

Decarbonisation and electrification of freight

According to the latest DfT Transport Statistics Great Britain 2020¹, GHG emissions resulting from freight movement, which include HGVs, vans and domestic shipping account for 37% of total domestic transport emissions. Van movements have seen a particular intensification, with a doubling of van traffic since 1990 increasing van emissions by 67% comparing to 1990s levels.

With GHG emissions related to congestion as well as vehicle traffic, areas which are already constrained or showing signs of congestion, such as those identified in the Enhanced Freight and Logistics Analysis Report, including the M62, M6 and A1(M) will produce increased emissions of GHG unless interventions are undertaken.

Decarbonisation targets

In July 2018 the DfT published The Road to Zero² strategy setting out a commitment to end the sale of new conventional petrol and diesel cars and vans by 2040 and laying out steps to decarbonise road transport including freight with the aim of achieving almost every van and car to be zero emission.

In June 2019 the UK Government made the legally binding commitment to achieve net zero greenhouse gas (GHG) emissions by 2050 and in April 2021 stated their intention to align with the Climate Change Committee's sixth carbon budget, including a 78% reduction in whole economy emissions by 2035. In 2020, DfT has brought the date to end the sale of petrol and diesel cars and vans forward to 2030, or earlier if a faster transition appears feasible.

As a starting point to developing the policy that will form the Transport Decarbonisation Plan, DfT has published in 2020 the 'Decarbonising transport: setting the challenge'³ which set the direction of travel, at a high level, in terms of the focus of policies and priority areas likely to be included in the governments Transport Decarbonisation Strategy.

¹ Transport Statistics Great Britain: 2020 summary, Department for Transport (DfT), published on 17 December 2020

² The Road to Zero, Department for Transport (DfT), July 2018, ([The Road to Zero \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk))

³ Decarbonising transport: setting the challenge, Department for Transport (DfT), March 2020, ([Decarbonising Transport: Setting the Challenge \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk))

Within its Strategic Transport Plan (STP), TfN committed to the development of a Northern Decarbonisation Pathway to 2050, to support meeting the national net zero pathway. TfN's response to DfT's 'Decarbonising transport: setting the challenge' was one of the first steps that TfN undertook to support developing the coordinated National Transport decarbonisation Plan. In this response TfN identified key messages and recommendations to be considered by the government:

- The need for a quantified national pathway to net zero for transport by 2050, and a clear functional policy framework.
- The need for certainty on the role of national and local government, as well as STBs and the private sector.
- The need for a clear decision on road user charging for all roads.
- The need to develop an inclusive decarbonised transport solution for those living in dispersed communities.
- That government should utilise the evidence base being prepared by TfN and other STBs.
- That the North is awarded an equitable share of any funding for the trialling and development of emerging technologies.

Following this first examination of the decarbonisation challenges, TfN has developed the TfN's Decarbonisation Strategy, which sets TfN's decarbonisation trajectory, estimates the future baseline emissions under each Future Travel Scenario⁴ and explores the likely level of policy commitment required to bridge the gap between the forecast emissions under the Future Travel Scenarios and the required emissions under the Decarbonisation Trajectory (known as Policy Gap). The result of this analysis forms TfN's Decarbonisation Pathways and provides the focus for related policy recommendations and TfN's priority decarbonisation actions to 2025. The summary table of these actions for freight is included at the end of this chapter.

Decarbonisation challenges

The NIC report⁵ emphasises the importance of regulatory certainty and consistency in driving positive innovative changes in the freight and logistics sector. A regulatory framework that sets out policies that consider and encourage technological advancements is fundamental to achieving the net-zero pathway. 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.

⁴ Further detail on what the future travel scenarios consist presented in Chapter 5, section 'Future scenarios and uncertainty'

⁵ Future of Freight – Interim Report, National Infrastructure Commission (NIC), December 2018

While the technology for zero emissions cars is well advanced, there is more uncertainty about the optimal technology for zero emissions HGVs. This provides a significant challenge for meeting sales targets for zero emissions HGVs that TfN has set out for the next 25 years, presented in the table below.

Table 1: TfN’s Decarbonisation Strategy pathway

| | | 2025 | 2030 | 2035 | 2040 | 2045 |
|-----------------------------|---------------------------|------|------|------|------|------|
| ZEV share of sales | Cars | 55% | 100% | 100% | 100% | 100% |
| | Vans | 40% | 100% | 100% | 100% | 100% |
| | HGVs | 26% | 44% | 72% | 100% | 100% |
| Rail decarbonisation | Co2 reduction on baseline | 0% | 25% | 75% | 100% | 100% |

Hydrogen powered delivery vehicles which emit no tailpipe GHG nor any other harmful exhaust gases, are likely to have a crucial role in achieving the carbon targets. However, there are several barriers and challenges, ranging from providing adequate refuelling infrastructure to funding support, production technology and cost. Technology trial projects would provide essential evidence for the feasibility of different HGV technologies. With the support of robust strategies that promote the adoption of alternative fuelled freight vehicles (decarbonisation strategies, funding, aligned strategic transport plans) and by gathering evidence through demonstrators there is an opportunity to raise the confidence of HGVs fleet owners and leverage regional partnerships in the North to purchase zero emission HGVs in bulk.

Within the North, many Local Authorities have already taken action to drive the change towards alternative fuel with EV Charging initiatives to reduce carbon emissions; however most of the initiatives are focused on private vehicle users since there is still a lot of uncertainty about the optimal technology for zero emission HGVs.

A priority activity identified within TfN’s Decarbonisation Strategy is to undertake or facilitate a pan-northern hydrogen transport refuelling strategy, to provide a ‘look-ahead’ of what an effective hydrogen refuelling network for the north could look like, servicing both HGVs and rail. Taking into account factors related to the supply and transport of hydrogen, as well as the spatial requirements of refuelling facilities, the study would provide an important part of the evidence base upon which both policy makers and freight operators can begin to make future investment decisions.

Although freight operators are already strongly incentivised towards efficiency, some opportunities for improvement, particularly in relation to

reducing vehicle mileage and increasing vehicle efficiency are missed due to barriers in terms of information sharing between operators. Data democratisation measures, would ensure that all freight operators both large and small would again be able to make operational and investment decision based on robust and current evidence.

Last mile freight deliveries using active modes can also contribute to achieving the national net zero goal. Utilisation of cargo and e-cargo-bikes can help deliver low or zero carbon delivery networks, alongside demand management measures such as promoting and incentivising the use of green shipping options by both shippers and consumers.

Freight consolidation at different stages of the transport chain, from the procurement to the last-mile delivery, also gives an opportunity to reduce carbon emissions. By optimising the parcels transported in each vehicle and using the vehicle capacity more efficiently it is possible to reduce the number of goods vehicles trips which leads to a reduction in carbon emissions and congestion, by potentially removing a number of vehicles from the road network. Micro-consolidation centres can also make the use of cargo and e-cargo bikes more effective.

In November 2021 TfN's Board approved the Decarbonisation Strategy which was widely consulted upon and supported by partners and industry. The freight priority actions contained and agreed within the strategy are presented below:

TfN's Priority Decarbonisation Actions: Freight

| TfN Role | TfN Decarbonisation Action | Scope | Timeframe |
|------------------------|--|---|-----------|
| 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, | Pre-2025 |

| | | | |
|------------|---|---|------------|
| | | 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. | |
| Supporting | PGA2: Facilitating large ZEV truck trials in the North. | Work with local authority partners and National Highways 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 | Continuous |

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| | | schemes and technology available to everyone. | |
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Decarbonisation:

Whilst the current emissions for freight do not form the largest emitter of the transport sector, they are nevertheless significant, and the proportions will alter as other areas decarbonise.

Highway freight decarbonisation:

Central government has yet to set out a single strategy on how road freight will decarbonise. The expectation is that a combination of technology shifts, grants and taxes will encourage highway freight users to shift to electric or hydrogen vehicles. Freight is generally expressed as part of a wider approach to highways despite the obvious higher scale of the technical challenge of decarbonising freight vehicles. However, the current quickest and simplest way of decarbonising road freight is to send more by rail which even with diesel traction is 76% lower in terms of carbon emissions per tonne km. It is worth bearing in mind that rail is not yet carbon neutral either with significant distances of electrification to take place to help that to happen. Overall, it will be for the road freight sector to decarbonise and design the ability for each decarbonised vehicle to be able to carry loads that diesel vehicles can.

Rail freight decarbonisation:

NPR and other initiatives supported by TfN seek for more of the rail network in the North to be electrified. Network Rail has issued an interim programme business case for its Traction Decarbonisation Network Strategy. However, there is no certainty of funding for electrification of the wider network – and the routes used most by freight traffic (excepting sections of the Midland Mainline) tend to be lower priorities than routes used by frequent passenger services. Network capacity issues may also drive freight onto alternative routes to the West and East Coast mainline that currently have a still less pressing case for electrification investment.

It has been suggested that hydrogen or battery operation may allow freight to be decarbonised without investment in network electrification equipment and supply. However, the power required of freight locomotives is very much larger than for passenger vehicles, and no technical solution has been proposed that will not compromise the performance of freight – thus making rail freight both less capable and more expensive.

TfN will continue to work with Network Rail and DfT to ensure certainty around the investment in electrification of the rail network. That will help industry understand the plans and timelines so they can respond with providing investment in their rolling stock that matches the delivery of the electrification work. This will offer some security so the freight operators can plan to invest in the appropriate engines that match the infrastructure.