regime on new vehicle CO_2 emissions, aligned to UK carbon budget commitments.
70	National Government	General	As per the recommendations above, ensure Benefit-in-Kind and Vehicle Excise Duty rates on all ICE vehicles escalate in line with emissions intensity.
71	National Government	General	Roll out nationally funded eco-driving training schemes, implemented through workplaces in relation to freight operators or organisations with large company car fleets.
72	National Government	General	Support smaller freight operators to implement other efficiency technologies, such as aerodynamic attachments.
73	National Government	General	Ensure new vehicle regulations use technology solutions to support efficient driving styles.
74	National Government	General	Work with Highways England to review maximum speed limits on the Strategic Road Network where safe to do so.
75	TfN Partners	General	Extend existing demand management and pollution abatement measures (e.g. Ultra Low Emission Zones) to consider fuel efficiency of private cars, so as to tackle the trend towards driving larger, heavier private vehicles (e.g. sports utility vehicles).

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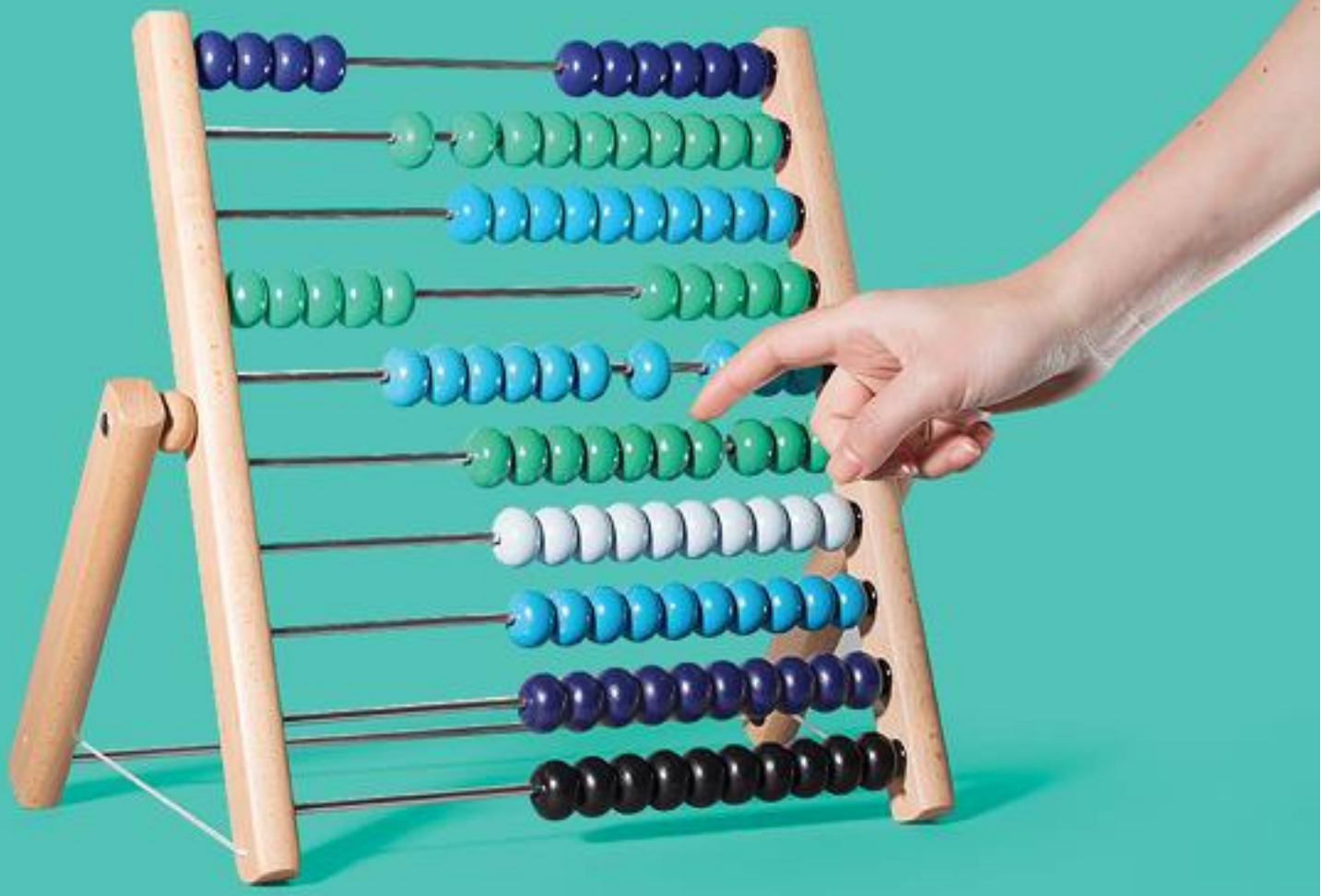
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Decarbonisation Strategy

Annex B: Northern Carbon Model (NoCarb) Development Report



TRANSPORT FOR THE NORTH

Document details

Document history

Version	Issue date	Description of changes
1.0	13/04/21	
2.0	08/11/21	Updates following consultation

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1 Glossary

Term	Description
Analytical Framework	Transport for the North's set of modelling tools
Chainage	Vehicle kilometres travelled
Cohort	Vehicle registration year
CYA	Completed year average (vehicle age in years)
Decarbonisation trajectory	TfN's emissions trajectory for the North, which represents emissions targets over milestone years.
DfT	Department for Transport
LAD	Local Authority District
MSOA	Middle layer Super Output Area: Macro level ONS zoning system from 2011 census
NAEI	National Atmospheric Emissions Inventory
NELUM	Northern Economy and Land Use model
NoCarb	TfN's Northern Carbon Modelling Tool
NoHAM	TfN's Northern Highway Assignment Model
RWC	Real-world correction factors
Scenario years	Milestone years in TfN's Future Travel Scenario planning (2018, 2020, 2025, 2030, 2035, 2040, 2045 and 2050).
TfN	Transport for the North
Zone	A spatial unit used for aggregating data in a model. NoCarb has zoning that can be flexibly adjusted so long as the zoning system is based on Middle-layer Super Output Areas.

2 Introduction

This report outlines the development methodology for TfN's NoCarb Tool: a vehicle fleet model that produces a baseline estimate for surface transport emissions in the North and projects emissions into the future based on scenario inputs. As part of TfN's Analytical Framework[1], the NoCarb Tool provides essential evidence for TfN's Decarbonisation Pathways, which are intended to show what policies and measures are likely to be required to meet decarbonisation targets (as outlined in TfN's Decarbonisation Strategy). This report also covers technical detail on how NoCarb was applied to inform the Decarbonisation Strategy.

The NoCarb tool takes in four groups of inputs:

- Demand data
- Emissions data
- Vehicle registration data
- Future policy inputs

For cars, vans and HGVs, the model produces emissions estimates disaggregated by year, zone and vehicle attributes. Bus and rail emissions estimates are pan-Northern and only broken down by year. For bus, this aggregate approach is due to a lack of detailed data and modelling tools available at a regional level. For rail, the approach is due to the difficulty attributing vehicle movements and emissions to origin zones.

[1] The Transport for the North (TfN) Analytical Framework is a set of modelling tools, which are used to generate the evidence and insight that underpins TfN's Strategic Transport Plan, Investment Programme and business cases. The job of Analytical Framework is to show how patterns of travel might change in future due to both external factors and the planned improvements that TfN is developing.

3 Background

3.1 TfN's Analytical Framework

This section outlines some of the key components of TfN's Analytical Framework modelling suite and provides context about NoCarb as a component within the framework.

The Analytical Framework aims to provide a common approach to data, modelling and appraisal across all regions of the North. It provides the basis to generate evidence to support TfN programme activities.

Consistency across the North requires consistent data, as well as a consistent approach to modelling. The Analytical Framework therefore focuses on maintained datasets that are available for the entire North and, as much as possible, mainland Great Britain.

The first tier of the Analytical Framework modelling system, the Northern Economy and Land Use Model (NELUM),[2] is the key future-year travel scenario exploration tool and is used to generate future travel markets for different land-use scenarios. NELUM is also used as a Land-Use Transport Interaction model, to assess the impact of transport improvements on the location of households and businesses.

The second tier of the Analytical Framework incorporates the Northern Transport Modelling System (NorTMS), which includes the Northern Rail Modelling System (NoRMS) and the Northern Highway Assignment Model (NoHAM). NoRMS focuses on modelling pan-northern rail passenger movements as well as more strategic modelling of longer distance passenger movements. NoHAM is a highway assignment model, covering passenger and freight road vehicles. For freight multi-modal modelling, the Analytical Framework focuses on using the Great Britain Freight Model (GBFM), as updated for the new National Transport Model (NTMv5).

NELUM produces both baseline and future demand estimates that can be fed into NoCarb, with future estimates based on TfN's four Future Travel Scenarios (see Figure 1). NoHAM also produces baseline demand outputs that can be fed into NoCarb, allowing emissions to be estimated on all roads, or exclusively on the Major or Strategic Road Networks within TfN's boundary. The functionality to use NoCarb with NoHAM is being finalised and will be applied in business year 2021/22 as part of TfN's Investment Programme work.

[2] A detailed overview of how NELUM works can be found here: https://transportforthenorth.com/wp-content/uploads/Future-Travel-Scenarios-Future-Transport-Measures-Solution-Annex.pdf

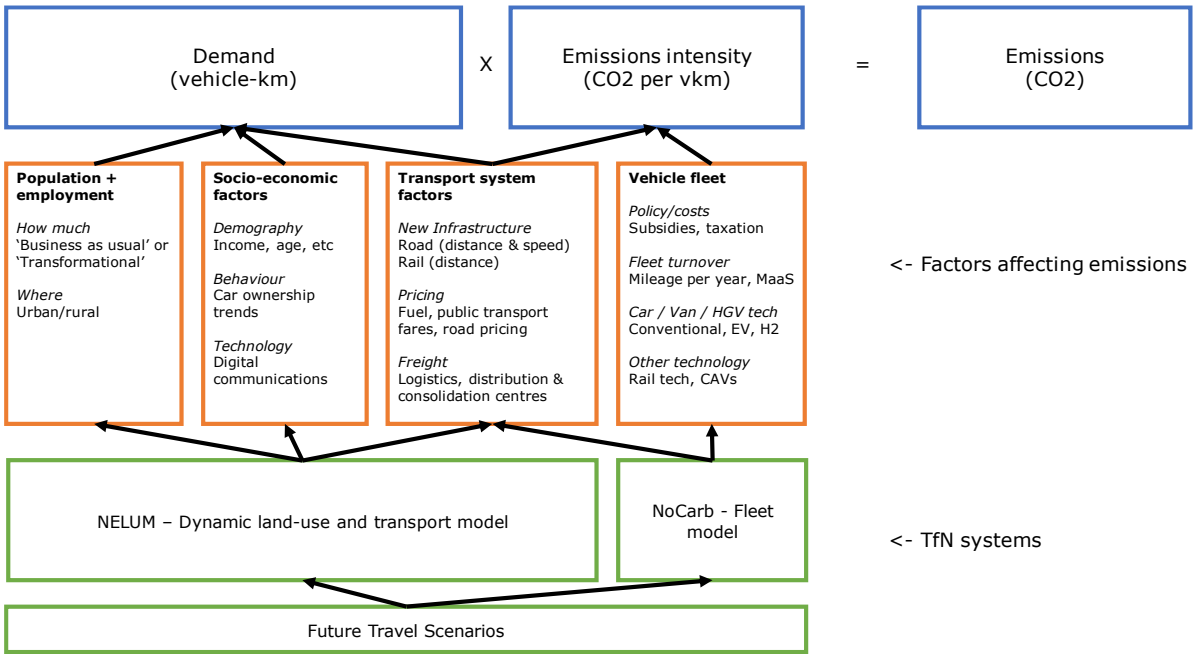


Figure 1: Using the Analytical Framework to model carbon emissions – a visual representation of how the Northern Economy and Land Use Model (NELUM) and Future Travel Scenarios interact with NoCarb to produce emission estimates.

3.2 Future Travel Scenarios

TfN's Future Travel Scenarios[3] explore how trends in society, the economy and national policy could influence the level and distribution of travel demand in the future. By using a series of different Future Travel Scenarios, we aim to future-proof our decision-making as much as possible, making it resilient to wide-ranging and cross-sector uncertainties.

The Future Travel Scenarios represent factors[4] that are external to TfN's direct control, acting as 'reference cases' to test the performance of TfN strategies and policies against objectives. In each scenario, the level of national government ambition and support for decarbonisation in the North is different, as is the level and distribution of travel demand.[5]

As mentioned in the previous section, the factors making up each Future Travel Scenario are fed into NELUM, which in turn estimates demand across future years.

Assessing the decarbonisation 'policy gap' – that is, the gap between each Future Travel Scenario's emissions trajectory and TfN's decarbonisation

[3] TfN's Future Travel Scenarios Report provides a comprehensive overview of the process undertaken to develop the new Future Travel Scenarios. It also delves into the contextual factors underlying each scenario and the expected implications on transport.

[4] A list of travel-related development policies and measures under each Future Travel Scenario can be found in the Future Transport Measures and Solutions Annex.

[5] Key national policy changes up to December 2020 are reflected within the Scenarios.

trajectory - will allow TfN to develop a resilient Decarbonisation Strategy that can adapt to different future circumstances. The policies and measures that are likely to bridge this policy gap are captured in TfN's Decarbonisation Pathways, which address the different levels of additional action required under each of TfN's four Future Travel Scenarios, recognising that the same action applied in different scenarios will result in different levels of efficacy in terms of the emissions reductions required.

The Future Travel Scenarios were developed in collaboration with Local Authority partners, national delivery partners and academic experts and informed by local strategies and priorities. The scenarios represent uncertainty across the following five external factors:

1. Growth in the population and economy;
2. Spatial planning policy and economic distribution;
3. National policy on environment and sustainability;
4. Technological change and advancement; and
5. Social and behavioural change.

The key elements of the scenarios can be summarised using the following set of 'what if' questions:

- **Scenario 1: Just About Managing** - What if society keeps developing broadly following existing trends? What if there is a gradual shift in lifestyles and travel, public and political behaviours do not alter, and we don't give up certain 'luxuries', leaving major developments and change to be shaped by market forces.
- **Scenario 2: Prioritised Places** – What if society becomes focused on quality of life, place-making and community, rather than primarily economic growth? This scenario is led by a change in priorities, with its biggest driver being the push for a fairer redistribution of economic prosperity.
- **Scenario 3: Digitally Distributed** – What if Northern Powerhouse ambitions[6] are realised by using technology solutions to create connections and agglomeration across towns and cities? This scenario is led by technology and some policy influence, as we fully embrace technological change, work remotely, and use an accessible service-based transport system with connected and autonomous shared mobility options.
- **Scenario 4: Urban Zero Carbon** – What if society achieves Northern Powerhouse ambitions by using policy interventions to maximise energy efficient city growth and urban densification? This scenario is led by public and political attitudes to climate action and urban place-making, with the biggest drivers being strong Government policy, resulting in fast action on

[6] As set out in the Northern Powerhouse Independent Economic Review.

zero-emission transport systems and places, with integrated planning across energy, spatial and other sectors.

3.3 Model geography

The NoCarb model produces emissions estimates for travel that takes place within TfN's boundary (the North). This can include trips that began or ended outside of the North, but only relates to the 'Northern' section of that trip.

NoCarb's zoning can be varied depending on the zoning of the input transport demand, although the most granular zoning that can be used is the Office of National Statistics' Middle-layer Super Output Areas (MSOAs), which typically have a population of around 10,000 people. For the Decarbonisation Strategy analysis, transport demand has come from TfN's NELUM model, which has zones that are a one-to-many aggregation of MSOAs. In city centres NELUM zones are MSOA level, but outside of city centres Local Authority Districts are used.

4 Model process flow and inputs

Figure 2 shows a process flow map summarising the functions and flow of data within NoCarb. The main inputs are represented as parallelograms, non-bold squares as pre-processed inputs and bold squares as model functions.

The grey square on the left encompasses baseline inputs and functions, which prepare the baseline fleet, scrappage curves and speed-emissions curves. The Fleet Projection Tool (blue box) projects the baseline fleet into future years using the scrappage curves and scenario inputs, such as segment and fuel sales and fleet growth. Alongside these scenario inputs sit the demand inputs, which are called in to the model and distributed across the fleet using ANPR data and observed fleet distributions. Once this is complete, the Greenhouse Gas (GHG) Tool takes in the baseline and future fleets, emissions and demand inputs, and scenario-based demand and CO2 reductions to calculate emissions for a given fleet in a given year within each NELUM zone. In addition, the GHG Tool calculates pan-Northern bus and rail emissions by applying scenario-based CO2 reduction factors to baseline inputs.

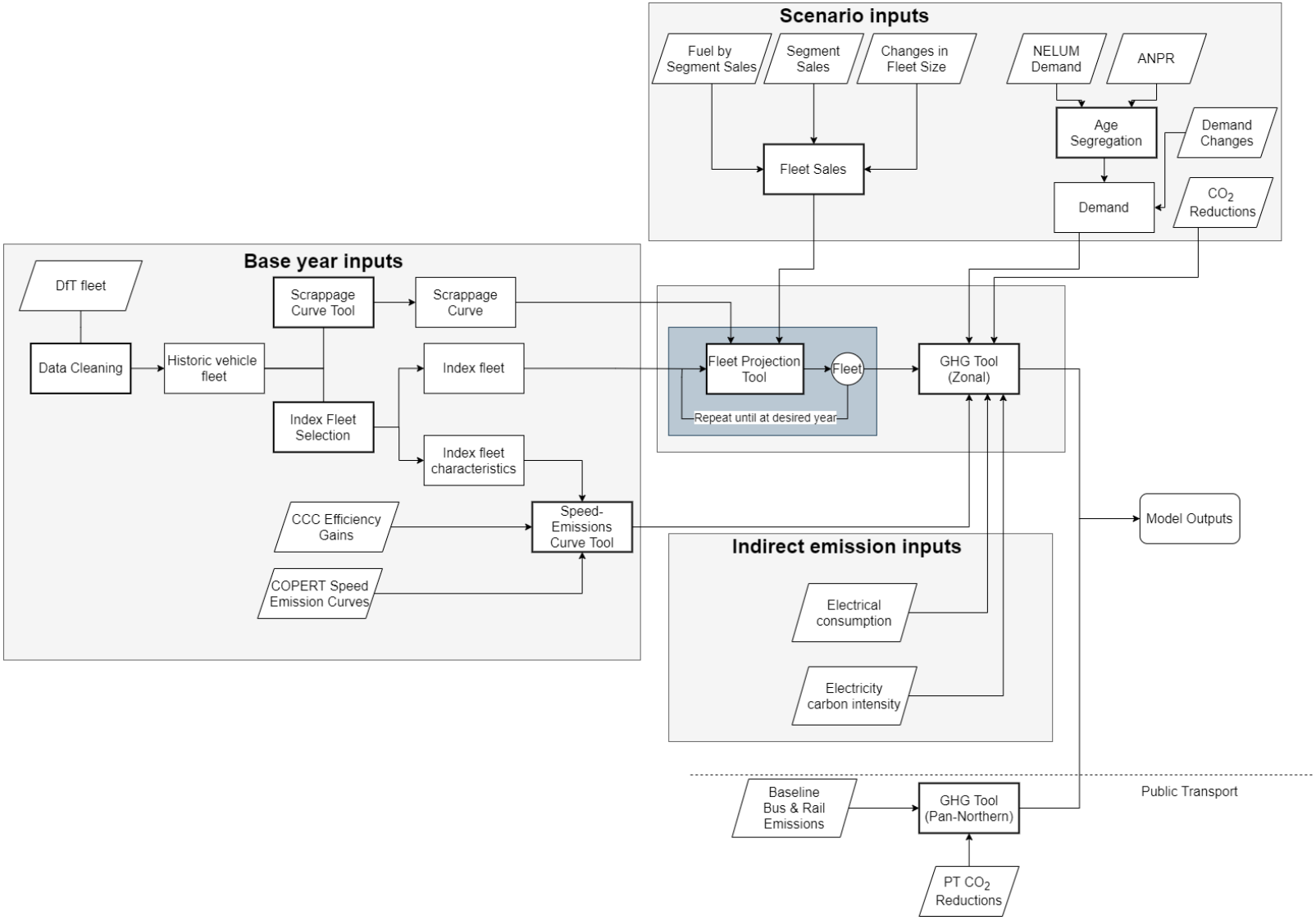


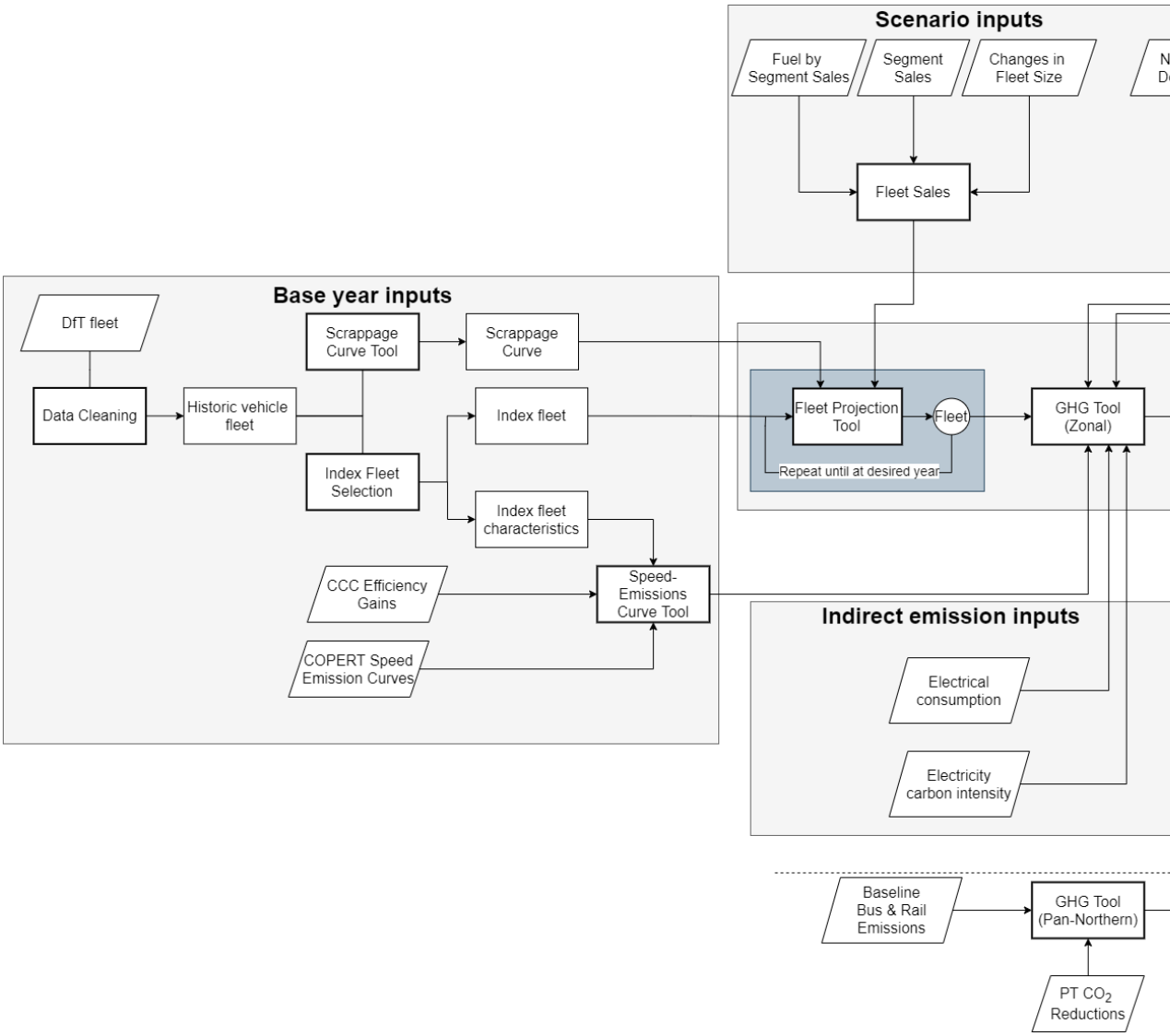
Figure 2: NoCarb model flow. The parallelograms represent the raw inputs that are fed into the model, the bold squares represent a model function and the non-bold squared represent pre-processed or transformed data.

Table 1 summarises all the input data used within the NoCarb model, its sources and methods of processing.

Table 1. Information about NoCarb data inputs.

File Name[7]	Version	Data Source	Data Description	Function	Processing required
DfT Fleet	2003 – 2018	DfT	Includes a record of all vehicle registrations in England, Scotland and Wales by Local Authority District (LAD) from 2003 to 2018. For each year, it outlines the number of vehicles in each segment, fuel and CYA group that exist within in each zone (i.e. 23 3-year-old petrol SUVs existed in zone 4 in 2006). There are three files, one each for cars, vans and HGVs. Alongside each observation, the dataset includes values for average mass, engine size and manufacturers estimate of CO_2 emissions per km.	This input has three functions: 1. Provide the baseline fleet upon which to assign demand and estimate emissions 2. Provide a baseline fleet to project forward into future years using scenario inputs. 3. Derive scrappage curves by vehicle type (cars, vans and HGVs). 4. Provide vehicle characteristics data to derive the real-world correction factors that are applied to NAEI speed emissions curves.	Data cleaning and imputation of the whole DataFrame (**Historic vehicle fleet)**, from which the **Index fleet** is selected. This includes mapping LAD zones to NELUM zones. As LADs are not nested perfectly within NELUM zones, vehicles are proportionately distributed using MSOA tallies and LAD vehicle shares (see Section 5.1.1). Weighted average of vehicle characteristics (**Index fleet characteristics**) for real-world corrections (average CO_2, average mass and average engine size) by tally, grouped by vehicle registration year, vehicle type, segment and fuel (see Section 5.1.1). Calculate the average survival rates by vehicle age and type (i.e. the proportion of cars that survive into their fifth year given they survived into their fourth year) to be used as **Scrappage curves** in the generation of future fleets (see Sections 5.1.2 and 6.2).
MSOA Fleet	2018	DfT	Tallies for cars, vans and HGVs by MSOA in 2018.	This input helps map LAD fleet data (**DfT Fleet**) to NELUM zones (see Section 5.1.1). As MSOAs are nested within NELUM zones, the vehicle type tallies are mapped to relevant NELUM zones (many-to-one), with segment, fuel, cohort and age distributions determined by LAD fleet shares.	None
CCC Efficiency Gains	Extract from the 2019 (RTM	CCC	Relates to CCC estimates of new vehicle emissions (gCO_2/km)	As indicated above, future fleets are projected forward using the	Future emissions intensity figures for each vehicle type were

[7] **The file names correspond to the parallelograms in**


Scenario inputs
Fuel by Segment Sales
Segment Sales
Changes in Fleet Size
Fleet Sales
Base year inputs
DfT fleet
Scrappage Curve Tool
Scrappage Curve
Data Cleaning
Historic vehicle fleet
Index fleet
Index Fleet Selection
Index fleet characteristics
CCC Efficiency Gains
Speed-Emissions Curve Tool
COPERT Speed Emission Curves
Fleet Projection Tool
Fleet
Repeat until at desired year
GHG Tool (Zonal)
Indirect emission inputs
Electrical consumption
Electricity carbon intensity
Baseline Bus & Rail Emissions
GHG Tool (Pan-Northern)
PT CO_2 Reductions

File Name[7]	Version	Data Source	Data Description	Function	Processing required
	Beta.13) of the CCC model (Fifth Carbon Budget)		weighted by vehicle kms according to fuel type. These are broken down by vehicle type and segment (e.g. small cars).	baseline fleet. To reflect future reductions in emissions intensity on-year, CCC estimates of gCO_2/km are applied to new vehicles (2019 and onwards) as reductions on baseline gCO_2/km (calculated using **COPERT Speed Emissions Curves**) for relevant vehicle types, segments and years.	converted into a percentage reduction on the baseline year (see Section 5.1.5).
Real-World Corrections / Fuel characteristics	2016	NAEI	Parameters from the NAEI manual to adjust the speed emission curves based on mass, engine size and manufacturers estimates of CO_2 per km.	This data allows the starting speed-emission curves, which were derived for a series of older vehicles, to be adjusted for newer and future vehicles. The input parameters are combined with data on vehicle characteristics from the DfT fleet file, using the NAEI formulae.	The parameters are applied using a formula (outlined in Section 6.3) to produce real-world correction factors.
COPERT Speed Emissions Curves	2016	NAEI	Speed-related emissions functions (outlined as a set of coefficients) by vehicle type, segment, fuel and vehicle age. A slightly older version (2016 rather than 2017) is used to align with the NAEI current method.	The speed emissions curves are merged into fleet and demand data to calculate gCO_2/km for each vehicle type, segment, fuel, vehicle age (see Section 5.4.1).	A formula (see Section 6.4) is used on the coefficients to fit the speed-emissions curves. This includes applying real-world corrections from **Index fleet characteristics**. The curves are then used to calculate emissions intensity in each speed band (broken down by vehicle type, segment, fuel and vehicle age).
Baseline Bus Emissions	2018	DfT National Road Traffic forecast (Scenario 1)	Pan-northern bus emissions estimate for 2018.	Provides a baseline figure for bus emissions from which future bus emissions are derived (using **Public Transport Reductions**).	PSV emissions figures were summed across Northern regions in 2015 and 2020 and interpolated to 2018. A more sophisticated approach will be explored in future.

Figure 2 and are cross-referenced in purple text throughout the report.

File Name[7]	Version	Data Source	Data Description	Function	Processing required
Baseline Rail Emissions	Internally derived in 2020	TfN/ Network Rail	Pan-northern rail emissions estimate for 2018.	Provides a baseline figure for rail emissions from which future rail emissions are derived (using **Public Transport Reductions**).	Emissions per mile data was sourced from TfN's Rail Operating Expenditure (OPEX) model, which uses factors supplied by Network Rail. These factors cannot be published due to commercial sensitivity. Timetable data (which provides information about distances travelled) was sourced from a 2015 version of TfN's Northern Rail Modelling System, which uses data from MOIRA.
Fuel by Segment Sales; Segment Sales	Scenario inputs developed internally in 2020	TfN	Relates to vehicle sales across scenario years: **1.** Segment share of sales by vehicle type **2.** Fuel share of sales by segment	These sales shares determine the distribution of new vehicles to be injected into future fleets (see Sections 5.2.3 and 6.5.1). The number of vehicles is determined by future **Changes in Fleet Size** and **Scrappage Curves**.	Sales shares are interpolated across intermediary years (i.e. 2021, 2022, 2023 and 2024) so that future fleets can be iteratively built, with old cars removed and new cars injected, on-year.
Changes in Fleet Size	National Car Ownership Model (DfT) run from 2016	TfN	Scaling factors to be applied on-year to determine the size of next year's fleet.	Multiplied against the baseline fleet size (total tally by vehicle type) to determine the number of registered vehicles in each scenario year (see Section 5.2.3). Fleet size in intermediary years is interpolated. A single DfT scenario is used at present. More work is required to directly link car ownership scenarios to car travel demand. TfN is progressing this work in 2021.	The year-on-year factors are converted into proportions of preceding years, upon which a cumulative product is used to give a proportion of the baseline year.
NELUM Demand	2015-calibrated model run in 2020	TfN	Total vehicle kms travelled in each NELUM zone, broken down by vehicle type, road type (motorway, urban or rural) and speed band. Information on how NELUM calculates speeds is provided below. Car demand data is produced for all scenario years but is only available for 2015 for vans and HGVs.	Demand is distributed across the fleet using ANPR data and observed fleet distributions (see Section 5.3). Alongside **COPERT Speed Emissions Curves** and **CCC Efficiency Gains**, demand is then used to calculate gCO_2/km (see Section 5.4.1).	Car demand in 2018 is interpolated from 2015 and 2020 demand under Just About Managing. Van and HGV growth relates to 2015

File Name[7]	Version	Data Source	Data Description	Function	Processing required
Van / HGV growth	Scenario inputs developed internally in 2020	Based on growth ranges from DfT National Road Traffic forecast (2018)	Growth factors to project 2015 van and HGV demand into future years. The growth factors are drawn from the DfT scenario that most closely matches the TfN scenario description. Bespoke, modelled TfN freight scenarios are currently being finalised.	The growth factors are applied to 2015 van and HGV demand (separate files) to produce future demand under each scenario and scenario year.	None.
ANPR	2018	ANPR	Share of demand on a given road type that is undertaken by vehicles of different body types (cars, vans, artic HGVs and rigid HGVs), fuels (petrol and diesel) and CYA.	ANPR data is merged with demand data (on vehicle and road type) and used to disaggregate demand across body types and vehicle ages.	A weighted average across fuels is derived using observed proportions of petrol and diesel vehicles in the baseline fleet (see Section 5.1.5).
PT CO_2 Reductions	Scenario inputs developed internally in 2020	TfN	Emissions reduction factors for bus and rail across scenarios/scenario years.	The reduction factors are applied to baseline bus and rail emissions to derive future emissions (see Section 5.4.2).	None.
Demand Changes	Scenario inputs developed internally in 2020	TfN	Scenario-based scaling factors for demand, broken down by vehicle type, area type and scenario year.	Once demand has been allocated across the fleet, Demand Changes are merged into the DataFrame (on year, vehicle type and road type) and applied (see Section 5.3).	Percentage change converted into a proportion (i.e. -0.1 -> 0.9).
CO_2 Reductions	Scenario inputs developed internally in 2020	TfN	CO_2 reduction factors by vehicle type and segment. This method is only used for further reductions in emissions intensity or mileage that happen on top of the manufacturer's technology-based improvements.	Reduction factors are applied to final gCO_2 estimates (i.e. to reflect fuel efficient driving) by merging into the final DataFrame (see Section 5.4.1). Currently these estimates are applied uniformly across all scenario years from 2025. More detail is provided below.	None.
Electricity Consumption	TAG v1.13.1 (2020) CCC Fifth Carbon Budget (2016)	DfT TAG Data Book (cars and vans) CCC Fifth Carbon Budget model (HGVs)	Electricity consumption per kilometre for battery electric cars, vans and HGVs (kWh per km) by cohort (vehicle registration year).	Electricity consumption is calculated by multiplying demand by electricity consumption per kilometre figures (see Section 5.4.3).	Plug-in hybrid (PHEV) and hydrogen fuels are added by duplicating the DataFrame. A corrective scaling factor of 0.5 is applied to the consumption per kilometre figures for PHEVs on the assumption that PHEVs operate in electric mode 50% of the time, and

File Name[7]	Version	Data Source	Data Description	Function	Processing required
					hydrogen values are kept the same to support a simple illustrative calculation of indirect emissions from alternative fuels (see Section 5.1.5).
Electricity carbon intensity	CCC Sixth Carbon Budget – Balanced Scenario (2020)	CCC Sixth Carbon Budget	Carbon intensity of the electricity grid by year (gCO_2/kWh)	Multiplied against **Electricity Consumption** figures in a given year to derive electricity emissions (see Section 5.4.3).	None
Population	Scenario inputs developed internally in 2020	TfN	Population estimates by NELUM zone, scenario and year, with additional information about NELUM area types.	Used to calculate emissions per head for the output file 'gis_attributes_all'.	None
Look-ups	Internal TfN look-up files	TfN	Zone mapping look-up files for MSOA to LAD and MSOA to NELUM.	Used to map **DfT Fleet** and **MSOA Fleet** data to NELUM zones (see Section 5.1.1).	

5 Process overview

This section goes into further detail about the process (and related functions) taken to project the vehicle fleet into future years and predict emissions in NoCarb. Methodology and formulas underlying the more complex functions are outlined in the following chapter.

5.1 Scenario independent

5.1.1 Data cleaning and pre-processing

NoCarb begins by calling in and cleaning the raw **DfT fleet** data. Pre-processing involves removing entries with negative tallies (number of vehicles), 'other' fuels and unknown zones and imputing fuels and vehicle ages (CYA).[8] This produces a partially pre-processed historic fleet DataFrame, from which the baseline fleet (segmented to only include the baseline year) is derived for advanced cleaning (imputation of segments and emissions characteristics[9]).

Emissions characteristics (average CO_2, mass and engine size) are then split out from the baseline fleet and a weighted mean is derived (using the vehicle tallies) for each cohort (registration year), vehicle type, segment and fuel.

The next step involves mapping the baseline fleet from LAD to NELUM zones. This is done by importing **MSOA fleet** data, which is equivalent to **DfT fleet** data (but only relates to 2018 and only has aggregate vehicle tallies by vehicle type) and nests perfectly within both LAD and NELUM zones. MSOA vehicle tallies are disaggregated by CYA, segment and fuel using the distributions from corresponding LADs. Disaggregated MSOA fleet data is then mapped to relevant NELUM zones using a many-to-one relationship.

5.1.2 Generate scrappage curves

Scrappage curves are derived from historic **DfT fleet** data (which dates back to 2003) for each vehicle type. This involves deriving the average proportion of vehicles that survive in the fleet on-year given they have survived up until that point (e.g. 60% of 5-year-old cars survive into their sixth year). Further information about the methodology for deriving scrappage curves is outlined in Section 6.2.

5.1.3 Convert emissions characteristics into 'real-world corrections'

Emissions characteristics from the baseline **DfT fleet** data (see Section 5.1.1 are merged with fuel consumption parameters (**Fuel characteristics**). A formula (outlined in Section 6.2) is then used to calculate real-world correction factors for each cohort, vehicle type, segment and fuel. These factors are applied to

[8] See Sections 6.1.1 and 6.1.2 for further information about the methodology used.

[9] See Sections 6.1.3 and 6.1.4 for further information about the methodology used.

COPERT speed-emissions curves to reflect real-world driving conditions (such as driving with air conditioning).

5.1.4 Generate speed-emissions curves

COPERT speed-related emissions functions are merged with real-world corrections. For each segment and fuel, missing parameters are imputed with those of the closest cohort year. Together these coefficients and the real-world correction factors are assembled into a formula (outlined in Section 6.4) that will later be used to calculate speed-emissions curves. For zero-emissions fuels, this formula is replaced with 0 and emissions from the electricity grid are calculated separately (see Section 5.4.3). For hybrids, only 50% of the mileage is assumed to use the Internal Combustion Engine, an assumption that will be refined in the next stage of work (see Section 7 for further information). A further future planned development is for curves that relate speed to electricity and hydrogen consumption to be introduced so that the region-level consumption of alternative fuels can be estimated.

Speeds are introduced into the DataFrame with corresponding values representing the centre of a speed band (e.g. a speed band of "10-30km/h" is given a speed of 20km/h).[10] The formula from the previous step is then applied to the speeds to generate gCO_2 per kilometre for each speed band.

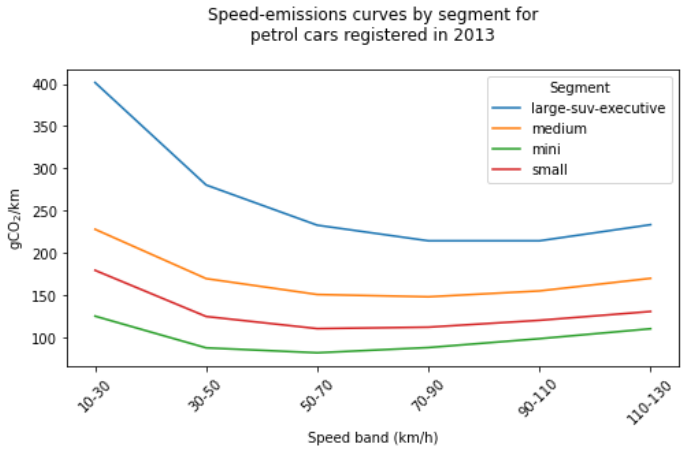


Figure 3: Final speed-emissions curves by segment for petrol cars in 2013 (produced using the steps outlined in Sections 5.1.3 and 5.1.4).

5.1.5 Pre-process general tables

CCC efficiency gains are the percentage improvements in technology-enabled vehicle efficiency estimated due to regulatory and fiscal measures on new vehicle sales. These have been assumed to be scenario independent at this stage, but TfN will explore the impact of variation in these assumptions across scenarios in a later stage of work, for example to represent different fiscal

[10] The NAEI curves are only fitted for a certain range of speeds. Outside of this range they aren't accurate (e.g. high-speed HGVs). An audit check is built into this function to raise a flag if this occurs.

policies and the phasing out of new engine production by manufacturers.[11] It is important to note that these improvements are applied within a size segment, so changes to the overall fleet efficiency due to changes in the size profile of purchased vehicles is handled separately.

CCC efficiency gains are converted from percentage reductions on the previous year to percentage reductions on the baseline year. This is done by changing the reduction into a proportion of the previous year (-4% to 0.96) and taking the cumulative product.

As **ANPR** data is not perfectly normalised (the proportions do not add to 1), the share of demand by vehicle age is renormalised in the first instance. For cars, a weighted average across fuels is then derived using observed proportions of petrol and diesel vehicles in the baseline **DfT fleet**, after which the shares are normalised again.[12]

As **Electricity Consumption** values exclusively relate to battery-electric vehicles (BEVs), the DataFrame is duplicated twice:

- Once for plug-in hybrid electric vehicles (PHEVs), so that kWh per km values can be multiplied by 0.5 (on the assumption that vehicles operate in electric mode 50% of the time);
- Once for hydrogen vehicles to support a simple, illustrative calculation of indirect emissions from alternative fuels.[13]

The three DataFrames are then combined.

5.1.6 Export pre-processed tables

Several pre-processed tables are saved so they can be imported in future runs. This improves efficiency by allowing NoCarb to skip several pre-processing steps (outlined in Sections 5.1.1 and 5.1.2). The following tables are saved for this purpose:

Table 2: A description of the tables saved following pre-processing, so they can be called in if 'run fresh' is set to False.

Name	Description
characteristics	Pre-processed emissions characteristics (average CO_2, average mass and average engine size) taken from the baseline **DfT fleet** data.
fleet_archive	Partially pre-processed historic **DfT fleet** data.
index_fleet	Fully pre-processed **DfT fleet** data from the baseline year.

[11] Some manufacturers are announcing their last engines being brought into circulation, which suggests that investment in and improvements in engine efficiency are likely to slow to a stop soon. However, the gap could be filled by taxation that pushes people towards lower emitting conventional vehicles.

[12] ANPR data for vans and HGVs exclusively related to diesel, so no weighted average is required.

[13] Data related to hydrogen carbon intensity was not readily available at the time.

scrappage_curve	Survival rates for each vehicle type (i.e. the proportion of a vehicle of age X that will survive in the fleet in each year, given they have already survived). Excludes bus and rail.

5.2 Scenario dependent

All remaining functions are completed separately for each Future Travel Scenario, using bespoke scenario and demand inputs.

5.2.1 Pre-process scenario tables

Scenario inputs undergo basic pre-processing. This includes interpolating values between scenario years[14] and, in the case of **Changes in fleet size**, converting year-on-year percentage changes to a proportion of the index year (as is done for **CCC efficiency gains** in Section 5.1.5).

5.2.2 Prepare NELUM demand data

Unlike car demand data (which is available for each scenario and scenario year), van and HGV data is only available for 2015. Scenario-based growth factors are uniformly applied to this data to derive van and HGV demand in 2018 and future scenario years.

5.2.3 Project fleet

The size of future fleets is determined from the baseline **DfT fleet** using scenario-based scaling factors (**Changes in fleet size**). These factors vary by vehicle type and are multiplied against the respective vehicle-type tallies in the baseline fleet. This returns a DataFrame with total vehicle-type tallies for each scenario and scenario year, which is then interpolated to return fleet-size projections across all years between 2018 and 2050.

A template fleet is created by merging all possible segment-fuel combinations (taken from **Fuel by Segment Sales**) with observed segment purchases in each zone in the baseline year. This preserves regional variation in segment purchasing habits and allows the introduction of new fuels for segments where these have not yet existed in some zones (e.g. hydrogen HGVs).[15]

Future vehicle sales in each zone are determined (see Section 6.5.1 for a formula) by taking the product of baseline segment-zone sales shares (e.g. 2% of all minis were sold to zone 3 in 2018) and scenario-based **Segment Sales** and **Fuel by Segment Sales** in a given year (e.g. 20% of car sales are minis and 25% of mini sales are diesel in 2020).[16] Before performing this operation,

[14] I.e. from 2020 and 2025, linear interpolation is used to derive relevant values for 2021, 2022, 2023 and 2024. The impact of using exponential interpolation will be explored as part of future work.

[15] A potential future area for development through TfN's new Car Ownership Model is to represent how purchasing patterns could vary spatially and over time in response to local and national factors.

[16] Future sales shares under each scenario are based on a review of literature.

the sales shares are merged in with the template fleet. This results in a DataFrame that outlines the segment-fuel-zone proportion of a vehicle type that is sold in each year (e.g. 3% of vans sold in 2025 are n1 class ii, petrol and sold in zone 43). As these vehicles are 'new sales' in a given year, the cohort (vehicle registration year) is set as the relevant sales year.

Future fleets are generated by iterating through each year (starting with the baseline year and finishing in 2050) and using the fleet in that year, scrappage curves and fleet sales to derive the fleet for the following year (see Sections 6.5.2 and 6.5.3 for more information). The new fleet is used to derive the fleet for the year after that, and so on. This approach means it is possible to specify changes in vehicle sales patterns and volumes. Changes in the fleet size and makeup can be represented by varying the rate of sales or the rate of scrappage.

The output is a large DataFrame outlining vehicle tallies for each year, zone, cohort, vehicle type, segment and fuel. This is then reduced to scenario years for the purpose of emissions calculations.[17]

5.3 Allocate demand

In the first instance, **ANPR** data is merged with and applied to **NELUM demand** data. This provides vehicle-type age distributions of demand on each road type (motorway, urban or rural) in each zone (e.g. two-year-old vans make up 10% of van demand on motorways in zone 43). Demand is then disaggregated by segment and fuel using observed fleet distributions in that year (e.g. petrol minis make up 2% of all two-year-old cars in zone 43 in 2025).

Once the demand is allocated across the fleet, scenario-based scaling factors (**Demand Changes**)[18] are merged in on year, vehicle type and road type (urban, suburban or rural) and applied.

The resulting output is a fleet DataFrame that includes demand for each vehicle and covers all scenario years.

5.4 Predict emissions

5.4.1 Cars, vans and HGVs

Emissions are estimated using the speed-emissions curves, **CCC efficiency gains** and scenario-based **CO_2 reductions**.

[17] TfN's Future Travel Scenarios and Decarbonisation Pathways work focuses on milestone years: 2018, 2020, 2025, 2030, 2035, 2040, 2045 and 2050.

[18] Using NELUM, separate analysis was undertaken to understand how car demand could be reduced in line with scenario-based demand changes (**Demand Changes**). An overview of the process is outlined in Appendix A.

The speed emissions curves are merged into the fleet data on vehicle type, segment, fuel, CYA and speed band (which is brought in with the demand data). As the curves do not relate to future years, vehicles registered after the baseline year are merged with the corresponding curve from the baseline year. The **CCC efficiency gains** seek to correct for this, providing a scaling factor to be applied to baseline emissions intensity to reflect on-year improvements to emissions intensity for each body type (cars, vans, artic HGVs and rigid HGVs).

Emissions are estimated for a given vehicle group in each year by taking the product of:

- gCO_2/km from the speed emissions curves
- CCC efficiency gains
- Demand
- Carbon equivalent emissions factors

Finally, scenario-based **CO_2 reduction** factors are merged in on vehicle type and segment. These represent measures such as improved fuel efficiency (through eco-driver training, drag reduction or reduced speeds) or zero-emissions vehicles driving proportionally more miles (e.g. through a high share of zero-emissions taxis). As a simplifying assumption in the absence of any more detailed data, these factors are uniformly applied to gCO_2 across the whole fleet in all years from 2025.

The output is a scenario-specific DataFrame, which outlines fleet, demand and emissions estimates across scenario years. This is automatically saved as a model output.[19]

5.4.2 Bus and rail

Baseline bus and rail emissions estimates are pan-Northern. Future emissions for these modes are estimated by applying scenario-based reduction factors (**PT CO_2 reductions**) to baseline figures. As noted above, for bus, this aggregate approach is due to a lack of detailed data and modelling tools available at a regional level. For rail, the approach is due to the difficulty attributing vehicle movements and emissions to origin zones. TfN will explore refinements to this approach in a future stage of work.

5.4.3 Indirect emissions

Indirect emissions are estimated by taking the product of **Electricity consumption** values (kWh per km), demand and **Electricity carbon intensity** (gCO_2 per kWh).

This is done by first merging **Electricity consumption** into the fleet data (on cohort, vehicle type and fuel (BEV, PHEV and hydrogen)) and setting kWh per km to 0 for vehicles that are not BEV, PHEV or hydrogen. Electricity consumption

[19] Demand from this output has been compared to the original NELUM demand to check that the transformations and calculations work as expected. This revealed an error, whereby output HGV demand is 6% higher than input HGV demand. This will examined further in future model development.

for each vehicle group is then derived by taking the product of demand and kWh per km.

As a final step, indirect emissions are calculated by merging in **Electricity carbon intensity** (on year) and taking the product of gCO_2 per kWh and electricity carbon intensity.

5.5 Save outputs

Several summary tables and figures are produced by NoCarb.

Table 3: A description of the outputs saved from NoCarb if 'generate outputs' is set to True.

Output type	Name	Description
Table	[scenario]_fleet_emissions	Provides disaggregated figures (by year, zone, cohort, vehicle type, segment and fuel) of gCO_2, vehicle kms and number of vehicles under each scenario. This only relates to cars, vans and HGVs (and does not include bus and rail). There are four tables in total – one for each scenario.
Table	fuel_share	The share of fuels for each vehicle type in 2050, by scenario. This only relates to cars, vans and HGVs (and does not include bus and rail).
Table	gis_attributes_all	A summary output file to support GIS mapping. Includes information for all scenarios, broken down by zone and year. This only relates to cars, vans and HGVs (and does not include bus and rail). The variables include: NELUM area type: Whether a zone is urban, sub-urban or rural North: Whether a zone is internal or external of TfN's northern boundary • Mega-tonnes of CO_2 • CO_2 percentage change compared to the equivalent zone in 2018 • Total CO_2 emissions from cars • Total CO_2 emissions from vans and HGVs • CO_2 per head • Emissions intensity (gCO_2 / vehicle kms) • Total kms travelled • Vehicle km percentage change compared to the equivalent zone in 2018 • Vehicle kms per head • Number of cars
Table	pt_emissions	Emissions estimate (mega-tonnes of CO_2) for bus and rail by year and scenario. Estimates are pan-northern.
Figure	total $MTCO_2$	A summary line plot of emissions from 2018 to 2050, by scenario. This includes emissions from bus and rail, as well as cars, vans and HGVs.
Figure	total $MTCO_2$ + target	Same as above, but with the addition of TfN's decarbonisation trajectory.

Figure	total chainage[20]	A summary line plot of vehicle kms travelled by cars, vans and HGVs from 2018 to 2050.
Figure	cumulative emissions	A summary line plot of cumulative emissions from 2018 to 2050, by scenario. This includes emissions from bus and rail, as well as cars, vans and HGVs.
Scenario-specific figures		
Figure	• HGV fleet for [scenario] • car and LGV fleet for [scenario]	An area plot outlining the fuel share of the fleet from 2018 to 2050 – one plot for HGVs and one plot for cars and vans.
Figure	• HGV sales for [scenario] • car and LGV sales for [scenario]	An area plot outlining the fuel share of sales from 2018 to 2050 – one plot for HGVs and one plot for cars and vans.
Figure	Chainage by: • Area type for [scenario] • Vehicle type for [scenario]	An area plot outlining total vehicle kilometres travelled for a given scenario, broken down by area type and vehicle type (two separate plots).
Figure	$MTCO_2$ by: • Area type for [scenario] • Vehicle type for [scenario]	Same as above but for mega-tonnes of CO_2.

[20] Vehicle kilometres travelled.

6 Methodology for key functions

6.1 Fleet imputation

Table 5 in Section 7 outlines the proportion of missing values in the historic fleet by variable. Only fuel and Completed Year Average (CYA) are imputed in the historic fleet data, while more advanced imputation is undertaken on the baseline fleet. This is because the historic fleet data is only used to derive vehicle-type scrappage curves, meaning that imputation of other columns is not necessary.

6.1.1 CYA

Missing CYA values in the historic **DfT fleet** data are imputed using the distribution of known CYA values for each year, vehicle type and euro standard. This is done by taking the product of the known CYA-tally distribution and unknown CYA tally (both grouped by and merged on year, vehicle type and euro standard) and disaggregating this further by multiplying the grouped imputed tally by the share of unknown CYA observations in relation to remaining columns. The imputed observations are then merged with non-missing observations. An audit check is built into the function to confirm that the tally is unchanged.

This is demonstrated in the following formula:

$$(X) = (Y, V, E)$$

$$P(C_i \neq \emptyset, X) = \frac{T(C_i, X)}{T(C \neq \emptyset, X)}$$

$$\tilde{T}(C_i, X) = T(C_i, X) + P(C_i, X) \cdot T(C = \emptyset, X)$$

Where P, C, Y, V, E[21] are the proportion of vehicles, CYA, cohort year, vehicle type, and euro standard respectively. T is the tally, $\tilde{T}$ is the imputed tally.

6.1.2 Fuel

All observations in the historic **DfT fleet** that had missing fuels were HGVs and all HGVs had missing fuels. As almost all HGVs are run on diesel, these fuels were imputed with diesel.

6.1.3 Segment

Once the baseline DfT fleet has been indexed from the historic fleet, missing segments are imputed. This is first done by comparing a vehicle's average mass

to the mass of known segments. For cars, this is done by using the 25th percentiles of each segment's mass as bins (see Figure 4), as this is approximately where the mass distributions of each size category overlap, and determining the segment where a vehicle's mass fits within the relevant bin.

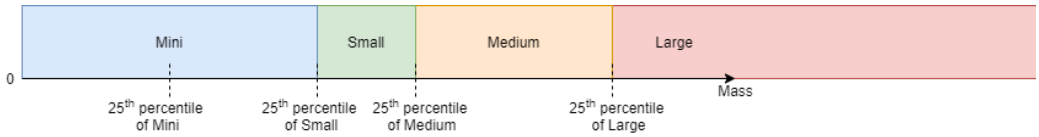


Figure 4: A diagram demonstrating how missing segments are imputed by matching a vehicle's average mass to the 25th percentile of known segments' mass.

For vans, the weight classes for the bins are derived from the EU directives that define them.[22]

Following this step, remaining missing segments are imputed using the distribution of known segments by CYA, fuel and vehicle type. This uses the same methodology as CYA imputation (see Section 6.1.1).

6.1.4 Emissions characteristics

Emissions characteristics (average CO_2, mass and engine size) in the baseline **DfT fleet** are first imputed using a weighted mean (using tally as the weight) for each CYA, fuel and segment group. Battery-electric vehicles that still have missing values after this step are imputed with 0.[23]

Multiple Imputation by Chained Equation (MICE) imputation is then used to impute the remaining missing emissions characteristics. This technique involves running a regression model on the emissions characteristics as well as segment, CYA and fuel columns to iteratively impute each of the emissions characteristics.[24] The process is repeated several times, using the imputed values from the previous round to update the explanatory variables and improve predictions for target variables, until the absolute difference between imputed values becomes very small between rounds.[25]

[22] As outlined here (Article 5.5): https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52003AG0063&qid=1614613434952&from=EN

[23] As the emissions characteristics are used to calculate real-world corrections to speed-emissions curves – and because battery-electric vehicles do not produce tailpipe emissions – it does not matter if average mass and engine size values are set to 0 for these vehicles.

[24] For example, 'average CO_2' might be set as the target variable and the others used as explanatory variables (with simple imputation methods such as mean imputation used to impute any missing values in the explanatory variables in the first instance). The process is then repeated, this time using 'average mass' as the target variable and the others (including the newly imputed average CO_2) as the explanatory variables.

[25] See here for a more detailed explanation of the MICE algorithm: https://medium.com/@ofirdi/mice-is-nice-but-why-should-you-care-e66698f245a3

6.2 Scrappage curves

In the raw **DfT fleet** data, CYA values are banded into the following age groups: 0, 1, 2, 3, 4, 5, 6-8, 9-11, 12-14 and 15+ (years old). These are separated into single years and the tally is divided by the number of years in each band (e.g. CYA 6-8 has its tally divided by 3). The scrappage rate of a vehicle is given by:

$$s_i = \frac{T_{i+1}}{T_i}$$

where s_i is the proportion of vehicles in year i which are still in use.

We assume that scrappage rates are constant through CYA groups and that the central year in the group has a proportional share of the vehicles (e.g. the middle year in a 3-year CYA group has 1/3 of the group tally). The scrappage rate for a group of n years can then be calculated as:

$$s_{i\to j} = \sqrt[\lceil \frac{n}{2} \rceil]{\left(\frac{T_{i\to j}}{n}\right) \div T_i}, \text{ with } j = i + n - 1$$

Figure 5 below provides a visual depiction:

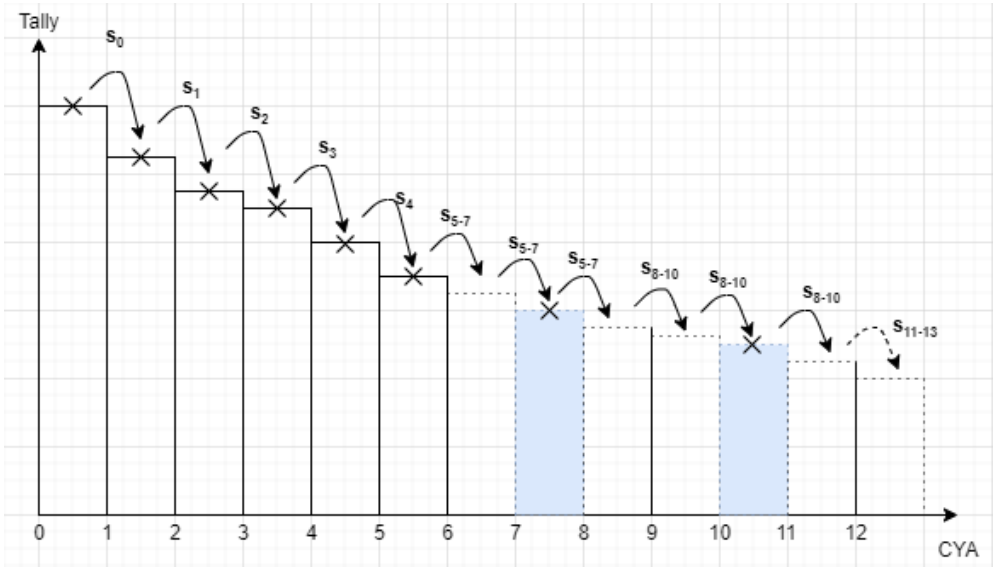


Figure 5: A diagram depicting how a scrappage rate for a group is calculated by assuming the middle year (in blue) hosts an equal proportion of the tally and using that to derive a constant scrappage rate across all years in that band.

6.3 Real-world corrections

To adjust the **COPERT speed-emissions curves** we use a real-world correction multiplier, RWM, given by:

$$FC_{Aprv} = \frac{12}{44}\frac{\langle CO_2 \rangle}{R_{F\to C}\rho_F}$$

$$FC_{In\ Use} = c_1 + c_2\langle ES \rangle + c_3\langle M \rangle + c_4 FC_{Aprv}$$

$$RWM = \frac{FC_{In\ Use}}{FC}$$

where FC, ρ_F,$R_{F\to C}$, are fuel consumption, fuel mass density, and mass ratio of fuel to carbon, and $\langle CO_2 \rangle$, $\langle ES \rangle$, and $\langle M \rangle$ are the vehicle's average CO_2 emissions, engine size, and mass respectively. c_n coefficients are provided by the NAEI.

Note that the relative atomic mass of Carbon is 12 and the relative atomic mass of Carbon Dioxide is 44. Therefore, $\frac{12}{44}$ represents the proportion of CO_2 that is Carbon.

6.4 Speed-emissions curves

COPERT publishes coefficients for an equation relating speed and emissions as a function of emissions characteristics (engine size, CO_2, mass):

$$I = \frac{\left(\alpha v^2 + \beta v + \gamma + \frac{\delta}{v}\right)}{\varepsilon v^2 + \zeta v + \eta} \cdot RWM \cdot \frac{M_c}{E}$$

where I, v, M_c and E are carbon emission intensity, speed, carbon mass, and energy respectively.

Each fuel-segment combination has a set of the coefficients written as Greek characters.

6.5 Fleet projection

6.5.1 Vehicle sales

Future vehicle sales in each zone are determined by taking the product of baseline segment-zone sales shares from the baseline **DfT fleet** (e.g. 2% of all minis were sold to zone 3 in 2018) and scenario-based **Segment Sales** and **Fuel by Segment Sales** in a given year (e.g. 20% of car sales are minis and 25% of mini sales are diesel in 2020). In parallel TfN is developing a new Car Ownership Model, which will represent patterns of car ownership at a zonal level and may allow a refined approach to modelling these purchasing behaviours over time.

This is demonstrated in the formula below:

$$R(Z_a, S_b, F_c) = R \cdot \tau(Z_a{:}S_b) \cdot \tau(S_b{:}\mathbb{U}) \cdot \tau(F_c{:}S_b)$$
$$R(Z_a, S_b, F_c) = R * \left(\frac{T(S_b, Z_a)}{\sum_j T(S_b, Z_j)}\right) \cdot \left(\frac{T(S_b)}{\sum_j T(S_j)}\right) \cdot \left(\frac{T(S_b, F_c)}{\sum_m T(S_b, F_m)}\right)$$

where Z, S, F, R, T, and $\tau(Z_a{:}S_b)$ are the zone, segment, fuel type, newly registered vehicles, vehicle tally, and proportion of segment S_b vehicles that are in zone Z_a.$\mathbb{U}$ is the set of all vehicles.

6.5.2 Apply scrappage to withdraw vehicles

As each year is incremented, we first withdraw vehicles from the fleet by taking the vehicle type's associated scrappage curve and multiplying the tally for each vehicle group by the corresponding scrappage value (matched on CYA) to derive the new tally. The CYA value for all vehicles is then incremented by 1 by subtracting the cohort year from the current year.

6.5.3 Use sales to inject new vehicles

After the scrappage has occurred, the required number of new vehicles to be injected into the fleet is calculated from the difference between the existing and projected fleet tally for a given year. This gives the number of required sales:

$$R(V, Y = i) = T_P(V, Y = i) - T_s(V, Y = i)$$

where R, T_P, and T_S are the newly registered vehicles, projected vehicle tally, and after scrappage tally respectively. Once the number of new vehicles to be introduced is known, these are disaggregated by zone, segment and fuel using the sales distribution as calculated in Section 6.5.1.

7 Data assumptions and limitations

The following assumptions were made in developing the model:

- Hybrid-electric vehicles were reclassified as petrol hybrids for cars and as battery-electric for vans and HGVs. For cars, petrol hybrids are by far the most common type. For vans and HGVs, no **COPERT speed-emissions** data was available for hybrid vehicles and extremely low numbers of hybrid vans and HGVs currently exist. There is also a greater focus from manufacturers on zero-emission vans and HGVs rather than hybrids at present.
- The real-world correction and electricity consumption for plug-in hybrid-electric vehicles was set to 0.5[26] on the assumption that they operate in electric mode 50% of the time. It is acknowledged that there is evidence that this assumption is on the high side[27], and that for this to be valid either further policy interventions or technological improvements (e.g. electric range improvements) would be needed. In any case, plug-in hybrids only make up a small fraction of the sales in our ambitious EV uptake pathway, so a deviation from this assumption would have a relatively small effect. Further sensitivity analysis on this point will be undertaken later in 2021.
- The NAEI methodology for LGV and HGV speed-emission curves is different to that of cars and is based on 'Euro standard' vintages (related to air pollution), rather than using the 'real-world' adjustment factor approach used for cars that adjusts for technology improvements and real-world driving styles. However, the speed-emission curve parameters for LGVs and HGVs do account for these factors as they are provided separately for vehicles of different ages and are derived from independent tests that take account of real-world driving conditions. These tests are carried out as part of the development of the EU's COPERT software. The main limitation of this approach is that future-year conventional efficiency improvements for LGVs and HGVs have to be applied at an aggregate level, rather than adjusting the speed emission curves, which is a slightly less accurate method.
- Aggregate scrappage curves were produced for each vehicle type. This assumes that the survival distribution of a vehicle type is unform across

[26] According to the Worldwide Harmonised Light Vehicle Test Procedure, a utility factor of 0.5 implies an electric-run range of 23km. It is expected that utility factors will increase over time as PHEV ranges improve, though,as is discussed, this utility factor is still likely an overestimation.

[27] See https://theicct.org/publications/phev-real-world-usage-sept2020 and https://www.transportenvironment.org/publications/plug-hybrids-europe-heading-new-dieselgate

segments, fuels and registration year. This assumption will be monitored as zero-emission vehicles become more widespread in the fleet.
- Similarly, the distribution of demand by vehicle age (as outlined in **ANPR** data) is only available by vehicle type and relates only to 2018. This assumes the age distribution of demand on a given road type is uniform across segments, fuels and registration year. This data will be refreshed the next time TfN re-bases its transport models, which will likely be in 2022 or 2023.
- Missing fuels in the historic **DfT fleet** data were imputed with 'diesel' on the assumption that the vast majority of HGVs are diesel-run (all observations with missing fuels were HGVs and all HGVs had missing fuels).

There are several limitations to the data:

- NELUM is currently based to 2015. This means that baseline **NELUM demand** estimates (currently 2018) are interpolated between 2015 and 2020 (using a 'Just About Managing' scenario for the latter). Work is underway to re-base NELUM to 2018, at which point the baseline and future demand estimates are likely to be more accurate.
- There is no van and HGV demand in two zones (1 and 41) in the baseline **NELUM demand** data, and rigid HGV demand is completely missing in an additional three zones (and artic HGVs in one additional zone). As this data is scaled using growth factors for future years, this means that these zones have no van and/or HGV demand across all years.
- HGV demand outputted from NoCarb is higher (6% in 2018) than the original input data from NELUM, while LGV demand is slightly lower (-0.33%).[28] This change occurs when the demand data is merged with the fleet data so that it can be disaggregated by observed distributions of body types, segments and fuels for each vehicle type, zone and CYA group.
- The **COPERT speed-emissions curves** are only accurate within certain speeds (see Table 4). As a result, speeds outside of this range are reassigned to the nearest within-range speed band as part of NELUM demand post-processing.

Table 4: Minimum and maximum speeds that can be reliably used to estimate speed-emissions for each vehicle type.

Vehicle type	Min speed (km/h)	Max speed (km/h)
Car	20	130
HGV	12	85
LGV	10	110

[28] Changes to car demand are so minor that they are expected to be due to rounding (<1e5%).

- As outlined in Table 5, the **DfT fleet** data had a relatively high proportion of missing values. With no robust method to impute 'missing tally' data, just over one third of observations had to be removed. Remaining missing values (i.e. segment, fuel, CYA and emissions characteristics) were imputed using several techniques, as discussed in Section 6.1. These points reveal potential flaws in the accuracy of the fleet data, though this was seen as the best approach with the best available data at the time.

Table 5: Percentage of observations in DfT historical fleet data with missing values.

Variable	% of observations with missing data	
	Before removing missing 'tally'	After removing missing 'tally'
Fuel	15%	11%
Segment	21%	20%
Tally	35%	0%
Avg CO_2	59%	51%
Avg Mass	52%	42%
Avg Engine Size	2%	1%

8 Results

8.1 Baseline emissions in the North

Figure 6 provides headline figures related to baseline surface transport emissions in the North. At 26 mega-tonnes of CO_2, surface transport emissions in the North represent nearly one quarter of UK road emissions and 6% of total UK emissions. Over half of those emissions were generated by cars, with HGVs and vans producing 28% and 11% of surface transport emissions respectively. Bus and rail, on the other hand, represent just 5% of emissions.

Table 6: Total mega-tonnes of CO_2 and vehicle kms in 2018 by mode.

Vehicle type	Vehicle kms (billions)	$MTCO_2$
Car	102	13.6
HGV	11	7.1
LGV	13	2.7
Bus	*Not available*	0.6
Rail		0.8

A total of 126 billion kilometres were travelled in the North in 2018, representing 23% of vehicle kilometres travelled in the UK. The majority of the North's travel (56%) was through sub-urban areas, though distance per head was much higher for those in rural areas.

Table 7: Total mega-tonnes of CO_2 and vehicle kms in 2018 by area type.

Area type	$MTCO_2$	Vehicle kms (billions)
Urban	3.1	16.8
Sub-urban	13.7	70.0
Rural	6.6	38.8

The North had 8 million registered cars in 2018. Large and SUV cars, which typically have higher emissions intensity, made up nearly one quarter of those cars and just under one third of new car sales in that year. This reflects a national trend over the last two decades, which has seen a gradual increase in the purchase of larger cars. Only 0.09% of vehicles registered in the North in 2018 were zero-emissions.

Urban areas typically showed lower CO_2 intensity and emissions per head of population than rural areas. However, there was some variation within area types, with coastal areas having slightly more fuel-efficient cars.

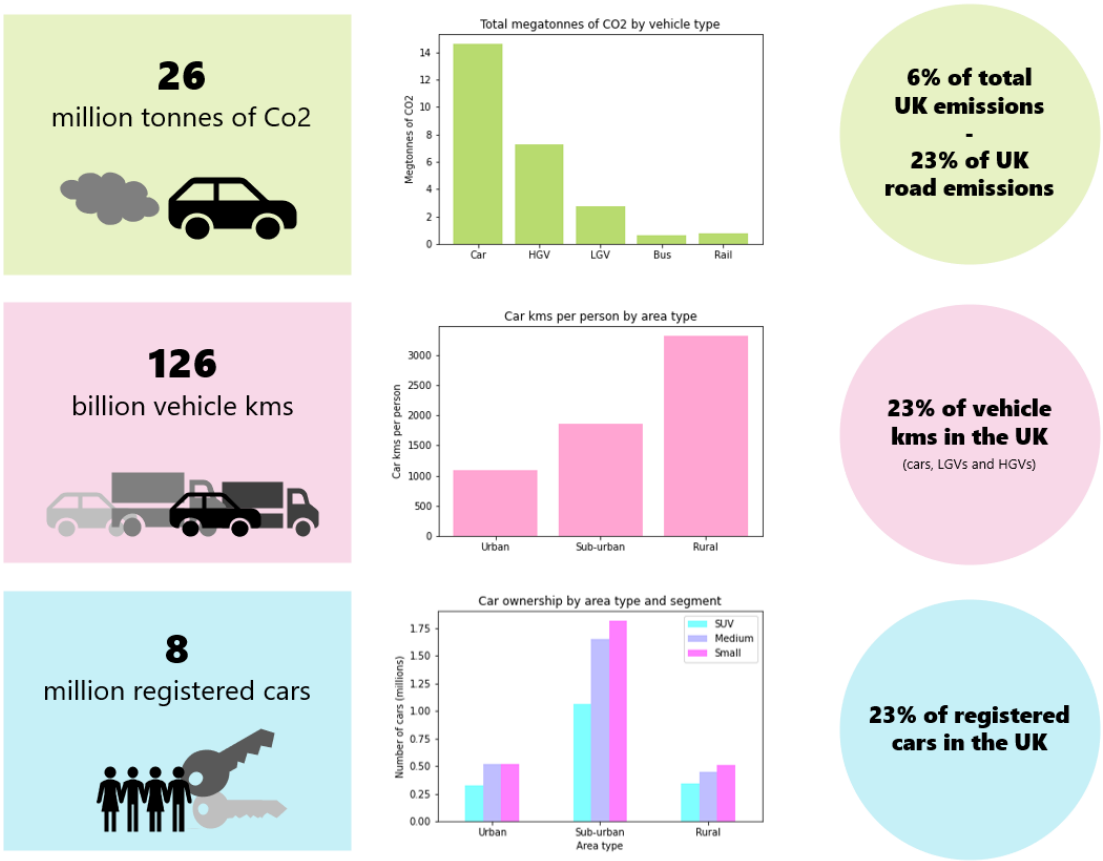


Figure 6: Headline figures related to surface transport emissions in the North in 2018.

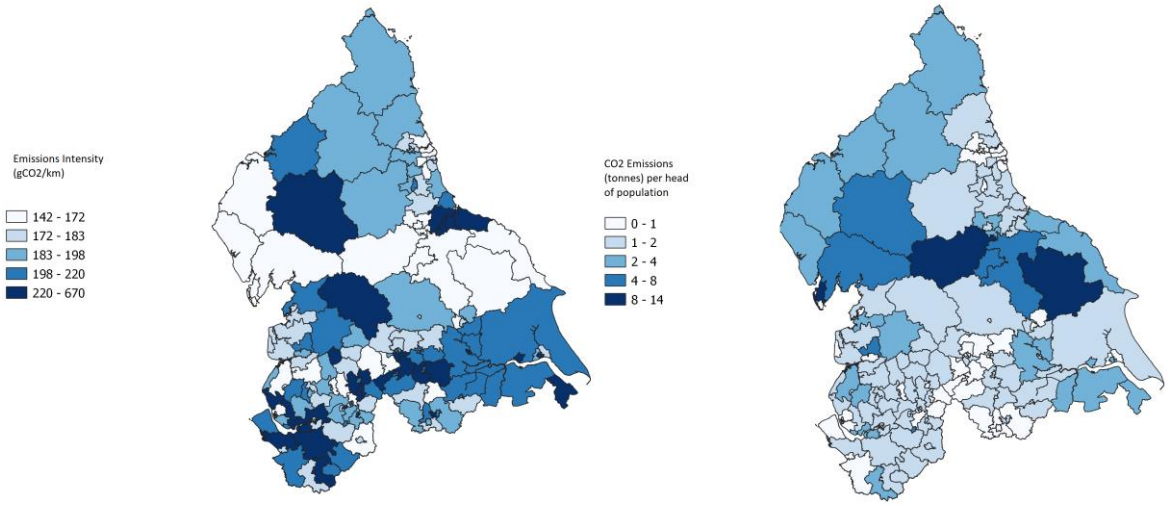


Figure 7: Regional distribution of emissions per capita and emissions intensity in the North in 2018.

8.2 Indirect emissions

Indirect emissions are very low compared to surface transport emissions.

Due to higher carbon intensity associated with electricity and a rapid uptake of zero-emission and plug-in hybrid electric vehicles in the short-term, Urban Zero Carbon and Digitally Distributed show the highest indirect emissions in 2025 and 2030. However, as electricity is increasingly produced by more renewable sources, indirect emissions slowly decrease from 2030 to be close to zero by 2050.

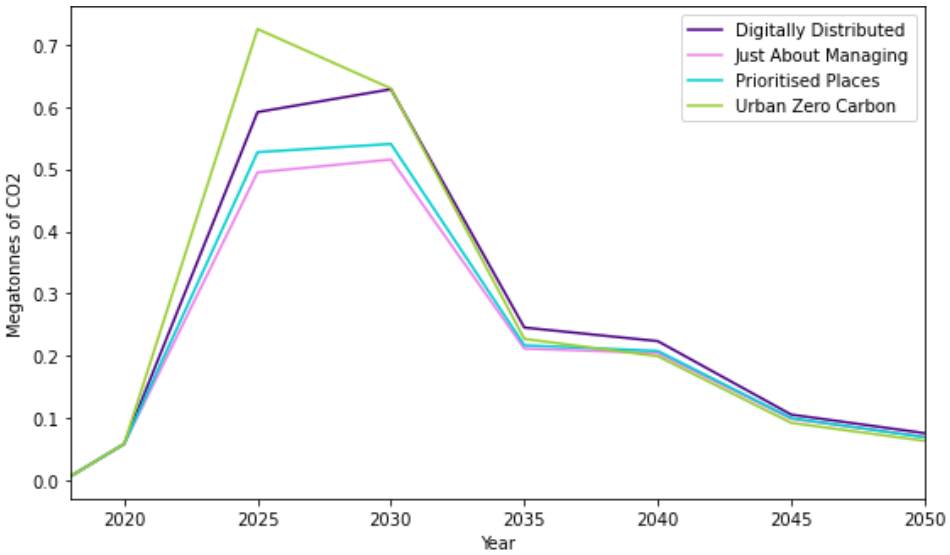


Figure 8: Indirect emissions from electric powered vehicles.

8.3 Scenario results

Aggregate emissions under each scenario appear to align to each scenario's unique context.

Just About Managing, which sees a broad continuation of current trends, shows a slow decrease in emissions, while more ambitious scenarios like Urban Zero Carbon (which sees strong government policy on climate change) show much steeper emissions reductions in the lead up to 2050.

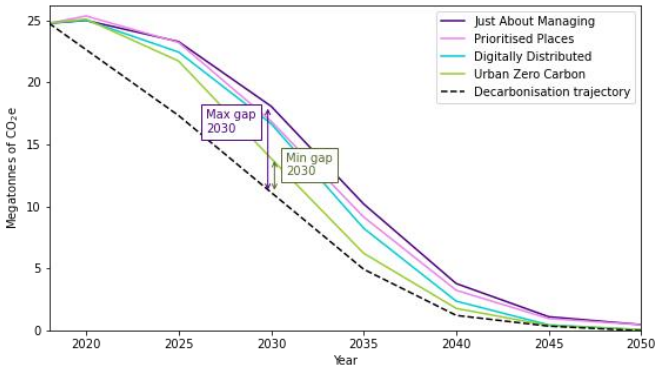


Figure 9: Surface transport emissions in the North under each Future Travel Scenario compared against the decarbonisation trajectory.

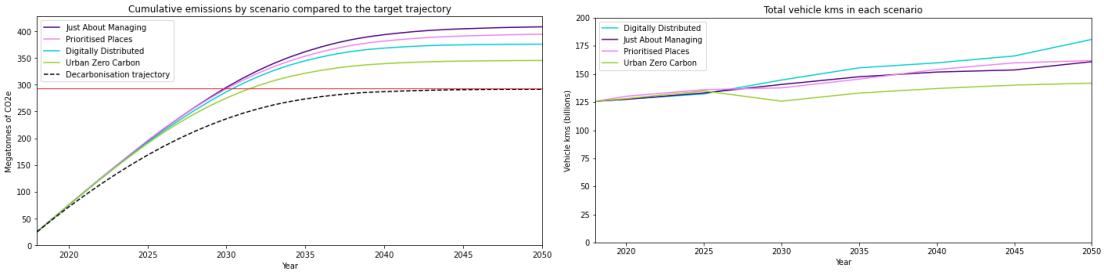


Figure 10: Cumulative emissions[29] (left) and total vehicle kilometres (cars, vans and HGVs) (right) under each Future Travel Scenario.

8.3.1 Just About Managing

Just About Managing sees a 98% reduction in tailpipe emissions from 2018 to 2050. Increases in car and van demand are largely offset by a growing share of zero-emissions vehicles. However, due to a slow uptake of zero-emission HGVs, around 0.5 mega-tonnes of CO_2 remain in 2050.

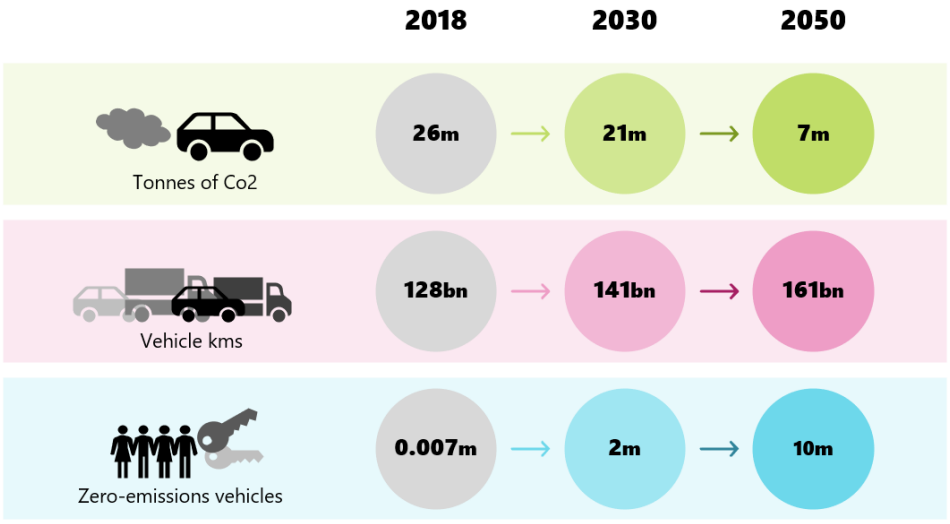


Figure 11: Headline figures related to surface transport emissions, vehicle demand and zero-emissions vehicles in the North under a Just About Managing scenario.

Table 8: Demand growth 2018 to 2050 and CO_2 emissions in 2030 and 2050 by mode under a Just About Managing scenario.

Mode	Demand growth 2018-2050	CO_2 emissions in 2030 (mega-tonnes)	CO_2 emissions in 2050 (mega-tonnes)
Rail	*Not available*	0.6	0.4
Bus		0.3	0.0

[29] As emission estimates from NoCarb only cover milestone years, emissions in intermediary years were derived through linear interpolation before being cumulatively summed.

Car	28%	10.9	0.0
Van	47%	1.7	0.0
HGV	6%	8.0	0.1

Table 9: Total vehicle demand and CO_2 emissions in 2050 by area type under a Just About Managing scenario (excludes bus and rail).

Area type	Vehicle kilometres in 2050 (billions)	CO_2 emissions in 2050 (megatonnes)
Urban	21.9	0
Sub-urban	90.0	0.1
Rural	49.0	0

Table 10: Fuel shares by vehicle type in 2050 under a Just About Managing scenario.

Vehicle type	Fuel type	Share
Car	BEV	99%
Car	PHEV	1%
Van	BEV	98%
Van	PHEV	2%
HGV	BEV	97%
HGV	Diesel	1%
HGV	Hydrogen	2%

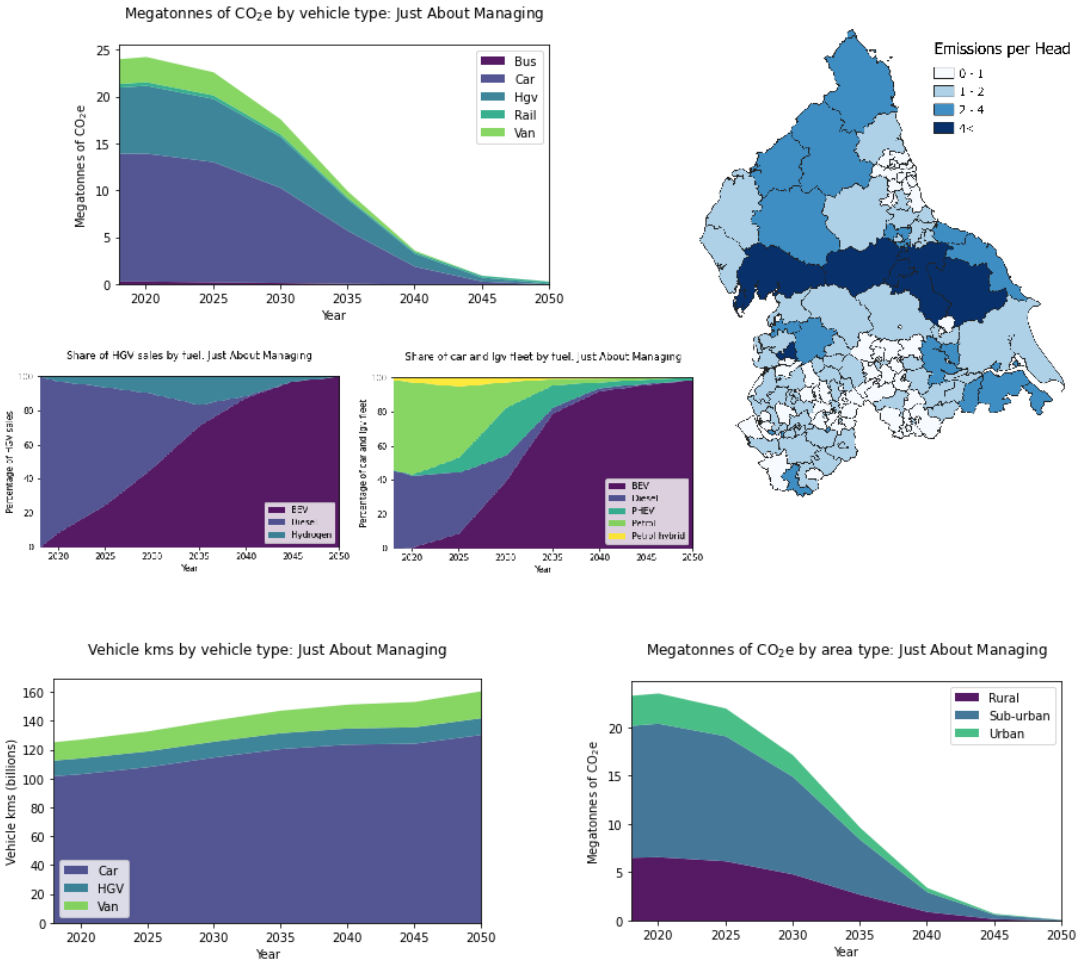


Figure 12: Mode, fuel and area type breakdown of emissions in the North under a Just About Managing scenario.

8.3.2 Prioritised Places

Prioritised Places sees a 98% reduction in tailpipe emissions from 2018 to 2050. Similar to Just About Managing, increases in car and van demand are largely offset by a growing share of zero-emissions vehicles. Near all HGVs transition to zero-emissions technologies, though only a marginal increase in demand means that the emissions are fractionally lower.

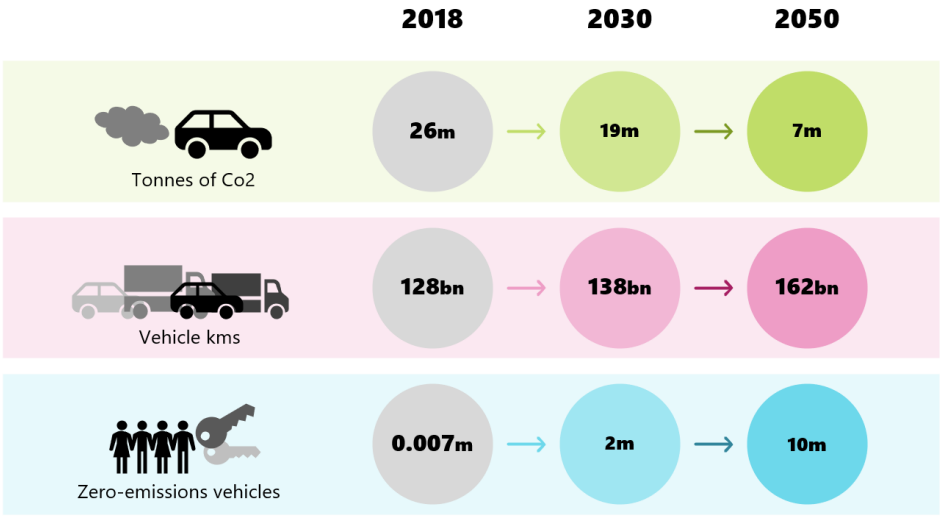


Figure 13: Headline figures related to surface transport emissions, vehicle demand and zero-emissions vehicles in the North under a Prioritised Places scenario.

Table 11: Demand growth 2018 to 2050 and CO_2 emissions in 2030 and 2050 by mode under a Prioritised Places scenario.

Mode	Demand growth 2018-2050	CO_2 emissions in 2030 (megatonnes)	CO_2 emissions in 2050 (megatonnes)
Rail	*Not available*	0.6	0.4
Bus		0.3	0.0
Car	30%	10.0	0.0
Van	47%	1.6	0.0
HGV	1%	7.6	0.1

Table 12: Total vehicle demand and CO_2 emissions in 2050 by area type under a Prioritised Places scenario (excluding bus and rail).

Area type	Vehicle kilometres in 2050 (billions)	CO_2 emissions in 2050 (megatonnes)
Urban	20.7	0
Sub-urban	87.8	0.1
Rural	53.4	0

Table 13: Fuel shares by vehicle type in 2050 under a Prioritised Places scenario.

Vehicle type	Fuel type	Share
Car	BEV	99%
Car	PHEV	1%
Van	BEV	99%
Van	PHEV	1%

HGV	BEV	97%
HGV	Diesel	1%
HGV	Hydrogen	2%

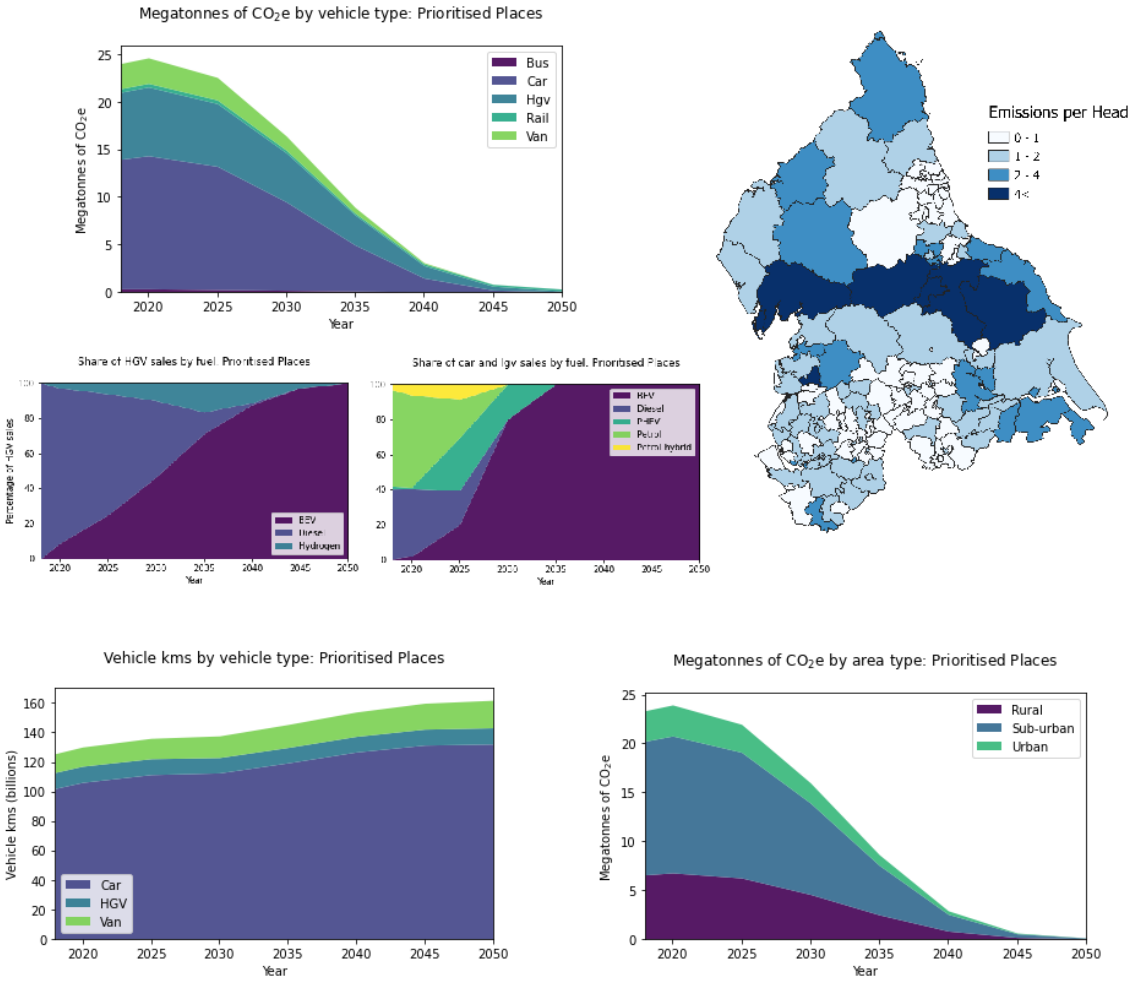


Figure 14: Mode, fuel and area type breakdown of emissions in the North under a Prioritised Places scenario.

8.3.3 Digitally Distributed

Digitally Distributed sees a 99.6% reduction in tailpipe emissions from 2018 to 2050. With just 0.1 $MTCO_2$ of residual emissions in 2050.

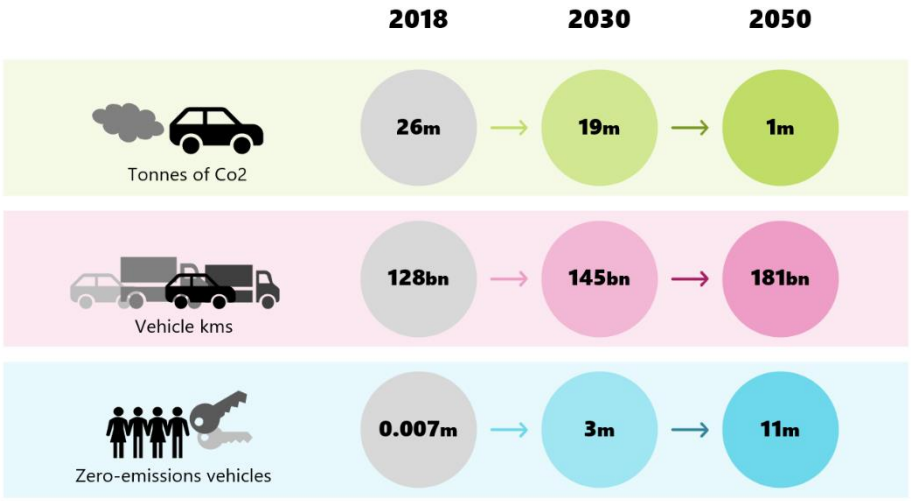


Figure 15: Headline figures related to surface transport emissions, vehicle demand and zero-emissions vehicles in the North under a Digitally Distributed scenario.

Table 14: Demand growth 2018 to 2050 and CO_2 emissions in 2030 and 2050 by mode under a Digitally Distributed scenario.

Mode	Demand growth 2018-2050	CO_2 emissions in 2030 (megatonnes)	CO_2 emissions in 2050 (megatonnes)
Rail	*Not available*	0.6	0.0
Bus		0.3	0.0
Car	44%	9.6	0.0
Van	74%	1.6	0.0
HGV	4%	7.9	0.1

Table 15: Total vehicle demand and CO_2 emissions in 2050 by area type under a Digitally Distributed scenario (excluding bus and rail).

Area type	Vehicle kilometres in 2050 (billions)	CO_2 emissions in 2050 (megatonnes)
Urban	24.4	0
Sub-urban	101.4	0.1
Rural	54.9	0

Table 16: Fuel shares by vehicle type in 2050 under a Digitally Distributed scenario.

Vehicle type	Fuel type	Share
Car	BEV	100%
Van	BEV	100%
HGV	BEV	97%
HGV	Diesel	1%
HGV	Hydrogen	2%

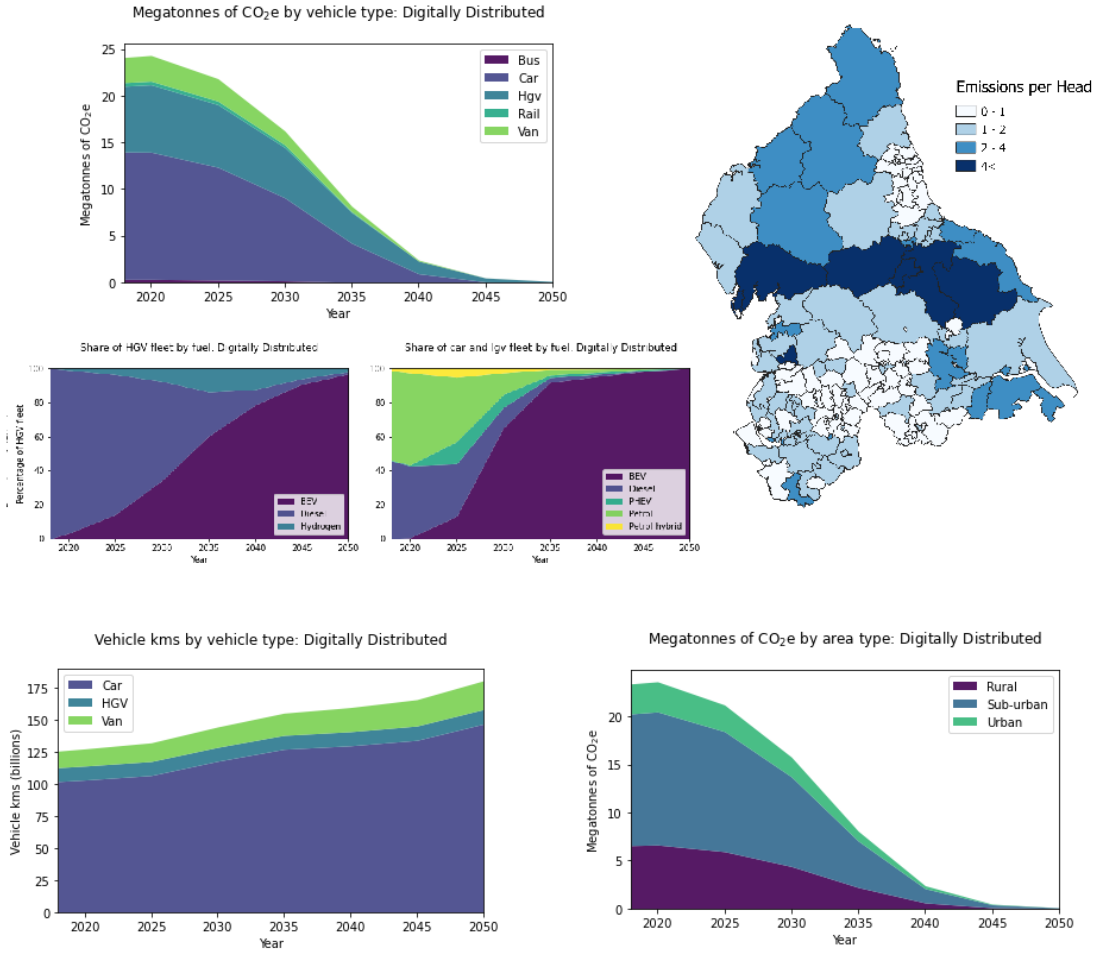


Figure 16: Mode, fuel and area type breakdown of emissions in the North under a Digitally Distributed scenario.

8.3.4 Urban Zero Carbon

Urban Zero Carbon sees a 99.6% reduction in tailpipe emissions from 2018 to 2050. It is the only scenario to see a decrease in HGV demand and is the fastest at shifting to zero-emissions vehicles. Consequently, it sees the lowest residual emissions (attributed to a small number of diesel HGVs) in 2050 at just over 1 $MTCO_2$.

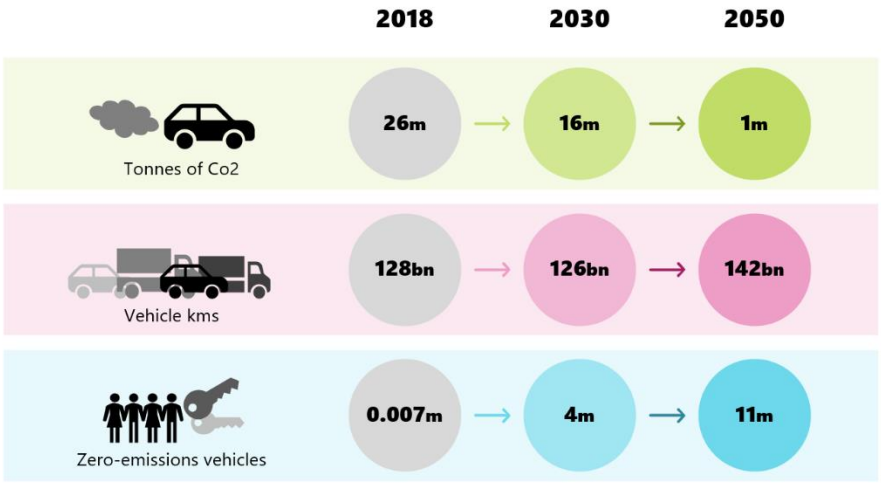


Figure 17: Headline figures related to surface transport emissions, vehicle demand and zero-emissions vehicles in the North under an Urban Zero Carbon scenario.

Table 17: Demand growth 2018 to 2050 and CO_2 emissions in 2030 and 2050 by mode under an Urban Zero Carbon scenario.

Mode	Demand growth 2018-2050	CO_2 emissions in 2030 (megatonnes)	CO_2 emissions in 2050 (megatonnes)
Rail	*Not available*	0.6	0.0
Bus		0.3	0.0
Car	10%	7.1	0.0
Van	50%	1.2	0.0
HGV	-3%	7.6	0.1

Table 18: Total vehicle demand and CO_2 emissions in 2050 by area type under an Urban Zero Carbon scenario (excluding bus and rail).

Area type	Vehicle kilometres in 2050 (billions)	CO_2 emissions in 2050 (megatonnes)
Urban	20.6	0.0
Sub-urban	78.8	0.1
Rural	42.4	0.0

Table 19: Fuel shares by vehicle type in 2050 under an Urban Zero Carbon scenario.

Vehicle type	Fuel type	Share
Car	BEV	100%
Van	BEV	100%
HGV	BEV	97%
HGV	Diesel	1%
HGV	Hydrogen	2%

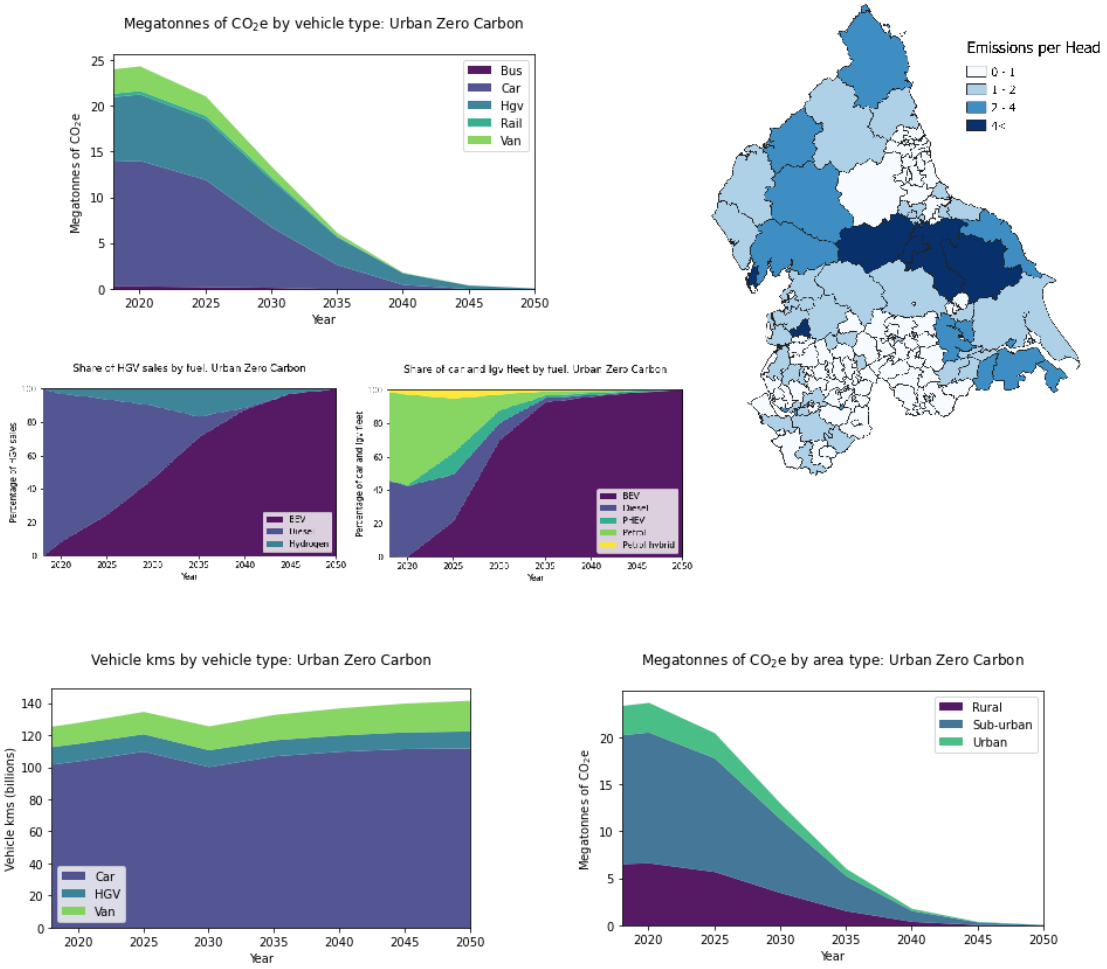


Figure 18: Mode, fuel and area type breakdown of emissions in the North under an Urban Zero Carbon scenario.

9 Quality assurance

9.1 Comparison checks against independent sources

There are limited independent sources available to check estimates of emissions at a sub-national level. The most definitive validation available is the amount of road fuel sold in any given year, but this data is only available at a national level. Total vehicle kilometres travelled are also very difficult to measure independently and is usually estimated using a base year model that takes account of a range of observed data, such as traffic counts and trip rates.

The DfT's National Transport Model has the advantage of being a national model, which can have its base year carbon emissions calibrated to the observed base year road fuel sales. With a well calibrated total, the main uncertainty is around the split between geographic regions and vehicle types. The DfT publishes estimates of vehicle kilometres travelled and emissions by region and vehicle type, which we have used for this comparison check. Table 20 below sets out the comparison for vehicle kilometres travelled.

Table 20: Total vehicle kilometres in the North by vehicle type – a comparison between DfT's 2015 estimate and NoCarb's 2018 estimate.

Billion vehicle-km by vehicle type	NoCarb (2018)	DfT National Transport Model (2015)
Car	102	92
HGV	11	17
LGV	13	7
Total	126	116

While the match is reasonably good, there are two main inconsistencies that need to be addressed:

- The NoCarb figures are generally higher than the National Transport Model figures. The first explanation for this is that the NoCarb figures represent 2018 demand, rather than 2015 demand, and there was some growth in traffic over that period. The second explanation is that the geographical scope of the Northern regions in the two models do not perfectly overlap. The National Transport Model uses the three Northern Government Office Regions, whereas NoCarb uses a version of the TfN administrative boundary, which includes parts of Derbyshire and Nottinghamshire. Furthermore, it is not clear whether National Transport Model figures attribute demand to regions based on origin zone or on where the emissions take place, as in NoCarb. Further discussions with DfT will be arranged by TfN to clarify the source of these differences.
- NoCarb has a higher share of vehicle kilometres attributed to HGVs relative to LGVs than the National Transport Model. Both models take inputs from the Great Britain Freight Model, but they use different versions and may also use different validation datasets. There is a known

issue of classification between large LGVs and small HGVs and we are confident that differences in how this classification is done is the main cause of this difference. During 2021, we will work with DfT to understand these differences and update our own modelling assumptions as required.

In terms of CO_2 emissions, the National Transport Model has a total for the Northern regions of 25Mt, compared to NoCarb's 24Mt, around a 4% difference. The difference in emissions estimates is smaller than the difference in vehicle kilometres, suggesting small differences in the emissions intensity assumptions used within the calculation. Given the National Transport Model's calibration to national fuel sales, this closer match on emissions is perhaps more important than the match on demand. Overall, this close match gives good confidence that the two approaches are broadly aligned and that TfN's work is aligned to the best available alternative sources of data. Going forward, we will also look to undertaken further validation against local tools within the North.

9.2 Error handling

NoCarb is written in PEP-8 compliant Python 3.7 standard as per TfN's Coding Standards document. The code has been designed to ensure the audits are conducted throughout any given run. Using Python ensures that the analysis is repeatable and can be adjusted for future iterations if required.

Care has been taken to check for anomalies throughout with audit messages and outputs to ensure that functions have executed as planned as the results are within expected ranges.

10 Future iterations and improvements

There are several opportunities to improve the model:

- Once NELUM has been re-based to 2018, the results will be updated. It is expected that this will improve the accuracy of both baseline and future car demand estimates.
- Full integration with NoHAM for Future Travel Scenarios, which will also include more detailed modelling of future van and HGV demand.
- At the moment, the model reflects CO_2e tailpipe emissions and high-level electricity emissions. There is an opportunity to update the model to calculate and reflect:
    - Consumption of hydrogen and more detailed estimates of electricity emissions;
    - Well to wheel emissions;
    - Life cycle emissions; and
    - The carbon impact of infrastructure proposals.
- The role of car ownership on car fleet size, car use, average vehicle mileage and fleet turnover, and how purchasing patterns could vary spatially and over time in response to local and national factors. This will be undertaken using the new Car Ownership Model TfN is developing in 2021.
- An additional step could be added into the tool to recommend the zero-emissions sales and demand reductions required to meet the decarbonisation trajectory and/or offset the carbon impact of infrastructure proposals.
- There is an opportunity to consider how demand reductions due to lift-sharing and other policy levers could be modelled in Analytical Framework travel demand tools and then reflected in NoCarb.
- CCC efficiency gains are based on analysis from their Fifth Carbon Budget. A request could be made to the CCC to access to the latest figures, so they can be updated in NoCarb. Parallel to this, there are plans to explore the impact of variation in technology-enabled vehicle efficiency, for example to represent different fiscal policies.
- As discussed in Section 7, sensitivity analysis related to the proportion in which PHEV vehicles operate in electric mode will be undertaken later in 2021.
- As mentioned in Section 5.2.1, explore the impact of using exponential instead of linear interpolation for scenario tables, such as vehicle sales.

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Appendix A: Quantifying demand change using NELUM

Process overview

A separate piece of analysis was undertaken using NELUM to understand how car demand could be reduced in line with scenario-based demand changes (**Demand Changes**).

Using Just About Managing scenario inputs as a baseline, NELUM was run several times, tweaking one demand-related input at a time to derive an associated car demand reduction. The demand reductions associated with changes in each input (see Results

The demand reductions associated with each input change are outlined in Table 21. The figures have been reviewed by Element Energy and are believed to provide sensible estimates for the impact of different measures in reducing car demand.

Table 21 for the list of inputs) were calculated by:

1. Taking the total car kilometres in 2030, 2040 and 2050 using the full set of Just About Managing scenario inputs.
2. Adjusting one scenario input (in most cases, this involved replacing the relevant values with those used for Urban Zero Carbon).[30]
3. Comparing the resulting demand against baseline demand projections (Step 1) to derive the associated demand reduction in each year.[31]

An extra step was then required to convert the metric for road-user charging (one of the demand-related inputs) from a percentage of generalised journey time (GJT) to an average additional pence per kilometre charge.[32] This was done by:

1. Taking the base GJT matrix and applying scaling factors that correspond to the percentage of GJT increase associated with road-user charging.[33]

[30] The input values were introduced 5 years prior to the demand measurement (2025, 2035, 2045) so that they had time to take effect.

[31] If the input change was the same across more than one year, the demand reduction was taken as the mean across those years.

[32] Road-user charging would typically be introduced as a pence per kilometre charge, making it a more intuitive metric.

[33] For the purposes of this analysis, these scaling factors were uniform across intra and inter-zonal trips (as is the case under Urban Zero Carbon). However, in some scenarios, road-user charging varies depending on

2. Retrieving the absolute difference in GJT between the new GJT matrix and the base GJT matrix.
3. Calculating the pence per kilometre charge using the formula below:

$$VoT = \frac{7}{60}$$

$$P = \frac{\sum_{i=1}^{n}(D_i \cdot VoT \cdot 100)}{n}$$

where VoT is value of time (pounds per hour converted to minutes)[34], P is the average additional pence per kilometre charge, and D is the difference in GJT for zone i. The pounds per kilometre charge is converted to pence by multiplying it by 100.

whether trips are intra or inter-zonal, meaning that the scaling factors are merged with the base GJT matrix based on flow type.

[34] The value of time of £7 per hour was drawn from the DfT Transport Analysis Guidance (TAG) databook.

Results

The demand reductions associated with each input change are outlined in Table 21. The figures have been reviewed by Element Energy and are believed to provide sensible estimates for the impact of different measures in reducing car demand.

Table 21: Demand-related NELUM scenario inputs and their variable descriptions. The blue text represents the metrics for each input.

Demand-related scenario input	Description	JAM baseline input	New input	Input change	Demand reduction
Shared transport/ usership	Bus travel in modelling used to represent both traditional and new shared transport solutions. Bus connectivity for **X flow types** (none, intra-sector or all flow types).	none	intra	none-intra	-2.6%
		intra	all	intra-all	-1.4%
		none	all	none-all	-4.0%
Micro-mobility	Active travel in modelling used to represent both traditional and new micro-modes. Micro-mobility in walk/cycle travel time with average speed of **XXkph / X% share of active travel.**	0/0	20/10	20/10	-1.1%
		10/10	20/10	10/0	-0.6%
		0/0	20/20	20/20	-1.8%
		10/10	20/20	10/10	-1.5%
PT fare subsidisation	**X% lower fares for intra-sector trips / X% lower fares for other flow types.**	0/0	-20/-10	-20/-10	-0.4%
RUC	**Average additional pence per km charge across all zone pairs.** Corresponds to 10%, 15%, and 20% of increase in car GJT respectively.	0	1.0	1.0	-7.9%
		0	1.5	1.5	-12.4%
		0	2.0	2.0	-17.1%
Sustainable access to rail stations	**X% lower perceived costs for access/egress.**	0	-20	-20	-0.6%
Densification	**City and town densification.**	Most growth in urban and sub-urban areas	Growth mainly weighted towards urban areas with very little growth in rural areas	Less growth in sub-urban and rural	-0.3%

Sustainable transport access GJT	**X% lower bus GJT for intra-sector trips / X% lower GJT for walk and cycle trips.**	0/0	-10/-10	-10/-10	-1.6%
WFH/Business trip adjust	**Days per week WFH in occupations where this is possible / X% business to business trip rate adjustment.**	1/0	2/-10	1/-10	-3.1%

Using these figures, different ‘packages’ of measures could be employed to achieve a specified demand reduction. Figure 19: Using the demand reductions from Table 21, this outlines three different methods in which car demand can be reduced by 10% under a Just About Managing scenario in 2030. demonstrates this, showing three different methods in which to bridge the 10% car demand reduction required in Just About Managing in 2030.

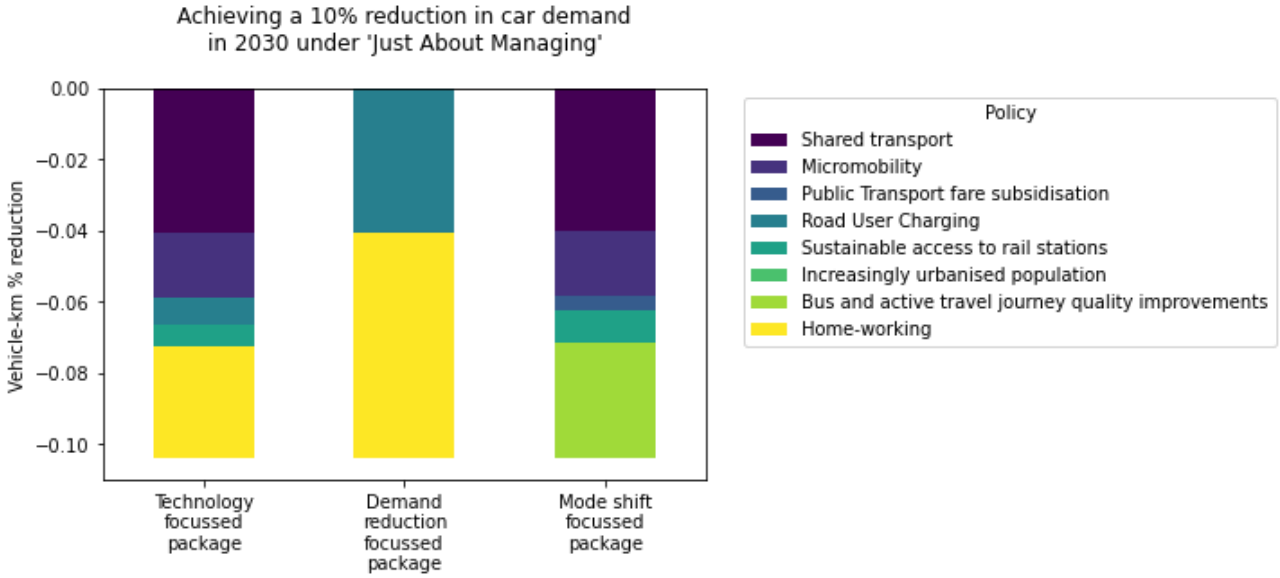


Figure 19: Using the demand reductions from Table 21, this outlines three different methods in which car demand can be reduced by 10% under a Just About Managing scenario in 2030.

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Transport Decarbonisation Strategy

December 2021



TRANSPORT FOR THE NORTH

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Introduction

The science is conclusive - the world is facing a climate emergency.

In the UK, surface transport is the largest contributing sector to greenhouse gas emissions, accounting for 22% of all emissions in 2019[1], of which more than 95% are from road transport. Furthermore, transport emissions have actually grown overall since 2013, despite modest falls in the last few years[2].

Whilst it is possible that 2020 and 2021 figures will show a drop in emissions due to reduced levels of travel during the COVID-19 lockdown, this is likely to be temporary, with demand for car travel rebounding more quickly than public transport, approaching pre-pandemic levels.

In our Strategic Transport Plan, published in 2019, Transport for the North (TfN) committed to scoping, developing and implementing a 'Pathway to 2050' in line with the then UK law of achieving an 80% reduction in national emissions by 2050 (now superseded by the current UK Government commitment to achieve net zero emissions by 2050). For the surface transport sector, this meant that road transport emissions would need to be near-zero and rail would need to be decarbonised by 2050.

TfN and our partners believe that an acceleration towards a zero-carbon transport network must be at the heart of public policy making and investment decisions. Our ambition for the North is to travel faster and further than national policy and maximise the clean growth opportunities that decarbonisation can provide for the North. Through this Decarbonisation Strategy, TfN and our partners are committing to a regional near-zero carbon surface transport network by 2045.

The achievement of TfN's vision of a thriving North of England, where world class transport supports sustainable economic growth, excellent quality of life and improved opportunities for all, is contingent on how we can reduce our greenhouse gas emissions across everything that we do, and then, making the right decisions at the right time.

22%
surface transport sector's contribution to total UK emissions in 2019

95%
of surface transport emissions come from road transport

[1] This relates to surface transport and does not include emissions from aviation and shipping.
[2] https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2019

The Role of TfN

Through its statutory powers, TfN acts as 'one voice' for the North, communicating pan-Northern priorities to the Secretary of State for Transport. We have a clear remit to identify the transport infrastructure required to support transformational economic growth in the North, and to prioritise that investment. This places TfN and partners in a strategic position to identify the transport infrastructure and policy measures that are required to achieve the North's decarbonisation ambitions.

When prioritising transport infrastructure delivery in the region, TfN must make decisions based on a knowledge of how those projects and programmes are likely to support or challenge the region's decarbonisation objectives. The Decarbonisation Trajectory within this Strategy provides a tool to robustly benchmark how our Investment Programme is performing in this respect. A planned programmatic assessment will support an appropriate sequencing of those investments and the mitigation actions that may be needed to deliver transformational economic growth in line with decarbonisation ambitions.

While most of the responsibility for policy implementation lies with national and local government, TfN operates at a geographical and institutional level that allows us to facilitate a regional approach to decarbonisation measures and research, for example, developing a pan-regional electric vehicle charging infrastructure framework . Indeed, a high proportion of the emissions from private road vehicles is generated by longer distance regional-level trips, with our analysis indicating that around 70% of road transport emissions in the North originating from trips on the Major and Strategic Road Networks. This means TfN has both an opportunity and a responsibility to help reduce this significant share of road transport emissions.

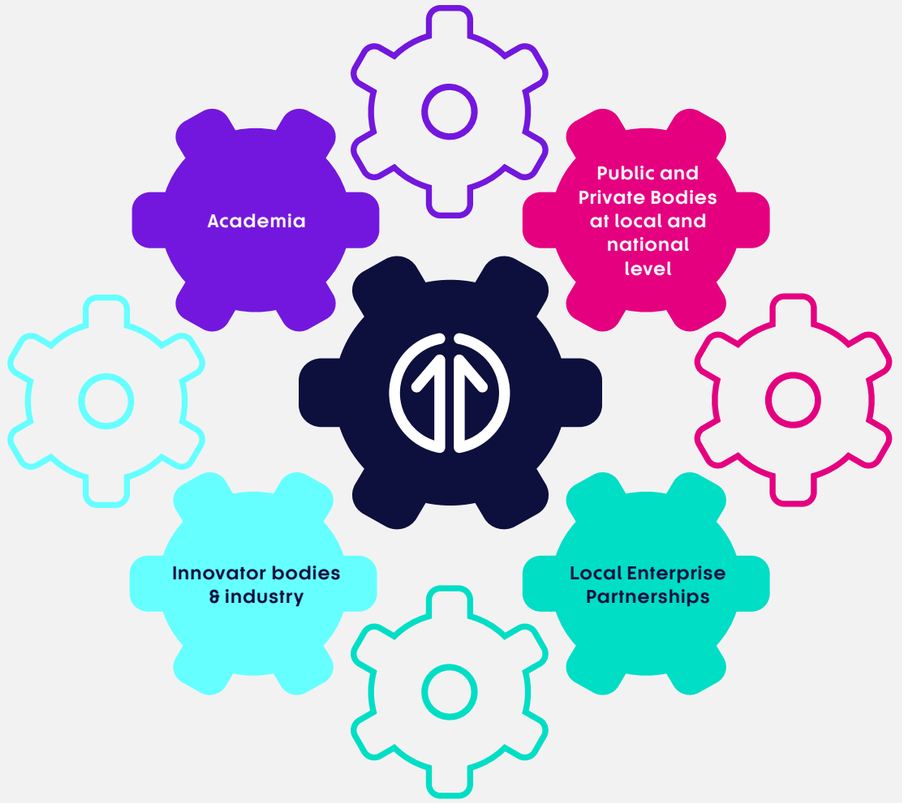
'Importantly, we won't just be focused on facilitating rapid technological solutions. Reducing vehicle mileage will be equally, if not more important in the short-term, and the results of our public consultation have shown that achieving modal shift in a fair and just way is priority for our communities.

Through our proposed Clean Mobility Visions workflow and our ongoing research on Transport Related Social Exclusion in the North, TfN can play an important role in supporting our partners in the development of place-based solutions. By analysing emissions at a more disaggregate level and providing enhanced evidence, data platforms and intelligence TfN can inform bespoke local and regional strategies. This can in turn support national policies to take account of spatial and social variation.

At a project level, TfN has a responsibility to ensure that the design and construction of our projects and programmes reduce lifecycle carbon and to encourage partners to adopt similarly ambitious policies.

The North is also extremely well placed to support the testing and trialling of many emerging technologies that will be crucial to transport decarbonisation in the UK, including through existing initiatives such as the UK's first Hydrogen Transport Hub in the Tees Valley, Zero Carbon Humber and HyNet North West. Through partnerships and co-working with Local Authorities, Local Enterprise Partnerships, transport providers and regional academic and industry players, TfN is committed to promoting the North as hub for innovation, research and the testing of emerging technologies.

Finally, TfN needs to lead by example. Whilst the focus of this strategy is upon understanding, measuring and reducing the emissions from surface transport in the North and the construction and operation of the proposed schemes within our Investment Programme; it is important that we look to reduce the emissions resulting from TfN directly as a result of our everyday business. These are called our 'organisational emissions'.



The Role of TfN

The full range of activities and goods, through which an organisation might generate greenhouse gas emissions is illustrated in Figure 1. These emissions sources are split into three types – known as Scope 1, 2 and 3. Different emissions sources will be of relevance to different types of organisations, particularly in relation to Scope 3. For TfN, these organisational emissions are likely to include:

- ⇒ Scope 1 emissions, which are direct emissions resulting from activities that TfN can control, such as the gas used to heat our offices.
- ⇒ Scope 2 emissions, which are indirect emissions resulting from the generation of any power that we use within our offices.
- ⇒ Scope 3 emissions, which cover indirect emissions as a result of our operations that are outside of TfN's direct control, albeit we can influence them through our working practices. This includes things like the emissions from the manufacture and transport of goods we use, like stationery and IT equipment, and also services we purchase, like cleaning and catering. It also includes emissions generated by our employees commuting and business travel, along with those generated by the disposal of our waste and our water consumption.

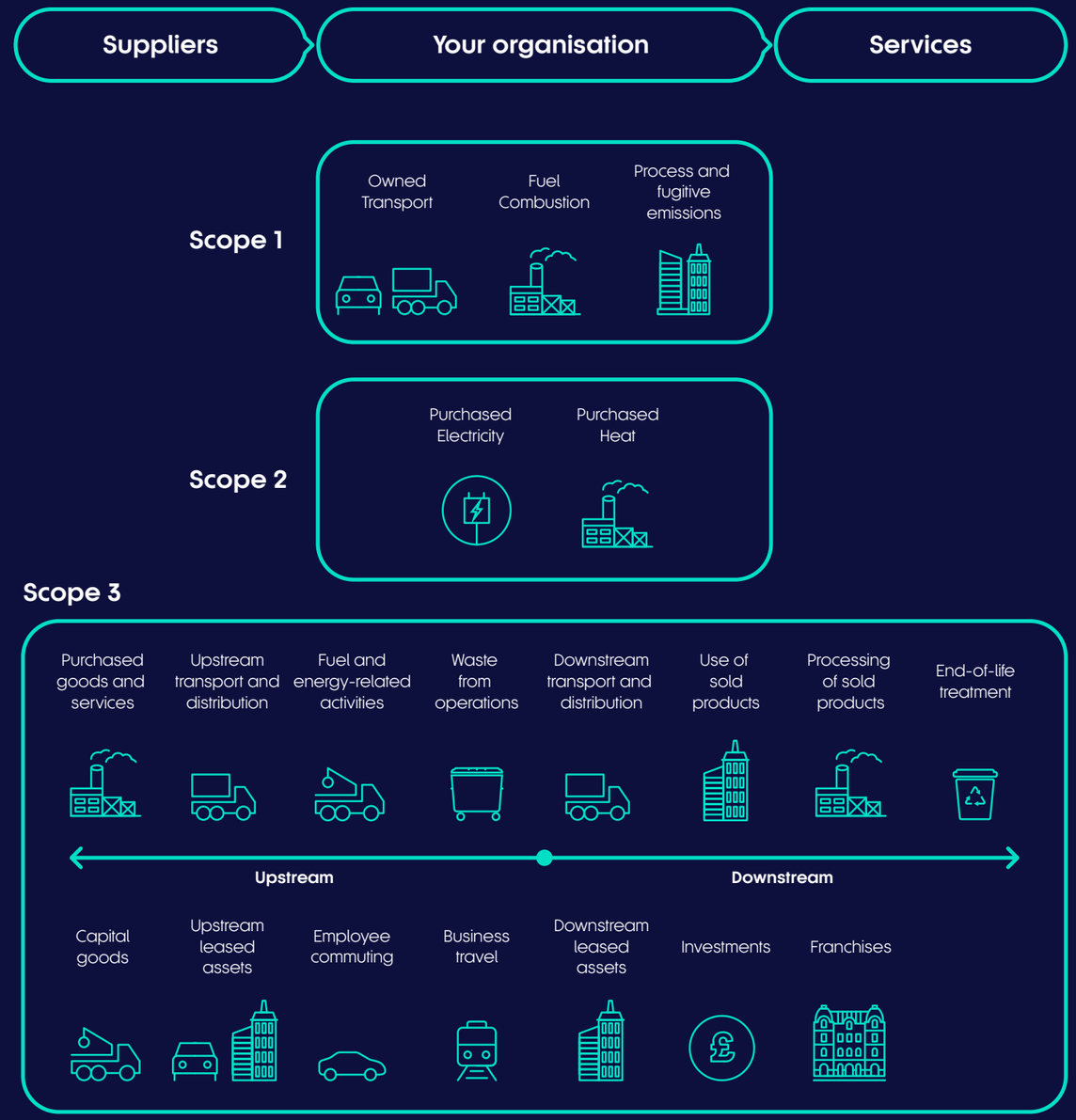
Emissions generated by our partners as a result of transport operations in the region are captured within our Greenhouse Gas Inventory, the reduction of which is a key driver for this strategy. Other Scope 1, 2 and 3 emissions generated by partners, including local authorities, train operating companies, Network Rail and National Highways will not be included within our own Scope 3 emissions. It is expected, that in most cases, these other emissions will be addressed by our partner organisations within their own decarbonisation action plans.

TfN is committed, by 2022, to understanding the carbon footprint of its organisational Scope 1 and 2 emissions and agreeing a target date for reducing these emissions to net-zero.

In the same timeframe, TfN will also develop a suitable carbon footprint scope for measuring its organisational Scope 3 emissions. This will reflect data availability, our environmental goals and the sources we can influence.

Emissions generated from the design, construction and operation of schemes within our Investment Programme, along with the emissions generated by surface transport in the North, are the main focus of this strategy document. Our approach to measuring these emissions and our Decarbonisation Trajectory are covered within Chapters 2 to 6.

Figure 1: Carbon Footprinting – Organisational Boundaries[3]



[3]Image sourced from Carbon Trust and The Greenhouse Gas Protocol, 'A Corporate Accounting and Reporting Standard, Revised Edition' (2004).

Why a Decarbonisation Strategy?

To achieve a near-zero emissions surface transport network in the North by 2045, there must be a clear understanding of the policies and measures required to bridge the gap between future emissions projections and future emissions targets. TfN's Decarbonisation Strategy reflects work undertaken to define four plausible baseline emissions trajectories, based on our Future Travel Scenarios, and to identify and assess the gap between each trajectory and TfN's Decarbonisation Trajectory.

We have also undertaken policy analysis to understand the policy ambition and suite of policy measures that could fill the policy gap for each scenario. This provides insights into the key, low-regret policy measures required under all scenarios, as well as the areas where TfN and partners are likely to require additional national support to achieve decarbonisation ambitions.

In terms of local action, this policy analysis provides tested, evidence based packages of measures that can be used by our partners and other organisations across our region, when developing their own plans.

Building upon these findings, this strategy lays out the North's minimum expectations in relation to both local and national decarbonisation policy ambitions. It is intended to provide an overarching framework for our partners and other organisations across the region to meet their decarbonisation responsibilities and ambitions.

The Strategy also recognises the importance of considering embodied carbon and climate change adaptation and resilience, drawing on the experience of our delivery partners, Highways England and Network Rail in these areas.

Finally, this strategy outlines TfN's key commitments to enabling the decarbonisation of surface transport in the North. Developed through research and engagement with partners, regional research bodies and industry, these relate to activities that would benefit from coordination at the regional level and can be most effectively undertaken by TfN. As part of this analysis, a key consideration for TfN, has been how the decarbonisation of transport can support our partners' economic growth ambitions, championing clean growth opportunities across our region. Cross-sectoral co-operation and planning will be essential if the North is to deliver both a decarbonised transport system and capitalise on the possibilities from green industrial revolution, especially with the energy generation and distribution sector.

The prioritsation of activities has been supported by an extensive public consulation exercise which is reflected, alongside required timescales within Chapter 9, TfN's Priority Decarbonisation Actions.

This strategy builds upon the four objectives in TfN's Strategic Transport Plan:

⇒ **Transforming economic performance:** We want to understand the full range of clean growth opportunities within the North as a result of transport decarbonisation.

⇒ **Increasing efficiency, reliability, integration and resilience in the transport system:** We want to integrate decarbonisation measures into existing and future programmes and projects in order to maximise efficiency and reliability gains (such as the electrification of our railway network). We also need to ensure that climate change adaptation and resilience is a key consideration in policy and project development.

⇒ **Improving inclusivity, health and access to opportunities for all:** The decarbonisation of transport in the North provides an important opportunity for reducing transport-related social exclusion. We want to ensure that decarbonisation measures optimise co-benefits relating to physical health, improved air quality and increasing levels of mobility for all communities and areas in the North.

⇒ **Promoting and enhancing the built, historic and natural environment:** While environmental conservation is the ultimate driver for decarbonisation, we need to consider the localised impacts of decarbonisation policies and measures. For example, local air quality, reduced noise levels, and the environmental impact of new infrastructure and operations required as part of the decarbonisation agenda (e.g. electrification infrastructure).



TfN's Decarbonisation Trajectory

What is TfN's Decarbonisation Trajectory?

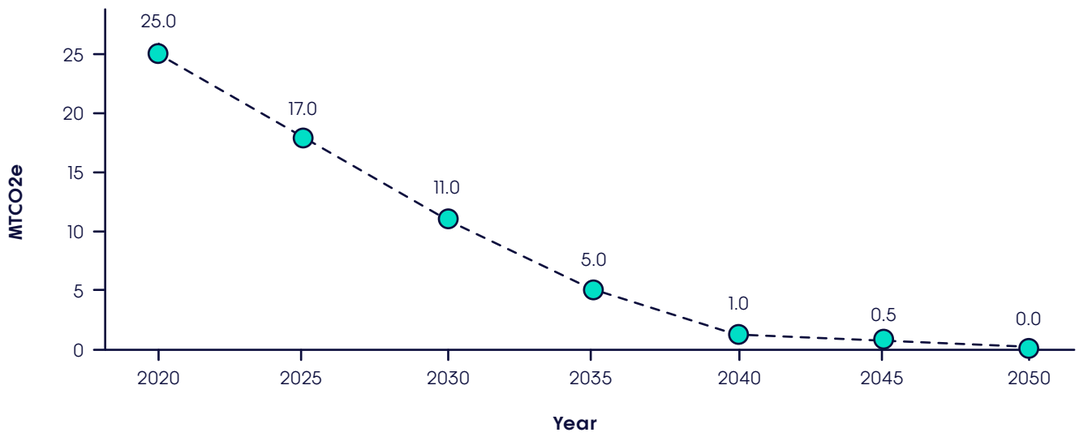
Our route to a decarbonised transport system is illustrated by a measurable, evidence based and time-bound carbon emissions reduction curve, which starts with 'where we are now' and travels towards alignment with the objectives of the Paris Agreement, i.e. deep emissions reductions over the coming decades towards a zero-emissions transport system before 2050.

That journey is called our Decarbonisation Trajectory, with the shape of the curve being dictated by a series of interim emissions reduction milestones that ensure a rate of progress aligned to the Climate Change Committee's Carbon Budgets as a minimum.

Our agreed Decarbonisation Trajectory is shown in Figure 2, with the headlines being:

- ⇒ A 56% reduction in emissions from 2018 to 2030, achieved mostly through mode-shift and demand reduction.
- ⇒ A 96% reduction in emissions from 2018 to 2040, reflecting longer-term decarbonisation measures, such as a high proportion of zero-emissions vehicles in the vehicle fleet.
- ⇒ A close to zero date of 2045 for carbon emissions from surface transport in the North. This is a challenging benchmark reflecting the ambition of our partners and their desire to push further and faster than current national policy.
- ⇒ A total carbon budget of approximately 290 mega-tonnes of CO_2 from 2018 to 2050 mostly through mode shift and demand reduction.

Figure 2: TfN's Decarbonisation Trajectory



Why 2045?

A decarbonisation trajectory set at a regional scale is, by its nature, a compromise between areas that have set different decarbonisation timescales and have different geographies, demographics and patterns of passenger and freight demand.

A number of our partners have set ambitious, economy-wide decarbonisation targets with net-zero dates pre-2040 for their authority areas. The contribution of transport emissions reductions to these economy-wide targets will depend on progress in other sectors and the assumed availability of negative emissions measures, but it is clear that these authorities are aiming for transport emissions being close to zero by 2040.

In preparing a Decarbonisation Trajectory, TfN seeks to achieve a compromise by moving faster than current national policy and the Climate Change Committee's (CCC) advised trajectory, while being mindful of the varying levels of progress that our partners have made in terms of their own climate change responses. In this way, TfN's Decarbonisation Trajectory considers the ambitions of the whole region, but does not override or specify local place-based targets.

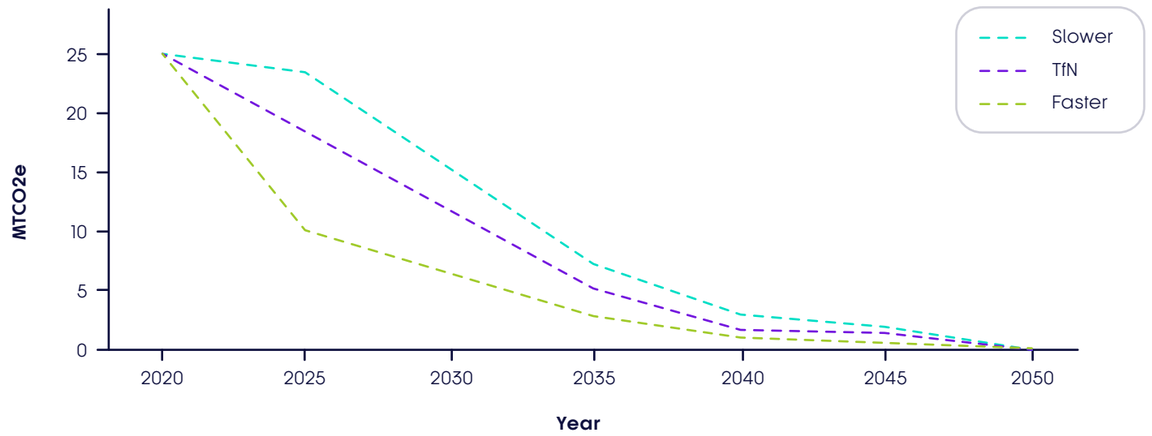
Indeed, the deep emissions reductions achieved by our most ambitious partners over shorter timescales will be needed if the region is to align itself, as a whole, with the level of reductions suggested by TfN's Decarbonisation Trajectory.

The **interim points** along our trajectory effectively represent an average for the region, with some areas' local transport systems decarbonising more quickly, while some may decarbonise slightly slower, although all areas will need to make significant progress both prior to 2025 and after. The **end point** of our Decarbonisation Trajectory means that by 2045, emissions from surface transport in the North will need to be close to zero.

Figure 3 illustrates how different places within the North may move ahead with different trajectories, helping to achieve an average regional trajectory, but with all places reaching close to zero by the agreed end date.

Aligned to this, the programmes and projects that together make up TfN's Investment Programme should collectively emit close to zero carbon dioxide emissions by 2045. It is also true that many of these projects and programmes may actively help reduce emissions in the longer term, for example, rail schemes may lead to a reduction in car vehicle and road freight mileage. This consideration will be important as we look to benchmark ourselves against our trajectory over the coming decades.

Figure 3: TfN's Decarbonisation Trajectory reflects an average across local authorities that can decarbonise slightly slower or slightly faster



What is included in our trajectory and why

TfN's Decarbonisation Trajectory comprises emissions from surface transport sources. This includes cars, vans and Heavy Goods Vehicles (HGVs), as well as bus and rail.

In recognition of TfN's remit, the Decarbonisation Trajectory relates to emissions from vehicle mileage that takes place on the transport network within the North, including through trips (e.g. Scotland to the South of England), as illustrated by the pink roads in Figure 5.

Other forms of transport with significant emissions profiles include aviation and shipping (both domestic and international), which together accounted for 11% of the UK's total emissions in 2019 (compared to 22% from surface transport sources). Eight percent of this was generated from aviation, of which 96% was from international aviation[4].

In April 2021, the Government announced that the UK's sixth Carbon Budget will incorporate the UK's share of international aviation and shipping emissions for the first time. TfN is also committed to developing a version of its baseline emission trajectories incorporating the share of these emissions generated by the North.

This process is currently ongoing, although we have included some initial findings and insights within Chapter 3, Estimating current and future emissions.

Alongside this, utilising the advice of an expert independent advisory group, we will work with our partners to define and agree TfN's potential role in relation to aviation and airports. It will be important to understand our aspirations, as the North, in terms of reducing aviation emissions beyond those projected within the government's Jet Zero consultation document, published in July 2021. This workstream will also investigate what actions both TfN and its partners could feasibly take at a regional and local level and the emission savings they could deliver, along with an understanding of how national policy may need strengthening in order to achieve our close to zero date of 2045.

We propose to undertake this activity during 2021-22, as the Government's emerging policy framework to achieve the reductions set out within the sixth Carbon Budget are fully understood, and the results of the government's Jet Zero Consultation are acted upon. Our commitment to undertaking this activity is recorded in Chapter 9, TfN's Priority Decarbonisation Actions.

TfN will engage with partners and relevant stakeholders throughout this work, and the outputs will be used: as guidance for local partners; to guide TfN's future activities in this area and inform future policy positions to government around aviation and shipping. It will also form part of the evidence base for the planned Strategic Transport Plan revision in 2024.

TfN recognises the need for aviation and shipping to be included in national targets and believes that the emissions from all flights from airports in the North need to be fully aligned with the requirements of the Paris Agreement. This means operating within a defined carbon budget for UK aviation as part of a wider international budget.

Manchester Airports Group has pledged to become a net-zero airport by 2038, and in 2020 launched a competition for the first airline to operate a zero-emission commercial flight from one of its airports. The contest, an industry first, will see the successful carrier win five years' free landing fees[5].

[4]https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2019
[5]MAG launches zero-emission flight competition worth over £1million (magairports.com).

Some residual emissions from aviation and shipping are assumed within the current Government target of net-zero emissions, for the whole economy, by 2050. It is important to note that, at this point, by excluding aviation and shipping from our trajectory, surface transport emissions will need to be zero by 2050.

As the vehicle fleet transitions to electric propulsion there will be an increasing demand for electricity, ultimately from zero carbon sources. The CCC's Sixth Carbon Budget analysis sets out that electricity carbon intensity will need to fall by as much as 75% between now and 2030 and be close to zero by 2040, suggesting that indirect emissions will be small in the medium to long term. Indirect emissions associated with electricity are not included within our Decarbonisation Trajectory, but we have carried out high-level analysis of electricity grid emissions, the results of which are outlined in Chapter 3.

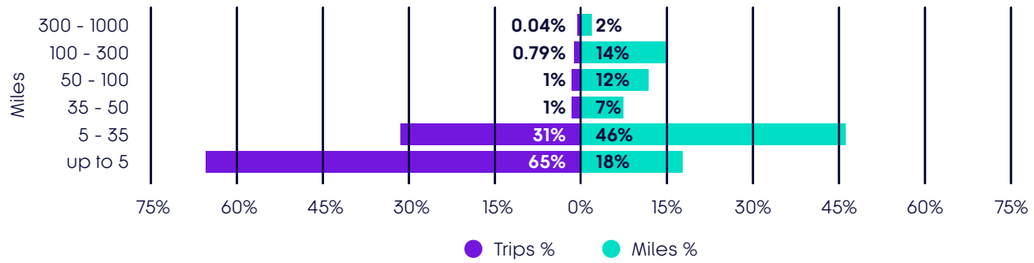
TfN's Decarbonisation Trajectory, set at a regional level, also recognises the importance of scale when attributing longer distance journeys against the decarbonisation budgets of smaller areas of spatial governance. For example, some authorities with relatively small populations may be assigned relatively large emissions because they happen to have a segment of motorway that passes through their boundary, or a large source of traffic, such as a seaport. If through traffic dominates local traffic, the ability of that authority to influence the carbon outcomes are low[6].

Similarly, a smaller authority may choose to discount emissions from through traffic from their decarbonisation plans, resulting in the responsibility for considering those emissions slipping between the gaps of different areas and levels of spatial governance.

Figure 4, compiled from National Travel Survey data, demonstrates that although approximately 95% of passenger trips (all modes) occur at a spatial scale that would suit consideration by a district, county or combined authority, these trips only account for about 65% of all miles travelled.

The remaining 35% of total miles travelled occur on journeys over 35 miles in distance, and whilst some of the longest trips would extend even outside of a pan-Northern focus, the majority of trips over 35 miles will be best considered at a pan-Northern level.

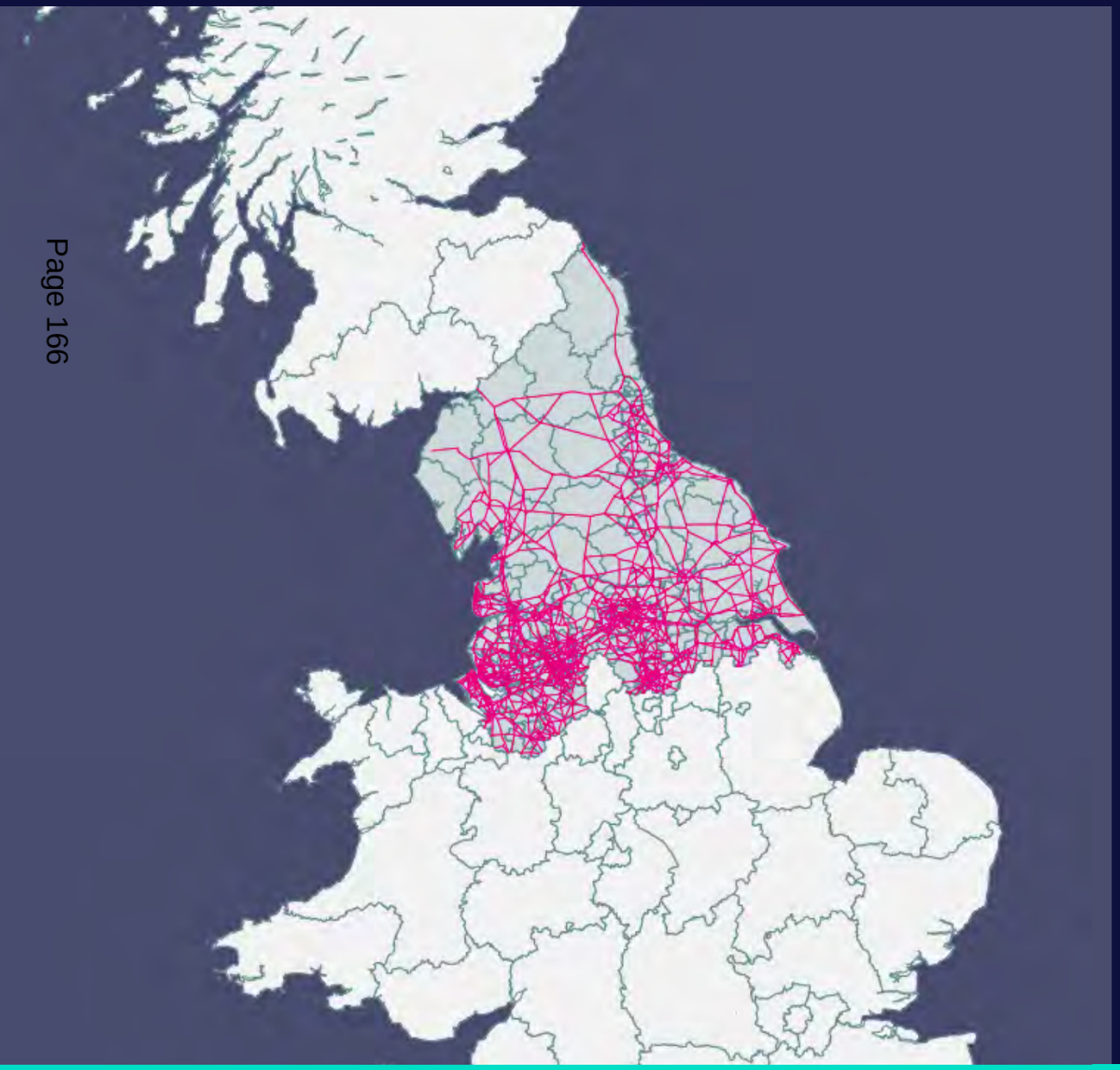
Figure 4: Percentage of trips (all modes) and percentage of all miles, by trip length[7]



[6]Marsden, G. (2020), The Role of Sub-National Transport Bodies in Carbon Governance, DecarboN8 working paper 3.1.
[7]Source: Addel, M. Wadud, Z. and Anable, J. 'An exploratory analysis of long distance travel in England', 99th Annual Meeting of the Transportation Research Board (TRB), Jan 2020, Washington DC.

What is included in our trajectory and why

Figure 5: Map of the Northern boundary in which TfN operates. The blue section represents the areas that TfN covers and the pink roads represent the key roads within this boundary





How we use our trajectory

Providing guidance

To understand what future transport decarbonisation interventions may be required, we need to understand a number of things:

⇒ Where are we likely to be living and working in the future, and what will our travel habits and patterns look like?

⇒ What national and local transport policy is likely to be in place that may affect the carbon emissions of transport?

Once we understand the answers to these two questions, we can work out the approximate carbon emissions from surface transport at a number of set points in the future. These are our future baseline emissions, and when you join these points together, it forms our baseline trajectory.

Of course, the future is not certain, and for that reason TfN has created and modelled a number of Future Travel Scenarios. These scenarios have given us the ability to calculate transport emissions change by scenario and area type - providing four plausible baseline emission trajectories. The scenarios were finalised in late 2020, and their underlying assumptions account for both the economic shock due to the COVID-19 pandemic and a range of plausible outcomes for longer-term behavioural trends that could be affected by COVID-19, such as remote working. More information on how the scenarios framework has been adapted to account for the COVID-19 pandemic can be found within pages 38 to 41 of TfN's Future Travel Scenarios Report. Chapter 3 explains more about the characteristics of each Future Travel Scenario and how they have been used.

If our baseline trajectories exceed our Decarbonisation Trajectory at any point in the future, the gap between the two is known as the **Policy Gap**. As part of the preparation of this strategy, TfN has modelled the Policy Gap for a number of interim points along the Decarbonisation Trajectory.

This Decarbonisation Strategy sets out how these Policy Gaps may be addressed through three main areas:

⇒ Identification of additional local policy commitment required to achieve the Decarbonisation Trajectory.

⇒ Identification of additional national policy commitment required to achieve the Decarbonisation Trajectory.

⇒ Identification of actions that TfN could take to support our local partners and national government in developing and implementing their own measures.

The identification of required additional policy commitment is important as it helps TfN and its partners evidence and illustrate the additional support required from national government to achieve our decarbonisation ambitions as a region. This support could be in the form of additional national policy or Government provision of more devolved funding or powers. Chapter 4 sets out the change in policy commitment that we believe is required to bridge the policy gap found in each Future Travel Scenario, and Chapter 5 identifies and provides qualitative guidance on the measures that are likely to be required to achieve those policy commitments.

TfN's Future Travel Scenarios report (December 2020): https://transportforthenorth.com/wp-content/uploads/TfN_Future_Scenarios_Report_FULL_FINAL_V2.pdf



Making the right decisions

At a strategic level, we need to understand how TfN's Investment Programme (IP) affects the future projected emissions from surface transport in the North.

A number of Intervention Sequencing Strategies, which could deliver our IP, are due to be appraised against our enhanced environmental, social and economic criteria, to understand the full range of benefits that could be delivered by each Sequencing Strategy. As part of this process, changes to surface transport emissions generated in the North as a result of these schemes will be modelled and any increase or reduction layered on top of our baseline emission trajectories, so that we understand the ramifications for the policy gap at given points in the future. Resultant changes to the policy gap will allow us an insight into what local and national decarbonisation policy commitment will be required at different points in the future to allow the schemes to be delivered within the parameters of TfN's Decarbonisation Trajectory. Ultimately, we will be asking the question: *'what needs to be true, if the North is to effectively decarbonise its surface transport as well as enjoy the significant connectivity, economic and environmental benefits that our IP will deliver?'*

The capability has been developed for TfN's Northern Carbon Modelling Tool, NoCarb, to assess the operational carbon emissions impact of highway schemes and their reference cases, through the use of TfN's highway modelling tool (NoHAM). These emissions can then be added to our future emissions baselines and the resultant carbon emissions can be compared to our Decarbonisation Trajectory to understand any changes to the policy gap previously identified (see Chapter 4: Decarbonisation Pathways). Through the functionality of NoCarb, further policy options will then be explored to reduce the policy gap as necessary to keep true to TfN's Decarbonisation Trajectory.

If it is not possible to reduce the carbon impacts of our IP through reasonable increases to decarbonisation policy commitments, to a level that is consistent with our Decarbonisation Trajectory, the recommended delivery of certain projects within the IP may need to be re-sequenced in consultation with our partners to a date when the future travel context enables the programme to operate within the Trajectory. For example, a particular road project may be re-scheduled to a point when the majority of additional traffic generated is by zero emission vehicles.

Recognising that the development of local and national policy is ultimately the responsibility of our partners and national government respectively, and that our actual future travel habits may occur differently from the four plausible Future Travel Scenarios we have modelled, TfN will work with individual scheme sponsors to embed consideration of the Decarbonisation Trajectory within the business case development process for individual projects within our Investment Programme.

Our approach to incorporating the consideration of our Decarbonisation Trajectory within our decision making at a strategic level is illustrated in Figure 6 and our approach to considering embodied carbon at both a strategic and project level is covered in Chapter 6, Consideration of embodied carbon.

How we use our trajectory

Figure 6: Framework for assessing TFN's Investment Programme against TfN's Decarbonisation Trajectory

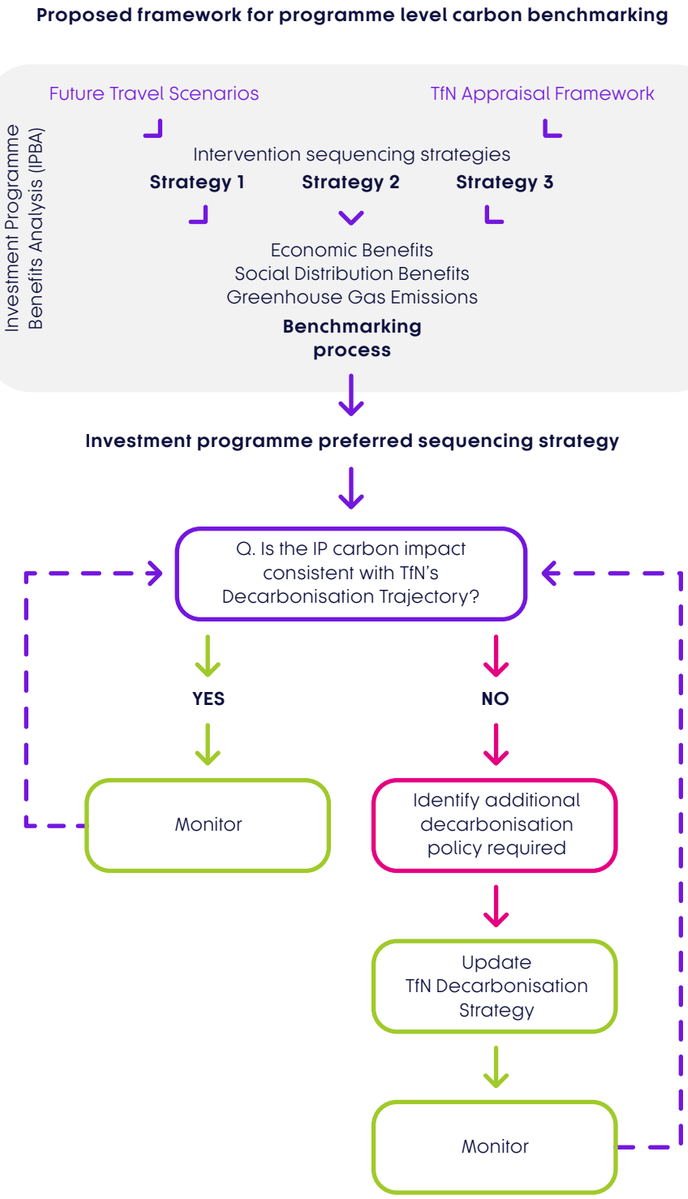
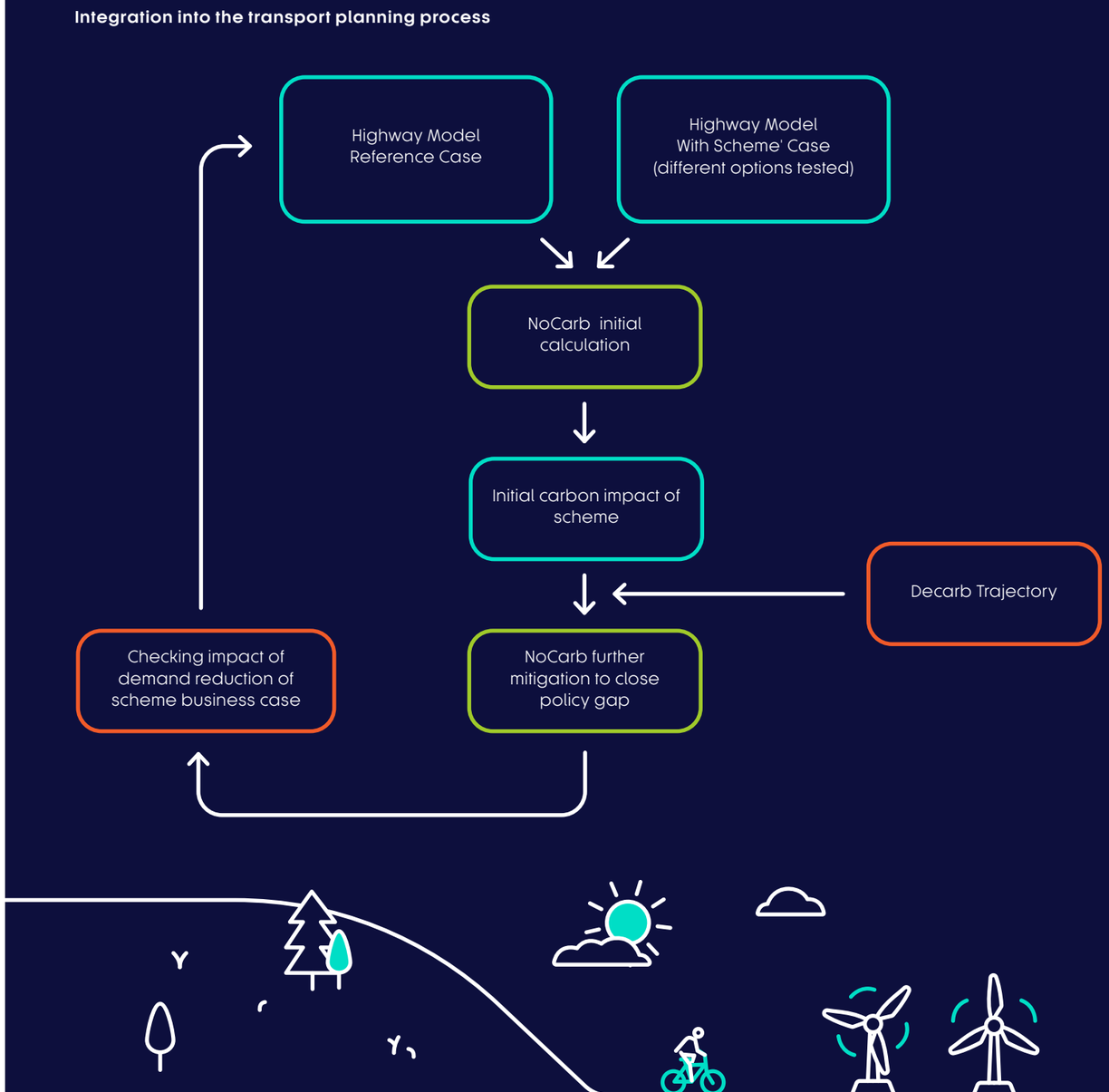


Figure 7: Use of Analytical Framework Tools in Programmatic Appraisal



Estimating current and future emissions

Estimating current and future emissions is key to identifying the policy gap between baseline and decarbonisation trajectories. TfN's Northern Carbon Modelling Tool, NoCarb, was developed for this purpose, taking in historic demand, fleet and emissions data as well as those associated with TfN's Future Travel Scenarios.

This chapter outlines the context and rationale behind TfN's Future Travel Scenarios, and how they have been used during our Decarbonisation Pathway work as a tool for exploring plausible futures for which emissions can be estimated. As the starting point for all four Future Travel Scenarios, the chapter goes on to outline baseline emissions estimates for 2018, before presenting the unique emissions trajectory of each Future Travel Scenario.



Future Travel Scenarios

TfN's Future Travel Scenarios explore how trends in society, the economy and national policy could influence the level and distribution of travel demand in the future. By using a series of different Future Travel Scenarios, we aim to future-proof our decision-making as much as possible, making it resilient to wide-ranging and cross-sector uncertainties.

The Future Travel Scenarios represent factors[8] that are external to TfN's direct control, acting as 'reference cases' to test the performance of TfN strategies and policies against objectives. They form the starting point for TfN's Decarbonisation Pathways.

In each scenario, the level of national government ambition and support for decarbonisation in the North is different, as is the level of support from wider society and the level and distribution of travel demand[9].

Assessing the decarbonisation 'policy gap' - that is, the gap between each Future Travel Scenario's emissions trajectory and TfN's Decarbonisation Trajectory - will allow TfN to develop a resilient Decarbonisation Strategy that can adapt to different future circumstances. The policies and measures that are likely to bridge this policy gap are captured in TfN's Decarbonisation Pathways, which address the different levels of additional action required under each of TfN's four Future Travel Scenarios. This recognises that the same action applied in different scenarios will result in different levels of efficacy in terms of the emissions reductions required.

The Future Travel Scenarios were developed in partnership with Local Authority partners, national delivery partners and academic experts and informed by local strategies and priorities. The scenarios represent uncertainty across the following five external factors:

1. Growth in the population and economy;
2. Spatial planning policy and economic distribution;
3. National policy on environment and sustainability;
4. Technological change and advancement; and
5. Social and behavioural change.

The key elements of the scenarios can be summarised using the following set of 'what if' questions:

⇒ **Scenario 1: Just About Managing** - What if society keeps developing broadly following existing trends? This scenario sees a gradual shift in lifestyles and travel, public and political behaviours do not alter, and we don't give up certain 'luxuries', leaving major developments and change to be shaped by market forces.

⇒ **Scenario 2: Prioritised Places** – What if society becomes focused on quality of life, place-making and community, rather than primarily economic growth? This scenario is led by a change in priorities, with its biggest driver being the push for a fairer redistribution of economic prosperity.

⇒ **Scenario 3: Digitally Distributed** – What if Northern Powerhouse ambitions[10] are realised by using technology solutions to create connections and agglomeration across towns and cities? This scenario is led by technology and some policy influence, as we fully embrace technological change, work remotely, and use an accessible service-based transport system with connected and autonomous shared mobility options.

⇒ **Scenario 4: Urban Zero Carbon** – What if society achieves Northern Powerhouse ambitions by using policy interventions to maximise energy efficient city growth and urban densification? This scenario is led by public and political attitudes to climate action and urban place-making, with the biggest drivers being strong Government policy, resulting in fast action on zero-emission transport systems and places, with integrated planning across energy, spatial and other sectors.

TfN's Future Travel Scenarios Report provides a comprehensive overview of the process undertaken to develop the new Future Travel Scenarios. It also delves into the contextual factors underlying each scenario and the expected implications on transport.

[8] A list of travel-related development, policies and measures under each Future Travel Scenario can be found in the Future Transport Measures and Solutions Annex.
[9] Key national policy changes up to December 2020 are reflected within the Scenarios.
[10] As set out in the Northern Powerhouse Independent Economic Review.

Modelling carbon emissions in the North

Over the past two years, TfN's Technical Assurance, Modelling and Economics (TAME) team has been developing and refining the Analytical Framework: a consistent set of data, modelling tools and appraisal approaches designed for TfN's programmes of transport strategy and business case development. TfN's NoCarb model forms part of the Analytical Framework and draws on other framework elements and data sources to estimate future vehicle emissions. These inputs relate to:

1. The composition of the vehicle fleet by size and fuel type;
2. The distribution of travel demand;
3. Emissions per kilometre travelled for each distinct type of vehicle.

Using these inputs, NoCarb carries out two core functions:

1. Projecting the make-up of future fleets using sales scenarios; and
2. Calculating emissions using fleet, emissions and demand inputs.

The first step involves projecting the make-up of the vehicle fleet under each of TfN's Future Travel Scenarios, while the second step estimates emissions based on the composition of the fleet and distance travelled in a given year. Estimates of kilometres travelled by each vehicle type under each of the Future Travel Scenarios were produced using TfN's travel demand modelling tools. Further information on NoCarb and these travel demand modelling tools is provided in Annex B, available at www.transportforthenorth.com/decarbonisation/

Baseline emissions in the North

Figure 8 provides headline figures related to baseline surface transport emissions in the North. At 25 mega-tonnes of CO_2, surface transport emissions in the North represent nearly one quarter of UK road emissions and 6% of total UK emissions. Over half of those emissions were generated by cars, with HGVs and vans producing 28% and 11% of surface transport emissions respectively. Bus and rail, on the other hand, represent just 5% of emissions.

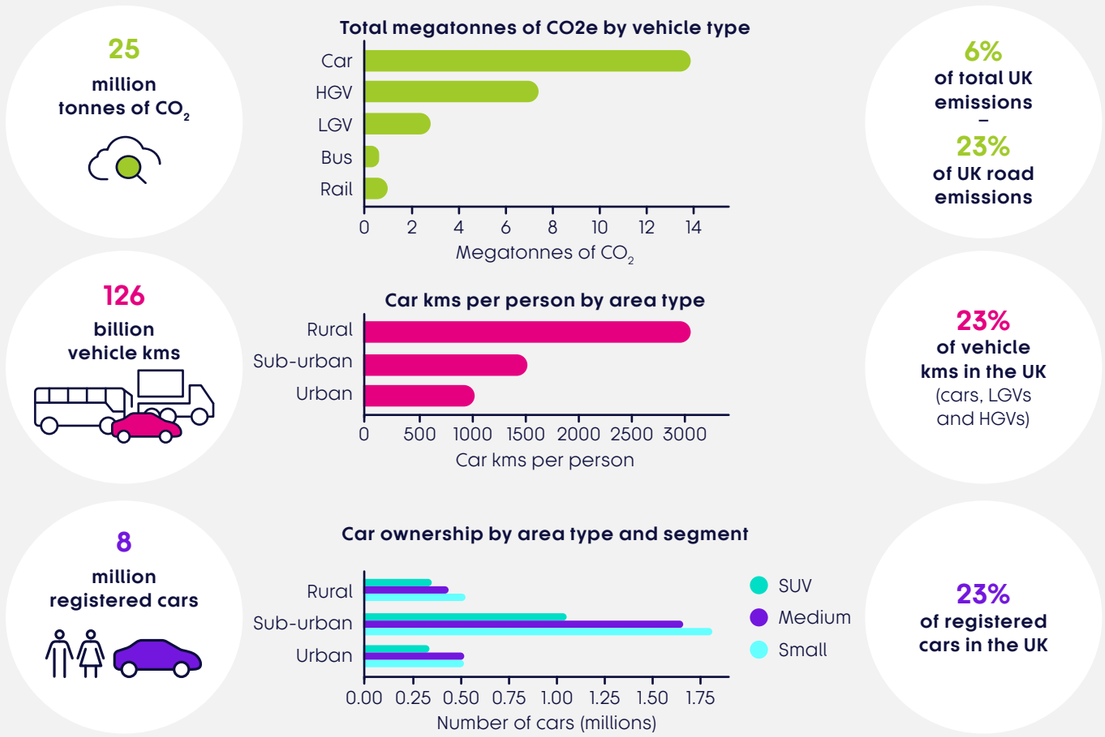
A total of 126 billion kilometres were travelled in the North in 2018, representing 23% of vehicle kilometres travelled in the UK. The majority of the North's travel was through sub-urban areas, though distance per head was much higher for those in rural areas.

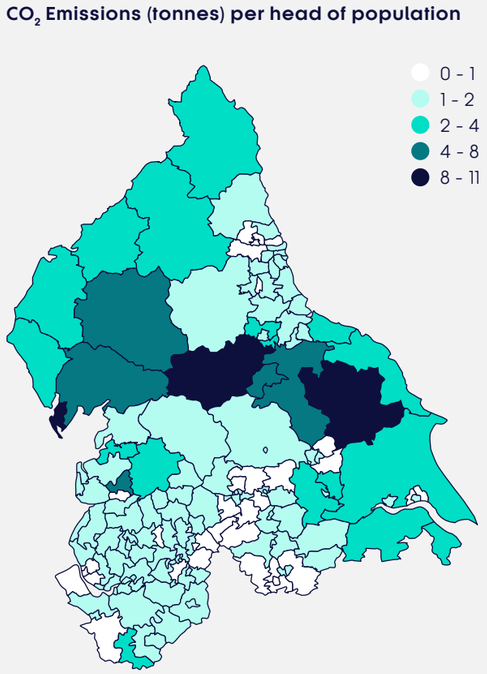
The North had 8 million registered cars in 2018. Large and SUV cars, which typically have higher emissions intensity, made up nearly one quarter of those cars and just under one third of new car sales in that year. This reflects a national trend over the last two decades, which has seen a gradual increase in the purchase of larger cars.

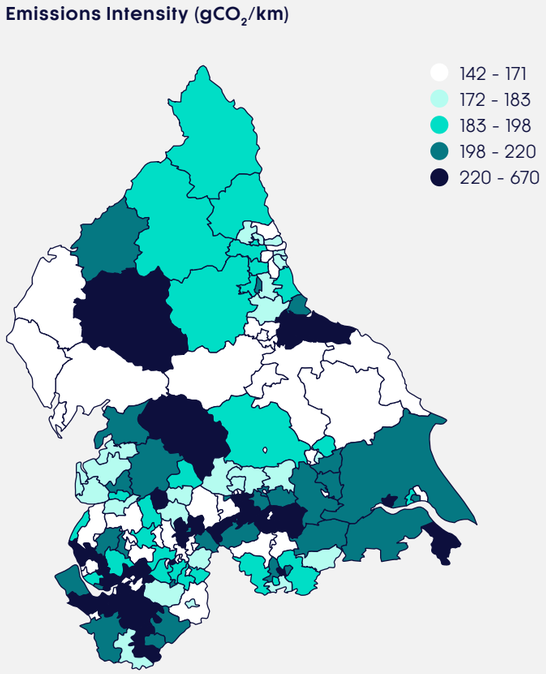
Urban areas typically showed lower CO_2 intensity and emissions per head of population than rural areas. However, there was some variation within area types, with coastal areas having slightly more fuel-efficient cars.

70% of emissions in the North were on the Major and Strategic Road networks, indicating that a high proportion of emissions from private road vehicles is generated by longer distance regional-level trips.

Figure 8: Headline figures related to surface transport emissions in the North in 2018







Emissions by trip purpose and distance

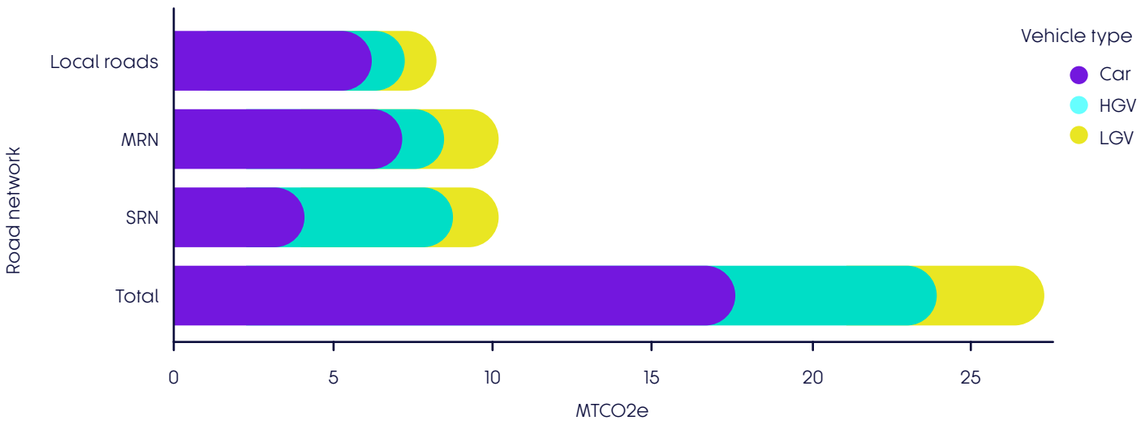
The next two sections show how emissions vary by travel and traveller type in the North of England at a regional level. We have used disaggregate trip data from the National Travel Survey to carry out this illustrative analysis, as some of the parameters are not currently included within NoCarb.

The majority of car emissions in the North related to non-employment related travel, with 67% generated by 'other' travel, 24% by commuting and the remaining 9% by business travel.

Through an increase in remote working and social distancing measures, the pandemic has demonstrated the potential for car emissions to be reduced across trip purposes. In the short-term, as we wait for a greater proportion of the vehicle fleet to be replaced by zero-emissions vehicles, reducing car travel will play a vital role in meeting decarbonisation targets[11].

Three-quarters of car trips in the North were under 5 kilometres, and just under 90% under 10 kilometres. Given their short distance, a notable proportion of these trips could be switched to walking, cycling, e-bikes, or public transport. Medium and long-distance trips, on the other hand, made up the majority of car emissions, with trips over 10 kilometres generating 54% of car emissions. Trips over 50 kilometres, while only representing 1% of car trips, were responsible for 14% of emissions. A significant proportion of these trips are related to leisure travel, with many of these to the north's rural tourism areas including our National Parks. We know that car travel to our National Parks in the North, closely reflects the national figure of 93%[11.5] modal share. The difficulty of shifting these trips to cleaner modes, especially to bus and active travel, demonstrates the importance of decarbonising the vehicle fleet in order to meet decarbonisation targets in the medium and long-term.

Figure 9: Megatonnes of CO_2 in the North by road network: local roads, the Major Road Network (MRN), the Strategic Road Network (SRN) and all of them combined



[11]The CCC estimates that 36% of mitigation will come from "demand reduction" (which includes mode-shift) in the period to 2025.
[11.5]https://www.cnp.org.uk/sites/default/files/uploadsfiles/180226%20National%20Parks%20for%20all%20Making%20car-free%20travel%20easier%20FULL%20REPORT.pdf

Figure 10: Percentage of car emissions in the North by trip purpose

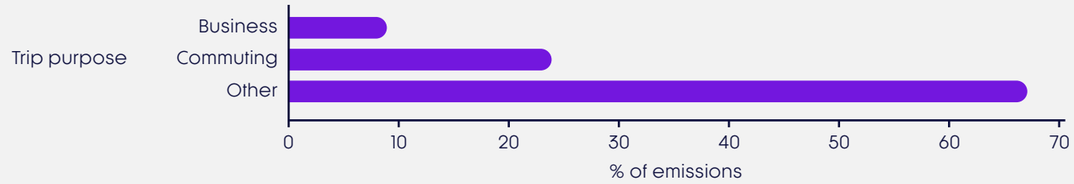


Figure 11: Percentage of car trips by distance

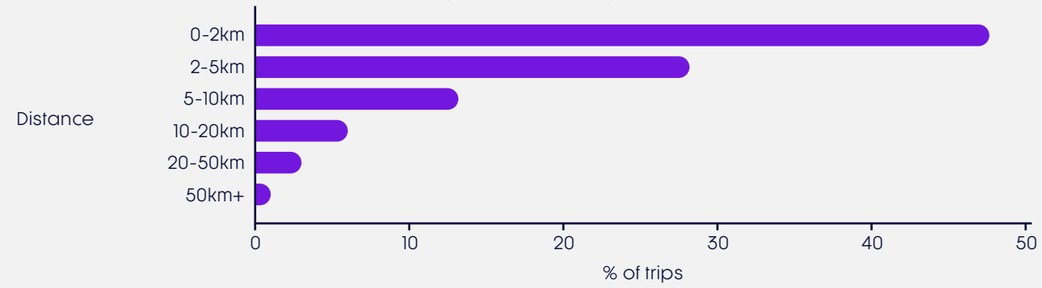
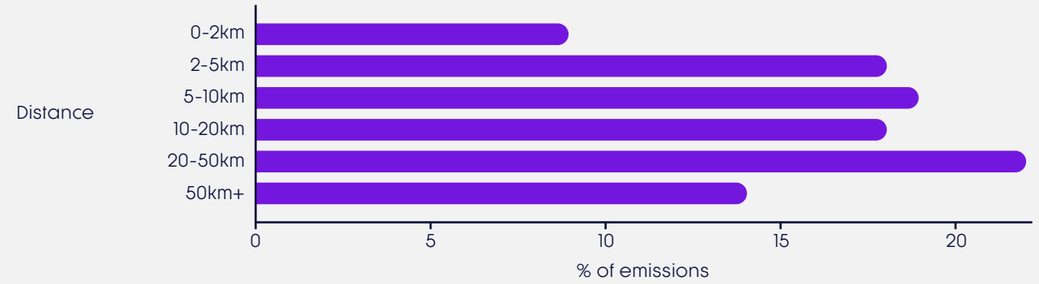


Figure 12: Percentage of car emissions by distance



Beyond surface transport

TfN's existing decarbonisation strategy and trajectory focuses on emissions originating from surface transport in current form. Trips made by surface transport for the purposes or our strategy, are those made on transport modes that run on land, such as cars, buses and trains. However, both aviation and shipping are also significant contributors to transport carbon emissions and in the North, aviation emissions are equivalent to about a third of the emissions from cars. To gain a full picture of the North's transport emissions, we need to understand and incorporate aviation and shipping.

The data analysed in this section originates from the Department for Transport's current trends scenario in the Jet Zero Consultation[12].

Aviation

We intend to work with Partners and an independent expert advisory group to (1) agree TfN's role in relation to aviation and airports, (2) investigate where national policy could be strengthened and (3) the potential actions that could be taken at a regional and local level to further reduce emissions from aviation and airports, additional to what has been proposed by government within its Jet Zero Strategy consultation.

As demonstrated in Figure 13, Northern aviation emissions, like the rest of the UK, are predicted to rise under current trends after a slight decline until 2030, ultimately exceeding present day by 2040[13]. Similarly, Northern aviation traffic demand is predicted to rise between 2020 and 2050 in line with the rest of the UK (Figure 14). However, compared to the rest of the UK, the North is predicted to see a corresponding rise in emissions under current trends, with the rest of the UK showing a reduction in emissions despite a rise in aviation trips, as demonstrated Figure 15.

Figure 13, Future Emissions Predictions for Northern Airports under Current Trends

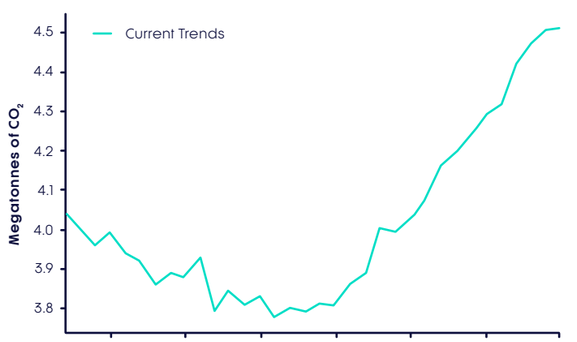
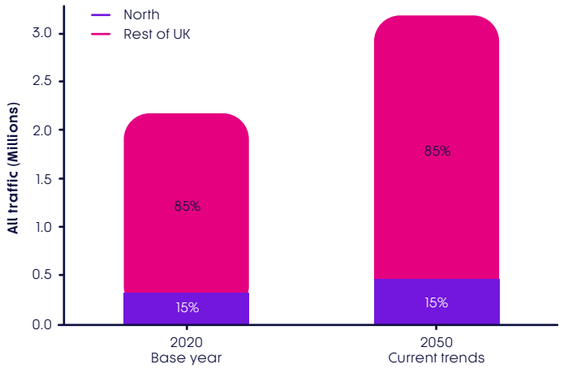


Figure 14: Comparison in Predicted Trips by Air, in 2020 and 2050, between the North and the Rest of the UK



[12]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1002716/jet-zero-consultation-a-consultation-on-our-strategy-for-net-zero-aviation.pdf
[13]Based on the Jet Zero consultation forecasts.

Figure 15, Comparison of Predicted Aviation Emissions in 2020 and 2050, between the North and the Rest of the UK



Domestic aviation emissions make up around just 5% of total emissions arising from aviation in the North. Figure 16 shows that whilst international aviation emissions from northern airports is predicted to grow from 3.9 to 4.4 megatonnes of CO2 between 2020 and 2050 under current trends, emissions from domestic aviation is set to fall from 0.13 to 0.11 megatonnes under the same timescales. As the aircraft used for domestic trips are usually much smaller than those used for international trips, it is expected that they will be more suited to transitioning under early zero-emissions developments. International contributions dominate emissions from the aviation sector and both size of aircraft and longer flight durations mean it will be difficult to achieving net zero emissions through technology alone.

Figure 16: Future Emissions Prediction for Northern Airports from Domestic and International Aviation



Shipping

Breakdowns of shipping emissions by region are not yet available, however, TfN is committed to reflecting shipping in its decarbonisation trajectory and will develop the corresponding modelling tools to support this ambition.

Distributional impacts

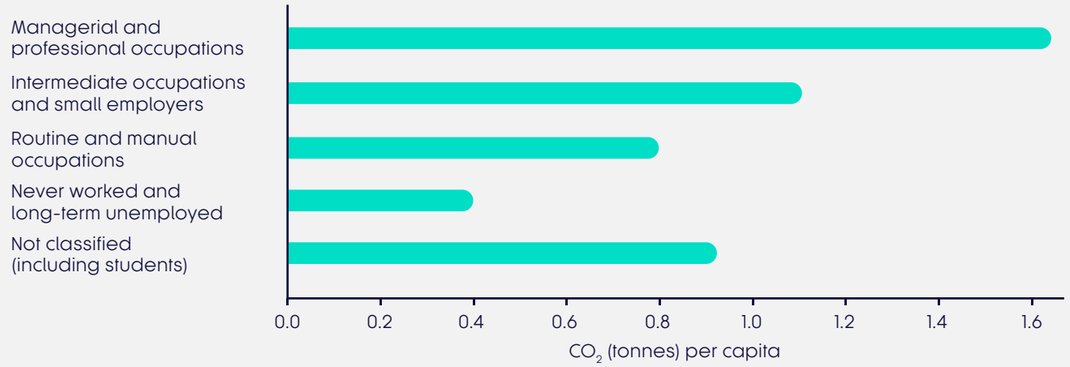
Distribution of emissions by employment group[14]

Different sections of the community produce varying rates of emissions. Our analysis[15] suggests that individuals in managerial and professional occupations produced the highest car and van emissions per capita out of all employment groups (Figure 17), representing around half of car and van emissions in 2018. Alternatively, non-working individuals produced the lowest car and van emissions per capita (representing less than 2% of total emissions in 2018).

Individuals in managerial and professional occupations were similarly responsible for the majority of rail emissions, making up over 60% of the total distance travelled by rail.

With the lowest total emissions of all modes, bus travel was slightly skewed towards those in routine and manual occupations and unclassified individuals (representing 38% and 15% of bus emissions respectively). Individuals in managerial and professional occupations, on the other hand, represented just 22% of bus emissions in 2018. These figures align with evidence that lower income groups are more likely to use buses than those on higher incomes, as the cost of bus travel is lower than trains and cars[16]. This highlights that, to effectively reduce surface transport emissions, proportionately greater focus will be needed on transport decarbonisation measures that are likely to affect higher-income groups.

Figure 17: Tonnes of CO_2 per capita by employment group

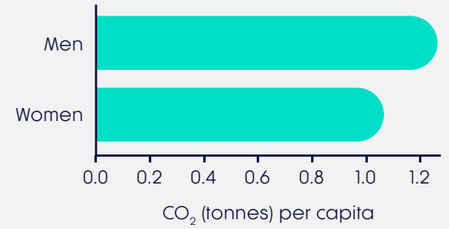


Distribution of emissions by gender

Responsible for 52% of car and van travel in the North, men produced slightly higher car and van emissions per capita than women (Figure 18). This is equivalent to the gender split of drivers, with 52% of trips recorded as having a man as the main driver. Trips taken by men also had slightly lower car occupancies, with an average of 1.93 people in a car or van compared to 2 for women.

Men represent just over half of rail emissions, making up 56% of rail travel in the North. The opposite is true for bus travel, with 56% of bus emissions produced by women.

Figure 18: Tonnes of CO_2 per capita by gender



[14]These employment groups relate to the Office for National Statistics' Socio-economic classifications (NS-SEC).
[15]This analysis was derived from the National Travel Survey 2017, filtered to only include trips that took place in the North. The share of emissions was assumed to be equivalent to the share of car, van and taxi kilometres travelled by each group. For the purpose of this analysis, it was not possible to isolate unique trips, so there may be some instances where trips were counted more than once (i.e. where people from the same household travelled together). Looking exclusively at trips undertaken by car/van drivers (or taxi passengers over 16 years old), the trends explained in this section are even more extreme. For example, the share of emissions increases from 50% to 54% for individuals in managerial and professional occupations and increases from 52% to 60% for men. The share of car and van emissions does not reflect the type and age of vehicles, meaning that newer, lower-emitting cars may slightly offset some of the emissions by higher-income groups.
[16]Gates, Shivonne et al. Transport and inequality: An evidence review for the Department for Transport. NatCen Social Research. 2019.

Distributional impacts

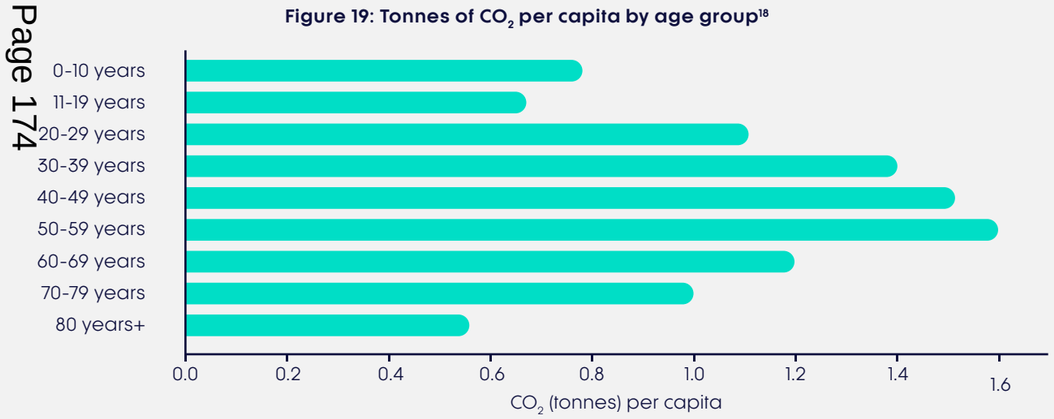
Distribution of emissions by age

Over 50% of car and van emissions, and 60% of rail emissions, were produced by people aged 30-60 years old. Covering most of the working age population, this likely reflects more commuting, business and escort[17] trips.

50-60 year-olds had the highest share of car and van emissions per capita out of all age groups (Figure 19), while teenagers and people over 80 had the lowest per capita emissions.

Bus travel was weighted more towards groups outside of the typical working age. 11-19 year-olds represented the highest share of bus emissions at 22%, and 60-69 and 70-79 year-olds together represented 29% of bus emissions.

Figure 19: Tonnes of CO_2 per capita by age group[18]



[17]Such as driving children to school or other activities.
[18]Emissions have been assigned to passengers as well as drivers.

What this means for decarbonisation

While this section provides a high-level overview of how emissions can vary across groups, it is not an exhaustive list; nor does it capture the complex relationships between income, gender, age, disability, location (to name a few) and carbon consumption. For example, research suggests that low-income individuals in rural areas experience the worst effects of transport poverty, with high transport costs and low public transport access[19]. Nevertheless, emissions intensity and emissions per head is often higher in rural areas compared to urban and sub-urban areas. This means that these individuals could be disproportionately disadvantaged by targeted decarbonisation measures, such as emissions-based fees for road-use charging.

Considering the impact of decarbonisation methods on different groups is critical to ensuring that the gap between disadvantaged and privileged groups is narrowed rather than widened. This is discussed further in Chapter 5.



[19]Gates, Shivonne et al.

Future emissions estimates
All of the scenarios presented within this chapter have incorporated existing national decarbonisation policy ambitions as set out in the Government's transport decarbonisation plan . The success of these measures in reducing the vehicle emissions intensity of the fleet and reductions in vehicle kilometres travelled, will vary under the different scenarios, reflecting a range of plausible future trends in society and the economy as well as differing levels of technological and societal readiness for the changes required.

Scenario 1: Just About Managing

Under Just About Managing, economic growth continues at a moderate rate and is largely market-driven, consumption-led and unequal (both geographically and socially). While there is global climate change awareness, as people become more conscious of regular disasters, the policies introduced under this scenario are not radical enough to meet the UK carbon budgets and the net-zero target of 2050.

The main consequence of this scenario is that highway networks become increasingly congested, and public transport levels remain similar to today. This is also reflected at the global scale, meaning that extreme weather events become more common in the UK, leading to frequent disruption to transport networks.

Mode	Demand growth[20] 2018-2050	CO_2 emissions in 2030 (mega-tonnes)	CO_2 emissions in 2050 (mega-tonnes)
Car	28%	10.9	0.0
Van	47%	1.7	0.0
HGV	6%	8.0	0.1
Rail	83%	0.6	0.4
Bus and shared mobility	-3%	0.3	0.0
Active travel	4%	0.0	0.0

What if society continues to develop in line with existing trends?

⇒ Existing trend of urbanisation and growth distribution continues. Little change in demographics and from travel behaviour seen today.

⇒ No transformation in level of economic growth. Reactive political direction results in a rigid economy, lacking agility and vulnerable to economic shocks.

⇒ Net Zero 2050 target not met – climate change and travel disruption becomes more extreme.

⇒ Technology uptake driven by existing policy (including those provisions laid out within the Government's transport decarbonisation plan); Electric Vehicle (EV) uptake at slowest rate of all four scenarios and some autonomy in the fleet. Continuation of shared transit and public transport use as seen pre-2020.

⇒ Continued trends of active travel, with increases experienced during 2020, although any further step-change increase would require a continued and committed impetus.

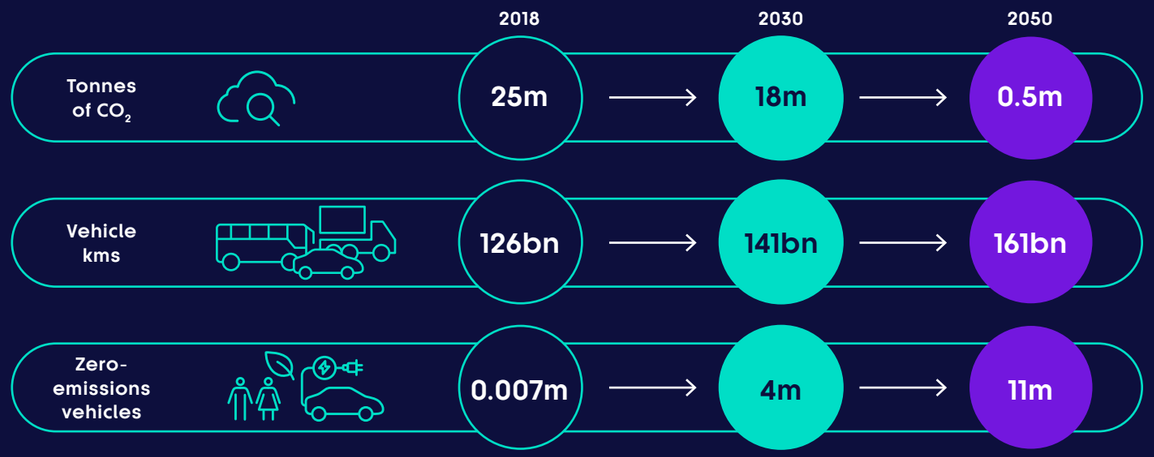
⇒ Moderate growth in remote working. Continuation of freight transportation as seen today.

Area type	Population in 2050 (millions)	Vehicle kilometres in 2050 (billions)	CO_2 emissions in 2050 (mega-tonnes)
Urban	3.9	21.9	0.0
Sub-urban	9.8	90.0	0.1
Rural	2.3	49.0	0.0

Increases in car, van and HGV demand are largely offset by a growing share of zero-emissions vehicles. Despite the higher costs associated with zero-emissions HGVs, the introduction of non-zero HGV sales phase out dates by the Government of 2035 for lighter HGVs and 2040 for heavier HGVs, results in a curbing of diesel HGV sales. This leads to near zero emissions by 2050 but exceeds our 2018-2050 carbon budget by over 100 megatonnes of CO_2e.

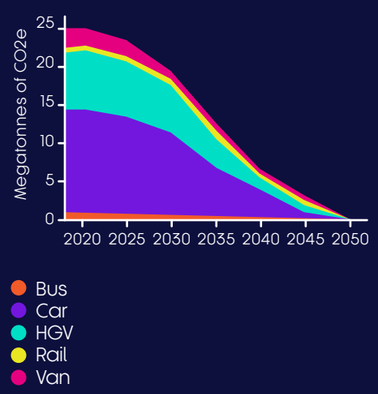
Vehicle type	Fuel type	Share
Car	BEV	99%
Car	PHEV	1%
Van	BEV	98%
Van	PHEV	2%
HGV	BEV	97%
HGV	Diesel	1%
HGV	Hydrogen	2%

[20]Due to differences in modelling, demand growth for cars, vans and HGVs was measured as a growth in total vehicle kilometres travelled, while bus, rail and active travel was measured as a growth in the number of trips.



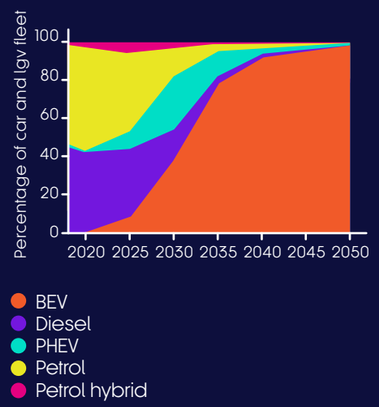
Mode breakdown

Total megatonnes of CO2e by vehicle type



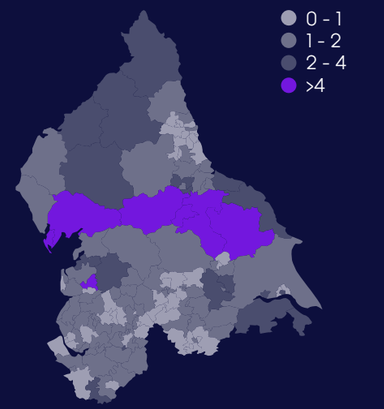
Fuel breakdown

Share of car and lgv sales by fuel

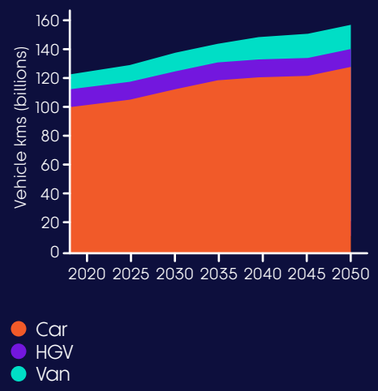


Area breakdown

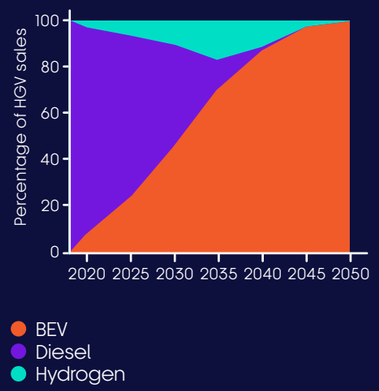
CO_2 emissions (tonnes) per head of population: 2030



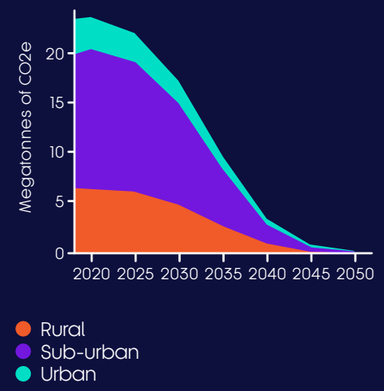
Total vehicle kms by vehicle type



Share of HGV sales by fuel type



Total megatonnes of CO2e by area type



Future emissions estimates

Scenario 2: Prioritised Places

Prioritised Places sees a focus on work-life balance and social equity within and between places. This involves a shift in the UK's political and economic direction to ensure that no place is left behind. Every area, including cities, towns and rural and coastal areas, has a bespoke local economic strategy, supported by investment in local assets and economic and social infrastructure. This scenario is led by a change in priorities, with the biggest driver being the push for a fairer redistribution of economic prosperity. Although an emphasis on localising activity and use of public transport helps to reduce emissions at a more rapid rate, a failure to sufficiently embrace technology sees continued private mobility ownership and a struggle to realise a fully zero-emission transport network before 2050.

Mode	Demand growth 2018-2050	CO_2 emissions in 2030 (mega-tonnes)	CO_2 emissions in 2050 (mega-tonnes)
Car	30%	10.0	0.0
Van	47%	1.6	0.0
HGV	1%	7.6	0.1
Rail	122%	0.6	0.4
Bus and shared mobility	19%	0.3	0.0
Active travel	13%	0.0	0.0

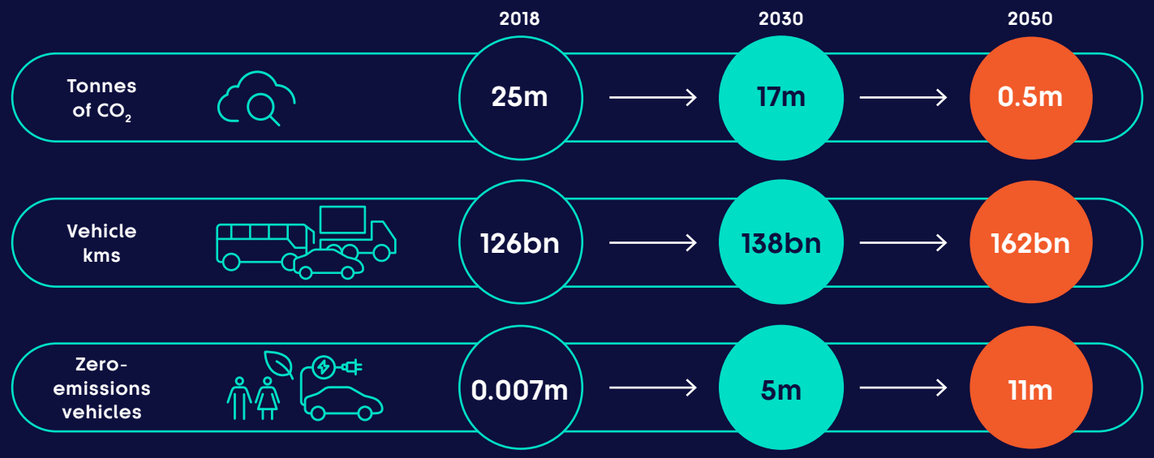
What if society becomes more focused on place, place-making and community than growth or connectivity?

- ⇒ Bespoke local strategies, focusing on quality of life, place-making and community, rather than primarily economic growth. Slower growth in cities, more in towns and rural/coastal areas.
- ⇒ No transformation in level of economic growth, but society is more equitable and there is a fairer distribution of prosperity across the region.
- ⇒ Moderate growth in electric vehicles and some autonomy, especially in cities. Realisation of benefits for vulnerable groups, people with disabilities and extending Autonomous Vehicle (AV) networks to more isolated areas.
- ⇒ More active and public transport within communities. People value face-to-face interaction.
- ⇒ Focus on work-life balance and social equity within and between places.

Area type	Population in 2050 (millions)	Vehicle kilometres in 2050 (billions)	CO_2 emissions in 2050 (mega-tonnes)
Urban	3.8	20.7	0
Sub-urban	9.6	87.8	0.1
Rural	2.7	53.4	0

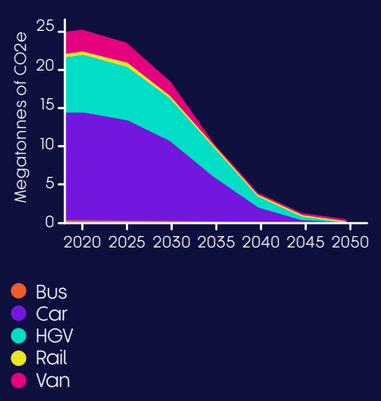
Similar to Just About Managing, increases in car, van and HGV demand are largely offset by a growing share of zero-emissions vehicles, though only a marginal increase in demand means that the emissions are slightly lower than in a Just About Managing scenario.

Vehicle type	Fuel type	Share
Car	BEV	99%
Car	PHEV	1%
Van	BEV	99%
Van	PHEV	1%
HGV	BEV	97%
HGV	Diesel	1%
HGV	Hydrogen	2%



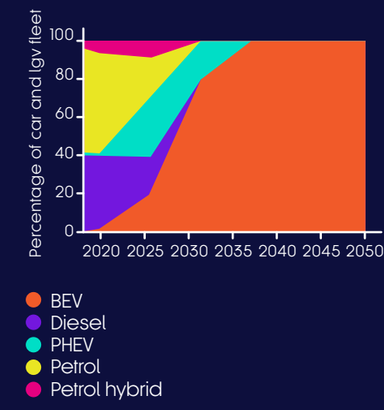
Mode breakdown

Total megatonnes of CO2e by vehicle type



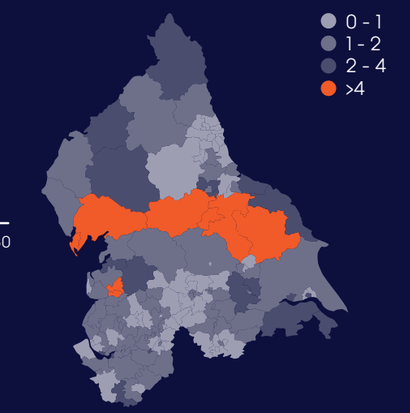
Fuel breakdown

Share of car and lgv sales by fuel

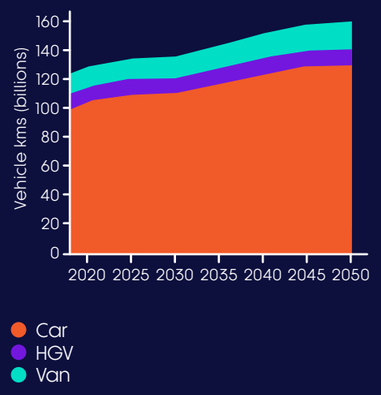


Area breakdown

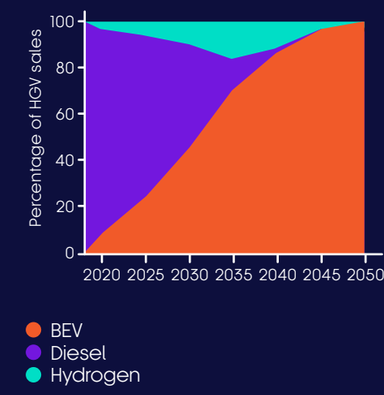
CO_2 emissions (tonnes) per head of population: 2030



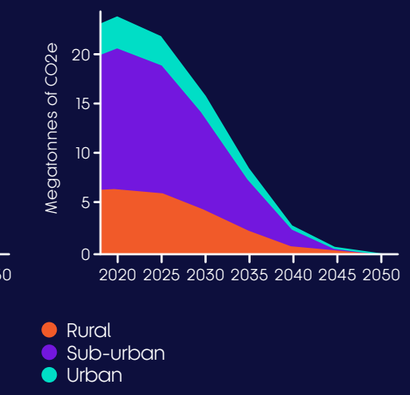
Total vehicle kms by vehicle type



Share of HGV sales by fuel type



Total megatonnes of CO2e by area type



Future emissions estimates

Scenario 3: Digitally Distributed

This scenario sees a future where digital and technological advances accelerate, transforming how we work, travel and live. In general, we embrace these technological changes and the move towards a distributed, service-based transport system, with the biggest drivers being technical advances and a willingness to embrace mobility-as-a-service and shared mobility.

Long-term climate change targets are nearly met, but there is slow progress in the short-term due to a general preference for individualised mobility over traditional public transport.

Mode	Demand growth 2018-2050	CO_2 emissions in 2030 (mega-tonnes)	CO_2 emissions in 2050 (mega-tonnes)
Car	44%	9.6	0.0
Van	74%	1.6	0.0
HGV	4%	7.9	0.1
Rail	78%	0.6	0.0
Bus and shared mobility	11%	0.3	0.0
Active travel	6%	0.0	0.0

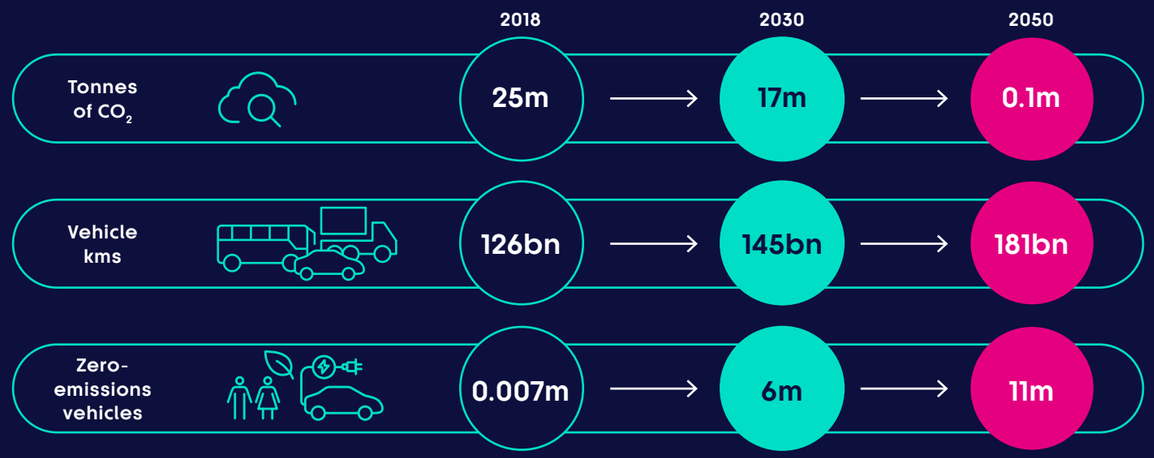
What if society achieves Northern Powerhouse Independent Economic Review (NPIER) outcomes by using technological solutions to create connection and agglomeration across towns and cities?

- ⇒ Growth dispersed between cities and towns and less city-centric.
- ⇒ High uptake of EV, Ultra Low Emissions Vehicles (ULEVs), Zero Emissions Vehicles (ZEVs) and driverless vehicles results in near-zero emissions in 2050 (but slow progress in the short-term). Some fiscal and regulatory action to influence technology use, but congestion persists in places due to availability of transport options. Increased digital remote working and dispersed employment means trip lengths are longer but less often.
- ⇒ General willingness to embrace Mobility-as-a-Service (MaaS) and shared mobility - through technology acceptance which supports increased efficiency and use of road capacity.
- ⇒ Freight warehousing, distribution and logistics centres are distributed.
- ⇒ Transformational economic growth as towns and cities see polycentric agglomeration and become more interdependent, due to better skills-matching within geographical areas.

Area type	Population in 2050 (millions)	Vehicle kilometres in 2050 (billions)	CO_2 emissions in 2050 (mega-tonnes)
Urban	4.0	24.4	0
Sub-urban	10.6	101.4	0.1
Rural	2.6	54.9	0

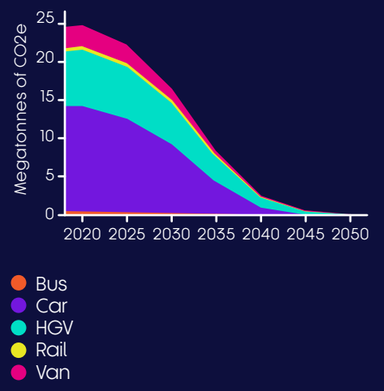
Similar to Just About Managing and Prioritised Places, emissions in 2030 show slow progress in reducing emissions. However, faster uptake rates in zero-emissions cars and vans results in final cumulative emissions exceeding our 2018-2050 carbon budget by approximately 75 megatonnes (25 megatonnes less than Just About Managing).

Vehicle type	Fuel type	Share
Car	BEV	100%
Van	BEV	100%
HGV	BEV	97%
HGV	Diesel	1%
HGV	Hydrogen	2%



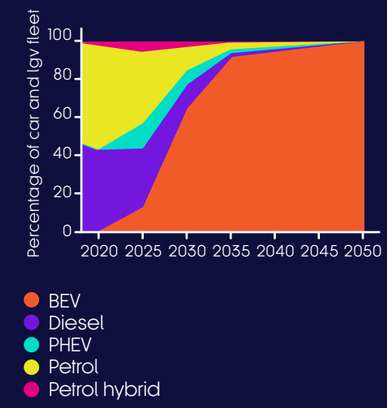
Mode breakdown

Total megatonnes of CO2e by vehicle type



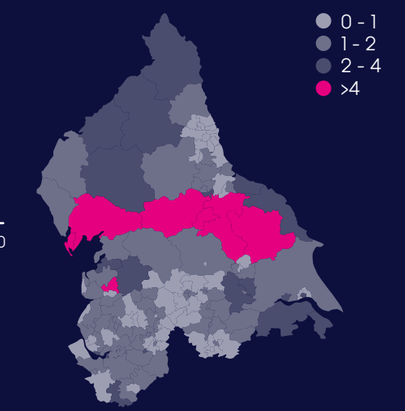
Fuel breakdown

Share of car and lgv sales by fuel

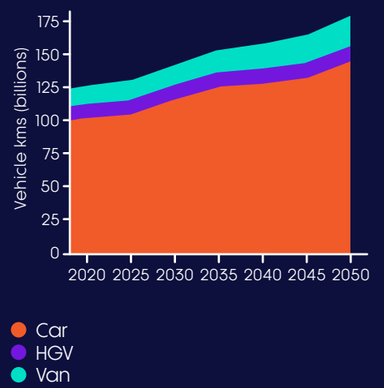


Area breakdown

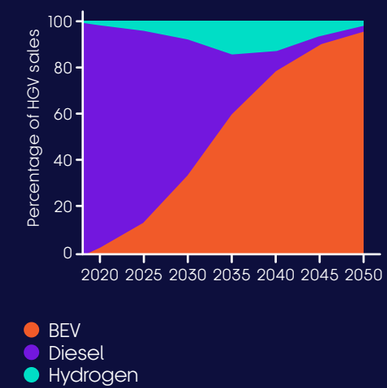
CO_2 emissions (tonnes) per head of population: 2030



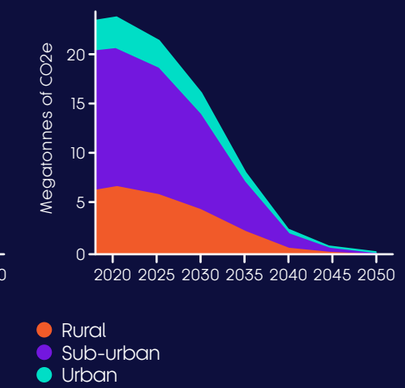
Total vehicle kms by vehicle type



Share of HGV sales by fuel type



Total megatonnes of CO2e by area type



Future emissions estimates

Scenario 4: Urban Zero Carbon

This scenario sees a significant shift in public attitudes towards action on climate change, and a strong government response to meet it. Transport and energy planning and systems are adapted and integrated to deliver effective clean networks. Almost all road transport is powered by electric drivetrains ahead of 2050, with an increasing supply of low-carbon hydrogen available for some vehicles.

This scenario is led by attitudes to climate action and urban placemaking, with the biggest drivers being strong government policy and urban densification.

Mode	Demand growth 2018-2050	CO_2 emissions in 2030 (mega-tonnes)	CO_2 emissions in 2050 (mega-tonnes)
Car	10%	7.1	0.0
Van	50%	1.2	0.0
HGV	-3%	7.6	0.1
Rail	193%	0.6	0.0
Bus and shared mobility	21%	0.3	0.0
Active travel	30%	0.0	0.0

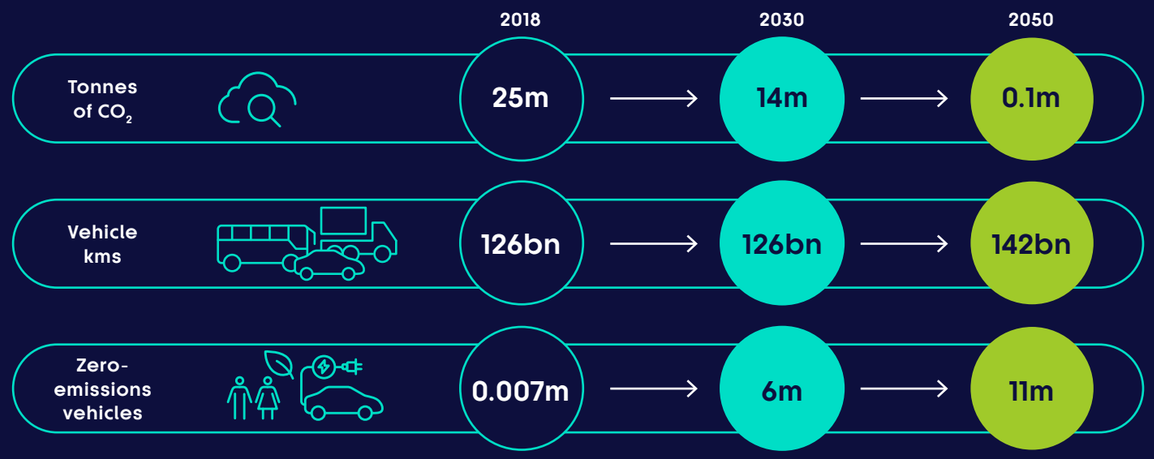
What if society achieves NPIER outcomes by using policy intervention to maximise energy-efficient city growth?

- ⇒ Cities and large towns become more dense but attractive places to live. Large rural settlements may benefit, others will see reduction in population and employment without support of national policy.
- ⇒ Transformational economic growth primarily through urban agglomeration and place-making.
- ⇒ Strong fiscal and regulatory action set us on a pathway to near-zero carbon before 2050. Increased devolution leads to integrated transport and energy systems which deliver clean networks.
- ⇒ Urban living reduces remote working and increases urban freight consolidation centres.
- ⇒ Increased public and active transport, including shared mobility, as public and private travel becomes blurred.
- ⇒ All new vehicles have a high level of autonomy, but are not fully autonomous by 2050. Shared AVs are well integrated into urban transport systems to complement public transport, but this doesn't extend to rural areas or small towns. Opportunities are not available to all, both geographically and due to attitudes and abilities with technology, sharing and data use.

Area type	Population in 2050 (millions)	Vehicle kilometres in 2050 (billions)	CO_2 emissions in 2050 (mega-tonnes)
Urban	4.9	20.6	0
Sub-urban	10.0	78.8	0.1
Rural	2.3	42.4	0

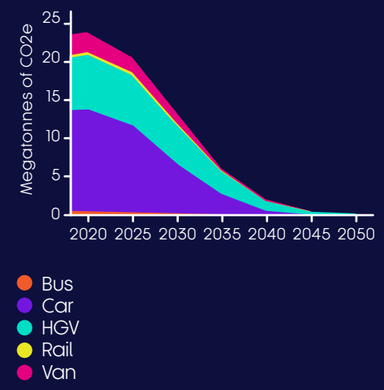
This scenario sees increased demand across public transport and active modes, with a decrease in HGV demand. Consequently, it sees the lowest residual emissions out of all scenarios but still exceeds the 2018-2050 carbon budget by 50 megatonnes (half that of Just About Managing).

Vehicle type	Fuel type	Share
Car	BEV	100%
Van	BEV	100%
HGV	BEV	97%
HGV	Diesel	1%
HGV	Hydrogen	2%



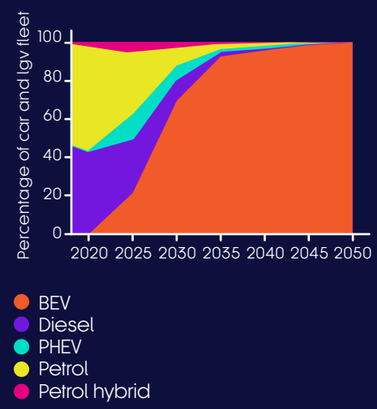
Mode breakdown

Total megatonnes of CO2e by vehicle type



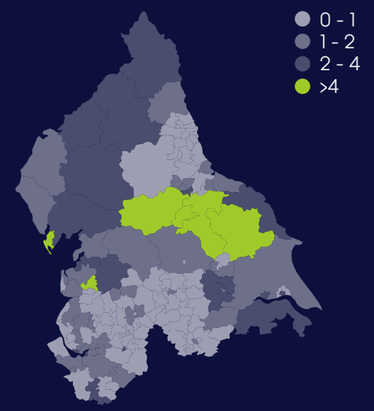
Fuel breakdown

Share of car and lgv sales by fuel

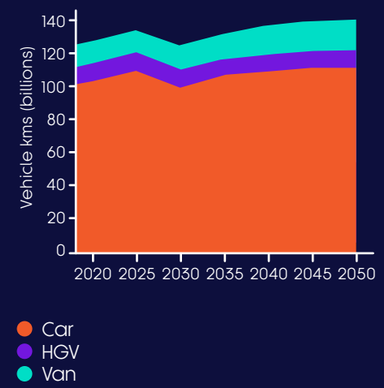


Area breakdown

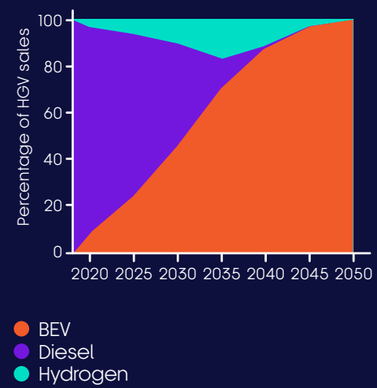
CO_2 emissions (tonnes) per head of population: 2030



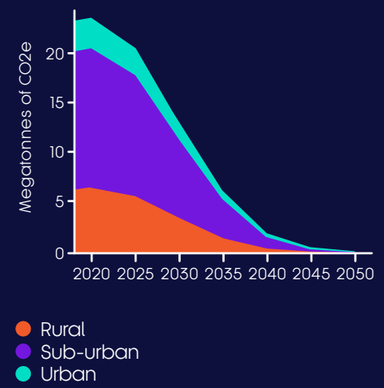
Total vehicle kms by vehicle type



Share of HGV sales by fuel type



Total megatonnes of CO2e by area type



Future Travel Scenarios compared

Just About Managing sees the highest emissions overall as public transport use and active travel remains largely unchanged from today's levels and there is a slower uptake of zero-emissions cars and vans in the short-term. Prioritised Places sees slightly more ambitious emissions reductions in the short-term compared to Just About Managing through an emphasis on localised activity and use of public transport, though a failure to sufficiently embrace technology sees similar emissions to Just About Managing by 2050.

With high-density living, a rapid uptake of zero-emission vehicles and strong government action on climate change, Urban Zero Carbon sees the lowest emissions in all years and exceeds the carbon budget by the least. Digitally Distributed sees slower progress in the short-term due to more dispersed growth, slightly slower uptake of zero-emission vehicles and a preference for individualised transport.

By 2030, emissions are likely to continue to vary significantly across different parts of the region, although progress is made in reducing emissions across all area types. Residual emissions in 2050 across all scenarios are near zero, but all scenarios still significantly exceed the 2018-20250 carbon budget, reflecting the critical challenge of embracing alternative technologies in the near future **and** also the need to start reducing road vehicle mileage immediately.

Figure 20: Total emissions in each scenario

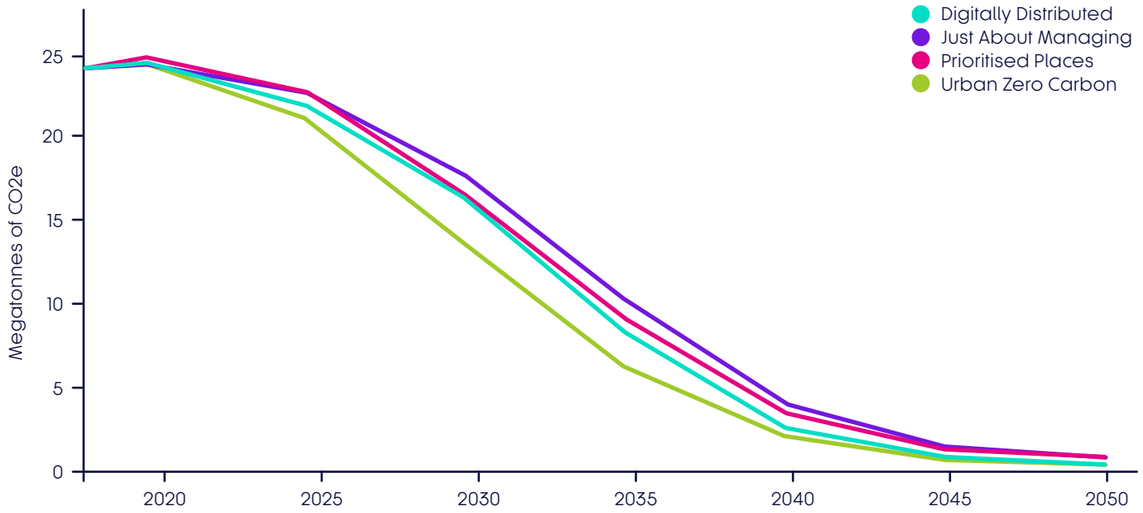
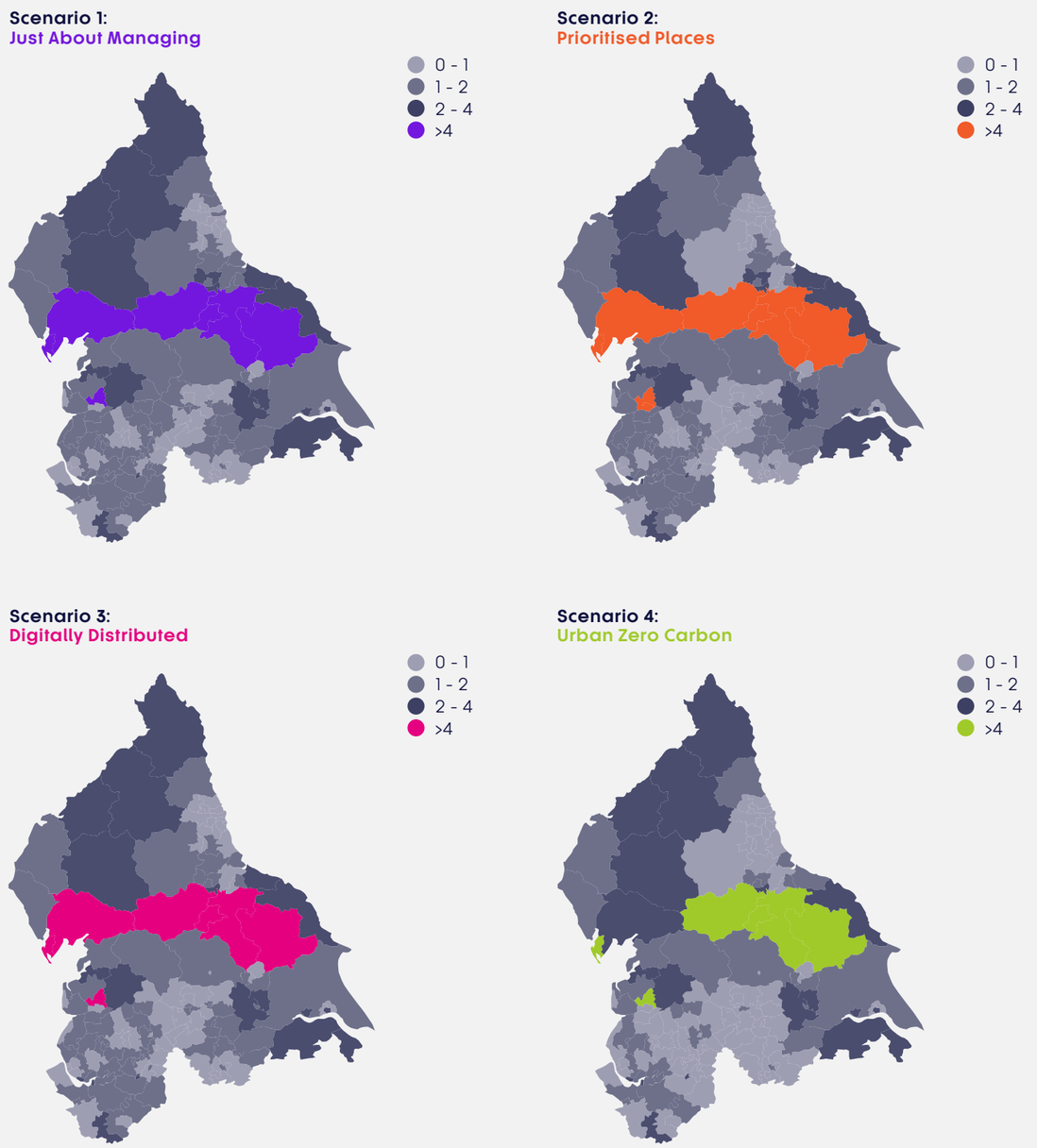


Figure 21: CO_2 emissions per person (tonnes) in 2030 under each Future Travel Scenario, broken down by TfN's geographic zones



Indirect emissions

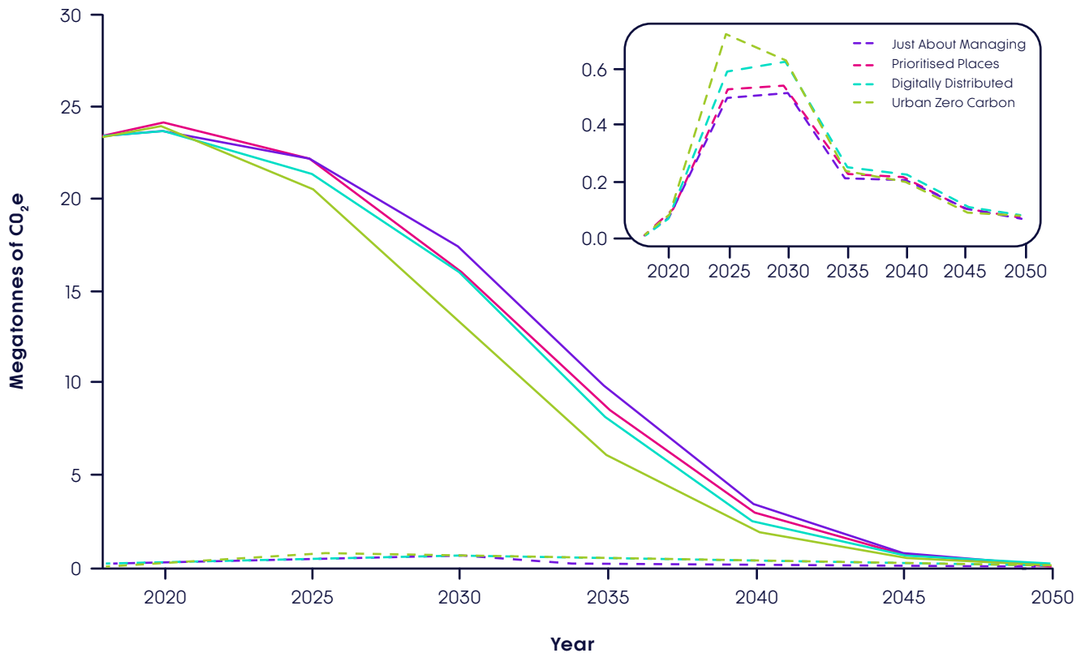
As the vehicle fleet transitions to electric propulsion there will be an increasing demand for electricity. Using the electricity carbon intensity assumptions from the CCC's Balanced scenario, we have carried out high-level analysis of how electric vehicle use under each scenario will affect indirect emissions associated with increased electricity demand[21]. As Figure 22 shows, the emissions are very low compared to surface transport emissions.

Due to higher carbon intensity associated with electricity and a rapid uptake of zero-emission and plug-in hybrid electric vehicles in the short-term, Urban Zero Carbon and Digitally Distributed show the highest indirect emissions in 2025 and 2030. However, as electricity is increasingly produced by more renewable sources, indirect emissions slowly decrease from 2030 to be close to zero by 2050.

The Government published its response to its consultation on smart charging in July 2021[22], and as a result it is expected mandate a 'smart' requirement for private chargepoints sold in the UK.

Within their Future Energy Scenarios 2021[23], nationalgridESO predict that under all scenarios, offshore wind makes up over half of electricity supply by the late 2030s, with wind and solar power providing at least 78% of generation by 2050. The scenarios also demonstrate the significant potential of smart charging and Vehicle to Grid (V2G) technology to not only achieve significant 'shaving' of peak system demand from EVs under all scenarios, but also the potential for net EV demand at peak times to become negative from the mid-2030s (under more ambitious scenarios), with more power being fed back to the grid from EVs at these times than is used to charge them.

Figure 22: Tailpipe and indirect emissions in each scenario



[21] For this simple, illustrative calculation we have replaced all hydrogen fuelled HGVs in our modelling with battery electric HGVs.
[22] Electric vehicle smart charging - GOV.UK [www.gov.uk]
[23] Future Energy Scenarios (July 2021), nationalgridESO, page 149 [https://www.nationalgrideso.com/document/199871/download]

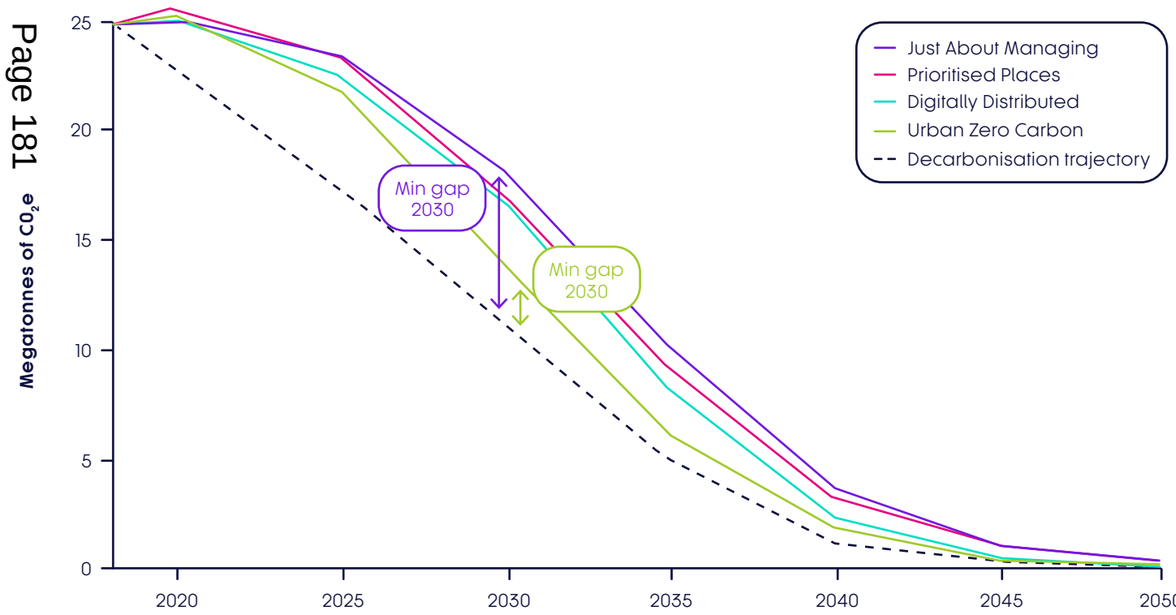


Decarbonisation Pathways

Chapter 2 set out TfN's Decarbonisation Trajectory and Chapter 3 introduced the Future Travel Scenarios, which show varying levels of progress towards that trajectory as a result of background trends and the different plausible policy approaches that national government might take. In this chapter we examine the 'policy gap' that could exist between these baseline scenarios and TfN's Decarbonisation Trajectory, and establish the broad Decarbonisation Pathways that TfN and partners could seek to follow to close the gap in the coming decades.

Figure 23 shows the Decarbonisation Trajectory alongside the four baseline trajectories, with our estimated minimum and maximum scale of the policy gap in 2030 shown as an example.

Figure 23: Total emissions by scenario compated to the Decarbonisation Trajectory



The Decarbonisation Trajectory sets a total carbon budget of approximately 290 mega-tonnes of CO_2 from 2018 to 2050. All scenarios exceed this budget from 2030, despite Urban Zero Carbon and Digitally Distributed achieving close-to-zero emissions by 2050. This demonstrates the importance of rapidly reducing emissions in both the short and long term.

Figure 24: Cumulative emissions by scenario compared to the target trajectory

Decarbonisation Pathways

Table 1: The absolute and cumulative policy gap between the highest and lowest polluting scenarios when compared against the Decarbonisation Trajectory

Year	Absolute gap (mega-tonnes CO_2)		Cumulative gap (mega-tonnes of CO_2)	
	Max	Min	Max	Min
2025	6	4	26	22
2030	7	3	59	39
2035	5	1	88	48
2040	3	1	107	52
2045	1	0	114	54
2050	0	0	117	54

Table 1 shows how the policy gap varies in milestone years, both in absolute terms and cumulatively.

A number of key messages can be drawn from this table:

⇒ **In the short term**, there is a large absolute policy gap across all four scenarios, which ultimately exhausts the entire carbon budget from 2030. It will be challenging to bridge this gap with policies that take time to have an effect, such as vehicle fleet policies that only tend to affect new vehicles, or infrastructure that takes time to plan and construct. Demand-management and mode-shift policies that can be implemented quickly will be essential

⇒ **In the longer term**, recent policy announcements have significantly reduced the uncertainty around emissions from both light and heavy-duty vehicles, meaning the absolute policy gap by 2050, could be relatively small in some scenarios. However, a requirement to find a zero-emission solution that sees a significant level of transition to zero-emissions HGVs pre-2035, is necessary to remain within the carbon budget.



Bridging the gap will involve a combination of policies and regulations that target vehicle sales, mode-shift, demand reduction and improved fuel efficiency. As a first step in assessing how the gap can be closed, we have established some broad-brush 'rules of thumb' on the scale of change needed in the vehicle fleet and in road transport demand – we refer to these as our Decarbonisation Pathways. In Chapter 5, we set out a more detailed analysis of the policies that might be needed to achieve the required scale of change. This policy analysis forms the building blocks of our Decarbonisation Strategy.

Each of the Future Travel Scenarios reflect the Government's phase out of date for the sale of new petrol and diesel vehicles from 2030 and new hybrid vehicles by 2035. The Government's proposed phase out dates of non-zero HGVs below 26t by 2035, and HGVs above 26t by 2040, are also included. While theses phasing out targets are a significant reform, rapidly increasing zero-emissions vehicle sales and shifting towards smaller, less polluting vehicles sales in the period to 2025 will be crucial and further policy commitment will likely be needed[24].

In addition to a change in fleet composition, policies that shift demand to active and public transport modes, reduce demand overall and improve fuel efficiency will be necessary in both the short and long-term. These policies are especially important in the short-term as fleet composition changes and infrastructure developments take time to implement.

[24]In line with CCC analysis (Fifth Carbon Budget), vehicle efficiency improvements (as defined by planned EU/UK new vehicle regulations) have been reflected in all Future Travel Scenarios.

Decarbonisation Pathways

Table 2: Scale of change required (relative to a given year) to reduce emissions in line with the Decarbonisation Trajectory

		2025	2030	2035	2040	2045
Zero-emissions share of sales[25]	Cars	55%	100%	100%	100%	100%
	Vans	40%	100%	100%	100%	100%
	HGVs	26%	44%	95%	100%	100%
BEV high mileage CO_2 reduction[26]	Cars	20%	20%	20%	20%	20%
Public transport CO_2 reduction on baseline	Bus	15%	40%	70%	90%	100%
	Rail	0%	25%	75%	100%	100%
Reduction in distance travelled relative to baseline growth	Cars	1-4%	3-14%	3-14%	3-14%	3-14%
	Vans[27]	5%	10%	10%	10%	10%
	HGVs	3-5%	11-15%	6-15%	6-15%	6-15%
Conventional vehicle efficiency CO_2 reduction[28]	Cars and vans	3.6%	3.6%	3.6%	3.6%	3.6%
	Artic HGVs	22%	22%	22%	22%	22%
	Rigid HGVs	13%	13%	13%	13%	13%
Share of car sales	Large cars[29]	27%	22%	17%	10%	10%

Table 2 outlines the broad pathways to bridge the policy gap in all Future Travel Scenarios. The measures demonstrate the significant scale of change required in both the short and long-term, requiring over half of car sales, and 40% of van sales, to be zero-emissions in the next four years. This also requires a reversal of recent trends favouring the purchase of larger cars – from 32% of car sales in 2018 to 20% in 2025, and 10% from 2030[30]. A rapid transition of high mileage vehicles, such as taxis and company cars to battery electric (accounted for in Table 2 within the 'BEV high mileage CO_2 reduction' category) will be needed, along with an ambitious transition of bus and rail to zero-emission technologies.

[25]Apart from public transport CO_2 reductions, all of the measures outlined in this table are relative to the baseline in a given year (i.e. they are not cumulative or related to 2018). For example, the BEV high mileage CO_2 reduction in 2030 relates to emissions that have been projected in 2030 under each scenario.
[26]Rapidly transitioning the most intensively used vehicles in the fleet to battery electric will lead to a relatively larger amount of vehicle miles falling within the BEV segment. We express this as a reduction in CO_2 - in this case, an additional 20% reduction in emissions from cars.
[27]The next stage of analysis will consider scenario-specific variation in van demand. However, it is worth noting that van emissions are notably smaller than cars and HGVs, meaning that a variation in van reduction across scenarios would have a small effect on overall emissions.
[28]Relative to the baseline in a given year. This means that the efficiency measures will have a decreasing effect on absolute emissions as the fleet transitions to ZEV vehicles, where efficiencies will translate to less demand on the electricity grid.
[29]Large cars are defined as a collection of the Euro Car Segments categorisation, which can be found here: https://en.wikipedia.org/wiki/Euro_Car_Segment. This is used to allow a mapping to the categorisation used in COPERT for speed-emission curves. While these measures seek to target conventional vehicles in the short-term, smaller electric vehicles also support reduced demand for electricity in the medium and long-term.
[30]As the fleet transitions to zero-emissions vehicles, it is assumed that the rate of fleet turnover will be unchanged. This will be supported by increasing price parity of zero-emissions vehicles, lower operating costs, improved zero-emissions charging infrastructure and other measures to disincentivise owning and operating a conventional vehicle.

As we wait for zero-emissions vehicles to make up a larger proportion of the vehicle fleet, car demand (i.e. the total vehicle kilometres projected to be travelled in a given year) will need to be reduced by 1% to 4% in 2025[31] and 3% to 14% in 2030[32] to bridge the residual emissions gap. Van and HGV demand reduction will also be required, achieved through a combination of operational and logistics efficiencies and freight mode-shift where possible. Finally, improving the fuel-efficiency of conventional vehicles is an essential component to emissions reductions. Recent evidence from the Climate Change Committee suggests that eco-driver training and enforcement of 70mph speed limits could improve conventional car efficiency by 3.6%, and that improved aero-dynamic designs and drag reduction, in combination with driver training, could improve artic and rigid HGV efficiency by 22% and 13% respectively. To support rapid emissions reduction in the short-term, the maximum improvement in conventional vehicle efficiency will be required by 2025.

The scale of change identified in this section is indicative of the difficulty of the decarbonisation challenge which is faced everywhere. The changes shown here are not policies set in stone but show that rapid action will be required across mode-shift, technological change and demand reduction on a significant scale.



[31]This would bring 2025 demand to around a 4%-5% increase on total vehicle kilometres travelled in 2018.
[32]This would bring 2030 demand to anywhere between -5% and +1% of 2018 levels.

Policy analysis

Within the previous chapters, we have:

1. Introduced our four Future Travel Scenarios;
2. Explained how they have been used to estimate future emissions (our baseline trajectories);
3. Identified the difference between future emissions under each scenario and those that would be required under our Decarbonisation Trajectory (known as the Policy Gap);
4. Identified the broad-brush level of policy commitment required (our Decarbonisation Pathways) to bridge those Policy Gaps and achieve our Decarbonisation Trajectory.

This chapter provides further detail about the measures required to deliver on these policy commitments and the relevant roles and responsibilities of government, our Partners and TfN in implementing them. The measures are grouped into the following themes:

1. Zero Emission Vehicles (ZEVs)
2. Demand Management
3. Improvements to conventional vehicle efficiency

Each theme is accompanied by a high-level summary of policies and actions that our evidence suggests will help achieve the changes set out in Table 2 in Chapter 4, Decarbonisation Pathways. This includes high-level analysis of the broad scale of policy commitment required under each theme, covering quantified and costed policies where possible. It also includes some high-level narrative on the distribution of responsibility across the themes:

1. **TfN:** Measures that could be effectively undertaken at a regional scale or a Sub-national Transport Body level of governance and therefore led or facilitated by TfN with a focus on the things we can do to support our local partners in the preparation of their Local Transport Plans (LTPs)
2. **Government:** Actions required by national government that should be brought forward within the action plans and policy measures needed to underpin the commitments made within the governments transport decarbonisation plan, including additional national policies and appropriate devolution of funding and powers.
3. **TfN Partners:** Measures that might be employed by our partners, subject to receiving sufficient national funding, recognising that each place within our region will have different decarbonisation timescales and different geographies, demographics and patterns of passenger and freight demand that require a bespoke place-based approach.

Further details of these packages of policies is provided in Annex A – Detailed policy recommendations.

It's important to note that the measures identified for consideration at a local level are intended as guidance for our partners to aid their consideration of the most effective mix of measures and actions, applicable to their individual places. We recognise that local policy makers are best placed to understand what will and won't work, for the communities within their own areas.

In recognition of the unique landscapes underlying each scenario, the magnitude of change varies across scenarios. This is especially the case for demand reduction, but applies across most other measures, where the gap between baseline projections and the required level of change (such as ZEV sales) is larger in some scenarios than others. This means our analysis has allowed us to develop supporting policy recommendations that can be adapted and implemented differently, depending on the evolution of future travel trends.



Modal Shift and Demand Management

		2025	2030	2035	2040	2045
Reduction in distance travelled relative to baseline growth	Cars	1-4%	3-14%	3-14%	3-14%	3-14%
	Vans	5%	10%	10%	10%	10%
	HGVs	3-5%	11-15%	6-15%	6-15%	6-15%

As it will take time for new ZEV vehicle sales to translate into a substantial proportion of the fleet, it is essential to shift journeys away from private cars to sustainable modes and find ways to avoid journeys. In the long term, as the fleet becomes predominantly electrified, even if running on energy generated through renewable sources, a ZEV will still have a significant carbon footprint through the emissions embodied in its manufacture.

Travel demand reduction also provides a range of other co-benefits, even with a predominantly electrified fleet, such as improving local air quality and safety whilst reducing congestion and avoiding potential transport related social exclusion issues. A shift to active travel also has the potential to improve the physical and mental wellbeing of users. These demand reductions will require significant behavioural change – from a culture focused on personal car use to one that embraces shared mobility and active travel – and a comprehensive set of policies and supporting infrastructure to facilitate it.

There is a large and growing evidence base on the policies required to achieve this behaviour change[33]. Here we summarise the key areas:

1. Encouraging mode shift to walking, cycling, micro-mobility[34] and public transport
2. Disincentivising car use and avoiding unnecessary travel
3. Encouraging the uptake of shared mobility
4. Improving freight efficiency
5. Ensuring transport and land-use planning processes encourage sustainable choices

Encouraging mode shift to walking, cycling, micro-mobility and public transport

To achieve significant mode shift, investment will be required in bus, rail and cycling infrastructure to improve journey times and quality and ensuring these networks are accessible and affordable to all. Funding must be made available for bus and rail, including investment to deliver improved journey times and reliability; targeted reduction and flexibility in fares; network expansions; and fleet improvements. A commitment to £3bn of funding has already been made by the Government to improve buses outside of London, out of which £25 million will be provided during 2021/22 to support partnership and franchising development, including a Bus Centre of Excellence[35].

The potential for rail to substitute for longer distance car trips, particularly those associated with leisure and domestic tourism is significant, and network expansion, including through schemes such as High Speed 2 and Northern Powerhouse Rail will play a part in stimulating modal shift for these types of journeys. Similarly, new major public transport nodes and capacity are likely to lead to additional development and shifts in population and employment to places that are well connected, leading to impacts on travel patterns beyond the use of the schemes themselves.

The shifting of freight movements from road to rail also has the potential to deliver large emissions reductions, even without the electrification of the freight lines themselves. Our decarbonisation pathway assumes a modest level of shift, and TfN's Freight and Logistics Strategy will focus on how this shift could be maximised.

[33] See for example:
- https://www.gov.uk/government/publications/switching-to-sustainable-transport-a-rapid-evidence-assessment
- https://www.transportforqualityoflife.com/policyresearch/
- https://www.local.gov.uk/decarbonising-transport

[34] Micro-mobility refers travel undertaken on small, lightweight vehicles such as e-bikes and e-scooters.
[35] Bus back better - GOV.UK (www.gov.uk).

Marketing and engagement must also be used to rebuild public confidence in the safety and value of public transport following the COVID-19 pandemic. Increasing uptake in active travel will require policies and investments that promote comfort, safety and convenience and prioritise provision for active travel ahead of motorised transport, particularly the private car. Local planning policies can play a role, for example by protecting pedestrian use of pavements and supporting active commuting by requiring workplaces to provide appropriate facilities. Policies should also promote safe and accessible use of e-bikes and scooters for longer distance trips.

Both local and national planning policy should place greater emphasis on the location of new development in relation to existing and proposed public transport hubs. New developments without easy access to public transport should consider how appropriate alternatives are incorporated (e.g. shared transport solutions). A related approach is to remove the need to travel long distances by creating '15- or 20-minute neighbourhoods', where residents can meet most needs within a short walk or cycle and use public transport to access other services.

Disincentivising car use and avoiding travel

In addition to making alternative options more attractive, policies that make car travel less attractive or encourage people to avoid travel altogether should be part of the mix. These policies can also generate revenue that can be reinvested in sustainable transport solutions. These measures will be particularly important given the low running costs of Electric Vehicles, which will lead to significant demand growth and make mode shift more difficult if appropriate price signals are not introduced.

Parking policy is an important tool to manage demand for car travel. This can include reducing parking supply in urban centres and introducing schemes like a Workplace Parking Levy (see Figure 26). City centre land occupied by parking is often valuable and can be repurposed, for example as cycling infrastructure or green space. Related policies that restrict car access, such as Low Traffic Neighbourhoods, can also be effective at reducing car use and car ownership.

Working from home became a necessity for many during 2020, and this has been linked to a decrease in car traffic. Ongoing home-working after the pandemic will lead to fewer commuter trips, but evidence is mixed on the net carbon impact of this trend due to travel activities that can replace commuting or using more energy per person in the home setting compared to the office. On balance, evidence suggests there is likely to be an energy saving in most circumstances[36] and homeworking should be supported, particularly where it provides other benefits to quality of life.

Road user charging could be one option to manage demand as a complement to and eventual replacement for fuel duty. This could include measures such as congestion charging and road tolls. Smart technology solutions should be used to target charges at the most congested times of day, the most polluting vehicles and at discretionary car trips, rather than essential travel, for example by key workers. Time-of-day and emissions-based pricing would have the added benefits of improving network efficiency and incentivising the purchase of ZEVs.

Our transport system needs to reflect the true cost of our travel choices, inclusive of the full range of negative externalities associated with road transport, such as local air quality effects and congestion, alongside the direct costs of highways development and maintenance. These costs need to be considered alongside the costs and benefits of public transport and active travel with the ultimate ambition of developing a fairer pricing system that delivers on key outcomes such as modal shift and reducing congestion.

Equally, the relationship between released or increased highways capacity and increased car use is recognised. Current scheme development processes ensure that development schemes that increase highways capacity are appraised to consider these adverse consequences alongside other social, environmental and economic benefits. However, it is also important that the projects and programmes within which they sit, are compliant with national pathways to net-zero and TfN's own pathway to close to zero by 2045. In line with the Climate Change Committee's recommendations, investments in roads should also be accompanied by proportionate investment in EV charging infrastructure, active travel and public transport[37].

[36] A systematic review of the energy and climate impacts of teleworking. Hook et, al, ERL (2020).
[37] Progress in Reducing Emissions 2021 Report, Climate Change Committee, Jul 2021, Table A6

Modal Shift and Demand Management

Encouraging the uptake of shared mobility

Shared mobility refers to a number of different services that make low or zero emission vehicles accessible to people. They can involve lift sharing, car hire, car clubs, demand-responsive bus services, taxis, and cycle and e-scooter hire schemes. Widespread availability of such services can reduce the need to own a car, and lower car ownership is strongly correlated with lower car use[38].

Use of shared vehicles can be encouraged through the provision of dedicated car club parking spaces combined with stringent parking standards for new development. The use of planning obligations and the Community Infrastructure Levy can fund shared vehicle provision in new developments. Similar approaches can be adopted with cycle hire schemes, and the UK e-scooter trial offers an opportunity to increase the impact of such schemes by incorporating new forms of mobility.

Demand-responsive bus services are more convenient for many travellers than traditional bus services in that they are not bound to a fixed route or timetable. Supporting the provision of these services would help reduce car dependency and complement established public transport networks. This may be particularly important in settings with lower population density, where traditional public transport services need to be heavily subsidised. The Government's Rural Mobility Fund was launched to trial demand responsive transport solutions for providing transport services which work better for local residents of rural and suburban areas than traditional transport services. Through this fund, significant trials have commenced in Cheshire East, Cheshire West, Cumbria and North Lincolnshire.

Mobility-as-a-Service (MaaS) can encompass the benefits of all these modes, providing a platform to access different mobility solutions. Such services offer reduced cost, low-carbon options in areas with low EV home-charging potential, linking public transport and improving accessibility and reliability. 'Mobility Credits' could be used as an incentive to trade older, more polluting private cars for public transport or shared vehicle use.

"Homeworking should be supported, particularly where it provides other benefits to quality of life."

Improving freight efficiency

Freight operators are already strongly incentivised towards efficiency, as it helps them to increase their competitiveness. However, some opportunities are not being taken due to market failures, such as a lack of information, an inability to coordinate between operators, or a consumer willingness to pay for fast deliveries at the expense of energy efficient outcomes. These barriers can be overcome through a number of policies described below.

Road-user charging is one way to incentivise operators to use vehicles more efficiently. By increasing the unit cost per mile, there will be an additional incentive to reduce vehicles running empty which will improve vehicle efficiency and make rail a more financially competitive option. This would be complemented by other freight efficiency measures, where information and technology alternatives help prevent policy costs being passed on to consumers.

[38] https://www.creds.ac.uk/shared-mobility-where-now-where-next/

Figure 25: Green Growth Boards

In their formal consultation response to the Planning for the Future white paper, the Royal Town and Planning Institute (RTPI) proposed the formation of **Green Growth Boards**, bringing together local authorities with other organisations of strategic scale to support cross-boundary cooperation and make the connections between housing, employment, transport, energy, water, natural resources, public health and climate change, recognising that a full systems approach is needed to effectively tackle any one of these areas[39].

Green Growth Boards

'Just-in-time' deliveries and next day deliveries can significantly reduce opportunities for freight consolidation. A campaign to encourage shippers to offer a green shipping option as standard could demonstrate best practice, whilst lower prices for, and the provision of information about, green shipping options could influence consumer behaviour. Other 'green' shipping practices include deliveries in low traffic periods and encouraging consumer uptake of local community drop off/pick up points, reducing emissions due to congestion and improving last-mile delivery efficiency.

Accurate and shareable data on goods and vehicles could allow optimisation between companies that reduces empty running of vehicles. Data formats and sharing protocols must be designed to allow this sharing without risk of prosecution under anti-collusion regulation. This sharing would also enable government and local planning bodies to track freight data to make evidence-based decisions about freight optimisation and consolidation centre planning.

Ensuring transport and land-use planning processes encourage sustainable choices

Transport and land-use planning processes can have a substantial impact on the relative investment in car use versus more sustainable modes. Several of the policies outlined within this strategy are determined by this process but in this section, we focus on the policies themselves.

Augmented project appraisal processes could encourage a reduction in demand through a stronger focus on projects' environmental impacts. This would see a more rigorous assessment of a transport project's impact on carbon, air quality and the urban realm, as well as the whole life carbon impacts of infrastructure development and of manufacturing cars. There is also an opportunity to improve integration between public health and transport. Health providers could disseminate resources to encourage physical activity to replace short car trips, and land-use planning could be integrated with behavioural change programmes to reduce carbon.

Figure 26: Demand Management policy in action, Nottingham's Workplace Parking Levy

Demand Management policy in action: Nottingham's Workplace Parking Levy (WPL), introduced in October 2011, is an annual charge of £415 levied on all employers within Nottingham City Council's administrative boundary which provide 11 or more liable workplace parking bays. Since 2012 £64 million has been generated which has been reinvested in public and sustainable transport.

Nottingham implemented the UK's first bus lane that also allows access by ULEVs. For this scheme an 'Ultra Low Emissions Vehicle' (ULEV), is a vehicle that emits less than 75g of carbon dioxide (CO_2) per kilometre travelled, with a capability of travelling a minimum range of 10 miles with zero CO_2 emissions. This is based on the HM Treasury Company Car Tax definition.

Nottingham's 'try before you buy' scheme aimed at Nottingham's taxi drivers has contributed to Nottingham having the biggest fleet of ULEV hackney taxis outside London.

Nottingham has the biggest fleet of ULEV hackney taxis outside London

[39] https://www.rtpi.org.uk/consultations/2020/october/pwpconsultationresponse/

Modal Shift and Demand Management

Table 3: Scenario-specific considerations for demand management

Scenario	Scenario considerations for implementation of key areas	Secondary measures (more detail picked up in local measures below)
Just About Managing	Population more urbanised. People less embracing of technological and societal change.	Slow progress in ZEV and public transport uptake may mean more restrictive additional measures on car travel.
Prioritised Places	Population less urbanised. People embrace societal change but are less receptive to technological change.	Regulation to support rural on-demand MaaS services. Enabling homeworking in remote areas by ensuring full fibre internet access. Implement planning policy to support localisation of travel needs. Direct mobility credit schemes at communities in smaller towns with fewer public transport options, and at those living in areas of low EV home-charging capability.
Digitally Distributed	Population more sub-urbanised. Population embraces technological change and are receptive to using a shared service-based transport system, although are less receptive to societal changes.	With a more distributed population, e-bikes in particular, may be an effective way to increase the uptake of active travel modes for those living in more dispersed communities. Supporting strategic park-and-ride to avoid CAVs congesting urban areas. Implement policies to promote CAVs in a way that increases the coverage of MaaS systems, particularly to connect town and cities.
Urban Zero Carbon	Population significantly more urbanised. Population receptive to both technological and societal change.	Micro-mobility options, such as e-scooters and e-bikes, could play an important role in last mile journeys for those living in areas of with low parking provision. Implement planning policy to support localisation of travel needs. Supporting strategic park-and-ride to enable sustainable access for rural communities into growing cities.

Quantifying the level of policy commitment - Demand management

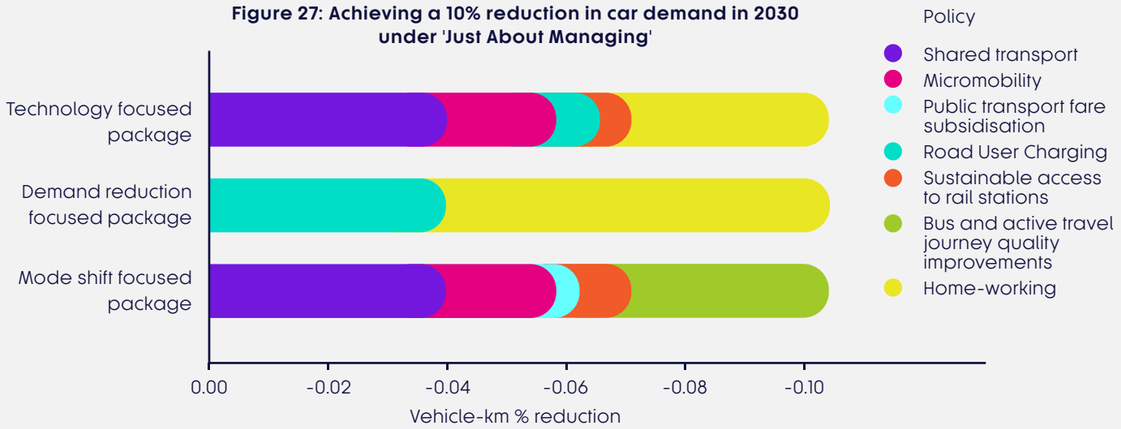
Our analysis suggests that between a 3% and a 14% reduction in car distance travelled is required relative to baseline growth. This range is due to the fact the baseline varies between each Future Travel Scenario. To understand what scale of intervention might be needed to achieve such a reduction, we have modelled three illustrative policy packages to bridge the gap in the *Just About Managing* scenario, which requires around a 10% reduction in car demand by 2030. The results are shown in Table 6 and Figure 27 below and on the following page.

Table 4: Illustrative policy packages - Just About Managing

Policy	Technology focused package	Demand reduction focused package	Mode shift focused package
Shared transport	There is bus and shared transport connectivity across all flow types	No change	There is bus and shared transport connectivity across all flow types
Micro-mobility	Micro-mobility represents 20% of all active travel with an average speed of 20 kilometres per hour	No change	Micro-mobility represents 20% of all active travel with an average speed of 20 kilometres per hour
Public Transport fare subsidisation	No change	No change	20% lower fares for intra-sector trips and 10% lower fares for other flow types
Road User Charging	An average additional pence per km charge of 0.1ppkm across all zone pairs	An average additional pence per km charge of 0.5ppkm across all zone pairs	No change
Sustainable access to rail stations	20% lower perceived costs for access and egress	No change	30% lower perceived costs for access/egress
Increasingly urbanised population	Most growth in urban and sub-urban areas	Most growth in urban and sub-urban areas	Most growth in urban and sub-urban areas
Bus and active travel journey quality improvements	No change	No change	20% lower bus generalised journey time (GJT) for intra-sector trips and 20% lower GJT for walk and cycle trips
Home-working	Individuals work from home 2 days a week (in occupations where it is possible) and there is a 10% reduction in intra-sector business trips	Individuals work from home 3 days a week (in occupations where it is possible) and there is a 20% reduction in intra-sector business trips	Individuals work from home 1 day a week (in occupations where it is possible)

Modal Shift and Demand Management

Figure 27: Achieving a 10% reduction in car demand in 2030 under 'Just About Managing'



This analysis shows that policy changes of a significant scale will be required to achieve the scale of demand reduction in our pathway. Choices are available to policy makers who prefer different types of intervention but leaving out any particular policy lever will require more radical policies in other areas. Our view is that a balanced approach that implements policies in all of these areas will be most likely to succeed.



The carbon impacts of Northern Powerhouse Rail: Northern Powerhouse Rail (NPR) is a large-scale programme of investment in the North's rail network between six major cities, the North's largest airport and other significant economic centres. NPR is a key element of TfN's Investment Programme, delivering substantial changes in journey time and frequency using fully electrified rail services. We estimate NPR will remove around 58,000 car trips per day from the road, or around 590 million car kilometres per year. The impact of this mode shift on carbon will vary depending uptake of ZEV cars when NPR is fully open around 2040. Taking mode shift and electrification together, we estimate that NPR could reduce Northern car and rail emissions by around 1-2% in 2040, depending on the scenario.

Impacts in 2040	Carbon reductions as a result of NPR (tonnes CO_2)	
Scenario	**Just About Managing**	**Urban Zero Carbon**
Reductions from mode shift	-9,000	-3,000
Reductions from rail electrification	-20,000	-20,000
Total reductions	-29,000	-22,000
Total annual North car and rail emissions (2040)	17,000,000	2,500,000
Percentage reduction in emissions due to NPR	-1.2%	-2.1%

Further reductions could be possible, given that NPR will encourage more housing and commercial development in highly accessible areas next to rail hubs, but more work is needed to quantify these impacts. Further work is also needed to quantify the embodied emissions of NPR infrastructure, which will offset some of these reductions.

Recommendations

This section sets out our headline recommendations on Demand Management.

Firstly, we focus on what TfN can do. As these proposed actions and activities have been identified through our analysis of policies likely to be needed to bridge the policy gap between our baseline scenarios and Decarbonisation Trajectory, they have been categorised as 'Policy Gap Actions' (PGAs). We have then turned to the areas the Government should prioritise within the policy measures needed to underpin its Transport Decarbonisation Plan, and finally look at recommendations for our partners to consider. Further detail is provided in Annex A – Detailed Policy Recommendations.

The outcomes from the public consultation on this strategy provided us with an insight as to which recommendations our stakeholders and communities felt should be prioritised at both a national and local level. Whilst we are clear that all recommendations will be needed, we have now reflected this balance of priorities within them.

TfN – What actions should we prioritise?

Mode-shift

PGA8: Develop and implement comprehensive plans for the regional public transport network, such as Northern Powerhouse Rail and wider improvements to the rail network.

Reducing car travel

PGA9: Develop an evidence base on the extent to which less work-related travel has a detrimental effect on productivity and agglomeration to understand whether homeworking can be consistent with TfN's vision for a transformed Northern economy.

Shared mobility

PGA10: Use our role within the Rail North Partnership to promote shared mobility at train stations, including car share, car club, cycle hire and e-scooter schemes.

Modal Shift and Demand Management

PGA11: Provide evidence and strategic support to partners to identify opportunities for shared mobility.

Freight efficiency

PGA12: Work with Government to support regional coordination of measures to improve logistics efficiency, including consolidation centres, mode shift to rail and information democratisation schemes.

Planning policies

PGA13: Influence government to develop appraisal guidance that includes the full impacts of transport projects on carbon.

National Government – What actions are needed to underpin the commitments made within its Transport Decarbonisation Plan

Mode-shift

1. **Stakeholder Priority – Work with train operating companies to implement a targeted reduction in rail fares and increase integration and flexibility of ticketing systems.**

2. **Stakeholder Priority – Provide a substantial and consistent funding stream to Local Authorities to improve public transport and active travel networks.**

Reducing car travel

3. **Stakeholder Priority – Develop a coherent plan for taxing and pricing car travel that accounts for reduced Fuel Duty revenues and incentivises key outcomes such as reduced overall car travel, more efficient road network operation and uptake of ZEVs.**

4. Support employers to roll-out home working, flexible working and remote working hubs.

5. Plan for coach friendly measures, particularly in tourist areas (including rural areas), ensuring coach operators have safe and sufficient access to local sites.

Shared mobility

6. Ensure Local Authority funding and planning regimes support shared mobility solutions alongside traditional public transport options.

7. Require employers to report on emissions from all employee travel to encourage a shift towards vehicle sharing.

Freight efficiency

8. Require shippers to provide consumers with information on emissions from different shipping options and encourage uptake through information and pricing.

9. Fund a project to develop common data collection methods, formats and sharing platforms that overcome competition and privacy barriers and enforce data reporting to government.

10. Establish a framework for consolidation centre planning as well as funding and support for Local Authorities to perform local area assessments.

11. Support the licensing of high capacity vehicles on specific roads (major motorways) for specific users where the benefits are clear.

Planning policies

12. Use the National Planning Framework to promote '15/20-minute neighbourhoods'.

13. Develop appraisal guidance that includes the full impacts of transport projects on carbon.

Local Partners – Where should local action be prioritised?

Mode-shift

1. Use marketing policies to re-build confidence in the safety and value of public transport.

2. **Stakeholder Priority – Subject to Government funding, invest in bus and light rail networks to offer improved journey quality, accessibility and cheaper fares to passengers.**

3. **Stakeholder Priority – Implement policies to enhance dedicated cycle networks, low-traffic neighbourhoods, and activities to promote behaviour change.**

4. Implement policies to promote safe and accessible use of e-bikes and e-scooters.

5. Plan for coach friendly measures, particularly in tourist areas (including rural areas), ensuring coach operators have safe and sufficient access to local sites.

Reducing car travel

6. Roll out parking policies to reduce congestion and make space for sustainable infrastructure.

7. Consider charging policies such as clean air zones or congestion charging, particularly where and when sustainable transport modes are a viable alternative option.

Shared mobility

8. Utilise planning contributions from new developments to enable shared vehicle provision.

9. Develop mobility-as-a-service (MaaS) platforms and mobility credit systems, to link public transport journey stages and improve accessibility and reliability.

10. Support the provision of demand-responsive bus services to complement existing networks.

11. Trial and roll out cycle hire / e-scooter sharing schemes.

Planning policies

12. **Stakeholder Priority – Use local planning policy to promote '15/20-minute neighbourhoods', prioritise development close to public transport hubs and encourage car-free or car-lite development.**

13. Consider introducing a Workplace Parking Levy, utilising lessons learnt from Nottingham.

14. Support and facilitate the roll out of car-free zones and streets.

15. Develop park-and-ride sites with integrated EV charging infrastructure and cycle parking.

16. Implement planning policies that support the development of freight consolidation centres.



Zero Emission Vehicles (ZEVs)

		2025	2030	2035	2040	2045
ZEV share of sales	Cars	55%	100%	100%	100%	100%
	Vans	40%	100%	100%	100%	100%
	HGVs	26%	44%	95%	100%	100%
BEV high mileage CO_2 reduction	Cars	20%	20%	20%	20%	20%
Public transport CO_2 reduction on baseline	Bus	15%	40%	70%	90%	100%
	Rail	0%	25%	75%	100%	100%

As long as vehicles use fossil fuels, it will not be possible to achieve near-zero emissions in the North's surface transport network. The typical life of a car is around 15 years, with some lasting longer in the fleet, meaning it will take roughly this long for ZEV vehicles to tip the balance and deliver the deep emissions reductions required to meet decarbonisation targets. It is therefore critical to introduce policies that will rapidly increase ZEV uptake as soon as possible.

This section describes the policies required to meet the ambitious targets outlined above.

ZEV cars and vans

In November 2020, the Government announced the phase-out of the sale of new petrol and diesel cars and vans by 2030, and hybrid cars and vans by 2035. Our analysis suggests that we need to go further, with a phase out of petrol, diesel and hybrid car and van sales by 2030 and an ambitious uptake of ZEV cars (55% of sales) and vans (40% of sales) by 2025.

In order to achieve this, all consumers must have sufficient access to charging infrastructure. This will require a significant increase in the provision of public charging, including rapid charging hubs. Consumers will also need to be discouraged from purchasing internal combustion engine (ICE) cars and vans. From the mid-2020s, zero-emission cars and vans are expected to reach cost parity with ICE vehicles[40], at which point fiscal policy should shift towards substantially increasing the cost of buying and using ICE vehicles. In addition, policies that can encourage the uptake of ZEVs for high mileage applications, such as taxis, could result in around a 20% reduction in car CO_2.

Our analysis suggests that we need to go further, with a phase out of petrol, diesel and hybrid car and van sales by 2030 and an ambitious uptake of ZEV vehicles in the short-term

[40]Kate Palmer, James E. Tate, Zia Wadud, John Nellthorp, Total cost of ownership and market share for hybrid and electric vehicles in the UK, US and Japan, Applied Energy, Volume 209, 2018, Pages 108-119, ISSN 0306-2619, https://doi.org/10.1016/j.apenergy.2017.10.089.

ZEV HGVs

While the technology for ZEV cars is well advanced, there is more uncertainty about the optimal technology for ZEV HGVs, making it a challenge to meet our ambitious sales targets for ZEV HGVs.

Technology demonstration projects would provide essential evidence for the feasibility of different HGV technologies and the necessary infrastructure to support them. Using this evidence, there is an opportunity to leverage regional partnerships in the North to purchase ZEV HGVs in bulk. This would help draw significant numbers of vehicles into the region (with potential cost savings) and send a message to original equipment manufacturers (OEMs) that the demand is there.

Decarbonising rail

Route electrification is the most efficient way of reducing rail emissions in the long-term. Not only does it remove tailpipe emissions on those routes, but it supports the use of bi-mode trains on other routes. Overhead electrification also helps to improve rail journey times and reliability, making rail a more attractive mode of transport and encouraging mode shift. Improvements to rail services and modal shift to rail are covered in more detail in the Demand Management section below and consideration of the interventions needed to move a greater proportion of freight to rail and other modes will be addressed within TfN's Freight and Logistics Strategy.

Building on Network Rail's Traction Network Decarbonisation Strategy (TNDS), a regional plan should be formulated laying out the order and timing in which higher-density routes will be electrified and identifying routes where alternative technology is a permanent solution. The current rail fleet in the North is of mixed vintage. There is scope to develop a plan that cascades rolling stock as electrification develops to push out the worst polluters. Electric-only trains are a known quantity and low-risk, but other ZEV technologies (battery-electric, battery and hydrogen) will need further testing to understand their viability[41]:

1. Battery technology is emerging rapidly, but range is constrained, and it requires charging infrastructure.

2. Hydrogen presents risks around the quantity needed and the knock-on impacts on operational costs (fuelling time and capacity to carry fuel needed).

[41]Traction Decarbonisation Network Strategy, Interim Programme Business Case, Network Rail (2020).

ZEV buses

Electric buses are increasingly being trialled and rolled out across towns and cities, spurred on by the need to improve air quality as well as reduce carbon emissions. The Government's national bus strategy, 'Bus Back Better', reaffirms a commitment of £3bn of new funding to level up bus services outside of London, towards London standards, including the purchase of at least 4000 new zero emission buses (more than a tenth of the fleet). The strategy also includes a commitment to set a date for ending the sale of new diesel buses in the UK. In general, these buses are being used for shorter routes where buses have more recharging opportunities, and longer routes will likely require technological improvements for electric buses, or hydrogen options.

ZEV policy in action: In 2020, Norway became the first country in the world to see the sale of electric cars overtake those of petrol, diesel and hybrid vehicles. Battery electric vehicles (BEVs) sales made up over 54 per cent of all new cars sold in 2020, up from over 42 per cent in 2019. Norway is currently leading the way in EV ownership in Europe. By 2025, the country aims to ban the sale of all fossil fuel cars. Oslo launched its first municipal EV charging infrastructure program in 2008, providing incentives including free parking for EVs, exemption from a congestion tax, and exemptions from Low Emission Zone (LEZ) fees. Only zero tailpipe emission taxis will be able to operate in the city from 2023. The city is deploying fossil free public transport from 2020 and is considering a ban on petrol and diesel cars within the city centre by 2024.

BEV sales made up over 54% of all new cars sold in 2020 in Norway

Zero Emission Vehicles (ZEVs)

ZEV policy in action: In Sweden, an increase in EV usage can be traced to the government's recently adjusted incentive scheme that sees a tax increase for vehicles with high emissions. In addition, cars with low CO_2 emissions can receive up to €5,700 as a grant.

In Sweden, cars with low CO_2 emissions can receive a grant up to €5,700



Quantifying the level of policy commitment - ZEVs

Global action to build new markets for Electric Vehicles, as well as wider investment in battery technology and manufacturing processes, has led to significant reductions in the costs of ZEV cars and vans. However, to achieve the ambitious levels of uptake in our pathway, further policy commitment will be required in the 2020s. As noted above, a combination of policies that help to differentiate the upfront costs of new ZEV and ICE vehicles will be required, as well as a coherent and comprehensive approach to the electric chargepoint network, involving a mixture of public and private investment. ZEV HGVs will require a similar combination of investment in vehicles and infrastructure, with public funding required to accelerate the transition. Decarbonising rail will require primarily public investment and infrastructure and rolling stock, but there are significant wider public benefits to these investments that offset some of these costs. Table 3 summarises our high-level quantification of the policy commitments and investments required for the North to 2030.

Table 5: High level quantification of level of policy commitment and investments required to 2030

Area	High-level quantification of the level of policy commitment for the North (2020 prices)	Notes on implementation and public/ private investment split
ZEV cars and vans	To reach our 2025 pathway, grants or equivalent tax differentials for new ZEVs need to continue until around 2022, totalling around £210m in 2021 and £590m in 2022 for the Northern car and van fleet[42]. Around £220m annual investment in Northern charging infrastructure is needed by 2025, and around £280m by 2030[43]. This will deliver around 2.4 million installed chargepoints across the region by 2030.	Support for vehicles could be focused on taxation (e.g. VED), with minimal or modest additional grant funding. Some public investment is needed for charging infrastructure, but a proportion could be delivered by private investment if the Government develops new markets and innovative regulatory regimes.
ZEV HGVs	Grants or equivalent tax differentials for ZEV HGVs need to be introduced in the next few years, ramping up to a total of around £2m in 2025 and £50m in 2030 for the Northern HGV fleet[44]. Around £110m cumulative investment in Northern HGV charging and refuelling infrastructure is needed by 2030[45].	More significant public investment in vehicles and infrastructure likely to be needed initially, but private investment could take over in the 2030s. An even fleet share of electric and hydrogen fuelled ZEV HGVs is assumed in these costing estimates, in line with CCC assumptions.
Decarbonising rail	The Network Rail Traction Decarbonisation Network Strategy (TDNS) interim business case suggests that a zero-emission rail network by 2040 could have a net present value ranging from a £4.4bn net cost to a £480m net benefit, with much of this wide range due to uncertain technology costs. This is a whole UK figure as Network Rail did not split these costs out by region. TfN will work with Network Rail to estimate Northern figures in a future phase of work.	Mostly public investment required, but there are also significant wider public benefits, such as faster, more reliable journeys.

[42]Cost outputs are developed using Element Energy's car and van choice model ECCo, developed for DfT.
[43]Calculated by Element Energy for TfN using a method developed by the ICCT, which can be found here: https://theicct.org/publications/charging-gap-UK-2020
[44]Cost outputs are developed using Element Energy's truck choice model, developed for CCC.
[45]Data taken from Ricardo analysis for the CCC and scaled to match TfN area, available at: https://www.theccc.org.uk/publication/zero-emission-hgv-infrastructure-requirements/

Zero Emission Vehicles (ZEVs)

Scenario-specific considerations

Our Future Travel Scenarios allow us to consider how policy should respond to different outcomes in society and the economy that would affect decarbonisation progress. The considerations below help us to plan for an uncertain future, whether society ends up closer to one of the scenarios or somewhere within the range of the scenario outcomes.

Table 6: Scenario-specific considerations for ZEVs

Scenario	Scenario considerations for implementation of key areas	Secondary measures (more detail picked up in local measures below)
Just About Managing	Population more urbanised. People less embracing of technological and societal change.	Stronger taxation and subsidy signals may be needed to incentivise the purchase of ZEVs, given the resistance to change.
Prioritised Places	Population less urbanised. People embrace societal change but are less receptive to technological change. Additional policy levers may be needed to stimulate ZEV vehicle uptake.	Increased population in rural areas will need to be factored into the regional charging infrastructure strategy. For example, support should be introduced to help car parks in remote locations to provide more reserved EV parking spaces over time.
Digitally Distributed	Population more suburbanised. Population embraces technological change and are receptive to using a shared service-based transport system, although are less receptive to societal changes.	More suburban living could allow more people to charge vehicles at home off-street, altering the requirement for public chargepoints. Charging needs to be integrated with emerging use-models for Autonomous Vehicles, which are adopted more rapidly in this scenario. Growth in out-of-town employment will need to be supported with appropriate charging infrastructure.
Urban Zero Carbon	Population significantly more urbanised. Population receptive to both technological and societal change.	Very few people will have on-street parking for overnight re-charging, so strategy needs to be more focused on rapid re-charging. Electric car-clubs may be a more viable choice for many.

Recommendations

This section sets out our headline recommendations on ZEVs.

Firstly, we focus on what TfN can do. As these proposed actions and activities have been identified through our analysis of policies likely to be needed to bridge the *policy gap* between our baseline scenarios and Decarbonisation Trajectory, they have been categorised as 'Policy Gap Actions' (PGAs).

We then turn to the areas the Government should prioritise within the policy measures needed to underpin its Transport Decarbonisation Plan, and finally look at recommendations for our partners to consider. Further detail is provided in Annex A – Detailed Policy Recommendations.

The outcomes from the public consultation on this strategy provided us with an insight as to which recommendations our stakeholders and communities felt should be prioritised at both a national and local level. Whilst we are clear that all recommendations will be needed, we have now reflected this balance of priorities within them.

TfN – What actions should we prioritise?

Road vehicles

PGA1: Develop a pan-northern ZEV infrastructure plan to ensure trans-boundary road trips are considered, factoring in interoperability across the region and optimal locations for high-power charging hubs on the Major Road Network, with input from Local Authorities and the Distribution Network Operators (DNOs).
PGA2: Work with Local Authority partners and Highways England to facilitate large ZEV truck trials in high traffic corridors in the North.
PGA3: Work with Local Authorities and freight stakeholders to help aggregate large orders of ZEV vans and trucks across the North and overcome demand shortages.

Rail

PGA4: Through the Northern Powerhouse Rail programme, support the government and Network Rail in identifying appropriate routes for electrification and associated implementation.
PGA5: Work with Network Rail and train operating companies to ensure service patterns are based around the progression of electrification and minimising the use of diesel-only trains.
PGA6: Influence Government to trial alternative technology freight locomotives in the North.
PGA7: Work with Network Rail to ensure there is sufficient capacity to allow freight traffic to run directly and with minimal dwell times, reducing emissions from existing diesels.

National Government - What actions are needed to underpin the commitments made with its Transport Decarbonisation Plan?

Road vehicles

1. Strengthen the existing policy to phase-out ICE car and van sales by 2030 to include hybrids.
2. Increase taxes on new ICE vehicles from the early 2020s, with rates escalating in line with emissions intensity.
3. **Stakeholder Priority - Develop a coherent and comprehensive strategy for charging infrastructure, defining a role for local and regional bodies, providing public funding where appropriate and developing a regulatory regime that enables the private sector to invest and ensure interoperability.**
4. As more ZEV HGV models become available in the 2020s, introduce a system of strong grants and tax incentives.
5. Fund large ZEV HGV trials in high-traffic corridors.
6. Implement measures to rapidly increase supply of ZEV models. This could include measures that stimulate domestic manufacture, which also have the potential to drive green growth in the North (see Chapter 8).

Rail

1. **Stakeholder Priority – In partnership with Network Rail, identify and fund a core network for electrification with the highest traffic density, then prioritise secondary, lower density routes where alternative technology will be the permanent solution.**
2. For routes where alternative technology is the long-term solution, provide funding to procure new rolling stock.
3. In partnership with delivery bodies, work with freight operating companies to understand the need for incremental electrification of freight, and the need to electrify the full distance to the main freight nodes (e.g. ports).
4. Support freight operating companies and rolling stock builders in the development of alternative technology freight locomotives.

Zero Emission Vehicles (ZEVs)

Local Partners – Where should local action be prioritised?

General

1. **Stakeholder Priority – Develop a model for delivery and maintenance of electric vehicle charging infrastructure, covering rapid hubs, on-street charging, public parking spaces, and council fleets. Initially proactive bidding for Government funds will be needed, but over time private sector investment will support this, subject to an effective national and local regulatory regime.**

2. Implement a common procurement framework for infrastructure across administrative areas to encourage economies of scale and interoperability across the region.

3. Carry out community engagement to increase understanding of EVs and EV infrastructure.

4. Implement policies to prioritise ZEV shared transport, such as car share and car clubs.

5. Collectively adopt taxi licensing policies that require new vehicles to be zero-emission. This will need to be coupled with provision of charging infrastructure at taxi ranks.

6. Aggregate purchases of ZEV vans and trucks across the North (supported by TfN).

7. **Stakeholder Priority – Engage with coach and bus operators to set targets and standards for rapid roll-out of ZEV coaches and buses.**

In smaller towns, villages and dispersed communities:

8. Incentivise EV uptake (including electric bikes) and development of home charging infrastructure through direct funding and awareness raising (e.g. telematic tests, EV trials).

9. **Stakeholder Priority – Develop charging infrastructure servicing rural tourist spots to counter range anxiety. These should be developed in such a way to avoid unsustainable traffic levels within protected rural areas (e.g. charging infrastructure developed within park-and-ride sites servicing National Parks).**

> “Develop charging infrastructure at rural tourist spots to counter range anxiety.”



Improvements to conventional vehicle efficiency

		2025	2030	2035	2040	2045
Conventional vehicle efficiency CO_2 reduction	Cars and vans	3.6%	3.6%	3.6%	3.6%	3.6%
	Artic HGVs	22%	22%	22%	22%	22%
	Rigid HGVs	13%	13%	13%	13%	13%
Share of car sales	Large cars	27%	22%	17%	10%	10%

In their Sixth Carbon Budget, the Climate Change Committee (CCC) lay out several measures that can reduce emissions from ICE vehicles. Our analysis suggests that these measures must be taken up to maximum effect from 2025.

Cars and vans

The CCC estimated that full enforcement of 70mph speeds limits would reduce overall fuel consumption by 2% and 60mph speed limits by 7%. Given the journey time disbenefits and associated political difficulties in reducing speed limits, we have opted to include only the 2% from speed limit enforcement in our pathways. Fuel-efficient driving styles, supported by eco-driver training, can improve fuel efficiency by 8% for up to 20% of drivers who adopt them[46]. Taken together, enforcing speed limits and eco-driving could reduce car and van emissions by 3.6%.

Shifting to smaller ICE cars

Large cars now make up nearly one third of new car sales in the North. As emissions intensity for these vehicles is higher than smaller cars, there is an opportunity to reduce emissions by discouraging the purchase of large ICE vehicles in the short-term. This can be achieved through changes to taxation on new vehicles, such as Vehicle Excise Duty, which the Government is considering restructuring to increase the upfront costs on the most polluting vehicles[47].

HGVs

More fuel-efficient driving can also support CO_2 reductions in HGVs. Alongside more aerodynamic designs and retrofitting of drag reduction devices, these measures can offer efficiency savings up to 13% for a rigid HGVs and 22% for articulated HGVs.

Scenario-specific considerations - Improvements to conventional vehicle efficiency

The roll-out of measures to improve conventional vehicle efficiency will be similar in all scenarios, with the main differences being driven by the extent to which Autonomous Vehicles improve the energy efficiency of driving styles, which could vary between scenarios.

Quantifying the level of policy commitment – Improvements to conventional vehicle efficiency

We have not quantified the policy commitments required in this area due to a lack of available data or analytical tools to undertake these calculations, particularly at the regional level. We will consider further analysis of this area in a future phase of work.

Recommendations

This section sets out our headline recommendations on improving conventional vehicle fuel efficiency. Further detail is provided in Annex A – Detailed Policy Recommendations.

Enforcing speed limits and eco-driving could reduce car and van emissions by

3.6%

[46] In addition to more fuel-efficient driving, other benefits of eco-driver training include reduced mechanical wear on vehicles and fewer road accidents.
[47] https://www.gov.uk/government/publications/vehicle-excise-duty-call-for-evidence

Improvements to conventional vehicle efficiency

TfN – What actions should we prioritise?

PGA14: Work with partners to increase public awareness of fuel-efficient driving styles and the associated environmental and financial benefits.

National Government – What actions are needed to underpin the commitment made within its Transport Decarbonisation Plan?

1. Ensure an ambitious post-Brexit regulatory regime on new vehicle CO_2 emissions, aligned to UK carbon budget commitments.
2. As per the recommendations above, ensure Benefit-in-Kind and Vehicle Excise Duty rates on all ICE vehicles escalate in line with emissions intensity.
3. Roll out nationally funded eco-driving training schemes, implemented through workplaces in relation to freight operators or organisations with large company car fleets.
4. Support smaller freight operators to implement other efficiency technologies, such as aerodynamic attachments.
5. Ensure new vehicle regulations use technology solutions to support efficient driving styles.

Local Partners – Where should local action be prioritised?

1. Extend existing demand management and pollution abatement measures (e.g. Ultra-Low Emission Zones) to consider fuel efficiency of private cars, so as to tackle the trend towards driving larger, heavier private vehicles (e.g. SUVs).

> “National government should consider rolling out nationally funded eco-driving training schemes”

Co-Benefits and Potential Adverse Consequences

Whilst measures that decarbonise transport will help to reduce the level of climate change and the effects of global warming on both our global and local environment, it is important to understand how those measures might affect our local environment and local communities in other ways. The co-benefits and also potential adverse consequences of these measures are important considerations when developing the policy mix and timescales relevant to the different place typologies in the North. These are summarised within Table 7.

Table 7: Summary of risks and co-benefits associated with key transport decarbonisation policy levers

Policy Area	Overarching Policy Lever	Potential Co-Benefits	Potential Adverse Consequences
Low Emission Vehicle Uptake	Policies to encourage ZEV/ CAV take up.	Local air quality benefits initially. Noise benefits. Lower operating costs benefitting particularly those leasing vehicles. Trade and investment benefits (clean growth opportunities). Benefits to the energy system in terms of energy storage and smart grid opportunities. **In relation to Connected and Autonomous Vehicles (CAVs):** Accessibility benefits for those unable to drive. Increased productive time for those previously driving. Potential to reduce congestion through traffic flow optimisation and re-routing. Increased potential for ridesharing. Potential application for demand responsive transport in rural areas.	May perpetuate long term local air quality issues if EVs are chosen over shared and active modes. Maintains congestion levels. Potential to increase Transport Related Social Exclusion (TRSE) for those areas with low home charging potential and higher purchase price means low income groups may be less able to purchase new EVs and enjoy incentives in the short term. Potential impacts upon urban realm/ rural landscapes from charging infrastructure and refuelling hubs. Local grid network capacity issues. Increased embedded carbon in vehicles than ICE vehicles in the short term. Reduced revenues from Vehicle Excise Duty and Fuel Duty. **In relation to CAVs:** May increase ridership, making private mobility accessible to a larger section of society. Increases in city/town centre congestion levels. Loss of employment from service providers that would be in competition with CAV services (e.g. taxi drivers).

Co-Benefits and Potential Adverse Consequences

Table 7 continued: Summary of risks and co-benefits associated with key transport decarbonisation policy levers

Policy Area	Overarching Policy Lever	Potential Co-Benefits	Potential Adverse Consequences
Demand Management	Encouraging uptake of shared mobility. Encouraging modal shift to public transport.	Reduced TRSE especially if focused in low income residential areas and areas of low home charging capability. Reduced congestion. Reduced embodied carbon if it stimulates lower car ownership. Local air quality benefits. Decreased spending on new transport infrastructure through integration of existing network. Reduced congestion. Local air quality benefits. Increased accessibility and potential to reduce TRSE.	These services may be unaccessible to people who require mobility assistance. Can encourage modal shift away from active modes.
	Encouraging modal shift to active travel and micro-mobility.	Improvements in physical and mental health. Local air quality and noise benefits. Reduced congestion. **In relation to e-bikes/e-scooters:** Increased accessibility.	Safety (potential to increase RTAs involving cyclists). **In relation to e-bikes/e-scooters:** Higher levels of embodied and operational carbon than non-motorised bikes. May attract modal share. Potential for conflict with other road users and pedestrians.
	Digitalisation, working from home and localisation.	Local air quality and noise benefits. Reduced congestion. Improved access to community services and facilities. Higher local spending and more investment in local areas.	Potential adverse impacts upon mental health. Potential to increase TRSE if policies reduce access to transport solutions for those who need to travel. Shifting of emissions to different sectors (e.g. energy sector) Impact upon viability and productivity of city and town centres.
	Disincentivising car use.	Potential to ring-fence revenues for active travel/PT schemes. Reduced congestion. Local air quality and noise benefits. Associated health benefits if mode shift to active travel.	Potential to exacerbate TRSE for those with less/no alternatives to private car use. Levies can create inequitable impacts upon businesses where employees and customers have few other mode choices.

Policy Area	Overarching Policy Lever	Potential Co-Benefits	Potential Adverse Consequences
Improving Freight Efficiency	Planning for Urban Consolidation Centres.	Local air quality and noise benefits. Reduced congestion with associated economic and safety benefits. Financial benefits from economies of scale. Can reduce cargo handling and improve security, reduce damage and loss of goods.	Depending on location, potential to blight particular areas with elevated level of HGV and delivery vehicle traffic.
	Local community drop off/pick up and green shipping options.	Local air quality and noise benefits. Reduced pavement parking by delivery vehicles. Potential for an increase in local spending within community centres.	Higher costs for 'just in time' or next day deliveries may disproportionately affect lower income groups and smaller businesses.
	Fuel efficient driving / aerodynamics.	Cost savings on fuel. Local air quality benefits.	
	Shifting freight from road to rail.	Local air quality and noise benefits. Labour market opportunities in relation to manufacture and installation of electrification infrastructure.	Labour market changes as more freight moved by rail, disproportionately affecting those with low to middle levels of education.

Transport Related Social Exclusion and Distributional Impacts

It will be important that policy makers at a local and national level both understand and take actions to mitigate the risk of adverse consequences arising as a result of decarbonisation policy and measures.

Examining the relationship between Transport Related Social Exclusion (TRSE) and transport decarbonisation measures is the subject of one of TfN's priority actions to 2025 (Action SD4), further details of which are included in Chapter 9, TfN's Priority Decarbonisation Actions. The evidence and data generated through this research can be used by our partners to help identify where transport decarbonisation policy measures may need to be altered to avoid exacerbating existing TRSE issues and to maximise the opportunities to reduce TRSE.

Chapter 3 of this Strategy provided a high-level overview of how emissions vary across different groups in the North, by gender, age and employment type. TfN's Analytical Framework will allow us to provide spatially disaggregated socio-economic data to partners, to help ensure local decarbonisation measures avoid disproportionately affecting more disadvantaged groups.

When looking at average carbon intensity for specific occupations and education levels, people with low and middle levels of education (those with education up to A levels) tend to be employed in jobs with a higher average carbon intensity than more highly educated employees (degree level and upwards), with many of the former being classed as 'process plant and machine workers' with a high propensity to work in the transport and storage industry[48].

These workers may be more exposed to labour market changes as a result of a net-zero transition, both in terms of direct changes to the transport system (e.g. a future scenario where more freight is moved by rail), or indirectly through changes in the vehicle manufacturing industry or energy generation sectors. Labour market changes as a result of the net-zero transition may also provide opportunities for these groups, particularly in electrification (rail electrification and grid upgrades of EV infrastructure) and the manufacture of ZEVs and their components (e.g. gigafactories).

The use of cars by lower income groups is often driven by accessibility and affordability challenges:

- ⇒ The need to travel to work 'out of hour' shifts (e.g. cleaners, post office workers, warehouse workers).
- ⇒ Due to disabilities that mean using shared modes of transport or active modes is not possible.
- ⇒ Those who live or work in areas of low public transport accessibility, which can be exacerbated by the correlation between high access and high house prices.
- ⇒ Public transport costs for some journeys can be prohibitive and therefore private car travel offers a cost-effective alternative.

For these groups, demand management measures that increase the cost and decrease the convenience of car use could result in increased levels of TRSE. Similarly, the higher purchase price of ZEVs may mean that policies to increase the speed of uptake may lead to uneven distributional impacts on lower income groups who are least able to afford them.

Public transport and shared transport modes can be essential for groups who have no access to private vehicles for financial or accessibility reasons (for example, those living in flats or terraced housing with no parking facilities). Whilst these groups may benefit from polices to enhance public transport provision; policies to encourage the uptake of ZEVs have the potential to impact upon public transport provision (e.g. use of bus lanes by ZEVs and other shared modes, increased congestion in low emission zones).

[48]H/M Treasury, Net-Zero Review: Interim Report (2020).

Managing the distributional impacts of decarbonisation: In their Net Zero Review: Interim Report (2020), the Treasury propose a series of measures to manage these effects, including:

- ⇒ the ongoing burden of a policy can be increased or reduced for different groups, or some can be excluded from paying altogether (e.g. surcharges, exemptions, or targeted reliefs).
- ⇒ targeted support can be provided to cover the capital and/or running costs caused by a policy (e.g. targeted scrappage schemes coupled with low-emission zones);
- ⇒ the funds raised by a levy or tax can be redistributed to a particular group to offset the primary impact (e.g. road-user charging);
- ⇒ the general tax and welfare system can be used to compensate those who are affected (e.g. targeted tax cuts or higher welfare payments); and
- ⇒ progressive redistribution can also be a co-product of policies with other explicit aims (e.g. taxes on air travel).



Consideration of embodied carbon

What is embodied carbon?

The 'embodied carbon' component of a project refers to the emissions of greenhouse gases arising from:

- ⇒ the sourcing and extraction of raw materials needed to build the project;
- ⇒ the energy needed to process those raw materials in construction components (i.e. the manufacturing stage);
- ⇒ the transporting of those building materials; and
- ⇒ the construction activities themselves from construction plant, through to worker accommodation and transport.

Embodied carbon is often referred to as supply chain carbon, or construction carbon, and is sometimes considered separately from operational emissions that refer to the emissions of greenhouse gases arising as a result of the operation of a development.

For example, the embodied emissions associated with a new road might include consideration of the emissions associated with sourcing and processing raw materials, transport of materials and the construction of the road itself, whilst the operational emissions would include those generated by the vehicles that end up using the scheme throughout its operational life (including maintenance related emissions).

The Rail Safety and Standards Board (RSSB) estimates that in the reporting year 2019/2020, the UK rail industry generates approx. 3.5 million ktCO_2e in relation to traction energy (i.e. operational emissions) but that its embodied carbon emissions are closer to 5.2 million ktCO_2e - 48% higher[49].

Every infrastructure development will use embodied carbon; however, many will stimulate behaviours or facilitate technologies that reduce greenhouse gas emissions, from a 'business as usual' state, during their operation. For example, a new electrified railway can encourage a reduction in private car vehicle mileage, substantially reducing passenger travel carbon intensity. The amount of time that is needed to recoup the embodied carbon of a project, through the reductions in emissions realised as a result of its operation, is often called the 'payback period'.

Where payback periods are unacceptably long, **carbon sequestration** may be an option to reduce the overall net balance of embodied carbon within a scheme. Carbon sequestration is a term used to describe actions that absorb and store carbon dioxide from the atmosphere. Carbon sequestration activities that may be incorporated within our major infrastructure projects broadly fall into two categories: natural processes such as tree planting and peatland restoration; and the use of innovative construction materials such as carbon 'absorbing' cement and concrete. Whilst sequestration may play a part in reducing net emissions associated with schemes, and maximising sequestration is a worthwhile goal, it is unlikely to offset more than a small proportion of the embodied carbon across a scheme and needs to be considered and utilised in that context.

Another term, commonly used, is 'Whole Life Carbon'. In the context of major transport infrastructure, it is used to describe the emissions associated with project from 'cradle to grave'. This means its embodied emissions, plus those emissions generated through the operation of the scheme and finally its 'end of life' profile (i.e. those emissions associated with decommissioning and demolition). For the purposes of this Strategy, both embodied carbon and operational emissions have been considered, albeit separately.

[49]RSSB DECARB: Carbon Measurements (T1197) https://www.rssb.co.uk/en/research-catalogue/CatalogueItem/T1197

How TfN is considering embodied carbon

The accounting principles for carbon mean that embodied emissions from constructing transport projects do not count as 'transport emissions' but as part of industrial emissions. It is for this reason that the Government has suggested that carbon from the construction of transport schemes is outside of the scope of its Transport Decarbonisation Plan.

It is also difficult to robustly calculate the likely embodied carbon footprint of major infrastructure developments at a conceptual level of design or when the scheduled design and construction of the infrastructure is many years or decades in the future. Equally, it can be problematic to forecast the extent to which embodied carbon may be reduced on future schemes through careful design, responsible sourcing of construction materials, and innovative construction techniques.

For these reasons, the consideration of embodied carbon is outside of the scope of our decarbonisation trajectory and pathways, however, it is not outside the scope of this strategy. TfN is clear on the significance of embodied carbon in the North's future transport system and across the projects that make up TfN's Investment Programme (IP). It is inevitable that, as a region, the North will have to 'spend' some carbon to develop a truly sustainable multi-modal transport system. Alongside our partners, however, we are committed to developing a carbon reduction culture, permeating every stage of the project development lifecycle.

It is important to understand the relative economic and social value that schemes or programmes accrue alongside their residual carbon costs and that due weighting is given to those carbon costs as part of any decision making processes. Where new schemes are progressed, TfN and its partners will promote ambitious supply chain carbon reduction requirements to drive down levels of embodied carbon.



How TfN is considering embodied carbon

What we are doing at a strategic level:

We want to better understand the level of emissions likely to be generated by the construction of the schemes included in our IP and also explore how we can start reducing that profile at the earliest point. We'd also like to understand the relative carbon pay-back period of the projects and programmes within our IP.

TfN is collaborating with DecarboN8, a network led by the eight most research-intensive universities in the North working with industry and government to facilitate zero emission transport systems, to explore the embodied emissions associated with the multi-modal corridors proposed within our Strategic Development Corridors (SDCs).

A pilot study was initiated in September 2020, focusing on the Tyne and Wear – South Northumberland sub-corridor within the 'Connecting Energy Coasts' and 'East Coast' corridors, being a sub-corridor example with a good mix of road and rail schemes. This pilot study is scheduled for completion in 2021.

Reacting to sentiment expressed through the responses received to the public consultation on this Strategy, we have included an additional TfN activity within our proposed actions to 2025 (**SD13**), to undertake a strategic embodied carbon footprint study of those schemes included within our Investment Programme (IP) scheduled for delivery up to 2033. Beyond 2033, the levels of uncertainty surrounding delivery dates, funding, location and design for schemes within the IP, are too great to allow a realistic and useful assessment of embodied carbon.

The study will acknowledge the wide range of uncertainty by defining the potential range of carbon intensity which is present for schemes considered at a conceptual level of design and allow TfN to benchmark the potential maximum and minimum embodied carbon footprints of the schemes to be considered, against TfN's Decarbonisation Trajectory. In turn, this will allow us to better understand the potential implications on the north's carbon budget for surface transport.



What we are doing at a project level:

TfN will set a supply chain carbon reduction target for each TfN-led major infrastructure project.

To do this we will:

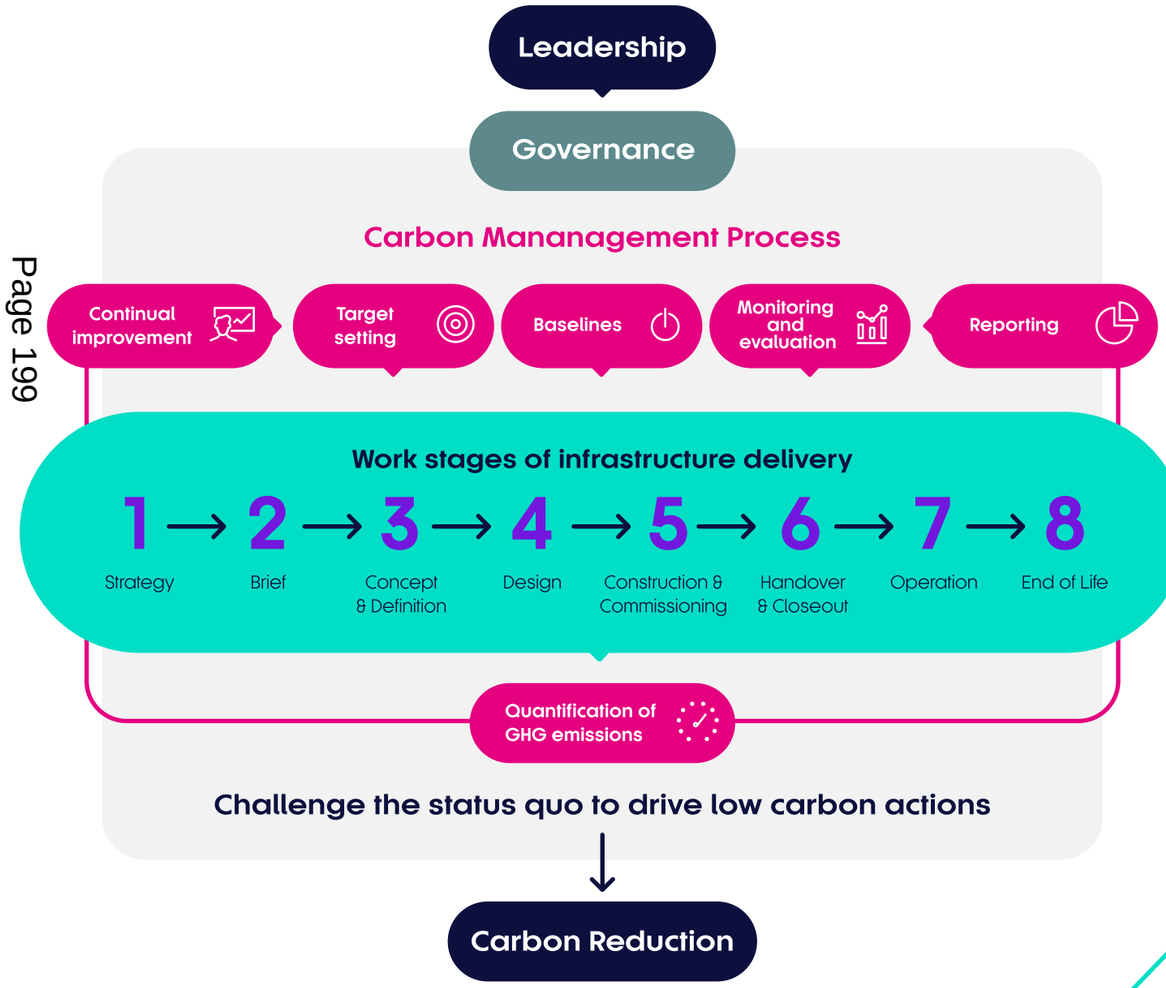
- ⇒ **Embed the consideration of embodied carbon within our upstream project appraisal processes,** so that we understand the relative carbon intensity related to different design options and the particular aspects within our schemes generating the highest amount of embodied carbon emissions. It is during the initial concept design stages where the opportunity to reduce carbon is greatest.
- ⇒ **Support the development of an embodied carbon database** for major transport infrastructure developments as one of TfN's planned activities to 2025. This could be used by both TfN and our partners to ensure consistency in baselining embodied carbon during the initial design stages of development projects.
- ⇒ **Set a supply chain carbon baseline for each TfN-led project,** based on early carbon foot-printing work carried out during the upstream project appraisal. It is against these baselines that we can set and pursue our supply chain carbon reduction commitments.
- ⇒ **Use a Carbon Management Process** to achieve our supply chain carbon reduction target, through the adoption of PAS 2080 on TfN-led projects. PAS 2080: 2016 *Carbon Management in Infrastructure* (launched in May 2016) is a voluntary carbon management framework designed by the UK Green Construction Board. The use of PAS 2080 will help us to establish a common understanding and approach for managing the whole-life carbon of our projects. The framework, as illustrated in Figure 28, assigns roles and responsibilities to those leading, designing, constructing, maintaining and operating the transport infrastructure, in playing their part to drive low carbon actions. For those schemes within our IP that are not TfN-led, we shall encourage our delivery partners to align to the same standard or other recognised similar standard or specification.
- ⇒ **Optimise opportunities for carbon sequestration** through both enhancing natural processes and the use of innovative construction materials, using our Carbon Management Process to ensure this objective is understood and implemented throughout the design and construction of TfN-led schemes.

For Northern Powerhouse Rail (NPR) we will set a supply chain carbon baseline and corresponding carbon reduction target during the next stage of design, for use and implementation during both the design and construction stages of the project.



How TfN is considering embodied carbon

Figure 28: Adapted from PAS 2080 Carbon Management Process, Source: PAS2080:2016 – Carbon Management in Infrastructure





Climate change adaptation and resilience

Changes to global climate, as a result of the release of carbon dioxide and other Greenhouse Gases into the atmosphere, are already happening and are visible through the increased prevalence of heatwaves, floods, droughts and fires.

Less visible effects, but equally as worrying, include damage to marine ecosystems leading to fisheries failing, sea level rise, increased risk to water supplies and a rise in global food insecurity, as well as an unprecedented loss of biodiversity.

Although we can't be certain of what our future climate will be in the North, it's important that we understand the potential changes that may occur within the limits of uncertainty and how these changes might affect the viability of our transport systems and how our transport infrastructure might exacerbate or reduce the effects of climate change on our communities.

Factoring in the effects of climate change

The latest climate predictions (UKCP18[50]) predict progressively hotter, dryer summers and warmer, wetter winters, with increasing frequency of extreme weather events such as storm events and heat waves.

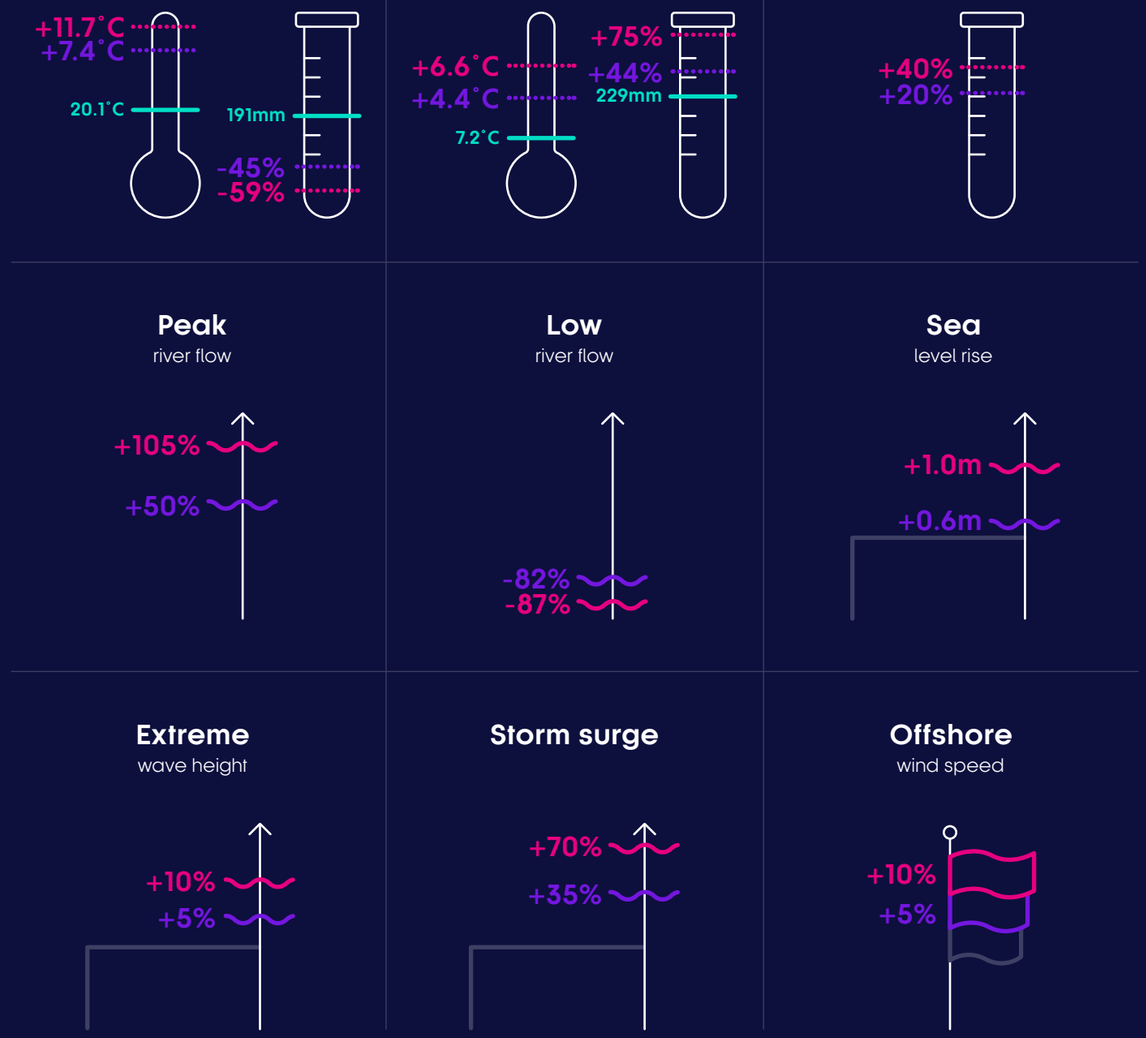
The Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment Report, indicates that the Earth's average surface temperature is set to reach 1.5oC-1.6°C above pre-industrial levels by the early 2030s under all its modelling scenarios, and potentially up to 4.4°C by the end of the century under the highest emission scenarios[51].

The Environment Agency's 'Climate Impacts Tool: Understanding the risks and impacts from a changing climate' (2019), provides a starting point to help us understand an upper limit on possible change across three timescales: today's climate, the 2050s and the 2080s, consistent with a 4°C rise in global mean temperature by the end of the century. Figure 29 is based on national England averages, taken from the Environment Agency Climate Impact Tool.

[50] https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/download-data
[51] Climate Change 2021, The Physical Science Basis: Summary for Policymakers, Working Group contribution to the Sixth Assessment Report of the IPCC (2021)

Figure 29: Environment Agency's Climate Change Tool (2019)

● Current average ● 2050s ● 2080s



Factoring in the effects of climate change



Whilst the UK is committed to reducing its emissions in alignment with the goals of the Paris Agreement, i.e. limiting global temperature rises to well below 2°C on pre-industrial averages, global emissions trends are set to exceed the threshold levels required in the future to achieve these goals. For this reason, we need to understand the potential climate change effects resulting from greater global temperature rises when determining the resilience of our current and planned transport infrastructure.

The latest UK Climate Change Risk Assessment (UKCCRA)[52] identifies a number of risks to transport infrastructure, which are illustrated in Figure 30.

[52] https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/

Figure 30: Key risks to infrastructure from climate change

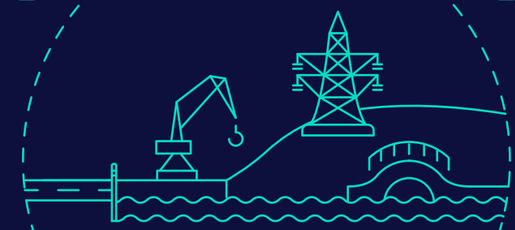
Infrastructure networks rely on each other so disruptions to one have an impact on others.

Flooding and erosion

More infrastructure assets will be at high risk of flooding due to heavier rainfall and rising sea levels.

Higher temperature extremes

Railways, roads, telecommunication and electricity networks will be more vulnerable to heat extremes.



Heavier rainfall

As weather extremes increase, heavier rainfall could cause more rail embankment failures.

Stronger winds

More powerful storms could increase disruption to transport networks and overhead power and communication cables.

Factoring in the effects of climate change

The Committee on Climate Change (CCC) notes that the most significant climate change risk to UK infrastructure is increased frequency of flooding from all sources[53], with the number of infrastructure assets exposed to this risk set to double by the 2080s. This can be seen most clearly in relation to the highway network, where currently 1% of UK roads are at risk of flooding, however, this rises to over 40% in the event of a 2°C rise in global temperatures. Our rail network already experiences significant disruption from various seasonal weather-related factors from flooding to leaf-fall through to rails buckling from heat during the summer. The disruption associated with these events is likely to get worse.

Other climatic aspects which should be considered within our planning for transport infrastructure include those associated with extreme weather events such as stronger wind, more frequent lightning strikes, high and low temperature extremes, as well as increased fog and high humidity events.

Climate change adaptation themes

Whilst climate change **mitigation**, the main focus of this strategy, refers to those measures that reduce greenhouse gas emissions, climate change **adaptation** measures are those that reduce or avoid the potential for harm caused by a changing climate, as well as those measures that seek to exploit the potential opportunities presented.

A review of national and local policies and guidance, including that of our delivery partners, identifies a number of main themes within which adaptation measures related to transport infrastructure can be categorised. These represent the immediate priorities for climate resilience.

Flood risk management. Predictions of increased extreme rainfall events and warmer, wetter winters means that increased flooding from rivers and groundwater will be a key consideration for our transport systems in the North. Transport infrastructure situated near rivers will be more susceptible to direct flooding as well as ground movements caused by bankside erosion.

Storm surges and rising sea levels are likely to increasingly effect transport infrastructure near our coasts, estuaries and tidal reaches of our rivers.

There is a need to ensure both new and existing transport infrastructure is resilient to floods based upon current climate projections.

Both the regularity and intensity of flooding can be reduced by identifying problem locations and regularly monitoring existing drainage systems.

Retrofitting existing infrastructure to higher tolerances and drainage capacities along with regular maintenance of those drainage systems and infrastructure, including bridges, culverts, embankments and cuttings, will be essential.

At the same time, in line with existing processes, scheme promoters need to understand and mitigate any increased flood risk on third parties as a result of new transport infrastructure.

Geotechnical change management. For both existing and proposed infrastructure, asset owners need to identify areas where ground conditions could be affected by increased rainfall and groundwater levels (e.g. soil saturation or slippage).

[53]The second UK Climate Change Risk Assessment, CCC (2017).

Improve service resilience in infrastructure. Scheme promoters will need to understand the links and interdependencies between stakeholders and assets in other sectors (e.g. telecommunications and power generation) so we understand the full potential for disruption and the increased costs of delivering infrastructure that is resilient to that disruption.

Adoption of green and blue infrastructure. Designers should look at opportunities within their projects to adopt green and blue infrastructure as a way to combat overheating and excess water run-off.

Heatwave planning and management. The predicted increase in extreme weather events may also lead to periods of extreme heat, on top of already higher average summer temperatures. The materials used to build our transport infrastructure and the vehicles that operate on it will need to be resilient to these weather episodes, not only ensuring continued operation but also maintaining passenger comfort. There is a need to identify how existing assets can be upgraded as well, such as employing cooling technologies and alternative insulation for our rail stations and the removal of jointed track and obsolete fastenings to make our rail tracks more resilient[54].

Increasing the resilience of active modes. Focus shouldn't just be on major transport infrastructure, but also our active travel infrastructure, and how we can make sure it is resilient and convenient to use in all types of weather.

Knowledge sharing and employee awareness. Many of our partners, including delivery authorities such as Network Rail and Highways England have made significant progress in how they build in climate change adaptation measures to their new developments. TfN will ask all partners to identify adaptation and resilience 'champions' within their organisations to share latest practice and advice with other partners and internally within their own organisations.

Themes relating to effective longer-term planning and implementation of climate adaptation and resilience measures include:

Targeted investment for resilience measures. There needs to be proactive investment in resilient materials and adaptation measures. The costs and benefits of adaptation need to be integrated into asset management, investment strategies, economic appraisals and decision-making. The Climate Risk Assessment Process provides a process and platform with which to do this.

Policy, indicators and monitoring. Where they haven't already, transport authorities and delivery bodies should develop specific policy in response to climate risks and adaptation priorities, along with mechanisms for ongoing monitoring of risks and progress against objectives.

Continuous improvement. Tracking the development of innovative technologies and approaches to the development of climate resilient transport infrastructure and systems.

[54]NR South East Route CP6 Weather Resilience and Climate Change Adaptation Plan (2019-24).

Factoring in the effects of climate change

Co-benefits of climate change adaptation

The benefits of developing climate change adaptation measures, particularly **nature based solutions**, are often not limited to increased resilience to climate change effects. If planned and delivered in the right way, potential co-benefits include:

- ⇒ Ecological enhancements
- ⇒ Flood and coastal resilience
- ⇒ Improved water quality
- ⇒ Improved air quality
- ⇒ Improved physical and mental human health
- ⇒ Reduced need for mechanical cooling
- ⇒ Increased uptake of active travel
- ⇒ Creation of green jobs

We can achieve nature based solutions through forming partnerships between scheme promoters and landowners, farmers, environmental groups and local communities[55], making space for excess water in other places, and using tree planting and sustainable drainage systems to store and slow down runoff from intense rainfall events. These green spaces can deliver co-benefits of providing valuable habitats for native wildlife, as well as accessible green spaces for promoting wellbeing.

For example, the creation and use of ecologically rich pond and wetland habitat to attenuate and filter rainwater runoff from major transport infrastructure can provide valuable habitats for native wildlife, as well as recreational space and educational opportunities for local communities.

[55]National Flood and Coastal Erosion Risk Management Strategy, Environment Agency (2020).



How we are increasing the resilience of our projects

Our principal delivery partners, Network Rail, Highways England and HS2, have taken a lead in planning for the resilience of the transport systems they promote and maintain. TfN's role, however, in developing an investment programme for the North's transport system means that as an organisation, we need to understand the implications of climate change on that system.

By undertaking a Climate Risk Assessment, we are able to identify and assess the climate change risks for our major transport infrastructure programmes and for any other projects with elements that could be affected by the weather and effects of climate change.

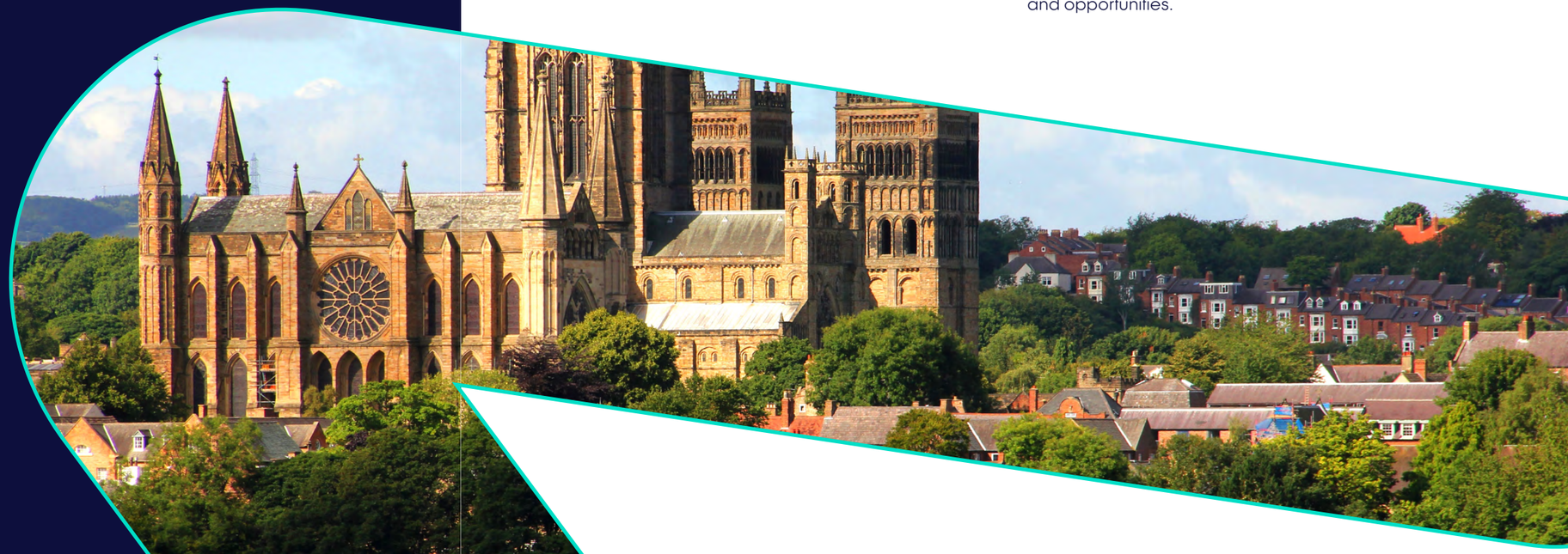
Guidance on when to undertake a Climate Risk Assessment and the assumptions to use in terms of global temperature rise is given within the Supplementary Green Book Guidance 'Accounting for the Effects of Climate Change' (DEFRA, 2020). Where a project, policy or programme is likely to have a lifespan that goes beyond 2035, the guidance recommends that it should be considered in the context of at least two future climate scenarios aligned with both a 2°C and 4°C rise in global temperatures.

We will undertake a Climate Risk Assessment for all TfN-led major infrastructure projects. By doing this we will be able to:

- ⇒ Refine early designs to improve resilience to future climate change
- ⇒ Incorporate climate scenarios within our appraisal of costs and benefits
- ⇒ Identify no or low regret adaption actions
- ⇒ Develop adaptive management processes that allow a project to adapt to changing risk over time, given the high uncertainty over the future impacts of climate change
- ⇒ Prioritise green infrastructure solutions which can deliver a wide range of co-benefits

Through our projects, we will also develop a strong collaborative relationship with the Environment Agency (EA) to stay abreast of major issues in relation to flood risk and geotechnical change, and discuss mitigation strategies.

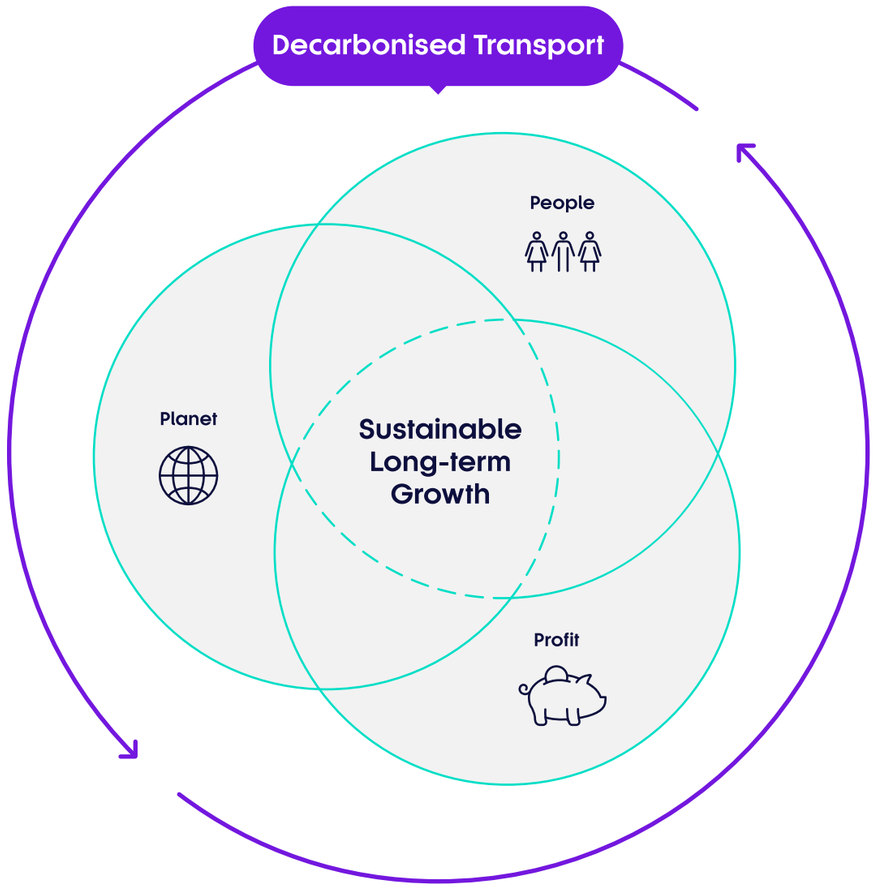
For those schemes within our IP that are not TfN-led, we shall encourage our delivery partners to align to the same or a similar process for identifying climate change risks and opportunities.



Stimulating clean growth in the North

Financial profit is now not the only driver of growth, as we recognise that positive outcomes for people and the environment are also essential to achieve sustainable long-term growth. Transport is a key enabler to achieve the **Triple Bottom Line**.

Figure 31: Triple Bottom Line



Whilst the ultimate stated aim of transport decarbonisation is to limit and eventually eliminate greenhouse gas emissions as a result of our travel, the potential opportunities it can provide in terms of driving economic growth and social value are significant.

TfN has a strategic objective to facilitate transformational economic growth. This underlying theme drives our Decarbonisation Strategy. Our Decarbonisation Strategy allows us an understanding of 'what needs to be true' in terms of transport decarbonisation policy, to allow the North to benefit from the significant economic and connectivity outcomes which would result from the schemes within our Investment Programme, at the same time as achieving our decarbonisation commitments.

At the same time, it is important that we understand the opportunities for transformational economic growth that can be **driven** by the decarbonisation of transport itself. Economic growth that is achieved at the same time as cutting greenhouse gas emissions is often referred to as 'clean growth'.

During the preparation of this Strategy, we explored the existing clean growth opportunities and initiatives already identified by our LEP partners and other business/industrial groupings. We wanted to understand how TfN could support these opportunities and initiatives, as well as understanding any opportunities that remain relatively unexplored and which of these exhibits the most potential for the North.

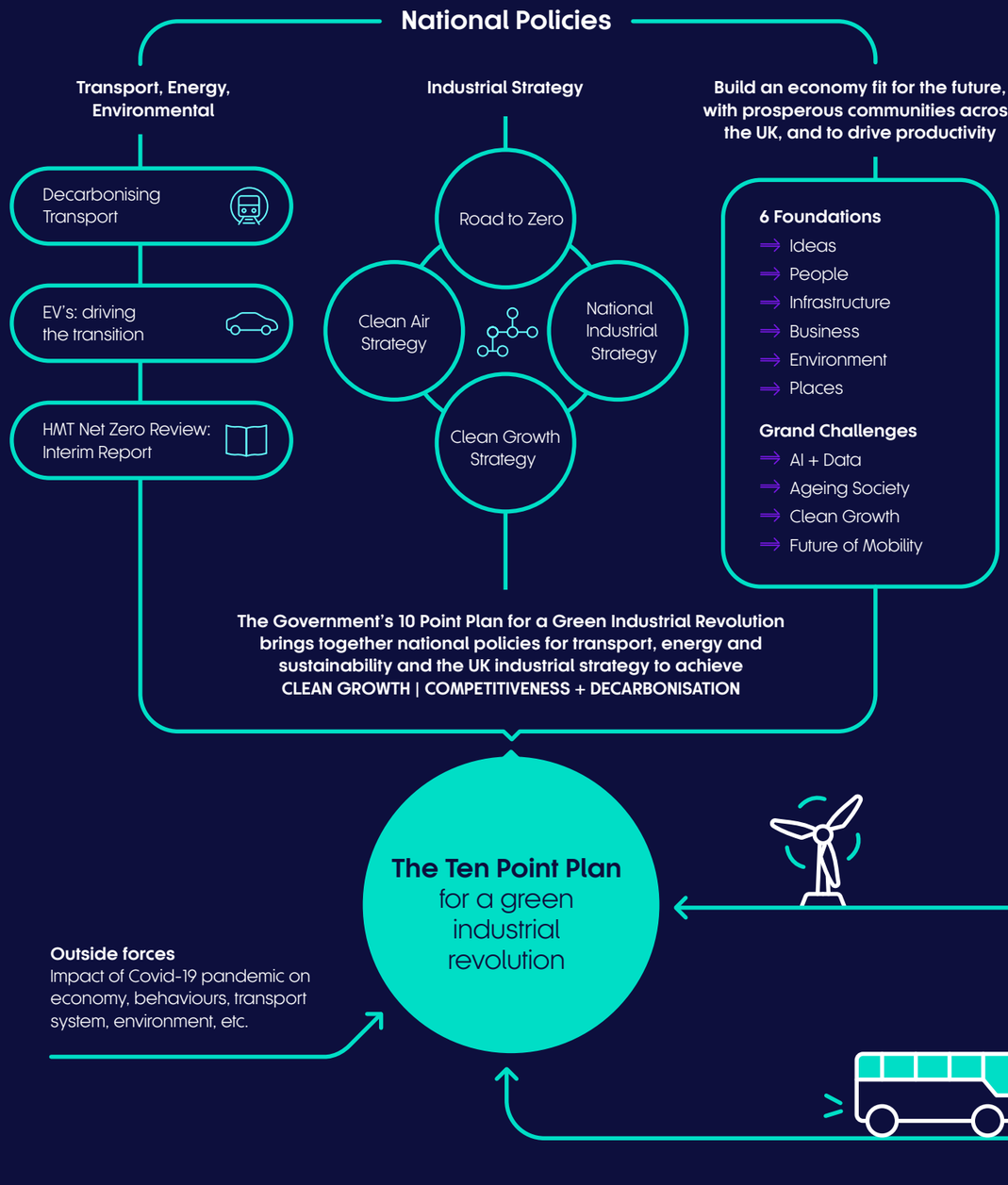
The key outcomes from this work are presented in this chapter, along with some analysis of where we feel TfN can play a meaningful role in supporting clean growth opportunities in the North.

Figure 32 frames our Decarbonisation Strategy within relevant national and regional strategies which are aimed at setting the UK on a sustainable clean growth path, conceptualising the interdependencies between Northern Local Industrial Strategies (LIS) and national strategies. Our work included a high-level review of this policy framework focused around eight key transport decarbonisation themes.

The findings of our clean growth opportunities review are presented around the identified key transport decarbonisation themes.

Stimulating clean growth in the North

Figure 32: Clean Growth Policy Framework



Zero Emission Vehicles and Charging Infrastructure

Zero Emission Vehicles are a necessity to achieve full decarbonisation of transportation and significant growth opportunity for the North

Regional Strengths:

- ⇒ Proximity to industry and expertise in the chemical, automotive and aerospace sectors, particularly in Cheshire and Warrington, Greater Manchester, Humber and Tees Valley.
- ⇒ Strategic locations for test bed applications, for example, for rural ZEV infrastructure and operation using the Lake District National Park.

Project Charge (2019 -2022) runs across Merseyside, Cheshire, North Shropshire, North & Mid Wales. The project merges transport and electricity network planning to create an overarching map of where EV charge points will be required and where they can be best accommodated by the electricity grid.

The City of York's Public Electric Vehicle Charging Strategy 2020-2025 outlines the city's plans to:

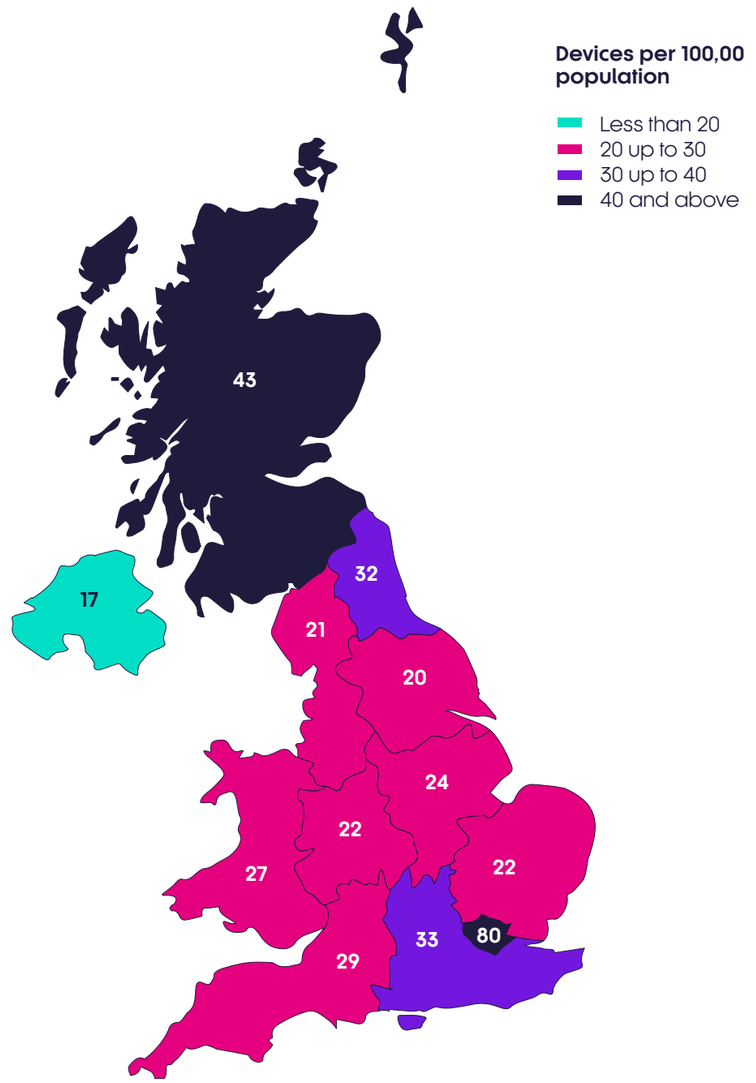
- ⇒ install fast chargers at 5 per cent of parking bays within their own long-stay car parks;
- ⇒ use funding from the UK Office for Low Emission Vehicles and the European Commission to install ultra-rapid chargers in hyperhubsat strategic locations around York; and
- ⇒ provide competitive tariffs to minimise the costs of using an EV for local residents and businesses.

Regional Challenges:

- ⇒ Relatively high proportion of rural areas and terraced housing which pose challenges to the installation of effective ZEV charging infrastructure and ZEV operation.
- ⇒ Uneven capabilities in relation to accessing grants and funding for ULEV infrastructure.
- ⇒ Most charging infrastructure provision is market led to some extent and this has led to an uneven geographical distribution of existing charging devices within the UK.
- ⇒ A more strategic 'whole network' approach is required to deliver an optional network that delivers best for the user and caters for trans-boundary trips.



Figure 33: Public charging devices per 100,000 of population by UK region (April 2021).[56]



[56]Sourced from DfT, Electric Vehicle Charging Device Statistics, July 2021, Zap-Map, Office for National Statistics licensed under the Open Government Licence v.3.0, Contains OS data © Crown copyright and database right 2021.

Zero Emission Vehicles and Charging Infrastructure

Regional Opportunities:

The widespread adoption of ZEVs will need to be supported by the provision of adequate charging infrastructure that caters to road trips that occur with the region as a whole and not just the places within it.

- ⇒ Northern LEPs are well placed to support and host giga-factories (for manufacturing ULEV batteries and parts) with OEM vehicle supply being a critical factor in the achieving the UKs decarbonisation targets. The UK Government has identified up to £1bn of spending on an automotive transformation fund, although has yet to decide on exact funding allocations.
- ⇒ Scaling up the supply chain can achieve economies of scale and reduced cost across the ZEV value chain.
- ⇒ Testing and trials of innovative ZEV charging technologies focused on delivering rural and on-street ZEV charging solutions.
- ⇒ Exploring the potential of multi-modal mobility hubs, including ZEV charging infrastructure, to stimulate urban regeneration, both by creating an additional incentive to visit and support local businesses and by improving access to affordable sustainable mobility.

Potential TfN Activity:

A catalyst for ZEV uptake and charging infrastructure deployment.

- ⇒ Engage with and support partners to access funding, technical expertise and co-ordination with Distribution Network Operators (DNOs). Facilitate cross boundary teams amongst partners to deliver strong and **effective bidding propositions** for ZEV funding and trials.
- ⇒ Engage with partners to support programmes and campaigns to **build awareness** in our communities via strong messaging around the financial and environmental benefits of ZEVs (relative to the use of equivalent ICE vehicles).
- ⇒ Develop a **coherent, data driven, regional ZEV Charging Infrastructure Framework**, including an assessment of provision of charging infrastructure requirements on the Major Road Network, as well as considering the requirements for charging **on-street and in rural and remote areas**. Coupled with this, TfN could look to influence government to alter the competitive bidding process into a more **outcomes-driven allocation** based on evidence and data.

CGA1: Develop a **regional EV Charging Infrastructure Framework** – laying the foundations for an outcomes driven approach to the delivery of charging infrastructure in the North, ensuring our network caters for the full range of journeys being made to, from and within our region.

CGA2: Supporting local partners in the development of local ZEV infrastructure charging plans and the pursual of funding opportunities, through the provision of data and evidence.



Hydrogen Vehicles and Refuelling Infrastructure

The North has competitive advantage in hydrogen production, but a strong business case for hydrogen transport applications is yet to emerge.

Regional Strengths:

- ⇒ Existing clusters of hydrogen producing industry located around Liverpool, Cheshire and Warrington, the Humber estuary and Tees Valley.
- ⇒ Existing hydrogen clean growth opportunity partnerships, for example HyNet North West (supported by Manchester, Liverpool and Cheshire and Warrington LEPs), the North West Hydrogen Alliance, and Zero Carbon Humber.
- ⇒ Liverpool City Region, through HyMotion, deploying hydrogen buses and refuelling systems as well as developing the first public hydrogen refuelling station in the North West.

UK H2Mobility brings together industry (fuel cell technology, energy & gas utilities, fuel retail, car and train manufacturers, government and Devolved Administrations) to support the development of hydrogen as a transport fuel and further the commercial roll-out of hydrogen mobility technology. A roadmap details how the UK can build a hydrogen refuelling infrastructure to support the introduction of Fuel Cell Electric Vehicles (FCEVs), with the initial focus on developing infrastructure serving metropolitan areas and the major routes that link them. Infrastructure development to date has been a public-private partnership with national and local governments, and fuel cell, industrial gases, energy, and vehicle manufacturers.

The HyNet North West partnership is to create the UK's first CCUS infrastructure including a hydrogen pipeline.

The Nordic Hydrogen Partnership consists of regional clusters involving major and small industries, research institutions, and local, regional and national authorities. The national bodies covering Norway, Sweden, Iceland and Finland act as NHP coordinators. Most hydrogen installations are meant to serve fuel cell buses, as well as cars. Activities are based on collaboration across the borders and are backed with strong public and private support in terms of funding, financial tax exemption schemes and investments (www.nordichydrogenpartnership.com).

Regional Challenges:

- ⇒ Despite a strong focus on hydrogen in the region, the development, testing and uptake of hydrogen vehicles is not a strong priority, at present, for the region in general.
- ⇒ Viability of hydrogen as a fuel source is likely to depend on the deployment of Carbon Capture, Use and Storage (CCUS) in the short and medium term.
- ⇒ Competition for hydrogen from high-priority hard-to-decarbonise industrial uses and government strategic priority to utilise hydrogen for domestic heat.
- ⇒ Current absence of Europe-wide strategy for low-carbon HGV. Investment in infrastructure will be at risk until established.
- ⇒ Lack of certainty within supply chain around future supply/demand dynamics.
- ⇒ Industrialisation of electrolysers, fuel cells and hydrogen tank manufacturing – and linked to this, the current high production cost of hydrogen which will be important for fuel-intensive transport uses.

Regional Opportunities:

Increased certainty around future hydrogen transport applications will allow a scale-up of the supply chain, necessary to support viable deployment of the technology.

- ⇒ Hydrogen as a fuel source could contribute significantly to the decarbonisation of ports and shipping.
- ⇒ Much of the hydrogen production in the region is still based on fossil fuels, supporting our industrial ports to start the shift to a green hydrogen supply would drive down overall costs through scale and enable the deep decarbonisation of 'first mile' freight transport that utilise our ports (e.g. shipping and HGVs).
- ⇒ Job creation in energy-intensive industrial regions (e.g. Humber and Tees Valley) to offset and exceed any expected job losses due to step changes in the decarbonisation agenda.
- ⇒ Potential for the development of low carbon hydrogen (blue hydrogen) from gas reforming combined with Carbon Capture and Storage (CCS) alongside the scaling up of green hydrogen production.

Potential TfN Activity:

There is no short-term policy that will allow an accelerated deployment of hydrogen in transport, but taking action to ready the supply chain in priority sectors will build the foundations for the future.

- ⇒ Apply a 'look ahead' in systems planning and **support the supply chain** by assessing future infrastructure requirements (e.g. refuelling networks) to expedite and encourage uptake once the technology becomes ready to enter the mainstream market.
- ⇒ Encourage collaboration with other regions (e.g. Scotland and Wales) and other sub-national transport bodies, mirroring the success of initiatives such as the Nordic Hydrogen Partnership.
- ⇒ Encourage and support our LEPs to develop a green hydrogen strategy for the North's industrial ports. Our ports are ideally placed to scale up the use of clean hydrogen, achieve scale in CCUS and decarbonise the 'first mile' of freight transport from ports.
- ⇒ Work with Tees Valley to make the region **the testbed home for hydrogen mobility**, leveraging the existing capability around Tees Valley Net Zero Innovation Centre and the Tees Hydrogen Transport Hub.
- ⇒ Engage with HyNet North West to identify actions to form a supply-chain cluster to include hydrogen transport applications and to pool resources and share knowledge around the adoption of hydrogen fuels for transport.

CGA3: Undertake or support **a pan-northern hydrogen transport refuelling study**. Provide confidence to users about the future path of the technology, particularly with regards to priority applications, e.g. hard-to-electrify rail services and long-haul HGVs.

CGA4: Supply chain support for future hydrogen infrastructure solutions for both first and last mile hydrogen applications. TfN to engage in emerging hydrogen partnerships in the North to support the development of a viable business case for hydrogen and provide confidence to the supply chain.

Demand Management, Digitalisation and Modal Shift

Embracing new technologies and providing access to alternative modes of travel is essential to achieving our decarbonisation objectives, especially in the short term

Regional Strengths:

- ⇒ Strong support for both MaaS and digital substitution within LEP strategies.
- ⇒ Strong pipeline of existing proposals to help make the region a world leader in digitalisation. This includes Greater Manchester's ambition to become a top five city-region for the digital economy in Europe, with full fibre broadband and 5G coverage, and, the Borderlands Inclusive Growth Deal proposal that seeks to complete the roll-out of super-fast broadband to properties that do not yet have access in Cumbria.
- ⇒ Strong regional support for modal shift to public transport.
- ⇒ Significant support for rail investments, including Northern Powerhouse Rail.
- ⇒ Ambitions in many city regions (e.g. Sheffield and Liverpool) to deliver zero-carbon public transport networks.
- ⇒ Existing programmes piloting demand-responsive transport and community-based initiatives as a solution to the problem of accessibility in rural areas in the Tees Valley.

Regional Challenges:

- ⇒ Despite some areas experiencing world-class digital connectivity, some areas of the region still have limited broadband connectivity which needs to be addressed to allow for effective employment of MaaS systems, improved customer experience on public transport and digital substitution, in a way that meet the needs of the North's often dispersed populations, labour force and economy.
- ⇒ Continued investment needed to expand 4G mobile data coverage and to support the transition to 5G.
- ⇒ The North's topography and climate, especially in more rural areas, act as a barrier to active travel uptake.
- ⇒ Local bus services are often considered unreliable and expensive.
- ⇒ Some existing industrial employment centres are poorly serviced by public transport and in some areas there are no direct rail alternatives for passenger or freight movements which creates reliance on the Strategic Road Network (SRN) for both local and regional journeys.

Regional Opportunities:

Capturing and optimising the economic, social and environmental benefits from digitalisation and cleaner, greener travel.

- ⇒ Development and updating of LEP Digital Infrastructure Plans, where needed, to support the transition towards 5G.
- ⇒ Proliferation of 5G innovation opportunities / programmes in the Tees Valley.
- ⇒ Development of a Mobility Hub concept, which integrates public transport services with shared mobility services and ZEV charging infrastructure. Hubs can act as a focus for economic growth by creating an additional incentive to visit community and commercial centres.

Plymouth City Council has secured £6M to build 50 mobility hubs. This is to be established by 2023 and are to include electric vehicle charging infrastructure, an e-car club, e-bikes and digital information boards. Additionally, an integrated MaaS platform will be developed to enable travel.

- ⇒ To become a leader in the development of rural public and active transport solutions. Exploring how new technologies can transform rural travel and incentivise the use of public transport and other forms of greener, shared and active mobility, and, how these solutions can stimulate return-investment in our rural communities.
- ⇒ Given the aspirations for zero-carbon public transport networks existing across the North's city-regions, aggregating orders for ultra-low emission buses from cities across the North could draw significant investment from the OEM vehicle supply industry into the region.
- ⇒ Championing the consideration of social and environmental value on an equal basis to economic return on investment when competing for government funding for active travel and public transport infrastructure.

Potential TfN Activity:

Creating a narrative for sustainable future travel in the North

- ⇒ Supporting and encouraging programmes such as the Made Smarter Tees Valley Pilot; 5G Testbed and Trials Programme and Future Mobility Zones, **to make the Tees Valley a leader for tests and trials using 5G technology in rural areas.**
- ⇒ Supporting and engaging LEPs in the development or updating of **Digital Infrastructure Plans**, to deliver strong messaging around the benefits of MaaS and digital substitution and also robust timelines in relation to the delivery of the enabling technology.
- ⇒ To influence government for continued investment **to expand the North's 4G mobile data coverage and support the transition towards 5G** as both an economic stimulator and a key bedrock of an effective, digitally enabled, integrated transport system.
- ⇒ To facilitate alongside partners, where feasible, the **aggregation of large orders of ultra-low emission buses from across the North's city regions** to attract inward investment and ensure supply.
- ⇒ As we move towards the decarbonisation of road vehicles, public perception of road investment being the environmentally least friendly option may shift, particularly in rural areas where demand for road investment may increase. There is an opportunity to co-ordinate, with partners, in **the delivery of strong messaging around the benefits of MaaS, public transport and active travel** and also robust timelines in relation to the delivery of supporting infrastructure and enhanced services. It is essential that the region can provide this parallel narrative to **build back confidence in public transport after the COVID-19 pandemic and create a demand for 'Liveable Places'.**

CGA5: TfN to develop **Clean Mobility Visions** for the North, identifying policy interventions to reduce levels of private car use that will be effective and suitable in the diverse population contexts of the North, including those in relation to demand management, active travel, micro-mobility and public transport. The recommendations flowing from the visions will focus on the interventions where the greatest co-benefits can be obtained, such as improved health and reduced congestion, rather than purely on the scale of the decarbonisation effect. The objective would be to **create a narrative for liveable places across the various geographies of the North based on reduced car usage.**

CGA6: Supporting our local partners with **data and evidence to analyse potential locations for mobility hubs** and to access funding sources. The hubs should act as stimulators of urban and rural economic growth.

Freight Decarbonisation and Ports

Tailored solutions to deliver deep-decarbonisation of freight transport, recognising the diversity of supply chain and stakeholder needs

Regional Strengths:

- ⇒ Established freight networks and world leading ports.
- ⇒ With the UK Government ambition, through its Maritime 2050 Strategy and Clean Maritime Plan, to lead the way in transitioning to a future of zero emission shipping. The North's ports are well placed to support this ambition through the formation of 'clean maritime' clusters.
- ⇒ Three of our ports have been confirmed as freeport locations, including Liverpool City Region, Teesside and Humber (including Immingham), and are expected to attract investment in manufacturing and logistics infrastructure through tax incentives and customs freedoms. This will make them excellent locations for clean and green transport infrastructure investment. A number of other candidate locations, including Tyne and Wear and Barrow/Workington also play a valuable role in overall picture for maritime industry and freight transfer within the North.

The Port of Rotterdam in the Netherlands, one of Europe's largest port and energy hubs, is positioning itself as a hydrogen leader, working with various partners to make the port area an international hub for hydrogen production, import, application and transport to other countries in Europe. For example, the "H-vision" project brings together industry, the port and R&D partners to investigate the switch to blue hydrogen, which can be achieved with significant public and private investment in new infrastructure. The project is also considering the conversion of existing installations to transport hydrogen to the industrial companies and deliver captured CO_2 to empty fields underneath the North Sea. According to the Port, the focus on large-scale hydrogen infrastructure will strengthen its international competitive position and attract new businesses that focus on sustainability (source: www.h-vision.nl/en).

The European Technology Platform ALICE is set-up to develop a comprehensive strategy for research, innovation and market deployment of logistics and supply chain management innovation in Europe. In 2019, ALICE published its 'Roadmap Towards Zero Emission Logistics in 2050', looking at the radical changes needed to deliver fully competitive low emissions vehicles, trains, barges, ships and airplanes (source: Roadmap Towards Zero Emissions Logistics 2050, ALICE (2019), www.etp-logistics.eu).

Regional Challenges:

- ⇒ Low or zero carbon technology in both maritime and freight sectors is at a relatively low maturity level. Technology selections should ideally be made when the options are mature, so any investment choices made now (e.g. liquid natural gas as a fuel for shipping) will have a long-term impact that is hard to re-frame.
- ⇒ The North's sizeable freight and logistics sector exacerbates road traffic congestion hot-points, as well as the emissions associated with ports and airports.
- ⇒ The need for a coherent regional strategy to enhance the North's competitive strength and develop supply chains in relation to the green maritime agenda.
- ⇒ European cooperation is required to develop compatible solutions for the decarbonisation of freight, recognising the significant number of cross-border trips (by HGVs, shipping and aviation).

Regional Opportunities:

Green and competitive ports need a bold vision that combines a roadmap of lowering GHG emissions from shipping and pollution in maritime areas, with integration of other sustainable transport modes

- ⇒ To lead the way in data collation and democratisation, mapping goods to vehicles in common formats, allowing the North's freight operators, both large and small to benefit from information on efficiency schemes and measures, and the latest technologies.
- ⇒ TfN's Investment Programme will provide significant additional rail capacity in the region, providing an opportunity to move freight transport from road to rail.
- ⇒ Rail freight is one of the most carbon-efficient means of moving goods, however heavy freight loads typically require overhead electrification (as the zero carbon alternative to diesel traction). The infrastructure works required to achieve coverage of the regions main freight corridors represent an opportunity to invest further in the regions rail manufacturing capability.
- ⇒ The Government has committed to a £20million investment in the Clean Maritime Demonstration Programme, and that a hydrogen refuelling port will be launched in Teesside.
- ⇒ There is potential for our partners (ports, local authorities and delivery authorities) to work together to deliver effective 'port to port' hydrogen or electric refuelling corridors across our region. Many of these corridors are identified within the Strategic Development Corridors defined within TfN's Strategic Transport Plan.

Potential TfN Activity:

Providing data and evidence to expedite the development of a decarbonisation pathway for shipping and freight

- ⇒ **Supporting the sector by assessing future infrastructure requirements** for hydrogen or electric refuelling, to expedite and encourage uptake once the technology becomes ready to enter the mainstream market. Supporting the formation of partnerships to consider 'port to port' zero carbon freight corridors.
- ⇒ Using TfN's analytical framework to **build a better understanding of freight and logistics movements and the effects of efficiency measures and technologies**. Making this data available for all.
- ⇒ Supporting the region in becoming a **centre of excellence for zero carbon ports or shipping** in the region.
- ⇒ **Encouraging and supporting our cities to develop Sustainable Urban Logistics Plans** through the provision of data and research and developing a structured approach to sharing knowledge through our Northern Evidence Hub.

CGA7: Developing and **supporting partnerships to consider port-to-port, multi-modal, zero carbon freight corridors**, optimising the economic benefits that our freeports and clean maritime clusters can generate for our region.

The Port of Gothenburg, in Sweden, is collaborating with Volvo Group, Scania and Stena Line to accelerate the transition to fossil-free fuels in the transport sector and cut emissions linked to the port by 70% by 2030. The collaboration focuses on the electrification of sea transport. Gothenburg Port Authority will produce the necessary infrastructure and access to fossil-free fuels for heavy vehicles, including electric power, biogas, and hydrogen gas. The freight transporters and Stena Line will have a key role to play by ensuring new fossil-free trucks and vessels are brought into service by 2030.

Rail Decarbonisation

Regional Strengths:

⇒ The North possesses strong rail manufacturing capability and the region is well placed to benefit from a nationwide acceleration of rail electrification programmes, as well as the potential to lead on innovative new clean transport technologies (e.g. hydrogen-powered passenger trains).

Regional Challenges:

⇒ Many of the North's dispersed communities have poor access to rail services and there is a perception that the existing rail infrastructure needs improvement and better maintenance before investment in decarbonisation programmes.

Regional Opportunities:

⇒ To increase the North's access to both UK and international markets in relation to green rail infrastructure and rolling stock.

Potential TfN Activity:

⇒ Work with government and Network Rail to ensure new rail schemes within our Investment Programme are electrified, including NPR, providing future market certainty to the supply chain and allowing development of further skills and capability in this sector within the North.

⇒ Work with partners, Network Rail and Train Operating Companies (TOCs) **to bid for the testing and trialling of new low emission train technologies in the region**. This should serve as a sign of our intent to employ these technologies in the future and attract further investment from the rail manufacturing sector into our region.

CGA8: Supporting our partners to attract testing and pilots of new low emission train technologies in the region.



Clean Growth

Our Clean Growth Opportunity Summary Matrix allows us to consider the identified priority Clean Growth Actions relative to each other in relation to their potential to stimulate economic growth and positive health outcomes.

All identified potential Clean Growth Actions have moderate to strong potential to stimulate growth in either jobs or skills within our region. The strongest actions in this respect are likely to be those in relation to expediting the effective development of ZEV charging infrastructure and increased uptake of ZEVs in the region, and in doing so, demonstrating significant regional demand to the supply chain.

There is also significant economic growth potential in relation to proving a market for hydrogen fuels for first mile freight journeys, however, there is also a greater level of uncertainty around these outcomes which is related to the relative immaturity of technology in this area.

Stronger, 'all-round' performers include actions around supporting demand management and modal shift, which may see increased health benefits and more potential to simulate growth in a more equitable way.

All eight of the identified potential Clean Growth Actions are taken forward for further deliberation within Chapter 9, where TfN's priority activities to 2025 are considered.

Clean Growth Opportunity Summary Matrix

Figure 34: Clean Growth Opportunity Summary Matrix

Definition: Socio-Economic Factors

Jobs	Potential to support job growth directly through design, manufacturing and construction opportunities, and also in the wider job market by improving connectivity and resilience.
Skills	Potential to increase the skills base within our communities and the demand for skilled labour to support business growth and new mobility infrastructure.
Health	Potential to improve the health and wellbeing of our communities.

Definition: Impact

Strong	Strong potential to deliver socio-economic benefits of jobs, skills and health. Policy is very likely to induce private sector investment and support a high level of job creation in innovative and future industries, requiring an increased level of skilled workers. Strong potential to support the health agenda, encouraging an active lifestyle, and reducing pollution.
Medium	Those opportunities where there is a more modest potential to deliver socio-economic targets of jobs, skills and health, or where the potential is strong but uncertainty is high. Some potential to support the health agenda, encouraging an active lifestyle, and reducing pollution.
Low	Weaker potential to deliver socio-economic targets of jobs, skills or health. Policy may not have strong outcomes in all three socio-economic areas, or, only over the long-term horizon.

Clean Growth Actions	Potential for Beneficial Socio-Economic Impact: Jobs	Skills	Health	Justification
Action 1: Develop a regional EV charging framework	Strong	Strong	Low	Effective ZEV infrastructure resulting in higher ZEV uptake leading to a stronger supply chain. Jobs and skills benefits from the manufacture and installation of infrastructure and investment in the region from OEMs. Health benefits less clear due to risks associated with increased uptake of private vehicles and persistent local air quality emissions along with potential to exacerbate TRSE.
Action 2: Supporting local partners in the development of local EV charging infrastructure	Strong	Strong	Medium	Effective ZEV infrastructure resulting in higher ZEV uptake leading to a stronger supply chain. Jobs and skills benefits from the manufacture and installation of infrastructure and investment in the region from OEMs. Provision of data in relation to distributional impacts and transport related social exclusion may help obviate potential health impacts.
Action 3: Undertake or support a pan-northern hydrogen transport refuelling study	Medium	Medium	Medium	The hydrogen economy presents significant opportunities for jobs and growth in the North and developing a market in hydrogen for transport would further stimulate this. Medium ratings reflect a significant uncertainty that persists around the viability of hydrogen as a fuel relative to other technologies.
Action 4: Supply chain support for future hydrogen infrastructure solutions	Medium	Medium	Medium	The hydrogen economy presents significant opportunities for jobs and growth in the North and developing a market in hydrogen for transport would further stimulate this. Medium ratings reflect a significant uncertainty that persists around the viability of hydrogen as a fuel relative to other technologies.
Action 5: Developing Clean Mobility Visions for the North	Medium	Low	Strong	This activity in itself is unlikely to lead to direct significant growth in jobs and skills, however, a shift away from private vehicle use and any uptake in active travel is likely to lead to health and wellbeing benefits. A more effective, integrated and comprehensive public/ shared/ active transport system is ultimately likely to be a more equitable transport system, allowing a broader spectrum of our communities to access more jobs.
Action 6: Supporting local partners in the development of mobility hubs	Medium	Medium	Medium	Mobility hubs may principally encourage healthier and greener mobility choices, improving air quality and tackling TRSE. Dependent on location and integration into spatial planning, they also provide an opportunity to accelerate commercial regeneration and localisation concepts.
Action 7: Developing and supporting partnerships to consider zero carbon, port-to-port freight corridors	Strong	Medium	Medium	Using the strong connection between out ports, airports and intermodal terminals to both stimulate the transition to clean fuels and create substantial economic investment opportunities in our ports and their hinterlands. The use of hydrogen as a fuel for first mile journeys, would stimulate the maximum opportunity for our region, however, significant uncertainties persist around the viability of hydrogen as a fuel relative to other technologies.
Action 8: Supporting our partners to attract testing and pilots of new low emission train technologies	Strong	Medium	Low	Given the existing strong rail manufacturing base in the North, it is well placed to deliver the materials needed to decarbonise railways/locomotives. Health benefits are relatively low next to other actions given the limited portion of air quality / carbon emissions generated from existing railways.

Our work has identified a number of other significant clean growth opportunities for the North. Transport is not the key driver of these opportunities, but it can play an important enabling function.

Advancing Offshore Wind

Substantial installed offshore wind energy generation can be found off much of the North's coasts, with Cumbria being home to the largest offshore wind farm in Europe. The associated supply chains, research and development activities and the deployment of offshore wind farms are of significant benefit to many of our existing coastal areas.

Whilst offshore wind and the activities that support it are a relatively mature industry in the North, any opportunities to strengthen the transport infrastructure that supports the industry, should be explored. For example, the UK Government's 10 Point Plan committed to investing £160m into modern ports and manufacturing industries to further boost the UK's offshore wind energy generation capacity.

Further to this, some high-value components are still being imported. Transport links will be important if the region is to attract the appropriate skills base and inward investment to fill these manufacturing gaps.

The energy generated by offshore wind farms could also be used as a source of renewable energy to power the electrolysis process required to produce green hydrogen, to be used for transport applications.

Potential TfN Activity:

⇒ Preparation of pan-northern hydrogen refuelling network strategy has been proposed as a potential priority activity for TfN (alongside industry stakeholders) before 2025. Any strategy should consider the contribution that offshore wind energy could play in the electrolysis process to produce green hydrogen and understand how the spatial characteristics of a refuelling network might optimise this potential.

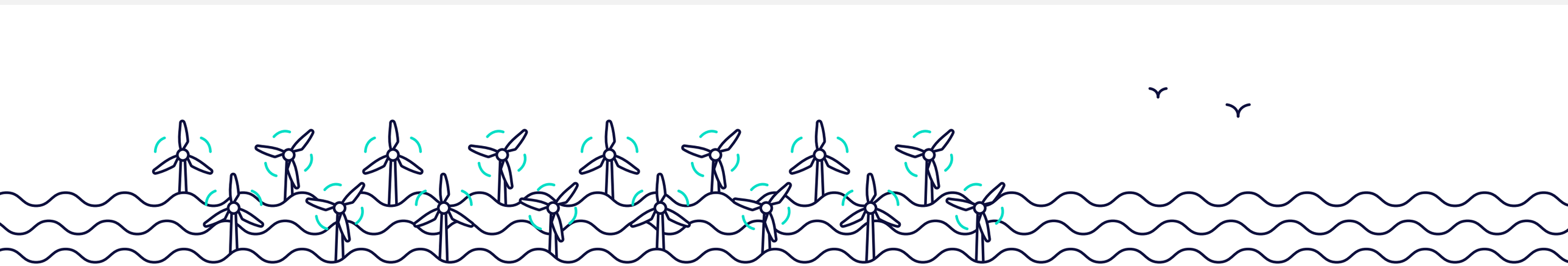
⇒ Supporting coastal LEPs (e.g. Humber and Liverpool) to access government funds which would unlock increased investments in the North's port infrastructure, including the formation of clean maritime clusters.

Investing in Carbon Capture, Usage and Storage (CCUS)

The North already leads the country in CCUS research and development, with the region's ambitions being driven by the need to decarbonise the North's heavy industrial clusters, including those in the Humber, Tees Valley and Merseyside. The UK Government's 10 Point Plan pledges significant investment to support the establishment of SuperPlaces: industrial clusters pioneering hydrogen production and carbon capture, returning the latter to under the North Sea. Given its location, the North is perfectly placed to host these clean growth clusters and utilise the hydrogen they produce.

The majority of decarbonisation pathways, including those presented by the Climate Change Committee, rely on an element of CCUS to achieve their decarbonisation trajectories. It is also true that the effective and rapid development of CCUS in the North will be an essential component within the hydrogen supply chain (before green hydrogen production sufficiently develops) if it is to be chosen as a viable fuel source for zero or low emission HGVs. **Without CCUS, it is likely that the decarbonisation pathways for our HGVs would need to pivot to alternative fuel sources (e.g. battery electric). Given the North's potential in relation to the development of CCUS and hydrogen production/ use, this would represent a missed growth opportunity for the region.**

The scale of major infrastructure planned through our Investment Programme will also mean that the region's ability to scale CCUS activity, particularly in relation to industries producing construction materials (e.g. steel), is likely to be an important component in mitigating our embodied carbon emissions.



TfN's Priority Decarbonisation Actions

We believe that TfN has an important role to play in achieving transport decarbonisation in the North.

Demonstrating:

Evidence-building, running pilots and collating and sharing best practice.

Facilitating:

Working for consensus, ensuring consistency, co-ordinating cross-sectoral partnerships and teams, as well as representing our partners as a single, strong unified voice in national forums.

Supporting:

Developing regional strategy to support local objectives and provide a basis for effective and co-ordinated influencing of government.

Our policy analysis work has revealed those areas of policy through which the most challenging emissions reductions must be achieved. These provide a focus for our proposed research, data and evidence-building activities in the short-term to 2025. Specific activities generated by this analysis are signposted as 'Policy Gap Actions' (PGAs).

Alongside the policy analysis, our exploration of those activities which can provide the greatest potential for clean, green growth in the North has identified eight 'Clean Growth Actions' (CGAs).

Finally, a number of additional activities have been identified as priorities and refined through engagement with our partners, industry, research networks such as DecarboN8 and other Sub-national Transport Bodies, and these are highlighted as 'Stakeholder Driven Action' (SDAs).

Taken together, these represent TfN's proposed Priority Decarbonisation Actions.

Given the enormity of the decarbonisation challenge and the risks associated with failing to achieve what is needed, the majority of activities around decarbonisation would justifiably be classed as 'high priority'. TfN's proposed Priority Actions , are those activities which we believe need to happen in the short-term (i.e. up to 2025) and that are most effectively delivered at a pan-Northern level.

They typically:

- ⇒ recognise the transboundary nature of our surface transport system and tackle those challenges and emissions that fall between the gaps when employing a local or combined authority governance approach;
- ⇒ generate evidence that can be applied usefully across a range of places and that increase the capacity and technical capability of our partners.
- ⇒ reflect preferences expressed by our partners and other stakeholders.

The Role of Sub-National Transport Bodies (STBs)

The government's Transport Decarbonisation Plan proposes a clear role for STBs to turn national priorities into actionable plans for their region and supporting the governments decarbonisation objectives by ensuring a coherence in approach across local authority borders[57].

A key component of this work will be supporting our partners in the preparation of their Local Transport Plans, specifically in developing quantified carbon reduction targets for transport (where these do not already exist) and the sustainable transport solutions that will be needed achieve these targets.

TfN has been building a useful repository of data and evidence in recent years, including research studies into the North's visitor economy, Transport Related Social Exclusion and business user insight surveys. In addition, our Analytical Framework and carbon modelling tool has the potential to provide the data needed for our partners to derive, measure and monitor both the targets and quantifiable reductions required of them.

It is our intention to build on this existing evidence base, for use by our partners, through many of the activities proposed within this Strategy.

TfN's Proposed Activities to 2025

Table 8 defines TfN's proposed Priority Decarbonisation Actions by policy area. The urgency of the climate crisis requires us to address as many actions as possible in the short term, up to 2025. There are a number of actions, typically where TfN can play an ongoing support function to others, where we envisage that support as being 'continuous', or, as and when required. Other actions are likely to have specific outputs which will require further definition.

The activities within this list present differing levels of opportunity for TfN influence. The public consultation provided insights on the priority given by different groups of stakeholders to different activities and their views on the most appropriate role for TfN in relation to those activities. Further details can be found in TfN's Decarbonisation Strategy: Consultation Analysis Report. These insights have been used to prioritise TfN's proposed activities and each is identified within Table 8 as a 'Stakeholder Priority'.



[57]Decarbonising transport: a better, greener Britain (July 2021), pg. 152

TfN's Priority Decarbonisation Actions

Table 8: TfN's proposed Priority Decarbonisation Actions by policy area

Policy Area	TfN Role	TfN Decarbonisation Action	Scope	Timeframe
Decarbonisation Strategy	Leading	**Stakeholder Priority - SD1:** Regional route-map for transport decarbonisation.	Disaggregating baseline emissions for a number of place typologies that typify the North. Assessing against a regional trajectory to develop place-specific policy baskets and to understand the optimum timing and resource use profiles for each typology, in order to achieve regional decarbonisation.	Pre-2025
	Supporting	**Stakeholder Priority - SD2:** Developing place-based decarbonisation pathways for rural typologies.	Similar to the work proposed under the 'regional route-map' action, although focused predominantly on the challenges and opportunities of decarbonising rural transport systems. Includes development of appropriate policy baskets.	Pre-2025
	Leading	**SD3:** Formation of decarbonisation working group/s with TfN partners.	Working groups to help scope and guide the implementation of the Decarbonisation Strategy. This may take the form of one dedicated working group or a number of project specific steering panels.	Pre-2025
	Leading and Supporting	**Stakeholder Priority - SD4:** Exploring the relationship between transport decarbonisation and transport-related social exclusion (TRSE) (inclusive of PGA11).	Understanding the geography of TRSE in the North and the potential effects on TRSE, by place, of different transport decarbonisation policy measures.	Pre-2025
	Supporting	**SD5:** Research into embodied carbon analysis for strategic transport infrastructure programmes.	Partnering with research bodies to investigate the requirements and feasibility of carrying out embodied carbon assessments of strategic multimodal transport infrastructure corridor proposals. We shall use a selection of schemes from TfN's existing Strategic Development Corridors for this task.	Pre-2025
	Leading	**SD6:** Programmatic assessment of Investment Programme (IP) against TfN's Decarbonisation Trajectory.	Assessment of modelled emissions as a result of TfN's IP Intervention Sequencing Strategy, against TfN's Decarbonisation Trajectory to identify any additional decarbonisation policy required and potential adjustments to the IP.	Pre-2025
	Leading and Supporting	**SD7:** Consideration of emissions from aviation and shipping generated by the North.	Calculating the North's contribution to UK aviation and shipping emissions, and inclusion of this within our future emissions baselines. Analysis of national policy measures to reduce aviation and shipping emissions to consider how TfN and its partners can support these policies, as well consideration of additional local measures and further focused TfN activities.	Pre-2025
Electric Vehicles and Fuel Efficiency	Leading	**Stakeholder Priority – CGA1:** Develop a regional ZEV charging framework (inclusive of PGA1).	Identifying those facets of a low carbon charging system that are best approached at a pan-Northern level, including coverage of the Major Road Network (MRN), consistency and interoperability of technology and payment systems, procurement principles, future proofing and consideration of future grid requirements.	Pre-2025
	Supporting	**CGA2:** Supporting local partners in the development of local ZEV charging infrastructure.	Supporting local partners in the development of local ZEV infrastructure charging plans and the pursual of funding opportunities, through the provision of data and evidence.	Pre-2025
	Supporting	**Stakeholder Priority - PGA14:** Increase awareness of fuel-efficient driving styles.	Through the policy positions we adopt and our communication and engagement activities, work with partners to increase public awareness of fuel-efficient driving styles and the associated environmental and financial benefits.	Continuous
Hydrogen	Supporting	**Stakeholder Priority - SCGA3:** Support a pan-northern hydrogen transport refuelling study.	Using modelled HGV demand across the MRN, as well as potential interfaces with the rail, aviation and shipping networks, to identify strategic locations for investment in hydrogen refuelling depots/stations and storage facilities.	Pre-2025
	Supporting	**CGA4:** Supply chain support for future hydrogen infrastructure solutions.	Engaging with emerging hydrogen partnerships in the North to support the development of a viable business case for hydrogen for first mile freight applications and provide confidence to the supply chain.	Continuous

TfN's Priority Decarbonisation Actions

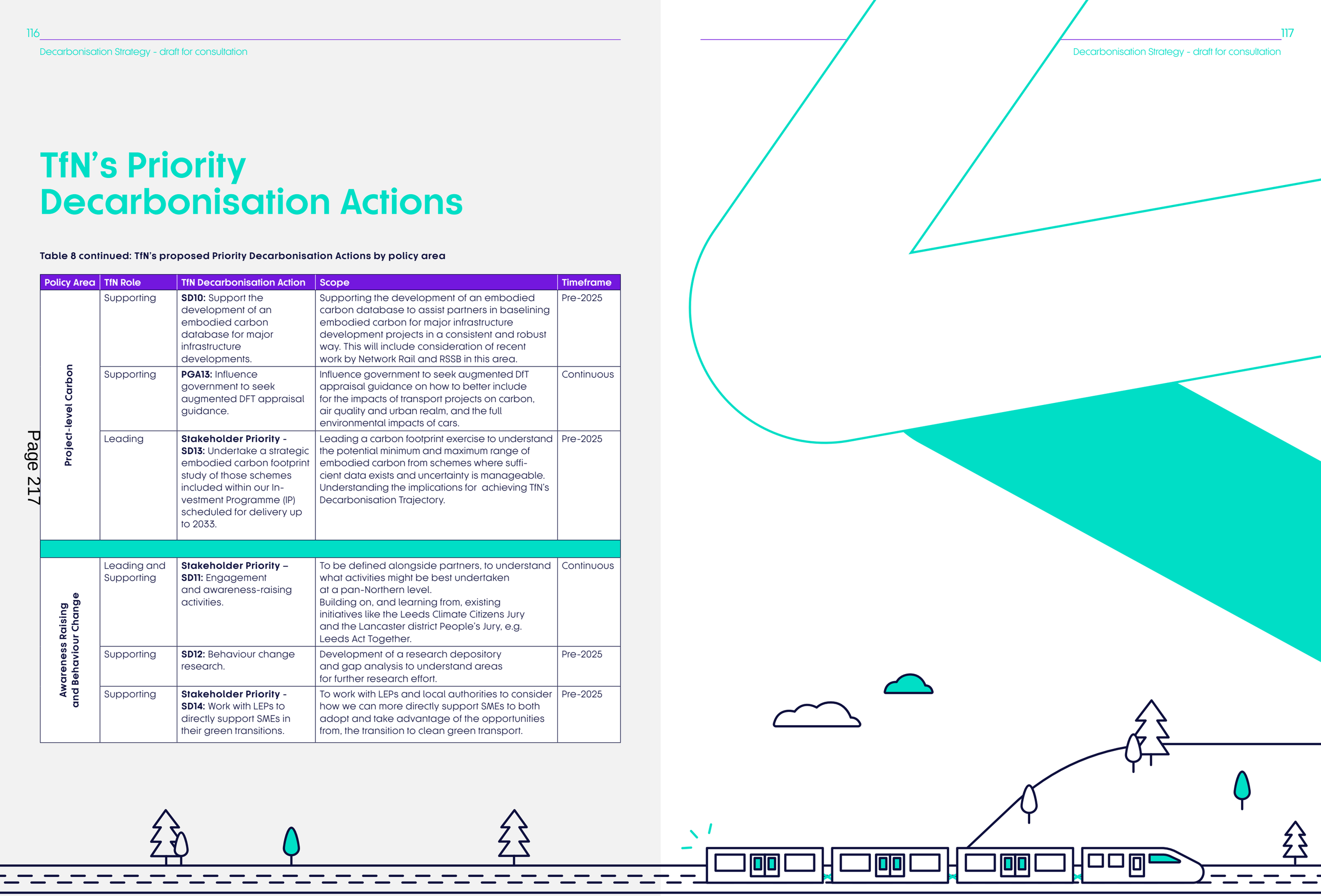
Table 8 continued: TfN's proposed Priority Decarbonisation Actions by policy area

Policy Area	TfN Role	TfN Decarbonisation Action	Scope	Timeframe
Demand Management	Supporting	**SD8:** Supporting the development of scalable digital solutions for incentivising greener, shared and active mobility in rural areas.	Supporting partners, through provision of evidence and data, in understanding the key requirements of an effective rural MaaS system.	Continuous
	Leading and Supporting	**Stakeholder Priority - CGA5:** Developing Clean Mobility Visions for the North	Developing compelling visions highlighting the advantages of reduced car usage, active travel, micro-mobility and public transport in creating 'Liveable Places' across the various geographies of the North. Underpinning this work with a robust evidence base and baskets of relevant policy measures.	Pre-2025
	Supporting	**CGA6:** Supporting local partners in the development of Mobility Hubs.	Provision of data and evidence to facilitate analysis into potential locations for mobility hubs, in both rural and urban areas, and to access funding sources.	Pre-2025
	Supporting	**PGA10:** Consider the role of micro-mobility/shared mobility in the first and last mile journeys at train stations.	Use our role within the Rail North Partnership to facilitate a consideration of how shared mobility, including cycle hire and e-scooter schemes, can be encouraged for first and last mile journeys at train stations.	Pre-2025
	Leading	**Stakeholder Priority - PGA8:** Develop schemes and infrastructure to improve the regional public transport network, e.g. Northern Powerhouse Rail.	Develop and implement comprehensive plans for the regional public transport network, such as Northern Powerhouse Rail and wider improvements to the rail network.	Continuous (and beyond 2025)
	Supporting	**PGA9:** Research on the effects of home-working upon productivity and agglomeration.	Continue to an evidence base on the extent to which less work-related travel has a detrimental effect on productivity and agglomeration to understand whether home-working can be consistent with TfN's vision for a transformed Northern economy.	Pre-2025
Freight	Supporting	**Stakeholder Priority - SD9:** Low carbon urban freight scenarios.	Research on appropriate place-based, low carbon, urban freight (last-mile) solutions in the North.	Pre-2025
	Leading and Supporting	**Stakeholder Priority - CGA7:** Developing and supporting partnerships to consider zero carbon, port to port freight corridors.	Exploring the potential for our partners (ports, local authorities and delivery authorities) to work together to deliver effective 'port to port', multi-modal, hydrogen and/or electric refuelling corridors across our region. Many of these corridors are identified within the Strategic Development Corridors defined within TfN's Strategic Transport Plan.	Pre-2025
	Supporting	**PGA2:** Facilitating large ZEV truck trials in the North.	Work with local authority partners and Highways England to facilitate large ZEV truck trials in high traffic corridors in the North.	Continuous
	Supporting	**PGA3:** Support partners to aggregate large orders of ZEV vans, truck and buses across the North.	Current ZEV production will not meet the demand required to hit our targets. By helping to aggregate demand from stakeholders across the North, significant numbers of vehicles would be drawn to the region and would signal to manufacturers that the regional demand is present.	Continuous
	Supporting	**PGA12:** Supporting freight information democratisation schemes.	Working with and influencing government to support information democratisation schemes that make the latest information on the best efficiency schemes and technology available to everyone.	Continuous
Rail	Supporting	**Stakeholder Priority - CGA8:** Supporting our partners to attract testing and pilots of new low emission train technologies (inclusive of PGA6).	Work with partners, Network Rail and Train Operating Companies (TOCs) to bid for the testing and trialling of new low emission train technologies in the region.	Continuous
	Leading and Supporting	**Stakeholder Priority - PGA4:** Identify appropriate routes for electrification.	Support the Government and Network Rail, utilising the NPR project, in identifying appropriate routes for electrification and associated implementation.	Pre-2025
	Supporting	**Stakeholder Priority - PGA5:** Work with Train Operating Companies (TOCs) and Freight Operating Companies (FOCs) to exploit operational efficiency opportunities (inclusive of PGA7).	Work with train operating companies to: a. Revise service patterns based around the progression of electrification to minimise the use of diesel-only trains before they are phased out; b. Optimise timetables to maximise benefits of frequency and reduce flighting of services; c. Work with freight and train operating companies and Network Rail to ensure there is sufficient capacity to allow freight traffic to run directly and with minimal dwell times, reducing emissions from existing diesels.	Continuous

TfN's Priority Decarbonisation Actions

Table 8 continued: TfN's proposed Priority Decarbonisation Actions by policy area

Policy Area	TfN Role	TfN Decarbonisation Action	Scope	Timeframe
Project-level Carbon	Supporting	**SD10:** Support the development of an embodied carbon database for major infrastructure developments.	Supporting the development of an embodied carbon database to assist partners in baselining embodied carbon for major infrastructure development projects in a consistent and robust way. This will include consideration of recent work by Network Rail and RSSB in this area.	Pre-2025
	Supporting	**PGA13:** Influence government to seek augmented DFT appraisal guidance.	Influence government to seek augmented DfT appraisal guidance on how to better include for the impacts of transport projects on carbon, air quality and urban realm, and the full environmental impacts of cars.	Continuous
	Leading	**Stakeholder Priority - SD13:** Undertake a strategic embodied carbon footprint study of those schemes included within our Investment Programme (IP) scheduled for delivery up to 2033.	Leading a carbon footprint exercise to understand the potential minimum and maximum range of embodied carbon from schemes where sufficient data exists and uncertainty is manageable. Understanding the implications for achieving TfN's Decarbonisation Trajectory.	Pre-2025
Awareness Raising and Behaviour Change	Leading and Supporting	**Stakeholder Priority – SD11:** Engagement and awareness-raising activities.	To be defined alongside partners, to understand what activities might be best undertaken at a pan-Northern level. Building on, and learning from, existing initiatives like the Leeds Climate Citizens Jury and the Lancaster district People's Jury, e.g. Leeds Act Together.	Continuous
	Supporting	**SD12:** Behaviour change research.	Development of a research depository and gap analysis to understand areas for further research effort.	Pre-2025
	Supporting	**Stakeholder Priority - SD14:** Work with LEPs to directly support SMEs in their green transitions.	To work with LEPs and local authorities to consider how we can more directly support SMEs to both adopt and take advantage of the opportunities from, the transition to clean green transport.	Pre-2025



Internal assurance, monitoring and evaluation

Through our internal policy framework, we shall consider the carbon implications of all our projects and programmes at their inception, to ensure we understand the implications and where appropriate, take actions to mitigate the impacts. These processes also ensure that TfN's activities are informed by the growing evidence base on the impacts of transport interventions in the North of England across a range of domains – including impacts on carbon emissions.

We also need to grasp the opportunities to achieve carbon reductions wherever we can. We expect these opportunities to occur in our development projects and through our policy-making, but also when making corporate decisions around aspects such as our ways of working, procurement activities and staff benefits.

Our internal assurance process will require the owners of TfN projects, programmes and processes to understand TfN's Decarbonisation Trajectory and assess whether their proposals are supportive of this direction of travel. Figure 6 in Chapter 2 illustrates how we intend to benchmark our Investment Programme against our Decarbonisation Trajectory at a strategic level.

Where proposals are in relation to infrastructure development, or the procurement of supply chain services, they will also need to align with TfN's targets in relation to reducing supply chain and construction carbon.

Monitoring and evaluating our progress

When it comes to decarbonisation, the time for strategising is short and the time for delivering on our commitments is now.

Rigorous monitoring and evaluation processes will ensure that progress towards TfN's decarbonisation commitments is clearly measured, that reductions in carbon can be attributed to specific causes, and that any unforeseen consequences of this are properly analysed. These processes are vital to shaping and updating our strategies and actions over the coming decades to ensure the maximum benefits are derived, and any negative externalities are minimised.

TfN is currently developing a Monitoring and Evaluation (M&E) Strategy and Framework, which is scheduled for completion in early 2022. The M&E Strategy sets out the processes necessary for a rigorous system of M&E within TfN, including how the outputs of monitoring and evaluation should inform the development and appraisal of TfN projects. Alongside this, the M&E Framework sets out the indicators by which TfN will measure progress towards the four objectives set out in the Strategic Transport Plan. Decarbonisation connects to all of these objectives, but falls most directly within objective four: "Promoting and enhancing the built, historical and natural environment".

Tables 9 and 10 highlight those indicators that we have developed in relation to decarbonisation. These indicators will allow us to understand:

- The North's progress in terms of the decarbonisation of our surface transport, allowing us to benchmark this progress against our Decarbonisation Trajectory. This is measured by the set of indicators detailed in Table 10, which will be included in TfN's M&E Framework.
- The success of the specific measures and actions committed to within this Decarbonisation Strategy (Table 9).

It will be important to take stock **before** each milestone along our Decarbonisation Trajectory, the next being in 2025, to allow us to adjust our focus and strengthen our approach where needed.

In addition to re-modelling the North's transport carbon footprint before each of these milestones, we will also review our list of priority activities **annually**, with our partners, as part of TfN's yearly business planning process.



Monitoring and evaluating our progress

Table 9: Indicators to measure the success of TfN's Decarbonisation Strategy

Impact: Reduce emissions from the Major Road Network in the North.		
Measure: Annual estimates from TfN NoCarb model.		
Outcomes	**Outputs**	**Activities**
Rollout of sufficient low carbon charging network to meet trajectory. (M: To be set based on the infrastructure framework). Rollout of sufficient hydrogen refuelling network to meet trajectory. (M: To be set based on the ZEV infrastructure framework). Modal shift away from private car travel, towards active travel and public transport. (M: NTS, and datasets on MaaS uptake where these are developed). Increased occupancy levels among car users for journeys in and through the North. (M: DfT statistics). **PGA14:** Increasing fuel efficiency among drivers. (M: To be developed).	**SD1:** Regional route-map for transport decarbonisation. (M: Route-map signed off by stakeholders). **SD2:** Place-based decarbonisation pathways for rural typologies. (M: Pathways signed off by stakeholders). **CGA1 & PGA1:** A regional ZEV charging framework. (M: Framework signed off by stakeholders). **CGA5:** Clean Mobility Visions for the North. (M: Visions signed off by stakeholders). **PGA8:** Develop schemes and infrastructure to improve regional public transport networks, e.g. Northern Powerhouse Rail. (M: Delivery of schemes identified at the planning stage).	**SD3:** Formation of decarbonisation working group/s with TfN partners. **SD4 & PGA11:** Research on the relationship between transport decarbonisation and transport-related social exclusion (TRSE). **SD6:** Assessment of Investment Programme (IP) against TfN Decarbonisation Trajectory. **SD11:** Engagement and awareness-raising activities with the public. **SD14:** Work with LEPs to directly support SMEs in their green transitions. **CGA2:** Research and evidence to support the development of local ZEV Charging Infrastructure. **CGA3:** Research, data and evidence to support a pan-Northern hydrogen transport refuelling study. **SD8:** Research and evidence to support the development of scalable digital solutions for incentivising greener, shared and active mobility in rural areas. **CGA6:** Research, data and evidence to support local partners in the development of Mobility Hubs. **PGA9:** Research and evidence on the effects of home-working upon productivity and agglomeration. **PGA10:** Research and evidence to consider the role of micro-mobility/ shared mobility in first and last mile journeys at train stations.

Outcomes continued...	**Outputs continued...**	**Activities continued...**
		SD7: Consideration and analysis of emissions from aviation and shipping generated by the North. **SD12:** Research and evidence on behaviour change and transport user insights. **PGA8:** Develop and implement comprehensive plans for the regional public transport network, such as Northern Powerhouse Rail and wider improvements to the rail network.

Impact: Reduce emissions from land freight transportation in the North.		
Measure: Annual estimates from TfN NoCarb model.		
Outcomes	**Outputs**	**Activities**
Rollout of sufficient low carbon charging network to meet trajectory. (M: To be set based on the infrastructure framework). Rollout of sufficient hydrogen refuelling network to meet trajectory. (M: To be set based on the ZEV infrastructure framework). Modal shift towards rail freight. (M: Great Britain Freight Model). Increasing fuel efficiency among drivers. (M: To be developed).	**SD1:** Regional route-map for transport decarbonisation. (M: Route-map signed off by stakeholders). **CGA1 & PGA1:** A regional ZEV charging framework. (M: Framework signed off by stakeholders). **PGA3:** Aggregated large orders of ZEV vans, truck and buses across the North. (M: Number of ZEV units ordered through aggregated partnerships).	**SD3:** Formation of decarbonisation working group/s with TfN partners. **SD9:** Research and evidence to inform appropriate place-based, low carbon, urban freight (last-mile) solutions in the North. **CGA7:** Developing and supporting partnerships to consider zero carbon, port to port freight corridors. **CGA3:** Research, data and evidence to support a pan-northern hydrogen transport refuelling study. **PGA2:** Facilitating large ZEV truck trials in the North. **PGA12:** Supporting freight information democratisation schemes.

Monitoring and evaluating our progress

Table 9 continued: Indicators to measure the success of TfN's Decarbonisation Strategy

Impact: Reduce operational emissions from the North's rail network.		
Measure: Annual estimates from TfN NoCarb model.		
Outcomes	**Outputs**	**Activities**
Rollout of sufficient hydrogen refuelling network to meet trajectory. (M: To be set based on the ZEV infrastructure framework). Upgrades to conventionally powered trains to reduce emissions. (M: Estimated emissions reductions achieved through upgrades). Increased electrification of the rail network. (M: Proportion of the network electrified). Increased operational efficiency of the rail network. (M: To be developed based on linked area of research).	**SD1:** Regional Road Map for Decarbonisation. (M: Road map agreed by key stakeholders). **CGA3:** Pan-Northern hydrogen refuelling network infrastructure study. (M: Study agreed by key stakeholders). National regulatory and legislative changes. (M: Register of policy changes in key identified areas).	**SD3:** Formation of decarbonisation working group/s with TfN partners. **PGA4:** Identify appropriate routes for electrification and associated implementation. **PGA5 & PGA7:** Work with Train Operating Companies (TOCs) and Freight Operating Companies (FOCs) to identify operational efficiency opportunities. **CG8:** Supporting our partners to attract testing and pilots of new low emission train technologies.

Impact: Reducing supply chain and construction carbon linked to transport in the North.		
Measure: Use of PAS 2080 Carbon Management Framework.		
Outcomes	**Outputs**	**Activities**
Reduction in supply chain/construction carbon on TfN-led schemes. (M: Use of PAS 2080 Carbon Management Framework on TfN-led schemes).	**SD10:** An embodied Carbon Database for Major Infrastructure Developments. (M: Database developed and subject to peer review). National regulatory and legislative changes. (M: Register of policy changes in key identified areas).	**SD3:** Formation of a decarbonisation working group/s with TfN partners. **PGA13:** Increased efforts to influence national appraisal guidance, national regulatory and legislative changes, and effective policymaking. **SD10:** Research on challenges and opportunities for carbon reduction in the construction sector. **SD13:** Undertake a strategic embodied carbon footprint study of those schemes included within our Investment Programme (IP) scheduled for delivery up to 2033.

Table 10: Decarbonisation related indicators within TfNs Monitoring and Evaluation Framework

Indicator	Baseline	Data source	Update frequency
Millions of tonnes of CO_2 emitted by cars per year	14.6326 (2018)	TAME NoCarb model	5 years
Millions of tonnes of CO_2 emitted by HGVs per year	7.2467 (2018)	TAME NoCarb model	5 years
Millions of tonnes of CO_2 emitted by LGVs per year	2.7403 (2018)	TAME NoCarb model	5 years
Millions of tonnes of CO_2 emitted by buses per year	0.6279 (2018)	TAME NoCarb model	5 years
Millions of tonnes of CO_2 emitted by rail per year	0.7659 (2018)	TAME NoCarb model	5 years
The proportion of vehicle kilometres travelled by battery electric cars	0.08% (2018)	TAME NoCarb model	5 years



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TRANSPORT FOR THE NORTH

Meeting:	TfN Board
Subject:	Major Roads Report
Author:	Owen Wilson, Major Roads Strategy & Planning Manager
Sponsor:	Peter Molyneux, Major Roads Director
Meeting Date:	24 November 2021

1. Purpose of the Report:

1.1 The purpose of this report is for Members to consider and approve TfN's Major Roads Report, which aligns to TfN's Decarbonisation Strategy.

2. Recommendations:

2.1 Developed as a position statement to support TfN's statutory function, the Major Roads report focuses on the role of Major Roads in achieving TfN ambitions and objectives.

2.2 Board members are asked to:

a) Consider how TfN should be influencing future policies and priorities for investment in our transport system, including on our Major Roads.
b) Comment on the report
and
c) Approve publication of the report

2.3 The Major Roads Report was discussed at TfN's Scrutiny Committee on 4th November, questions and comments raised by Members at Scrutiny are addressed in section 3 of this report and for transparency also noted in appendix 1.

3. Main Issues:

3.1 TfN's 2021/22 Business Plan includes a commitment to publish an updated Major Roads Report (MRR), following DfT publication of the national Transport Decarbonisation Plan and the TfN Decarbonisation Strategy. Both of these documents have now been published, with the final version of TfN's Decarbonisation Strategy on the agenda for this Board meeting on 24 November.

3.2 The MRR draws upon evidence and policy within TfN's Strategic Transport Plan and reflects TfN's more recent work on Future Travel Scenarios, the Transport Decarbonisation Strategy and emerging Freight Strategy.

3.3 Roads are used by pedestrians; cyclists; horse-riders; motorcyclists; drivers of cars and vans; and passengers in cars buses and coaches. In total, 97% of all personal journeys are made by these modes, amounting to 88% of distance travelled. 87% of freight movements are by road.

3.3 With almost nine out of ten passenger miles travelled by road and 87% of freight goods moved by road, roads are an integral part of our economy and wider transport system. Even with huge investment in other transport and ways of working, most journeys will still be made by road in 2050.

3.4 The MRN, which makes up 7% of the road network accommodates 69% of vehicle-km in the North. This is made up of around 32% of distance driven on the 2% of roads classed as Strategic Road Network, managed by National Highways, and 37% on Major Roads managed by local highway authorities.

3.5 The Major Road Network (MRN) plays a critical role in connecting people, businesses and communities, and put simply, major roads are indispensable to supporting a functioning society and our overall quality of life.

3.6 While good transport connectivity is fundamental to achieving TfN's vision for a thriving North of England, that must be balanced against environmental goals, the most urgent being the need to deliver rapid and substantial reductions in carbon emissions.

3.7 Transport is the largest contributor to UK domestic GHG emissions, contributing 28% of UK domestic emissions in 2018, with UK emissions from road transport amounting to 109 MtCO2e per annum, 88% of domestic transport carbon emissions. Policies to reduce emissions from road transport are therefore vital to achieving ambitions for net zero carbon by 2050 or earlier.

3.8 The MRR reflects draws upon evidence in TfN's Decarbonisation Strategy, setting out the scale and pace of change required to decarbonise our transport system. This will require a wide-ranging package of policy measures and both public and private investment targeted at:

a) Promoting more sustainable transport behaviours, for example through better integration of the MRN with public transport and the provision of high-quality infrastructure for active travel modes.
b) Investment in improving access to/from intermodal rail freight depots and local freight hubs facilitating low and zero emission 'last mile' deliveries.
c) Rapid investment in infrastructure to underpin the need for a speedy transition to zero emission vehicles, including a comprehensive network of Electric Vehicle Charging Points and where evidence demonstrates the need, hydrogen re-fuelling.
d) A programme of measures and investment increasing the attractiveness of public transport in comparison with travel by car. These factors are modelled within TfN's Future Travel Scenario's and fall within the remit of national government and local transport authorities. For example, changes to public transport fare structures and how road users are taxed.

3.9 As highlighted in TfN's Decarbonisation Strategy, achieving the reduction in carbon emissions in line with the decarbonisation strategy will require significant scale of change in both the short and long-term. With changes in the vehicle fleet and in travel behaviour critical in the period up to 2030. This includes:

a) The need for reductions in forecast growth in vehicle kilometres driven (between 1% - 4% by 2025 and a 3%-14% reduction by 2030)[1]
b) over half of car sales, and 40% of van sales, to be zero-emissions in the next four years.
c) A reversal in trends favouring purchase of larger cars
d) Improved efficiency of existing cars, vans and HGV's

3.9 Investment decisions and policy choices impacting on the way we use, manage and maintain our roads are therefore critical to supporting our ambition for "A thriving North of England, where world class transport supports sustainable economic growth, excellent quality of life and improved opportunities for all."

3.10 The scale of change needed is indicative of the difficulty of the decarbonisation challenge faced across all areas of our society. As a major source of carbon emissions, transport has a vital role to play in meeting net zero goals and TfN will

[1] This would bring 2025 traffic demand to around a 4%-5% increase on total vehicle kilometres travelled in 2018 and 2030 traffic demand to anywhere between -5% and +1% of 2018 levels.

work to ensure that future proposals for transport investment, including in the MRN are compatible with commitments in our transport Decarbonisation Strategy.

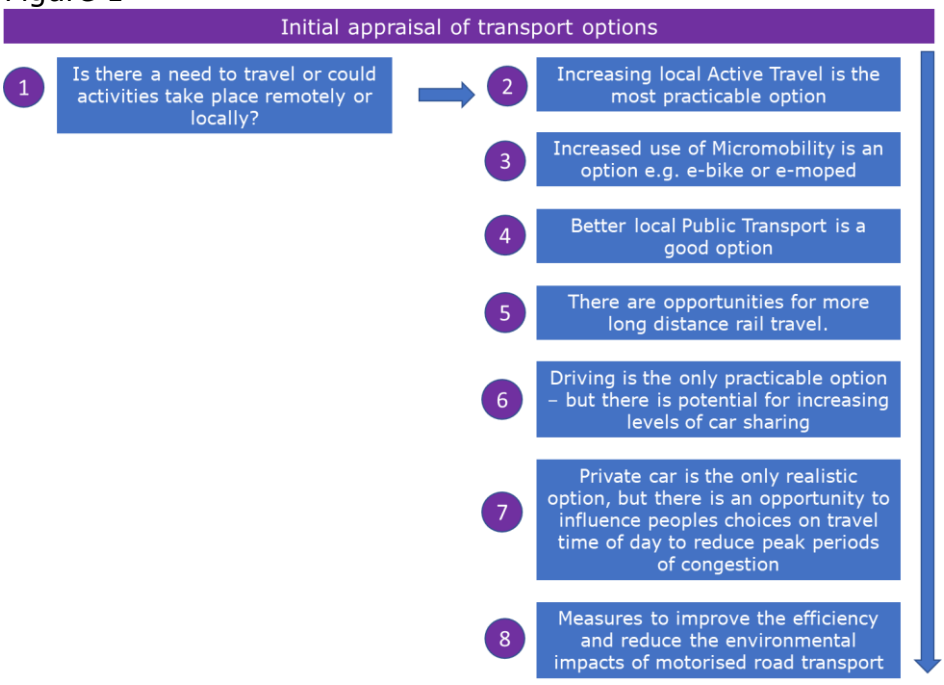
3.11 Decarbonising will require actions at all levels of society, including by local, regional and national Government. For example, national policy on phasing out of all petrol and diesel vehicles means Government must consider new fiscal models for generating the lost tax revenues from fuel duty and Vehicle Excise Duty and on how revenue raised is used for investment in our transport networks. TfN is ready to work with Government on considering new approaches to taxation and how revenues can be used to fund improvements across all modes of an integrated transport system. Transparency and public trust in a fair system of charging and the allocation of tax revenues should be key measures of success for a new approach to taxing and funding transport. We believe this is an opportunity to ensure customers are better informed of the true cost of a journey via different modes, enabling people to make better choices on which forms of transport to take, resulting in more efficient and environmentally friendly journeys.

3.12 Proposals for future transport investment, including on new and improved roads should take a holistic and hierarchical account of all options for improving access for people and goods.

3.13 Figure 1 below outlines the conceptual process for considering an initial transport options appraisal, starting with a question on whether there is a need to facilitate more travel, and consideration of a range of options before deciding on whether there is a clear need for new road capacity.

3.14 The MRN's primary role is to facilitate inter-urban journeys, with a general presumption that MRN routes should not extend directly into the main urban centres (city and town centres). However, urban development over many decades has resulted in a network of major roads extending into urban areas. It is therefore important that TfN works with Local Highway Authorities to support plans for the MRN that are aligned with local place-based objectives, taking account of the role of the MRN in a particular location. For example, that could be facilitating movement of traffic but with a focus on creating sustainable, healthy and resilient places, focusing on people (everyone who uses the street) rather than primarily on vehicles.

Figure 1



3.15 The application of Future Travel Scenarios within Investment Programme Benefits Analysis (IPBA) using TfN's multi-modal analytical framework will provide evidence on the social, economic and environmental outcomes from investment in the North's road and rail networks.

3.16 Developed in collaboration with industry experts and TfN partners the Future Scenarios represent 4 plausible future states, 'driven' by exogenous factors (distinct from the Investment Programme) e.g., Land use changes, fare structures, cost of road travel, levels of digital substitution and automation; and are being used in our appraisal of the Investment Programme to help future proof our recommendations.

3.17 Outputs from that work, which assess the investment programme as a whole are scheduled for 2022 and will inform TfN's recommendations for further work on developing a pipeline of transport investment schemes.

3.18 As part of this assessment, we will be asking the question: 'what needs to be true, if the North is to effectively decarbonise its surface transport as well as enjoy the significant connectivity, economic and environmental benefits that our Investment programme P will deliver?'

3.19 It is also important to be clear that the IPBA work will inform TfN recommendations at a programme level and that specific schemes or packages of schemes will subsequently need to be developed in accordance with the treasury 'Green Book', and statutory processes including an environmental impact assessment.

3.20 In practice solutions are likely to include a package of measures, and in some circumstances major investment in new or improved roads may still be required, for example to accommodate new housing and jobs growth, access to international gateways and to take traffic away from core urban areas.

3.21 The MRR will support TfN in providing statutory advice to Government on future transport investment, including on the Major Road Network.

3.22 The MRR is a key TfN document we will share with National Highways (formerly Highways England) as supporting evidence for their work on SRN Route Strategies and the RIS3 Programme. Assisting TfN in meeting our Northern Transport Charter (NTC) ambition to 'Lead strategic transport delivery' in making recommendations for investment in the Major Road Network.

4. Corporate Considerations

Financial Implications

4.1 *There are no direct finance implications as a result of this report.*

Resource Implications

4.2 *There are no direct resource implications as a result of this report.*

Legal Implications

4.3 There are no apparent legal implications as a result of this report other than outlined in the report.

Risk Management and Key Issues

4.4 The risk management and key issues have been considered and addressed within the report.

Environmental Implications

4.5 This report does not constitute or influence a plan or programme which sets the framework for future development consents of projects listed in the EIA Directive and therefore does stimulate the need for SEA or EIA.

4.6 The Major Roads Report and the data that underpins it, will also form an important part of the evidence base for the upcoming Strategic Transport Plan update in 2024. As such, it will be a consideration within the Integrated Sustainability Appraisal which will accompany that plan making process.

Equality and Diversity

4.7 An equality and diversity impact assessment has not been undertaken. Transport investment and policy measures have the potential to lead to uneven distributional impacts and it will be important that the appropriate level of equalities impact assessment is undertaken where legislated. As part of TfN's Investment Programme Benefits Analysis - the programme level appraisal of options for future transport investment will include a high-level assessment of societal distributional impacts.

Consultations

4.8 The MRR has been developed in consultation with TfN's constituent partner authorities, National Highways and the DfT.

5. Background Papers

5.1 Major Roads Report and summary version of the report

6. Appendices

6.1 Issues raised at Scrutiny Committee

6.2 Major Roads Report – Summary version

Glossary of terms, abbreviations and acronyms used *(if applicable)*

Please include any technical abbreviations and acronyms used in the report in this section. (Please see examples below.) This will provide an easy reference point for the reader for any abbreviations and acronyms that are used in the report.

a) MRR Major Roads Report
b) MRN Major Roads Network
c) RIS Road Investment Strategy
d) GHG Green House Gas
e) $MtCO_2e$ Metric tonne of carbon dioxide equivalent

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Appendix 1 –Comments at Scrutiny Committee 4th November 21

TfN's Scrutiny Committee provided feedback on the Major Roads Report at the meeting on 4th November. The Scrutiny Chair also read out a set of questions submitted to the committee on 3rd November.

Questions submitted by Mr Anthony Rae, representing environmental NGO's, received 3rd November

1. **Should the MRR not contain an explicit commitment to compatibility with the Decarbonisation Strategy, as is required by the TfN strategic transport plan?**

   TfN is committed to ensuring that our recommended investment programme for road & rail is aligned with and matches commitments in our transport Decarbonisation Strategy. As described in the MRR we are appraising our investment programme against social, economic and environmental outcomes; this will inform our recommendations for future investment. This includes recommendations on future investment on our Major Roads. Ultimately, we will be asking the question: 'what needs to be true, if the North is to effectively decarbonise its surface transport as well as enjoy the significant connectivity, economic and environmental benefits that our investment programme will deliver?'
   The Major Roads Report conditional outputs (page 32 of the summary report) include a conditional output on Carbon emissions: *"Reduction in carbon emissions from road transport in the North in line with TfN's trajectory for achieving near-zero net carbon emissions from surface transport by 2045."*

2 **Has an analysis been undertaken that establishes whether TfN's proposed investment in increased road capacity, facilitating more traffic generation, either assists the proposed carbon reduction pathway to Net Zero or alternatively undermines it?**

   We are undertaking an 'Investment Programme Benefits Analysis (IPBA) to inform recommendations on the TfN investment programme and will adjust recommendations based on evidence encompassing the social, economic and environmental outcomes (including GHG emissions) of that analysis. In practice this means that the recommended delivery of certain projects within the programme may need to be re-sequenced in consultation with our partners to a date when the future travel context enables the programme to operate within the decarbonisation trajectory. For example, a particular road project may be re-scheduled to a point when the majority of additional traffic generated is by zero emission vehicles.
   It is also important to be clear that the IPBA work will inform TfN recommendations at a programme level and does not represent a final decsion on whether and when a scheme will be delivered.
   As specific schemes or packages of schemes are taken forward, they will subsequently need to be developed in accordance with the treasury 'Green Book', and statutory processes including an environmental impact assessment.

3. **How would the MRR manage increased demand for road travel consistent with its preferred future travel scenario and in order to achieve its 2030 & 2050 carbon reduction targets?**

The four travel scenarios developed through collaboration with industry experts and TfN partners represent 4 plausible future states – these are 'driven' by exogenous factors, distinct from the Investment Programme and outside of the direct influence of TfN.
For example, factors including future planning policy leading to land use changes, public transport fare structures, cost of road travel, levels of digital substitution and propensity of citizens to change travel behaviours. The scenarios are being used in our appraisal of the IP to help future proof our recommendations.

Through this work we are taking a far more sophisticated approach than a simple core scenario for traffic growth / passenger demand – based on evidence on what are credible future states - influenced by Government, local decisions, and societal changes. Our Urban Zero Carbon scenario shows a lower increase in vehicle KM than the Committee on Climate Change (CCC) projection.

4. **TfN's Strategic Goal for the environment requires TfN to make best use of existing transport infrastructure before investing in new capacity. Has TfN undertaken such an assessment to see if best use is being made of the road network?**

TfN has developed a robust set of analytical tools representing performance of the existing road and rail networks and which is used to model the impact of future changes in transport behaviour for both the road and rail networks. This is a strategic analytical tool used to inform recommendations on a where transport connections need to improve, not used for final decision making on transport investment in a specific programme or scheme.
To be absolutely clear TfN's work on developing Investment Programme recommendations is the starting point for more detailed options appraisal looking at options for transport improvements on specific routes or corridors. Wherever possible we will promote the best use of existing infrastructure, important on value for money grounds, as well as for reducing future carbon emissions.

5. **Will TfN review (or ask DfT/National Highways to do likewise) the strategic case for all the MRR road schemes in the context of the Green Book?**
The final decision on whether to invest in highway schemes on the SRN or on schemes funded via the MRN/LLM programmes lies with the Department for Transport and Secretary. of State for Transport. Schemes in development are following guidance set out in the Green Book.

6. **The negative impacts of the MRR on the wider environment are nowhere to be found in the documents. Carbon emissions**

reduction is not the only emergency – there is a nature crisis and a public health crisis as well. What are the impacts of the MRR investments on these other two emergencies, and why have they not been included within its analysis?

The MRR full report[i] includes a specific section 3 (page 58 – 61) on transport's role in contributing to sustainable & inclusive growth, specifically refers to air quality issues (section 3.3) and highlights air quality and noise pollution as key areas for improvement.

Table 4.3 (page 67) summarises how the Major Road Network can contribute to meeting the STP's four objectives – including "Improving inclusivity, health, and access to opportunities for all" & "Promoting and enhancing the built, historic, and natural environment."

And Chapter 5 "Current and future requirements of the MRN" section 5.1.2 and 5.1.3 refer to societal issues and trends and how transport including the function of the MRN impacts on peoples' lives.
For example, section 5.1.3 (page 81) includes the statement that: "Consideration of sustainable and active travel should be an early part of the design stages for all schemes on the MRN, with decisions on a route-by-route and location-by-location basis as to the most appropriate type of provision in each locality. Investment in active travel should be designed and maintained in accordance with the principles contained within 'Stepping up a Gear' and as described in more detailed within Local Transport Note (1/20) Cycle – Infrastructure."

Environmental Impacts Assessments will be required for every MRN road scheme in terms of assessing impacts on biodiversity and public health.

MRN investments can have significant beneficial impacts on communities and citizens health – for example if removing traffic from residential areas.

Questions and comments raised by Members at Scrutiny Committee on 4th November and officer's consideration and responses.

7. **How much will road use need to reduce in order to meet the TfN decarbonisation trajectory.**
This is detailed in the Board report, point 3.9; and is based on the TfN's analysis for the Decarbonisation Strategy.

8. **How do we tackle air quality issues?**
Section 3.3 of the Major Roads Report (full report) focus on Air Quality issues, and states that "TfN recognises the steps taken by National Highways to improve air quality on the SRN, and we are keen to explore how this strategy could be expanded to also cover the MRN through future investment on the network."
TfN's has also taken steps to monitor the proportion of the

population in the North exposed to high levels of PM2.5 and NO2 emissions, to which vehicles are a significant contributor.

9. **Electric cars are not the only solution to decarbonising.**
Absolutely true, and TfN's analysis for the Decarbonisation Strategy and in the work, we are undertaking for the Investment Programme Benefits Appraisal (IPBA) includes an evidenced based assessment of a range of factors impacting on emissions. This includes projections on the uptake of Zero Emission Vehicles, but also data on population changes, levels of car ownership, assumptions on levels of home working etc..
Further detail on factors we are considering can be accessed at: https://transportforthenorth.com/future-travel-scenarios/

10. **We need more low traffic neighbourhoods and reallocation of road space is important.**
As stated in the Board report, the MRN's primary role is to facilitate inter-urban journeys, with a general presumption that MRN routes should not extend directly into the main urban centres (city and town centres). Local transport and highway authorities have responsibility for decisions on where to reallocate road space to active travel, public transport or develop new traffic free open spaces. TfN supports increased and sustained investment in place making and sustainable travel.
The Major Road Network was developed by TfN in partnership with our local transport and highway authority partners and will work with partners in taking forward proposals for future changes to the MRN.

11. **How do we maintain good road connectivity without encouraging more car use / discouraging public transport?**

Points 3.11 and 3.12 in the Board report outline the need for a holistic and hierarchical account of all options for improving access for people and goods. Also, that TfN is ready to work with Government on considering new approaches to taxation and how revenues can be used to fund improvements across all modes of an integrated transport system. And that we believe this is an opportunity to ensure customers are better informed of the true cost of a journey via different modes, enabling people to make better choices on which forms of transport to take, resulting in more efficient and environmentally friendly journeys.

12. **Need to promote the right solutions for different areas, for example public transport should be the first choice in urban areas, whereas for many rural areas' car is the primary or only option.**
The Major Roads Report section 2.8.5 focuses on the role of the MRN in urban areas. As highlighted in the previous response we are taking a whole network approach to developing proposals for transport investment, assessing the potential for increases in active travel and public transport in place of car travel. And doing this for different geographical areas of the North, for example urban and rural locations.

[i] Note that the full version of the Major Roads Report was circulated with Scrutiny Committee papers for the meeting on 4th November. Link to papers here.

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Major Roads Report: Summary







TRANSPORT FOR THE NORTH

Our highways are at the heart of our communities, including as they do our footpaths, cycle ways and roads.

They are critical to a modern functioning society, connecting people and places with services and opportunities. Each and everyone of us use some part of the highway when making a journey.

An efficient, reliable and safe highway network is essential for modern supply chains: enabling raw materials to be received, finished goods to be dispatched, food stores to be supplied, office complexes to be serviced.

In the last century motorised transport revolutionised our way of life, and as we move towards the second quarter of the 21st century our highways will continue to be a fundamental part of our transport system.

However, as we look to address climate change we will need to make choices about how we use the available highway space, with greater priority given to pedestrians, cyclists and public transport.

New highways will continue to be built, needed to provide access to new housing and employment sites. We will continue to invest in our highways, ensuring that existing roads are maintained, and that new roads are designed and delivered in ways that minimise their impact on our environment.

And we will need to consider and agree on how we will pay for that investment and indeed on how we pay to use our roads. The electrification of road vehicles means that as a nation we will lose the revenues from Vehicle Excise Duty and fuel duty that pays for new roads. We need to do things differently but at the same time ensure that our way forward does not disadvantage those for whom travel by car is the only practical option. If we're to have that debate then we must seize the opportunity to look at how the relative cost of motoring, bus travel and rail travel influences the choices we make. For only by looking at transport in the round will we be able to ensure that our investment choices are sustainable for the longer term.

This Major Roads Report outlines the critical role that the North's major roads play in enabling our residents and businesses to go about their daily lives. It sets out the scale of the challenge as we look to enhance their safety and reduce their environmental impact.

Our highways will continue to be at the heart of our communities: they will continue to be an essential component of a sustainable, connected transport system.
As the 'one voice' for the North, TfN is committed to ensuring that our roads are fit for purpose. We will work with Government and its agencies to identify a way forward that is fair and sustainable, as part of a multi-modal transport system that is truly fit for the 21st century.

Martin Tugwell
TfN Chief Executive

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About Transport for the North

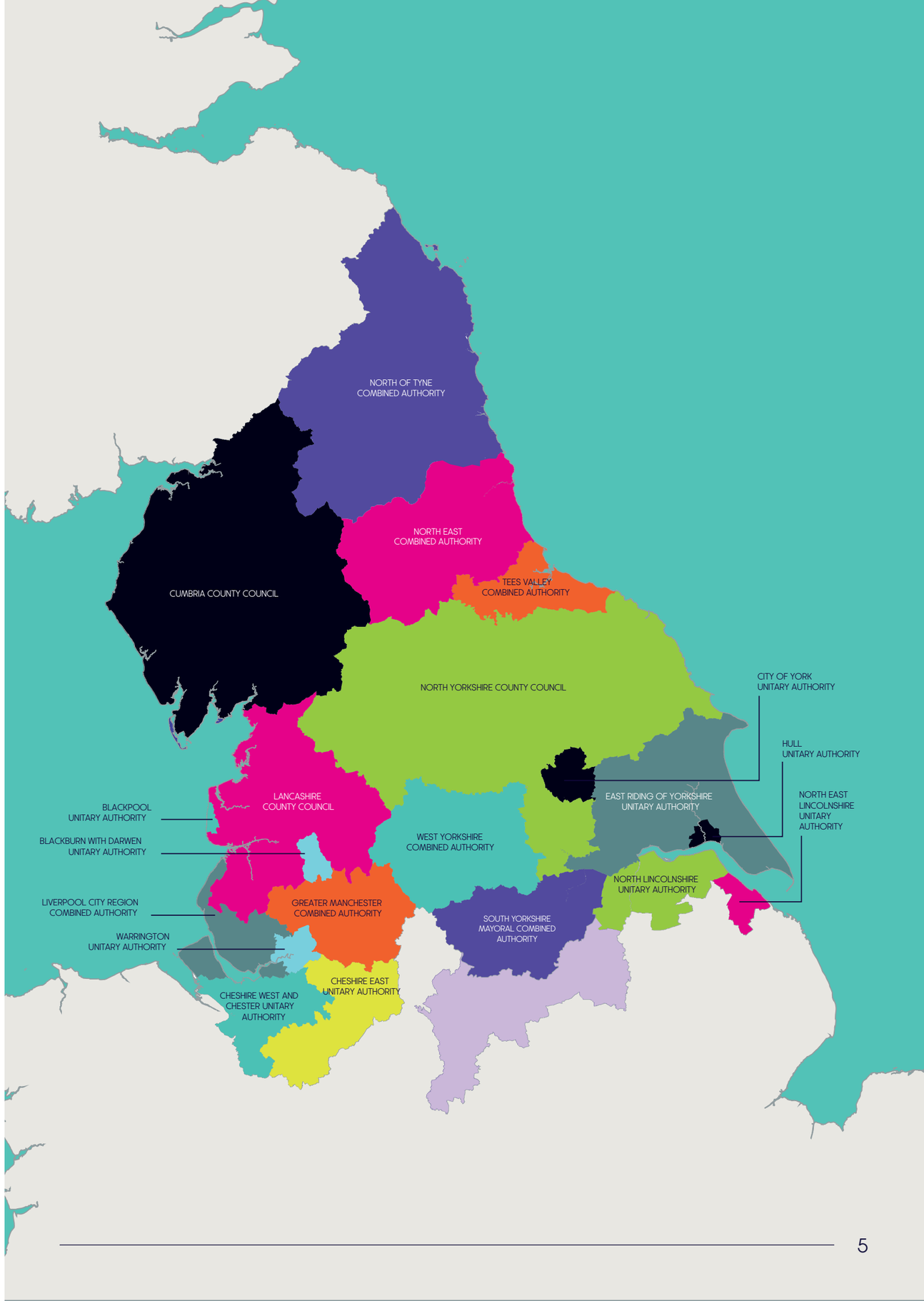
Transport for the North (TfN) is a Sub-national Transport Body (STB) with a statutory requirement to advise UK Government on the transport priorities for the North of England.

Our role is to add value through statutory advice to UK Government, ensuring value-for-money funding and strategic decisions regarding transport in the North are informed by our local knowledge, expertise, and needs. Our advice reflects the views of our Members, bringing the region's political and business leaders together to consider transport solutions which connect the economic assets across the North, both internally to create an economic mass, and also externally as part of a global marketplace.
We published our Strategic Transport Plan (STP) and Investment Programme in February 2019. The STP set out TfN's vision of:

"A thriving North of England, where world class transport supports sustainable economic growth, excellent quality of life and improved opportunities for all."

Supporting this vision are four pan-Northern transport objectives, which shape TfN's work programmes:

- Transforming economic performance
- Increasing efficiency, reliability, integration, and resilience in the transport system
- Improving inclusivity, health, and access to opportunities for all
- Promoting and enhancing the built, historic, and natural environment



Introduction

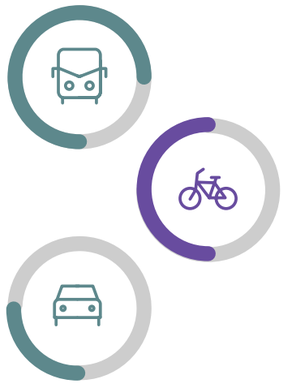
Through our statutory powers, TfN acts as ‘one voice’ for the North, communicating pan-Northern priorities to the Secretary of State for Transport. We have a clear remit to identify the transport infrastructure required to support transformational economic growth in the North, and to provide evidence, data, and insight to help prioritise that investment. This places TfN and partners in the unique strategic position of being able to identify the transport infrastructure and policy measures that are required to help our region’s people and businesses achieve their ambitions through the support of a reliable transport network.

Developed as a position statement to support TfN’s statutory function, the Major Roads Report focuses on the role of major roads in achieving TfN’s ambitions and objectives. This document provides a summary of the Major Roads Report (MRR). The report also reflects upon the Government’s Road Investment Strategy 2 (RIS2) announced in 2020, and the Major Road Network (MRN) programme.

With 97% of personal journeys and 88% of freight movements in the North made using our highways, roads are central to our way of life. And with close to 70% of all vehicle kilometres on the Major Road Network, our major roads have a vital role in underpinning economic activity, opening up access to jobs, goods and services and in enabling growth in new employment and housing.

To function well the Major Road Network must be seen as a fundamental part of an integrated transport network where people and businesses can make well informed choices on the best forms of transport for their journey, and where for many journeys there are a range of good quality options in place of travel by private car. TfN promotes a ‘total network’ approach to improving transport, and sees improvements for pedestrians and cyclists, investment in rail, light rail and bus, as critical to delivering more efficient and sustainable transport choices for people and businesses in the future.





Key Messages

97%

of all personal journeys are made using our highways, amounting to 88% of distance travelled:

- 61% car and taxi
- 26% pedestrian
- 9% bus
- 2% cycle

88%

of freight movements are by road

2%

of roads (by length) in the North are managed by National Highways and classed as part of the Strategic Road Network (SRN).

Two-thirds of freight kilometres are on the SRN.

There are 8 million registered cars in the North and 126 billion vehicle kilometres travelled per year.

There are substantial differences in travel behaviours across income and age groups. On average, higher earners and those aged 30-60 travel further, have greater access to employment and services, and through their travel generate higher carbon emissions

Commuting and business trips account for around one-third of carbon emissions from cars, with trips for shopping, leisure and other purposes making up two-thirds of car-based emissions.

In the North, more than 95% of the 26 million tonnes of transport-related carbon emissions per year are from road transport.

On average, rural residents drive more than twice as far per year as people living in urban areas and are more dependent on private transport to access jobs, education, and other essential services.

Just under 90% of car trips are under 10 kilometres; there should be significant potential to switch a proportion of these to less polluting travel modes.

However, the 37% of car trips over 10 kilometres generate 54% of car emissions, so adoption of zero emission vehicles is a critical element in the strategy to reduce transport-related emissions.

More than two-thirds of all vehicle kilometres are on Local Authority roads.

Strategic context

Inclusive and more balanced growth is a key priority for the Government and Local Authorities in the North. As the country emerges from the profound economic and social impacts of the Covid-19 pandemic, the Government has reiterated its commitments to 'building back better' and the levelling up agenda.

Future investment in the North's transport network must be considered within the context of the UK's productivity challenge; the long-term opportunities for a more inclusive and balanced UK and Northern economy; and, critically, the need for rapid and concerted action on reducing transport carbon emissions.

In an era of climate emergency it may seem counter-intuitive to be investing in the future of our roads. However, as can be seen from the evidence in this report, the majority of journeys now and in the future will continue to be on our roads – whether this is through driving zero emission vehicles, walking, cycling, or getting the bus or tram.

The North has around 1.1 million businesses and prior to the impact of Covid-19 around 7.4 million jobs[3] and is currently home to more than 15.5 million people[4]. For the last 30 years, the North's economic value per person (measured as Gross Value Added, GVA) has been consistently around 15% below the average for the rest of the UK, excluding London[5]. Most recent data reveal the gap has widened further, with the economic value (GVA) per person in the North now 18% below the UK average[6].

The Northern Powerhouse Independent Economic Review (NPIER), published in 2016, highlighted the clear links between transport investment and the productivity and performance of the North's economy, identifying the potential, by 2050, for the North's economy to generate an additional £100 billion GVA and 850,000 additional jobs. The report shows there are major opportunities for growth in Advanced Manufacturing, Energy Sector including low carbon technologies, Health Innovation and Digital sectors and in Logistics, Education and Financial & Professional services. Advanced Manufacturing, Energy Sector and Logistics businesses are particularly reliant supply chain movements by road, whilst all sectors require good road connectivity for business travel and access to labour markets.

Strategic Transport Plan (STP)

TfN published the North's first Strategic Transport Plan (STP) and Investment Programme in February 2019. The STP set out TfN's vision of

"A thriving North of England, where world class transport supports sustainable economic growth, excellent quality of life and improved opportunities for all."

Plus four pan-Northern transport objectives, which shape TfN's work programmes:

- → Transforming economic performance
- → Increasing efficiency, reliability, integration, and resilience in the transport system
- → Improving inclusivity, health, and access to opportunities for all
- → Promoting and enhancing the built, historic,and natural environment

Alongside TfN's vision and objectives, TfN's Board Members have developed and agreed the Northern Transport Charter, which will underpin TfN's work in four key areas:

Championing an inclusive and sustainable North

Long-term Northern funding settlement

Leading strategic transport delivery

Putting rail passengers first



Decarbonisation of road transport

While good transport connectivity is fundamental to achieving our vision for a thriving North of England, that must be balanced against environmental goals, the most urgent being the need to deliver rapid and substantial reductions in carbon emissions.

Transport is the largest contributor to UK domestic greenhouse gas (GHG) emissions, contributing 28% of emissions. TfN's analysis of surface transport emissions in the North shows that 26 mega-tonnes of carbon dioxide (CO_2) were emitted from surface transport in 2018, representing nearly one-quarter of UK road emissions and 6% of total UK emissions. Over half of those emissions were generated by cars, with HGVs and vans producing 28% and 11% of surface transport emissions respectively. Bus and rail, on the other hand, represent just 5% of emissions.

26 million tones of CO_2

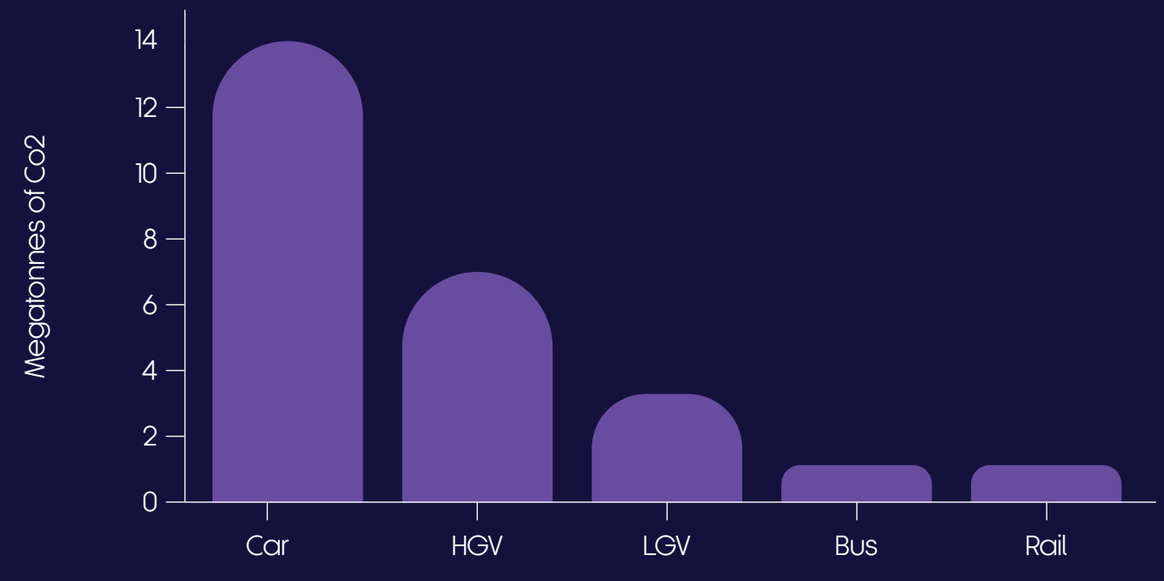
→ **6% of total UK emissions**
→ **23% of UK road emissions**

126 billion vehicle kms

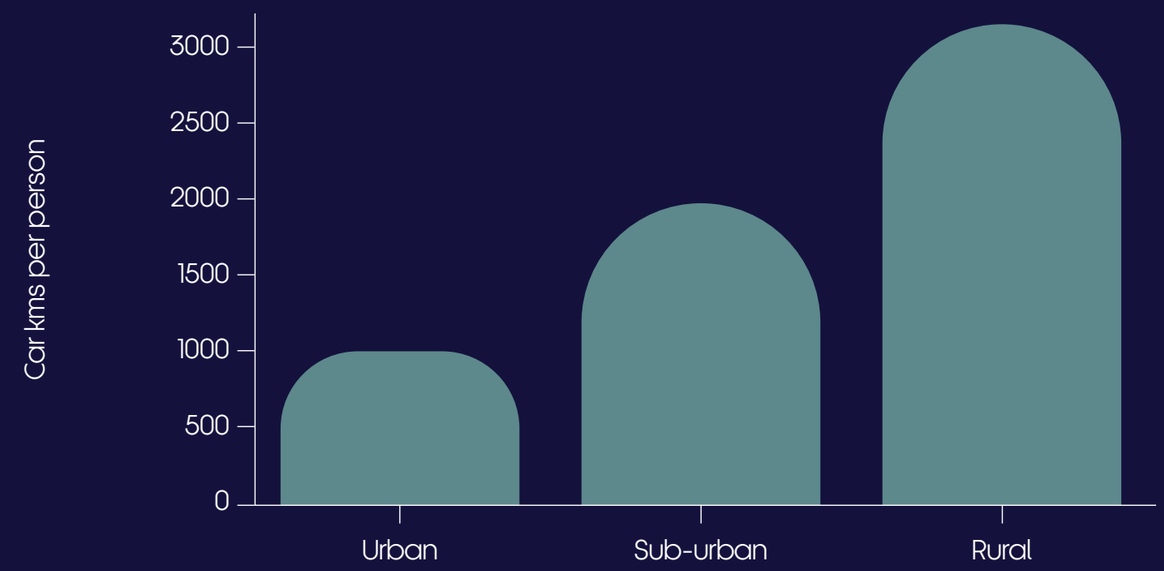
→ **23% of vehicles kms in the UK**
(Cars, LGVs, HGVs)

Figure 1: Headline figures related to surface transport emissions in the North in 2018.

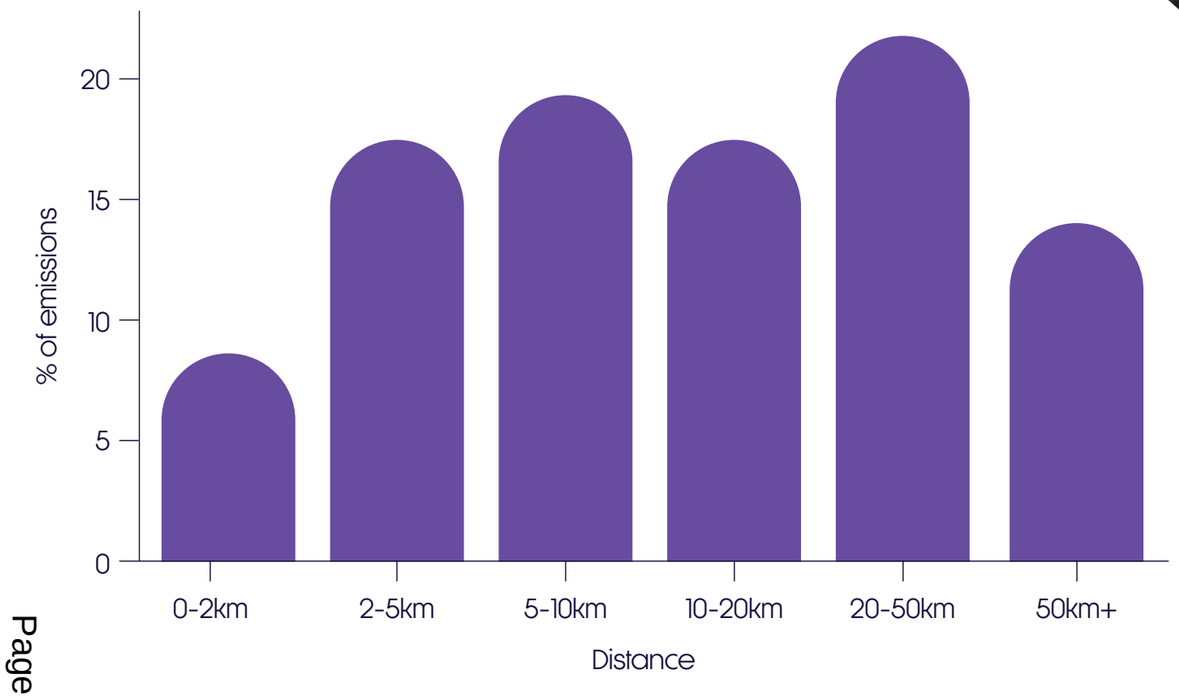
Total megatonnes of CO2 by mode



Car kms per person by area type



% share of car emissions by distance



Reducing greenhouse gas emissions from the transport network is a key priority and on **[24 November 2021]** TfN's Board adopted our Decarbonisation Strategy for the North.

This sets out a decarbonisation trajectory and set of TfN actions towards achieving a near-zero date of 2045 for carbon emissions from surface transport in the North.

Policy measures to reduce travel by car and future investment to make the use of our roads less carbon intensive will be vital in meeting emission reduction targets. TfN analysis of what is required demonstrates that we will need:

- **55% of all new car sales to be zero emission vehicle (ZEVs)by 2025.**
- **To reduce distance travelled by car, van and HGV.**

Reductions in distance travelled by road are particularly important in delivering the earlier reductions in emissions needed to keep within the overall carbon budget, with our evidence suggesting car kilometres in 2030 need to fall by between 3-14% relative to baseline growth. Achieving this in a sustainable and inclusive way is critical to achieving TfN's ambitions.

TfN is committed to ensuring that our recommended investment programme for road & rail is aligned with commitments in our transport Decarbonisation Strategy.



How roads support people and communities in the North

People rely on our roads to access jobs, homes, services, leisure facilities, and visit friends and family. Most goods are transported by road, and many businesses are dependent on reliable deliveries to support 'just in time' supply chains.



Case studies:
The importance of roads for people in the North



Rural residents make up 8% of the North's population

David and Sara live in North Yorkshire. Sarah works full time in the agri-food sector and Peter works part time for the National Park Authority.

They live in a medium-sized village with just two buses per day, so both use a car to commute to work and drive to get to shops and other services. Although they would like to drive less they can't see any way they could use public transport more often. Recently they and their neighbours have started ordering more shopping online, reducing their personal car mileage, though increasing the number of vans traveling to/from the village.

Access by car is always likely to be important to rural residents like David and Sara. Measures which would support reductions in vehicle kilometres include improved rural bus services, integrated public transport tickets and reasonably priced fares, shared mobility options, good broadband connectivity enabling home working and online shopping, and encouraging the provision of local shops and other key services. Incentives to promote use of a low or zero emission vehicle could help reduce transport-related carbon emissions. TfN will work with local authority partners on developing the evidence to support new measures and investment to improve options for rural mobility.

Case studies are fictional examples based on the lived experiences of people in the North.



Around 13% of the population live in similar circumstances to Matt and Rebecca

Anthony and Rebecca and their three school-aged children live in Sunderland. They own one car which Anthony uses to commute to his production line job in the manufacturing industry. Rebecca walks with her younger children to the local school, then continues to her part-time job at a local retail park. Their teenage son catches a bus to secondary school. Shopping is done at the local supermarket, a 10-minute drive from home. At weekends they sometimes drive to the coast for a family day out. Car ownership is a significant cost to the family, reducing levels of disposable income for other activities, however it is seen as essential in reducing travel time to work and providing more freedom for family leisure and shopping trips.

For people like Anthony and Rebecca, reliable access to a car through a car club could be an alternative to personal ownership, particularly if improved public transport and/or active travel routes provide good access to Anthony's workplace, the school, local shops, and other facilities. The transition to electric or hydrogen vehicles could be an opportunity to encourage higher levels of car sharing, and the greater utilisation of more efficient low or zero emission vehicles. TfN will work with local authority partners on developing the evidence to support new measures and investment to improve travel options within urban and metropolitan areas, and strongly support further devolution of funding for delivery of local transport improvements.



Keith is close to retirement age and lives alone on the outskirts of Halifax. Although there are bus services through the day, he finds it more convenient to travel by car, particularly when visiting friends in Leeds. At weekends he likes to travel further afield to the Peak District and Yorkshire Dales.

People like Keith might also benefit from access to a car club, and the introduction of a simpler, better integrated public transport ticketing system might persuade him to drive less, particularly if local authorities introduce measures to discourage cars from entering urban areas.

Around 13% of the population live-in small-town suburbs



Visitor economy

The North of England boasts five National Parks, significant areas of Outstanding Natural Beauty (AONB) and nationally important coastal areas and resorts.

Research prior to the Covid-19 pandemic identified that the North of England attracts 369 million visitors annually, comprising 4.54 million overseas overnight visitors, 28.88 million domestic overnight visitors. and 336.17 million-day visits.
Many of the North's key natural landscapes have relatively poor access to public transport, with the majority of visitors traveling by car. For example, 93% of those who travel to the National Parks do so in their own car.

The five National Park Authorities (Lake District, Northumberland, North York Moors, Peak District, and the Yorkshire Dales), face an ongoing challenge in balancing the need to accommodate millions of visitors with the ambition to minimise the impact of visitor traffic on the environment and local communities.

The car is likely to continue to be the dominant mode of travel to and within National Parks. Measures to reduce car reliance being considered or trialled in some locations include: improved rail and bus services linking urban areas to National Parks; development of 'gateway' destinations where visitors can transfer from private car to bus, coach or car sharing; investment in substantially improved active travel facilities coupled with improved sustainable travel options; and increased parking fees in some locations.

The Lake District National Park has set a target of reducing the percentage of people arriving by car from 83% to 64% by 2040.



Business travel

Business-related travel is particularly reliant on the road network, with evidence from 2018[7] showing that, for the average weekday, there were 1,194,272 trips by road and more than 32.4 million kilometres travelled by road for business purposes between 7am-7pm, with an average distance per trip of 27.1 kilometres.

Business sectors that are heavily reliant on private cars or vans for business travel include[8]:

- Agriculture, forestry and fishing
- Mining and quarrying
- Manufacturing
- Electricity, gas, steam and air con supply
- Water supply, sewerage, waste managementand remediation
- Information and communication
- Construction
- Health and social work

The impact of the pandemic has reduced overall levels of business-related travel, though sectors most reliant on travel by car/van, such as those listed, are less able to switch to remote working. Some of these, for example manufacturing and quarrying, are more prevalent in the North than the UK average. TfN user insight research completed in 2021 shows business to have a mixed set of expectations in terms of future travel. Further details are provided in TfN's User Insight Phase 3[9] report.

Measures to reduce the amount, and impact, of business travel, should include support for remote working, for example through improved digital connectivity, and improved rail and express inter-urban bus services, integrated with local transport provision.



Freight and logistics

In the UK a total of 1.65 billion tonnes of freight are lifted by all modes per year, with a little more than of a third of freight activity taking place in the North of England. Around 90% of the tonnage lifted is moved by road in the North.

For commodities such as food products, including beverages and tobacco, textile, leather and wood products, and machinery and equipment and consumer durables (such as furniture), more than 98% of movement is by road.

The North is directly served by a number of major international gateways – both ports and airports – which play a major role in facilitating trade and exports, for the North and the UK as a whole, as well as generating significant local employment. There are also a growing number of national and regional distribution centres serving a wide variety of commodities including fast-moving consumer goods (FMCG), construction, and support for the energy supply chain.

Sections of the road network carrying the greatest volumes of freight are the M6 south of Warrington, the M62 between Manchester and Leeds, the M1 south of Sheffield, and the A1(M) in Yorkshire.

Measures to reduce the environmental impacts of freight movements are particularly challenging. In 2018 the National Infrastructure Commission (NIC) report 'Future of Freight' emphasised the importance of regulatory certainty and consistency in driving positive innovative changes in the freight and logistics sector. Uncertainty on future freight regulations, such as the type of alternative fuels technology to adopt, creates significant challenges for both freight industry and planning of infrastructure.





Given these uncertainties, investment to enable more freight to move by rail and measures to improve efficiency of road freight movements are critical to achieving short term reductions in carbon emissions, these include improved aerodynamic design, eco-driving training, development of freight consolidation centres and better use of data to support combined shipments and greater utilisation of spare freight capacity. Better utilisation of space is particularly important with light goods vehicles (LGVs), which have grown rapidly in number in recent years.

Combined with the measure above there is a need to stimulate Zero Emission HGV/LGV sales, and with strengths in renewable energy (e.g. off shore wind) and in process industries producing hydrogen the North is well placed to support both electric and hydrogen technologies.

Roads are, and will remain, critical to the functioning of our society, and within this context national policy on phasing out of all petrol and diesel vehicles means Government must consider new fiscal models for generating the lost tax revenues from fuel duty and Vehicle Excise Duty and on how revenue raised is used for investment in our transport networks. TfN is ready to work with Government on considering new approaches to taxation and how revenues can be used to fund improvements across all modes of an integrated transport system. Transparency and public trust in a fair system of charging and the allocation of tax revenues should be key measures of success for a new approach to taxing and funding transport.

We believe this is an opportunity to ensure customers are better informed of the true cost of a journey via different modes, enabling people to make better choices on which forms of transport to take, resulting in more efficient and environmentally friendly journeys.



Major Road Network

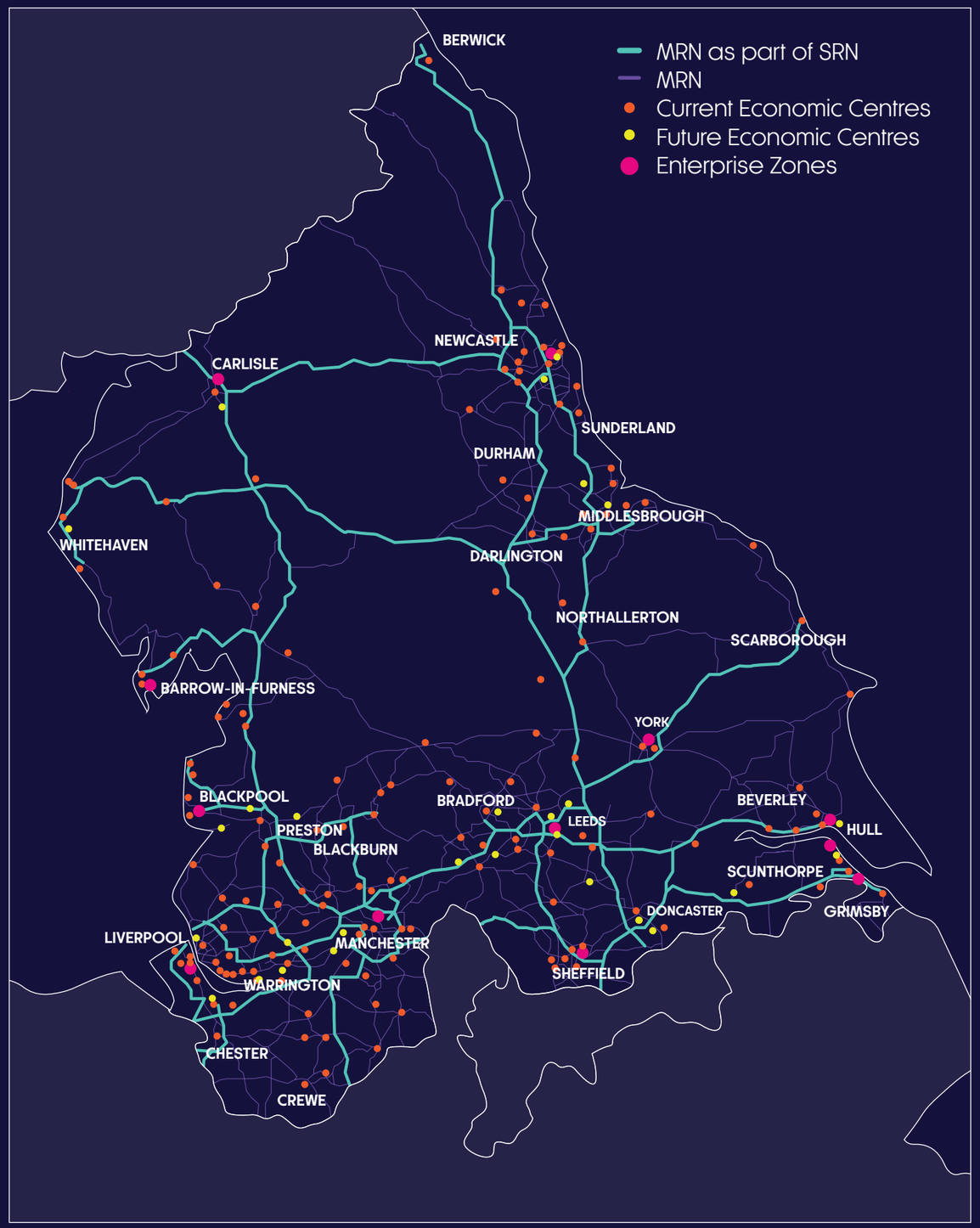
While total traffic volumes are greatest on roads operated and managed by National Highways, known as the Strategic Road Network (SRN), this only accounts for 2% of the road network in the North. Almost all road journeys start and finish on local roads, including those first and last miles of a journey that can make all the difference as to whether goods or people make it in time and as efficiently as possible.

In response to this issue, TfN and our Members have identified and mapped a Major Road Network (MRN) for the North - a network consisting of the North's economically important roads. This network, which includes both the SRN and important local roads, represents about 7% (by distance) of the roads in the North, and links the North's important centres of economic activity, including the first and last miles to and from the SRN.

The North's important centres of economic activity include:

- Ports and airports, supporting imports, exportsand the visitor economy.
- Clusters of the prime and enabling capabilities as defined in the Northern Powerhouse Independent Economic Review.
- Major population centres, which are generally over 50,000 residents.
- Enterprise zones, universities and other key employment sites.
- Major centres of tourism.

Figure 2: Major Road Network in the North









There is a direct link between better connectivity to these assets and enabling the North's economy to realise its potential.

The MRN[10] has a critical role in connecting people, businesses and communities, and, put simply, major roads are indispensable to supporting economic activity, access to services, and our overall quality of life.

Roads are used by pedestrians, cyclists, horse-riders, motorcyclists, drivers of cars and vans, and passengers in cars, buses and coaches. In total, 97% of all personal journeys are made by these modes, amounting to 88% of distance travelled.

% of trips in the North

Using roads in the North

59% by car

26% by foot

9% by bus

2% by bicycle

2% by taxi

Other

2% by rail/ metro

<1% by other

Good transport connectivity is central to people's lives; to opening up opportunities to access jobs, education, health, and leisure facilities; to supporting new housing; and allowing goods to be delivered and businesses to grow. Roads are flexible in that they can be adapted to support different transport needs and users, for example providing more space for cyclists and pedestrians during the Covid-19 pandemic.

Although the majority of all trips are by road, integration of our major roads with other transport networks is vital in achieving a more sustainable transport system. This includes providing good access from the MRN to public transport hubs (such as park and ride, tram and rail stations) and multimodal options for freight movements, supporting the transfer of goods from road to rail and enabling cleaner and more efficient last mile delivery.

At present, 87% of freight movements are on our roads. Our goal is to move more freight by rail, and, where appropriate, inland waterway. But even in the most ambitious scenarios road freight will continue to be by far the dominant mode, with continued growth of freight on light goods vehicles likely to remain a significant trend.

148 million tonne/kilometres of freight is moved by road in the North

Ambition for the Major Road Network

Major roads are part of the 'life blood' of our economy with more than 90% of the distance travelled in the North by road, and 75% of commuters travelling to work by car.

TfN's ambition is for the North's Major Road Network to support fast action towards achieving net zero for transport, while maintaining a vital role in enabling safe, reliable and resilient multimodal journeys.

For the North's major roads to fulfil this role they must, in combination:

- Enable the most efficient journeys across multiple transport modes.
- Contribute to improving access to opportunities for all citizens of the North.
- Rapidly deliver new technologies to drive forward the adoption of low and zero emission vehicles.
- Support agglomeration economies by providing better connectivity and more reliable journeys to bring businesses closer together.
- Enable growth in key employment and housing sites.
- Increase the resilience of the economy to outside opportunities and threats.
- Enable international connectivity by improving access to airports, ports and associated economic clusters, where an appropriate rail connection or other more sustainable access is not possible.

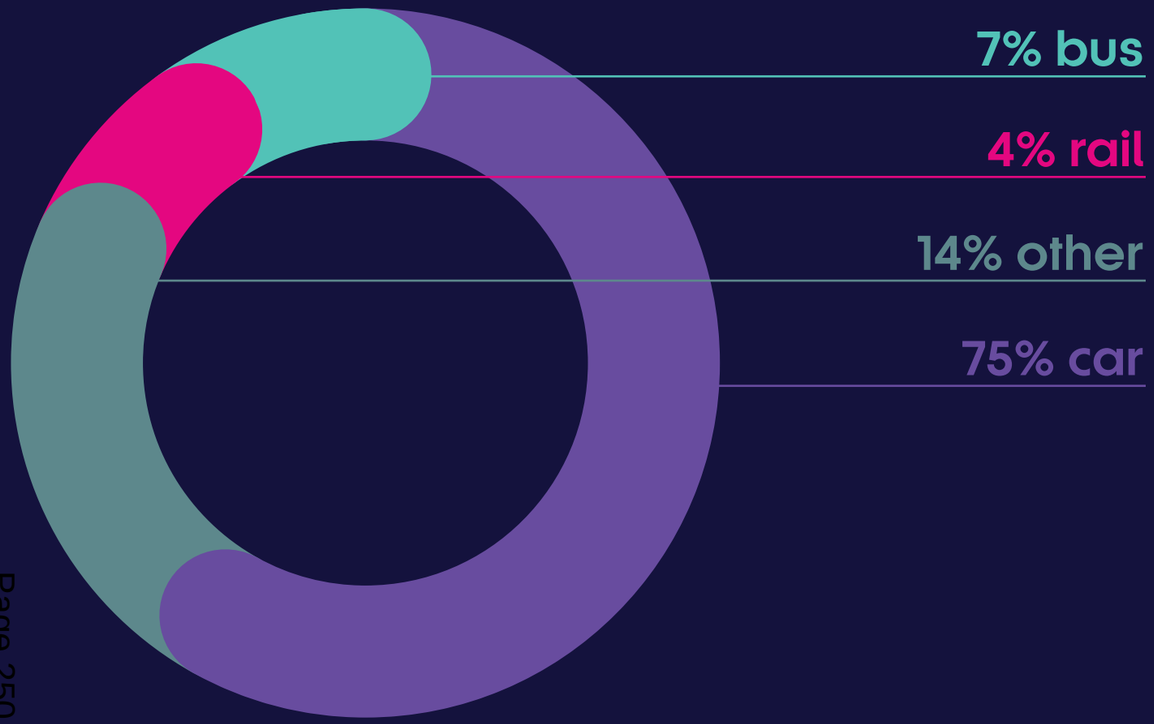




There is an opportunity for TfN to play a critical role in working with our local partners, Government, the other Sub-national Transport Bodies and national delivery partners (National Highways and Network Rail) in coordinating the development of an evidence base and delivery programme for transport, including a coordinated approach to investment in the Major Road Network.

TfN's Northern Transport Charter advocates the case for devolution of further powers and responsibilities from central Government.

Figure 3: Snapshot of travel in the North (2018 data).



13km
Average commute

26 minutes
Average travel time to work

126 billion
Vehicle KM's on our roads

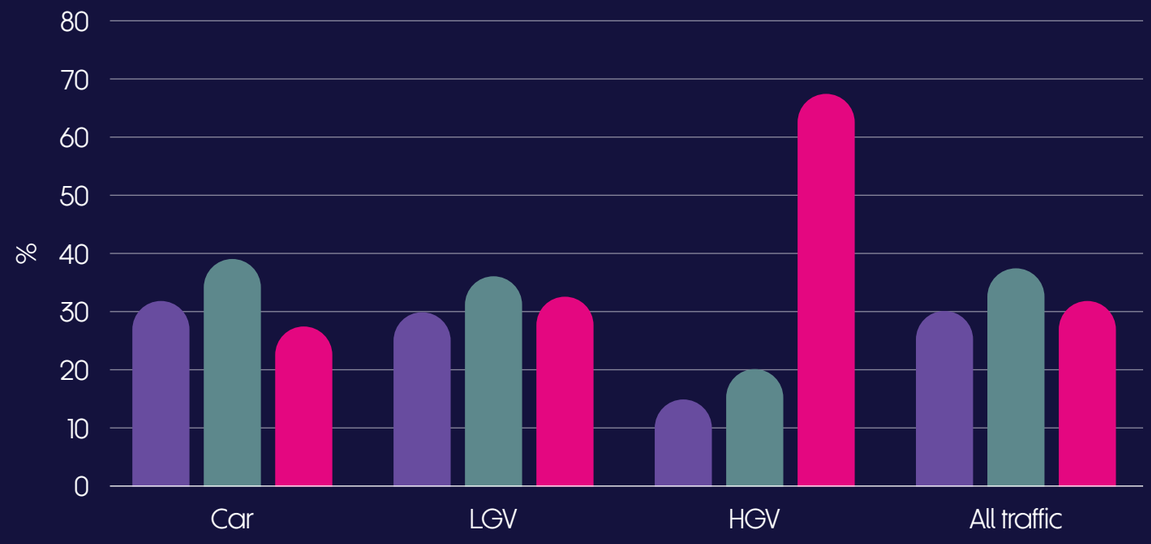
1.54
Vehicle occupancy

+8%
increase in road trips between 2012-2016

222.9 million
Passenger rail journeys

Figure 4: Vehicle kilometres in the North. 11

Share of vehicle-km in the North by road type



Key

- Local Roads
- MRN (ex. SRN)
- SRN only

% of v-km	Car	LGV	HGV	Total
Local Roads	32%	31%	13%	31%
MRN (ex. SRN)	39%	36%	20%	37%
SRN only	28%	33%	67%	32%

Major Road Network - Conditional outputs

TfN and our partners have agreed a set of pan-Northern conditional outputs against which we aim to monitor the MRN, and will use these to identify issues and develop proposed actions to improve performance.

- **Journey reliability:** Where drivers on 90% of the MRN should experience an average peak hour delay of no more than 25% in relation to the 'free-flow' travel time. This equates to a delay of 15 minutes or less on a 60-minute journey.
- **Network efficiency:** Aiming to ensure that the MRN contributes to a sustainable and inclusive transport system. This includes reducing carbon emissions through optimising the efficient flow of people and goods on the MRN; encouraging travel behaviour change; and supporting new technologies to reduce emissions of pollutants and greenhouse gases.
- **Network resilience:** Aiming to reduce the number of MRN route closures leading to severe journey delay. This will require a focus on infrastructure maintenance, renewals, and adaptation to mitigate for impacts of climate change.
- **Journey quality:** Improving the experience of using the MRN, including the quality and availability of travel information
- **Carbon emissions:** Reduction in carbon emissions from road transport in the North in line with TfN's trajectory for achieving near-zero net carbon emissions from surface transport by 2045.

In addition to the pan-Northern conditional outputs above, improving safety and air quality are fundamental objectives for TfN Members and partners in managing their road networks. These elements are reported by National Highways and local Highway Authorities and are captured as part of TfN's Monitoring and Evaluation Framework. The Monitoring and Evaluation Framework also includes measures of:

- **Air pollution:** The proportion of the population exposed to high levels of PM2.5 and NOX12 emissions, to which vehicles are a significant contributor.
- **Noise pollution:** The proportion of the population exposed to high levels of day and night-time noise pollution from vehicles.
- **Road incidents:** The number of road incidents resulting in fatalities or serious injuries.
- **Physical inactivity:** The proportion of adults walking or cycling for travel at least three days per week.





Future Travel Scenarios and what they could mean for the MRN

Even before the Covid-19 pandemic during 2020/21, the effects of the digital age colliding and merging with the motor age over the last two decades were becoming apparent in our daily lives. Long-run trends of relevance to travel and transport have been changing (in the UK and other countries). Technology-based innovations are a source of ongoing potential disruption and change. Now underscored by Covid-19 and its effects, there is deep uncertainty regarding what the future has in store.

Recognising the need to ensure that our policymaking and statutory advice should account for a sophisticated range of future uncertainties, in 2020 TfN completed work on updating and identifying four plausible Future Travel Scenarios looking ahead to 2050. Our scenarios take a whole system view to capture social, spatial, economic, technology

The four scenarios are:

1. In a **Just About Managing** scenario we see a gradual shift in lifestyles and travel – we do not alter our behaviours or give up certain 'luxuries', leaving major developments and change to be shaped by market forces.

2. In a **Digitally Distributed** world we fully embrace technological change, work remotely, and use an accessible service-based transport system with connected and autonomous shared mobility options.

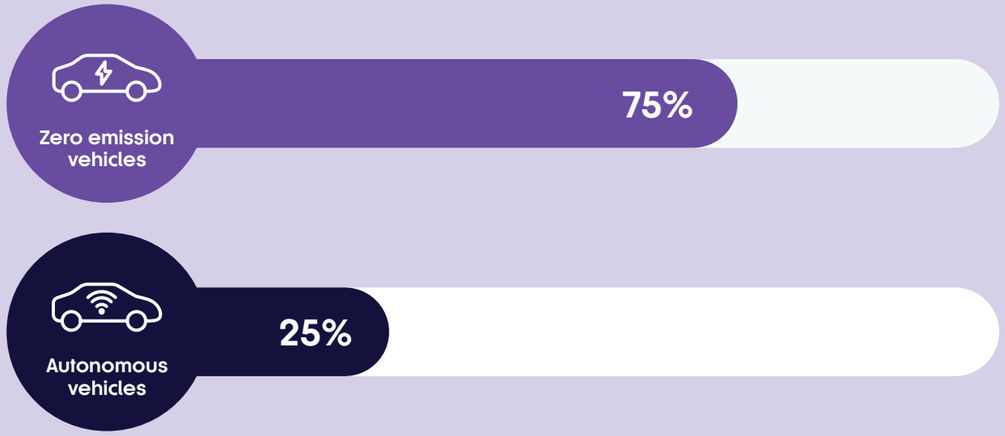
3. In an **Urban Zero Carbon** future there is a fundamental refocus by both the public and Government towards action on climate change, resulting in fast action on zero-emission transport systems and places, with integrated planning across energy, spatial and other sectors.

4. A **Prioritised Places** scenario would see a focus on people and place, with strategies and investments in local assets, specialisms and economic and social infrastructure. This scenario also sees a change in priorities, a focus on work-life balance and community.

Figure 5: Summary of the four Future Travel Scenarios.

Just About Managing

if society continues to develop in lin with existing trends



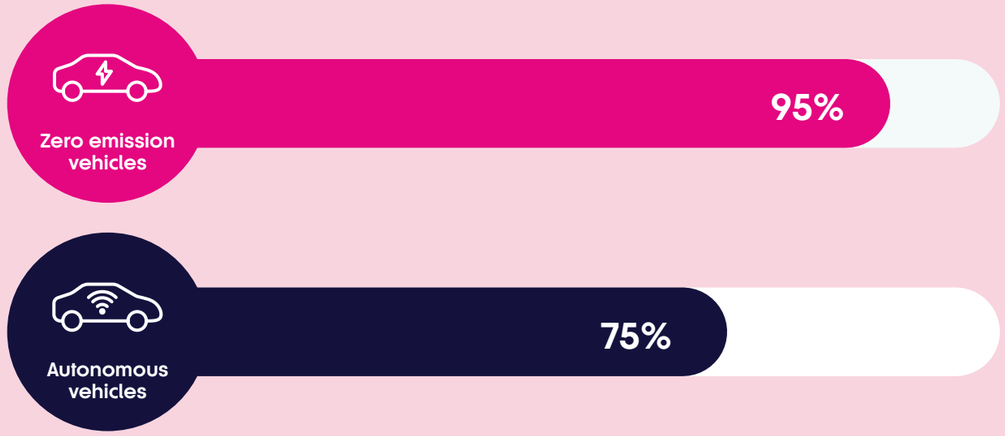
Transport demand growth - Number of trips made (2015 - 2050):

6%	83%	-3%	4%	-71%
Car	Rail	Bus	Active travel	Change in transport carbon emissions



Digitially Distributed

If society achieves NPIER outcomes by using technological solutions to create connection and agglomeration across towns and cities



Transport demand growth - Number of trips made (2015 - 2050):

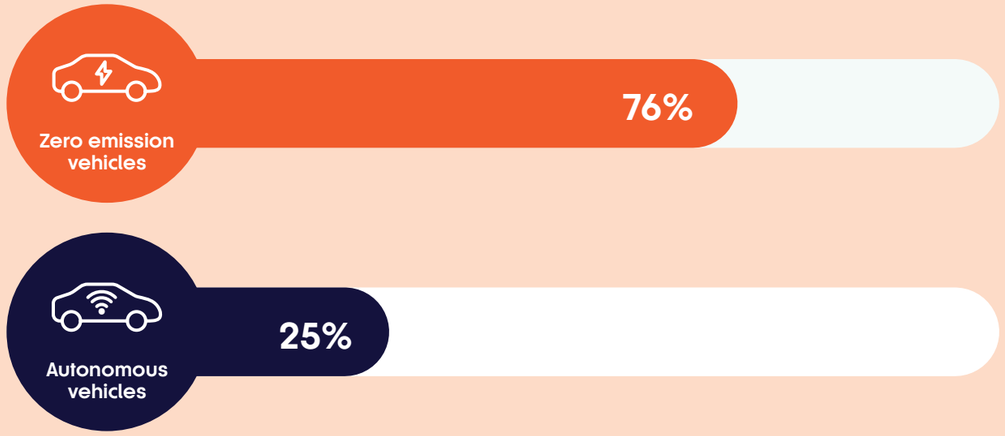
8%	78%	11%	6%	-96%
Car	Rail	Bus	Active travel	Change in transport carbon emissions



Figure 5: Summary of the four Future Travel Scenarios. (continued)

Prioritised Places

If society becomes more focused on place, place-making and community than growth or connectivity



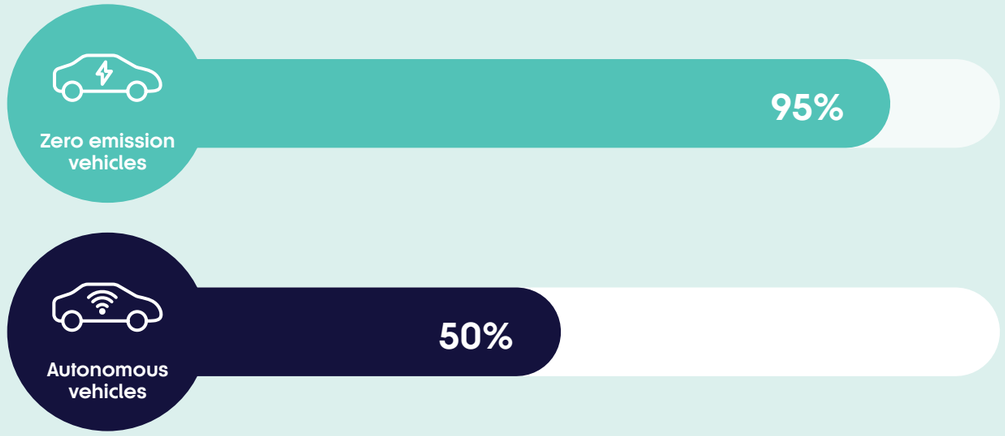
Transport demand growth - Number of trips made (2015 - 2050):

1%	122%	19%	13%	-73%
Car	Rail	Bus	Active travel	Change in transport carbon emissions



Urban Zero Carbon

If society achieves NPIER outcomes by using policy intervention to maximise energy-efficient city growth



Transport demand growth - Number of trips made (2015 - 2050):

-6%	193%	21%	30%	-96%
Car	Rail	Bus	Active travel	Change in transport carbon emissions





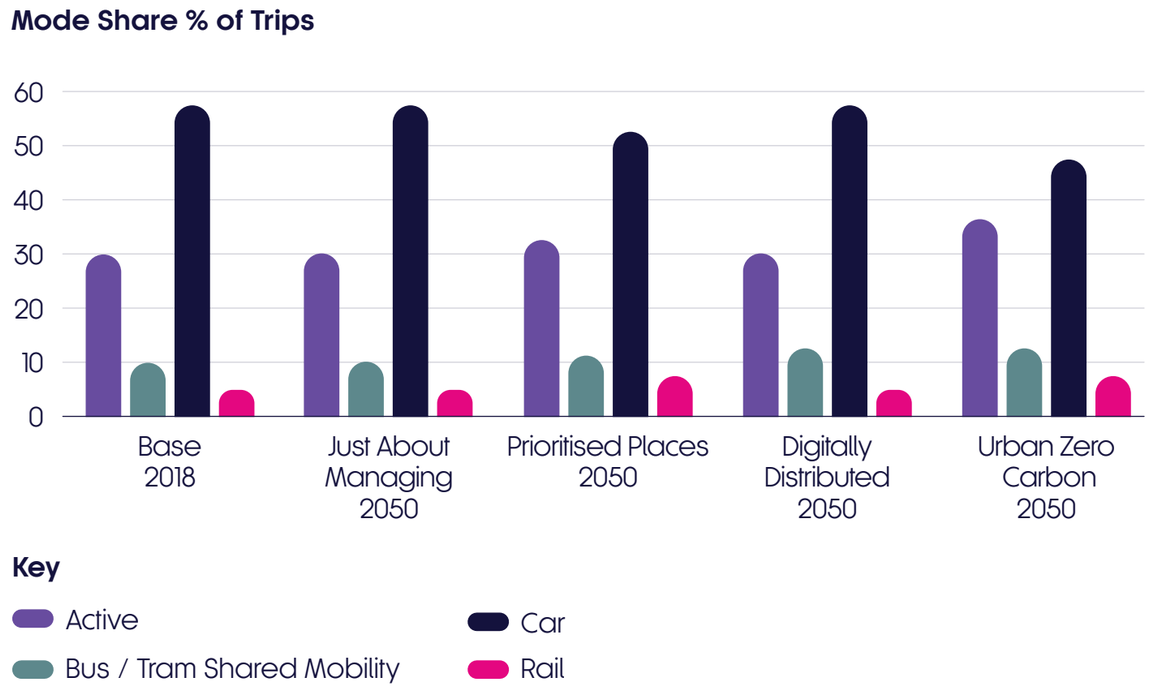
Using the scenarios

Our Future Travel Scenarios are being used to estimate future travel demand and the potential performance and impact of transport plans within each of the four broad potential futures. We are applying these within our Analytical Framework[13] tools to evidence and inform policy recommendations and future transport investment priorities in the North. The scenarios are built for the long term, with pathways out to 2050, however we have adapted these to reflect change and uncertainty resulting from the Covid-19 pandemic.

The recent changes we have all experienced may continue to evolve in different and unknown ways, affecting the way we travel and creating ongoing uncertainty. We might see continued high levels of home working for those who can; a rapid return of passengers on public transport; or ongoing reluctance to use shared mobility. Critically, the rate of economic recovery and introduction of new measures to boost the economy, for example flexible season tickets, will impact on levels and types of travel demand. This makes it even more important to build tools that facilitate an assessment of how changing trends may affect transport networks in the North.

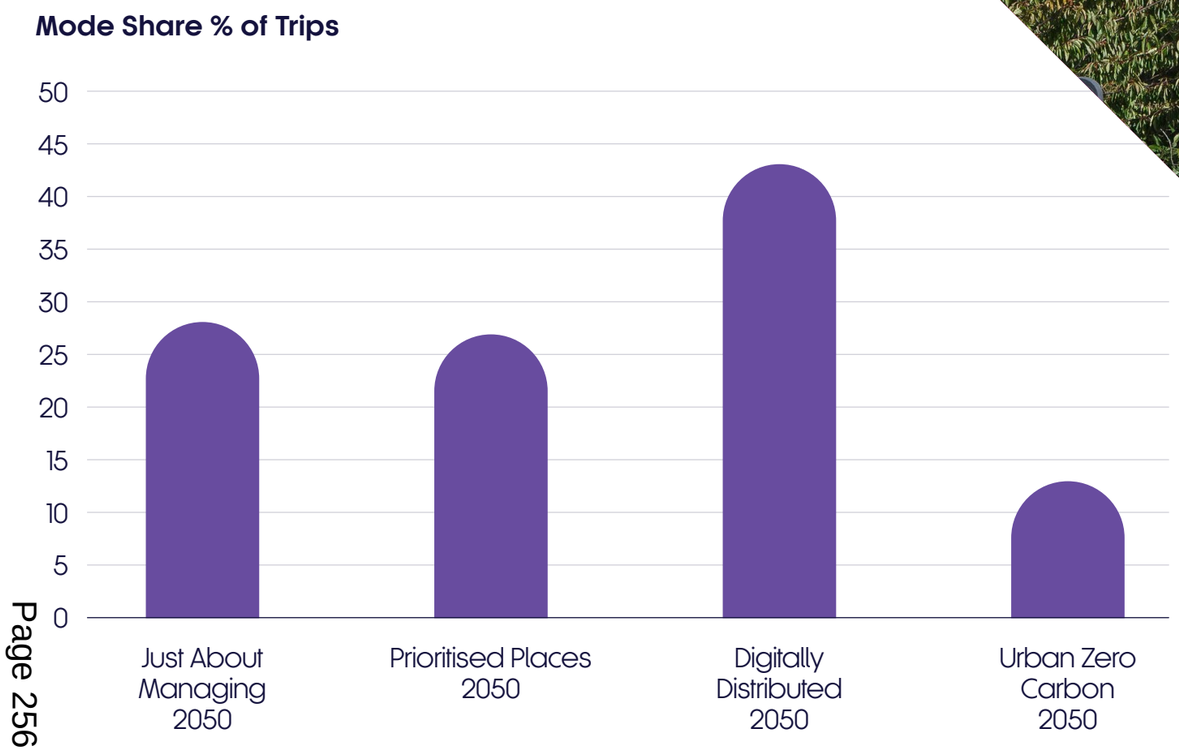
Our scenario analysis tool provides the basis for further interrogation of evolving and new trends, based on evidence as it develops. The Future Travel Scenarios Framework can be regularly reviewed and adjusted with the aim of learning more about future change trends and supporting an ambition of 'building back better'.

Figure 6: Summary of forecast estimates for changes in mode share for the four scenarios.



In all four scenarios the % share of rail shows the highest growth, however total vehicle kilometres in 2050, including car, van and HGV, are higher than for the 2018 baseline, and car remains the dominant mode across all scenarios. Vehicle kilometre increase is lowest in Urban Zero Carbon as this scenario requires the most policy activity to drive such a change (seeing less than the 15% road demand growth advised by the Climate Change Committee's 6th Carbon Budget). Digitally Distributed sees a slower shift towards sustainable policy and modal shift, and an increased access to road travel through uptake of advanced technology solutions. Just About Managing sees a continued trend of road reliance due to longer journeys which are not feasible via other modes as it stands. Prioritised Places is driven by population and trip growth in rural and sub-urban areas, increasing shorter journeys made by active travel and by bus.

Figure 7: Forecast changes in vehicle kilometres.







Next steps

Roads were first developed in the Iron Age and have had an important role in moving people and goods for millennia. In the last hundred years the internal combustion engine has provided the automotive power to transform our society, opening up opportunities for longer distance travel to access jobs, a wide range of services, and leisure activities, and enabling the movement of vast quantities of freight. Motorised transport has delivered many benefits, but also brought with it some significant social problems, particularly air and noise pollution, severance, and social exclusion for those without access to a car.

As we move into the second quarter of the century, road transport will continue to have a vital role in underpinning economic activity, social interaction, and movement of goods.

To be fit for the future, how we manage, operate and invest in our transport networks, including the 85,000km of roads in the North (7,899km of MRN) should reflect the needs and priorities of our communities in the 21st century.
This means a focus on improving air quality, reducing exposure to high levels of traffic noise, and the rapid decarbonisation of our transport system. Measures to achieve this include encouraging higher use of public transport, shared mobility and active travel so that where practicable these modes replace car trips. Similarly, where viable, movement of freight by rail can take pressure off our roads. Alongside changes in the movement of people and freight we need to see the swift adoption of zero emission vehicles, with electric and hydrogen power seen as the leading options.

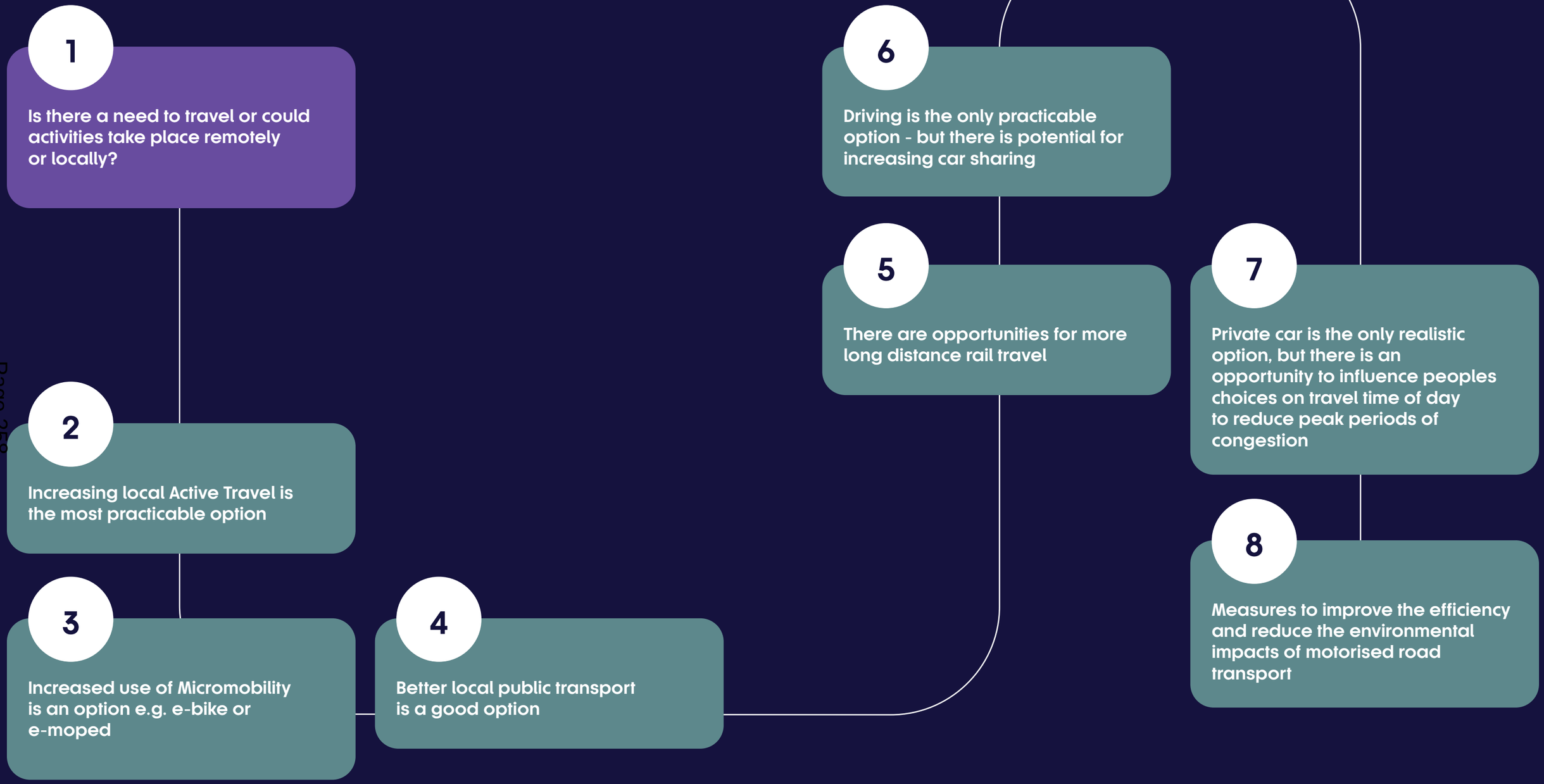
Figure 8 outlines the recommended process for considering an initial transport options appraisal, starting with a question on whether there is a need to facilitate more travel, followed by consideration of options before making a decision on whether there is a requirement for new road capacity.

Achieving the required scale of change will need an emphasis on improved active travel and local public transport infrastructure (particularly in urban areas), faster and more reliable rail services, policies and actions to encourage behaviour change, and targeted investment in improving the efficiency of our road networks including in electric and hydrogen refuelling infrastructure.

Policy measures beyond TfN's direct area of influence are represented in the Future Travel Scenarios we are using to appraise and evidence our recommended transport investment programme, including investment in our roads.

Through application of our Analytical Framework, we are assessing the transport benefits and wider social, economic and environmental outcomes of our proposed programmes of transport investment. The Investment Programme Benefits Analysis work will provide a strong evidence base, supporting recommendations for future policy decisions and transport investment, including where the evidence supports it, investment in improving our Major Roads.

Figure 8: Initial appraisal of transport options.



Action Plan - Major Roads

Major roads are part of the 'life blood' of our economy with more than 90% of the distance travelled in the North by road, and 75% of commuters travelling to work by car.

- → **Transforming economic performance**
- → **Increasing efficiency, reliability, integration, and resilience in the transport system**
- → **Improving inclusivity, health, and access to opportunities for all**
- → **Promoting and enhancing the built, historic, and natural environment**



TfN action	Description	Timing
Investment Programme Benefits Analysis (IPBA)	This will provide a quantified understanding of the Investment Programme benefits and support TfN Board in recommending policy and investment priorities for the North's transport networks (including the MRN), as statutory advice to the Secretary of State for Transport.	Spring 2021 – Summer 2022
TfN input to SRN Route Strategies	With our comprehensive evidence base we will input to influencing the National Highways-led SRN Route Strategies.	Autumn 2020 – Summer 2023
TfN inputs to Road Investment Strategy pipeline (RIS3)	Using evidence from our Strategic Development Corridor studies, the IPBA and our wider portfolio of research, TfN will represent the North's position with regard to the development of the National Highways RIS3 pipeline.	Autumn 2020 – Summer 2023
Major Road Network Performance Monitoring Evidence Base	Utilising data from tracking mobile phones we will provide TfN partners with access to MRN data reporting on journey times, journey time reliability, origin and destination of motorised trips using the MRN. This will support TfN and our partners in identifying issues on the MRN, in appraising options, developing business cases and in evaluating the impact of policies and of investment.	Annual reporting 2019-2022
Electric Vehicle Charging Strategy	Using TfN's suite of analytical tools to underpin work on assessing the future trajectory and geographical location of EV demand, combined with input from our partners and Distribution Network Operators, we will develop an EV charging infrastructure evidence base for the North.	Summer 2021 – Summer 2022

Action Plan – Major Roads

TfN action	Description	Timing
Zero Emissions Vehicle charging & re-fuelling Strategy	Working with partners across the North with regards to hydrogen fuelling, we will combine work on identifying requirements for hydrogen re-fuelling with the Electric Vehicle Strategy to formulate a ZEV Infrastructure Strategy and support Local Authority partner delivery of charging and re-fuelling solutions.	Summer 2021 – Spring 2023
Multimodal hubs policy position and evidence base	We will develop a TfN policy position and evidence base on the provision of multimodal transport hubs in the North.	Spring 2022
TfN research into Transport-Related Social Exclusion	This project will provide new data tools and primary empirical evidence on the link between transport and social exclusion. This includes accessibility analysis, socioeconomic analysis, and demographic analysis. Evidence from this work will support transport related investment and policy decisions, including on the role of the MRN in supporting an inclusive and sustainable North.	Winter 2020 – Summer 2021
TfN research into health and wellbeing	This project will expand evidence on the link between transport, health, and wellbeing in the North – focusing on severance, physical inactivity, poor user experience, and access to health services. It will provide new data tools and indicators to measure these relationships. Evidence from this work will support decisions on the role of the MRN in supporting an inclusive and sustainable North.	Autumn 2021 – Spring 2022
TfN Clean Mobility Visions project	This project will develop a set of strong and attractive mobility visions based on practicable evidenced based policy options for reducing private car usage, applicable to specific place and population contexts in the North. It will consider the decarbonisation, health, inclusion, and accessibility-related impacts of these policies.	Summer 2021 – Spring 2023
Impact of Future Mobility on the MRN	Building on the Future Travel Scenarios, this workstream will support TfN and partners in planning for the impact of new and emerging technologies, for example connected autonomous vehicles, freight platooning and data platforms supporting greater use of shared mobility solutions.	2023/2024
Future MRN investment	Building on the outputs of the IPBA, EV Strategy and performance monitoring, we will set out the priorities for MRN investment 2035-2030.	2022/2023

Footnotes

[1] TfN Major Roads Report – XXXXX 2021

[2] Business Population Estimates 2020, October 2020, BEIS [Accessible here]

[3] Labour Force Survey (Jan-Mar 2020), May 2021, ONS [Accessible here]. The most recent data (Jan-Mar 2021) indicate that employment across the North is around 7.2 million.

[4] Estimates of the population for the UK, England and Wales, Scotland and Northern Ireland (Mid-2019), June 2020, ONS [Accessible here]

[5] The Northern Powerhouse Independent Economic Review: Final Executive Summary Report, June 2016, Cambridge Econometrics and SQW [Accessible here]

[6] Regional gross value added (balanced) per head and income components, December 2019, ONS [Accessible here]

[7] Northern Highway Assignment Model (NoHAM) 2018

[8] Data from the National Travel Survey (NTS, 2019)

[9] TfN User Insight Phase 3 Business Survey 2021

[10] Note that the MRN defined by TfN and our partners differs from the Department for Transport's definition of the MRN, which is defined as being separate to the Strategic Road Network (SRN) and encompasses around 2% of roads in the North.

[11] TfN Northern Highway Assignment Model (NoHAM) 2018 baseline data

[12] Particulates under 2.5 Microns in diameter and Nitrous Oxide air pollution, both harmful to humans

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TRANSPORT FOR THE NORTH

Meeting:	Transport for the North Board
Subject:	Rail Reforms
Author:	David Hoggarth
Sponsor:	Martin Tugwell
Meeting Date:	Wednesday 24 November 2021

1. Purpose of the Report:

1.1 This report summarises recent discussions with the rail industry on the implementation of the Rail Reform White Paper. It seeks endorsement of the approach and sets out planned next steps including detailed engagement with the Great British Railways Transition Team.

2. Recommendations:

2.1 The Board is asked to:

1. Note the progress on working with the industry on implementing the Rail White Paper in the North.
2. Endorse the approach set out in the paper.
3. Mandate officers to engage with Great British Railways (GBR) Transition Team, Mayoral Combined Authorities and Local Transport Authorities to work collaboratively on developing the proposals.
4. Support the case for locating the new Headquarters for Great British Railways in the North.

3. Main Issues:

Background

3.1 Transport for the North has consistently identified the potential for transformation of the North's transport system to realise economic potential and economic productivity gains and used its analytical tools to demonstrate the value to the national economy. The Rail White Paper signals a radical transformation of the national rail network and highlights the need for strong partnerships at regional and local levels to help achieve this.

3.2 At the last meeting of this Board members endorsed an initial response to the Rail White Paper setting out a strong partnership offer to the new GBR organisation based on four pillars:

1. A strategic partnership with GBR
2. Transport for the North as the lead on multi-modal strategy and investment priorities in the North
3. Transport for the North as the provider of evidence and analysis
4. Transport for the North as the link between local devolution (including in the city regions) and GBR regions.

3.3 The White Paper set out sweeping reforms to the structure of the rail industry to improve customer focus, accountability and make it simpler. The reforms will require legislation and are unlikely to be fully implemented until 2023/24. The Government has set up a transition team headed by Andrew Haines (who is also

Chief Executive of Network Rail) to oversee the changes and, where possible, deliver some of the desired outcomes ahead of structural change.

3.4 Transport for the North Board member Sir Peter Hendy (Chair of Network Rail) indicated the desire for Network Rail to work with Transport for the North on how the reforms will be implemented in the North. Initially Sir Peter arranged for Network Rail's Strategy and Planning Director, Graham Botham to work with the Transport for the North Executive on proposals.

3.5 Since the last meeting of the Board, positive discussions have taken place, including a workshop with senior Transport for the North officers and Network Rail staff. This collaborative work has highlighted that there is a real opportunity now for the North to take a pioneering approach by building on existing successes and evidence to harness the clear ambition of the North, together with the expertise of industry.

3.6 This report covers some of the main principles discussed for members' input and endorsement. The discussions have very much focussed on outcome and principles rather than structural change and governance, which would form part of a further phase of work with the Transition Team.

Overview

3.7 Initial joint work on implementing the White Paper has highlighted that there are already strong building blocks in the North including Transport for the North's Strategic Transport Plan, the Rail North Partnership (which is the first stage of devolution) and city regions that are well-placed to deliver on integrated local public transport. There is also some very strong joint working taking place across the industry (for example on strategic planning and future, more responsive timetables) as well as local initiatives such as new stations and multi-modal ticketing linked to Bus Service Improvement Plans and new rail passenger routes such as the Northumberland Line. For this reason, there is a huge opportunity for Transport for the North and its partners to build on this work and implement a step change in the North. The North is therefore able to move more quickly than other parts of the country and can be a pathfinder for the reform in a way that starts to deliver tangible passenger (and freight) benefits sooner.

3.8 The initial discussions focussed on the following elements that would form the core of the new partnership in the North:

A. A Strategic Transport Plan that establishes the need for transformation of our transport system
B. Through that Plan identify the role and outputs required of the rail sector in support of realising the North's economic potential
C. A prioritised pipeline of investment – expressed in terms of outcomes and against which detailed interventions are developed
D. The principle of 'double devolution' used to empower City Regions (and other areas) to enable integration of services at the local level , with increased oversight and local accountability
E. Decision making and advice at the regional/local level to be shaped by a 'profit and loss' account for the North that guides strategic choices, investment and service specification

A. A Strategic Plan for Transformational Rail Outcomes

3.9 The Northern Powerhouse Independent Economic Review (NPIER) identified the extent to which realising the economic potential of the North is dependent upon transforming the connectivity between the North's great towns and cities. The

importance of rail to the economic outcomes of the North was emphasised in the aftermath of the May 2018 timetable problem where a report by the Northern Powerhouse Partnership put the immediate economic impact at £38m. More recently the recovery from the pandemic where the North's rail services have been at the leading edge of the national recovery emphasises the relative economic importance of rail.

3.10 Transport for the North's statutory Strategic Transport Plan (STP) for the North is built upon a strong evidence base including the NPIER. The Strategic Transport Plan sets out the key role that improved rail connectivity has to play in achieving that transformation, enabling the North's requirements to shape the strategic direction of the rail sector. In so doing the Strategic Transport Plan provides the mechanism by which strategic choices can be better aligned to support and enable investment by individual Mayoral Combined Authorities and Local Transport Authorities.

3.11 This approach has the advantage of being able to identify where rail is the best mode to address the specific challenge and may also provide opportunities to determine priorities across modes and also look across funding streams (e.g where rail can relieve pressure on highways). Working with Mayoral Combined Authorities and Local Transport Authorities it should also be possible to ensure that the strategy reflects 'place-based design' and delivers the right outcome for local communities including meeting their decarbonisation targets.

3.12 Transport for the North is about to embark on a refresh of the Strategic Transport Plan and associated Long Term Rail Strategy over the next 18 months. The Great British Railways Transition Team is also developing the 30-year Whole Industry Strategic Plan so there is an opportunity to work together in the North over the next 12 months to develop a common view of the long-term strategy for rail in the North. Transport for the North's review of the NPIER will enable changes in the economy post pandemic to be reflected in our planning moving forward which will in turn be used help update the Strategic Transport Plan. The context provided by the work of Transport for the North needs to be a key input into the development of Whole Industry Strategic Plan.

3.13 This work would aim to reflect the ambition and economic needs set out in Transport for the North's STP, but also take into account the likely funding available over the period to ensure the outcomes sought are prioritised appropriately. Transport for the North can bring its analytical framework and modelling suit to support decision-making and business cases. Naturally, there will be greater certainly about funding available in the near term (for example the next 5-year control period) and greater short-term prioritisation.

3.14 Transport for the North's Long-Term Rail Strategy has the planned NPR network at its heart and Transport for the North and Network Rail has already commenced work on a 'Combined Train Service Specification' for the whole of the North's network once NPR is implemented. This will set out the level of service and connectivity to be delivered across the network including both HS2/NPR and the existing network. It will inform future timetables and provide the North's partners with the opportunity to shape future service contracts. In the discussions with Network Rail this was identified as a potential early collaboration between GBR and Transport for the North as it will set out the future shape of services and how NPR is integrated into the wider network to maximise the benefits.

3.15 Taking these actions together, there is the opportunity (over the next 12 months) to set out a clear shared vision for the rail network in the North which would be used to shape earlier investment decisions and priorities.

B. A Prioritised Investment Pipeline

3.16 Key objectives of the White Paper are to join up decision-making and delivery between track and train and make the whole system simpler. In part, historic disjoints between franchise commitments and infrastructure delivery contributed to the problems that flowed from the May 2018 timetable change. Transport for the North has existing powers to provide advice on investment priorities and the mechanism for this is the Rail North Partnership. In recent months significant progress has been made on joining up infrastructure requirements and service changes through a 'Railmap' for addressing the Central Manchester congestion problems. There is an opportunity to roll this approach out across the North (for example on the East Coast Main Line) to set out how infrastructure and service changes will, over time, build towards the shared vision set out in the strategy. Building on our input to the Union Connectivity review we will look to strengthen the working relationships with both Transport Scotland and Transport for Wales with a view to ensuring that future developments plan for improved connectivity.

3.17 The other key element will be to jointly develop a pipeline of enhancements, service and rolling stock changes, suitably sequenced according to anticipated funding availability, and also taking into practical delivery and passenger disruption (drawing on industry knowledge and the views of stakeholders). The advantage of a pipeline approach alongside a clear vision for the network is that early development work can be undertaken on projects in the pipeline and schemes can be brought into the programme as and when funding becomes available. An indicative funding envelope (including indicative capital funding and revenue funding for services) will equip the Transport for the North Board with the advice to make informed choices on joined up priorities for investment in infrastructure and services across the North.

3.18 There is also a significant opportunity to ensure that the investment programme reflects local 'place-based' priorities (for example ensuring that station developments don't stop at the boundary and are better integrated into the townscape) including tapping into local funding opportunities including from Local Transport Authorities (for example through Local Transport Plans) and third parties.

3.19 Following the Spending Review, the Government intends to publish an update of the Rail Network Enhancements Programme which will include a programme of schemes in the North. This will provide a starting point for the development of the pipeline which could be developed in parallel with the strategy and combined train service specification over the next 12 months.

C. Setting the Outputs Required from the Rail Sector

3.20 Service specifications are the remit of the Rail North Partnership which is already a joint entity between Transport for the North and DfT. DfT's role in the Rail North Partnership is expected to transfer to GBR under the White Paper and provides a strong building block for the wider partnership and further devolution in the future (In fact there is a specific provision for further stages of devolution in the Partnership Agreement). RNP will be overseeing the move to National Rail Contracts and including the objectives set out in the White Paper so there is an opportunity to collaborate on these to tailor them to meet the needs of the North, for example plugging in to local markets and integrating with other modes. Initial steps have already been taken to improve collaboration including inviting Network Rail to attend Rail North Partnership Board meetings.

3.21 As with investment, understanding the funding envelope and financial performance of services (including the required level of subsidy) is key to being

able to prioritise services and drive changes to allocate resources to where they can deliver more either in financial terms or wider policy objectives.

3.22 There are several specific elements of the existing Partnership Agreement that could be utilised to provide some progress ahead of wider changes. This includes the provision for devolved fares setting that already exists for Transport for the North. Members have previously explored proposals to utilise this power to simply the fares structure in the North of England. This would need to be at a point where the transformation of services in the North was visible to passengers and in the context of a wider national reform plan to deliver better value for money and smarter fares for customers.

3.23 Given that there are now plans for a national roll out of smart ticketing including Pay and You Go on rail, there is an opportunity to work together to create a simplified fares structure in the North which will help maximise the benefits of national investment in smart technologies. Transport for the North can draw on initial work and learning from the former IST Programme in collaboration with train operators. Given the strong progress on smart, multi-modal ticketing in the city regions there is an opportunity for Transport for the North to work collaboratively with these areas to join up local initiatives across modes and geographies.

3.24 Freight is an important element of the Strategic Transport Plan in terms of its economic and decarbonisation contributions. There is a need to give greater emphasis on planning for rail freight - reflecting the commitment in the Williams-Shapps Review. The planned partnership between Transport for the North and GBR will enable this by bringing together the economic and demand analysis for freight contained within the STP with the network planning role of GBR and the passenger contract role of Rail North Partnership. This approach would help ensure that, for example, the economic benefits of freeports are fully realised. Transport for the North would also be able to provide advice to GBR on the trade-offs between freight and passenger services.

D. Double Devolution to Empower City Regions

3.25 Alongside Transport for the North's role in the Rail North Partnership the North has the advantage of strong examples of local devolution working in practice. These include the Tyne and Wear Metro operated by Nexus and the Merseyrail service contract which is fully devolved to the Liverpool City Region. Whilst these areas are operationally separate from other parts of the network, the city regions have been able to secure significant local investment, for example for the new trains that are currently being rolled out in Liverpool and are due in the North East from 2023/4. In Liverpool, this local specification has facilitated the first example of truly level boarding and spearheaded innovation in battery technology to allow the electric trains to operate beyond the electrified network and therefore expand the catchment and demand reach of the network. The Merseyrail network has also consistently topped the national league table of performance.

3.26 Whilst devolution aspirations differ across the North, Transport for the North will work with local areas and GBR across boundaries to facilitate the right local arrangements and ensure that cross-boundary and inter-regional issues are addressed, thereby assisting GBR to ensure that the benefits of an integrated network approach are not lost. This approach to double devolution has been welcomed by the rail sector.

3.27 A quick win is the provision (in the Rail North Partnership Agreement) for devolved Business Units within the Partnership Agreement. These are designed to facilitate much greater local involvement in the specification and monitoring of services. The North East authorities have already established a successful

business unit (NERMU) working across the North East. The Partnership Agreement would allow this to be developed further and become in effect a form of 'double devolution' within the Rail North framework. This could be rolled out to other areas (e.g individual city regions or groups of city regions working together) as a first step to fully devolved responsibilities. In particular it would facilitate a direct dialogue with operators with the local area and local decisions on timetable changes and priorities for change, fares etc. and help deliver the aspirational 'London style' local networks and ticketing. The geography of Business Units does not have to be linked to Mayoral/Combined Authorities and there would be the flexibility to develop the right type of devolution for each area (e.g a more strategic outcome focussed role or one focused more on local service outputs).

3.28 It is proposed to engage with the Mayoral/ Combined Authorities (in the first instance) to develop appropriate business units that are aligned with local integrated networks and provide a greater level of local oversight and accountability.

E. Local Decision Making Shaped by a 'Profit and Loss' Account for the North

3.29 Running throughout the themes above is a proposition for a 'Profit and Loss' account for the North's railways which will guide prioritisation of both infrastructure and services. It would be a step towards Transport for the North's Northern Transport Charter aspiration of a devolved budget for the North and would enable industry and Transport for the North to make informed choices across the whole industry (i.e track and train).

3.30 Transport for the North is already using its tools and analytical frameworks to enable wider economic, social and environmental considerations to shape decision making. This will enable wider economic, social and sustainability measures to be included alongside financial metrics in line with the recent changes to the Treasury Green Book. This will help demonstrate how the continued transformation of the rail network in the North can play a key role in the levelling up agenda and realising the full potential of the North.

3.31 In addition to guiding prioritisation at each stage of the process, the Account for the North would also facilitate an assessment of the outcomes achieved from particular proposals and provide an important loop back from delivery to the strategy. Given that there is already a North of England Enhancements Programme which is about to be refreshed following the Spending Review, and that Rail North Partnership already has the responsibility for monitoring the financial metrics of TransPennine Express and Northern operators it should be possible to create an initial account relatively quickly as a pilot. Over time this could be developed and disaggregated further to facilitate a Northern region within GB Railways and also more local disaggregation at a city region business unit area.

3.32 The overall account would be used to shape regular dialogue between Transport for the North Board and the GB Railways (who it is assumed would become a board member as a strategic partner) as a way of monitoring the impact of joint decisions and informing future priorities. Through the Board, Transport for the North will also bring the voice of business through the LEP representatives. Coupled with the investment pipeline, it would be the cornerstone of a new strategic relationship between Transport for the North Board and GB Railways.

Conclusion and Next Steps

3.33 There are already some very strong building blocks in the North including Transport for the North's Strategic Transport Plan (rooted in economic analysis) and the Rail North Partnership which has a number of provisions which can assist

with early enaction of some of the outcomes in the White Paper. Working collaboratively with the GBR Transition Team and Mayoral/ Combined Transport Authorities, the North is able to move quickly to become a pathfinder for the Government's reforms and bring significant early benefits to customers.

3.34 Subject to views from the Board, it is proposed to engage with both the GBR Transition Team and city regions in the North to develop the proposal further to develop a proposition in parallel to pursuing the quick wins highlighted.

Great British Railways Headquarters

3.35 DfT has indicated that it is going to launch a competition to host the new Headquarters of GBR which will be outside of London. Several areas in the North have already expressed an interest although, at the time of writing, the formal process for inviting expressions of interest had not commenced. Locating the HQ in the North of England would send a strong signal on levelling up and whilst it is for individual areas to put forward specific proposals, it is proposed the Transport for the North supports the location of the new Headquarters in the North.

4. Corporate Considerations

Financial Implications

4.1 Transport for the North Finance Team has confirmed there are no financial implications. Dependant on the implementation of the GBR Target Operating model there may be structural, resource and skills implications for Transport for the North. This will be kept under review and the Board appraised as this proposal evolves.

Resource Implications

4.2 Dependant on the implementation of the GBR Target Operating model there may be structural, resource and skills implications for Transport for the North. This will be kept under review and the Board appraised as this proposal evolves. The organisation recognises UNISON, should changes to the delivery model subsequently be required, full and proper consultation will be undertaken with UNISON and any employees potentially affected.

Legal Implications

4.3 There are no apparent immediate legal implications arising from this report.

Risk Management and Key Issues

4.4 There are no new risk implications arising from this report and thus a risk assessment is not required.

Environmental Implications

4.5 This report does not constitute or influence a plan or programme which sets the framework for future development consents of projects listed in the EIA Directive and therefore does stimulate the need for SEA or EIA

Equality and Diversity

4.6 A full Impact assessment has not been carried out because it is not required for this report.

Consultations

4.7 Transport for the North's partners have been informally consulted on our approach and will have the opportunity to provide further input as the proposition evolves. Transport for the North's initial response to the White Paper was considered by Transport for the North's Scrutiny and Rail North Committees.

5. Background Papers

5.1 None

6. Appendices

6.1 There are no Appendices to this report.

Glossary of terms, abbreviations and acronyms used *(if applicable)*
a) DfT — Department for Transport *b) GBR — Great British Railways* *c) RNP — Rail North Partnership* *d) NPR — Northern Powerhouse Rail* *e) STP — Strategic Transport Plan* *f) NPIER — Northern Powerhouse Independent Economic Review* *g) IST — Integrated Smart Travel*

TRANSPORT FOR THE NORTH

Meeting: Transport for the North Board

Subject: Governance Report

Author: Manjit Dhillon Senior Solicitor

Sponsor: Julie Openshaw Head of Legal

Meeting Date: Wednesday 24 November 2021

1. Purpose of the Report:

1.1 For Board to make the remaining Committee appointments outstanding from the Board meeting of 29 September 2021;

1.2 To consider the future arrangements for Board meetings;

1.3 To make minor updating changes to the Constitution as set out in the report;

1.4 To consider the request from the four Leaders of the Humber authorities with regard to representation on the Rail North Committee and, if necessary, to delegate authority to the Monitoring Officer, having consulted with the Chief Executive, to make any consequential changes to the Constitution.

2. Recommendations:

2.1 That the nominees for the General Purposes Committee as set out in Appendix 1 be appointed and Board considers nominees for the vacancy on the Audit and Governance Committee;

2.2 The Board cancels the waiver of the Terms of Reference in respect of the Chair of the Partnership Board and replaces Appendix 12 of the Constitution;

2.3 That subject to compliance with health and safety considerations, the Board agrees in principle to hold 4 meetings per annum: one in person at a Manchester venue, one in person at a Leeds venue, with the other two meetings held as Chief Executive Consultation calls;

2.4 That the Board considers the request from the four Leaders of the Humber authorities and agrees a way forward and if necessary, delegates authority to the Monitoring Officer, having consulted with the Chief Executive, to make any consequential changes to the Constitution.

3. Main Issues:

Appointment to Committees

3.1 At the TfN Board meeting on 29 September, two of the 11 seats on the General Purposes Committee were filled so that 9 remained vacant. Whilst one vacancy for a Constituent Authority member on the Audit & Governance Committee was filled, a further vacancy remains. Board needs to appoint to these vacancies. The nominations set out in Appendix 1 have been received for General Purposes Committee; where vacancies are still shown, nominations for these are invited at the meeting. Nominations are also invited for the remaining vacant Constituent Authority member seat on Audit & Governance Committee.

Amendments to the Constitution

3.2 The Constitution provides that non-elected members of TfN must adhere to the Code of Conduct published by the Cabinet Office and this is set out in the Constitution within paragraph 38.3 with the Code itself appended as Appendix 12. In November 2019, the Cabinet Office published a revision of the Code. Whilst the Constitution at 38.3 is clear that the Cabinet Office published version is the applicable version, Appendix 12 needs to be formally updated to reflect the current version. The current and amended versions are appended to this report in Appendix 2 and Appendix 3.

3.3 On 29 September 2021, Board agreed to suspend, until further notice, the provision of the Terms of Reference of the Partnership Board (Appendix 5 of the Constitution) which normally requires the Chair of Partnership Board to be the Independent Chair. This allowed the Partnership Board to be chaired by a Constituent Authority Member (Councillor Gittins) during the recruitment process for a new Independent Chair was complete and an appointment made. A separate report on this agenda now makes recommendations as to the appointment of a new Independent Chair. Board is therefore recommended to cancel the waiver of the Terms of Reference of the Partnership Board with effect from the taking up of office of the new Independent Chair.

3.4 Board has over recent months considered a series of reports relating to its meeting arrangements and has indicated a wish to develop the opportunity to have "hybrid" meetings when face-to-face meetings are held, allowing Members to dial-in "virtually", which would enable contribution from a remote location, albeit their presence could not legally be counted for quorum purposes, and in the event of a formal vote, they would be unable to cast a formal vote. The Constitution has already been updated to accommodate the principle of such meetings. Hybrid arrangements involve considerable technological complexity, and involve additional resource and therefore cost, but logistically would be simpler to plan for if the location of Board meetings was more firmly agreed in advance.

3.5 To plan the programme of TfN Board meetings for the year ahead it is proposed that there be 4 meetings in total: one in person at a Manchester venue, one in person at a Leeds venue, with the other two meetings held as Chief Executive Consultation calls. Additional meetings would be convened if required by circumstances.

3.6 Other TfN committees have been consulted on their own meeting arrangements. A report was presented to Scrutiny Committee on 4 November dealing with the Scrutiny review, and meeting arrangements for Scrutiny. At the request of the Scrutiny Chair, the report was deferred until the next scheduled meeting, with a small member working group set up meantime to further discuss future arrangements for Scrutiny meetings and presentation of the next report to Scrutiny on this topic.

Membership of Rail North Committee

3.7 Following the Board meeting of 29 September 2021, the four leaders of the Humber authorities (Hull City Council, East Riding Council, North East Lincolnshire Council and North Lincolnshire Council) have written to the Monitoring Officer requesting that the issue of representation for that Region be considered by the Board. The letter is at Appendix 4.

3.8 Under the Constitution the four Humber Authorities have a combined representation on the Rail North Committee as a sub-regional grouping. Historically, the nominated RNC members (both the main and substitute members), have been from a single authority, North Lincolnshire, but now the

four authorities agree that different geographies, different populations and being serviced by two parts of the rail network merit having separate representation for the north and south bank of the Humber at RNC.

3.9 By way of background, when Rail North Limited was set up as a limited company in around 2014 an exercise was carried out in order to ensure representation on the interests of all Local Transport Authorities whilst having a Board that was manageable in number. As a result of that exercise the (then) 29 Local Transport Authorities were combined into 11 sub-regional groupings.

After TfN became a statutory body on 1 April 2018, Rail North Limited's role was subsumed into TfN, as the Rail North Committee, and its membership matrix was transferred to TfN and included into its Constitution with member numbers remaining at 11.

3.10 Any alteration to representation on Rail North Committee would be for full Board to agree upon as it would require a change to the Constitution. The options are as follows:

1. Make no change to the Constitution but highlight that any Board member, whether or not also an RNC member, can attend RNC and speak and contribute to the Committee's debate with the Chair's agreement albeit this would not be as a member of the Committee;
2. Allow the Humber sub-region (for the purposes of RNC) two representatives, one North and one South: in this scenario if there was ever a formal vote the northern representative could cast the votes currently attributable to Hull and East Riding combined, and the southern representative could cast the votes currently attributable to North Lincolnshire and North East Lincolnshire.

3.11 Board is asked to note that there will be a need to review the governance and working arrangements for the Rail North Committee in the long term as a consequence of the implementation of the rail reforms outlined in the Williams-Shapps Plan for Rail.

4. Corporate Considerations

Financial Implications

4.1 There are no additional financial implications for 2021/22 as a result of this report. The financial implications for 2022/23 will be captured as part of the budget process for that year.

Resource Implications

4.2 No additional resource implications other than those raised in previous reports.

Legal Implications

4.3 Legal Implications are included within the report.

Risk Management and Key Issues

4.4 There are no additional risks associated with the content of this report.

Environmental Implications

4.5 This report does not constitute or influence a plan or programme which sets the framework for future development consents of projects listed in the EIA Directive and therefore does stimulate the need for SEA or EIA.

Equality and Diversity

4.6 A full impact assessment has not been carried out as it is not required for this report

Consultations

4.7 No formal consultations are required.

5. Background Papers

5.1 There are no background papers.

6. Appendices

Appendix 1 – Nominees for General Purposes Committee

Appendix 2 – Current Appendix 12 of the Constitution

Appendix 3 – Revised Appendix 12 of the Constitution

Appendix 4 – Letter from Humber Leaders

Glossary of terms, abbreviations and acronyms used *(if applicable)*
TfN – Transport for the North *EIA – Environmental Impact Assessment* *SEA – Strategic Environmental Assessment*

General Purposes Committee

Regional Group	Member	Substitute Member
Greater Manchester	Mayor Andy Burnham	Cllr Andrew Western
West Yorkshire and the City of York	Cllr Susan Hinchcliffe	Mayor Tracy Brabin
South Yorkshire Mayoral Combined Authority	Mayor Dan Jarvis	To be confirmed
Liverpool City Region	Cllr Liam Robinson	To be confirmed
North East	Cllr Martin Gannon	Mayor Jamie Driscoll
Lakeland	Cllr Charles Edwards	To be confirmed
Tees Valley	To be confirmed	To be confirmed
North Yorkshire	Cllr Carl Les	To be confirmed
Humber	To be confirmed	To be confirmed
Cheshire	To be confirmed	To be confirmed

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Appendix 12

Code of Conduct for Non-Elected Co-opted Members



CABINET OFFICE

CODE OF CONDUCT FOR BOARD MEMBERS OF PUBLIC BODIES

JUNE 2011

FOREWORD

The Government expects all holders of public office to work to the highest personal and professional standards. In support of this, all non-executive board members of UK public bodies[1] must abide by the principles set out in this Code of Conduct. The Code sets out, clearly and openly, the standards expected from those who serve on the boards of UK public bodies and should form part of individual members' terms and conditions of appointment. Any breach of the Code should be viewed as a breach of those terms and conditions of appointment.

This *Code* replaces *Guidance on Codes of Practice for Board Members of Public Bodies* issued by the Cabinet Office in 2004.

Any questions on the *Code* should be directed to:

Propriety and Ethics Team
Cabinet Office
70 Whitehall
LONDON
SW1A 2AS

Tel: 020 7276 0269/0387

Copies of the *Code* can be downloaded from:

www.cabinetoffice.gov.uk/content/public-bodies-and-appointments

[1] The principles set out in this Code should apply to all non-executive members on the boards of Government Departments, non-Ministerial Departments, Executive Agencies, Executive and Advisory non-department public bodies (NDPBs) and national public corporations.

CODE OF CONDUCT FOR BOARD MEMBERS OF PUBLIC BODIES

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CODE OF CONDUCT FOR BOARD MEMBERS OF PUBLIC BODIES

1. INTRODUCTION

1.1 As a public office-holder, your behaviour and actions must be governed by the principles set out in this Code of Conduct. It is your responsibility to ensure that you are familiar with, and comply with, all the relevant provisions of the Code.

2. KEY PRINCIPLES OF PUBLIC LIFE

2.1 The key principles upon which this Code of Conduct is based are the Seven Principle of Public Life[2]. These are:

Selflessness

You should take decisions solely in terms of the public interest. You should not do so in order to gain financial or other material benefits for yourself, your family or your friends.

Integrity

You should not place yourself under any financial or other obligation to outside individuals or organisations that might, or might be perceived to, influence you in the performance of your official duties.

Objectivity

In carrying out public business, including awarding contracts and recommending individuals for rewards and benefits, you should make choices on merit.

Accountability

You are accountable for your decisions and actions to the public and must submit yourself to whatever scrutiny is appropriate for your office.

Openness

[2] *Standards in Public Life: First Report of the Committee on Standards in Public Life*. Volume 1: Report. CM 2850-I.

You should be as open as possible about the decisions and actions that you take. You should give reasons for your decisions and restrict information only when the wider public interest clearly demands.

Honesty

You have a duty to declare any private interests relating to your public duties and to take steps to resolve any conflicts arising in a way that protects the public interest.

Leadership

You should promote and support these principles by leadership and example.

2.2 These principles should inform your actions and decisions as a board member.

3. GENERAL CONDUCT

Use of Public Funds

3.1 You have a duty to ensure the safeguarding of public funds[3] and the proper custody of assets which have been publicly funded.

3.2 You must carry out your fiduciary obligations responsibly – that is, take appropriate measures to ensure that the body uses resources efficiently, economically and effectively, avoiding waste and extravagance. It will always be an improper use of public funds for public bodies to employ consultants or other companies to lobby Parliament, Government or political parties.

Allowances

3.3 You must comply with the rules set by the board and the public body regarding remuneration, allowances and expenses. It is your responsibility to ensure compliance with all relevant HM Revenue and Customs' requirements concerning payments, including expenses.

Gifts and Hospitality

3.4 You must not accept any gifts or hospitality which might, or might reasonably appear to, compromise your personal judgement or integrity or place you under an improper obligation.

[3] This should be taken to include all forms of receipts from fees, charges and other sources.

3.5 You must never canvass or seek gifts or hospitality.

3.6 You must comply with the rules set by the body on the acceptance of gifts and hospitality. You should inform the Chief Executive (or equivalent) of any offer of gifts or hospitality and ensure that, where a gift or hospitality is accepted, this is recorded in a public register in line with the rules set by the body.

3.7 You are responsible for your decisions on the acceptance of gifts or hospitality and for ensuring that any gifts or hospitality accepted can stand up to public scrutiny and do not bring the public body into disrepute.

Use of Official Resources

3.8 You must not misuse official resources[4] for personal gain or for political purposes. Use of such resources must be in line with the body's rules on their usage.

Use of Official Information

3.9 You must not misuse information gained in the course of your public service for personal gain or for political purpose.[5]

3.10 You must not disclose any information which is confidential in nature or which is provided in confidence without authority. This duty continues to apply after you have left the board.

Political Activity[6]

3.11 In your public role, you should be, and be seen to be, politically impartial. You should not occupy a paid party political post or hold a particularly sensitive or high-profile role in a political party. You should abstain from all controversial political activity and comply with Cabinet Office rules on attendance at Party Conferences[7].

3.12 On matters directly related to the work of the body, you should not make political statements or engage in any other political activity.

[4] This includes facilities, equipment, stationery, telephony and other services.

[5] Board members who misuse information gained by virtue of their position may be liable for breach of confidence under common law or may commit a criminal offence under insider dealing legislation

[6] If you are an MP, Member of the House of Lords, Member of a Devolved Administration or Local Councillor, you are exempt from these requirements - although you should still exercise proper discretion on matters directly related to the work of the body and recognise that certain political activities may be incompatible with your role as a board member.

[7] www.cabinetoffice.gov.uk/content/public-bodies-and-appointments

3.13 In your official capacity, you should be even-handed in all dealings with political parties.

3.14 Subject to the above, you may engage in political activity but should, at all times, remain conscious of your responsibilities as a board member and exercise proper discretion. You should inform the Chair and/or the parent Department before undertaking any significant political activity.

Employment and Appointments

3.15 If you wish to take up new employment or appointments during your term of office, you must inform the Chair and/or the relevant parent Department.

3.16 On leaving office, you must comply with the rules of the body on the acceptance of future employment or appointments.

4. MEMBERS' INTERESTS

4.1 You must ensure that no conflict arises, or could reasonably be perceived to arise, between your public duties and your private interests – financial or otherwise.

4.2 You must comply with the rules of the body on handling conflicts of interests. As a minimum, these will require you to declare publicly any private interests which may, or may be perceived to, conflict with your public duties[8]. The rules will also require you to remove yourself from the discussion or determination of matters in which you have a financial interest. In matters in which you have a non-financial interest, you should not participate in the discussion or determination of a matter where the interest might suggest a danger of bias.[9]

4.3 It is your responsibility to ensure that you are familiar with the body's rules on handling conflicts of interests, that you comply with these rules and that your entry in the body's register of members' interests is accurate and up to date.

5 RESPONSIBILTIES AS A BOARD MEMBER

[8] In general, all financial interests should be declared. When considering what non-financial interests should be declared, you should ask yourself whether a member of the public, acting reasonably, would consider that the interest in question might influence your words, actions or decisions.
[9] These are common law provisions.

5.1 You should play a full and active role in the work of the body. You should fulfil your duties and responsibilities responsibly and, at all times, act in good faith and in the best interests of the body.

5.2 You should deal with the public and their affairs fairly, efficiently, promptly, effectively and sensitively, to the best of your ability. You must not act in a way that unjustifiably favours or discriminates against particular individuals or interests.

5.3 You must comply with any statutory or administrative requirements relating to your post[10].

5.4 You should respect the principle of collective decision-making and corporate responsibility. This means that, once the board has made a decision, you should support that decision.

5.5 You must not use, or attempt to use, the opportunity of public service to promote your personal interests or those of any connected person, firm, business or other organisation.

6. RESPONSIBILITIES TOWARDS EMPLOYEES

6.1 You will treat any staff employed by the body with courtesy and respect. It is expected that employees will show you the same consideration in return.

6.2 You will not ask or encourage employees to act in any way which would conflict with their own Code of Conduct.

[10] In the case of a body incorporated under the Companies Act or the Companies (Northern Ireland) Order, you will also be subject to the duties of directors under company law. In the case of a body that has charitable status, you will also be subject to the duties of trustees under charities law.

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Cabinet Office

June 2019

Code of Conduct for Board Members of Public Bodies



Foreword

The Government expects all holders of public office to work to the highest personal and professional standards. In support of this, all non-executive board members of UK public bodies must abide by the principles set out in this Code of Conduct. The Code sets out, clearly and openly, the standards expected from those who serve on the boards of UK public bodies and should form part of individual members' terms and conditions of appointment. It also makes clear that harassing, bullying or other inappropriate or discriminatory behaviour is not consistent with what is expected of a board member of UK public bodies and will not be tolerated. Any breach of the Code should be viewed as a breach of the terms of appointment.

The principles set out in this code apply to all non-executive members on the boards of government departments, non-ministerial departments, executive agencies, non-departmental public bodies (NDPBs) and national public corporations.

The Code complements a public body's governing documents (legislation, memorandum and articles of association, royal charter) and any administrative documents (framework agreements, memoranda of understanding) which may set out the responsibilities and obligations of its board members. The Code's provisions must be observed alongside the provisions set out in these documents.

This Code replaces the Code of Conduct for Board Members of Public Bodies issued by the Cabinet Office in 2011. This Code can be found online at https://www.gov.uk/public-bodies-reform

In the first instance any propriety and ethics issues should be raised with the senior responsible official within your sponsoring department, or the Permanent Secretary as necessary. If additional advice is required, any questions should be directed to the Cabinet Office on: pbpropriety@cabinetoffice.gov.uk

1. Introduction

As a public office holder, your behaviour and actions must be governed by the principles set out in this Code of Conduct. It is your responsibility to ensure that you are familiar with, and comply with, all the relevant provisions of the Code.

2. Key principles of public life

2.1 The key principles upon which this Code of Conduct is based are the Seven Principles of Public Life.[1] These are:

Selflessness
Holders of public office should act solely in terms of the public interest.

Integrity
Holders of public office must avoid placing themselves under any obligation to people or organisations that might try inappropriately to influence them in their work. They should not act or take decisions in order to gain financial or other material benefits for themselves, their family, or their friends. They must declare and resolve any interests and relationships.

Objectivity
Holders of public office must act and take decisions impartially, fairly and on merit, using the best evidence and without discrimination or bias.

Accountability
Holders of public office are accountable to the public for their decisions and actions and must submit themselves to the scrutiny necessary to ensure this.

Openness
Holders of public office should act and take decisions in an open and transparent manner. Information should not be withheld from the public unless there are clear and lawful reasons for so doing.

Honesty
Holders of public office should be truthful.

Leadership
Holders of public office should exhibit these principles in their own behaviour. They should actively promote and robustly support the principles and be willing to challenge poor behaviour wherever it occurs.

2.2 These principles should inform your actions and decisions as a board member.

1 https://www.gov.uk/government/publications/the-7-principles-of-public-life

3. General Conduct

Use of Public Funds[2]

3.1 You have a duty to ensure the safeguarding of public funds[3] and the proper custody of assets which have been publicly funded.

3.2 You must carry out these obligations responsibly – that is, take appropriate measures to ensure that the body uses resources efficiently, economically and effectively, avoiding waste and extravagance. It will always be an improper use of public funds for public bodies to employ consultants or other companies to lobby Parliament, Government or political parties.

Allowances

3.3 You must comply with the rules set by the board and the public body regarding remuneration, allowances and expenses. It is your responsibility to ensure compliance with all relevant HM Revenue and Customs' requirements concerning payments, including expenses.

Gifts and Hospitality

3.4 You must not accept any gifts or hospitality which might, or might reasonably appear to, compromise your personal judgement or integrity or place you under an improper obligation.

3.5 You must never canvass or seek gifts or hospitality.

3.6 You must comply with the rules set by the body on the acceptance of gifts and hospitality. You should inform the Chief Executive (or equivalent) of any offer of gifts or hospitality and ensure that, where a gift or hospitality is accepted, this is recorded in a public register in line with the rules set by the body.

3.7 You are responsible for your decisions on the acceptance of gifts or hospitality and for ensuring that any gifts or hospitality accepted can stand up to public scrutiny and do not bring your public office and the public body into disrepute.

Use of Official Resources

3.8 You must not misuse official resources[4] for personal gain or for political purposes. Deployment of such resources must be in line with the body's rules on their usage.

Use of Official Information

3.9 You must not misuse information gained in the course of your public service for personal gain or for political purpose.[5]

3.10 You must not disclose any information which is confidential in nature or which is provided in confidence without authority. This duty continues to apply after you have left the board.

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2 For more guidance on how to handle public funds, please refer to Managing Public Money https://www.gov.uk/government/publications/managing-public-money

3 This should be taken to include all forms of receipts from fees, charges and other sources.

4 This includes facilities, equipment, stationery, telephony and other services.

5 Board members who misuse information gained by virtue of their position may be liable for breach of confidence under common law or may commit a criminal offence under insider dealing legislation

Political Activity

3.11 In your public role, you should be, and be seen to be, politically impartial. You should not occupy a paid party political post or hold a particularly sensitive or high-profile role in a political party. You should abstain from all controversial political activity and comply with the principles set out in Cabinet Office rules on attendance at party conferences[6] and on conduct during the period prior to elections and referendums, whether local or national.[7]

3.12 On matters directly related to the work of the body, you should not make political statements or engage in any other political activity.

3.13 You should inform the Chair, Chief Executive and/or the parent/sponsor department before undertaking any significant political activity. Subject to the above, you may engage in political activity but should, at all times, remain conscious of your responsibilities as a board member and exercise proper discretion.

3.14 If you are an MP, [MEP[8]], member of the House of Lords, member of a devolved legislature, directly elected mayor, local councillor or police and crime commissioner, you are exempt from these requirements. There is no bar on such representatives taking a political party whip relating to their political role. You must exercise proper discretion on matters directly related to the work of the body and recognise that certain political activities may be incompatible with your role as a board member. You should not allow yourself to become embroiled in matters of political controversy.

3.15 In your official capacity, you should be even-handed in all dealings with political parties.

Employment and Appointments

3.16 If you wish to take up additional employment or appointments during your term of office, you must inform the Chair and/or the relevant parent department in advance, and allow them the opportunity to comment. Care should be taken if you accept additional public appointments to ensure that you are not being paid twice from the public purse for the same time.

3.17 On leaving office, you must comply with the rules of the body on the acceptance of future employment or appointments. Each body should have its own rules on this.

4. Conflicts of Interests

4.1 When accepting an appointment to the public body you should consider if any conflicts of interest arise from your private interests or by virtue of any other roles you hold. You should consider, with advice from the appointing department how these should best be managed, and agree these with the organisation.

4.2 You must ensure that no conflict arises, or could reasonably be perceived to arise, between your public duties and your private interests, financial or otherwise.

6 www.gov.uk/government/publications/civil-servants-and-party-conferences-guidance

7 www.gov.uk/government/publications/election-guidance-for-civil-servants

8 For the period which the UK remains a member of the European Union.

4.3 You must comply with the rules of the body on handling conflicts of interests. As a minimum, these will require you to declare publicly, usually in the body's register of interests, any private financial or non-financial interests of your own, or of close family members, which may, or may be perceived to, conflict with your public duties.[9] The rules will also require you to remove yourself from the discussion or determination of matters in which you have a financial interest. In matters in which you have a non-financial interest, you should not participate in the discussion or determination of a matter where the interest might suggest a danger of bias.[10]

4.4 It is your responsibility to ensure that you are familiar with the body's rules on handling conflicts of interests, that you comply with these rules and that your entry in the body's public register of members' interests is accurate and up-to-date.

5. Responsibilities as a board member, including non-executive chairs

5.1 You should play a full and active role in the work of the body. You should fulfil your duties and responsibilities responsibly and, at all times, act in good faith and in the best interests of the body.

5.2 You should promote an inclusive and diverse culture in the body and your actions should help create an environment where different perspectives and backgrounds are encouraged and valued.

5.3 You should deal with the public and their affairs fairly, efficiently, promptly, effectively and sensitively, to the best of your ability. You must not act in a way that unjustifiably favours or discriminates against particular individuals or interests.

5.4 You must not harass, bully or act inappropriately towards or discriminate towards others. Such behaviour is not consistent with what is expected of you as a board member and will not be tolerated.

5.5 You must comply with any statutory or administrative requirements relating to your post.[11]

5.6 You should respect the principle of collective decision-making and corporate responsibility. This means that, once the board has made a decision, you should support that decision.[12]

5.7 You must not use, or attempt to use, the opportunity of public service to promote your personal interests or those of any connected person, firm, business or other organisation.

5.8 You must inform the sponsor department of the body of any bankruptcy, current police investigation, unspent criminal conviction or disqualification as a company director in advance of appointment, or should any such instances occur during your appointment.

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9 In general, all financial interests should be declared. When considering what non-financial interests should be declared, you should ask yourself whether a member of the public, acting reasonably, would consider that the interest in question might influence your words, actions or decisions.

10 These are common law provisions.

11 In the case of a body incorporated under the Companies Act https://www.legislation.gov.uk/ukpga/2006/46/contents or the Companies (Northern Ireland) Order http://www.legislation.gov.uk/nisi/1986/1032, you will also be subject to the duties of directors under company law. In the case of a body that has charitable status, you will also be subject to the duties of trustees under charities law.

12 This does not apply to departmental non-executive board members, whose role is to advise and challenge the board and department.

5.9 You must also inform the sponsor department of the body of any change in your circumstances which results in you becoming bankrupt, subject to a police investigation, convicted of a criminal offence or disqualified from being a company director.

5.10 You have additional responsibilities as the chair of the body in leading the board/body and in ensuring that the principles covered in the Codes of Conduct for Board Members and Staff (where applicable) are upheld.

6. Responsibilities towards employees

6.1 You will treat any staff employed by the body with courtesy and respect. It is expected that employees will show you the same consideration in return.

6.2 You will not ask or encourage employees to act in any way which would conflict with their own Code of Conduct.

7. Social media

7.1 Social media is a public forum and the same considerations, including the provisions of this Code, apply as would to speaking in public or writing something for publication, either officially or in a personal capacity. When engaging with social media you should at all times respect confidentiality, financial, legal and personal information.

7.2 Where any personal social media accounts used by you make reference or link to your public role, you should take care to ensure that it is clear in what capacity you are acting.

8. Raising concerns

8.1 You should ensure that the body has an open, transparent and safe working environment where employees feel able to speak up and raise concerns, and complaints procedures are clearly communicated to them.

8.2 If you have a concern about a possible breach of this Code, a concern that you or any staff of the body are being asked to act in contravention of their own code of conduct, or a concern about misconduct or wrongdoing in any other areas, then you have a responsibility to raise that internally with the chair of the body or the Permanent Secretary of the sponsor department as appropriate.

COUNCILLOR DAREN HALE
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Sent via Email

Ms J Openshaw
Head of Legal and Monitoring Officer
Transport for the North

Our Ref: DH/SAD

1 November 2021

Dear Julie

Rail North Committee

I refer to your email dated 20th October in response to the concerns raised by Cllr Hale at the most recent Transport for the North Board meeting.

The north and south banks of the Humber are no longer considered a single entity; the Humber LEP no longer exists and there are no formal joint working arrangements in place between the Local Authorities which would support joint representation on the RNC.

The Unitary Leaders of the four Local Authorities have met and are in agreement that due to the different geographies, differing populations and being served by two parts of the rail network with minimal interaction or overlap that separate representation for the north and south bank of the Humber is required. We fully appreciate this may require a different voting balance with split responsibilities, but we feel as the issue is about both Regions, having a seat at the Rail North table this would not be an issue.

Cont'd …/…

Transport for the North must stay reactive to politically, geographical and community changes and we welcome further discussion with you on this basis.

Yours sincerely,



Cllr Daren Hale
Leader, Hull City Council



Cllr Philip Jackson
Leader, North East Lincolnshire Council



Cllr Rob Waltham MBE
Leader, North Lincolnshire Council



Cllr Jonathan Owen
Leader, East Riding of Yorkshire Council

c.c. Martin Tugwell, Chief Executive