



# Sustainability in practice

The art of the possible

## The UK's lowest carbon road - Pioneering low carbon road surfacing and reducing carbon emissions by up to 80%

### THE CHALLENGE

Three local roads in the North-East have become the lowest carbon highways ever to be resurfaced in the UK, thanks to a project that has set a new benchmark for the way roads are maintained. Working in partnership with Hartlepool Borough Council and Stockton-on-Tees Borough Council together with international partners including Shell, Volvo CE, Wirtgen and JCB, Tarmac, has reduced the carbon emissions of the road schemes by up to 80% compared to projects using traditional methods. It is understood these projects have the lowest CO<sub>2</sub> emissions for road resurfacing in the UK without using carbon offsetting. The project team combined an extensive range of low carbon materials, techniques and plant equipment for the very first time to resurface a section of the A689 in Wynyard, near Hartlepool, and two residential roads in Stockton-on-Tees Borough.

### COMBINED CARBON SAVINGS

By combining lower carbon materials sustainable plant and production technology the scheme managed to leverage carbon savings from a variety of sources and drive down the net carbon emissions.

Warm mix asphalt was used together with a new bio-component binder from Shell which uses bio-genic materials to create a technical carbon sink in the road to prevent carbon being released into the atmosphere. The surface course was supplied as a BIO ULTIPAVE 10 SURF 70/100 and the binder course as a BIO AC 20 DENSE BIN 40/60 DES. The binder course used 30 per cent recycled asphalt plantings (RAP) in the lower layer with 20 per cent in the surface course to reduce the need for primary materials. Shell developed a prototype C375 binder for this contract with an additional 50% increase in bio-oil

content beyond the C250 bio binder previously available. This increased biogenic content further reduced the average embodied carbon by 23%.

### WHAT IS BIOGENIC ASPHALT?

Biogenic asphalts replace some of the fossil fuel derived binder with a biogenic or plant-based alternative. As well as having a lower carbon footprint during production, the biogenic asphalt binder technology effectively locks away carbon absorbed during the growth of the biomass or plant-based element. Since the asphalt can be recycled at the end of the pavement life, this carbon will not re-enter the atmosphere but be incorporated into another road.





## LOW CARBON PROCESS TECHNOLOGY

Tarmac's asphalt manufacturing plant at Coxhoe was powered by a combination of bio fuel and electricity. Materials were also kept in dry storage to minimise the energy needed to dry them out before producing asphalt, and Greener Power Solutions provided a battery unit. A number of electric plant vehicles and prototypes were supplied by partners such as Volvo and Wirtgen, including electric and hybrid road rollers and an electric bond coat sprayer. Other plant vehicles were powered by hydrotreated vegetable oil (HVO), provided by Certas Energy, as an alternative to diesel.

## RESULTS AND BENEFITS

In all, 1,562 tonnes of Tarmac's Biogenic Asphalt was supplied and laid on the Hartlepool and Stockton schemes. Using the prototype biogenic asphalt mixes along with other carbon saving measures achieved a net reduction in carbon emissions of around 80%. This was achieved while meeting all of the critical specification and performance requirements including incorporating high PSV 65 aggregate.

The clients were delighted with the carbon savings achieved on these schemes. Councillor Mike Young, Leader of Hartlepool Borough Council, said: "The Tees Valley is an area renowned for innovation, and I'm delighted and proud that we are leading the way nationally - in partnership with Tarmac - with these low-carbon road resurfacing schemes. Schemes such as this reflect the Council's determination to reduce its carbon footprint to help tackle the causes of climate change. We are committed to becoming a "Net Zero" emissions authority by working in partnership with a range of stakeholders"

## SCALING FOR THE FUTURE

Commenting on the delivery of the project, Brian Kent, technical director at Tarmac, said: "While this project has delivered local environmental benefits in the North East, it's also nationally significant because it provides a blueprint for how to decarbonise every element of highways delivery. Our team has shown that it's possible to significantly turn the decarbonisation dial with new material technologies, cutting-edge plant and collaborative working with local authorities and the supply chain.

"To replicate this approach on every project will require further investment and scaling up of technology across the industry. It's now important that we take learnings from this groundbreaking project to help inform further decarbonisation across the local and strategic road networks."

## LOW CARBON LEADERSHIP

Introducing biogenic asphalt underlines Tarmac's commitment to supporting our customers in their journey towards a net zero future for road maintenance. It follows the introduction of other products like our Rubber Modified asphalts which can recycle rubber from up to 750 end of use tyres per kilometre of road and our decision in 2022 to take the lead in defaulting entirely to lower carbon warm mix asphalt. This decision alone will potentially save up to 21,000 tonnes of carbon dioxide per year. This scheme also illustrates Tarmac's commitment to working with clients to help them introduce innovative materials in a smart and considered way, while ensuring consistent performance comparable to conventional materials.

For more details visit: [tarmac.com](https://www.tarmac.com)

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