



Thatcham Research  
AUTOMOTIVE RISK INTELLIGENCE

# Insurability Blueprint for Electrified Vehicles



## CONTENTS

4	Context and Challenge	10	Two Fundamental Challenges to Insurability
5	Purpose and Audience	14	Requirements for Sustainable Electrification
5	Understanding Electrified Vehicles (EVs)	22	Glossary
7	The 'Insurability' Challenge	24	References
9	Three Foundational Principles	25	The Blueprint

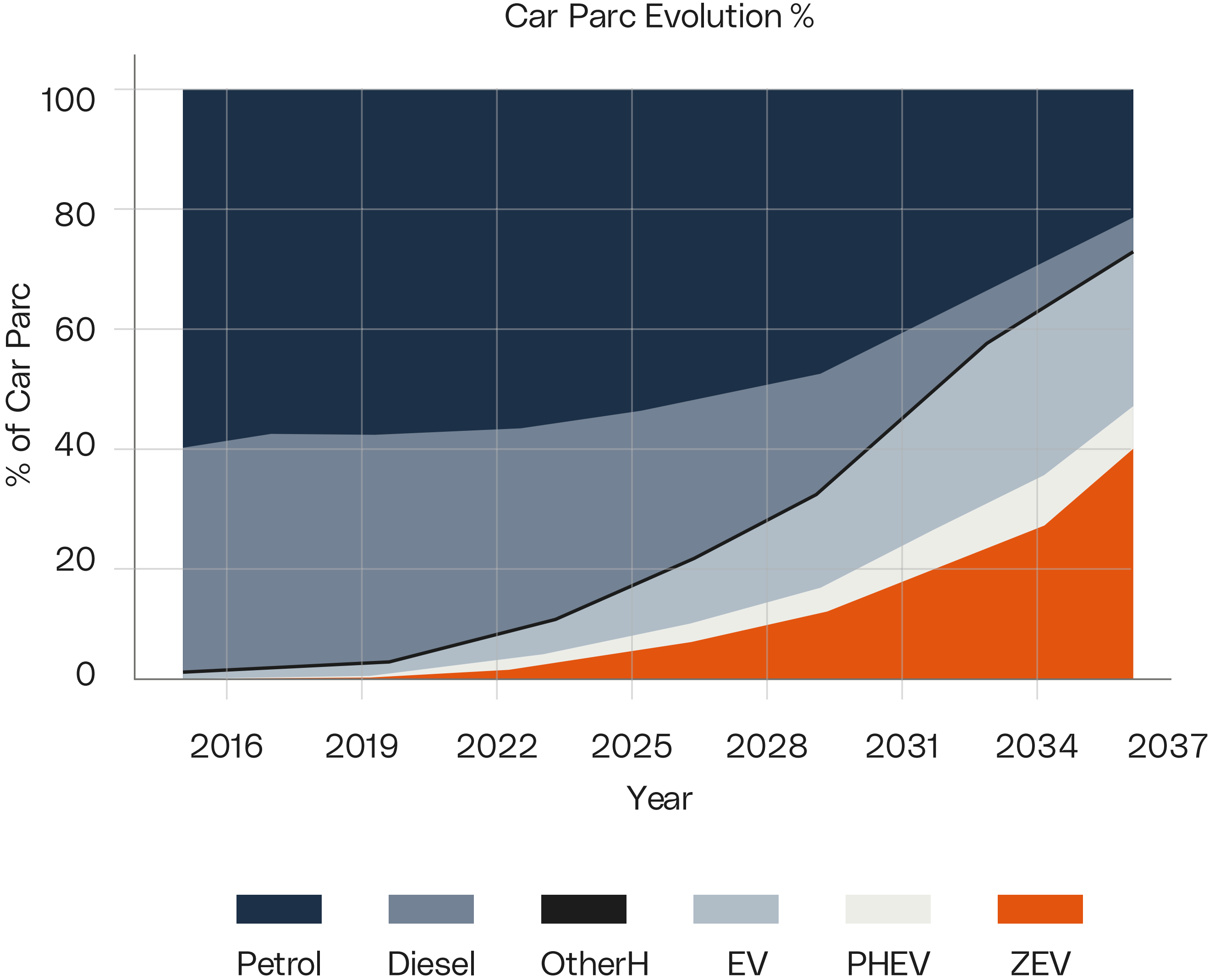


### CONTEXT AND CHALLENGE

The United Kingdom (UK) government is committed to phasing out new cars that rely solely on internal combustion engines, from 2035 only zero-emission vehicles will be sold, with projections suggesting that over 95% of UK vehicles will be zero-emission by around 2050. The transition has already begun. As of the end of 2025, there are 1.8 million electrified vehicles (EVs) on UK roads, representing 5.3% of the 34 million passenger vehicle market<sup>[1]</sup>.

This transition raises important challenges for the insurance industry associated with assessing and repairing vehicles equipped with electrified technology. Although significant progress has been made, fundamental challenges persist for the industry regarding the assessment and reparability of electrified vehicles.

Collaboration across the automotive chain is essential to ensure that future electrified vehicles not only reduce their environmental impact and incorporate advanced technologies but also uphold safety, sustainability, and affordability. Achieving this will require coordinated action among the automotive industry's stakeholders.



## PURPOSE AND AUDIENCE

This document focuses on three key groups of stakeholders:

- Insurers and Repairers who need clear guidance on what affects the insurance risks and repairability of electrified vehicles.
- OEMs and Battery Manufacturers who should understand insurance industry requirements when designing their vehicles.
- Government and Regulators who can create policies that encourage safe and sustainable electrification.

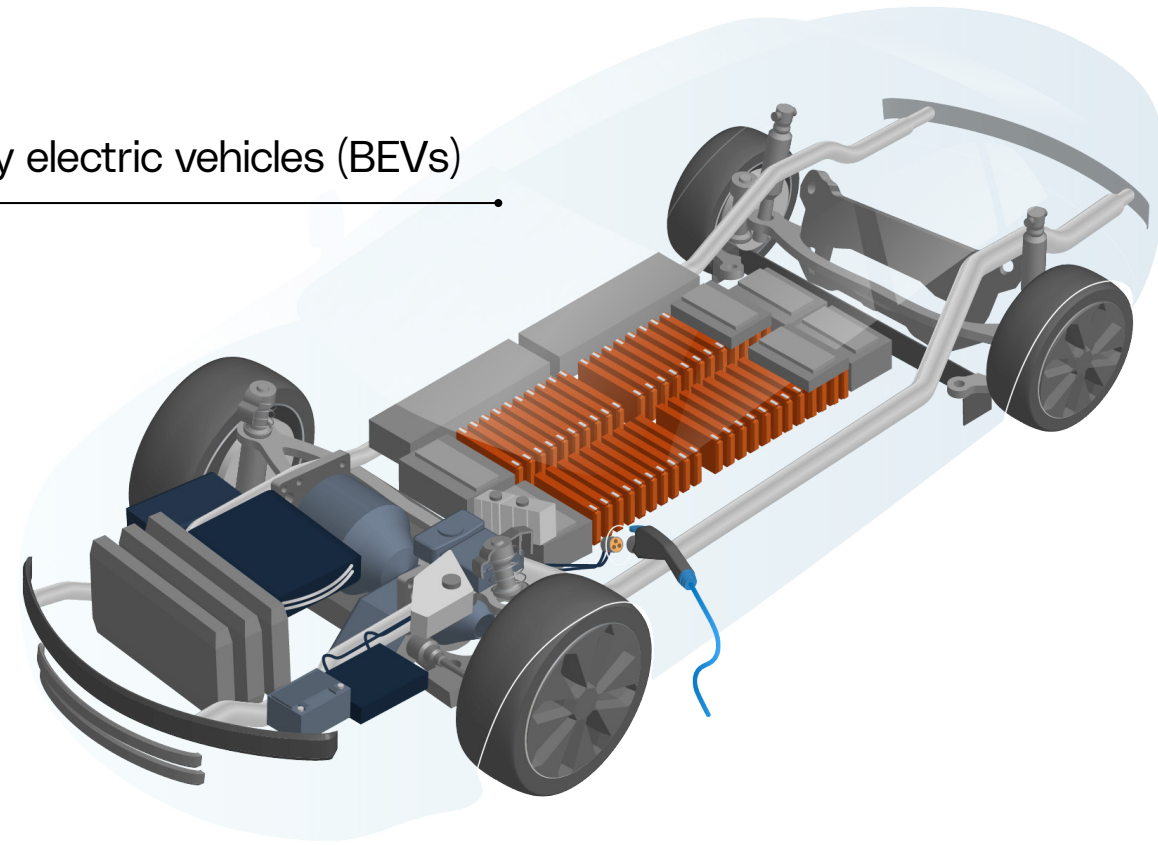
The analysis in this document is based on established research foundations. Thatcham Research's 2023 report, "Impact of BEV Adoption on the Repair and Insurance Sectors,"<sup>[2]</sup> outlines the initial challenges faced. Additionally, a 2025 industry questionnaire commissioned by the Centre for Economics and Business Research (CEBR) identified ongoing barriers. Data from Gecko Risk shows measurable progress but also highlights existing gaps that still need to be addressed.

## UNDERSTANDING ELECTRIFIED VEHICLES (EVS)

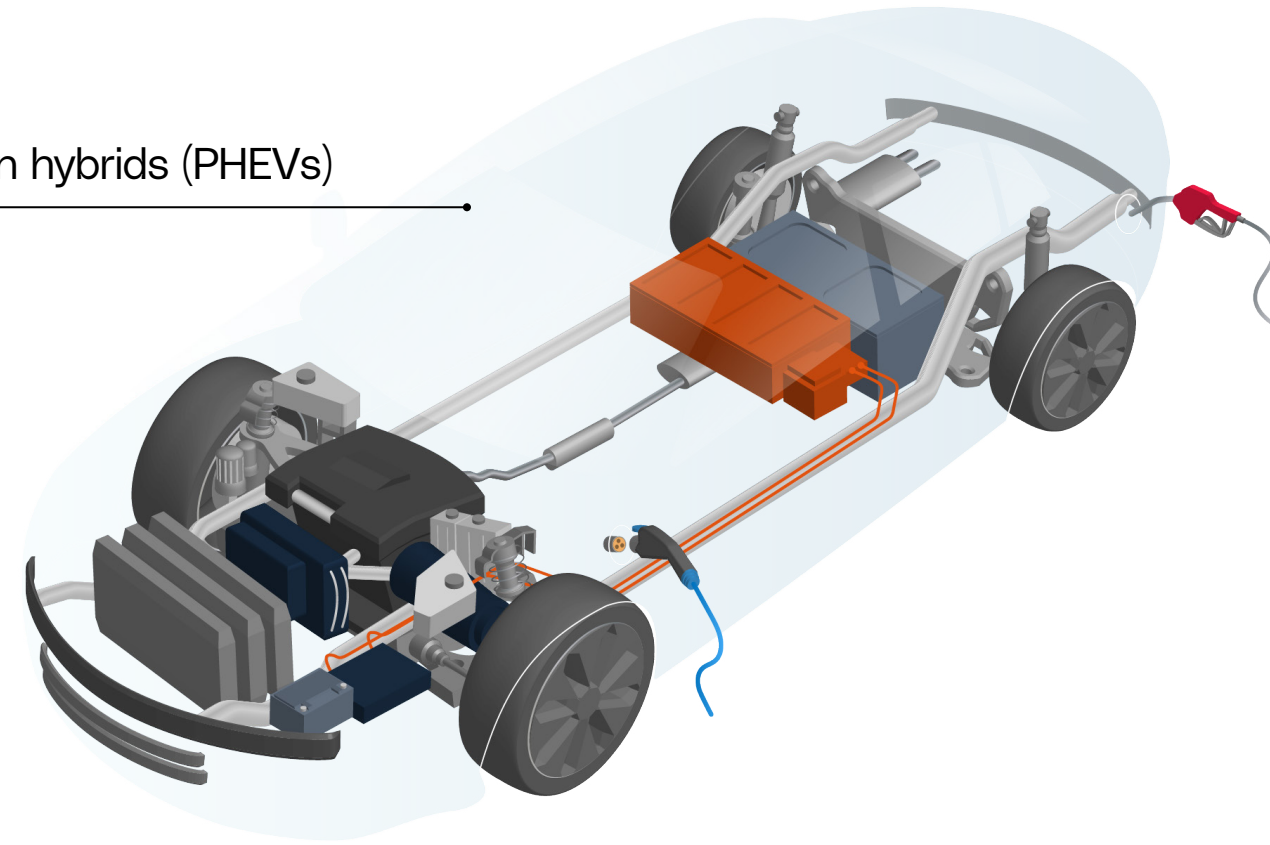
For the purposes of this document, electrified vehicles are defined as any vehicles that use an electric motor for traction and many have High Voltage (HV) battery systems exceeding 60 volts DC. These vehicles can take several forms, the most common examples are:

1. Battery Electric Vehicles (BEVs) are powered exclusively by electric motors that draw energy from rechargeable batteries.
2. Plug-In Hybrid Electric Vehicles (PHEVs) utilise two power sources: they can be charged and driven using electricity, or they can operate with internal combustion engines for traction or to recharge the battery.
3. Hybrid Electric Vehicles (HEVs) combine conventional internal combustion engines with electric motors into a unified traction system.
4. Fuel Cell Electric Vehicles (FCEVs) generate electricity for traction using hydrogen-powered fuel cells.
5. Range-Extended Electric Vehicle (RE-EV):  
A vehicle that uses an electric motor for propulsion but includes a small combustion engine to recharge the traction Battery.

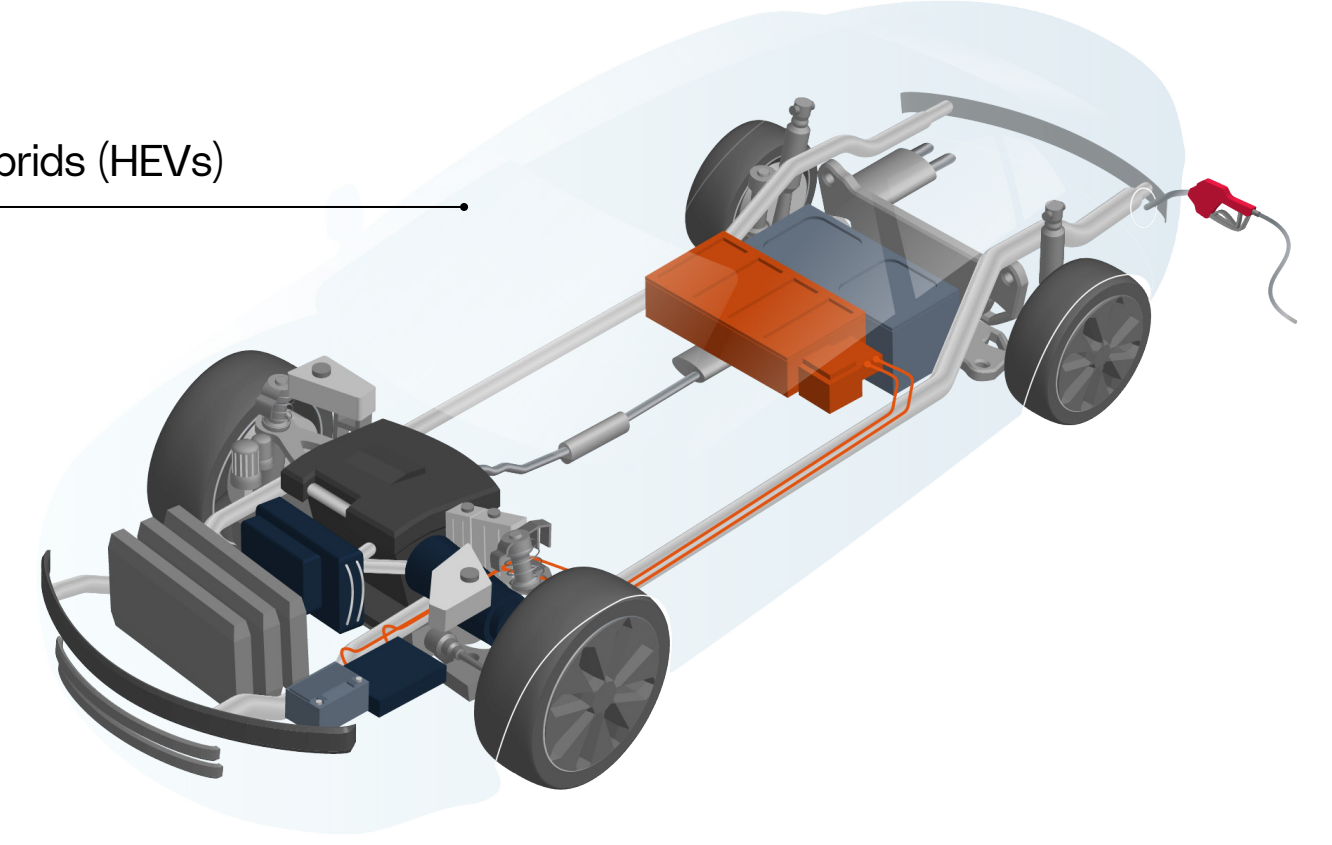
1. Battery electric vehicles (BEVs)



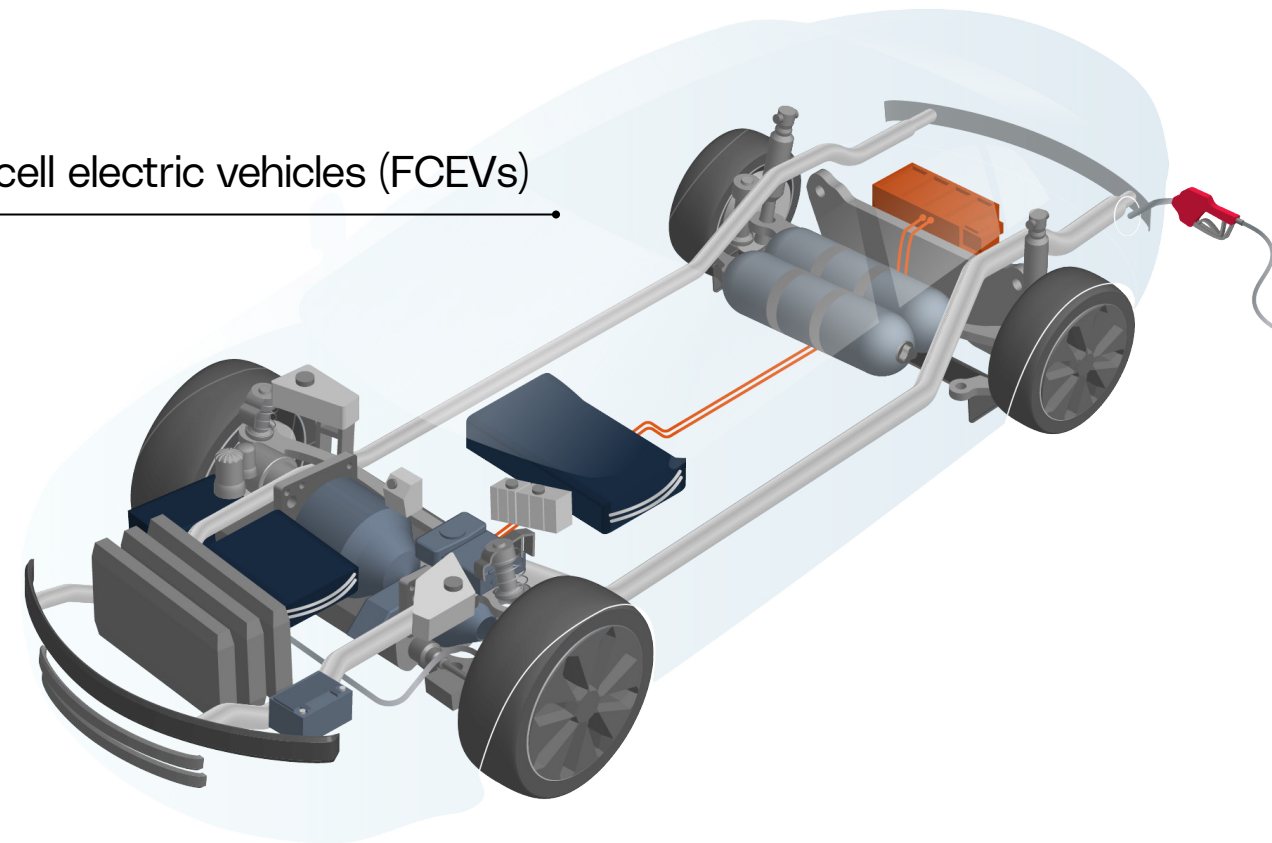
2. Plug-in hybrids (PHEVs)



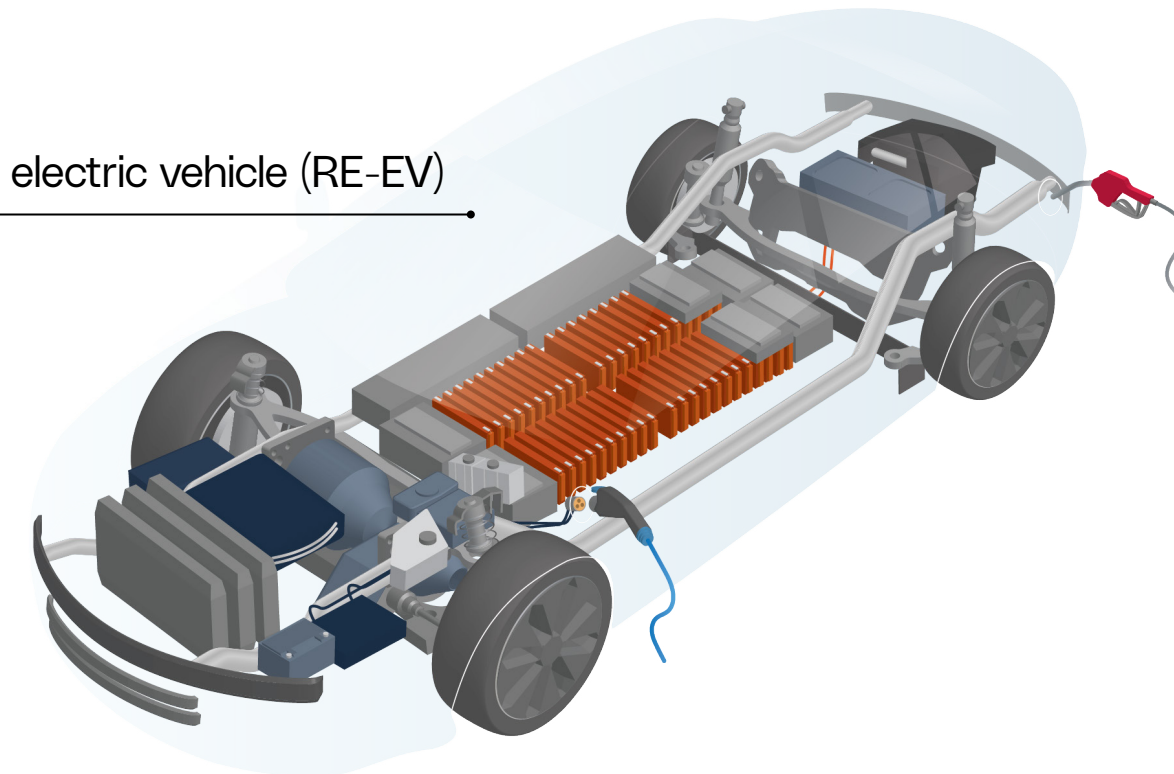
3. Hybrids (HEVs)



4. Fuel cell electric vehicles (FCEVs)



5. Range-extended electric vehicle (RE-EV)



## THE 'INSURABILITY' CHALLENGE

The primary obstacle to affordable electrified vehicle insurance is the industry's ability to effectively recover, assess, and repair these vehicles after incidents. This challenge must be addressed to ensure that the electrification of vehicles remains economically sustainable for both insurers and consumers.

According to a report published by Thatcham Research in 2023, the repair costs for BEVs were approximately 25% higher than those for internal combustion engine vehicles, with repair times extending by an additional 14%<sup>[2]</sup>. These figures pose a significant challenge to insurance premiums and directly affect consumer affordability.

However, recent data from Gecko Risk shows measurable progress in this area. Repair costs have decreased by 10.7%<sup>[3]</sup> as repair professionals have become more familiar with EV technologies and have developed more efficient processes. This improvement highlights the importance of skill development and procedural refinement within the repair sector. Despite this encouraging progress, it is still not enough to fully address the challenges at hand.

The 2025 CEBR questionnaire reveals ongoing barriers to competitive EV insurance and effective repairs. When asked to identify the biggest obstacles, 44.6% of insurers and 41.7% of repair professionals pointed to battery-related issues as the primary concern.

The issues surrounding electric vehicles can stem from high replacement costs, as batteries on average account for 40% of a vehicle's total new value; limited reparability due to current battery designs not being intended for serviceability or refurbishment; and a low availability of skilled technicians, as there is a shortage of individuals trained and capable of safely diagnosing and repairing high-voltage systems.

Consumer perceptions reflect these industry challenges. The questionnaire found that 89.4% of drivers express moderate to high concern about insurance affordability, while 71.5% are worried about the long-term environmental impact of EV batteries. These figures suggest that the challenges surrounding increased adoption extend beyond technical issues to include consumer confidence in the transition to electrification. Nearly nine in ten drivers question whether insurance will remain affordable, presenting a significant obstacle to the widespread adoption of EVs.



The BEV-to-ICE repair cost comparison chart for newer vehicles indicates approximately a 25% higher cost for BEVs.

## THREE FOUNDATIONAL PRINCIPLES

There are three essential principles that underpin the requirements outlined in this document. These principles represent fundamental obligations for the UK motor industry to effectively serve consumers and support the transition to electrification.

# 1

### PRINCIPLE ONE: SAFETY

Safety remains paramount throughout an EV's entire lifecycle. While vehicles are designed to meet stringent product safety standards, safety considerations continue beyond the initial collision event. This includes every stage of the post-incident process: recovery, assessment, and repair. Such requirements are crucial for ensuring the safety of everyone who interacts with these vehicles, including drivers, passengers, recovery personnel, assessors, and repair technicians. This necessitates careful attention to HV system management, prevention of thermal runaway, and safe handling procedures.

# 2

### PRINCIPLE TWO: SUSTAINABILITY

The industry needs access to a comprehensive traction battery circular economy. Currently, industry practices operate mainly on a linear model, which involves raw material extraction, battery manufacturing, vehicle use, and final disposal. This approach presents both environmental and economic challenges. In contrast, a circular economy model that incorporates repair, refurbishment, and remanufacture offers significantly better sustainability outcomes. This includes ensuring battery repairability, providing timely and affordable access to replacement components, and having the necessary skills and equipment available for repair services.

# 3

### PRINCIPLE THREE: AFFORDABILITY

High voltage components must be easily accessible and priced reasonably by both original equipment manufacturers (OEMs) and independent suppliers. When HV batteries account for 40% of new vehicle price, with depreciation there is a greater risk of total loss. However, this outcome should not be inevitable. Manufacturers should create total loss avoidance strategies specifically targeting HV system components, especially traction battery and motor costs. This includes new parts, warranted refurbished units, and remanufactured options. This is essential to ensure that the shift to electrification does not result in higher total loss rates compared to conventional vehicles.

## TWO FUNDAMENTAL CHALLENGES TO INSURABILITY

Although significant progress has been made in addressing the challenges associated with assessing and repairing modern vehicles equipped with advanced technology, two fundamental challenges persist for the industry regarding electrified vehicles.

### CHALLENGE ONE: POST-COLLISION DIAGNOSIS AND ASSESSMENT

The determination of whether a vehicle is repairable or a total loss is a critical decision point in the insurance claims process. Since high-voltage batteries can account for about 40% of a new vehicle's value, accurately identifying battery damage after a collision often influences the decision to repair or write off the vehicle. Achieving precision in this initial assessment is vital. Starting repairs that later prove ineffective leads to unnecessary delays, increased costs, and decreased customer satisfaction. Therefore, the assessment process at the First Notification of Loss (FNOL) stage must consider several key factors.

First, the skills and expertise of FNOL assessors and Vehicle Damage Assessors (VDAs) are crucial. These professionals need sufficient knowledge to accurately evaluate damage to advanced EV technologies. Additionally, recovery teams must be well-trained to ensure safe vehicle recovery, protecting both personnel and assets throughout the process. Understanding the vehicle's condition before the collision, including any existing issues, provides essential context for accurate assessment. This baseline information allows assessors to differentiate between collision-related damage and pre-existing conditions.

Quarantine requirements also warrant consideration. Determining whether a damaged vehicle needs quarantine, typically for a standard period of two weeks, serves important safety purposes. However, this precaution can lead to costly delays, increased claim costs, and lower customer satisfaction when it is applied unnecessarily.

The ability to visually assess battery damage is particularly important. Assessors need to evaluate whether scratches or dents on the battery fall within acceptable limits or require intervention. Current methods and specifications for this evaluation are limited and vary significantly across manufacturers, leading to inconsistencies in damage assessment.

Finally, diagnostic capability is increasingly important as vehicle technology becomes more complex. The assessment process must identify when diagnostic evaluations are necessary and ensure that the required equipment and expertise are available. Effective access to diagnostics also allows for a confident evaluation of undamaged battery packs following minor collisions, facilitating their reintegration into the economy and improving salvage rates.

## CHALLENGE TWO: POST-COLLISION REPAIR EXECUTION

The repair and reuse of high-voltage batteries, motors, and other system components continue to lag behind the rapid adoption of electrified vehicles. This limitation contributes to higher total loss rates, reduced salvage and residual values, and ultimately affects insurance premium structures.

The fundamental issue lies in the design philosophy. Currently many batteries are not designed for clean and efficient dismantling, which prevents battery components from being reused or refurbished. Some batteries are considered non-repairable even when the damage is minor. For instance, even minor surface damage to casings can necessitate full battery replacement due to the challenges of disassembly, labour intensity, and limited technical skills available.

For certain batteries that could theoretically be repaired, problems with sealants, foams, and adhesives significantly hinder disassembly efforts. As a result, shredding and recycling often become the only viable options. Given that producing a BEV battery can generate over 10,000 kg of CO<sub>2</sub>, relying solely on direct recycling is unsustainable [4].

In the UK, the current focus primarily addresses the external aspects of battery lifecycle management: manufacturing new batteries and recycling end-of-life units. While these activities serve important functions, they only represent a partial engagement with the full battery lifecycle opportunity.

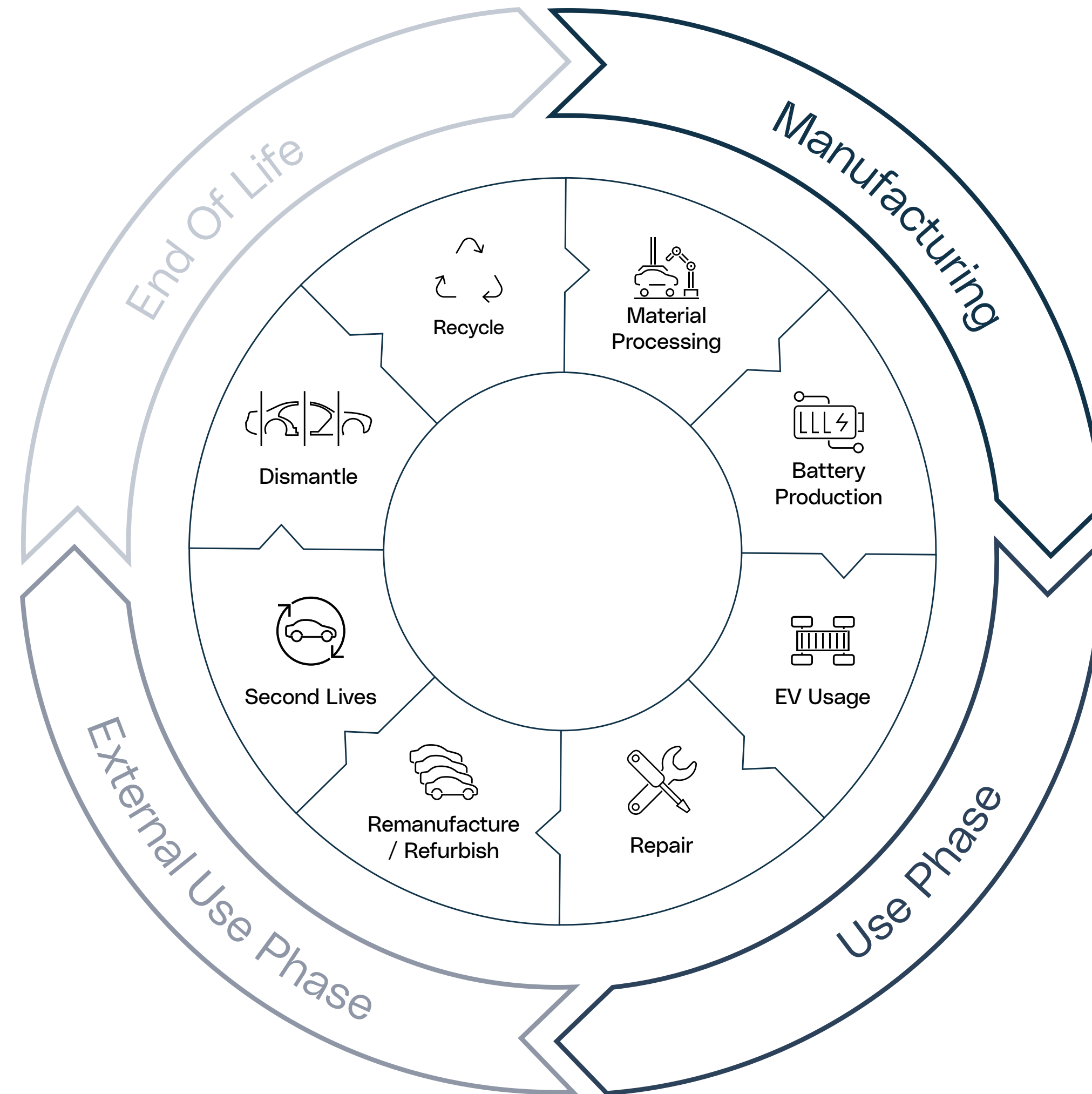
The internal cycle, which includes repair, refurbishment, and remanufacturing, provides a critical pathway for transitioning from a traditional linear model to a sustainable, closed-loop system that meets insurance industry requirements. This internal cycle addresses the core challenges outlined in this document and enables the creation of a safe, affordable, and sustainable framework for electrified vehicles.

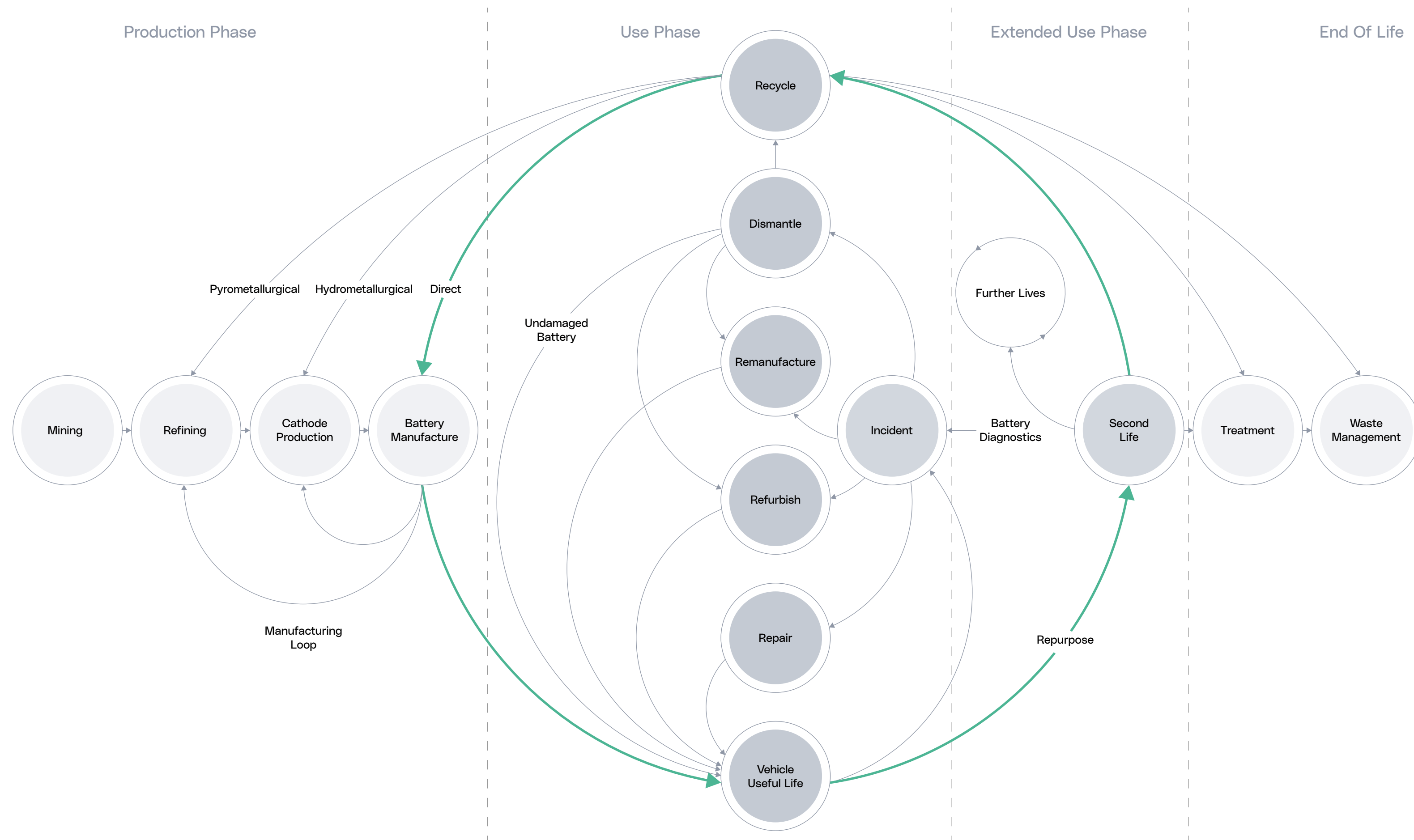
The implementation of a circular economy highlights the importance of reuse, repair, refurbishment, and remanufacturing in minimising waste and conserving resources. Consider a practical scenario that illustrates the current challenge and a potential solution.

For example, a three-year-old BEV sustains damage from a minor side impact to the HV battery bracket. Under current conditions this would frequently result in total loss because battery casing damage requires a replacement with a new battery exceeding the depreciated total vehicle value. In a functioning circular economy, the battery casing would be repaired without pack removal or replaced with a significantly lower cost refurbished units which would efficiently restore vehicle operation.

This approach has multiple benefits:

The vehicle can return to service promptly, the customer retains their vehicle, salvage values improve, and the environmental impact is substantially reduced compared to manufacturing a new battery. This represents an achievable future state, contingent upon addressing specific design and process barriers identified in the requirements that follow.





Access to refurbished or remanufactured batteries needs significant improvement, whether sourced from OEMs or third-party suppliers.

This capability is crucial in preventing older vehicles from being declared total losses, as the costs of new batteries often outweigh the depreciated vehicle values. Without viable refurbishment options, the economic calculation frequently favours write-off over repair, especially for vehicles beyond their initial warranty period.

## REQUIREMENTS FOR SUSTAINABLE ELECTRIFICATION

The following requirements translate the principles and challenges mentioned earlier into specific, actionable design and operational standards. Implementing these requirements will allow EV Insurability to achieve optimal efficiency while ensuring safety and sustainability.

### REQUIREMENT 1: BATTERY DAMAGE PROTECTION AGAINST IMPACTS

In most EVs, the HV battery is centrally located along the underside of the vehicle, typically spanning the area between all four wheels. This low-mounted position optimises weight distribution and enhances vehicle stability. However, this placement introduces unique risks that are not present in traditional internal combustion engine vehicles.

The location of the battery makes it susceptible to damage from underbody impacts, such as road debris, speed bump strikes, and collisions with elevated curbs, as well as from side impacts in the sill area.

To address these unique risks, robust under-shields are necessary to protect the battery, rather than relying solely on the lower casing. Critical components, including cells and cooling systems, often sit directly above the casing, which requires additional protective measures.

Internal testing from Thatcham Research indicates that effective side impact protection necessitates both adequate shielding and sufficient clearance in the sill area. In many cases, even minor damage to the outer battery brackets can lead to a complete battery replacement due to the integrated design of the battery casing.

Best practices include designing battery brackets that can be removed from the casing without unsealing the battery pack itself. These protective or replaceable components should be available for separate purchase, with costs kept at reasonable levels relative to their function.

Protecting other critical areas, particularly vents and battery wiring connectors, is also essential, as damage to these relatively inexpensive components can lead to costly and prolonged insurance claims in real-world situations.

### REQUIREMENT 2: HV SYSTEM COMPONENT DESIGN

The primary focus is on HV batteries, but repairs to other high-voltage system components can lead to significant insurance claim costs. One notable example is the charge port placement. When the HV charge port is located at the front of the vehicle, it becomes more vulnerable to damage during common low-speed incidents, such as front-end collisions and parking accidents. Since the front of vehicles often bears the brunt of minor accidents, front-mounted charge ports are at a higher risk of being struck, which can result in costly repairs or even render the vehicle temporarily inoperable.

The risk increases when charge ports are integrated with wiring looms or other HV components, such as onboard chargers. In the event of minor collisions, it may be necessary to replace larger electrical assemblies rather than just the charge port. A best practice is to position charge ports in less exposed locations and to design them as standalone components. This approach minimises repair complexity and associated costs.

Even rear quarter-mounted charge ports need to be designed with these principles in mind. Minor damage from collisions or theft of charging cables can lead to claims that require the full battery to be removed if the wiring runs underneath the HV battery.

### REQUIREMENT 3: RESETTABLE EMERGENCY SAFETY LOOP

Significant progress has been made in supporting first responders with comprehensive data sheets that provide information about the locations of safety-critical vehicle systems. The high-voltage nature of electrified vehicles requires reliable methods for emergency responders to make vehicles safe following accidents. Manufacturers have implemented various solutions, including cut loops, pyrotechnic fuses, and specialised reset tools.

Emergency safety systems for EVs, which place the vehicles into a safe mode for emergency services and recovery operations, must be designed to be resettable. The activation of these systems should not cause permanent damage. Once a qualified technician confirms that the vehicle is safe, the system should be able to be restored without requiring repairs or the replacement of components.

However, these systems should not require extensive repairs after activation. Replacing entire wiring looms or major electrical components after emergency disconnection is inefficient. Optimal implementation uses resettable switches or fuses as the primary safety mechanism, similar to the resettable fuel cut-off switches found in internal combustion engine vehicles, allowing for system restoration without component replacement.

When cutting wires is necessary, the design should limit this intervention to easily replaceable short cable sections. In cases where the primary safety system becomes damaged or inaccessible, any secondary disconnection points should also be designed for reset or straightforward repair.

**REQUIREMENT 4:  
VEHICLE DAMAGE ASSESSMENT GUIDELINES**

Reliable guidelines for assessing battery damage after accidents are essential for ensuring safety and achieving cost-effective repairs for electrified vehicles.

In the aftermath of a collision, it is crucial to have clear methodologies for conducting visual inspections and, when necessary, electronic diagnostics. This approach helps determine whether the batteries have experienced internal or external damage. Such guidelines empower assessors and repairers to identify superficial damage like minor scratches or dents that do not affect safety or performance versus more significant issues that require repair or replacement.

Damage tolerance limits must be accessible to all relevant stakeholders, including independent repairers and insurers. This transparency supports efficient repair processes during the early triage stage at the First Notice of Loss (FNOL). Increased accessibility helps prevent unnecessary total loss determinations that may arise from incomplete or unavailable damage assessment criteria.

Training programs like VDA, insurance engineer education, and the professional development of claims management teams should incorporate specific competencies related to assessing electrified vehicles. This ensures accurate decisions regarding whether a vehicle should be repaired or written off.

**REQUIREMENT 5:  
ACCESSIBLE DIAGNOSTICS**

Electrified vehicles should offer easy access to HV system diagnostic information through straightforward equipment. This will enable accurate assessments of battery condition after incidents, including evaluations for physical damage and risks of thermal runaway.

Diagnostic procedures must prioritise accessibility, efficiency, and cost-effectiveness. The reliance on complex or expensive equipment, along with proprietary subscription requirements, creates barriers for independent repairers and insurers, leading to increased costs and extended vehicle downtime.

The ideal implementation will standardise HV diagnostics, making them comparable to the On-Board Diagnostics (OBD) systems currently used for emissions assessments in conventional internal combustion engine vehicles. This standardisation will allow technicians to use widely available tools to assess common critical Diagnostic Trouble Codes, rather than relying on brand-specific equipment.

Standardised high-voltage diagnostic systems will promote transparency and competition within the repair market, enabling third-party tool manufacturers to develop compatible equipment with full system access. This approach will lower costs while enhancing safety through easier identification and resolution of high-voltage system issues.

Design considerations should ensure physical access to battery connectors, allowing for direct battery diagnostics even when auxiliary systems experience damage or shut down. This capability should be possible without the need to remove the high-voltage battery from the vehicle.

Accessible diagnostics will boost confidence in validating used battery performance, allowing for these components to be warranted and reused in vehicle repairs. This will enhance salvage values, reduce repair costs, and minimise the risk of unnecessary write-offs.



**REQUIREMENT 6:  
SAFE AND SIMPLIFIED BATTERY HANDLING**

Battery removal may be required either for direct repair or to facilitate other necessary repairs, such as welding operations in adjacent areas. Safe handling protocols throughout this process protect both the vehicle and all personnel who interact with it.

Clear guidance must specify circumstances requiring battery isolation or removal for additional repair operations, including panel replacements. Once removal is determined necessary, vehicles should feature straightforward high-voltage system shutdown processes, enabling technicians to reliably test for zero volts and confirm safe working conditions.

Design documentation should clearly indicate the structural rigidity contribution provided by the battery, allowing determination of whether the vehicle can be moved without the battery installed or if other considerations such as temporary bracing is required.

Beyond electrical systems, cooling system complexity merits attention. Some vehicles currently require diagnostic tools merely to drain and bleed cooling systems, adding additional cost to repair processes.

Best practices include incorporating non-return valves in cooling systems or implementing bleeding procedures that can be initiated without diagnostic equipment. These design considerations substantially reduce battery removal and reinstatement time requirements.

Battery removal and reinstatement processes should maintain simplicity and avoid requiring complex procedures or specialised tools. Complex processes and expensive tooling or subscription requirements increase labour costs and create barriers to efficient repair operations.

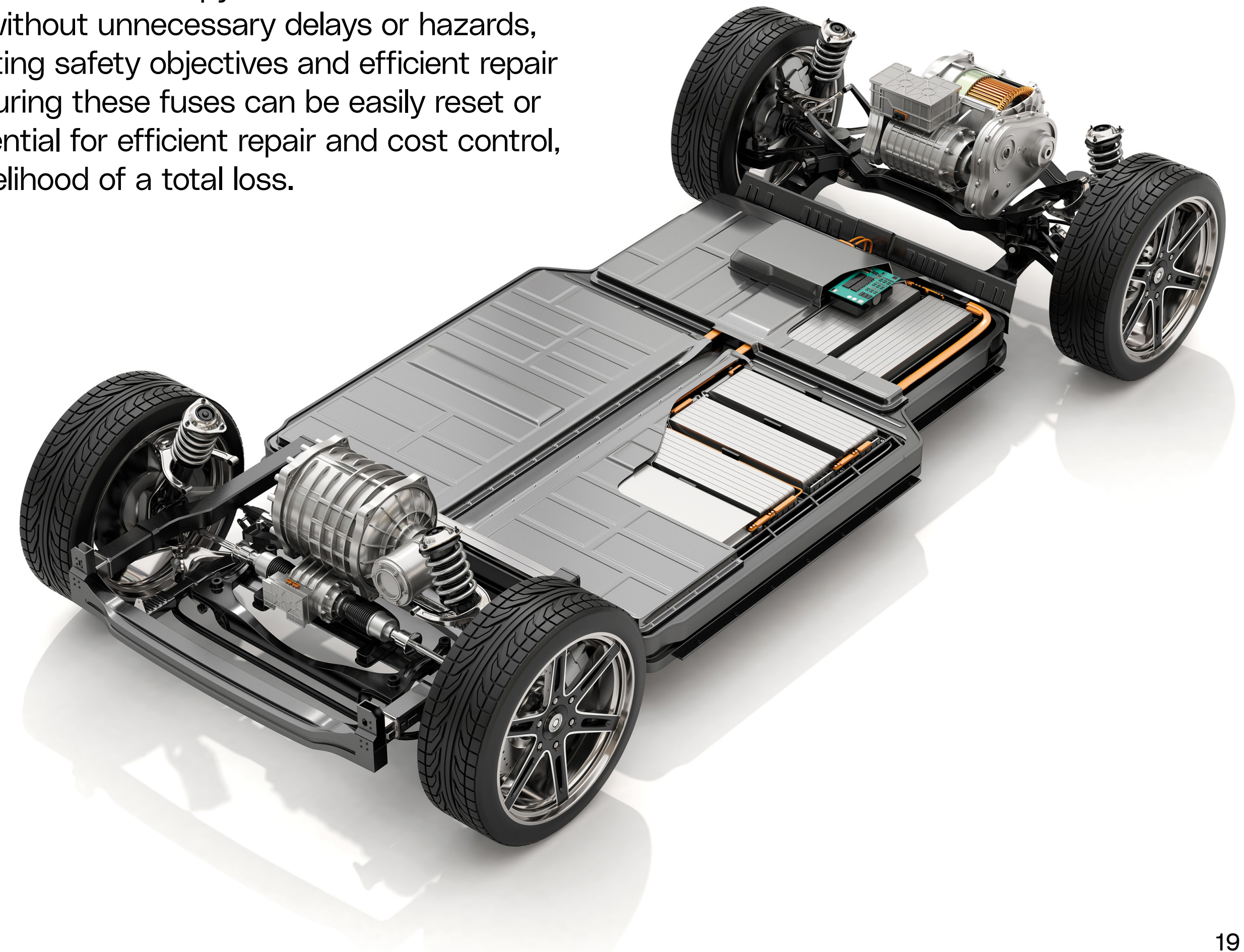
## 7 REQUIREMENT 7: HV BATTERY REPAIR STRATEGIES

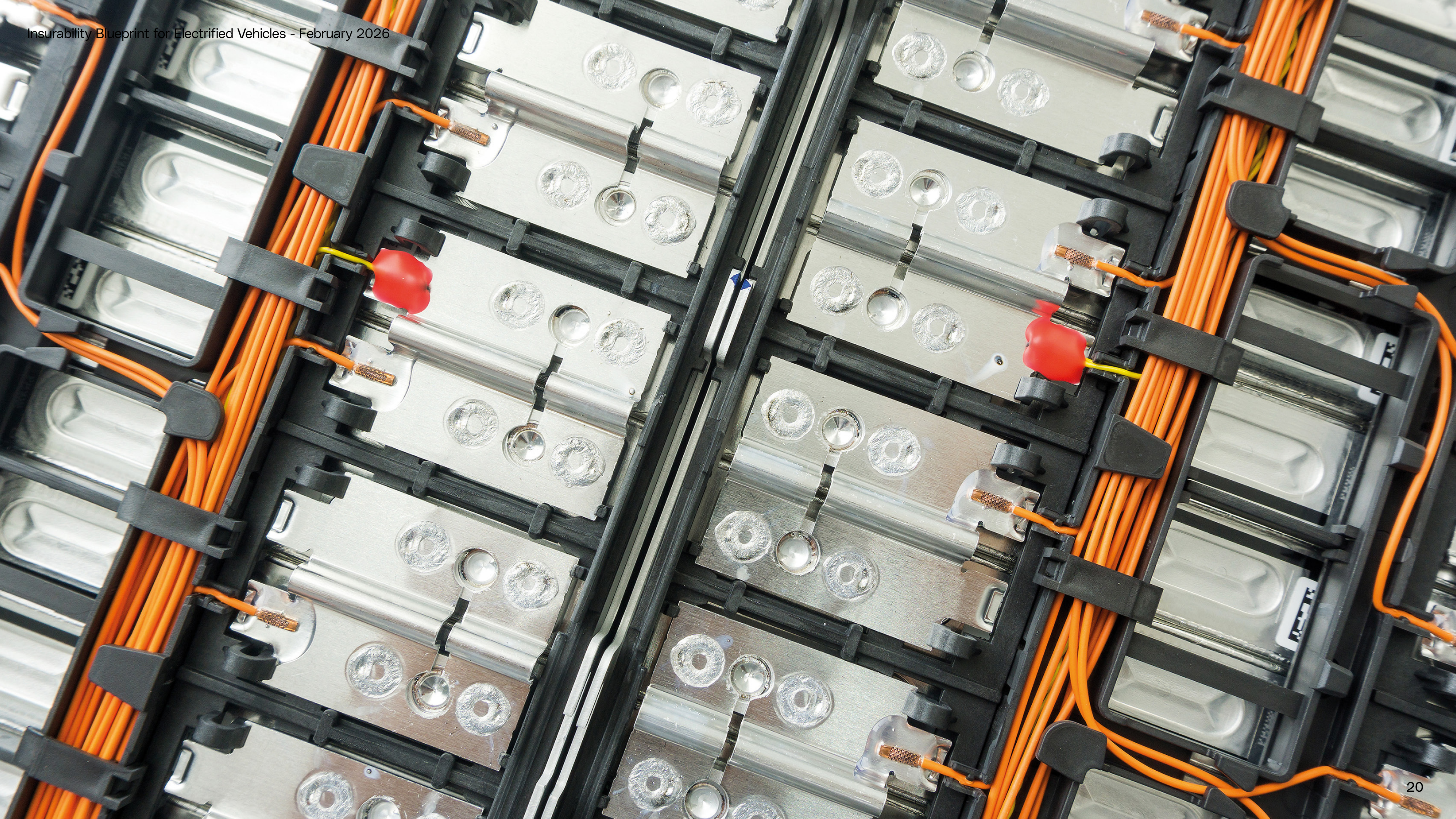
Despite careful design and substantial shielding, battery casings in EVs remain vulnerable to damage. Therefore, having established repair strategies, readily available parts, and clear methods for common casing repairs is essential.

Solutions for repairing the lower battery casing and side brackets should allow completion without the need to remove or disassemble the entire battery pack. This capability addresses a critical issue: even minor damage to battery casings or mounting brackets can lead to significant problems, often requiring expensive repairs or complete battery replacements.

Currently, battery re-casing is often economically unfeasible, as the significant cost of labour and parts is frequently disproportionate to the cost of completely replacing the battery. A useful analogy can be found in the engine sump: despite its vulnerability, there are straightforward repair or replacement processes that do not necessitate engine removal. Battery casing repairs should adopt similar principles.

The serviceability of HV battery pyrotechnic fuses also requires careful consideration. These pyro fuses act as rapid disconnect mechanisms that isolate high-voltage batteries during collisions or emergencies. Ensuring prompt and reliable access to pyro fuses allow technicians to work safely without unnecessary delays or hazards, thereby supporting safety objectives and efficient repair operations. Ensuring these fuses can be easily reset or replaced is essential for efficient repair and cost control, reducing the likelihood of a total loss.







#### REQUIREMENT 8: SERVICEABILITY OF HV BATTERIES

Full serviceability of HV batteries is essential for creating sustainable and cost-effective electrified vehicle ecosystems. HV batteries should be designed for easy, safe disassembly, allowing for efficient dismantling and recovery of valuable components, such as cells and modules, for refurbishment and remanufacturing within the United Kingdom.

OEMs and Battery manufacturers must provide clear, standardised procedures and make specialised service tools and guidance accessible to qualified repairers, dismantlers, and recyclers. This support should extend beyond exclusively authorised service centres, encouraging broader market participation.

Designing for serviceability involves minimising the use of permanent adhesives and sealants that complicate disassembly. A modular construction with removable fasteners can reduce labour costs and make refurbishment or remanufacturing a more economical option than disposal. This approach not only supports environmental sustainability by reducing waste and conserving raw materials, but it also helps control insurance costs by keeping electrified vehicle repairs more economically viable compared to declaring a vehicle a total loss.

Improving battery serviceability could enhance the salvage value of EVs, which currently lags behind that of internal combustion engine vehicles. The substantial salvage return from internal combustion engine vehicles is largely due to valuable engine components. In contrast, while the battery is the most valuable component in EVs, it currently offers minimal return and may even incur disposal costs due to shipping regulations and hazardous materials.

By enhancing serviceability and simplifying dismantling, this expensive component could create value through various avenues: refurbishment for reuse, component stripping to supply quality parts for the industry, or more efficient recycling to recover valuable rare earth metals and minerals.

## GLOSSARY

### BEV (Battery Electric Vehicle):

A vehicle powered exclusively by an electric motor using energy stored in a rechargeable battery, with no internal combustion engine.

### Car Parc:

Refers to the total number of vehicles registered and licensed for use on UK roads

### CEBR (Centre for Economics and Business Research):

An independent consultancy that produces industry questionnaire results.

### FCEV (Fuel Cell Electric Vehicle):

A type of zero-emission vehicle that uses a fuel cell, typically hydrogen-powered, to generate electricity for traction.

### FNOL (First Notification of Loss):

The initial report made to an insurer after a vehicle incident, triggering the claims and assessment process.

### HEV (Hybrid Electric Vehicle):

A type of vehicle that couples a conventional internal combustion engine (ICE) with electric motors into a combined traction system.

### HV (High Voltage):

Refers to the electrical systems and components in electrified vehicles that operate at voltages significantly higher than traditional 12V automotive systems (greater than 60 volts DC), primarily for traction.

### ICE (Internal Combustion Engine):

A conventional vehicle engine powered by burning fuel (commonly petrol or diesel) to generate traction.

### OEM (Original Equipment Manufacturer):

The company that originally manufactures the vehicle or its components.

### PHEV (Plug-In Hybrid Electric Vehicle):

A dual power source vehicle which can either be charged and driven electrically via a motor or use an ICE engine to either provide traction or charge the battery.

### RE-EV (Range-Extended Electric Vehicle):

A vehicle that uses an electric motor for propulsion but includes a small combustion engine to recharge the traction Battery.

### Pyrotechnic Fuse:

A safety device in HV batteries that rapidly disconnects the battery in the event of a collision or emergency, isolating high voltage to protect occupants and first responders.

### Quarantine:

A safety protocol where a damaged electrified vehicle is isolated to ensure no delayed hazards (such as battery fires) arise before repair.

### VDA (Vehicle Damage Assessor):

A professional responsible for evaluating damage to a vehicle and determining appropriate repair or write-off decisions.

### ZEV (Zero Emission Vehicle):

A vehicle that emits no exhaust pollutants from its onboard power source, including BEVs and FCEVs.

For further information,  
visit Thatcham Research  
[www.thatcham.org](http://www.thatcham.org)



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[4] “Closing the confidence gap”, Autocraft Solutions, 2025. [Online]. Available at: [https://autocraftsg.com/wp-content/uploads/2025/04/Autocraft-Closing-the-EV-Confidence-Gap-Whitepaper\\_Digital.pdf](https://autocraftsg.com/wp-content/uploads/2025/04/Autocraft-Closing-the-EV-Confidence-Gap-Whitepaper_Digital.pdf) (Accessed: 11 December 2025).

## THE BLUEPRINT

Success for insurers depends on implementing these actions to achieve safe, sustainable, and affordable insurance—ultimately supporting the development of the most insurable vehicles.

- 1. Battery Damage Protection**  
**Against Impact:**  
Batteries should be robustly shielded from road debris and curb drops by a substantial under-shield and have sufficient clearance and protection in the sill area to prevent damage to the battery from low-speed side impacts.
- 2. HV System Component Design:**  
The charge port should be positioned to avoid damage in common accidents and must be a standalone component, not directly integrated into the wiring loom or other HV devices, to prevent complex and costly repairs from minor collisions.
- 3. Resettable Emergency Safety Loop:**  
Cutting the emergency safety loop should not cause permanent damage; the system must be resettable without repair once the vehicle is confirmed safe by a qualified technician.
- 4. Vehicle Damage Assessment Guidelines:**  
Reliable methods are required to diagnose battery health post-accident and provide an accurate assessment for repair. Clear guidelines are provided around the acceptable limits of physical damage to the Battery and HV system.
- 5. Accessible Diagnostics:**  
Diagnostic procedures should not depend on complex or expensive equipment and subscriptions. Ideally, diagnostics would return to a standardised approach, similar to previous OBD systems for emissions, but focused on high-voltage (HV) safety.
- 6. Safe and Simplified Battery Handling:**  
Vehicles should feature a straightforward shutdown process, enabling easy confirmation of zero volts. Battery removal and reinstatement must be simple and not require complex processes or specialised tools.
- 7. HV Batteries Repair Strategies:**  
Batteries should have established repair strategies, parts, and methods for common casing repairs. It is critical to provide repair solutions for the lower battery casing & side brackets, ideally without requiring removal or disassembly of the battery pack.
- 8. Serviceability of HV Batteries:**  
HV batteries must be designed for easy disassembly, supporting efficient dismantling and enabling the supply of battery components for refurbishment and remanufacturing within the UK.

