Powering the UK's battery supply chain

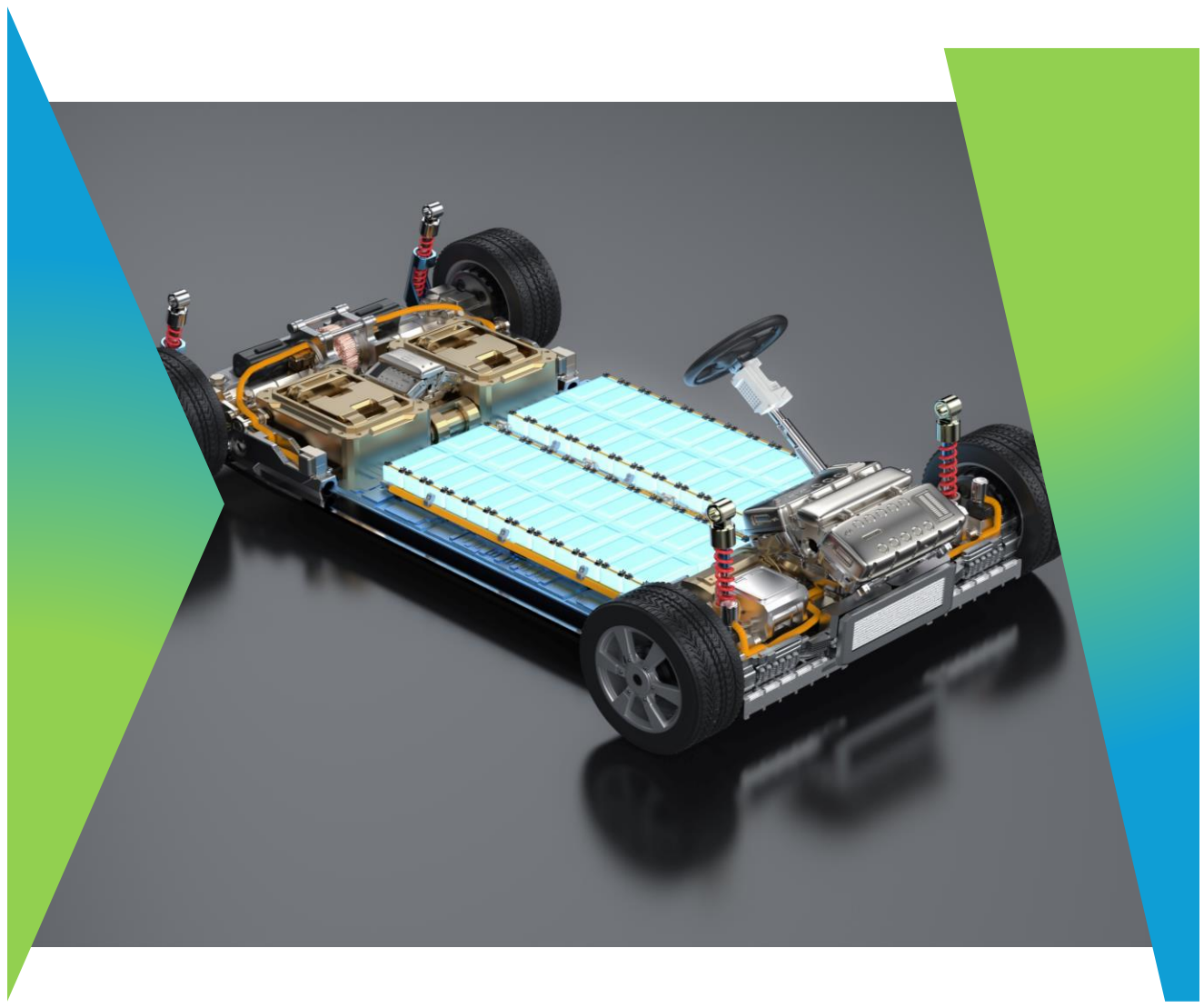
ADVANCED PROPULSION CENTRE UK

Battery end-of-life recycling and second use

Reuse, remanufacture, recycle: building a circular economy for EV batteries

Current EU law demands that vehicle manufacturers retain responsibility for the safe disposal of electric car batteries. In the UK alone, there are currently around 1.2 million pure electric vehicles and plug-in hybrids on the road. RECOVAS is a ground-breaking project focused on creating a new circular end-of-life supply chain for the electric vehicle industry, establishing a standardised and reliable route for recycling and repurposing lithium-ion car batteries at a scale that can cope with expected future demand.

The new supply chain will help all partners to triage batteries when they arrive at approved end-of-life vehicle treatment facilities across the UK. Possible options are remanufacturing, repairing and re-engineering existing batteries for potential use in new cars, reuse, giving batteries a second life in stationary storage to help balance the use of the electricity grid during peak use and optimise the use of renewable energy, or recycling, recovering critical materials for future applications.



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Permanent magnet recycling attracts investment

By 2035 all new cars sold in the UK will be electric or hybrid. Many of these vehicles will have permanent magnets in their motors. By 2030 the UK has a target to deploy over 50 GW of offshore wind turbines, requiring over 32,000 tonnes of magnets. Rare earths are a vital component of permanent magnets, so establishing a domestic supply chain is critical.

Ionic Technologies (formally Seren Technologies), a 2014 spinout company from Queens University Belfast, has worked out how to recycle this valuable commodity by hydro-metallurgically extracting, separating, and refining rare earth oxides from spent magnets. While participating in the APC's Technology Developer Accelerator Programme (TDAP), founding company Seren was purchased by Australia-based multinational, Ionic Rare Earths (IonicRE), who have made significant investment in the UK to take the technology towards scale-up.

Ionic has recently been awarded further APC funding to progress its technology from the lab bench to a commercial venture, accelerating scale-up of the construction of a new facility at the Titanic Quarter in Belfast.

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Decarbonising manufacturing using recycled aluminium alloys

Aluminium's strength-to-weight ratio makes it incredibly valuable to the automotive net-zero agenda. Its lightweight nature can significantly enhance performance and improve fuel economy, its strength means it can absorb twice the crash energy of mild steel. It is however, a carbon intensive product, around 16 tonnes of CO2e are produced per tonne of aluminium.

Recognising this, aluminium specialist Constellium embarked on a project to develop scrap sorting and blending technologies to ensure this precious alloy is recycled rather than downcycled, contributing to a circular economy. Having demonstrated that high-strength alloys with high-recycled content can meet or exceed OEM key performance criteria, such as strength, crushability and durability, the CirConAl project established the first aluminium re-melting plant in the UK, and is now producing automotive grade material to be used by BMW.