

Foreword

Last year we published *Net zero highways: our 2030 / 2040 / 2050 plan*, which included a commitment to publish an annual report on our progress and performance towards net zero roads. I am very pleased to introduce this, our first annual report, covering the progress we have made over the past twelve months in implementing our ambitious net zero plan. Across England, our roads connect communities and business, supporting relationships and driving the economic growth that underpins our wellbeing. Many journeys would not be possible without the practicality of the road network. This is why 9 out of 10 miles travelled in England are by road.

To address the dangers of climate change, we will need to adapt to a changing climate and reduce our impact on the climate. Earlier this year we published a climate resilience plan – Climate change and the strategic road network: Building resilience for a changing future. Meanwhile it is our our 2030 / 2040 / 2050 plan that will reduce our impact. For Britain to be a net zero greenhouse gas economy, our roads have to be net zero too. This is why we are taking fast action to lead net zero road transport. Even with huge investment in other transport and ways of working, most journeys will still by made by road in 2050.

Over the last year colleagues from across National Highways and our supply chain have been turning this plan into a reality. I am enormously proud of the hard work they have put in so far, as set out in this report. This has built the foundations of the programme that will deliver our targets, moving us forward as this progress report attests to. However, there is still much to be done, and we look forward to delivering upon our ambitions during the next year and beyond. We hope that our transparent progress reporting will bring you with us on our net zero journey.



Nick Harris Chief Executive Officer



Summary

Year 1 progress update on our 2030 / 2040 / 2050 plan



Net zero by 2030

2020-21

82,150
tCO₂e
2021-22
26,300
tCO₂e



Already purchase 100% renewable energy



Have converted **38% of our vehicle fleet** to **plug-in hybrid**



Over **16% of our network** is lit with low energy **LEDs**

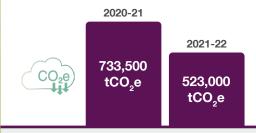


Refurbished 10 green depots



MAINTENANCE & CONSTRUCTION EMISSIONS

Net zero by 2040





Preparing a road map for zero carbon materials



Integrating zero carbon into our buying process



Trialled low carbon concrete on the M42



Trialled low carbon bio-asphalts on the A590



ROAD USER EMISSIONS

Net zero by 2050

2020-21 2021-22 32,960,000 tCO₂e 32,610,000 tCO₂e



Trained 93% of our traffic officers to deal with electric vehicle (EV) breakdowns



Undertaken **freight platooning trials** with our partners



Funded and monitored **electric van trials** in Leeds, Coventry, Kent, Nottingham, Sheffield and Bristol



Integrating zero carbon into an update of our **Planning Guide**

ENABLING ACTIONS

Registered our **Net Zero**plan with **Science Based**Targets International (SBTi)

Set up our **Central Carbon Team**

Refined our **Scope 1, 2 and 3** baseline

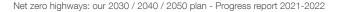
Implementing a certified carbon management system

Established a **net zero data improvement group**

Run strong communications programmes to promote our plan

Launched carbon literacy training

Built links with key
partners to take faster net
zero action together



Introduction

This report provides a summary of the progress we have made in twelve months since publishing our ambitious net zero plan – *Net zero highways: our 2030 / 2040 / 2050 plan*.

At National Highways we are proud of our role as custodians of the strategic road network (SRN). Our network is good for the country. It directly supports over 64,000 jobs and delivers £314 billion of benefit to the economy every year. We are the largest builder of cycleways in the country. However, we recognise that the good our network does comes at a cost. Currently it is a major source of carbon emissions.

Our vision is to decarbonise our network as quickly as we can. This is why we committed to be net zero for our corporate emissions by 2030, our maintenance and construction emissions by 2040 and our road user emissions by 2050 – using a robust and internationally recognised definition of net zero.¹



Net zero by 2030



Net zero by 2040



Net zero for our own operations by 2030

This area covers energy used to light and power our network, travel by our traffic officers, and the energy used in our offices and other travel. We also include the carbon locked up in trees and plants on our road verges and the land surrounding our roads in this target. It includes our Scope 1 and 2 emissions, and some Scope 3.

Net zero for our maintenance and construction activities by 2040

This target covers the greenhouse gases emitted in making the materials we use to keep our network in good condition. This includes cement, steel and asphalt. We also include the transport of materials to where we use them and emissions from construction on our sites.

Net zero carbon travel on our roads by 2050

The largest source of emissions comes from the vehicles driving on our network. Government has set its trajectory for net zero road transport by 2050. This is a rapid transition with up to a 55% reduction in emissions by 2030 and up to a 90% reduction in emissions by 2040. Our plan will enable this transition by providing the infrastructure needed for zero carbon motoring on the strategic road network.

¹ https://sciencebasedtargets.org/resources/files/Net-Zero-Standard.pdf

Our 2021-22 greenhouse gas emissions

This table shows our greenhouse gas emissions for 2021-22. Emissions are reported against the scope and requirements of Greenhouse Gas Protocol and Science Based Targets Initiative Net Zero Standard.







Net zero by 2040



Emissions source	Scope	Baseline (tCO ₂ e)	Reporting year (2021-22) ² – tCO ₂ e	Progress	Intensity ratio
Corporate		2020			tCO ₂ e / full time equivalent employees
Vehicle fuel	1	10,000	8,000	1	1.33
Buildings gas	1	150	1,400	1	0.23
Electricity	2	50,000	-	1	0.00
Corporate purchases	3	17,000	15,000	1	2.50
Business travel	3	5,000	1,900	1	0.32
Total	N/A	82,150	26,300	1	4.37
Maintenance and construction		2020			tCO ₂ e / £mil spent on maintenance and construction
Cement and concrete	3	203,000	181,000	1	50
Material transport	3	179,000	94,600	1	26
On-site plant	3	164,000	56,600	1	16
Steel	3	76,500	62,300	1	17
Asphalt	3	65,500	76,500	1	21
Other Materials and aggregates	3	35,000	43,400	1	12
Supply chain operational energy	3	10,500	8,600	1	2
Total	N/A	733,500	523,000	1	145
Road user		2020			tCO ₂ e / billion km travelled on network
Cars	3	16,500,000	16,250,000	1	103,400
Articulated HGVs	3	7,950,000	7,950,000	_	50,600
Vans	3	5,550,000	5,500,000	_	35,000
Rigid HGVs	3	2,700,000	2,660,000	1	16,900
Buses and coaches	3	260,000	250,000	1	1,600
Total	N/A	32,960,000	32,610,000	1	207,500
Carbon removals	N/A	-15,000	-15,000	_	
Grand Total	N/A	33,760,650	33,144,300	1	

The figures presented in the table³ are similar but slightly different to i) the corporate emissions reported to Department for Transport (DfT) as part of UK Greening Government Commitment (GGC). This is because the scope and way emissions are accounted for are slightly different between GHG Protocol and the GGC. ii) emissions from maintenance and construction reported in our annual report. This provides consistency between reports – in our annual reports we cover just the data provided by our supply chain. In this net zero report we use a more sophisticated approach to account for data gaps and use the same approach we used for our 2020 baseline.

² Our baseline was compiled on the basis of a calendar year. However, to align to our other reporting commitments we will report on a financial year basis. Both periods cover 12 months and as such re-baselining has not been considered proportionate.

³The rounding of individual figures can lead to the addition of individual figures not adding up to the total figures, which are also rounded.

PROGRESS ON OUR THREE ACTION AREAS

Corporate emissions have fallen from 82,150 tCO₂e in our baseline to 26,300 tCO₂e during 2021-22. The main change is because we now buy all our electricity from renewable sources backed by a certified Energy Attribute Certificate. We see action to decarbonise electricity as part of a hierarchy of activities. This means we are also focused on energy efficiency and our own renewable generation. Emissions have also fallen in all other corporate categories other than buildings gas. This has increased due to office re-occupation following the COVID-19 lockdowns.

Maintenance and construction emissions have fallen from 733,500 tCO₂e in our baseline, to a modelled 523,000 tCO₂e during 2021-22. Suppliers reported to us that they emitted 295,617-347,104 tCO₂e from their activities with us in 2020-21. This is reported in our annual report. Our data improvement plan will align how we measure and report these emissions. Much of the decrease in our modelled emissions is due to the re-timing of some of our schemes to later in this Road Period up to 2025. The reduction is also due to innovative work that we are starting on lower carbon materials.

Road user emissions are modelled to have fallen from 32,960,000 tCO₂e in our baseline, to 32,610,000 tCO₂e during 2021-22. This is due to increased vehicle efficiency and the uptake of electric vehicles (EVs). Set against this efficiency is the rebound in traffic volumes after COVID-19.

Our carbon data has been developed in line with best practice methods. For further details please see our separate methods statement.







Our progress to date

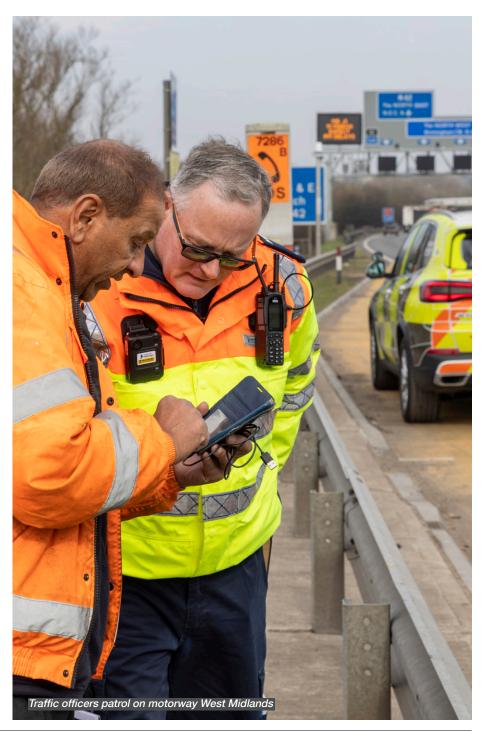
In the year since we launched our *Net zero highways:* our 2030 / 2040 / 2050 plan, we have been busy putting in place the foundations needed to successfully deliver on our targets. The journey we are on is challenging and uncharted, and we are working at pace and with flexibility to make sure we deliver the net zero strategic road network (SRN) the country needs.

We are proud of what we have achieved so far. We have delivered tangible progress across all three of our emissions categories:

- Against our corporate ambitions, we already purchase 100% renewable energy, have converted 38% of our vehicle fleet to plug-in hybrid and over 16% of our network is now lit by low energy lighting (LEDs)
- Our road maps and category plans have made a great contribution to our maintenance and construction ambitions. We now understand the low carbon solutions we will need. We are well on the way to launching a certified carbon management system that will further reduce our emissions
- Against our road user ambitions, we have trained 93% of our traffic officers to better support customers with electric vehicles and have undertaken freight platooning trials with our partners

This is a promising start. We will continue to work hard across our organisation to deliver against all our ambitions but acknowledge that there is still much to do, and we will need to be flexible as we seek to deliver the most cost-effective possible route to a net zero SRN.

The remaining sections of the report provide a narrative against each of the commitments which we made in our net zero plan.





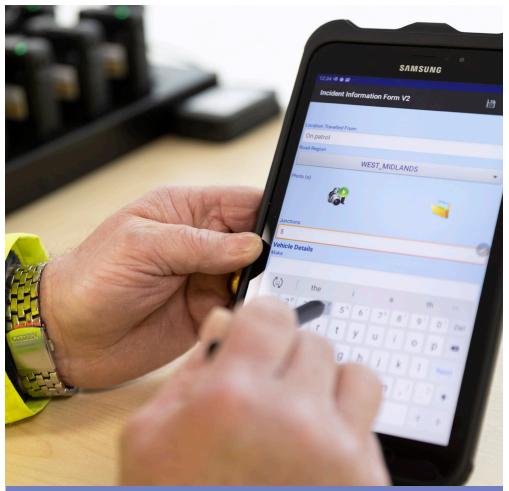
ACTION AREA 1 Cutting our direct carbon emissions

- Our non-traffic officer vehicles will be 100% electric by 2027, with traffic officer vehicles to be 100% electric by 2030

 To date, we have successfully upgraded 38% of our fleet to plug-in hybrid.
- We will buy 100% of our electricity via a certified renewable tariff by 2020 We are continuing to buy a certified renewable tariff for all our electricity.
- We will replace 70% of our road lighting with LEDs by 2027
 We have identified areas of the SRN that are not currently switched to LED and are working to align these with existing renewal strategies. To date, we have upgraded over 16% of our lighting to LED.
- We will aim to reduce the overall size of our estate by one third by 2027
 We have mapped out the lease events for our estate and have used this to
 develop our rationalisation programme. We have already reduced floorspace
 by 50% at two locations and have submitted business cases for three more
 locations where reductions vary between 30% and 60%.
- personal) by 2026. We will be exploiting technology to introduce new ways of working and update our travel and expenses policy to discourage flying and incentivise low carbon travel options

 We are planning to launch a green cars salary sacrifice scheme in 2022/23. We are reviewing our policies to encourage virtual working and discourage flights.

100% of our business mileage will be by electric vehicles (hire or



Case study Device amnesty

We held a technology Device Amnesty between October 2021 and May 2022 and successfully recovered **327 mobiles and 86 tablets**. These devices have been returned for re-use or recycling. This supported our work to deliver our Greening Government Commitments.

Over the past year, we have also donated **130 laptops and 650 tablets** to schools and community centres across the UK. In December, we donated a further **50 laptops** to the Regular Forces Employment Association, known as The Forces Employment Charity.



ACTION AREA 1 Cutting our direct carbon emissions

Develop a plan for micro-generation of power on our land to meet a part of our energy needs

Our original pilot scheme was planned to be part of works on the A14 - a site which has since proven not feasible for renewables. We are looking at alternative sites now, with one large site being investigated, among others.

Plant at least an extra 3 million trees by 2030

We have worked in three areas: firstly to support the sustainable supply of seeds, secondly to secure internal funding to buy these, and finally to plan where and how we will plant these on our network.

100% electric or hydrogen heavy vehicles by 2040

We have until 2040 to meet this commitment and, at present there are no zero-emission models which will replace our winter gritters, which are the only heavy vehicles in our fleet. We are exploring options for lowering the Heavy Goods Vehicles' (HGVs) carbon footprint using hydrotreated vegetable oil (HVO) and we will continue to monitor technology options.

- Aim to agree zero carbon memoranda with our landlords by end of 2022 Work is ongoing aligned to our rationalisation programme (see above).
- Increase the energy efficiency of our sites and use of low carbon heating in our buildings

Work is ongoing for this. We have completed 23 projects across our depots, with carbon savings projected to be 154 tCO_ee.



Case study **Green depot**

We have been upgrading the heating and lighting systems across our depots. Our work has included fitting better and energy-efficient lights and improving the heating systems in the buildings.

We are aiming for BREAAM excellent standard at all new depots and our depot at Milton Common is an example of what we have been able to achieve. Measures taken include:

- PV panels to office roof
- Rainwater harvesting
- Sustainable drainage systems (SuDS) and improvement of natural habitat
- Electric vehicle charging points
- Materials such as concretene being favoured and looking at engineered timber instead of concrete for push walls (salt barn)
- Natural heating/cooling systems
- Cycle storage and shower facilities



Cutting emissions from maintenance and construction

We will build the first net-zero major road enhancement scheme, starting by 2030 and opening for traffic by 2035

We have been working to identify and develop a series of pilot schemes that will focus on key material categories to support the development of the first net zero scheme.

- 100% electric or hydrogen heavy vehicles deliver to our sites by 2040 Work is initially focused on a logistics improvement pilot to minimise heavy vehicle deliveries to our sites, and we are actively following innovation and developments in the hydrogen market.
- In each Road Period we will identify which low/zero carbon products we will use in construction and maintenance

We have completed a wide-reaching horizon scan with around 190 interventions longlisted, alongside collaborative work to identify the most viable products, technological readiness, and dissemination methods.

- Develop a near-zero plan for each of our buying categories by 2022

 Progress developing the plans is ahead of schedule. Consultation has been held with the supply chain, and we expect publication later in 2022.
- Develop a zero carbon 2040 roadmap for steel cement, concrete and asphalt

We developed draft roadmaps in March 2022 and are on track to publish final plans later in 2022.

Case study

M42 trial of low carbon reinforced concrete

Our largest single source of emissions from maintenance and construction is cement and concrete. Finding lower carbon concretes that are safe, durable, and work on our projects is key to delivering our goal of net zero construction and maintenance in 2040. At Junction 6 of the M42 we used a temporary access road to trial four concrete designs:

- Ordinary Portland Cement (OPC) mix with steel rebar (to be used as a comparative benchmark)
- OPC with basalt fibre rebar
- Alkali Activated Cementitious Material (AACM) geopolymer concrete with steel rebar
- AACM geopolymer concrete with basalt fibre rebar

 This was achieved by laying the concrete in slabs and then later removing them for testing at Building Research Establishment (BRE) laboratories. The results from this trial will provide useful data to help the understanding and development of future designs using a combination of these innovative low carbon materials.





Cutting emissions from maintenance and construction

▶ Launch a zero-carbon construction innovation programme

We have been developing our approach to our program and have held workshops consulting key stakeholders. We are on track for launch in 2022.

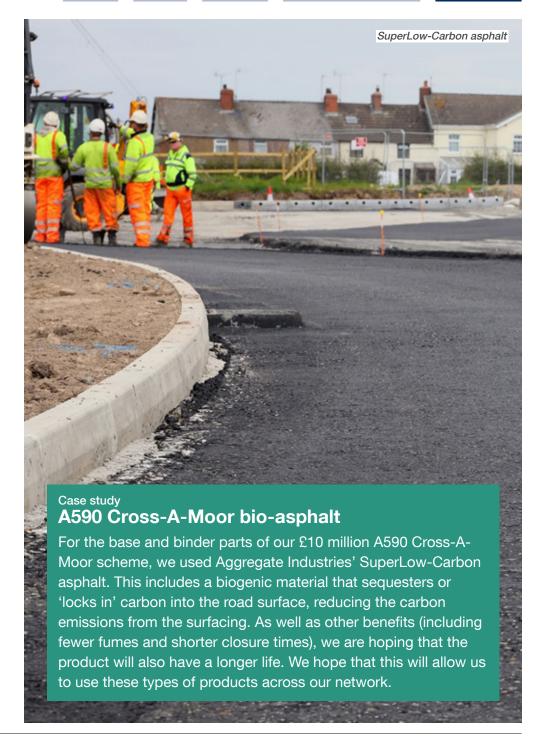
100% electric vehicle site cars and vans by 2030, and all compounds run on renewable electricity by 2030

We have been identifying vehicle and site needs and mapping to appropriate technologies alongside initial stakeholder consultation.

- 100% zero-carbon plant used on sites and site cabins by 2030
 We have been working with the supply chain to understand currently available options and the pipeline for harder to decarbonise heavier plant.
- Make Digital Roads an integral part of our current Road Period and build this into the next Road Period strategy and beyond from 2023

 Carbon and digital roads are a key part of our work today and our ongoing planning for the next road investment period.
- Implement and certify a construction carbon management system by the end of 2022 (and require our Tier 1 and Tier 2 suppliers have their own certified carbon management systems)

We have undertaken a gap analysis review between the requirements of the international carbon management system, PAS2080, and our existing processes and have developed a draft system. We have appointed auditors and work is continuing to deliver our target for accreditation later in 2022.





Net zero carbon travel on our roads

Explore the potential to work with partners to practically demonstrate the electric vehicle charging services blueprint

We have begun by obtaining customer insights to understand behaviours and preferences regarding electrical vehicle charging provision.

Support to 'project rapid' delivering £950 million of charging infrastructure at motorway service areas (MSAs)

We are engaging with Office for Zero Emission Vehicles' (OZEV) work with Distribution Network Operators and National Grid to help develop the Rapid Charging Fund. This aims to have six high-powered chargers at every motorway service area by 2023, with an ambition to rapidly grow the network further as demand increases.

Mobilisation of the wider delivery industry to support market delivery of chargepoints will continue throughout the rest of 2022 along with development of the outline business case.

Launch an electric vehicle charging demonstrator lounge to provide comfortable rapid charging at MSAs in 2025

We have been working with providers to identify preferred location(s) for a demonstrator lounge.

By 2025 we will have spent £11million supporting MSA operators develop energy storage solution to enable charger roll out

We have developed and agreed our Terms of Reference and have sought applications from MSA providers across the country. Development of the contracts is close to completion, and we intend to run the competition for the projects in summer 2022.

Case study

Electric van trials

Vans using our network produce about 5.5 million tCO_2 e per year making them a significant source of emissions. Faster progress on electric van uptake is also highlighted as a key priority by the UK's independent Climate Change Committee.

In 2022 we extended our Electric Van trial programme to Coventry and Bristol and also carried out detailed monitoring of our existing schemes in Leeds, Kent, Nottingham and Sheffield.

In these trials local businesses can typically trial an electric van for two months for free. The schemes are funded by National Highways' Designated Funds programme and are delivered in partnership with cities or local authorities who run the scheme on a day to day basis. The aims of the trial are to let businesses try electric vehicles, delivering improvements in fuel efficiency, greenhouse gas emissions and local air quality at the same time.





ACTION AREA 3 Net zero carbon travel on our roads

Traffic officers ready for electric vehicle breakdowns by end 2022

We have successfully developed and deployed an electric vehicle/hybrid vehicle awareness learning package to over 93% of our traffic officers. The remaining 7% are new starters, who will receive this as part of their initial training.

We will publish our proposed approach to zero carbon HGV trials by the end of 2022, and by the end of the road period explore options for further freight demonstrators

National Highways are a key partner in the Department for Transport led Innovate UK zero emission road freight trials, which include a feasibility study into the potential for an Electric Road System demonstrator. We expect further information on the potential for three trials and the role of National Highways in these later this year.

Have a preferred investment plan for HGV charging/zero emission HGVs by 2028, for Road Period 4 implementation

We are working closely with the Department for Transport to make sure any proposed activities align with wider government policy. We expect to know more about our role and future involvement in planning and preparing for changes to HGV technology later this autumn.



Case study

Our readiness for electric vehicles on the network

We have invested £200,000 in new equipment and training for our traffic officers to help speed up the time it takes to move broken down vehicles – including electric vehicles – to a safe place and keep traffic moving.

As electric vehicles cannot be easily towed without damage, our traffic officer vehicles are now equipped with plastic skates which lets our officers easily and safely tow electric vehicles without damaging the motor. It's a significant improvement which allows us to move vehicles right away to safe places without needing to wait for recovery vehicles. Our traffic officers are also equipped now with battery boosters to help give a short power supply to help motorists get to the closest service station for a full charge.

It is expected that removing incidents from live lanes more quickly will contribute around £29.8 million per year to the UK economy as well as boosting safety on our network.



Net zero carbon travel on our roads

Lead the first real-world operational trial of platooning vehicles on UK roads

National Highways are also a key partner in the HelmUK Heavy Goods Vehicle (HGV) Platooning project and on road trials were completed earlier this year. The report detailing the outcomes of the trials has now been published and can be found here.

- Report in 2023 how we can help reduce empty lorry movements
 - We are currently reviewing outcomes of previous discussions we have held with both the Department for Transport and the wider industry to understand what options may be feasible for further development.
- Integrate net zero into our statutory consultee responses to planning applications from 2022

Net zero principles are being embedded into the refresh of our Planning Guide. In addition, in collaboration with supply chain partners 12 detailed opportunities have been identified where spatial planning and net zero can be aligned.



Case study

Leading on research and development

As well as showcasing successful materials and technologies, National Highways is at the forefront of investigating innovative uses of the network.

In 2021 we conducted HelmUK – the first real world trial of HGV platooning. The concept of platooning is to use advanced driver assistance systems to enable HGVs to safely travel close together, typically 0.5 to 1.0 seconds apart. We wanted to investigate if platooning could safely provide:

- More effective use of the SRN, reducing the need to build new roads
- Fuel efficiency as slipstreaming in safe conditions

Following conclusion of the trials, the final report detailing the outcomes has been published here. While this showed that platooning was not a viable solution for now, we will continue to test and innovate to support zero carbon and efficient use of our network.

ENABLERS

Progress on the enablers for our plan

Establish and maintain clear governance, from a carbon team to clear roles agreed for delivery and execution - we will also appoint an Executive Board member to have responsibility for delivery of our net zero plan

We have appointed a new Director for Environmental Sustainability and formed a Central Carbon Team to oversee the implementation of our Net Zero programme. We have also improved our governance structures and have given responsibility for the delivery of our ambitions to executive sponsors alongside a clear process for implementation of those ambitions.

We have carried out a review of current data systems and will develop a plan to upgrade our processes, systems and assurance, which will be complete for the end of 2024

We have established a cross-company net zero data improvement group. This is working at pace to improve greenhouse gas data quality, coverage and consistency.

Communicate our net zero plan effectively through the company and keep all our teams up to date

We have a strong internal and external communications programme to raise the awareness of our net zero plan and to involve all our people in playing their part in delivering it. This has included internal webinars, leaders talking about their programmes and making the opportunities for our people and stakeholders to attend monthly drop-in sessions.





ENABLERS

Progress on the enablers for our plan

Conduct a skills needs assessment and launch a zero carbon skills programme in 2022. Give our leaders the knowledge and confidence to talk and exemplify low carbon leadership, and put carbon as an integral part of people and performance management

We have launched carbon literacy e-learning, which is available to suppliers as well via the Supply Chain Sustainability School. More than this, we are currently conducting a training needs analysis to further plan our activities and will be rolling this out later in 2022.

We will work closely with our supply chain and other UK and global infrastructure providers, to deliver faster net zero action, share progress and develop common standards. To deliver on our road user ambitions, we will work with the Department for Transport and local transport authorities, to support the uptake of zero carbon vehicles, facilitate modal shift, and efficiently manage traffic

We have been building our relationships with key stakeholders, including within the supply chain, other government bodies and departments, and sub-national transport bodies and local authorities.

As part of this work, we have been sharing best practice and lessons learnt and provided input to three regional transport decarbonisation plans.





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