

NETWORK RAIL

# Our ambition for a low-emission railway

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2020 – 2050





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# Our ambition for a low-emission railway

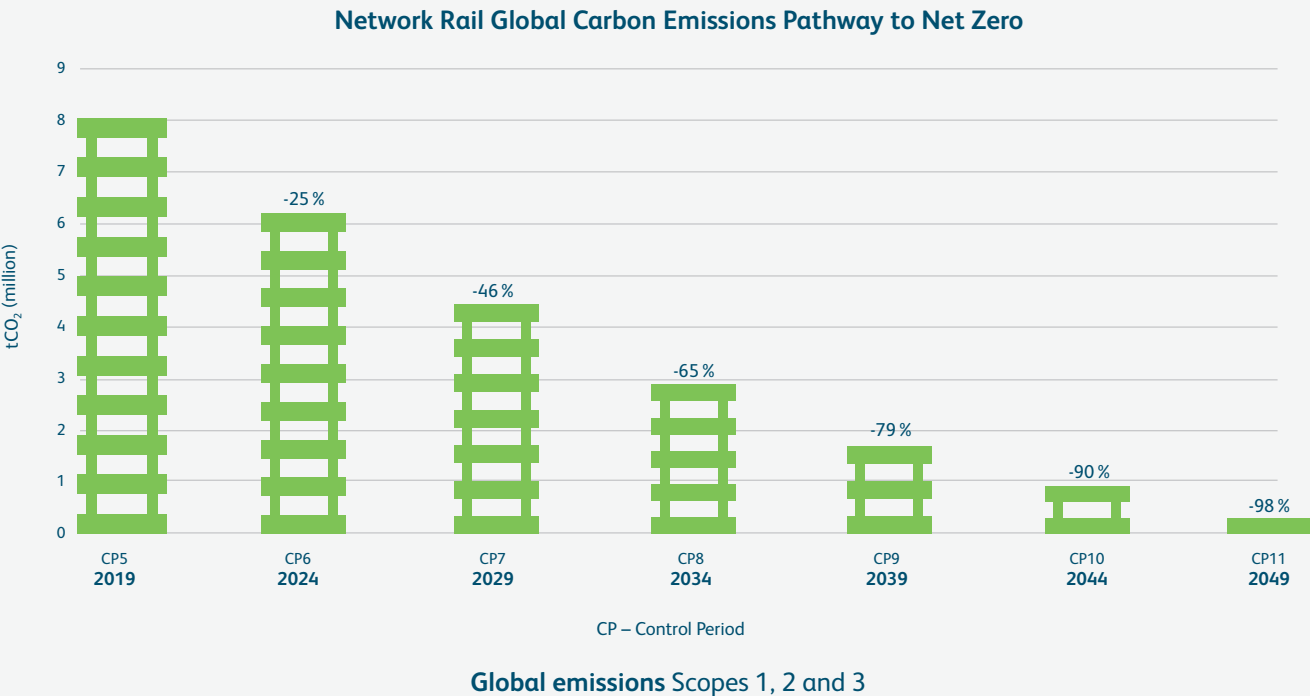
We are proud to be the first railway organisation in the world to set science based targets to the most ambitious target of limiting emissions from our own operations to a 1.5°C warming scenario.

We will achieve net zero carbon emissions by 2045 in Scotland and 2050 in England and Wales in line with government policy. Our pathway to net zero sets out the targets for each control period.

The impacts of climate change affect our railway every day and it is our responsibility to do all that we can to limit our own contributions.

Network Rail is committed to delivering a low-emission railway. Although rail is already one of the most sustainable forms of mass transit, we accept that there is much more that can be achieved through careful management of our assets and activities. We have developed and adopted a series of carbon reduction targets, aligned to globally accepted climate science, to establish our pathway to net zero emissions.

These targets span the whole of our value chain and we have set out our strategies to achieve them, working to reduce carbon emissions from our own operations and those of our suppliers and customers.



# Our ambition for a low-emission railway

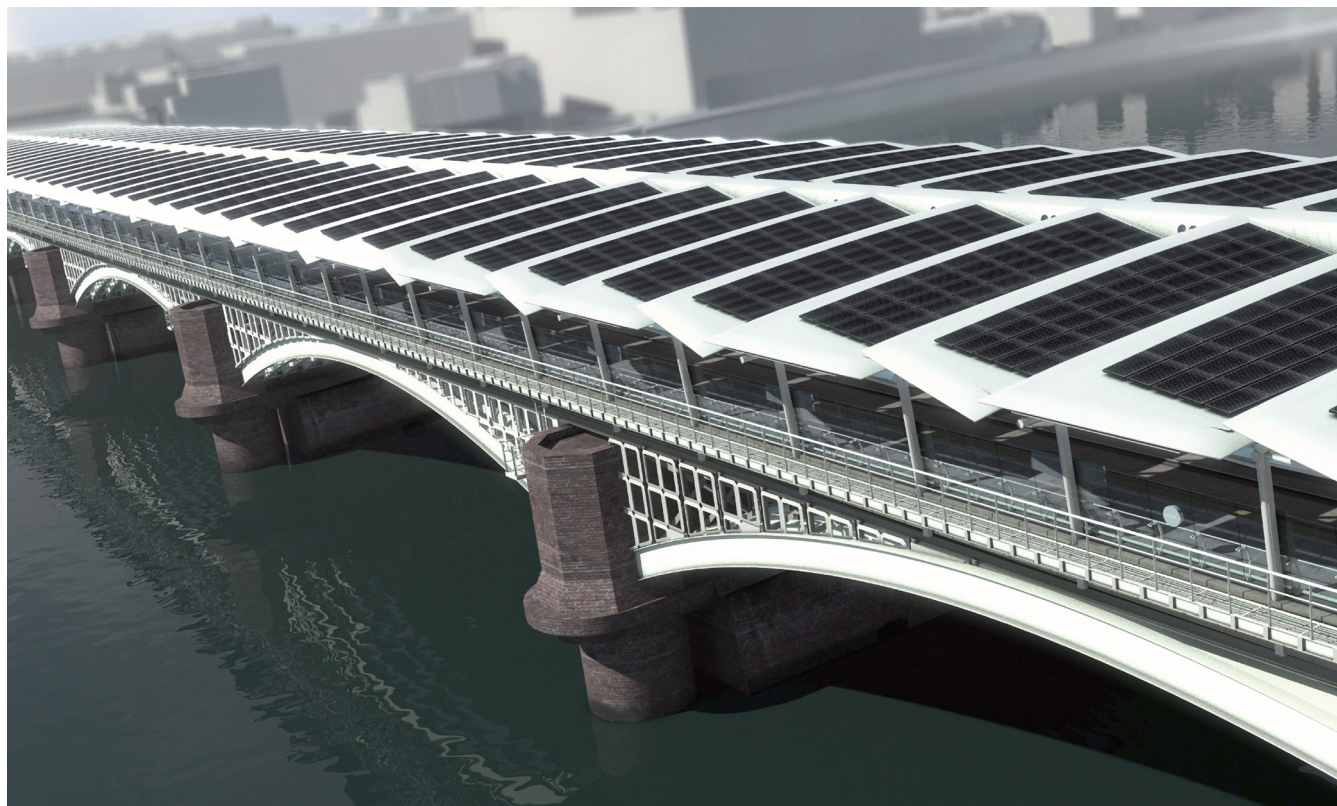
Science-based targets are the globally accepted standard for setting long-term carbon reduction targets and are calculated in line with the scale of reductions required to keep global temperature increase well-below 2°C above pre-industrial temperatures. They are based on the concept of a global carbon budget. By accounting for the greenhouse gas emissions that have been put into the atmosphere since the industrial revolution began, and understanding how these affect the climate, it is possible to predict how emissions should be limited to maintain levels of global warming below 2°C in order to avoid catastrophic climate change.

In October 2018 the Intergovernmental Panel on Climate Change (IPCC) published a report which summarised that we only had 12 years to avoid climate catastrophe as a result of global warming, and that temperature rise should be further limited to 1.5°C. Subsequently, the UK Government declared a climate emergency and in June 2020 committed to a target of achieving net zero carbon emissions by 2050, mirroring the 1.5°C warming limit set by IPCC.

## How will we get to net zero?

The targets that we have adopted are challenging. The rail industry is increasing services and moving from mechanical to digital technologies to better serve our customers. We are planning to increase passenger and freight services and encourage more users away from roads to a more sustainable form of transport.

Yet we know that we must also manage this growth in a way that minimises the environmental impact of Britain's Railway. The following sections set out how we intend to achieve the huge reductions in carbon emissions that are required.





# Our ambition for a low-emission railway

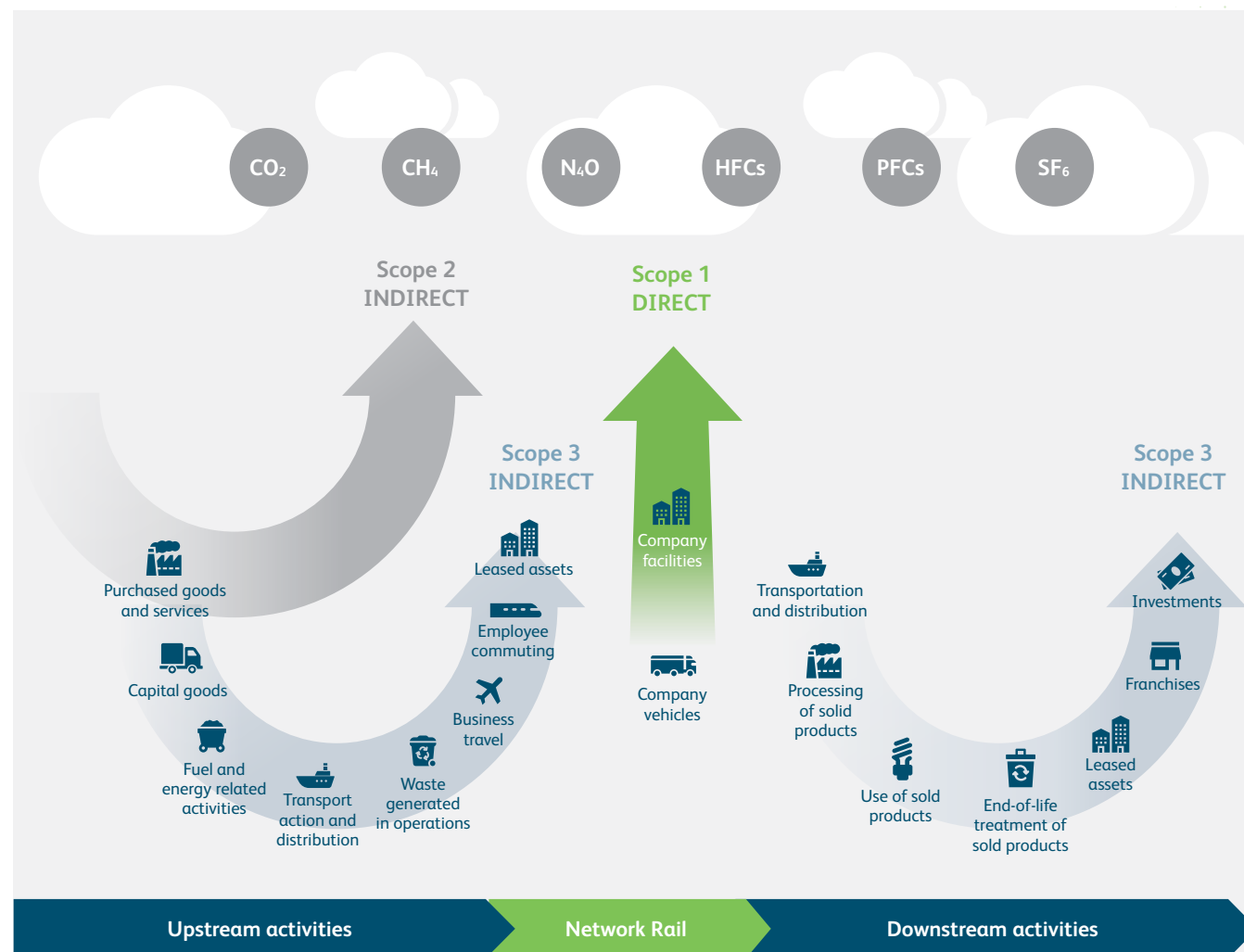
## What do we mean by 'carbon emissions'?

The internationally accepted standard for reporting carbon emissions is the Greenhouse Gas (GHG) Protocol. The GHG Protocol defines three 'scopes' of emissions caused by our operations:

<b>Scope 1</b>	Direct emissions from sources owned by Network Rail, e.g. from burning fuels such as natural gas for heating our buildings or petrol and diesel to fuel our cars and vans.
<b>Scope 2</b>	Indirect emissions from the electricity, heat or cooling that we buy.
<b>Scope 3</b>	Other indirect emissions along Network Rail's value chain from suppliers or customers.

When we use the general term 'carbon emissions' or 'carbon footprint' we are actually referring to a collection of different harmful Greenhouse Gases:

- Carbon dioxide
- Methane
- Nitrous oxide
- Hydrofluorocarbon gases
- Perfluorocarbon gases
- Sulphur hexafluoride.



CO<sub>2</sub>e, or carbon dioxide equivalent, is a standard unit for collectively measuring these gases. The idea is to express the impact of each different greenhouse gas in terms of the amount of CO<sub>2</sub> that would create the same amount

of warming. That way, a carbon footprint consisting of lots of different greenhouse gases can be expressed as a single number.

A low-angle, upward-looking perspective of a large array of solar panels. The panels are dark blue with a grid of silver lines and small square cells. They are tilted diagonally across the frame, leading the eye from the bottom left towards the top right. The background is a dramatic sky at sunset or sunrise, with a bright sun low on the left horizon, casting a warm orange and yellow glow. The sky is filled with soft, white and grey clouds, and the overall lighting is warm and atmospheric.

**Limiting emissions within our  
direct control (Scopes 1 and 2)**



# Limiting emissions within our direct control (Scopes 1 and 2)

The vast majority of Network Rail's Scope 1 and 2 carbon emissions are from energy consumption, mainly electricity use for our infrastructure and in our buildings, and from fuel use throughout our road fleet of around 8,500 vehicles. In our baseline year of 2017/18, total emissions from our operational estate were 248,000 tonnes CO<sub>2</sub>e. That's more carbon emissions than 3.5 million trees could absorb.

Our Net Zero target means that we have to reduce these emissions by at least 98%.

Our commitments to achieve our low-carbon ambitions for our own operations are:

- **From this year onwards, all of our non-traction electricity will be sourced from renewable generation**
- **By 2035 our entire road vehicle fleet will be ultra-low-emission vehicles**
- **We will minimise energy use at the offices, depots and stations that we manage and look for innovative ways to reduce energy throughout our infrastructure.**

## Renewable energy

Our ambition is to be feeding in electricity from renewable generation, to both our traction and non-traction assets, within 10 years. We can do this by directly connecting solar and wind generators to our buildings and infrastructure, or by purchasing the energy directly from solar or wind farms owned by others. There's a lot of work to do to enable this, so whilst we are working to develop our plans, we have committed, from this year onwards, to match our total non-traction electricity demand with energy from certified renewable generation that is fed into National Grid.

We're pleased to say that we have already completed this step and our non-traction electricity use is classified as zero carbon.

But we're not resting on our laurels. We have already undertaken a comprehensive study of land in and around the rail network, matching it against where we have most demand for electricity and the need for a secure supply, so that we can understand where sites can be used for solar or wind farms to generate the electricity that we need. We plan to work with external developers to provide the new generation assets that will supply the right amount of electricity in the right places. To meet our electricity demand needs, and for areas where renewable generation cannot be provided near to point of use, we will buy our energy from renewable energy generators through Power Purchase Agreements.



Riding Sunbeams

We have also worked with climate change charity Possible (formerly 10:10 Climate Action) and Community Energy South to develop Riding Sunbeams – the first solar farm in the world to be directly connected into a traction energy network. We aim to roll out this innovation alongside our other renewable energy ambitions.

# Limiting emissions within our direct control (Scopes 1 and 2)

## Transitioning Network Rail's Road Vehicle Fleet

The strategy to achieving our emissions targets relies on Network Rail removing traditional fossil fuels – petrol and diesel – from our fleet of 8,500 road vehicles. We have started this journey by committing to change the cars in our fleet:

25% to Ultra-Low  
Emission Vehicles  
by 2022

100% by 2030

Our total vehicle fleet will  
be Ultra-Low Emission  
by 2035

We are trialling our first electric vehicles now and working with our new fleet supplier Hitachi to plan the transition of the whole car fleet.

We are planning to install the infrastructure that's needed to enable our teams to use the new vehicles we are introducing in depots and offices right across our business.

We also understand that we have a responsibility to support our customers as the automotive landscape changes. We are installing more than 300 electric vehicle charging points at some of our managed stations this year and have committed to providing at least three times that number by March 2024.














## Energy efficiency

We know that there is a lot that we can do to save energy, and therefore eliminate carbon emissions. From our offices, stations and depots to rail controls, communications and crossings, we consume the same amount of energy each year to power more than 12,000 households. And we know that's too much.

Through careful management and applying energy efficiency measures we are striving to reduce our energy consumption throughout the non-traction estate. We have a target to reduce non-traction electricity and gas by 18 % before the end of 2023/24. We will do this by making sure that our buildings are controlled efficiently, and that the lighting that is used is switched to low-energy equivalents. We can look for energy efficient alternatives to some of the infrastructure that's traditionally high consuming, such as the heaters that stop the rail points freezing in winter or the way that lineside control buildings are kept cool during summer.



# Decarbonisation Programme

PROGRAMME	Energy Efficiency and Renewable Energy Integration			Network Rail Vehicle Fleet and Electric Vehicle Infrastructure		Process Improvement			Enablers		Low Cost/Low Carbon Infrastructure																																											
	WORKSTREAM NAME	DESCRIPTION			DESCRIPTION			DESCRIPTION		DESCRIPTION																																												
	1	Renewable Energy Integration		Assessing available assets, including Network Rail owned and adjacent land to identify the most advantageous applications of renewable technology across the estate. Identifying quick win projects to prioritise whilst developing and initiating a renewables strategy.		7	Energy Storage as Revenue Generator		Exploring the types and applications of battery storage technology most suitable to Network Rail to support operations and improve energy resilience, but also to generate a significant income by using a large battery asset base to help balance National Grid.		6	Route Energy Efficiency		Encouraging rapid acceleration of deployment of energy efficiency measures by the Region and Route teams by providing practical support, improving carbon compliance and effectively managing energy and carbon related risks.		12	Transforming Network Rail's Vehicle Fleet		Developing and implementing our strategy to move from petrol and diesel road vehicles to Ultra Low Emission Vehicles, and deployment of the necessary infrastructure to enable this change.		12a	Electric Vehicle Charge Points (NR Managed Car Parks)		Installation of Electric Vehicle Charge Points (Public Places) across Network Rail managed car parks		2	Electricity Industry Process Improvement		Working with electricity District Network Operators (DNOs) to map and improve power outage notification processes in order to avoid delays and Schedule 8 costs.		3	Managed Stations Recoveries & Metering		Improving sub-metering in our managed stations, fitting automatic meters to enable accurate billing of retail tenants and drive down total consumption and carbon emissions.		4	Process Improvement to Increase Cost Recovery		Improving our knowledge of 3rd party use of Network Rail energy across the estate, improving metering and billing processes and increasing cost recovery rates.		5	Utilities Category Strategy		A series of sub-workstreams designed to enable the best possible advantage from our utility contacts. Developing and running the re-tender of utilities		9	Enhancing Energy Management Capability		A training programme, starting at entry-level awareness raising and progressing to full Energy Manager status to support the business to improve energy management capability, thereby achieving significant energy, cost and carbon savings.		13	Designing for Low Cost, Low Carbon Infrastructure		Understanding how we can design and build future infrastructure in a much more carbon efficient way, reducing capital carbon thereby minimising our Scope 3 emissions and reducing costs.

The initiatives described here are no mean feat for a large infrastructure organisation like Network Rail. To tackle these challenges, we have embarked upon an ambitious Decarbonisation Programme to systematically roll out the changes that are needed. Consisting of thirteen individual workstreams, the programme is developing the solutions needed to enable large-scale renewable energy and energy storage, transition the road fleet to ultra-low emission vehicles, roll out energy efficiency measures, train our workforce and update our processes.

The Decarbonisation Programme is predominantly focussed on energy and carbon reduction throughout our non-traction estate and so impacts largely on Scope 1 and 2 emissions initially. There will also be some benefit to our customers throughout the rail industry, through integrating renewable energy to the traction energy network, for example. The Programme then extends significantly into tackling our Scope 3 emissions challenge by integrating whole life carbon thinking across all Network Rail activities and into our value chains.





Our upstream and downstream  
emissions (Scope 3)



# Our upstream and downstream emissions (Scope 3)

The level of emissions in our own sphere of control, and the actions to tackle them, are quite significant. It's therefore surprising that Network Rail's own operational emissions account for just 3 % of our global footprint. The remainder of our carbon footprint sits within our value chain – that is, the emissions of our customers and our suppliers.

These are referred to as upstream and downstream emissions, or our Scope 3 emissions and we are driving change in our value chain, by reviewing and updating standards and policies to introduce new low cost, low carbon materials and design into the infrastructure.

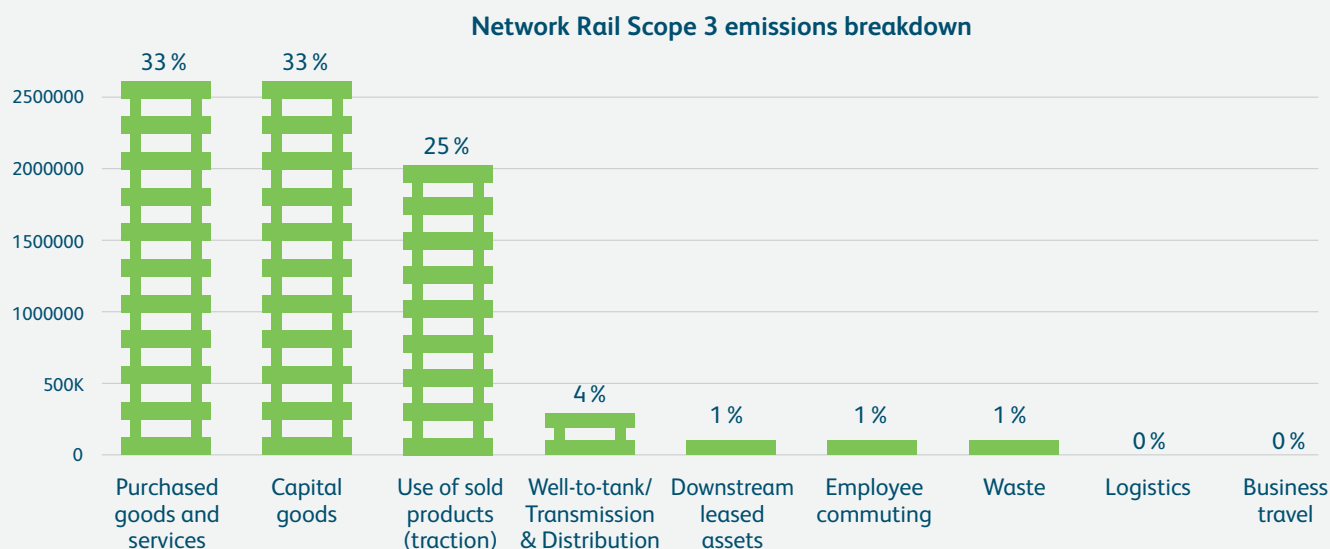
Each of the scope 3 emissions categories shown in the graphic on page 3 has been measured to understand which of them contributes the greatest proportion of emissions. From this work, we found that most of our upstream and downstream emissions sit within three major categories:

- Purchased goods and services – emissions from suppliers of the goods and services that we purchase
- Capital goods – emissions from contractors and suppliers who are carrying out our capital works and infrastructure development

- Use of sold products – in this instance, use of sold products means the use of the rail network that we own and operate. The users of that network are the train operating companies, who run their trains on our tracks. Therefore, this category measures the emissions from running those trains. These emissions are categorised as 'indirect' because we don't have direct control over the fuel used in the trains.

By carrying out this analysis, we know that we must drastically reduce the emissions in each of these categories in order to achieve net zero emissions.

Our commitments to achieve our Scope 3 carbon reduction ambitions are:



- We will work with our supply chain so that by 2025 at least 75% of our suppliers, by emissions, will have set their own science based targets.
- We will make recommendations to our funders on infrastructure enhancement schemes that will enable traction diesel to be reduced by at least 27.5% by 2030.

# Our upstream and downstream emissions (Scope 3)

## Working with our suppliers

Two of the major contributing emissions categories are related to our supply chain. This is, by far, the largest proportion of our global emissions. Whilst these emissions are outside of our direct control, we have a great deal of influence to enable carbon reduction through the works, goods and services that we buy.



We can do this by making sure that we are asking the right questions of our suppliers as we let new contracts; writing requirements into our procurement activities; and by being a demanding client. We will work with our existing suppliers to understand their priorities and encourage low carbon behaviours. We must require that the suppliers working on our behalf strive to reduce their own emissions. Many of our largest suppliers are already working hard to reduce carbon in their own organisations and we will work with our contracting teams and our supply base to encourage and accelerate this sea-change.

Some of this work is already progressing and we are working with our current and future suppliers to facilitate carbon reduction activities.

## Emissions from traction

Obviously, there are significant emissions from use of the traction network, by our customers who run the trains that run on the tracks. These customers, the train and freight operating companies, have their own obligations to reduce emissions, but we also have an enabling role to play as we can plan the infrastructure improvements that are needed to decarbonise. The electricity used to run the electrified traction network is already sourced from zero carbon, nuclear energy, so efforts need to be focussed on reducing diesel use across the British rail network.

We have undertaken intensive work over the past year to advise our Governments how best to invest in the rail network to enable the best decarbonisation options. The Traction Decarbonisation Network Strategy highlights where best to extend the electrified network, invest in battery-powered trains, or where hydrogen trains are likely to be the best option.

Whilst it's recognised that these decisions lie with the Department for Transport, our role is a leadership and enabling role.



Find the Traction Decarbonisation Network Strategy at:  
<https://www.networkrail.co.uk/campaigns/sustainability>





Working to deliver a  
low-emission railway



# Working to deliver a low-emission railway

We are in no doubt that decarbonising the railway is a challenge but the strategy that we have adopted and the activities that we've outlined here aim to embed low-carbon thinking at the heart of everything that we do. This is a long-term strategy which strives to achieve net zero emissions across all of our activities and right across Britain's railway.



There can be few more important tasks than ensuring that the greenest form of mass transit becomes greener still. That's our ambition in rail as we deliver innovations that support the UK's net zero target.

Every decision we take – from new forms of powering trains, to diesel-free worksites, or more efficient ways to heat and light our stations – is an opportunity to make a real difference.

**Andrew Haines** – Chief executive



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