

## Submission to the consultation on TfN's Decarbonisation Strategy

August 2021

1. This is a submission from the High Speed Rail Group (HSRG) to the consultation on Transport for the North's (TfN) Decarbonisation Strategy. The submission highlights the role of high speed rail and HS2 in decarbonising the transport system including across the TfN area and how HS2 should be harnessed to achieve modal shift – in order to deliver the many benefits it brings including a new railway spine that hugely improves the rail network, enables modal shift from aviation and road to rail and freight to rail, decarbonisation of the transport network, reshaping the economic geography of the country, supporting the government's growth and levelling up, and freeing up capacity on the existing rail network.

### About HSRG

2. HSRG is committed to supporting the successful delivery of a world-class high speed rail network in Britain. Our members help deliver major infrastructure projects in the UK, and globally, including creating entirely new high speed networks and improving the UK's existing rail network. This gives us a unique insight into both the shortcomings of the current network and the transformative capacity, connectivity and economic, resilience and environmental benefits that high speed rail brings.
3. HSRG supports a national high speed rail network including the delivery of HS2, high speed rail's integration with the existing rail network, investment to maximise the released capacity benefits that HS2 brings on and off route, and other rail schemes such as Midlands Engine Rail and Northern Powerhouse Rail (NPR). We have previously engaged with TfN, and representatives have spoken at HSRG conferences and events. Details on membership can be found [here](#).

### Summary

4. HSRG has published several reports which feature transport decarbonisation, modal shift and the role of rail and high speed rail including:
  - [HS2 – Towards a Zero Carbon Future](#) (Nov 2019)
  - [High Speed Rail and Scotland](#) (June 2020)
  - [Decarbonising Transport: Setting the Challenge](#) (Aug 2020)
  - [Building Back Better: The green case for rail investment after the pandemic](#) (Sep 2020)
  - [High Speed Rail and Nature Networks](#) (Jan 2021) and [summary](#)
  - [Union Connectivity Review](#) (Jan 2021)
  - [International High Speed Rail Voices](#) (Mar 2021)
5. This submission draws together elements of these reports and their application in relation to TfN's Decarbonisation Strategy. The submission outlines:
  - That as an electrified railway, HS2 will be one of the greenest ways to travel and help transform journeys across the North and to from the North.
  - As a new high speed rail spine, HS2 can play an important role in modal choice and shift from cars, aviation and HGVs to rail.
  - HS2 frees up capacity on the existing rail network and enables other rail schemes such as NPR, enhancing the opportunities for rail. The Eastern Leg of HS2 is being reviewed as part of the IRP and we await the outcome of this. We support the delivery of the Eastern Leg to

bring the full benefits of HS2 including transport decarbonisation in the east of the county and this part of TfN's area.

- Although the pandemic has led to a fall in rail travel, experience from past pandemics shows that travel bounces back. Rail use has been doubled over the past two decades. Rail will have a key role in helping to reduce transport emissions and meet the UK's emission targets.
- Leisure travel - and longer distance leisure travel - is an ever increasing part of transport mileage and rail, and high speed rail, has an important role in addressing this need and making this segment of travel the greenest it can be.
- Previously the DfT and HS2 Ltd have been cautious on the impacts of HS2 on modal choice and the role of the railways in achieving modal shift - it is not part of the HS2's strategic case for example. However, evidence from around the world indicates that HS2 will achieve significant modal shift; and other countries are explicitly promoting and using high speed rail as part of their decarbonisation plans.
- Government policy is now starting to reflect the role of rail such as in the Rail Environment Policy Statement On Track for a Cleaner, Greener Railway which accompanied the Transport Decarbonisation Plan.
- TfN's Decarbonisation Strategy commits to modal shift as one of its eight goals. However, while TfN is supportive of HS2, the role the scheme can play is not as fully reflected within the Decarbonisation Strategy as it could be. With TfN highlighting it is the first region to set out its transport decarbonisation path in such a strategy, there is the opportunity for TfN to show how high speed rail can be harnessed in the region.
- For the new high speed rail network to maximise modal shift and bring the greatest decarbonisation gains, the railway needs to be fully integrated with the existing transport system including final mile and active travel. Similarly, HS2 stations could be transformative green travel hubs. High speed rail also allows a greener path for land use with for example intensification of housing around stations.
- Stronger assessments of the whole life cost of transport modes (reflecting the amount of carbon used in making cars and requisite infrastructure such as roads) could help with determining the optimum decarbonisation path as well as assisting with modal shift and customer choice.
- While embedded carbon in the construction is outside of the Decarbonisation Strategy, HSRG members have outperformed the stretch targets set by HS2 Ltd in delivering HS2. These innovations have application for TfN's programme.

### ***Detailed response***

#### **Rail and a zero carbon trajectory**

6. As the Decarbonisation Strategy notes, surface transport is now the biggest single contributor of greenhouse gas emissions in the UK economy, laying out 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.'*

7. HSRG supports this direction and sustainability is central to our work. Our members are at the forefront of designing and delivering future infrastructure to meet the net zero goals of the country and regions, are signing up to science-based targets and embedding net zero in their operations.
8. As the Government's Rail Environment Policy Statement On Track for a Cleaner, Greener Railway outlines: *'Rail is lower carbon than other long-distance transport and becoming even less carbon intensive as the National Grid decarbonises. In 2019, greenhouse gas emissions from rail made up just 1.4% of the UK's domestic transport emissions, while 9% of passenger miles travelled in Great Britain were by rail. On average, rail freight trains emit around a quarter of the CO2 equivalent (CO2e) emissions of HGVs, per tonne mile travelled. In 2019/20, carbon emissions per passenger kilometre were at their lowest level since comparable data began in 2011/12.'*<sup>1</sup>
9. TfN's consultation highlighted that: *'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.'*
10. HS2, as a new transport spine for Britain able to operate on zero carbon electricity, will be transformative both for longer journeys as well as unlocking capacity on the existing network to reducing these emissions outlined above. Only HS2 combined with schemes like NPR, can deliver the capacity and journey times savings to shift many more people and freight out of cars, HGVs and planes by the 2030s, without causing a decade of disruption to existing train services.

### Accelerating modal shift

11. While demand for travel has fallen during the pandemic, as Lord Stern, who led the landmark review into climate noted, the *'longer-term story is one where public transport will be extremely important'*.<sup>2</sup> This is highlighted in HSRG's report [Building Back Better: The green case for rail investment after the pandemic](#) which shows after previous pandemics travel picked up again. Rail travel has actually doubled in two decades. In the future increased demand for sustainable travel will likely attract more passengers to low carbon modes like rail.
12. Longer distance travel, often for leisure, contribute the most to transport sector carbon emissions. Tackling them must be a priority. HS2 will be transformative for these longer journeys and unlock the full potential of existing railways. Up to now, HS2's decarbonisation potential has been underplayed by national forecasts which suggest a decrease in rail growth and demand on HS2 capped shortly after it opens. These assumptions do not sit with achieving net zero, HS2's role in modal shift and the experience of uplifts in passenger growth from new railways.<sup>3</sup> The benefits of freed up capacity on the existing network for freight and local passenger services have also still not been fully modelled.
13. As an electrified railway and being designed from the start to reduce carbon, HS2 has an important role in transport decarbonisation within TfN's area and should be reflected much more strongly within TfN's Strategy and role in modal shift.

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<sup>1</sup>[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1002166/rail-environment-policy-statement.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1002166/rail-environment-policy-statement.pdf)

<sup>2</sup><https://www.bloomberg.com/news/articles/2020-06-09/lawmakers-must-resist-urge-to-regress-toward-fossil-fuels>

<sup>3</sup> <https://www.gov.uk/government/publications/hs2-phase-one-full-business-case>

14. TfN presents four different future travel scenarios for its area which shape the decarbonisation pathway. While rail growth demand is estimated to be higher in all four scenarios and is the highest increase in demand registered for each of the transport modes, high speed rail and its integration with existing rail and upgrades through NPR and associated schemes can play a much bigger role than suggested.
15. Through our reports our independent environmental consultant highlighted the importance of not just looking at trip numbers which can overplay daily travel and commuting as opposed to longer distance and leisure travel, which tend to be more irregular (and see the diagram below). Our reports have highlighted research that shows that while most UK journeys made are short, with about 83% being under 10 miles most travel measured by person-km is medium/long distance (63% over 10 miles), which is beyond the range of walking, and for most people cycling and is slow by bus. This proportion may increase further if more people work regularly from home. Longer journeys are responsible for most carbon emissions, so reducing them needs to be an explicit priority. Rail already has a high modal share for longer journeys, but its share could improve much further with a national high speed rail network and wider upgrades such as electrification. Making rail an even more attractive option will require segmenting user needs to address them better. 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.
16. A high speed network can significantly increase the number of trips being taken for leisure. HS1, the UK's only existing operational high speed line, shows that that over 15,000 leisure trips were carried on the line daily compared to 4,000 business trips. Between 2010 and 2016, leisure journeys to Kent via HS1 increased almost nine-fold, with almost of third of Kent visitors citing the line as having influenced their decision to choose the county.<sup>4</sup> HS2 could be similarly harnessed within TfN's area.
17. The largest segment of journeys, those 10-25 miles long, are a quarter of transport's carbon emissions. HS2 frees up existing railways, enabling the network to better cater for shorter journeys, and through catalysing wider sustainable travel upgrades. For instance, the proposed East Midlands Hub at Toton includes transformative upgrades to public transport and the creation of safe and appealing walking and cycling connections, linking it to surrounding towns and villages.<sup>5</sup> The goal should be enabling shorter distance travel for example by e-bikes and longer distance by rail (and high speed rail). Building on its scenarios, TfN should segment the possibilities for behaviour change over different journey purposes, timescales as well as different types of behaviour change, and from a carbon perspective, modal shift, destination shift and service shift.

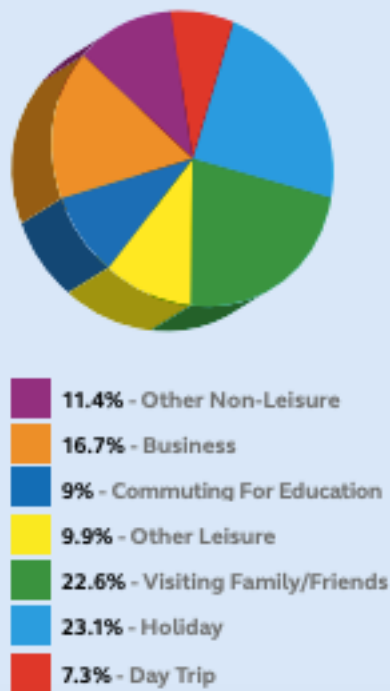
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<sup>4</sup><https://highspeed1.co.uk/media/vemxmot/delivering-for-britain-and-beyond-the-economic-impact-of-hs1-march-2020.pdf>

<sup>5</sup> <https://www.midlandsconnect.uk/media/1706/final-access-to-toton-report.pdf>

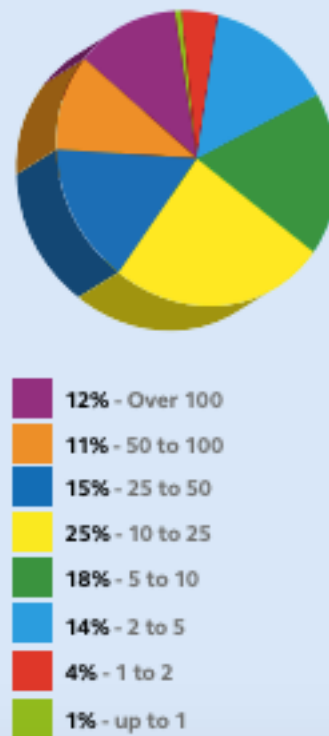
**Leisure and visiting friends and family is responsible for over half of long-distance journeys**

**Note:** Mileage share: by purpose (domestic journeys over 50 miles). **Source:** Analysis of National Travel Survey data (2015-2017) by ITS, University of Leeds.



**Almost half of surface transport emissions come from trips over 15 miles, whilst nearly a quarter of emissions from 50+ mile trips**

**Note:** Mileage share: by journey distance. **Source:** Carbon Pathways Analysis. Informing Development of Carbon Reduction Strategy for the Transport Sector (Department for Transport, 2008).



18. It is important not to oversimplify trends, not least those from Covid. Rail commuting may be reduced due to an increase in home working (service shift) while space may be reallocated in cities to active travel (modal shift). In the medium term more people may move further from their offices, commuting further (destination shift). By contrast, service shift is less relevant for leisure travel - video conferencing can be used to keep in touch with family and friends but is not the same as face-to-face contact.<sup>6</sup> The combination of increasing environmental taxation, awareness and upgraded rail services in the UK and abroad is likely to lead to destination shift for holidays, including more Europeans travelling to different parts of the UK by rail including the North.

19. There are further corollaries too for decarbonisation associated with modal shift. By encouraging longer journeys to shift to rail, the average car would not need such a large battery, needing a capacity that would be barely used for daily travel. By contrast battery trains on branch lines can make more efficient use of resources as their energy needs can be optimised based on their timetable. Prioritising modal shift creates a virtuous circle, by supporting the case for more train paths for freight as well as passengers which strengthens the case for rail electrification. In turn electrification can enable better services with lower operating costs. So, it is important not to

<sup>6</sup> <https://www.sciencedirect.com/science/article/pii/S2214367X2030171X>

assume current service patterns will continue on the rail network, which could preclude the case for upgrades.

20. Electrification too is not just about vehicles, but also e-bikes and new modes such as e-scooters to cater for a wider range of journeys in conjunction with public transport. This requires integration of policy, procurement and funding, such as purchase incentives and infrastructure design. The procurement specification for HS2 trains already includes a requirement for on train cycle storage to allow charging of e-bikes.<sup>7</sup>

### Stations and hubs

21. In the Netherlands, the cycling modal share at the home-end of trips to railway stations increased from 36% in 2005 to 43% in 2016, with bike-rail travellers preferring larger stations with intercity services to suburban ones. At the activity-end, cycling modal share has risen from 10% to 14%, with shared bikes becoming more popular.<sup>8</sup> Recent research concluded that *'once a traveller can rely on the bicycle and train for longer distance trips, the bicycle arguably becomes a more suitable mode for local trips.'* E-bikes offer more potential for modal shift, whether replacing a car trip or in conjunction with rail.<sup>9</sup> Opportunities should be taken to use the transformative potential of HS2 stations to encourage further provision of high quality cycleways, cycle hire, and e-bike schemes integrated into the station and the surrounding areas. New modelling would support this.

### Freight

22. Transporting freight by rail reduces carbon emissions by 76% compared to road haulage. In 2017, HGVs were responsible for 17% of all road transport carbon emissions while making up just 5% of vehicle miles. This is likely to have significantly increased through the pandemic. By moving high speed trains onto a new, dedicated intercity line, HS2 will free up space on the existing rail network to carry more goods via freight trains. According to the Rail Delivery Group, every freight train could take up to 76 lorries off the road.
23. With freight miles (in vehicles over 3.5t) making up just 5% of mileage on the UK road network but 17% of carbon emissions tackling these emissions will be crucial. TfN rightly highlights freight in the Decarbonisation Strategy. In 2018 only 9% of UK freight tonnage by distance was moved by rail. Other European countries have higher rates such as Italy at 14%, Germany 18% and Switzerland 35%.
24. HSRG has said that the Government should set modal shift targets for freight. It could mean working with TfN to agree these for the TfN area and how this takes shape across the North. We think that this should start with the Government committing to double rail freight mileage when HS2 opens in 2030. Further increases and benefits can be achieved as the HS2 network is delivered. This should be reflected with TfN's Decarbonisation Strategy.
25. Rail and high speed rail can also help by bringing freight into city stations, particularly outside peaks. The Government should put in place the right price signals (which could be supported or amplified regionally) to encourage the private sector, whether carriers or users, to invest in rail freight. Charging road freight vehicles to take account of their impacts on the network and wider

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<sup>7</sup> <https://www.gov.uk/government/publications/hs2-rolling-stock-procurement>

<sup>8</sup> <https://link.springer.com/article/10.1007/s11116-019-10061-3>

<sup>9</sup> <https://www.creds.ac.uk/publications/e-bike-carbon-savings-how-much-and-where/>

environment would provide a revenue stream for urban consolidation centres as well as rail freight enhancements, which could happen through the modernisation of the HGV Road User Charge which the Government has consulted on.<sup>10</sup>

26. The carbon impact of air freight is rarely considered explicitly despite amounting to about a fifth of aviation emissions. Some studies suggest to achieve net zero, air freight should be eliminated for all but the most essential items.<sup>11</sup> Other countries such as China now are introducing dedicated high speed freight trains. Though HS2, unlike HS1, is not designed for conventional rail freight, it could carry high value freight on dedicated high speed trains or in flexible compartments. Clearer long-term policy and medium-term incentives would encourage this market which TfN should consider.

### Anglo-Scottish links

27. Providing a high capacity, higher speed and resilient rail connection between England and Scotland to open in the early 2030s would reduce the busiest domestic aviation routes and encourage long distance freight to rail.<sup>12</sup>
28. As the [High-Speed Rail and Scotland](#) report shows, through a series of investments and interventions in Scotland and the north of England, it is possible to enhance connectivity between the two nations by cutting travel time between London and Scotland to just over three hours. This does not require the huge cost of building high speed rail infrastructure all the way from Scotland to Crewe. A smarter, more targeted, and more affordable approach can be delivered the works more quickly. HSRG has recommended that the Government commits to funding development work to take to the next stage appraising the deliverability of the options developed by DfT, Network Rail, HS2 Ltd and Transport Scotland, identifying any impediments to progressing investment as a matter of high national priority, and setting out an appropriate vehicle and governance structure for taking forward on an accelerated timescale. It could match the HS2 Phase 1/2a delivery timescale. Later delivery would reduce the carbon reduction contribution.
29. Extending high speed services to Scotland and improved Anglo-Scottish connectivity will make a significant contribution to joining economies in the North with Scotland giving an economic boost to the north of England and Scotland and help meet the Scottish Government's 2045 net zero target, UK Government's 2050 target and those in the TfN Decarbonisation Strategy. It would save 45,000 tonnes of CO<sub>2</sub> per year from taking HGV freight off the road, and driving the modal shift needed to move passengers from aviation to green and electric rail. In terms of demand, between 2006 and 2016 Office of Rail and Road figures show all cross border passengers increasing by 61%. Since 2007, rail passenger travel levels between Manchester and Scotland were up 191%. High speed links cater for this increasing demand and will reduce the demand for long distance cross-border car travel, a substantial quantity of further avoidable carbon emissions.

### Place-based solutions

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<sup>10</sup> <https://www.gov.uk/government/consultations/reforming-the-heavy-goods-vehicle-road-user-levy>

<sup>11</sup> <https://www.cat.org.uk/info-resources/zero-carbon-britain/research-reports/zero-carbon-britain-rising-to-the-climate-emergency/>

<sup>12</sup> <https://www.rail-leaders.com/wp-content/uploads/High-Speed-Rail-and-Scotland.pdf>

30. HSRG supports transformative investment to level up regions with the lowest rates of sustainable travel. Providing certainty for such investments is necessary to align land use plans with transport and through this unlock wider changes to deliver more sustainable transport and development such as master planning by local authorities to unlock denser development and transformative public transport and active travel routes.
31. A core planning principle of the original 2012 version of the National Planning Policy Framework (NPPF) required authorities to *'actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are or can be made sustainable.'* The current version is weaker, simply suggesting that *'opportunities to promote walking, cycling and public transport use are identified and pursued' and that 'appropriate opportunities to promote sustainable transport modes can be - or have been – taken up.'* There is no mention in the transport section of climate or carbon, nor any explicit linkage between that section and that on climate change. By missing opportunities to design in fullest possible levels of sustainable travel, including for freight, the current NPPF risks undermining the strategic principle of modal shift.
32. TfN working with local authorities and combined authorities in its area should look to use the planning system and policy to achieve the fullest possible shift to public transport (including rail), walking and cycling.
33. Longer-distance travel by its very nature connects different places. Without some minimal level of alignment and standards of service between places, such as the public transport offer and integration of new modes, opportunities to tackle carbon from longer journeys will be missed. This may have further impacts, for example failing to enable seamless journeys from the biggest cities into the countryside could hinder city dwellers giving up car ownership and releasing more urban space for walking and cycling.
34. The DfT is proposing a Future of Mobility: Rural Strategy to complement its Urban Strategy, risking a gap for longer distance journeys, whether interurban or between urban and rural. A longer distance or national Future of Mobility strategy should address travel between places. TfN can reflect this within its Decarbonisation Strategy. While TfN is mainly concerned with travel within its area there is also travel from, to and through its area which is likely to be longer distanced travel, for example between Scotland and TfN's area or to the Midlands and London.
35. As the Integrated Rail Plan for the North develops, a second longer distance Future Mobility Zone could be considered across the Pennines, aiming to shift longer-distance and irregular non-daily travel by focusing on a minimum level of integration between city transport systems. App coverage does not simply stop at city boundaries and integration of modes at station hubs.

### **Wider carbon issues**

36. Enabling transport users to understand the full carbon impacts of their choices will encourage some change in behaviour. Although the DfT is promoting open data through its Future of Mobility workstream, this is focused on transport data (such as routes and speed limits) rather than environmental impacts of transport data, such as carbon. Comparing transport modes from 'well to wheel' is difficult as it depends on varied factors such as the power source and emissions from vehicle manufacture and maintenance are making up a growing proportion of the life cycle emissions compared to use. Comparative information about different lifetime emissions of different modes requires assumptions about lifespan - a train may last 30 years, a new hybrid car



only ten - and the degree of occupancy or sharing. A major advantage of HS2 is its scaling of proven technology, enabling greater certainty about its emissions.<sup>13</sup> Besides making efficient use of energy, rail, in particular high speed rail with ballastless track and high occupancy of carriages, makes efficient use of resources.

37. Providing consumers with information about the carbon cost of products would help spur more efficient logistics and a shift towards rail freight. This could involve customers obtaining data from delivery as well as transport providers on emissions for which they are personally responsible. There is an opportunity for TfN to develop leadership in this area as part of its Decarbonisation Strategy.
38. Achieving net zero will require very substantial changes in how we use our land. Various modes of transport investment result in a change to land use and corollary degrees of carbon impacts. In turn, how transport unlocks land use should be considered, and given a goal of transport investment is supporting housing. Higher density developments located near public transport services generate fewer emissions.
39. A corollary is looking at mobility choices through an adaptation lens. Cars, whether conventional, electric or autonomous require more hard space, making it harder to manage runoff with heavier rainfall or create places that are permeable for nature.
40. Although the Decarbonisation Strategy is not focused on emissions through construction, 16% of UK emissions are associated with construction, operation and maintenance of economic infrastructure.<sup>14</sup> HS2 has stretch targets to reduce its carbon footprint of main works for Phase 1 by 50%. HSRG members have outperformed on these, which provides lessons for future infrastructure projects including TfN's plans.

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<sup>13</sup><https://www.gov.uk/government/publications/research-and-innovation-to-support-transport-decarbonisation-2019/position-statement-on-transport-research-and-innovation-requirements-to-support-the-decarbonisation-of-transport>

<sup>14</sup> <https://www.ukgbc.org/wp-content/uploads/2017/09/Delivering-Low-Carbon-Infrastructure.pdf>