

INNOVATION

Constant competition and headwinds in the automotive industry demand that sustainable innovation form a key part of our culture, product, and operational strategies. Innovation underpins both our effort to be leading in sustainability and our aim to improve efficiency year-on-year. It helps us to respond to changes in market conditions too, and to turn challenges into opportunities.

From virtual vehicle development to AI-driven quality control, we are harnessing cutting-edge technology to improve efficiency, reduce waste, and elevate our sustainability credentials. Our innovation is not only shaping the future of our products—it is revolutionising the way we design, manufacture, and deliver sustainable luxury.

The ETC is a key site for innovation with future development for new equipment underway, including virtual vehicles, a virtual driver-in-the-loop simulator, a light room for headlamp testing, and high voltage bays for electric vehicles.

A prime example of this transformation is our [Compact Full Spectrum Driving Simulator](#), purchased in 2023 and now operational. This high-tech investment in innovation replicates real-world driving conditions. This innovation reduces the need for physical testing, improves efficiencies, and enables us to identify issues earlier in the design process.

Additionally, our AI-driven Aerodynamics Project has enabled instant aerodynamic performance evaluations during the design process, supporting traditional Computational Fluid Dynamics (CFD) processes, which previously took circa. one week. By leveraging machine learning models developed with AI and trained on our proprietary data, we have significantly improved

design efficiency while reducing the energy consumption associated with high-powered data centres.

We have enhanced and embedded the use of Virtual Series Testing - an approach that divides the vehicle development process into eight 'checkpoints' where we freeze data and test it virtually. This identifies issues earlier and enables iterative improvements.

These innovations are reshaping the way we develop, test, and refine our products.

Innovation for sustainability is a mindset, and we know that it is not easy. We continue to support our engineers to make the big cultural shift to virtual testing and have invested in training and integration to support their use of the driving simulator and AI technology.

Patents at Bentley

Innovations at Bentley are driven by our colleagues and are funnelled through the patent process, led by our R&D department. All colleagues are welcome to submit their ideas to this process. Sustainability is one of the core innovation areas in our patent process, meaning a greater focus is given to innovations that enhance our sustainability performance. Recent protected innovations have included ways of using existing elements of the vehicle in new and exciting ways, ideas to reduce part installation and rework time, and innovations which reduce vehicle weight. Our innovations are aimed at delighting our customers and keeping Bentley at the forefront of technology and innovation.

In September 2024, we hosted the biennial Patent Award Ceremony, where we celebrated with colleagues who have had their inventions submitted to the UK Patent Office, or have had their patent specification granted. Inventors receive a certificate, a 'Bentley Inventor' pin badge, and a monetary reward. As part of this event, we were also pleased to award three colleagues with 'Extraordinary Innovator' recognition, for their work in spearheading 'innovative thinking' within their functions.



Charlie Smith
CAD Verification
Engineer

Bentley Inventor Badge

Patent Awards 2024

Virtual reality

We have made significant strides in virtual vehicle development and testing, enabling faster, more efficient testing while dramatically reducing reliance on physical prototypes. Through advanced simulation technologies, we are:



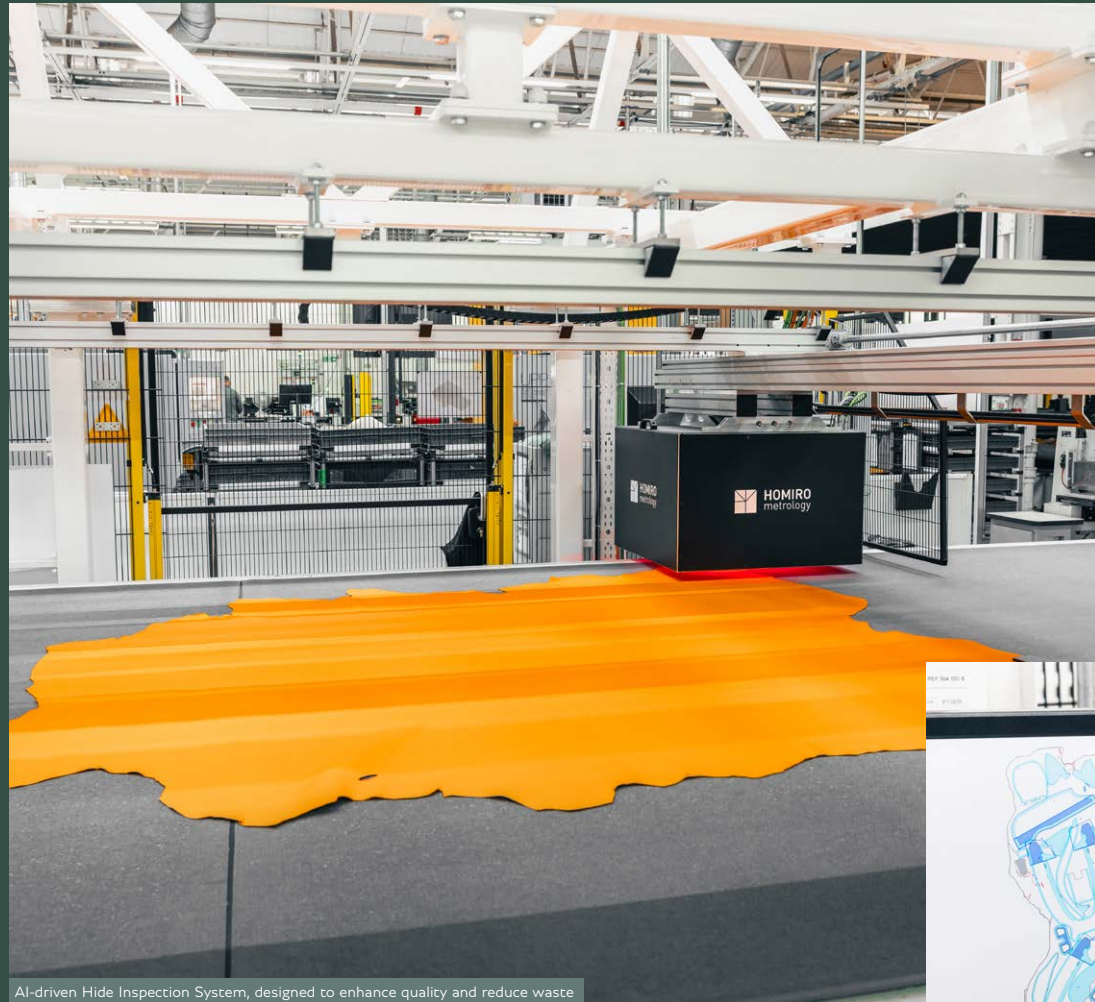
Minimising the number of physical test vehicles, reducing associated emissions and material waste (scraps)



Accelerating the design phase, allowing earlier issue identification and refinement



Enhancing vehicle safety and performance through precise, data-driven testing methodologies



AI-driven Hide Inspection System, designed to enhance quality and reduce waste

INNOVATION CASE STUDY: AI HIDE INSPECTION

Leather is an essential part of the Bentley brand and one of our most exciting advancements in 2024 is the AI-driven Hide Inspection System, an industry-leading technology designed to enhance leather quality while reducing waste.

Detecting leather defects in hides for our seats is challenging and expensive. Overlooking defects is even costlier, since it results in wasted resources and a requirement to use more leather.

Our innovative AI Hide Inspection System – a Group first – inspects every hide digitally for all possible defects at a microscopic level. This solution is faster, more accurate, and better for the environment compared to manual inspection.

The system picks up minuscule defects such as growth lines, healed scars, and insect bites. It delivers live quality data and grades leather defects based on part usability requirements. This improves hide utilisation, and the system can better calculate the positioning of the trim parts, further reducing waste.

Previously, vehicles commonly required more hide than the amount provided by logistics. The results of AI hide inspection has cut our leather waste, spend, and reduced our carbon emissions, since we require fewer hides. Early data shows a 5.9 per cent improvement in hide utilisation, equating to a 135.7 kg reduction in CO₂ emissions per car.



AI computer-generated image



CHARGING SOLUTIONS

Providing a comprehensive charging portfolio aligned with the BEV rollout timeline is essential to the achievement of our decarbonisation goals.

While supply chain issues – including changes in partner commitments – has had an impact on the rollout of charging solutions, we remain committed to our goal to develop a comprehensive charging portfolio for our customers globally.

Given the challenges of the charging solutions market, we have opted for a people-centric approach alongside our integration with Group infrastructure. We must understand our customers' needs and develop solutions that are adapted to the unique requirements of different markets, ensuring local relevance and customer convenience.

The people-centric approach also encourages stakeholder collaboration with cross-brand workshops and global visits to investigate and better meet customer needs.

In 2024, we focused on understanding the charging solutions market better and planning more closely for market entry. We made market visits to China and hosted workshops with Group brands to refine the charging plans and global outlook. As a result of our collaboration and research our understanding of customer needs and global charging market dynamics has been further enhanced.

Also in 2024, we secured a partner to support the introduction of a high-quality UK home charging solution, with deployment expected in 2025. We improved our alignment within the Group to ensure seamless rollout of public and home charging solutions. Our integration with Group-level infrastructure to provide seamless plug-and-charge technology to enhance customer experience aligns with our Beyond100+ strategy.

Additionally, we will introduce charging solutions to our retail network – utilising it as the primary customer touchpoint for education and support.

Ideation workshops

We rely on our teams to drive the strategic and product innovation required for us to develop and source the most sustainable products and materials possible. To that end, we encourage innovation with structured ideation workshops and innovation challenges. We have integrated new processes to capture and prioritise the sustainability-focused ideas from these workshops and have enabled a systematic approach to identifying high-impact sustainability projects.



Continental GT in Tourmaline Green on charge