

Net zero highways: our zero carbon roadmap for concrete, steel and asphalt



Net zero roadmap for asphalt

Over 96% of the strategic road network is surfaced with asphalt, making it one of our most widely used materials and one of our largest sources of carbon emissions.

We use different types of asphalt to meet different performance needs, including thin surface course systems (TSCS) for our surface courses and asphalt concrete (AC) for our lower asphalt layers. We also use a small amount of hot rolled asphalt for re-surfacing bridge decks and in other limited applications.

Every tonne of asphalt that we lay emits an average of 70 kg CO₂e and analysis of our usage estimates that we produced 77,300 tCO₂e in 2020.

The decarbonisation trajectory for asphalt

Modelling the activities in this roadmap shows that a 78% reduction in the carbon intensity of asphalt against our 2020 baseline is achievable by 2040. Decarbonising actions like building less and extending asphalt life will also reduce overall emissions and will be captured in future updates to this roadmap

Reducing emissions from asphalt production between now and 2030

Before 2030 our focus is on maximising the impact of emerging and available technology to reduce emissions from asphalt production (i.e. module A3).

Warm mix asphalt is already becoming the default option and by 2030 it will account for >80% of the asphalt we use. The asphalt we extract from our maintenance activities will be recycled into new asphalt mixes in increasing quantities and we will work with our supply chain partners to realise this on our schemes.

Transitions to lower carbon fuels are already underway across our supply chain and they will further support the reduction targets we must achieve by 2030.

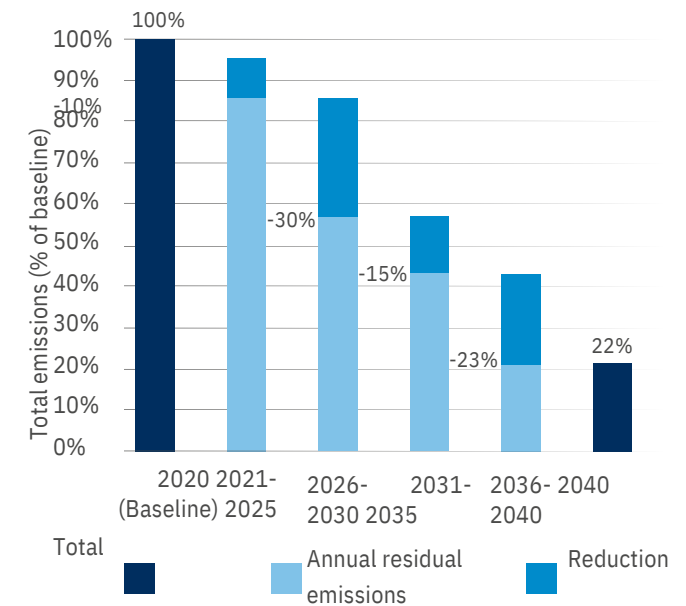
Increasing emphasis will be placed on reducing the carbon intensity of asphalt in the procurement of materials on all of our contracts. This process has started and aligns with our 2025 target for every project we commission to have an ambitious and transparent carbon reduction target applied to it.

Emerging technologies driving further reductions from 2030 - 2040

Emissions from bitumen production are the biggest contributor to the residual carbon in 2040. This is because crude oil extraction and global transport are anticipated to decarbonise slowly given the geographical and geopolitical influences.

Bio-component binders will mitigate some of the emissions associated with bitumen production and some products are available now. These will become increasingly prevalent and work has started to enable their use on the network.

Decarbonisation of the transportation sector and construction plant will gain pace as alternative fuels (e.g. hydrogen) drive down transport and construction emissions further. They are also expected to reduce heating and drying emissions at the asphalt plant generating additional carbon reductions for asphalt production.



Current asphalt decarbonisation trajectory



Asphalt paving machine and roller

WE ARE GOING FURTHER THAN DECARBONISING THE ASPHALT MATERIALS

Realising net zero means going beyond material decarbonisation and actively integrating net zero thinking across all of the complementary activities and decision-making processes that take place in the organisation. Some of the most important of these are summarised below:

Embedding whole life carbon reduction into pavement asset management

The Asset Class Strategy for Pavements defines the approach for maintaining pavement assets. The new strategy has been developed and it defines a new approach to extending asset life. A combination of preventative maintenance and using more durable, longer-life materials is an important enabler in realising a reduction in asphalt use. It also reduces the disruption to customers associated with resurfacing works.

More durable asphalt materials will deliver longer service life

Increased material durability can extend the lifespan of asphalt surfaces and reduce re-surfacing frequency and material use. Material selection and mix design is critical to maximising asphalt service life. Long-life asphalt surfaces can deliver whole life financial cost and carbon reductions even if their initial construction cost is higher.

Best practice pavement construction will reduce maintenance and operational carbon

Adopting best construction practices will extend the service life of asphalt pavements and reduce operational carbon associated with their use. We will be advocating construction processes that reduce joints (e.g. echelon paving), maintain asphalt delivery consistency and quality (e.g. material transfer vehicles) and enhance surface regularity to improve ride quality.

Building less new road infrastructure will directly reduce demand for asphalt

‘Building less’ is a component of our Net Zero Plan and this will reduce our demand for asphalt, further driving down our carbon emissions associated with these materials. This must be balanced against the need to deliver a modern and efficient road network that meets the needs of the nation. Building less also reduces disruption for our customers given fewer maintenance interventions will be required to maintain roads in the future.

