

Electric Vehicle Battery Stewardship

Consultation Paper arising from
industry submissions in 2023.



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1. Overview & proposed action

The Battery Stewardship Council (BSC) wish to thank those organisations and associations that took the time to respond to the initial discussion paper issued earlier in 2023. Your comment and insight, along with further discussions with industry, input from international experts in the battery industry, and research commissioned by the BSC has formed this follow up paper.

The aim of this paper is to distil the feedback provided, identify common themes and a possible approach to EVB Stewardship, and set out a schedule for a consultation process with industry to explore the development of EVB Stewardship for the Australian market.

1.1. Summary of submission feedback

The submissions received presented a range of diverse topics including differing views on the need for stewardship at this time, the scope of a stewardship scheme, the consideration of 2nd life applications, battery tracking & Battery Passports, the introduction of product standards, education & awareness across the supply chain and community, technical training, influence on product design, warranties & accidents, battery safety, battery quality & reliability, stockpiling, governance & independent verification, just to name a few.

There were however some common themes running through the submissions. These themes included the importance of supporting the development of the EV industry and the uptake of EV's, the consistency and conformity to the EU Battery Directive, and the involvement and support of Government. The BSC hopes to build on these areas as the cornerstone of any approach to stewardship.

Some submissions assumed the BSC is proposing that the B-cycle scheme would be the template for an EV stewardship scheme. This is not the case, the BSC recognise that any EV stewardship scheme needs to address the issues relevant to the EV sector in a way that works for the EV industry.

Of the numerous market failures listed in the submissions it was believed that not all failures would occur concurrently. Additionally, certain actions may mitigate or delay the onset of some market failures while others may be accelerated.

Attachment 1 contains BSC consolidated submission feedback. It represents a distillation of feedback from submissions and any error in interpretation is the BSC's. We would appreciate feedback if any issues are missed or misrepresented.

1.2. The case for a circular economy and staged EV battery stewardship

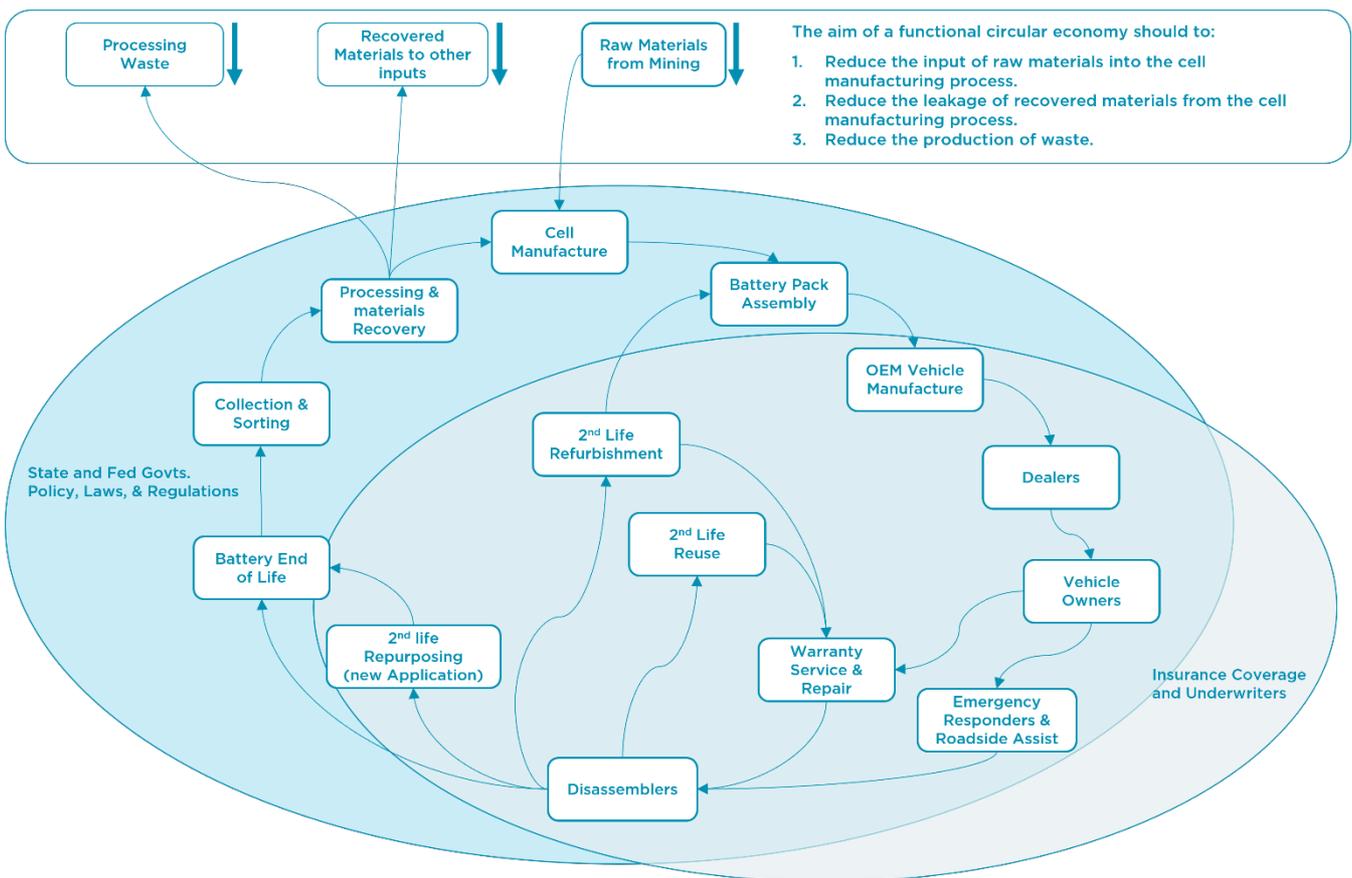
Currently, EV batteries account for only 7%, by weight, of all batteries entering the market in 2023 and only 0.2% of all batteries, by weight, entering the waste stream. These statistics suggest that there is not an immediate need for significant battery recycling capability for the EV sector just yet.

However, within the next decade the number of EV batteries entering the market, as a percentage of the total battery market, will increase to 30% with 5% of waste arising coming for EV's. By the middle of the century almost 40% of all batteries entering the market will be in an EV and over 32% of battery waste arising will come from an EV. By this time EV batteries will be the dominant category of batteries and battery stewardship will be an essential component of a circular economy.

Establishing a circular economy for batteries is a crucial step in Australia's path toward achieving net zero emissions and maximising its energy security needs for generations to come. The electric vehicle sector will be integral to its establishment and is well poised to lead the way in the creation of a circular economy for critical battery minerals.

1.3. Elements in a circular economy for EV batteries

The following diagram highlights the elements and operators needed for a circular economy for EV batteries. This diagram depicts the end state where all components of a circular economy are in place and functioning effectively.



To get to this state, industry and governments must come together to design, build, implement, and integrate each of the components to deliver a workable circular economy for batteries.

Based on the future market insight above, and the feedback received from industry through submissions and consultation, this does not all need to be in place today, but work towards this desired future state must start today in a staged approach.

2. A staged approach to Stewardship

Numerous market failures were identified in the submissions, but these market failures may not all occur concurrently. Additionally, certain actions may mitigate or delay the onset of some market failures. Some market failures need addressing earlier than others prompting the thinking of a “staged approach” to the introduction of Stewardship for EV Batteries.

Possible Phases of EV Battery Stewardship		
Today	2025 - 2030	2030 - 2040
EV sales expansion, EV battery tracking, training, awareness, education, safety controls and incident response.		
	Reuse, refurbishment, repurposing, technical training, collection and transport, storage and stockpiling	
		Recycling with on-shore processing capacity
Advocate for staged approach to EVB with government		
CUMULATIVE APPROACH TO A STAGED STEWARDSHIP SCHEME DESIGN		
Stage 1	Stage 1 & 2	Stage 1, 2, & 3
Accelerate the uptake of EV's and transition the national vehicle fleet towards electrification	Engage industry in the design of stewardship mechanisms that supports reuse, refurbishment, and repurposing of EV batteries.	Expand a scheme design to drive onshore processing.
Align with global approaches such as the EU Battery Regulation to inform future requirements as stewardship evolves.	Demand mandatory participation in battery data capture across the battery life cycle from all industry players.	Augment the emerging domestic critical mineral industry with recycled content.
Explore the integration of voluntary takeback programs as a possible pathway for stewardship participation.	Work with Government and industry to develop policy and remove barriers to investment for reuse and recycling	Align a scheme design to integrate with a whole of vehicle stewardship Scheme.
Define an appropriate funding model that evolves through three phases of EVB Stewardship to be adjusted over time.	Define the requirements for specialised skills and expertise in battery recycling and repurposing.	
Accelerate the implementation of advanced battery tracing across the lifecycle (e.g. Battery Passport).	Develop standards to support safe battery reuse, refurbishment, and repurposing.	
Publish and advocate for factual and accurate commentary and communication about EV's.		
Create and deliver training and education materials and guidelines for handling used EV batteries.		
Provide a framework for safe recovery of EV batteries following accidents.		
Adjust funding model over time to enable each stage to be effective		

3. Consultation and next steps

As stated, this paper is putting forward the proposal that industry consider a staged approach to the introduction of EVB stewardship and the development of a circular economy for critical battery minerals.

The ideas put forward in this proposal are based on submissions received from industry and research and consultation conducted by the BSC. That said, these ideas are those of the BSC and need further consideration and discussion with industry to determine if this concept is a preferred path forward.

To progress this idea the BSC is proposing two consultation forums in both Sydney and Melbourne to be held in April 2024 (dates to be confirmed)

The aim of these forums will be to discuss the following:

- + challenges with assuring a circular economy for EV batteries that could represent a market failure
- + review and refinement of the above stages giving consideration to current and future market failures
- + challenges and opportunities associated with a staged approach to EVB stewardship
- + current and future data and gaps
- + roles and responsibilities for achieving EV battery stewardship
- + options for funding the work needed at each stage
- + elements to a successful pathway forward

Attachment A. Consolidated submission feedback

The following table is a distillation of feedback from submissions and any error in interpretation is the BSC's. We would appreciate feedback if any important issues are missed or misrepresented. It is important to note that the submissions included a range of ideas and possibilities and further discussion is needed to land on the best pathway(s) forward.

Key topics raised	Industry feedback
<p>Market size and waste arising</p>	<ul style="list-style-type: none"> + Insufficient data provided in the submissions to quantify the scale of the market size / waste arisings. + Some say there are existing stockpiles of hybrids. + Some sighting low waste arisings as a barrier to industry investment. + There is a likelihood that higher volumes of spent EV batteries will not emerge until the 2040s, due to the average rate of vehicle retirement, and the potential for a further 10 to 15 years in second-life applications prior to recycling. In the interim, batteries will continue to be processed and recycled in Australia in small volumes or sent offshore to OEM facilities for diagnostics, refurbishing or recycling.
<p>What components are necessary for an EVB Scheme?</p>	<ul style="list-style-type: none"> + Adequate market analysis is needed to design the stewardship scheme. + The scheme should include clear objectives and targets. + Extended producer Responsibility. + Central administration of a stewardship Scheme. + The stewardship scheme should include a voluntary takeback component. + A nationally consistent labelling, tracking and data sharing system should support the stewardship scheme. + Strategic stewardship scheme design to minimise transport costs and support safe collection. + Recycler and logistic orientation. + Scheme design that supports reuse of EV batteries. + An appropriate funding model which will secure funding and avoid costs to consumers. + Accreditation & Certification, Audit & Verification, Traceability, Battery Recycling, Funding Model, Public Awareness & Education, Collaboration & Stakeholder Engagement. + Defining a funding model is a core component of a stewardship scheme.

Key topics raised	Industry feedback
<p>Market failure</p>	<ul style="list-style-type: none"> + Numerous market failures were identified by respondents however it was not always clear if the market failure was current or emerging. A few respondents indicated that there are no emerging market failures to consider. + Market failures listed but not defined as current or emerging. <ul style="list-style-type: none"> + Lack of proper identification and tracking systems for EV batteries + A lack of governance around 2nd life applications (i.e. cell mismatching etc.) + Increasing stockpiling and improper disposal of used or damaged EV batteries + Recovery and recycling of orphaned, damaged, or out-of-warranty batteries + Low-quality or unreliable batteries entering the market risking public safety + Difficulties influencing the design of EVs to support a stewardship model + A lack of best practice guidance to mitigate risks and hazards associated with EV batteries + Limited volumes of EV batteries reaching end of use impacts reuse and recycling + Safe and independently verified collection, disassembly, and processing; stockpiling; recovery and recycling of orphaned, damaged, or out of warranty batteries + Insufficient standardised collection and recycling infrastructure + Limited establishment of independent verification and certification processes + Expensive and inefficient recycling technologies for EV batteries + A lack of adequate safety standards, enforcement, import and product controls + Non-existent pre-planning for design for repair, re-use, recycling + Little access to technical information on battery care, repair, re-use, recycling, e.g. schematics, BMS, discharge information, disassembly, construction and materials information + Public education and awareness + Lifecycle infrastructure, collections, return logistics is limited or non-existent outside of capital cities + No responsibility on brands or owners to thoughtfully dispose products, no obligations following warranty period + No record of battery history for used vehicle market or for end-of-life practitioners + Battery recycling bandwidth is low and overwhelmed in the event of a recycling demand spike e.g. product recall + End markets for battery materials is underdeveloped in Australia, depend on overseas

Key topics raised	Industry feedback
<p style="text-align: center;">Role of Government</p>	<ul style="list-style-type: none"> + The role of Government was seen by many respondents as playing an important part in any stewardship approach. + Encourage the uptake of electric vehicles e.g. through initiatives such as the Fringe Benefits Tax (FBT) concessions in December 2022. + Strategic development of the battery manufacturing and recycling industries <ul style="list-style-type: none"> + Development and investment in infrastructure supporting EV market penetration. + Streamlining the regulatory and/or legislative framework. + Overcome consumer barriers and our unique geographic and consumer circumstances with strong policy settings and measurable, verifiable targets and initiatives. + Restrict the Export of Electric Vehicle Batteries to: <ul style="list-style-type: none"> + prevent leakage in terms of traceability and environmentally competent recycling of such batteries + assure compliance with the Basel Convention on Transboundary Movement of Hazardous Wastes. + Reduce regulatory barriers and provide policy certainty to investors to de-risk early investment in both second-life applications as well as battery recycling. + Introduction of purchase subsidies on EVs, and vehicle purchase and registration tax rebates are needed but not enough. + Strong regulatory framework that ensures manufacturers comply with the standards set by Government e.g. EU battery passport. + Minimisation of the regulatory costs and red tape where safe and sustainable to do so. + Consider code-of-practice instead of regulation where available. + Consistency with overseas regulation. Policy developments are consistent across each state and international borders. (Example: traceability rules like battery passport) + Governments have a key role to play in working with industry to facilitate the development of onshore recycling capabilities for EV batteries, providing support for industry innovation to further reduce the life-cycle emissions of battery technology through second-life applications, and deliver additional employment opportunities for Australians through this emerging industry. + Providing policy and regulatory certainty will play a significant role in enabling domestic battery recycling and second-life capabilities. There is need to align with standards being established in overseas markets, including the EU and China, to enable industry to develop globally consistent approaches to managing end-of-life batteries, ensuring better traceability and circularity. + To provide further surety around product safety across the battery value chain, the industry can work with the Federal Government and State and Territory counterparts to establish nationally consistent data collection initiatives, including fire and safety incident reporting. + To share learnings and support data analysis.
<p style="text-align: center;">Standards</p>	<ul style="list-style-type: none"> + Numerous submissions called for standards and harmonisation of existing standards across transport, storage, and safety.
<p style="text-align: center;">Traceability</p>	<ul style="list-style-type: none"> + Adopt the EU battery passport to align Australia with world's best practice for the traceability of the battery lifecycle. It would also provide a comprehensive system to reach back through the supply chain to better identify the source of critical minerals and assist Australia to comply with international agreements and conventions prohibiting the sourcing of materials from so-called 'blood' markets, and ensure that suppliers comply with Australia's global anti-slavery commitments.

Key topics raised	Industry feedback
<p>Battery Information</p>	<ul style="list-style-type: none"> + A battery passport would improve the efficiency of a stewardship scheme and streamline the tracking of battery data throughout its lifecycle. + Technical information is needed to determine the appropriate action after confirmation of the end-of-life of EV batteries. + Technical information and implementation of information sharing requirements, such as those in the European Union, would support battery recycling, reuse and repurposing.
<p>2nd Life Application: Reuse and refurbishment</p>	<ul style="list-style-type: none"> + Strong approach of 2nd life – Reuse and refurbish. + Essential for EVB's addresses the circular ecosystem (Reuse & Repurpose) for alternative use (2nd life), and not just wording suggesting “waste” after initial use. + Consideration for the transport of these reused or repurposed batteries is also critical especially if the EV battery is within its design state during transport. (The chassis of the battery are intact and not modified for transport.) + As a country, second life applications of EV batteries need to form part of an overarching and coordinated plan to realise the opportunities presented by batteries, including government policy to drive this transformation.
<p>2nd Life Application: Repurposing</p>	<ul style="list-style-type: none"> + Mixed approach of 2nd life – Repurposing + Repurposing processes of batteries need a standard or guideline to follow. + Mandatory participation in information sharing program for manufacturers and importers to ensure that repurposing and recycling is done safely and efficiently. + Development of robust standards and a consumer protection framework to support safe battery repurposing. + Building local capacity for recycling and repurposing + Addressing the need for specialised skills and expertise in battery recycling and repurposing. + Government should encourage reuse and repurposing, whenever it is appropriate to do so. Requiring reuse and repurposing is not appropriate.
<p>Accidents and roadside service</p>	<ul style="list-style-type: none"> + The cost of safely recovering the batteries from EV accidents depends on several factors, including the required tests on the battery. After the accident, a safety test should be performed on the battery to ensure its safety. + It is imperative that any organisation involved in the EV battery stewardship process take active steps to become acquainted with the research and work of EV Fire Safe. + Commentary and communication around EV accidents and / or fires need to be expressed in a responsible manner and from an informed position, or risk creating significant reputational issues for the EV industry as a whole. + Collection of data for learning and nationally consistent fire incident reporting to share learnings.

Key topics raised	Industry feedback
<p>Processing</p>	<ul style="list-style-type: none"> + Establishing dedicated infrastructure for battery collection, processing, and recycling to meet the growing demand for sustainable battery supply chains. + Research and development support: Invest in research and development initiatives to advance battery technologies, recycling processes, and materials recovery. Funding and support for innovation can lead to more sustainable and efficient battery systems. + Government support should focus on critical mineral extraction from battery recycling. Lithium-ion battery recycling in Australia is largely focused on the production of three waste streams through shredding, + The black mass is currently treated in offshore smelters that focus on the extraction of key critical minerals, usually cobalt and nickel. Government support and incentives for the development of domestic process is essential. + Recycling capacity should focus on critical mineral refinement of spent batteries onshore in order to capture maximum value locally and to augment the emerging domestic critical mineral refining industry.
<p>Performance monitoring</p>	<ul style="list-style-type: none"> + General consensus on the need for performance metrics and accountability. + A valid concern raised suggests a simple collection rate would not be a good indicator of success.
<p>Education and training</p>	<ul style="list-style-type: none"> + Need for insurance industry education regarding EV batteries and the differences with “household” lithium batteries. + Need for development of relevant training materials and guidelines for handling EV battery waste. + National marketing program that informs the public that scrap vehicles should only be sold to environmentally compliant Certified businesses.