BatteryStewardship**Council**

Electric Vehicle Battery Stewardship

A discussion paper to establish battery stewardship in the electric vehicle sector.



FEDERAL CHAMBER OF AUTOMOTIVE **INDUSTRIES**





Government Accredited Stewardship















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The information in this discussion paper is for general guidance only. It is published to encourage discussion and feedback from interested parties. It does not constitute professional advice and does not necessarily reflect current or future policy positions of the participating organisations.





1. Purpose of this document

The purpose of this document is to respond to the Government's call to action by providing the context for exploring key questions for achieving electric vehicle (EV) battery stewardship in Australia. The intent of the paper is to set the scene as a way of elevating the discussion to facilitate the following consultation steps toward EV battery stewardship:



2. What is stewardship?

The Product Stewardship Act 2011 defined product stewardship as **"an approach to reducing the environmental and other impacts of products by encouraging or requiring manufacturers, importers, distributors and other persons to take responsibility for those products"**. Stewardship by its definition brings together industry players from across the lifecycle of a product to ensure that all products under that class are responsibly managed throughout their lifecycle. Stewardship is particularly important for priority products whose inputs and outputs are significant for resource security, for environmental protection or for community wellbeing.

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3. Why are Electric Vehicle batteries a priority for stewardship?

3.1 An Electric Vehicle Industry priority

The Electric Vehicle industry is in the early and dynamic stage of its development which provides an ideal opportunity to engage in stewardship and meet the need for a circular economy approach to battery materials. Stewardship provides an effective mechanism for this, including:

- + the need to secure minerals for future battery production
- action to give effect to the corporate sustainability commitments, including sustainable use of resources
- an opportunity to learn from the past and build stewardship into the ethos of electric vehicle manufacturing
- + influencing government policy to secure strong standards for battery quality and safety.

Whilst companies are taking some action individually, industry wide collective action will ensure a more efficient outcome beyond individual corporate social responsibility. For example, stewardship also enables industry to provide a solution that addresses:

- + the period beyond the manufacturer's warranty
- + products that may be subject to accidents or insurance claims
- + extended battery life span
- products that are abandoned in the event of an exit from the market, corporate liquidation, or bankruptcy
- + potential for second life applications
- + the need for independent verification of recycling and environmental outcomes
- linkage to the domestic battery recycling industry which has undertaken a major evolution in the past 12 months with the commencement of B-cycle, Australia's national battery stewardship Scheme.

3.2 Government priority

In Australia, product stewardship is regulated under the Waste Reduction and Recycling Act 2020, formerly the Product Stewardship Act 2011. Under this Act, the Federal government identifies priority products as a mechanism for signalling to industry that action is needed. Products are removed only when the Minister is confident that the product has a clear pathway to stewardship through a regulated or an industry led stewardship scheme.

Batteries were listed as a priority product and formed the basis of the work which led to the establishment of the Battery Stewardship Council (BSC) and the launch in early 2022 of B-cycle, Australia's official battery stewardship scheme. Electric vehicle and energy storage batteries were included in this priority listing.





Figure 1. Government drivers for electric vehicle battery stewardship



In 2022, batteries were removed from the priority list in recognition that the BSC was progressing well towards the mandate of achieving the governments stewardship agenda.

4. Why is BSC, FCAI, and MTAA leading this discussion

The BSC is a not-for-profit company that was established by industry with the support of governments for the sole purpose of designing and managing battery stewardship in Australia. The BSC established and is managing B-cycle which although is currently focused on consumer batteries is intended to cover electric vehicle and energy storage batteries. This is reflected by:

- the decision by members of the Meeting of Environment Ministers that electric vehicle batteries and battery energy storage systems stewardship would fall withing the mandate of the Battery Stewardship Council
- the authorisation by the ACCC and endorsed by the Federal Government for the Scheme design which included a phased approach to including electric vehicle batteries and battery energy storage systems within the Battery Stewardship Scheme.
- the support from the Federal government which provided BSC with funding through the National Products Stewardship Investment Fund to conduct consultation to explore the issues and identify preferred approaches for electric vehicle batteries and energy storage.

Extract from the ACCC authorised Battery Stewardship Scheme Design 2020

"Governments have agreed to expand the scope of the Scheme to include energy storage systems and electric vehicle batteries.

The December 2018 Meeting of Environment Ministers endorsed the inclusion of energy storage and electric vehicle batteries in the scope of the Scheme.

Although some differences in approach will be needed for energy storage and electric vehicle batteries, much of the Scheme design will translate well, with the remainder being tailored using a modular approach as needed."





The Federal Chamber of Automotive Industries (FCAI) is the peak representative body for companies which distribute new passenger vehicles, light commercial vehicles, all-terrain vehicles and motorcycles in Australia.

The FCAI, in partnership with the Motor Trades Association of Australia (MTAA) is currently undertaking a major end-of-life vehicle study. This study is supported by the Commonwealth Government's National Product Stewardship Fund and is supporting the industry to develop a business plan on how best to manage the end-of-life waste streams generated from more than 700,000 vehicles annually. It is therefore appropriate the BSC and FCAI jointly explore the best ways of potentially addressing battery stewardship in an expanding electric motor vehicle sector.

The Motor Trades Association of Australia (MTAA) represents the federal interests of the statebased motor trades associations including the Motor Traders' Association (MTA) of New South Wales, the ACT, South Australia and Northern Territory, Western Australia, and Queensland as well as the Victorian and Tasmanian Automotive Chambers of Commerce.

A key policy initiative of the MTAA and its national industry sector group the Auto Parts Recycling Association of Australia (APRAA) has been for the introduction of an End-Of-life Vehicle (ELV) scheme to Australia. MTAA looks to the experience of the Battery Stewardship Council (BSC) to assist APRAA members in limiting the amount of automotive waste from entering landfill via an ELV scheme in Australia and to address the ever-growing concern and challenges that removal and storage of batteries from Electric Vehicles currently pose.

The BSC Discussion Paper is a great example of different industry sectors combining to help improve the footprint of the automotive retail sectors impact on the environment. The MTAA thanks the BSC for the opportunity to partner with BSC and FCAI on the BSC Discussion Paper.

In Australia today, B-cycle is the national authorised stewardship scheme for used, in-scope batteries. B-cycle:

- + is endorsed by all governments
- has widespread industry participation and engagement
 - + over 90% of importers of current in-scope batteries (loose and power tools)
 - + all major retailers
 - + all domestic lithium battery recyclers
- + strong and growing consumer acceptance.

The BSC welcome the support and participation of the FCAI and the MTAA in the release of this Discussion Paper. We look forward to working with industry on this important discussion.





4.1 Stewardship principles of B-cycle

In the development of the BSC's B-cycle Scheme, industry explored the important principles for the success of battery stewardship irrespective of chemistry or application. The principles adopted by industry present a broad and inclusive approach as identified in the table below.

Table 1. Battery stewardship principles

Principle	Key Scheme Features
Shared Responsibility	 All organisations in the supply chain have a contribution to make depending on their role. Maximises engagement and minimises free riders. Government support for industry development, efficient regulation, and stewardship framework.
Improved Environmental and Safety Outcomes	 Eliminates batteries from landfill to avoid environmental and health impacts. Maximises resource recovery from waste batteries and minimises use of finite raw materials. Leverages the expansion of existing collection and recycling process to reduces emissions.
Circular Economy	 Improves the economics of collection and recycling of batteries. Increases availability of battery materials for remanufacturer into batteries and other products. Facilitates positive procurement policies in industry & government.
Fair and Equitable Funding Model	 Funding model addresses market failure by offsetting the costs with a suitable safety net. Procedures to ensure that liable parties will not be double charged. Scheme expenses offset and adjusted in response to market forces.
Increased Competition, Innovation, & Efficiency	 Accesses well-established recycling networks for processing. Research to support program development: best practice, innovation, stocks & flows. Addresses known barriers to increased recovery of waste batteries to offset market failures.
Transparency & Accountability	 Good governance as a not-for-profit stewardship organisation with broad oversight and audits. Outsources import data reporting to independent agency. Independent verification of collection, processing, EH&S, downstream shipments and costs.
Focus on Behavioural Change	 Strong branding and marketing with a clear call to action. Incentives for stewardship action. Leverages marketing and education of industry participants and synergistic schemes.





4.2 The B-cycle Scheme – a snapshot

The BSC along with its many partners, established B-cycle - a Battery Stewardship Scheme for batteries under 5kg. This journey has taken significant time and effort, but in 2022 resulted in the successful launch of B-cycle.

Figure 2. The evolution of B-cycle

2013 - 2017	2018	2020	2021	2022 first half	Looking ahead
Federal Government lists batteries as a priority product for stewardship. Industry Working Group created. The Australian Battery Recycling Initiative pilots and research to explore consumer behaviour, collection channels, costs, and stewardship options. Funded by the QLD Government on behalf of all jurisdictions.	All Governments call for fast tracking battery stewardship. Stewardship options evaluated by industry. Battery Stewardship Council (BSC) formed as a Not- for- Profit company. BSC works with industry to develop a Scheme design to deliver a safe and transparent national collection network.	BSC conducts extensive industry consultation to finalise the approach and secure engagement from industry. Industry associations, ABRI, CESA & NRA assist in refining approach and engaging with industry. The Scheme authorised by the ACCC (Australian Competition and Consumer	BSC receives a \$1 million Federal Government Grant and matching industry funding. Government gives their tick of approval with the announcing B-cycle as a nationally accredited voluntary stewardship Scheme. New Board appointed with representation from entire battery value chain.	 B-cycle battery collections begin in January. Importer levy payments begin. 90% industry participation. The consumer launch in February covers loose household batteries and easily removable proprietary batteries Rebate payments begin. 600+ tonnes of batteries collected. Over 3000 Drop off points with presence in each state and 	Additional battery types are being phased in, including e-bike batteries, and portable energy storage batteries. BSC continues to expand industry participation and weed out free riders. Industry consultation is underway on EV batteries, and residential and grid- scale battery energy storage systems. Continued focus on improving systems and reporting.

The B-cycle Scheme design has evolved through consultation and decision making by industry. The attraction to this model was that it enabled industry to be in control, and to respond quickly to changes in the market and to the experience gained through deploying the collection and



The fundamental design features are described in Figure 3, however the ACCC's determination provides scope for the fundamentals of this design to be adapted to suit the specific needs of the electric vehicle industry.

recycling network.



Figure 3. Overview of B-cycle Scheme design



Accreditation is a key feature of the Scheme and is required for participants to participate and for the Collectors and Recyclers to be eligible to receive rebates. It is this mechanism that is used to secure industry engagement and assure safety, traceability, and independent verification of end-of-life management of collected batteries. The phased approach for different battery types being taken by the BSC is illustrated below.



Figure 4. Battery types included by battery stewardship

This discussion paper is intended to inform the consultation for electric vehicle batteries identified in the third box; to set the scene and identify a set of initial questions to explore regarding market failures; funding needs; collection channels; best practices; and the design is based on an understanding of the industry and its needs.



5. The next step – industry collaboration

We recognise all parties bring expertise and value to the table for discussion, sharing information and knowledge and identifying pathways forward. Figure 5 illustrates how the current B-cycle Scheme presents an open platform for exploring the issues and identifying how we might deliver an efficient and cost-effective model for electric vehicle battery stewardship.







sector.



5.1 Key discussion points and questions

The end-of-life pathway for EV batteries in Australia is evolving. The following figure illustrates the likely pathway of EV batteries at the current time, with opportunities for industry development to expand onshore processing and production. This diagram is provided to generate discussion and exploration of the reality of EV stewardship in Australia, and to inform the evolution of solutions.





5.2 Our top five questions for you

Qu 1. What types of vehicles should be included in scope (now and in the future):

- + trains, buses, autonomous ships and aircraft, automobiles, and commercial vehicles and heavy transport?
- Qu 2. What are current and emerging market failures in this sector with respect to electric vehicle batteries:
 - safe and independently verified collection, disassembly, and processing; stockpiling; recovery and recycling of orphaned, damaged, or out of warranty batteries?
- Qu 3. What do you see as the necessary components of an electric vehicle stewardship scheme:
 - + e.g. accreditation, audit verification, traceability, recycling of all or orphaned batteries, funding model?
 - + are there specific things that should not be included in an EV battery stewardship scheme?
- Qu 4. What do you consider to be essential policies or standards needed for future proofing EV battery stewardship in this space:
 - e.g. Reuse and Repurposing standards for EV batteries for 2nd life, efficient regulation for transport of used batteries, and funding.

Please contact Brett Buckingham at BSC: <u>contact@bsc.org.au</u> to arrange a time to discuss and explore the path forward.

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5.3 Detailed considerations

There are many matters that will need to be considered as we move to design and refine the Scheme. The following table sets out some of the issues and questions that will require further discussion and research and is provided to generate ideas and discussion. The table also provides useful context for answering the above top five questions.

TOPICS	CONTEXT	QUESTION
Scope	 The potential proliferation of EV's is set for unprecedented growth across a variety of vehicle types such as Cars, Trucks, Buses, Mining vehicles, bikes, marine applications etc., and other battery suppliers, e.g. after market batteries. Despite the various transport modes all battery packs present similarities and challenges at end of life. 	 What types of vehicles are to be considered in the stewardship scope.
Market size and waste arising	 Given the right conditions and supporting Government policies the market expansion of EV's will result in a potentially massive battery waste problem into the future. 	 How will the new and/or future governments influence the growth of the EV market in the future?
	 All minerals used to manufacture batteries such as Lithium, Cobalt, Nickel etc. are finite and the World Bank reports that by 2050 the consumption of these finite resources may lead to a mineral's shortage. 	How do we maximise the recovery of finite resources?
	 As minerals become more difficult to extract from the earth and greater sustainability in mining practices becomes mainstream (e.g. the reduction in blood cobalt) the economic value of recycled materials vs raw materials will shift. 	 Is this seen as an issue for the EV industry to consider? Is this a challenge to address if we don't have an onshore battery manufacturing capability?
Market failure	 In this early stage of the introduction of Electric Vehicles, manufactures are dealing with the majority of battery failures under in- warranty programs. The collection of end-of-life EV batteries is largely occurring through manufacturer authorised service centres. There is currently no requirement for manufacturers to report on the outcomes of end-of-life battery management specifically with respect to in-warranty collection rates, recovery rates, and materials recycling efficiencies. 	 How do we ensure that key stewardship metrics for the management of end-of-life batteries are accurately and openly reported? Is the EV industry demonstrating accountability for the management of end-of-life battery outcomes including recovery rates and materials efficiency?

Table 2. Initial discussion points - food for thought





TOPICS	CONTEXT	QUESTION
	 Outside of in-warranty services a significant percentage of battery failures would be due to accident damage or out-of-warranty failure. This results in the insurance sector, after- market service providers, and the scrape metal industry becoming involved in the management of end-of-life EV batteries. Aftermarket service providers and the scrap metal industry will need to enhance their electrical safety expertise 	 What is the insurance industry currently doing to manage end-of-life EV batteries? Who is responsible for recycling failed EV batteries in the aftermarket service sector? What training and information is needed to ensure the after-market service providers and the scrap metal industry is prepared for an upsurge of EV batteries and who will provide it? Are there unique environmental hazards that need to be consider when dealing with EV accidents? What fire and/or electrical safety need to be considered? What costs need to be considered and how are they currently tracked?
	 There are many new entrants to the EV market along with the traditional vehicle manufacturers. As the industry is in the early development phase, the possibility of new entrants exiting the market early for various reasons is high. 	 Who is responsible for retired out of warranty batteries? How do we avoid the proliferation of stranded batteries left by manufacturers exiting the market?
Battery Information	 Capturing details of EV batteries when introduced and tracking that battery through to its final fate is critically important in stewardship management. When an EV battery is no longer suitable for its current application it may be possible to repurpose the battery for another application. State of health information for the battery is important to determine the next appropriate use and safety requirements for: repurposing recycling. Current considerations to capture such information are via a battery passport and/or another shared database or blockchain technology is under study. 	 What information do we need to capture to determine: Safe recovery Safe transportation Reuse and repurposing the fate of the used battery What is the best way to capture and share this data now and into the future?
Disassembly	 Deenergising and disassembling the EV battery from the vehicle is a critical step requiring specific skills, knowledge, and experience to ensure safe work practices are followed. 	 What facilities currently exist to perform this service? Is there a national infrastructure in place or needed to enable safe and responsible disassembly? What training and information is needed to ensure the industry is prepared dissembling EV batteries and who will provide it? What is the cost?





TOPICS	CONTEXT	QUESTION
2 nd Life Application: Reuse and refurbishment	 The term "Reuse" refers to the removal of an EV battery from one vehicle for use with another vehicle of the same make and type. The term "Refurbishment" refers to the removal of an EV Battery and that the spent cells or cell packs are replaced with healthy cells or cell packs from another battery unit from a vehicle of the same make and model. 	 How prevalent is reuse and refurbishment now? Who is currently conducting reuse and/ or refurbishment activities? Who is best placed to conducted reuse and refurbishment activities as the market increases? What are the safety / knowledge issues with regard to reuse and refurbishment activities as the market? How is transfer of ownership of EV batteries tracked?
2 nd Life Application: Repurposing	The term "repurposing" refers to the removal of an EV battery from a vehicle and then disassembling the battery unit to repurpose those battery cells of good health for a completely different application. e.g. repurposing EV batteries for use in an Energy Storage application.	 How do we know who is responsible for stewardship at end of this next life? What are the safety / knowledge issues with regard to repurposing EV batteries? What are the legal requirements for product quality in repurposed EV batteries? What are the acceptable applications for repurposed batteries? What standards apply to repurposing EV batteries? How is transfer of ownership of EV batteries tracked? Is there a need for product certification for repurposed batteries?
Accidents and roadside service	 Unforeseen incidents such as vehicle accidents will occur and may present safety risks at the site and the need to recover the battery from the vehicle. 	 How do we ensure safe and responsible recovery of damaged batteries after an EV accident? What is the process for recovery of batteries from EV accidents? What additional training and information is needed to ensure safe recovery of batteries from EV accidents? Is there a need for additional infrastructure to ensure safe recovery of batteries from EV accidents? What is the cost of safe recovery of batteries from EV accidents?
Storage	 Dependant of numerous factors impacting the supply and ability to reprocess used EV batteries there may be the need to store used batteries. As the industry is in the early stages of development, storage requirements will most likely wax and wane over time and the capability to offer appropriate storage facilities may be challenging. 	 Does EV battery storage or stockpiling exist today? If so, are storage facilities designed to mitigate fire safety hazards? Is there any evidence that EV batteries are being exported legally or illegally?





TOPICS	CONTEXT	QUESTION
Collection & transportation	 Legal requirements for transporting lithium batteries is evolving and decisions regarding how to regulate used and damaged batteries will likely have a significant impact on the economics of recovery and battery stewardship. Once the EV Battery is safely removed from the vehicle its state of health needs to be assessed to determine its next application. Once determined the battery is collected and transported to an approved facility so it can then be dealt with according to its next application. 	 What are the differences in how used EV batteries are managed in-warranty and out-of-warranty? Who has the skills to effectively assess the state of health of a battery and determine its next application? Where is this currently done? Who is responsible for collection of used EV batteries? How will end of life batteries be dealt if the manufacturer exits the market? What proportion of failed EV batteries are shipped offshore? Dose the ownership of the battery transfer removed from the vehicle?
Processing	 Processing is the final stage in the recycling process of a used EV Battery. Used EV Batteries that have a poor state of health would be disassembled down to their raw minerals and those minerals would then re-enter the manufacturing process to make new products including new Batteries. 	 Who is currently conducting EV battery processing in Australia? What are the final fates of EV batteries at the moment? Who is preparing to conduct EV battery processing in Australia? What is needed to scale up? What proportion of EV batteries are currently being shipped offshore for processing? What is the cost/benefit of processing EV batteries? What is the value of the commodities after processing.
Other stewardship schemes	 Stewardship is not new to the vehicle sector with some vehicle components being already covered by a stewardship Scheme. In addition, a whole of vehicle stewardship scheme is under consideration. The principle of product stewardship is that all participants within an industry sector have a responsibility to actively participate in the end-of-life management, this includes producer responsibility. 	 Are there any relationships to existing Schemes that need to be considered when establishing battery stewardship? Tyre stewardship E-waste How might battery stewardship integrate with a whole of vehicle stewardship approach? How do we identify EV batteries being imported? Import codes Importer declaration How do we avoid free riding? How do we avoid greenwashing?

REF: BSC_FCAI_MTAA EVB Stewardship Discussion Paper 20230402.docx

