Electric Vehicle Discussion Paper

Submissions

B-cycle Battery Recycling

Battery Stewardship Council

B-cycle Battery Recycling

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BatteryStewardshipCouncil

Electric Vehicle Battery Stewardship

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

FEDERAL CHAMBER OF AUTOMOTIVE INDUSTRIES

B-cycle Battery Recycling

Australian Government Accredited Product Stewardship Scheme

MOTOR TRADES ASSOCIATION OF AUSTRALIA

B-cycle Battery Recycling

Published March 2023

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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:

Electric Vehicle Battery Stewardship Consultation Journey
Step 1. Release this discussion paper
↓
Step 2. Dialogue with industry and subject matter experts to confirm we are asking the right questions, explore answers, and identify gaps
↓
Step 3. Assess broader stakeholder views based on this dialogue
↓
Step 4. Develop options for Scheme design
↓
Step 5. Workshops to further discussion the issues and practicalities of implementation.

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.

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:

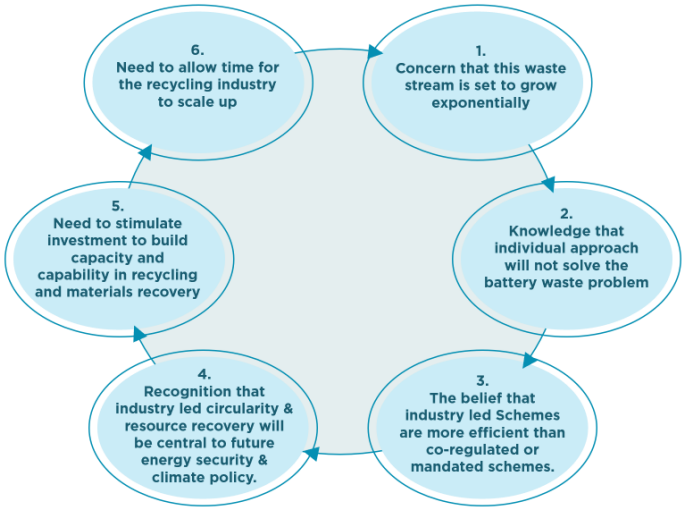
- the period beyond the manufacturer's warranty
- products that may be subject to accidents or insurance claims
- extended battery life span
- products that are abandoned in the event of an exit from the market, corporate liquidation, or bankruptcy
- potential for second life applications
- the need 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 state-based 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

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.

2018

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.

2020

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 Commission).

2021

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.

2022 first half

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 territory.

Looking ahead

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.

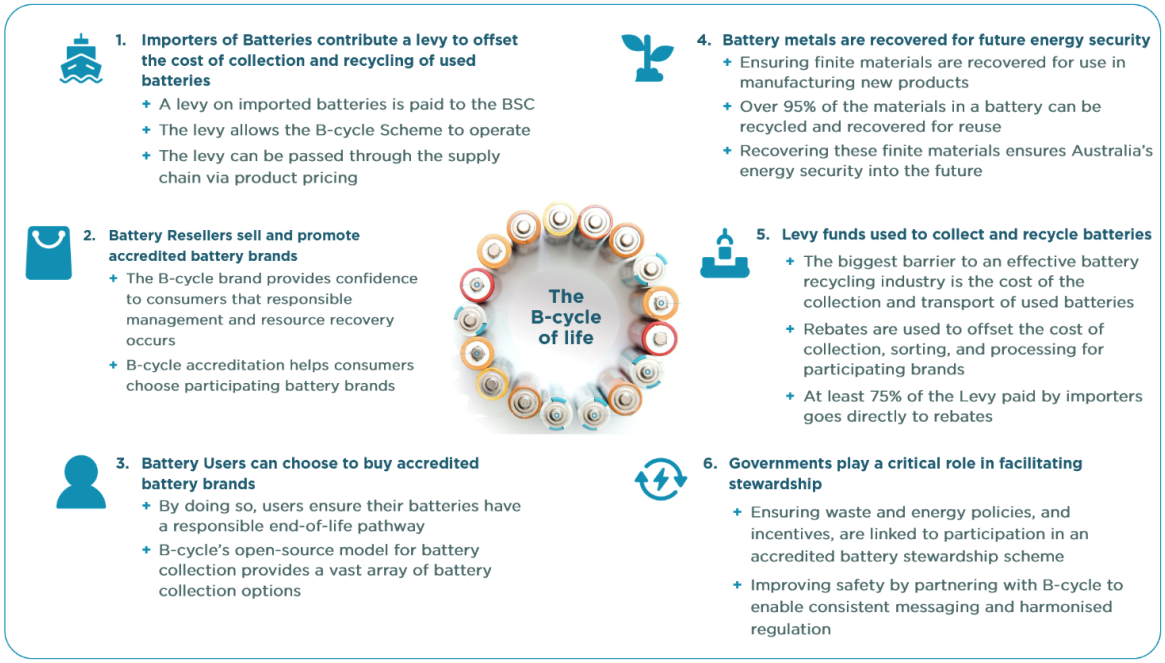
Continued focus on improving systems and reporting.

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 recycling network.

B-cycle offers industry flexibility and an ability to manage Scheme design and minimise costs.

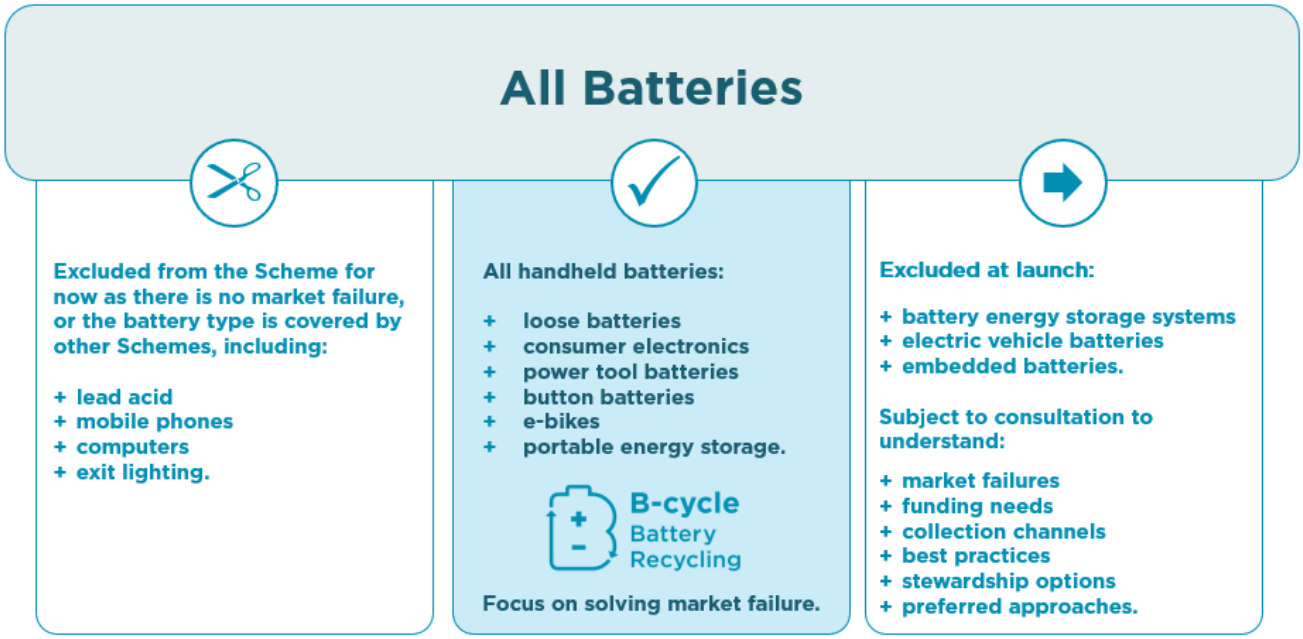
The fundamental design features are described in Figure 3, however the ACCC's determination provides scope for the fundamentals of this design to be adapted to suit the specific needs of the electric vehicle industry.

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

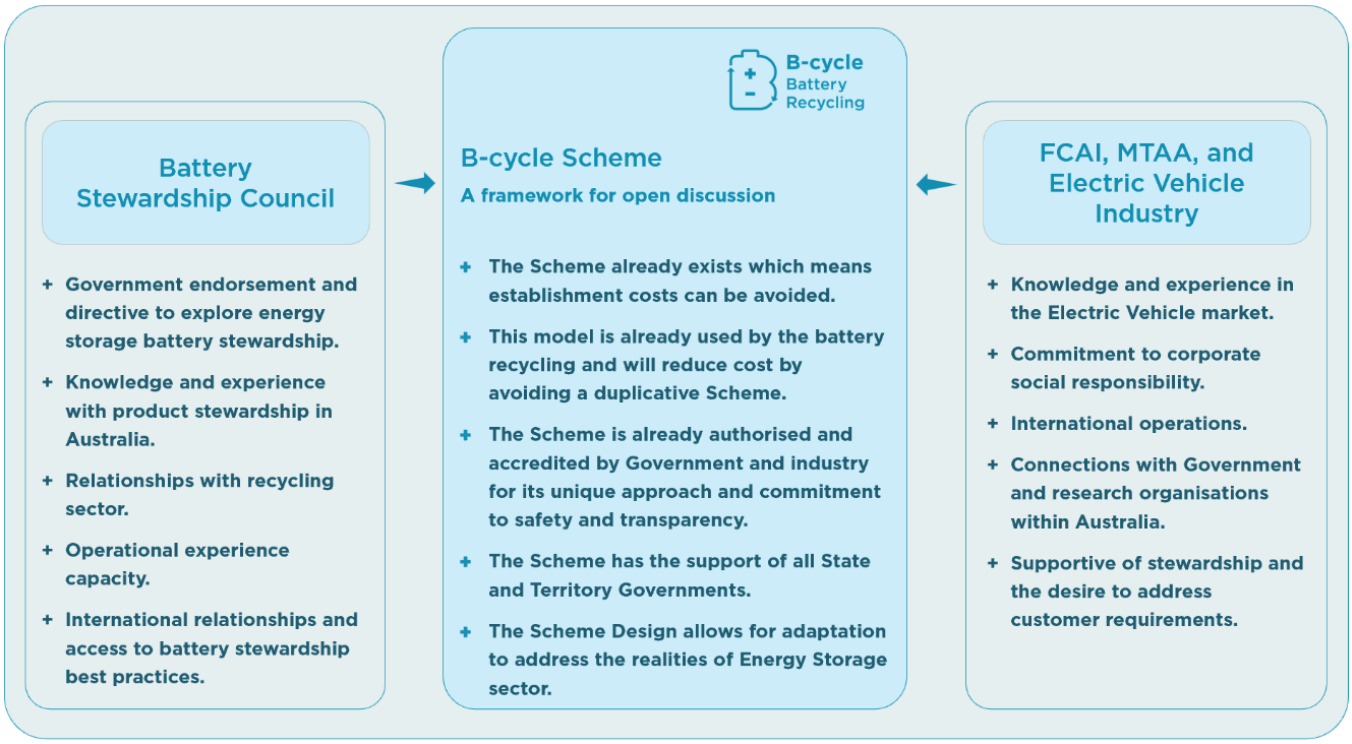


This discussion paper is intended to inform the consultation for electric vehicle batteries identified in the third box; to set the scene and identify a set of initial questions to explore regarding market failures; funding needs; collection channels; best practices; and the design is based on an understanding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

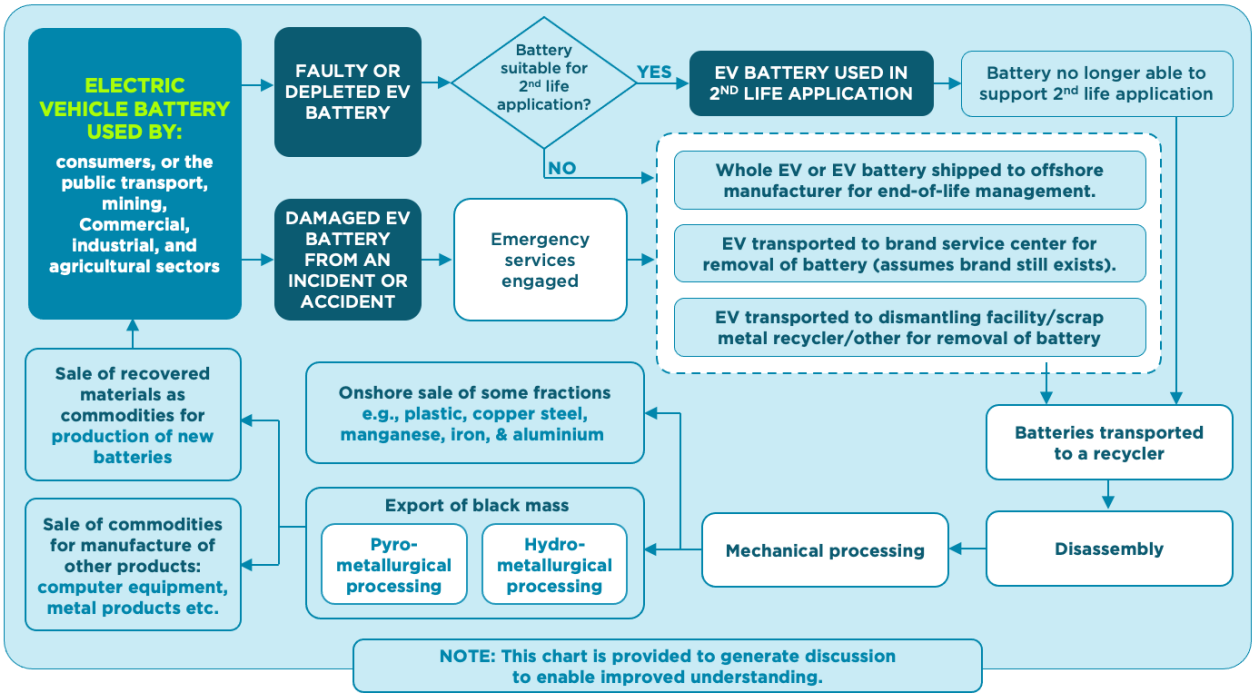
Figure 5. Framework for stewardship exploration



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.

Figure 6. Battery life cycle in the Australian context – feedback sought



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: contact@bsc.org.au to arrange a time to discuss and explore the path forward.

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.

Table 2. Initial discussion points – food for thought

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?

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
	  + reuse, or
	  + 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
2nd 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?
2nd 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?

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Submission by Innovative Mechatronics Group Pty Ltd

To the: BSC EV Battery Stewardship Discussion Paper

May 2023

1. Overview

Innovative Mechatronics Group Pty Ltd (IM Group), welcomes the opportunity to provide further industry perspective into BSC EV Battery Stewardship Discussion Paper. IM Group has a history of innovation. As pioneers in the field of automotive electronics repair and remanufacturing equipment, the company's IP and know-how are used by automotive aftermarket specialists in Europe and the USA. IM Group continues to leverage its in-house research and development capability to seize domestic and international growth opportunities.

Traditionally, the company focused its circular economy efforts on mechatronics parts for passenger vehicles running on internal combustion engines. With the electrification of the drivetrain, the company has taken steps to be the first in remanufacturing hybrid electric vehicle (HEV) batteries and components and, with the current program, to be the first to create a circular economy solution for plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs).

In November 2022, IM Group launched '**INFINITEV**' as a standalone division dedicated to Hybrid and EV batteries. In an Australian automotive first, Infinitev has shifted the industry's take-make-waste approach to hybrid and electric vehicle batteries, replacing it with a service that ensures end-of-life (EOL) batteries are reused, repurposed, and recycled as part of a sustainable circular economy.

Infinitev offers three unique service programs to the automotive industry:

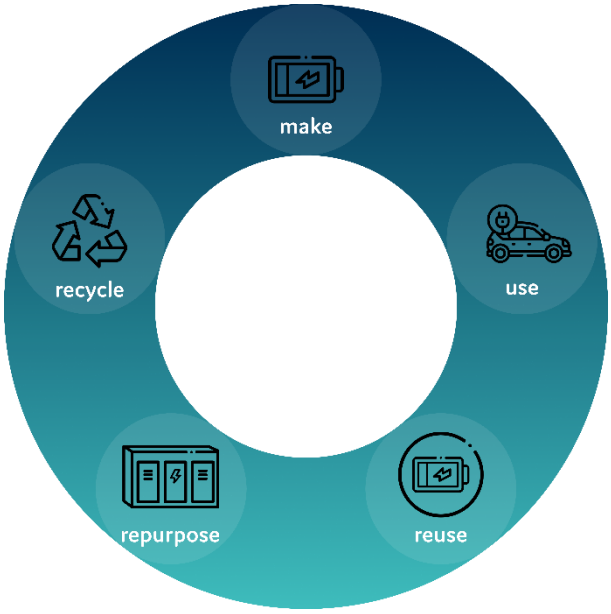

Figure 1: Infinitev's image of future potential – a sustainable circular economy

- Electric (and Hybrid) vehicle battery remanufacturing (**reuse**) - To give Australian motorists a choice to keep their HEV, PHEV & BEV on the road for longer, and to support automotive mechanics in meeting the needs of their electrified battery customers, Infinitev delivers Australia's first scalable component reuse of retired battery packs from hybrid electric vehicles. These batteries are reused in their original application as traction batteries. Leveraging this methodology, BEV & PHEV batteries are assessed for reuse purpose as traction too.

- Infinitev Battery Energy Storage System (**repurpose**) -Developed in partnership with Sustainability Victoria, Infinitev's innovative Battery Energy Storage System (BESS) utilises batteries no longer suited to vehicle applications and repurposes them into a stationary energy storage system for commercial and industrial facilities. This gives these batteries a second life in a new application (from traction battery to infrastructure support).

- Sustainable end-of-life parts treatment (**recycle**) – Traditionally, battery manufacturers source materials from the earth to produce hybrid and electric vehicle batteries, eventually discarding them as waste. Infinitev partners with the automotive industry, and other stakeholders, to create a sustainable circular economy for EV batteries. Infinitev partners with industry leading recycling programs to recover valuable materials that can subsequently be used to create new batteries.

Therefore, this BSC EV battery stewardship discussion paper is critical to the landscape of our operations and the future of battery life management, manufacturing, and recycling.

In collaboration with Sustainability Victoria, IM Group will be 'Servicing Retired EV batteries' by developing a novel commercial business plan for the EV industry to enable an assessment and servicing of EV (lithium) batteries as part of Battery Life Management Services (BLMS). The goal of the BLMS is to identify the next-best use of batteries that are no longer fit to serve as traction batteries, thus identifying opportunities to, in order:

1. Reuse (parts of) the battery as traction batteries for EV
2. Repurpose Electric Vehicle (lithium) batteries after extensive assessment and testing to deem applicable for Battery Energy Storage Systems (BESS), or
3. Recycle after discharge to a safe state before forwarding to an accredited EOL recycler for classification of components and treatment.

The program will primarily target repurposing and upcycling, including waste minimisation after the assessment and servicing of EV batteries as part of the BLMS. Giving EV batteries a second life in a BESS.

IM Group will deliver to the economy:

- A commercial plan for mitigating battery waste,
- A roadmap to increasing employment,
- Articulating increasing innovation on technology, and
- Opportunity to grow the Battery Energy Storage industry

2. Key Facts

Statistics	• Presence in Australia since 1983 • Operations and service facilities (throughout ANZ) across all states and in New Zealand • IM Group is a subsidiary of GUD Holdings Limited (ASX:GUD) – ANZ's largest automotive parts and accessories wholesaler. • Over 100 employees across all sites
Product & Brand	• GOSS • MAP • Genuine OEM Parts • Injectronics • Infinitev

3. Key Points for Discussion

OVERARCHING RESPONSE

IM Group is a leading player in the supply of vehicle management parts and repair of automotive mechatronics components, and established itself as a leader in testing, repairing, and remanufacturing automotive electronic components and other transportation electronics by supplying technology and remanufacturing solutions to remanufacturing companies around the world. With IM Group's reputation and winning accolades of awards over the past few decades within the automotive industry, IM Group can leverage its product relationship with all the leading Australian and New Zealand automotive component suppliers, to ensure awareness and sustainable viability.
 	
Recently, IM Group launched the new brand 'INFINITEV' to focus on Hybrid and EV batteries-related business (electrification). Growing the business, IM Group is innovating and exploring extending the life of lithium batteries for reuse as part of a Battery Lifecycle Management Service (BLMS) or repurposing into Battery Energy Storage System (BESS). This aligns with IM Group's core strategic themes of being first to market in mobility and circular economy.
 	
With the electrification of the drivetrain, the company has taken steps to be the first in hybrid electric vehicles (HEV) and, with the current program, to be the first to make a circular economy solution for battery electric vehicles (BEV).
 	
A strong battery sector can demonstrate a growing industry via its investment, R&D spending, and processing of used batteries. The opportunities lie in the R&D to develop technology to transform the used materials into raw, reusable materials (in battery–black mass). These processes are being mirrored overseas, where they are successful with funding and incentives.
 	
The EV Battery Stewardship discussion paper needs to set out a framework with these considerations to develop local technology and innovative processes.
• *With EV traction batteries, consider synergies of the three "R" - Recycling is part of the consideration with Reuse and Repurposing the higher-ranking methods in the hierarchy of waste management (modelled on EU Directive 2019/1004, aligned to Australian Battery Recycling Initiative (ABRI)'s best-practice framework, and delivering a viable route for Extended Producer Responsibility to be practiced.*
• *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)*
• *Appreciation and consistent application for Reuse and Repurposing of (traction) batteries are not the same as the EOL process of these batteries (i.e., not waste)*
• *A holistic approach to governing multiple jurisdictions (e.g., Road Transport, Heavy Vehicle, Environment, etc)*
 	
The paper should consider how best to approach and not be limited by "household (lithium button) batteries" practices:
• *Incentives and/or funding to expedite commercialisation opportunities for Australian-based facilities, including pilot/concept studies, capital expenditure, technology development in chemistry recovery, and alternative industries.*
• *Assist and fund fire safety, monitoring / tracking, artificial intelligence (AI), and robotics.*
• *Collection of data for learning and security*
  ○ *A nationally consistent fire incident reporting to share learnings*
  ○ *Support future data analytics*

- *Tracking of battery movements (until end-of-life)*
- *The best approach to "regulate" without impeding developments and commercialisation of technology. (Remove the "red tape" under the guise of "safety frameworks")*
  - *Consider industry voluntary code of practice*
- *Reused or repurposed batteries for another application must not be within the "e-waste" framework*

IM Group works closely and collaboratively with the Electric Vehicle Council (EVC), Battery Stewardship Council (BSC), Australian Battery Research Initiative (ABRI), Federal Chambers of Automotive Industry (FCAI) members, and many Original Equipment Manufacturers (OEMs) to drive continuous improvement in battery product (re)manufacturing, quality, and safety. IM Group is a leader in world-class circular economy practices.

When considering the type of vehicles to be within the scope, we believe it should cover all categories as per the Australian Design Rule (ADR) or the UN-ECE, including category G and omnibus, which ensure coverage for all light passenger, commercial, and mopeds. These classifications will be part of the transition toward electrification.

Learning from other regions should be acknowledged to mitigate market failures as well as other position papers shared concerning EV battery utilisation. A holistic approach needs to be adopted rather than immediate trends or focus. Consideration of the infrastructure, consumer, and product is important and not just from a waste perspective. A sustainable circular ecosystem is possible and achievable. Through in-depth discussions with multiple OEMs and stakeholders, an EV battery has multiple usages post its initial traction use, and therefore, understanding the tracing, disassembly, and removal of battery at different stages of its life is critical. IM Group hopes this discussion paper will highlight the type of stewardship necessary to ensure traceability, accrediting, verifying, and ensuring all EV batteries are processed in a structured manner without creating additional barriers or impact to the reuse & repurposing business (such as IM Group business methodology).

IM Group thinks it is essential that any policies or standards highlight 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 repurpose 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.)

QUESTIONS	RESPONSE
Theme Topic: Scope	
Q1: *What types of vehicles are to be considered in the stewardship scope.*	*IM group thinks the stewardship scope should cover all categories defined in the Australian Design Rule (ADR) or the UN-ECE governing the different categories of mobility and vehicles in Australia, including category G and omnibus. These classifications will be part of the transition toward electrification.* *Due to the different chemicals used in traction batteries, all vehicle types/categories be defined in the stewardship program. Therefore, an efficient and sustainable circular economy would be of importance for retired batteries in all types of vehicles.*

Theme Topic: Market Size & Waste Arising	
Q1.1 *How will the new and/or future governments influence the growth of the EV market in the future?*	*Government can share "best-practice guides" proposed by other countries if applicable and hold forums for greater awareness. For this aim, the government's initial measures primarily purchase subsidies on EVs, and vehicle purchase and registration tax rebates are needed but not enough. The complementary and holistic measures that governments should consider speeding up the EV market in the future are:* • *Direct investment to install publicly accessible chargers.* • *Incentives for EV owners to install charging points at home.* • *Strategic deployment of charging infrastructure.* • *Support the industry to create a sustainable circular economy of batteries.* • *Integration of EVs in power systems through smart charging and Vehicle to Grid (V2G).* • *Support the research projects on EV integration.* • *Sustainable products utilising Reuse and Repurposing of EV batteries*
Q1.2 *How do we maximise the recovery of finite resources?*	*Working with communities and localising the "problems" or "gaps" to innovate a sustainable solution utilising the battery framework, such as Repurposing EV batteries for battery energy storage to power remote/rural areas of Australia or to mitigate energy shortages due to increasing demand of electricity by ensure consistent energy supply with battery energy storage systems (BESS).*
Q1.3 *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?*	*The EV industry should consider the recovery of finite resources in the supply chain. Australia is a unique island country where the transportation of lithium batteries could be hazardous and considered "dangerous goods." Therefore, we need to focus on the battery we already have in the country, whether by reusing, repurposing, or recycling.* *This is still a challenge to be addressed if we don't have an onshore battery manufacturing capability. The demand for EVs is increasing swiftly and exploiting materials for new batteries has caused a large portion of emissions worldwide. It will be a major problem for Australia without adequate support for recycling of the minerals or accredited reuse or repurposing of EV batteries.*
Theme Topic: Market Failure	
Q1.1 *How do we ensure that key stewardship metrics for the management of end-of-life batteries are accurately and openly reported?*	*Transportation of lithium batteries could be hazardous and considered "dangerous goods." Therefore, we need to focus on the battery we already have, whether by reusing, repurposing, or recycling.*

	Some further considerations need to be given to battery reuse segments of the supply chain: o *Accelerate growth in lithium battery recycling capability (in consultation with ABRI and/or BSC)* o *Invest in R&D and commercialisation of technologies to improve utilisation (of used batteries) and possible safety and reverse logistics opportunities* o *Explore University/Industry research for efficient and better battery recycling processes and manufacturing, including emerging battery chemistries (sodium-ion and lithium-sulphur; etc)* o *Support industry trends, (EV sector) reuse EV batteries for other vehicle applications or repurposing (EV batteries) in the energy storage sector.* *The increasing number of EVs in Australia will necessitate drawing on battery experts to deliver a local solution for battery reuse and repurposing.* *Working with communities/authorities and localising the "problems" or "gaps" to innovate a sustainable solution utilising the battery framework (by understanding the roadmap and process of various stakeholders)*
Q1.2 *Is the EV industry demonstrating account ability for the management of end-of-life battery outcomes including recovery rates and materials efficiency?*	*Like IM Group, it is a mindset and value proposition that integrates into the business ecosystem. Australian stakeholders in the battery industry should look at how they could integrate the circular economy into their product design and manufacturing.* *As IM Group negotiates and discusses with OEMs, we share:* o *the vision for delivering circular economy and emissions goals.* o *facilitate accessible reuse and repurposing approaches* o *remove the pain point for batteries at the end of life with a simple and robust approach* o *support and comply with product compliance* *Leadership is an important requirement to support and grow the domestic battery industry. The foresight and strategy allow:* o *Further collaboration and commercialisation discussion through information sharing across the battery value chain* o *Understanding and discussion on resourcing work programs and identifying opportunities for regulatory reform* o *Identify skills, knowledge, and research priorities across the different elements of the value-chain*

	○ *Improving international opportunities and market access* *It is important Australia applies consistent standards and requirements as per international bodies and does not create any "unique" Australian requirements (without consultation and agreement with local manufacturers or recyclers). It needs a holistic approach to governing multiple jurisdictions (e.g., Road Transport, Heavy Vehicle, Environment, etc)*
Q1.3 *What is the insurance industry currently doing to manage end-of-life EV batteries?*	*Based on discussions with the majority of insurance companies, it is unknown as there are various business models, but it is known that "fear" and risk mitigation are taking precedence. Therefore, the important step is to educate the industry on EV batteries and the differences with "household" lithium batteries.*
Q1.4 *Who is responsible for recycling failed EV batteries in the aftermarket service sector?*	*All integrated parties in the EV market, i.e., government, OEMs, dealerships, the insurance industry, and the battery industry are responsible to send the failed EV batteries to the aftermarket service to verify battery recycling companies. And at the end, the onshore recycling companies are responsible for the safe recycling of failed end-of-life EV batteries.*
Q1.5 *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?*	*Leadership is an important requirement to support and grow the domestic battery & EV industry. BSC and ABRI members such as IM Group or Envirostream can assist in the education of policymakers, industry members, and the public in general (as IM Group has currently undertaken).* *From previous experience, an infographic would also assist in dispelling the myths and focusing on facts. FCAI has experience with "Connected Automated Vehicle infographics" which may assist.*
Q1.6 *Are there unique environmental hazards that need to be consider when dealing with EV accidents?*	*All EV vehicle-related stakeholders should be aware of required actions after accidents as well as the hazards potentials, including when a thermal run-away is possible (based on facts, not myths).*
Q1.7 *What fire and/or electrical safety need to be considered?*	*Similar to the Austroads guide to road tunnel (design), where future mobility (including EVs) was considered, a comprehensive review of the infrastructure and interaction with fire and electrical safety is necessary. EVs require an active safety system besides thermal barriers (passive systems) to prevent battery failures and achieve zero battery fires. Therefore, education of the general systems will remove hysteria and focuses on the product gaps, such as limited fire-resistance housing or allowable*

	charging indefinitely (cut-off timer once the system reaches a certain operational capacity (e.g., 100%).
Q1.8 *What costs need to be considered and how are they currently tracked?*	*The recycling cost is only a component of the total cost associated with the end-of-life of EV batteries.* *IM Group / Infinitev provides a holistic program in partnership with (accredited) EOL recyclers to handle EV lithium battery packs from an ongoing program perspective, and the value-add. Infinitev by providing to both the OEM and the EOL recyclers, allows commercial & financial operations utilising the triage methodology of ReUse, RePurpose, and ReCycle.* *It does not isolate "disposal" (or EOL) since it could be years before it is recycled (for EOL) and on the immediate price/ton, rather than the lifecycle cost. The process once it is no longer suitable for use in the EV, there are several steps to determine the next appropriate process, as part of INFINITEV's BLMS triage, which includes:* • *Handling of pack* • *Inspection of pack* • *Sorting of pack* • *Dismantle of pack* • *Storage of pack* • *EOL Processing preparation* • *Characterising the battery packs* • *Reporting of results and service* *Depending on the result of the assessment (and SOH), it may be repurposed for alternative uses, such as Energy Storage.*
Q1.9 *Who is responsible for retired out of warranty batteries?*	*Currently, it is a "grey" area depending on the leasing and purchasing agreement between the owner/leaser and the manufacturer or dealership. It can be agreed, however, that the EV owners, mechanics, and EV service sites could be held responsible for retired out-of-warranty batteries. Awareness and education are important parts. The stakeholders should be aware of the existing remanufacturer and recycle companies of batteries to ensure an on-time contact for retired out-of-warranty batteries is processed correctly and consistently.* *INFINITEV has been working with OEMs to ensure any out-of-warranty EV batteries are coordinated centrally and ensure they do not end up in not conforming situation.*
Q1.10 *How do we avoid the proliferation of stranded batteries left by manufacturers exiting the market?*	*A consideration would be ensuring a third-party entity (such as Infinitev) are able to ensure consistent handling in consultation with peak bodies like EVC, FCAI, TIC, and BIC.*

Theme Topic: Battery Information	
Q2.1 *What information do we need to capture to determine:* • *Safe recovery* • *Safe transportation* • *Reuse and repurposing* • *the fate of the used battery*	*Technical information is needed to determine the appropriate action after confirmation of the end-of-life of EV batteries. So once an EV battery is failed (for use as a traction battery), the following steps should be considered:* • *Contact the OEM of the vehicle or dealership - they can contact INFINITEV for the next steps and procedure* • *OEM/Dealerships will have the necessary battery datasheet information (chemistry material, capacity, power, voltage, etc…)* • *Recommending safe transportation by the OEM / Infinitev based on the battery's characteristics.* • *Initial testing of the battery by trained technicians* • *Based on the testing, recognizing the status of the battery - suitability for ReUse, RePurpose, or EOL (ReCycling)*
Q2.2 *What is the best way to capture and share this data now and into the future?*	*Currently, the idea of creating a "battery passport" that records the entire service life for each battery cell is tabled for discussion in the European Union.* *The best way to capture and share this data is to ensure the OEMs make available battery data sheets to remanufacturers and EOL recyclers (stakeholders as relevant).* *Another parameter is the method to monitor the battery characteristics of the EV. Most EVs do not support the available OBD ports (in vehicles), so it is difficult to monitor the EV battery's performance. The OEMs need to provide a connection to the EV battery through other access, such as a CAN or OBD port.*
Theme Topic: Disassembly	
Q3.1 *What facilities currently exist to perform this service?*	*The current method for disassembly of batteries performed by EOL recycler is destructive and not the best methodology to separate the different components. Infinitev and its EOL recycling partners are investing in better processing methodology.* *It is a growing industry, and learning is still being investigated.* *In Europe and USA, disassembly is (currently) done by battery technicians in remanufacturing and processing personnel at EOL/recycling facilities with limited training.* *Infinitev performs the service to add value to the process, and to maintain safety and compliance for OEMs.*

Q3.2 *Is there a national infrastructure in place or needed to enable safe and responsible disassembly?*	*There is currently no infrastructure in place or ready to add value to the disassembly process, which is the reason OEMs are engaging Infinitev to review and add value to the reuse, repurposing, and EOL (recycling) process.* *Disassembly is not always the main way to treat retired EV batteries, especially for lithium technology. IM-group / Infinitev will process the battery via its triage methodology to assess the battery's health before disassembly. Once the assessment of a battery presents disassembly is required, this should be done in the safest way via battery technicians.*
Q3.3 *What training and information is needed to ensure the industry is prepared dissembling EV batteries and who will provide it?*	*There are several international standards and guidelines which will ensure best practices that the leading EOL recyclers (eg Envirostream) are aware of and following.* *Some RTOs in consultation with Infinitev are preparing curriculum courses to ensure industry and stakeholders are prepared for the EV battery processes.*
Q3.4 *What is the cost?*	*Disassembly should be done by battery technicians in the safest way. Generally, more than 5 hours is required to disassemble an EV battery pack to its modules or stack, depending on architecture and chemistry. It is usually a costly process.*
Theme Topic: 2nd Life Application – Reuse & Refurbishment	
Q4.1 *How prevalent is reuse and refurbishment now?*	*According to the report by Electric Vehicle Council, it is estimated there are approximately 83,000 light electric vehicles on Australian roads in 2022. Considering the number of electric vehicles, reusing and refurbishment will be a prevalent topic.* *Sustainability Victoria has the foresight to support and enable a circular economy with EV Batteries and engaged IM Group to study the feasibility and commercialisation viability. IM Group/Infinitev will have the process and product to support a commercial business from March 2024*
Q4.2 *Who is currently conducting reuse and/ or refurbishment activities?*	*IM Group with its Infinitev brand is engaging and assisting OEMs with the circular ecosystem for its EV batteries.* *See the overarching response*
Q4.3 *Who is best placed to conduct reuse and refurbishment activities as the market increases?*	*See the overarching response (Infinitev)*

Q4.4 *What are the safety / knowledge issues with regard to reuse and refurbishment activities as the market?*	*Infinitev participates and engages with international stakeholders to ensure best-in-practice methodologies are utilised wherever possible. Infinitev has also communicated with OEMs of passengers, heavy and omnibus electric vehicles as well as United Nations to ensure a robust understanding of issues, such as recertification of batteries where it is not necessary as first used in EV, non-conformance of operators modifying battery cells and ensure function safety of the product. In some instances where an absence of regulations is known, no exemptions are given, even though function safety or compliance can be demonstrated (such as in Australia).*
Q4.5 *How is transfer of ownership of EV batteries tracked?*	*This is still in discuss amongst OEMs and batteries OEMs and third-party entities.*
Theme Topic: 2nd Life Application - Repurposing	
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?*	*See the overarching response (Infinitev)* *Safety is paramount and it is evolving as new chemistry, algorithm, and architecture are innovated. International standards and practices should be utilised where possible. The stewardship needs to ensure the transition from vehicle to other uses/application are robust and ensure the EV batteries are tracked during their life up until their process for EOL.* *Infinitev does not think a separate certification for repurposed batteries for alternative use such as BESS is necessary, and it does not need additional certification or testing (of the EV battery) when the use of the EV battery in its entirety has already been certified originally. A separate function safety test for the product unit (of course) may be necessary to ensure high quality.*
Theme Topic: Accidents & Roadside Service	
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?*	*See the overarching response (Infinitev) – the methodology and process can be same.* *In the event of "accident" battery packs, extra care needs to be taken to ensure the mitigation of thermal runaways by storing them in appropriate containers. IM Group has a process to ensure power down and limit the charge of EV batteries to enable safe disassembly of EV batteries and continuously discuss and work with battery OEMs, EV OEMs, and EOL recyclers for best practice.* *The most important training for recovery of EV accident batteries is to know who and where to contact after the*

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?*	*accident to ensure an accurate analysis of the battery status.* *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 a safe operation of the EV battery. A battery diagnostic service may be needed at the OEMs (manufacturer) or appropriate workshop for doing required tests on-site.*
Theme Topic: Storage	
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?*	*The pilot project with Sustainability Victoria for a stationary battery energy storage system (BESS) built from retired EV batteries was concluded in November 2022. In discussion with many OEMs, it is evident it will become a concern on the storage of many EV batteries across the country in later years (due to accidents and the old age of EVs)* *At IM Group / Infinitev, the first commercial BESS will begin production in March 2024 and designed in consideration of safety standards to mitigate fire safety hazards. A new SAE J3235 standard has been released and considering appropriate measures for storage. (The repurposing of EV batteries is a mitigation step to reduce the waste of EV batteries).* *It is important to recognize value add/engineering storage of an EV battery is very different from the waste storage of an EV battery due to the status of the battery, such as SOH, construction, and quality.*
Theme Topic: Collection & Transport	
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?*	*See the overarching response (Infinitev) – the methodology and process utilised by Infinitev answers many of these points.*

What proportion of failed EV batteries are shipped offshore? *Dose the ownership of the battery transfer removed from the vehicle?*	
Theme Topic: Processing	
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.*	*See the overarching response (Infinitev) – the methodology and process utilised by Infinitev answer many of these points.* *IM Group works closely and collaboratively with the Electric Vehicle Council (EVC), Battery Stewardship Council (BSC), Australian Battery Research Initiative (ABRI), Federal Chambers of Automotive Industry (FCAI) members, and many Original Equipment Manufacturers (OEMs) drive continuous improvement in battery product (re)manufacturing, quality, and safety. IM Group is a leader in world-class circular economy practices.* *Sustainability Victoria has seen the value in a sustainable circular economy and collaborating with IM Group to scale up commercial opportunities.* *The current process for retired EV batteries is to store them until they can be processed for recycling rather than shipped offshore for processing. IM-Group is a pioneer in Australia providing value-add engineering assessment of retired EV batteries to create a circular economy rather than just recycling.* *The process of manufacturing EV batteries can be costly. All processing steps are actioned by engineers and technicians familiar with lithium-ion batteries. Moreover, the testing equipment is expensive since they are designed for high voltage assessment of batteries with algorithms and safety protocols to assist the assessments.* *The holistic value and costs of processing EV batteries consider many factors in the supply chain, such as value-add, equipment, labour, assessment, insurance, storage space, and other factors.*

Theme Topic: Other Stewardship Schemes	
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?*	*Due to the importance of the circular economy of EV traction batteries, the battery stewardship program doesn't need to be integrated with other stewardship programs.* *When it comes to the identification of EV batteries imported, both import codes and importer declarations should be applied. The import codes might be used by battery manufacturers who import battery cells/modules. Importer declaration can be used by the EV OEMs to declare all battery packs imported with vehicle on-board or off-board as a spare.* *To avoid "Greenwashing", the appropriate CO_2 emission of different EV battery pack production should be determined based on each kWh of the battery manufacturing. A collaboration between academics, battery manufacturers, EV manufacturers, and the battery after-life industry is necessary. Generally, the emission for battery remanufacturing is much lower than or could be negligible compared to manufacturing a new battery.*

Insurance Council of Australia

12 May 2023

By email: contact@bsc.org.au

To whom it may concern,

RE: Electric Vehicle Battery Stewardship Discussion Paper

The Insurance Council of Australia (ICA) thanks the Battery Stewardship Council for the opportunity to comment on the Electric Vehicle Battery Stewardship discussion paper. We appreciate the BSC's collaborative approach with government and industry stakeholders on a significant emerging issue.

The ICA is the representative body of the general insurance industry in Australia and represents approximately 89% of private sector general insurers. As a foundational component of the Australian economy, the general insurance industry employs approximately 60,000 people, generates gross written premiums of $60.2 billion per annum and on average pays out $150.6 million in claims each working day, totalling $37.5 billion per year.

ICA's interest in battery stewardship

The insurance industry is committed to reducing emissions across its operations, investments, underwriting and supply chain[1] and recognises that the electrification of Australia's transport sector will be important to achieving this objective.

Accordingly, the ICA supports policies and initiatives that will assist in the increased electric vehicle (EV) uptake and have called on governments to support the Australian Battery Recycling initiative to expand the battery stewardship scheme to include EV batteries[2]. In our view, such a scheme would be critical for supporting the growth of EVs and enable the responsible management of these assets through to end-of-life.[3]

Insurance industry's current role in the supply chain

We note in the discussion paper a specific question regarding the insurance industry's current role in relation to the management of end-of-life EV batteries.

While insurers do not directly manage or process end-of-life EV batteries, insurers have a 'general environmental duty' to take reasonably practicable steps to minimise risks to human health and the environment in conducting its business activities.[4]

The most relevant consideration in this context is the way insurers manage the disposal of salvage vehicles following the finalisation of an insurance claim. When an insured vehicle is considered uneconomical to repair, insurers will typically, after finalising the claim, acquire the salvage vehicle and on-sell it to third party auction houses or salvage yards to offset the costs incurred by the claim.

In these scenarios, the general environmental duty sets an expectation that insurers perform due diligence to ensure that the organisations they contract to provide these services have the capability and capacity to manage end-of-life vehicle waste, including EV batteries. Some insurers may, as part of their contractual arrangements with auction houses and repairers, seek to understand the environmental management plans and systems these third parties have in place.

[1] Insurance Council launches insurer roadmap to net zero - Insurance Council of Australia
[2] Insurance Council: Accelerating Climate Action, Policy recommendations for government
[3] National Electric Vehicle Strategy: consultation paper (insurancecouncil.com.au)
[4] Environmental-Legislation-Guidelines-v1.0.pdf (ga.gov.au)

Insurance Council of Australia

Scope of an EV battery recycling scheme

We recommend that the EV battery recycling program be designed to process all types of end-of-life EV batteries, regardless of the mode of transportation. Initially, we suggest the focus should be on light vehicles as they currently generate the majority of end-of-life EV waste, but the scheme should be incrementally expanded to encompass all forms of transportation.

Consideration should also be given to the repurposing EV batteries, where possible. As EV batteries reach end-of-service, they can still store at least 70% of their original capacity, which can be repurposed for "second life" energy storage. Useful applications can include electrical grids and communications towers that demand energy storage for solar, wind and other renewable sources.

Potential sources of EV market failure

Consumers and government regulators may not have complete information about the quality and durability of EV batteries being sold. This may lead to the market being flooded with low-quality or unreliable batteries, risking public safety, reducing consumer confidence in EVs as well as increasing the volume of end-of-life batteries that will need to be managed under the scheme.

Similarly, there is limited or incomplete information regarding the appropriate management of end-of-life EV batteries which could lead to improper or dangerous waste management practices resulting in negative environmental externalities.

These types of information asymmetries may also have flow-on implications for the insurability of certain sectors and assets. For example:

- EV battery recycling facilities may have difficulty obtaining relevant insurance due to the perceived high risks associated with EV batteries
- Motorists may find it difficult to access affordable motor vehicle insurance for EVs, creating disincentives to purchase an EV
- Higher perceived risk may mean that building owners with EV charging facilities may find it difficult to obtain the relevant building or strata insurance

Essential policies or standards for future proofing EV battery stewardship

To mitigate the potential market failures described above, the ICA strongly believes that the EV battery stewardship scheme should be supported by:

- establishing appropriate product safety standards,
- sufficient regulatory oversight in the manufacturing or importation of EV batteries, and
- the development of relevant training materials and guidelines for handling EV battery waste.

It is important that only fit for purpose EV batteries are manufactured and/or imported and that appropriate training and guidelines are available to manage potential safety risks. These measures will continue to become increasingly important as the uptake of EV's in Australia expands.

The ICA and its members would welcome engagement with the Battery Stewardship Council to support the design of these policies and standards.

Insurance Council of Australia

It's worth noting that similar efforts are already underway in various industries across multiple jurisdictions in Australia and overseas, and there may be opportunities to learn from these initiatives to inform the development of the EV battery stewardship scheme.[5] [6] [7]

National approach preferred

To minimise operational complexity and promote a seamless approach to managing EV battery waste across Australia, it's important to establish a national approach with consistent standards, procedures, training, and licensing requirements. Without a consistent approach, businesses and stakeholders may need to navigate different rules and requirements in different jurisdictions, which can create confusion, inefficiencies, and additional costs. For instance, if each state or territory has its own set of regulations, businesses may need to comply with multiple sets of rules and standards, which can be time-consuming and costly. Furthermore, different regulations and standards can create a lack of clarity around what is expected from businesses, which can be challenging for stakeholders such as recyclers, regulators, and waste management organisations.

Examining existing regulatory settings

To manage EV battery waste effectively, it's crucial not only to establish new regulations but also to scrutinise existing regulations that may unintentionally lead to excessive waste. For example, under New South Wales' Written-Off Vehicle Register (WOVR) rules, insurers must automatically classify total loss vehicles as 'statutory write-offs', rendering them incapable of being repaired and re-registered by a third-party.[8] This is in contrast to other state and territory WOVR rules which permit total loss vehicles to be repaired and re-registered, subject to relevant safety checks, which means less vehicles going to waste.

Given the high parts and repair costs associated with EVs, insurers are more likely to declare them as total losses, resulting in their automatic classification as 'statutory write-offs' under NSW WOVR.

As such, there is a need to examine NSW WOVR to promote more sustainable supply chains and reduced waste, while also minimising potential unintended adverse impacts on EV uptake.

Conclusion

We trust that our input has been of assistance and remain open to further discussions throughout the consultation process.

Yours sincerely

[5] Battery Safety Initiative | NHTSA
[6] Battery Safety (frv.vic.gov.au)
[7] National safety standards for electric and hydrogen-fuelled vehicles | Department of Infrastructure, Transport, Regional Development, Communications and the Arts
[8] A Stronger NSW - Policy recommendations for the next NSW Government (insurancecouncil.com.au)

15/05/2023

Attn:
Libby Chaplin
libby.chaplin@bsc.org.au

Tes-Amm Australia Pty Ltd feedback on *Electric Vehicle Battery Stewardship*

Dear Libby,

TES thanks B-Cycle for its reasoned approach and diligent effort, and for the opportunity to provide feedback as follows. Feedback is general in nature given the current status of development.

From the perspective of a recycler, in general any scheme should be developed with the following underlying principles and policies:

- High environmental outcome
  - Solutions higher on the materials hierarchy such as 'reduce' and re-use' to be enabled and promoted over lower outcomes or downcycling
  - Circularity
  - High standards and accountability
- Social benefit
  - Safety
  - Coverage and completeness
  - Awareness
  - Dignified work
- Healthy market
  - Regulation/framework to promote quality solutions
  - Conditions for confidence in investment
  - Enforcement of standards (avoid race to the bottom)
  - Stability

Qu 1. What types of vehicles should be included in scope (now and in the future):
TES position is to accommodate the breadth of large form factor batteries in a proposed scheme, both EV and ESS. This is to ensure the maximum environmental benefit in recovery of valuable materials. However there are considerations and nuances around markets and products.

Under the assumption that the majority of large form factor batteries will come from ESS and EV batteries, supply chains for re-use and recycling will be established to accommodate these. A lower return on investment may preclude larger sized units (from trains, trucks, ships) from typical battery recycling operation given the additional investment in material handling and plant compared to the frequency of feedstock, particularly in the early years of technology adoption. These additional challenges may be neutralised through scheme design.

Potentially of most concern regarding the scope are the smaller variants of batteries in small mobility devices such as scooters and e-bikes, due to product safety concerns, usage and care of the devices.

Qu 2. What are current and emerging market failures in this sector with respect to electric vehicle batteries:

Categorised into two broad categories

Supply side emerging failures

- A lack of adequate safety standards, enforcement, and import and product controls accompanying an ever widening array of form factors and chemistry types
- 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
- No registry to track batteries throughout life cycle
- Potential planned obsolescence and overchurn of items
- Lack of governance over DIYers, mix and match of cells, combinations of batteries with aftermarket BMS

Use phase and end-of-life emerging failures

- 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

Qu 3. What do you see as the necessary components of an electric vehicle stewardship scheme:

More so than in other schemes is the importance of a stewardship scheme that interacts with the user throughout the life cycle of the product, enabling safety, longevity and circularity.

Key points to maximise the success potential of a EV/ESS scheme:

- Central administration
    - Single recognisable branding for public awareness and interaction
    - A common yardstick for performance, single audit and accreditation program
    - Outcome oriented, balancing quality, cost and delivery
    - Rolling reviews to recognise changes and evolve the scheme
- Recycler and logistic orientation

    - Stewardship schemes depend on a healthy recycling infrastructure with volume capacity and investment in plant delivering the highest circular outcome. In the case of storage and transport there will be investment in bespoke equipment and processes given the profile of the waste stream. Given these stakeholders will take on more risk than others, the scheme must set up the conditions for confidence to invest in solutions, such as certainty of volume, stable contracts, end markets, streamlined workflows etc
- Battery registration
    - Digital twin, or similar, to capture key technical information about the device and its specifications, as well as records of usage, state of health, repairs and servicing, defects and recalls
- Extended producer liability
    - Liability funded upfront upon import/manufacture to ensure funding is available at end-of-life
    - Mandatory participation of producers
    - Ultimate liability for battery defects throughout the entire battery lifecycle

Qu 4. What do you consider to be essential policies or standards needed for future proofing EV battery stewardship in this space:

<u>Standards and compliance</u>

1. Transport requirements and dangerous goods qualification of spent and repurposed batteries

Currently, the UN 38.3 standard for dangerous goods transport, as well as dangerous goods codes such as IMDG, ADR, IATA DGR, offer very little guidance regarding used batteries. In addition, certification of repurposed batteries under UN 38.3 falls into a regulatory grey zone because it is (a) difficult to ensure all newly built systems are same for type-testing purposes and (b) initially small batches of repurposed batteries make it uneconomical to comply with UN 38.3 testing requirements. These two issues are relevant to any certification of repurposed batteries that relies on type testing to establish compliance.

To overcome the above-mentioned issues, more attention needs to be paid to the end-of-life and repurposed batteries. Dangerous goods codes need to distinguish between normally used and damaged batteries, eventually making use of battery registration system mentioned under question 3. Transport certification for repurposed batteries must be achievable in a cost-effective way that does not compromise safety.

2. Guidelines / standards for repurposing

Repurposing processes of batteries need a standard or guideline to follow. One attempt of establishing such guideline is the UL 1974 standard. This or similar standard should be implemented to regulate repurposing of batteries. Alternatively, AS/NZS 5377 could be extended to include handling of batteries.

<u>Policy recommendations</u>

Following policy guidelines are suggested to make the stewardship scheme viable:

- Universal participation of battery producers and importers
- Enforcement of re-use and repurpose standards and single audit for all participants.

- Adequate adjustments of certification requirements for repurposed batteries and support in testing and certification efforts
- Mandatory participation in information sharing program for manufacturers and importers to ensure that repurposing and recycling is done safely and efficiently.

Yours Sincerely,

ABRI

ABRI submission to BSC, FCAI and MTAA consultation paper on EV stewardship

The Association for the Battery Recycling Industry (ABRI) welcomes the ongoing discussion on actions to accelerate the EV battery circular economy.

The EV battery recycling market is a separate market to consumer batteries with different dynamics. Battery weight and quality, manufacturers, logistics chains, data collection and tracking, and handling requirements are not comparable to the consumer small battery market. Experience to date suggests EV batteries are not the landfill issue of consumer batteries.

EV battery recycling is a good news story where companies have been showing leadership and initiative to recycle EV batteries - in some cases for more than a decade. ABRI members, who are Australian companies, are innovating and investing to develop manufacturing opportunities arising from electrification. They are driving investment in Australian intellectual property in conjunction with Australian universities to recover the critical minerals from EV batteries.

The industry is far-reaching and investing in a variety of activities beyond the immediate business of recycling. ABRI members also repurpose EV batteries for energy storage, develop advanced containers to support safe lithium battery transport, and take recovered minerals to develop cathode materials for batteries.

Pleasingly vehicle and large battery OEMs, a broad cross section of companies across the automotive sector and the battery recycling industry are already collaborating on the recycling, reuse and repurposing of EV batteries.

We should be acknowledging battery recycling industry initiative, investment and innovation when it comes to management of large batteries. The focus should be on continuous improvement for safe and sustainable materials recovery across the value chain.

ABRI will continue its work with all stakeholders to support 100% recycling of EV batteries in Australia and the growth of the local battery recycling industry. ABRI has already been advocating for the following industry priorities:

- Information sharing and data on battery chemistry and disassembly to support safe and sustainable recycling, reuse and repurposing.
- State based strategic planning for collection and aggregation sites to minimise transport costs and support safe collection.
- Streamlined planning and environmental approvals for collection and aggregation sites.
- Funding for proof of concept testing to ensure recyclers are ready at scale and to manage financial uncertainty at the early stages of industry development as volumes are not yet commercial.
- Consistent safe storage, handling and transport guidance for collection, aggregation and recycling sites across Australia

- Development of robust standards and a consumer protection framework to support safe battery repurposing.
- Funding for research to develop solutions to partial processing of used EV batteries on a smaller scale to reduce costs in transporting batteries from remote and regional areas.
- Review of hazardous waste import permit fees to support the building of domestic capacity as a South Pacific hub.

Across Asia, Europe and North America higher levels of EV penetration are driving leadership in policy thinking and implementation of tools to support EV battery recycling, reuse and repurposing. Implementation details vary but the themes are common as discussed in the attachment. Given this experience there is much that can be drawn on and, if necessary, adapted to the Australia context. These countries show that the concepts of producer responsibility and stewardship are much broader than an industry funded collection and recycling scheme. Indeed, there are a range of solutions emerging so that OEMs can achieve outcomes in different ways beyond a formal scheme which can come with high administrative and operational costs.

A review of major overseas programs to understand the effectiveness of developments and transferability to Australia would help participants across the supply chain. ABRI is examining these programs to see what has the best fit for local conditions including delivering these objectives:

- All batteries are recycled in Australia underpinned by a world leading battery recycling sector and local technology. Recycling should also include domestic processing of black mass to support value add and critical minerals recovery.
- Giving precedence to the development of commercial solutions.
- Strengthening product safety at all stages of the supply chain.
- Accessible product knowledge to support recycling and reuse.
- Minimising costs and administrative red tape where safe and sustainable to do so.
- Consistency with policy developments and regulation overseas.
- Ensure urban, regional and remote areas can access battery recycling opportunities.

To support this work, ABRI calls on the public release all submissions as soon as possible to increase transparency and collaboration across the sector.

By way of background, ABRI is the peak body representing over 50 companies across the battery value chain focusing on a battery circular economy and recycling. The move to a circular economy means that ABRI has expertise across the battery life cycle and for all battery types. ABRI's membership includes battery manufacturers, importers, distributors, retail, used battery collectors, recyclers and mining/mineral processing companies.

If you have questions regarding this submission, please email secretariat@batteryrecycling.org.au

ABRI

ATTACHMENT – Driving an EV battery circular economy

1 Maximining EV battery resource recovery requires a plan of action unique to the sector

Experience to date indicates that the passenger and larger vehicle EV battery recycling, reuse and repurpose market is a distinct market already prioritising recovery of resources and critical minerals. The market characteristics are shaped by:

- the weight of the batteries
- high quality, complex battery products with inbuilt safety features
- sophisticated battery tracking to support corporate commitments to recycle and reuse EV batteries, and ultimately demonstrate the materials recovered from the battery can meet circular economy and recycled battery content requirements
- narrow reverse logistics chains based around EV service delivery models
- the need for specialist skills and equipment to manage the batteries due to the weight and high energy density of the batteries
- different battery chemistries and evolving battery technology in what's still a relatively young section of the battery manufacturing industry
- the early life nature of the EV recycling and reuse industry. Europe, the US and Asia provide examples and lessons for Australia. However, there is still much learning to occur before the industry reaches maturity.

The EV battery recycling, reuse and repurpose market faces a unique set of challenges and characteristics that differ from the consumer and light mobility (e.g. e-bikes) segments of the market.

Consequently, a plan specific to the EV battery sector is required to maximise resource recovery from EV batteries and leverage existing initiatives such as repurposing of EV batteries for energy storage. Commercial arrangements suggest strong support for producer responsibility and the plan should look at addressing any gaps rather than adding costly, administration regulation.

2 A framework for action for resource recovery from EV batteries

There are a multitude of ways that companies and governments implement the concept of stewardship in relation to EV batteries. As noted at the *Australian Circular Economy Forum 2023*, stewardship covers the entire life cycle. Stewardship defined as an industry funded collection and recycling scheme is a narrow definition and may not always be the optimal solution or even needed.

When considering stewardship in its broadest definition, there are common elements to developing a stewardship, or indeed any policy, approach which are summarised in the below diagram.

This submission draws on an OECD framework for informing the design and delivery of programs to discuss the work program required to understand how Australia can align with global initiatives for an EV battery circular economy.

3 Impact- Setting objectives

Identification of the optimal solution(s) for maximising EV battery resource recovery in Australia, requires development of objectives against which to assess all possible options. These objectives must include:

- All batteries are recycled in Australia underpinned by a world leading battery recycling sector and local technology. Recycling should also include domestic processing of black mass to support value add and critical minerals recovery.
- Giving precedence to the development of commercial solutions.
- Strengthening product safety at all stages of the supply chain
- Accessible product knowledge to support recycling, reuse and repurposing
- Minimising costs and administrative red tape where safe and sustainable to do so
- Consistency with policy developments and regulation overseas, such as producer responsibility and battery tracking rules, to maximise and leverage existing opportunities and minimise administrative costs
- Ensure urban, regional and remote areas can access battery recycling opportunities

4 Mapping the EV battery landscape to identify market size, technical details and logistics chain – identifying bottlenecks and challenges

Formal mapping of the EV battery recycling, reuse and repurposing landscape would provide a framework for all parties in the reverse logistics chain to come to a common understanding of current and planned initiatives as well as identify potential bottlenecks and challenges. This would support achieving consensus on what additional steps are required to support an EV battery circular economy and what needs to happen over time as the market evolves. This exercise would provide a better understanding of the key players, emerging risks and issues, current challenges and actions already underway.

It would provide the baseline against which to:

- identify what, if any, intervention is needed
- what risks and gaps may need to be addressed
- the effectiveness of different tools

ABRI has anecdotal information on the reverse logistics chain for end of life EV battery recycling, reuse and repurposing built from review of public information sources, discussions with stakeholders and OEM requests for introductions to battery recyclers.

ABRI members are working with EV companies to support recycling of batteries and development of proof of concept projects. An ABRI preliminary assessment of EV company websites for passenger vehicles sold in Australia shows public commitments to battery recycling, reuse and repurposing. One car company has even pledged to develop a carbon neutral car by 2030. These commitments will need to be delivered in line with Australian consumer law compliance. They are supported by growing OEM commercial relationships with battery recyclers, reuse and repurposing companies as well as traceability.

Anecdotal evidence suggests EV batteries are entering the market as follows:

1. Embedded in cars (new and second hand)
2. New or used individual batteries for retrofitting internal combustion engine (ICE) vehicles
3. Used batteries imported for recycling, although this route is likely to have negligible volumes due to the cost of import permits for 'hazardous waste' batteries. In a circular economy world, imports of batteries for recycling should be given the same requirements as batteries for other uses.
4. Used batteries for second life purposes other than for EVs. Where this is an import pathway, it is likely to have different import approval processes as these may not be classified as waste under the Basel Convention where certain conditions are met.

Batteries are moving to the recycling chain through warranty/recall collection, OEM commitments to collect batteries at end of life or the scrap/dismantling sector. As far as ABRI is aware, these numbers are not public. Arrangements are still nascent and commercial in confidence. Entry of batteries for retrofitting and repurposing are the least transparent areas regarding size of market. However, due to the high transport costs of EV batteries these numbers are likely to be small if the EV batteries are imported.

For the battery recyclers, clarity on the number of batteries, technical characteristics (e.g. chemistry) and the routes by which they enter the recycling chain are important to support business investment. Technical information and implementation of information sharing requirements, such as those in the European Union, would support battery recycling, reuse and repurposing. The battery recycling industry is eager to work collaboratively with the motor vehicle industry on data and information sharing to support commercial and competitive outcomes which minimise administrative costs, protect intellectual property and improve safety and sustainability.

Discussions on a market analysis should include coverage and segments. Considerations include:

- a breakdown of battery volumes and chemistries by transport options (e.g. passenger vehicles, light mobility, industrial, mining, light and heavy commercial, buses, etc);
- battery chemistry, current and future; and
- different vehicle types such as hybrids and plug-in hybrids.

5 Effectiveness- Countries with high EV uptake setting the policy direction to scale up EV battery reuse & recycling

Across Asia, Europe and North America higher levels of EV penetration are driving leadership in policy thinking and implementation of tools to drive EV stewardship. Implementation details vary but the themes are common:[1]

- Battery traceability
- Responsibility for collection with different models appearing to meet producer responsibility commitments, either voluntary or mandatory
- Building local capacity for recycling and repurposing
- Disclosure of battery information
- Battery standards
- Recycled content levels for new batteries
- Research and development to improve material recovery levels and sustainability of recycling processes

EV battery transport and storage best practice arrangements are also becoming a prominent discussion point globally.

Given overseas experience there is much that can be drawn on rather than reinventing the wheel albeit it may need to be adapted to the Australia context. There is also much that will drive outcomes in Australia such as recycling of batteries to meet recycling content requirements in other countries. A review of major overseas programs to understand the effectiveness of developments and transferability to Australia would help participants across the supply chain as well as the expected impact on the local supply chain.

6 Pre-requisites to support EV battery recycling in Australia

As evidenced from overseas, EV battery producer responsibility, voluntary or mandatory, and with or without a formal scheme, cannot take place in a vacuum, a combination of tools is required. To support Australian EV battery recycling at scale the following are pre-requisites:

- Disassembly and battery chemistry – information sharing and data to support safe and sustainable disassembly of is critical to support battery recycling
- State based strategic planning for collection and aggregation sites to minimise transport costs and support safe collection
- Streamlined approvals process for collection and aggregation sites
- Funding for proof of concept testing to ensure recyclers are ready at scale
- Safe storage (short and long term) and handling guidance for collection and aggregation sites

[1] These themes are taken from the paper *Scaling up reuse and recycling of electric vehicle batteries: assessing challenges and policy approaches* from the International Council of Clean Transportation at https://theicct.org/wp-content/uploads/2023/02/recycling-electric-vehicle-batteries-feb-23.pdf

- Safe transport guidance for land-based and sea-based transport movements
- Development of robust standards and a consumer protection framework to support safe battery repurposing
- Funding for research to develop solutions to partial processing of used EV batteries on a smaller scale to reduce costs in transporting batteries from remote and regional areas
- Review of hazardous waste import permit costs to support the building of domestic capacity in Australia as a South Pacific hub

7 Next steps

ABRI proposes that the next steps to support the development of the Australian battery recycling industry and full recovery of EV batteries at end of life are:

- Delivery of the pre-requisites identified above. Where these require action from government, ABRI is already advocating on behalf of industry and working with various government agencies and engaging with the automotive industry associations.
- Mapping the EV battery landscape to identify and prioritise actions to support EV resource recovery at end of life including whether different EV battery chemistries and reverse logistics chains require different supports.
- Literature review and analysis of key international initiatives to determine how Australia can align with these to minimise red tape.

30 June 2023

Battery Stewardship Council
L 27 101 Collins St
Melbourne, VIC, 3000

Electric Vehicle Council Submission to BSC/FCAI/MTAA Discussion Paper

The Electric Vehicle Council (EVC) welcomes the opportunity to provide feedback on the BSC discussion paper on EV Battery Stewardship.

The EVC is the national peak body for the electric vehicle (EV) industry in Australia. Our mission is to accelerate the electrification of transport for a sustainable and prosperous future. We represent members across the EV value chain, including car, bus and truck manufacturers, importers, operators, charging infrastructure suppliers, battery reuse and recycling companies, financiers, and network providers.

The EV industry recognises the importance of addressing end-of-life battery management and is actively engaged in finding solutions. Establishing a circular economy around EV batteries will allow for the provision of critical minerals to meet future needs for clean energy technologies and achieve significant emissions reductions by reducing the use of raw materials in battery production.[1] OEMs are already collaborating to develop recycling and reuse options both within Australia and overseas. These efforts aim to establish a closed-loop system for EV batteries, ensuring that valuable materials are recovered and reused, minimising environmental impact, and contributing to the development of a circular economy.

The EVC advocates for evidence-based approaches to address end-of-life EV batteries, and does not support initiatives that lack sufficient justification and may hinder the adoption of EVs crucial to achieve sustainable transport objectives. The EVC supports the Federal Government's exploration of opportunities for EV battery reuse and recycling through a Government-led process under the National Electric Vehicle Strategy.

Distinction of EV Batteries from Household Batteries

At the outset, when discussing battery stewardship and product responsibility, there is a need to distinguish between batteries incorporated into portable electronics such as laptops and mobile phones and batteries for e-mobility (such as e-bikes and e-scooters), from EV batteries. While the BSC is to be commended for its efforts in implementing the existing

[1] Chen, Q et al (2022), 'Investigating carbon footprint and carbon reduction potential using a cradle-to-cradle LCA approach on lithium-ion batteries for electric vehicles in China,' *Journal of Cleaner Production*, 369 (133342). https://www.sciencedirect.com/science/article/abs/pii/S0959652622029286.

B-Cycle scheme for household batteries, it is important that concerns about small household batteries entering landfill do not get conflated with large-format batteries like EV batteries, which present significantly different opportunities for manufacturers, refurbishing and repurposing companies, and recyclers. Unfortunately, the BSC has conflated these different types of batteries in recent media commentary.

Unlike small batteries, **EV batteries are not being sent to landfill and do not present a significant market failure**. The size, weight, and composition of EV batteries makes them more financially attractive to recycle to recover critical battery materials. EV batteries also have much longer lifespans – due to the more granular control of battery health through complex battery management systems and provide for reuse or second-life applications for stationary energy storage prior to recycling.

EV batteries are generally expected to significantly outlast their usage in a vehicle (see **Figure 1**). Following an average 10-to-15-year lifespan in a vehicle, current EV batteries are expected to retain approximately 70-80% of their energy storage capacity, which makes them attractive for several secondary use cases prior to recycling.[2]

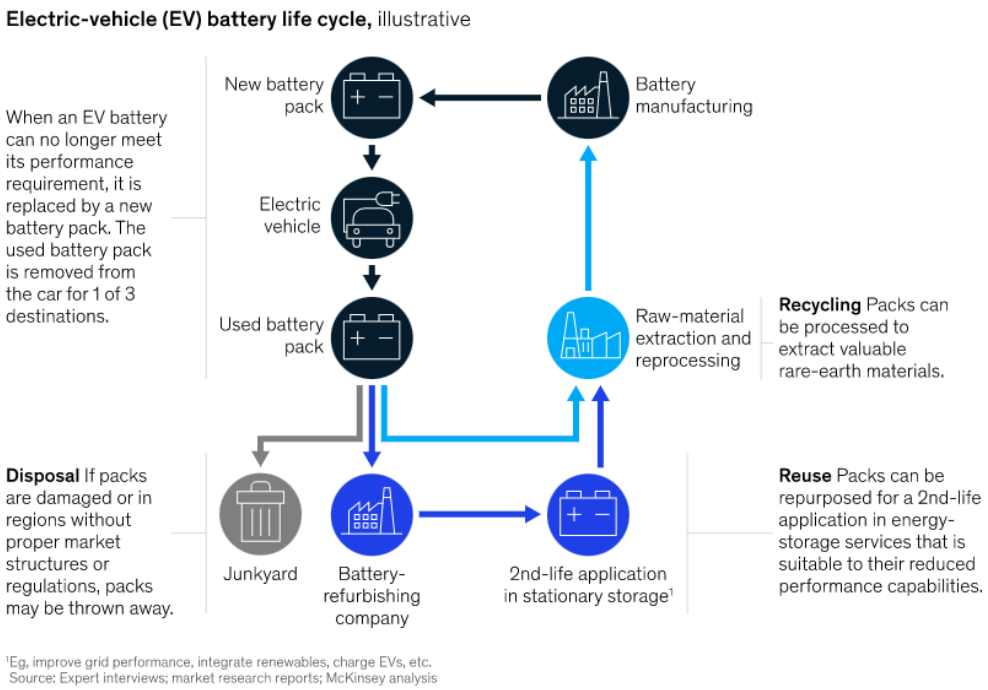

***Figure 1**. EV battery lifecycle including second-life and recycling (2019) McKinsey*

Second-life batteries remain useful until about 30% original capacity before the battery is spent and needs to be recycled (see **Figure 2**). Depending on the second use application, this can potentially provide an additional 10 to 15 years of use.

[2] IEA (2022) World Energy Outlook, p. 48; ICCT (2023), *Scaling Up Reuse and Recycling of Electric Vehicle Batteries: Assessing Challenges and Policy Approaches*, https://theicct.org/wp-content/uploads/2023/02/recycling-electric-vehicle-batteries-feb-23.pdf

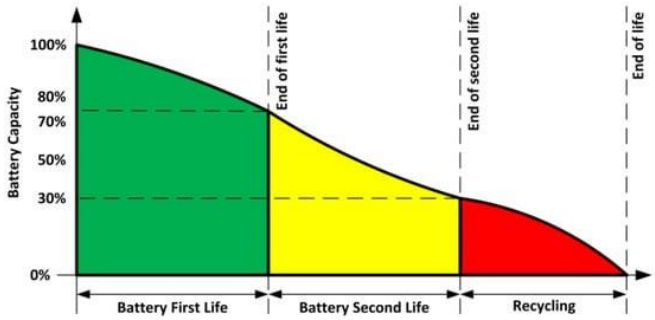

Figure 2. *Plot of EV battery life range as function of battery capacity (2023)* Font et al.

When discussing the circular economy for batteries and the development of sustainable supply chains, it is vital that we recognise the opportunities across the battery lifecycle. The underlying purpose of the current B-Cycle scheme is to recycle batteries.[3] This may be appropriate for small household end-of-life batteries, however, applying the same approach to EV batteries is a missed opportunity, given the value that EV battery cells provide for use in second-life applications in refurbished batteries and stationary energy storage.

Importantly, there also needs to be consideration for the rapid advancement of battery technology over coming years, including the provision of prolonged lifecycles and reduced environmental footprint and waste through changes to battery composition. This innovation is being led by major battery OEMs as they move towards a more cost efficient and sustainable model. This highlights a key risk in prematurely implementing a recycling stewardship scheme without proper consideration of technological changes. If a scheme is introduced based on the current state of battery technology, it may not account for the expected improvements in battery longevity, changes in battery design, and advancements in disassembly and recycling. Consequently, the scheme may become inefficient or ineffective in managing the evolving needs and challenges associated with end-of-life EV batteries.

Industry Development of EV Battery Reuse and Recycling

The electrification of the transport sector provides an opportunity to expand local recycling capabilities and second-life applications, reducing the life-cycle emissions of battery technology while supporting innovation and delivering additional employment opportunities in a rapidly evolving sector.

The automotive supply chain, including vehicle servicing and dismantling sectors, must be considered when seeking to address end-of-life EV battery solutions. Global OEMs possess expertise in battery technology and access to integrated supply chains. There are existing reverse logistics chains based around EV service delivery models, with OEMs recovering batteries from sold vehicles on a regular basis.[4] As with the existing ICE vehicle sector, batteries are not a component facing recycling challenges relative to other materials such as plastics, glass and non-metal materials. There is existing work underway by the industry,

[3] https://www.dcceew.gov.au/environment/protection/waste/product-stewardship/products-schemes/battery-stewardship.
[4] https://www.automotivelogistics.media/battery-supply-chain/tesla-outlines-strategy-on-supply-chain-emissions-in-impact-report/44189.article.

including through the FCAI, looking at end-of-life vehicle management to holistically address challenges posed by vehicle waste.[5]

The development of a domestic EV reuse and recycling industry faces challenges from limited volumes of EV batteries, high costs involved in battery disassembly, and regional collection difficulties. Introducing a targeted stewardship scheme specifically for EV batteries is unlikely to address these challenges effectively. Instead, it could potentially add complexity and place a greater administrative burden on the industry. To support any efforts to scale onshore battery reuse and recycling, a supportive policy environment is necessary, including incentives and regulations that encourage investment, research, and development in EV battery reuse applications and recycling.

EV Market Size

Scaling EV battery reuse and recycling domestically requires addressing a range of challenges prior to the consideration of an EV battery stewardship scheme. Establishing a mature battery reuse and recycling industry in Australia will require substantial financial support from both government and private investors. Crucially, the development of these industries is also dependent on a strong EV market.

The global capacity of end-of-life EV batteries will increase significantly in the coming decades (see **Figure 3**). However, given Australia's current uptake of EVs and the size of our domestic vehicle fleet, the available supply of EV batteries for second-life applications and recycling is expected to be considerably lower than global averages.

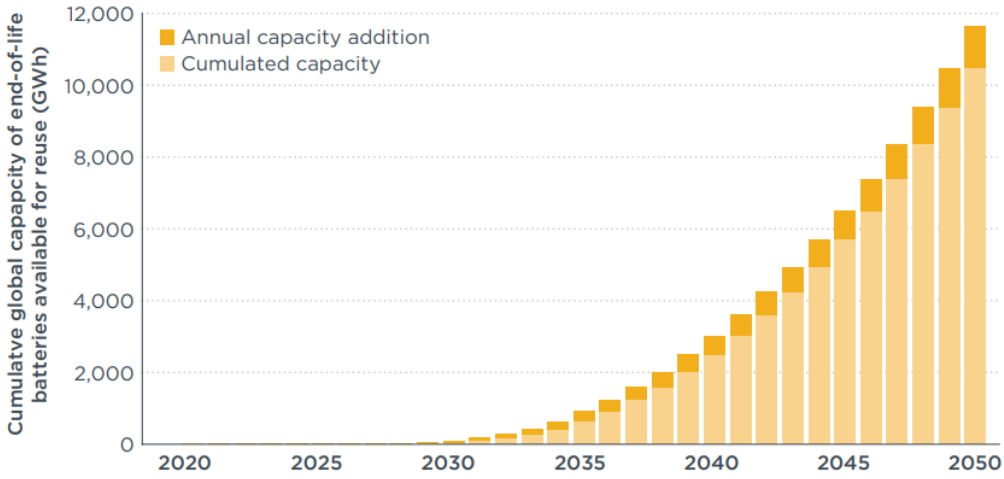

Figure 3. Global capacity for end of life EV batteries available for second-life applications. *ICCT (2023).*

For battery recycling, 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.

[5] https://www.dcceew.gov.au/sites/default/files/documents/npsif-factsheets-vehicle-waste.pdf.

Unintended Consequences

The BSC needs to consider the potential implications of lobbying to introduce a weight-based import levy on EV adoption. The unintended consequences of a stewardship scheme similar to the existing B-Cycle model include increased upfront costs for EVs relative to ICE vehicles, creating administrative costs for industry alongside a disincentive for consumers, potentially stalling the EV transition. As a consequence, this may result in lower volumes of EV batteries entering the country. Accordingly, there is a need to avoid introducing a scheme that may inadvertently prevent the development of a viable domestic battery reuse and recycling industry.

Additionally, as Battery Electric Vehicles (BEVs) contain heavier batteries than Plug-in Hybrid EVs (PHEVs) - it is important not to establish any scheme that would create a market distortion by incentivising the importation of vehicles with smaller batteries, which offer lower benefits for emissions reduction, reuse, and recycling. More work should be done to focus on harmonising regulatory frameworks that exist around waste collection and transport, developing a better understanding of battery technology and industry practices before any scheme is contemplated.

Supporting Industry Development

At present it remains challenging to establish and sustain a mature industry due to the high capital outlay required at the outset, given the limited supply of EV batteries that require recycling or refurbishing at the current stage of the EV market in Australia.

A significant level of investment and Government support is being directed overseas towards establishing battery reuse and recycling capabilities, including through direct partnerships between recyclers and the automotive manufacturing industry.[6] This targeted support is aimed at overcoming some of the challenges being faced globally:

- Funding innovation in recycling methods to increase material recovery rates in order to minimise waste, increase efficiency, and reduce costs. This includes supporting the commercialisation of direct recycling pathways to enable direct recovery of cathode and anode materials.[7]
- Establishing dedicated infrastructure for battery collection, processing, and recycling to meet the growing demand for sustainable battery supply chains.
- Overcoming technical hurdles associated with developing a mature industry around second-life battery applications. This involves establishing efficient processes for removing, testing, and refurbishing batteries for new purposes.[8]
- Addressing the need for specialised skills and expertise in battery recycling and repurposing. This can be achieved through workforce development programs and

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[6] US Department of Energy (2023), *LPO Offers Conditional Commitment to Redwood Materials to Produce Critical Electric Vehicle Battery Components From Recycled Materials*, https://www.energy.gov/lpo/articles/lpo-offers-conditional-commitment-redwood-materials-produce-critical-electric-vehicle; A Hawkins (2022), Redwood Materials announces $3.5 billion EV battery recycling plant in South Carolina, *The Verge*, https://www.theverge.com/2022/12/14/23509031/redwood-materials-ev-battery-recycling-factory.

[7] ICCT (2023), *Scaling Up Reuse and Recycling of Electric Vehicle Batteries: Assessing Challenges and Policy Approaches*, https://theicct.org/wp-content/uploads/2023/02/recycling-electric-vehicle-batteries-feb-23.pdf.; https://circubat.ch/kyburz/.

[8] https://www.europarl.europa.eu/news/en/headlines/economy/20220228STO24218/new-eu-rules-for-more-sustainable-and-ethical-batteries.

collaborations between industry, academia, and the government to train and upskill professionals.

By prioritising funding for innovation, infrastructure development, technical advancements, and workforce training, the industry can be better supported to develop a sustainable battery ecosystem in Australia. These initiatives should take precedence over implementing a battery stewardship scheme, as they are crucial for scaling up a competitive domestic reuse and recycling industry.

Policy Certainty

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.[9]

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.[10]

Summary

The development of a global reuse and recycling industry is crucial for sustainable battery supply chains. As the EV industry grows, so will demand for effective solutions to manage the end-of-life EV batteries, including the development of second-life applications for stationary storage, and recycling for batteries than cannot be repurposed.

The EVC believes that a proper understanding of the existing state of EV battery reuse and recycling is essential before the premature introduction of an EV battery stewardship scheme. The BSC needs to focus on the pre-requisites that need to be in place to support the scaling up of local reuse and recycling, while minimising costs for consumers and maximising resource recovery and efficiency.

Before the development of a stewardship scheme is progressed, significantly more work needs to be done to understand the overarching objectives of any scheme and whether it is needed. The BSC should prioritise actions that can provide strategic direction and incentivise industry development, while supporting and not slowing down the necessary

[9] See, e.g., European Parliament (2022), 'Batteries: deal on new EU rules for design, production and waste treatment', https://www.europarl.europa.eu/news/en/press-room/20221205IPR60614/batteries-deal-on-new-eu-rules-for-design-production-and-waste-treatment

[10] https://www.dcceew.gov.au/sites/default/files/documents/national-electric-vehicle-strategy.pdf.

transition to an electrified vehicle fleet.[11] Accordingly, the EVC recommends that the BSC should work with industry to:

- Accelerate the transition to EVs to increase the supply of batteries available for second-life applications and recycling and help to build critical mass for this sector.
- In alignment with global approaches, prioritise enhanced traceability across the life-cycle of EV batteries, to inform future requirements for onshore reuse or recycling when the industry is prepared for larger-scale battery processing.
- Reduce regulatory barriers and provide policy certainty to investors to de-risk early investment in both second-life applications as well as battery recycling.
- Address data gaps concerning battery collection and responsibility outside of OEM relationships, such as grey imports and retrofitted vehicles.
- Resolve concerns related to safety and transportation, including raising awareness with government and industry, advancing market maturity, and establishing regulatory clarity. This includes supporting research to develop solutions to partial processing of used EV batteries on a smaller scale to reduce costs in transporting batteries from remote and regional areas.
- Walk away from any efforts to implement a weight-based import levy for EV batteries, as it would disincentivise the supply of EVs into the country and hinder Australia's ability to meet 2030 and 2050 emissions reduction targets.

The Electric Vehicle Council emphasises the importance of evidence-based approaches to address end-of-life EV batteries, and will not support initiatives that will actively slow the adoption of critical technology needed to improve transport system sustainability. Our organisation remains committed to addressing any public misinformation campaigns on this issue, and advocating against the promotion of a levy scheme without sufficient justification or evidence.

The Australian Government has flagged its intention to explore the opportunities associated with EV battery reuse and recycling as part of the National Electric Vehicle Strategy. We welcome this approach and are supportive of a government-led consultation on this issue. The EV industry will continue to work directly with the government on EV battery reuse and recycling.

Thank you for your consideration of our submission.

Yours sincerely,

[11] Zhao, Y et al (2021), *Australian Landscape for Lithium Ion Battery Recycling and Reuse in 2020,* CSIRO, Australia. https://publications.csiro.au/publications/publication/PIcsiro:EP208519.

AUSTRALIAN AUTOMOTIVE DEALER ASSOCIATION

Brett Buckingham
Director: Engagement & Technology
Battery Stewardship Council

E: brett@bsc.org.au

Date: 30 June 2023

Dear Mr Buckingham,

The AADA welcomes the opportunity to make a submission in response to the Electric Vehicle Battery Stewardship - Discussion Paper.

The AADA is the peak automotive industry body which represents Australia's franchised new car Dealers. There are approximately 1,500 new car Dealers in Australia that operate over 3,000 new vehicle dealerships. Franchised new car Dealers employ more than 59,000 people directly and generate $59 billion in turnover and sales with a total economic contribution of over $14 billion.

The AADA and its members welcome consultation on the development of an electric vehicle (EV) battery stewardship scheme in Australia and consider that encouraging manufacturers, importers, and distributors to take responsibility for EV batteries is vital to reducing the environmental and other impacts of these products.

Over the last few years, there has been an increased push towards government policies and initiatives to reduce transport related emissions, with some Australian states and territories aiming for 100 percent of new car sales to be EVs by 2035. While the true nature of EV uptake in the future is unknown, this figure highlights the urgency to develop an effective program to collect and recycle end of life EV batteries.

Australia's vast network of automotive Dealers are at the forefront of consumer interaction and are generally the first point of call for consumers when seeking to have their vehicles repaired and serviced. Given that Dealers are customer facing and have well established relationships with their clientele, it is inevitable that customers will return to them when their EV reaches the end of its life. As such, it is vitally important that when developing programs to manage end-of-life pathways for EV batteries Dealers are involved to ensure solutions are practical and workable for industry.

AADA members are currently managing end of life EV batteries in collaboration with the vehicle manufacturers, however, as the uptake of EVs in Australia increases it is essential that Australia moves quickly to explore and establish the infrastructure needed to recover resources and avoid the stockpiling of EV batteries and manage subsequent safety risks.

Dealers risk becoming a dumping ground for batteries where there is no clear delegation of responsibilities in all stages of a battery/vehicle life cycle. EV batteries should be provided with a serial number and be easily identifiable, traceable and accounted for to ensure that stockpiling, dumping or inappropriate use does not occur.

The AADA also recommends that a battery stewardship scheme for EVs should be informed by the work being done at the industry level on the prospect of a National End of Life vehicle product stewardship arrangement.

AADA responses to the consultation questions are detailed below.

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?**

The AADA considers that all traction batteries including EV batteries should be included in a Stewardship scheme. The growing uptake of EVs in Australia as part of the country's ambitions to reach net zero emissions is not limited to passenger vehicles and regardless of transport modes, all battery packs used in EVs present similarities and challenges at end of life.

EV batteries contain many precious metals such as lithium, gold, silver, cobalt, manganese, nickel, and copper which if recycled and reused in an environmentally responsible way, can alleviate resource consumption and offer environmental and economic benefits. However, they also contain hazardous materials which if disposed of in an uncompliant way can cause environmental pollution and resource wastage.

Strong and targeted investment in EV battery stewardship and recycling infrastructure is needed now in order to avoid costly future fixes and avoid missing out on the economic opportunities offered by the recycling of used batteries.

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?**

EV uptake in Australia is still in the early stages, with only around 2 per cent of new vehicle sales being EVs, and a majority of these have not yet reached their end of life[1]. As such, the AADA is not aware of any current market failures in relation to recycling EV or hybrid batteries. Most EVs in circulation are currently managed under manufacturer in-warranty programs, which include EVs or hybrid vehicles being taken to an authorised Dealer/repairer where the battery is managed in accordance with manufacturer guidelines.

The AADA considers that Dealers are going to play a key role in any EV battery recycling and management programs, due to their ongoing relationship with EV consumers through their repair and service functions. Dealers see that there are a number of associated risks where there are no clear principles in place which outline how batteries should be transported, stored and handled.

[1] VFACTS National Report, Federal Chamber of Automotive Industries, May 2023

An emerging risk is a situation where EV batteries are becoming stockpiled in Dealer workshops while awaiting collection to be recycled or reused. This would present many occupational and safety risks and in order to avoid this, an EV battery stewardship scheme must set out clear criteria for the interaction between manufacturers, Dealers, and recyclers and the responsibilities of each party.

There are a number of other areas which need to be carefully considered when developing a stewardship scheme, these include, EV batteries which are out of the manufacturer's warranty period, abandoned EV batteries, and damaged vehicles which have been involved in accidents.

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?**

The AADA considers that accreditation, transparency, traceability, recycling and a sufficient funding model are all key elements of an effective battery stewardship scheme. EV owners will want to be reassured that the battery in their end of life or repaired vehicle will be recycled, not dumped. This will also help to ensure that circular economy principles, particularly elimination of waste and pollution, and circulation of materials are incorporated into the life cycles of EV batteries.

Recycling EV batteries within Australia can contribute to the recovery of resources and remanufacturing for use in new products. Domestic recycling programs will also avoid the production of transport emissions which will occur if the batteries are shipped offshore for recycling.

Another necessary component of an EV battery stewardship scheme is buy-in from across the whole EV battery supply chain which includes battery manufacturers, importers or suppliers, retailers, consumers and recyclers. Governments will also play an important role in regulating the stewardship scheme to make sure others in the supply chain are adhering to their responsibilities in the stewardship process.

4. **What do you consider to be essential policies or standards needed for future proofing EV battery stewardship in this space:**
    - **Reuse and Repurposing standards for EV batteries for 2nd life, efficient regulation for transport of used batteries, and funding.**

The AADA is supportive of standards aimed at the reuse (removal of an EV battery from one vehicle for use with another vehicle) or repurposing (the removal of an EV Battery and its components being repurposed for other uses) of EV batteries.

In order to ensure EV batteries are reused or repurposed, they must be easily identifiable and traceable in a stewardship scheme. Other international jurisdictions are undertaking research to determine how to accomplish this, for example, China has introduced a platform that traces batteries throughout their lifetime. As part of the

establishment of a battery stewardship scheme, this type of traceability or 'battery passport' should be explored.

Funding will also be another key element of an effective EV battery stewardship scheme. This could be in the form of a levy used to fund rebates for authorised collectors, processors and recyclers of end-of-life EV batteries.

Conclusion

The AADA is keen to continue to engage with the Battery Stewardship Council on the development of a fit for purpose EV battery stewardship scheme and leverage Dealers skills to ensure EV battery reuse and repurposing standards are adhered to and that EV batteries are stored and transported in a safe manner.

We would be happy to meet with you to discuss our submission and participate in any further consultation. If you require further information or clarification in respect of any matters raised, please do not hesitate to contact me.

Yours Sincerely,

Polestar

Polestar Australia Response
EV Battery Stewardship Discussion Paper

Friday 30 June, 2023

CONFIDENTIAL

General comments

Polestar was founded on a mission to accelerate the shift to sustainable, electric mobility. Together with design and technology, sustainability is one of the three pillars that form the foundation of the brand. As a young company, Polestar is legacy free and stands behind a powerful climate solution. This puts Polestar in a prime position to challenge old notions, lead with transparency, and embrace the power of exponential technology.

The automotive industry needs to fundamentally change the way it operates. Acknowledging the significant environmental, social, and economic effects of vehicle emissions through the production, transportation and use phase is the first step towards minimising its collective impact on people and planet. Polestar is no exception and that is why we publish our sustainability report annually, with a focus on four pillars – transparency, circularity, climate neutrality and inclusion – with a view to creating a truly climate-neutral car by 2030[1].

Addressing the circularity of our products at the design phase is key to reducing our impact and improving the refurbishment, remanufacture, reuse and recycling of our products[2]. This is why the Polestar 2 battery was designed to be modular, which allows for individual modules to be replaced and repurposed instead of replacing an entire battery pack.

In addition to increasing the circularity of batteries and materials, it involves lifetime optimisation and utilisation improvement to enable better and longer use of our cars. As demand for recycled materials is expected to soar in the coming years, we are placing an increasing emphasis on prolonging the use of materials and increasing the value of components. We view this as an opportunity to use design to redefine premium with sustainable materials.

[1] Polestar 0 project | Polestar Australia
[2] Circularity | Polestar Australia

What gets measured gets done, which is why we continue to advocate for a mandatory standard Life Cycle Assessment (LCA) framework for the car industry. We must harmonise the way we measure and communicate the lifetime CO2 e impact of our products for greater transparency and accountability. The EV battery stewardship proposal is an important but small step in the automotive industry meeting that challenge.

The battery of an electric vehicle that has reached its end-of-life holds significant value. For instance, disused batteries from electric vehicles can potentially be used for grid balancing, back-up power for telecommunications or low-voltage mobility. The possibilities are almost endless.

Battery minerals are a scarce resource and there are currently shortages of recycled minerals available. To manage this, we cooperate with partners in both industry and academia to develop concepts for better disassembly of batteries at end-of-life to ensure that re-use and refurbishment is promoted. This includes developing an in-house battery store to collect information on for example how a battery can be remanufactured and how much efficiency and charging capacity is lost in the process. We are also mapping the eco-system surrounding our parts and batteries. The insights provided enable us to identify bottlenecks and to decide on actions for future improvement.

Globally, we have teamed up with Volvo Cars for end-of-life management of batteries via regional battery hubs. This currently depends on market density, geography and environmental impact. For Australia, this approach is not currently a sustainable plan for the local market due to both the cost and climate impact of shipping batteries offshore. In Polestar's view, Australia needs to establish its own, local, and robust end-of-life remanufacturing and recycling capability, which will future-proof the local climate tech industry and stop the 'brain drain' of Australian businesses and talent to other countries. Local companies are already developing world-beating technologies and approaches to meeting this challenge.

Renewable Metals is an Australian battery recycling start-up that has unlocked the ability to redeploy more critical minerals from end-of-life lithium-ion batteries, production scrap and black mass back into the supply chain in a safe, and cost-effective way, right here in Australia[3].

Renewable Metals uses an alkaline leaching process, which provides a 20 - 30% reduction in capital and operating costs, eliminates the sodium sulphate chemical by-product of acid-based hydrometallurgy, and recovers >95% valuable metals from a battery.

Unlike other processes currently employed globally, there is no need to remove plastic, steel and aluminium to produce black mass.
This avoids the 5-15% metal loss from pre-processing and reduces costs by simplifying the process. In addition, lithium is not lost during the chemical precipitation stage when residual steel, aluminium and other impurities are extracted. This results in >95% recovery of lithium, compared with 70-80% in an acid-based process.

Renewable Metals has achieved this impressive feat by using a highly selective alkali leach which dissolves base metals - nickel, manganese, cobalt, copper and lithium - but doesn't touch iron or aluminium which end up in the leach residue. This also makes it a much more efficient recycling solution for lithium-iron-phosphate (LFP) batteries, which consume significant quantities of reagents in an acid-based recycling process. Renewable Metals believes it is the first company to seek to commercialise an alkali-based recycling process.

The process requires one solvent extraction stage, compared to the acid-based process which typically requires 3-6 steps. Importantly, it consumes materially less reagents as the leach lixiviant is recycled. The process can also be retro-fitted to existing hydrometallurgical operations. Perhaps most importantly, it can recycle lithium-ion batteries of any size and chemistry – from household varieties through the car, bus, and train batteries – in the same process, without the need for accurate sorting.

[3] See Renewable Metals (renewable-metals.com)

Renewable Metals will run a trial in August, which follows on from its successful pilot in November 2022 (~95% recovery of key battery metals from NMC622 batteries). The purpose of this pilot is to test varying blends of multiple battery chemistries.

The industry should follow the progress of Renewable Metals closely given its potential to help solve a key challenge of on-shore recycling with a high metal yield.

Currently, very few batteries have entered this system as they are still in active use in cars that are almost new.

In late 2022, the European Union reached a provisional agreement on a new cradle-to-grave regulatory framework for batteries. More detailed rules will now be developed and adopted from 2024 to 2028. One of the key elements is the creation of a digital passport for batteries, containing an electronic record with information on the entire lifecycle of the battery. We have started preparations to ensure compliance with the directive and the battery passport.

The following responses address the specific issues raised in the discussion paper.

5.2 Top Four Questions

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

To be effective and have impact, any battery stewardship program applying to electric vehicles needs to apply across the vehicle spectrum. While there are differences in battery chemistry by manufacturer, mechanisms do exist to cater for these differences in composition. For example, Renewable Metals, an Australian battery-recycling start-up founded by metallurgists, applies technological advances in alkaline leaching to enable a higher recovery rate of critical minerals from end-of-life lithium-ion batteries, production scrap and black mass. Its process has a lower environmental impact than previously achievable, provides a 20 - 30% reduction in capital and operating costs, eliminates the sodium sulphate chemical by-product of acid-based hydrometallurgy, and recovers >95% valuable metals from a battery.

Its process can be retro-fitted to existing hydrometallurgical operations and can recycle lithium-ion batteries of any size or chemistry – from the household variety to vehicle and heavy haulage batteries.

With regard to vehicle classification, it is worth noting that increasing numbers of electrified platforms, irrespective of brand, are frequently developed on a common platform. Such platforms are increasingly common across battery size, range capacity, and technological underpinnings. Carving out one part of the electric vehicle market on the basis of technical and functional capacities would therefore be a missed opportunity on capturing new and emerging classes of EVs.

This is demonstrated with the experience in Europe, where in 2021 the market witnessed a rise in the average proportion of battery electric light commercial vehicles, which increased from 6% in the third quarter to 8% in the fourth quarter. Among the manufacturers, only the Stellantis group surpassed the market average with a share of 10% battery electric light commercial vehicles. Overall, the average share of battery electric light commercial vehicles in 2022 (5%) rose by two percentage points compared to 2021. Germany emerged as the country with the highest proportion of battery electric light commercials in 2022, reaching 8%.

2. What are current and emerging market failures in this sector with respect to electric vehicle batteries?

The electric vehicle (EV) battery sector faces significant market challenges in the areas of safe and independently verified collection, disassembly, and processing; stockpiling; and recovery and recycling of orphaned, damaged, or out-of-warranty batteries. Key challenges include:

- Insufficient standardised collection and recycling infrastructure, resulting in inefficient and ad-hoc processes for EV battery handling and disposal.
- Lack of proper identification and tracking systems for EV batteries, making it difficult to trace them throughout their lifecycle and appropriately manage orphaned, damaged, or out-of-warranty batteries.
- Limited establishment of independent verification and certification processes, leading to inconsistent handling practices and potential safety hazards, environmental harm, or ineffective recycling methods.

- Increasing stockpiling and improper disposal of used or damaged EV batteries due to inadequate recycling capacity and regulations, posing risks to the environment and public health.
- Expensive and inefficient recycling technologies for EV batteries, coupled with a limited market for recycled materials, discouraging companies from investing in advanced recycling processes.
- Incomplete definition and enforcement of product lifecycle responsibility, resulting in fragmented approaches where stakeholders do not fully assume responsibility for the end-of-life phase of EV batteries.

Addressing these market challenges necessitates collaborative efforts among policymakers, manufacturers, recyclers, and research institutions. Key actions include improving battery collection infrastructure, implementing standardised tracking systems, promoting independent verification and certification processes, investing in cost-effective recycling technologies, and establishing clear product lifecycle responsibility.

3. What do you see as the necessary components of an electric vehicle stewardship scheme?

As experience in other stewardship schemes in Australia and overseas illustrate, an effective EV stewardship scheme needs to consider several critical components:

- Accreditation and Certification: The establishment of an accreditation system for EV battery manufacturers, recyclers, and other stakeholders involved in the battery lifecycle. This ensures adherence to environmental standards, safety protocols, and responsible practices.
- Audit and Verification: Regular audits and verification processes are conducted to ensure that participants in the stewardship scheme follow the prescribed guidelines and meet the required standards. This promotes transparency and accountability.
- Traceability: A robust system is implemented to track EV batteries from production to end-of-life. This involves monitoring important information such as battery origin, manufacturing details, ownership transfers, and recycling/disposal records. Traceability aids in identifying responsible parties and enables effective monitoring of the battery lifecycle.

- Battery Recycling: The development of a comprehensive and efficient infrastructure for recycling EV batteries. This includes the establishment of collection networks, recycling facilities, and processes for extracting valuable materials from spent batteries. It is crucial to ensure proper recycling of all batteries, including orphaned or abandoned ones, to minimize environmental impact and resource depletion.
- Funding Model: A sustainable funding mechanism is created to support the operations of the stewardship scheme. This may involve levies or fees on EV manufacturers, importers, or consumers, as well as grants, subsidies, or extended producer responsibility (EPR) programs. The collected funds must be allocated specifically to recycling infrastructure development, public awareness campaigns, research and development, and overall scheme management.
- Public Education and Awareness: Initiatives are implemented to raise awareness among EV owners, manufacturers, and the general public about the importance of responsible battery management. This includes promoting proper charging habits, battery maintenance, and the benefits of participating in the stewardship scheme.
- Collaboration and Stakeholder Engagement: Encouragement of collaboration among various stakeholders, such as government agencies, industry associations, manufacturers, recyclers, and consumers. Engaging all relevant parties fosters dialogue, knowledge sharing, and the development of effective policies and regulations.

4. What do you consider to be essential policies or standards needed for future proofing EV battery stewardship in this space?

To ensure effective stewardship of EV batteries, a range of essential policies and standards are necessary. These measures should encompass various stages of the battery lifecycle, including manufacturing, use, recycling, and disposal. Polestar consider the following principles align with its own corporate philosophy and are appropriate guardrails to help achieve this goal:

- Promote recyclable designs: Manufacturers should be encouraged to design batteries with recyclability in mind. This entails standardised battery form factors, modular designs, and easily dismantlable components, facilitating efficient and cost-effective recycling processes.
- Extended producer responsibility (EPR): Implement EPR policies that hold manufacturers accountable for the entire lifecycle of their batteries. This responsibility includes funding collection, establishing recycling infrastructure, and ensuring proper disposal of end-of-life batteries.
- Recycling targets and regulations: Establish recycling targets and enforce regulations that mandate the proper recycling and recovery of EV batteries. This can include setting minimum recycling rates, imposing restrictions on landfill disposal, and requiring mandatory reporting on recycling activities.
- Battery labelling and traceability: Introduce a standardised labelling system that provides comprehensive information about battery chemistry, capacity, and other relevant details. This enables better traceability throughout the battery's lifecycle and assists in identifying and sorting batteries for appropriate recycling processes.
- Battery data management: Develop a robust data management system that tracks battery information, including production, use, maintenance, and end-of-life data. This data can be utilised to optimise battery performance, evaluate environmental impacts, and facilitate efficient recycling and repurposing.
- 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.
- International harmonisation: Promote international collaboration and standardisation of EV battery stewardship practices. By establishing common standards and sharing best practices, regional disparities can be reduced, and global recycling efforts can be facilitated.

- Public awareness and education: Conduct public awareness campaigns and educational programs to educate consumers, manufacturers, and policymakers about the significance of proper battery stewardship. Encourage responsible battery use, maintenance, and recycling practices.
- Collaboration between stakeholders: Foster collaboration among stakeholders, including manufacturers, governments, recyclers, and researchers. Open communication and cooperation can result in comprehensive policies, effective recycling infrastructure, and sustainable practices.
- Incentives and subsidies: Provide financial incentives and subsidies to support the adoption of environmentally friendly battery technologies, recycling processes, and infrastructure. Such incentives can motivate manufacturers and consumers to choose sustainable options and invest in responsible battery stewardship.

5.3 Detailed Questions

Market size & waste arising

How will the new and/or future governments influence the growth of the EV market in the future?

The 2023 report *Joined in Climate Action: the Pathway Report*, commissioned jointly by Polestar and EV brand, Rivian, identified that based on its current trajectory, the global automotive industry is expected to overshoot its part of the global contribution to limit global warming to 1.5 degrees Celsius by 2050 by 75%.[4] Clearly, more action is needed to ensure the automotive industry is held to account and accepts its share of the heavy lifting when considering global decarbonisation targets.

Government policies supporting aggressive measures to reduce fuel emissions are essential for achieving these ambitious targets. This applies to all nations, including Australia, which must align its fuel efficiency goals with its climate commitments. The International Energy Agency (IEA) has confirmed that current national government policies, as indicated by the Stated Policies Scenario, are inadequate to meet the Global Fuel Economy Initiative 2030 target.

However, if countries align their fuel efficiency standards with their stated national policies and plans to fulfil their nationally determined contributions, they can successfully reach their targets. This requires proactive government intervention to decrease average fleet emissions and increase the market share of zero-emission vehicles and efficient technologies in internal combustion engines, coupled with improved fuel quality standards.

[4] https://www.kearney.com/industry/automotive/article/-/insights/polestar-and-rivian-pathway-report-

A testament to this approach is the fact that between 2017 and 2019, CO2 emissions decreased at a faster rate than fuel economy due to the increased adoption of electric vehicles. In 2019, the global average rated CO2 emissions were 167 grams of CO2 per kilometre (g CO2/km), representing a 1.6% decrease from 2017.

As a nation solely reliant on imported light vehicles, Australia is a technology taker. Government cannot rely on domestically developed solutions to address our vehicle emissions challenges. Consequently, the regulatory framework bears a greater responsibility in establishing strong signals for both car manufacturers and consumers. Voluntary compliance is also insufficient, as has been witnessed with the industry's own voluntary standard – a standard set by industry, for industry, and which industry did not meet for MC + NA class vehicles (heavy SUV and Light Commercial Vehicles).

While appreciating that Australia faces unique circumstances for its vehicle fleet, it is also true that all countries confront circumstances based on geography, vehicle requirements and lifestyle choice. Assumed consumer preferences for bigger vehicles and drivetrains fail to recognise that consumer behaviour is informed by a variety of factors, of which lifestyle and work needs are only part.

Taxation arrangements send a strong signal to consumers about which vehicles can be considered for purchase. This was most recently seen with the Government's introduction of Fringe Benefits Tax (FBT) concessions in December 2022 to encourage the uptake of electric vehicles. This has seen a tripling of EV car sales in the first four months of 2023 compared to the same period 2022.[5] It can also be seen with the cumulative impact of FBT concessions on light commercial vehicles, where the introduction of 'dual cab utes' in eligible FBT concessions from 2000. This inclusion has coincided with the growth in sales of light commercial vehicles and their variants, which have continued to grow at a faster rate to their passenger motor vehicle equivalents, albeit from a lower base.[6]

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[5] https://www.carexpert.com.au/car-news/electric-car-sales-in-australia-have-tripled-in-2023

[6] See https://www.bitre.gov.au/sites/default/files/documents/light-vehicles-info-sheet-108.pdf p.5;

Factors like tax treatment of vehicles are strong determinants in consumer behaviour and are a powerful policy lever to shift consumer preference.

Government can overcome consumer barriers and our unique geographic and consumer circumstances with strong policy settings and measurable, verifiable targets and initiatives. Part of this needs to include recognition that other policy levers, like taxation, also have a significant role in driving consumer behaviour.

To this end, Australian governments must lead by example to demonstrate the importance of transitioning the Australian new car fleet – in all its guises – to zero-emissions. If government fleets are mandated to transition to electric powertrains, Australia is likely to see a faster response from manufacturers to supply the Australian market, driven in part at least by a desire to maintain sizeable government contracts.

How do we maximise the recovery of finite resources?

The end-of-life battery of an electric vehicle holds significant value, presenting various potential uses such as grid balancing, telecommunications backup power, and low-voltage mobility. While this is the ideal, Australia's current ability to repurpose electric vehicle batteries for alternate applications is limited.

Globally, Polestar has teamed up with Volvo Cars for end-of-life management of batteries via regional battery hubs. Given Australia's geographical location, this is not a sustainable solution for the local market due to both the cost and climate impact of shipping batteries offshore.

Polestar Australia currently has a supplier relationship with Ecobatt who can recycle >95% of EV batteries with the exception of Cobalt, which is sent offshore for processing, along with the black mass by-product of its recycling processes.

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https://www.ato.gov.au/law/view/document?docid=MTR/MT2024/NAT/ATO/00001&PiT=20000119000001

This is an interim solution shared by most, if not all importers of Battery Electric Vehicles (BEVs)[7], until a stewardship framework is developed. When Polestar 2 initially entered production,recycled Cobalt was used in its batteries, however, supply of recycled raw minerals is difficult to source, and this practice has since ceased.

As the Polestar 2 experience demonstrates, recycled battery material demand outstrips supply, which is exacerbated by inefficiencies in extracting critical minerals from end-of-life lithium-ion batteries, production scrap and black mass.

Recycling is often viewed as a last resort behind the key principles of repair, remanufacture, repurpose, however the Renewable Metals example suggests Australia may be on the cusp of having its own, onshore solution to lithium-ion battery recycling.

Market failure

How do we ensure that key stewardship metrics for the management of end-of-life batteries are accurately reported?

In late 2022, the European Union reached a provisional agreement on a comprehensive regulatory framework for batteries, covering their entire lifecycle. Detailed rules will be developed and implemented between 2024 and 2028. One crucial aspect of this framework is the introduction of a digital passport for batteries.

The EU battery passport is a digital document that comprehensively captures information throughout a battery's entire lifecycle. It is a crucial component of the European Union's regulatory framework, which oversees the management of batteries from creation to disposal, with the primary aim of promoting transparency, traceability, and sustainability in the battery industry.

[7] Please note: Battery Electric Vehicles (BEVs) are fully electric vehicles. They are not hybrids, which have an electric battery and an internal combustion engine. Hybrids have been on sale in Australia for over two decades. Please refer to the New Zealand Automobile Association Inc. For more: What's the difference between a hybrid, PHEV and BEV? | AA New Zealand

The battery passport provides in-depth insights into various stages of the battery's journey, encompassing production, usage, and end-of-life considerations. It includes details such as the battery's composition, material sources, energy capacity, manufacturing processes, and environmental impact. Moreover, the passport tracks information pertaining to the battery's performance, maintenance, repair, refurbishment, and recycling activities.

Through the establishment of a standardised digital record, the EU battery passport enables efficient and responsible battery management throughout the entire lifecycle. Stakeholders can effectively monitor, evaluate, and make informed decisions regarding battery usage, recycling, and disposal based on the information it provides. The passport also facilitates the assessment of a battery's environmental footprint, identification of opportunities for reuse or refurbishment, and ensures compliance with regulatory obligations.

The EU battery passport assumes a vital role in promoting a circular economy for batteries, emphasising the conservation of resources, reduction of waste, and adoption of sustainable practices. It aligns with the broader EU objectives of enhancing the sustainability and efficiency of battery systems, addressing resource scarcity, mitigating environmental impacts, and supporting the transition towards a low-carbon economy.

A strong regulatory framework that ensures manufacturers comply with the standards set by Government is essential. It is Polestar's recommendation that Australia 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.

Is the EV industry demonstrating accountability for the management of end-of-life battery outcomes including recovery rates and materials efficiency?

Polestar understands, accepts, and fully embraces its responsibility to work towards a robust, efficient and successful EV battery stewardship program.

In the absence of such an Australian scheme, framework, or guidelines, Polestar, like most importers of BEVs, has established a supplier arrangement with Ecobatt, which offers an interim electric vehicle recovery, storage and recycling solution.

Polestar is also working towards engaging with Circular Australia as a 'Circular Leader' to help bring industry best practice to Australia for both EV batteries and broader end-of-life processes for vehicles.

The EV industry is committed to avoiding the potential for extreme outcomes as presented to media by the Battery Stewardship Council (BSC) on 1 June 2023 following its media release of the same date calling on the EV industry to 'act now'[8]. This alarmism does nothing to build confidence in the industry and actively undermines the extensive efforts that manufacturers have already implemented as Polestar has demonstrated, absent the BSCs assistance.

The calls, directed to the EV industry, fails to differentiate between importers of BEVs and hybrid vehicles, which feature an electric battery coupled with an internal combustion engine. Hybrid vehicles have been sold in and into the Australian market for over 20 years without any concern being expressed as to the disposal of batteries in those specific vehicles.

The BSC needs to distinguish the difference between hybrid vehicles and the relatively recent introduction of fully electric BEVs given the measures importers of BEVs have implemented to ensure safe transport, storage and recycling solutions for EV batteries via accredited suppliers like Ecobatt.

If the BSC wishes to understand how manufacturers and importers of hybrid vehicles have addressed the recovery and disposal of hybrid electric batteries for the past two decades, it will need to engage with the brands in question.

Regarding recovery rates, Polestar 2 has been available in market since February 2022, so it is too early to provide data on recovery rates given the vehicles are still effectively new.

[8] 1.6 Million Tonnes of EV Batteries to Reach End of Life in Australia by 2050 | Mirage News

However, while the EV industry has taken positive steps to identify and mitigate potential challenges with the safe disposal and recycling of EVs, further coordination and stakeholder engagement is required with insuers who operate in Australia.

Once an insurance premium has been paid out for a damaged vehicle, the asset becomes the property of the insurer. The importer no longer has jurisdiction over the vehicle, so cannot 'close the loop' on recovery.

Who is responsible for recycling failed EV batteries in the aftermarket service sector / retired out-of-warranty batteries?

The European Union has recently established an End-of-Life Vehicles Directive, which mandates automotive manufacturers to take back end-of-life vehicles, which includes components like EV batteries.

In the US, regulatory incentives are being used to close the loop on EV battery recycling, where recycled battery materials can qualify for tax credits as part of the US Inflation Reduction Act 2022. This incentive applies to all batteries, regardless of whether or not those materials were initially sourced from the United States[9].

Polestar supports a policy on extended producer responsibility for vehicles, of which EV batteries should be part, and and would welcome a regulatory framework with incentives and penalties for non-compliance.

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?

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[10].

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[9] https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/battery-recycling-takes-the-drivers-seat
[10] See https://www.evfiresafe.com/

Alarmist and ill-informed views, particularly when they are echoed through the media, do nothing to build confidence in the industry nor acknowledge the considerable responsibility that companies take in relation to product development and safety. 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.

This is Australia's 'new normal' and the industry needs to work collaboratively, not at cross purposes.

How do we avoid the proliferation of stranded batteries left by manufacturers exiting the market?

While Polestar has no intention of exiting the Australian market, there are lessons to be learned from the General Motors / Holden exit in 2017.

The BSC / FCAI / MTAA should engage with the Australian Automotive Dealer Association (AADA) to understand more about how to safeguard Australian consumers and improve importer obligation in future.

Battery Information

What info do we need to capture to determine the: Safe recovery, safe transportation, reuse and repurposing, fate of the used battery? What is the best way to capture and share this data now and into the future?

As outlined from pages 14 – 15 of this submission, the EU battery passport addresses these challenges and more.

It is Polestar's recommendation that Australia adopt the EU battery passport to align Australia with world's best practice for the traceability of the battery lifecycle.

Disassembly

What facilities currently exist to perform this service?

Polestar has partnered with dealers within the Volvo Car Australia network who provide factory-trained and accredited technicians to conduct the service and repair requirements of Polestar's EV batteries.

Polestar and Volvo EVs share the same, modular batteries which enable the EV battery to be repaired and therefore prolong the lifecycle of its batteries.

Further courses managed by RTOs such as TAFE can extend generalised knowledge to technicians outside of the Volvo Cars dealer network.

2nd Life Applications

Polestar is committed to circularity through design.

We aim to produce vehicles that contain more recycled material and last longer by adhering to principles such as repairability, remanufacturing, repurposing and recycling. EV batteries are no exception.

As previously outlined, Polestar batteries are modular, which enables individual modules to be replaced to ensure the longevity of the vehicle. Depleted cells are then recycled, however, in future, we hope Australia has the capability to repurpose those cells for other applications.

The EV industry provides a great opportunity to create new industries and offer significant job opportunities, particularly in countries like Australia that have automotive manufacturing experience[11].

[11] https://www.latrobe.edu.au/news/articles/2023/opinion/electric-vehicle-revolution-revives-an-industry

A report from the Carmichael Centre, which is part of the The Australia Institute,[12] identifies the industrial opportunities for Australia as the country transitions to electrification. The real opportunity is to establish a sustainable EV industry committed to environmental and social transformation.

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.

In Europe, the battery directive is linked to the New Circular Economy Action Plan[13][14] given the close link between the circular economy and decarbonisation[15].

As outlined from pages 14 – 16 of this submission, the EU battery passport addresses challenges associated with knowledge issues around battery chemistry and reuse and refurbishment activities.

In the interests of consumer protection, robust standards should apply to repurposed EV batteries.

Collection & Transportation

Polestar does not make any distinction between how EV batteries are managed in-warranty or out of warranty. Customers will be offered the option of refurbishment to maximise the product life cycle. The involves, where possible, the replacement of individual modules to ensure the battery is at an optimal state-of-health.

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[12] https://australiainstitute.org.au/report/rebuilding-vehicle-manufacturing-in-australia/
[13] https://www.europarl.europa.eu/news/en/headlines/economy/20220228STO24218/new-eu-rules-for-more-sustainable-and-ethical-batteries
[14] https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-new-circular-economy-action-plan
[15] https://kpmg.com/xx/en/home/insights/2023/03/sustainable-batteries.html

Industry trained and certified EV technicians with access to relevant diagnostic equipment and knowledge can assess the state of health of a battery.

As previously outlined, Polestar has a supplier arrangement with Ecobatt who can safely transport, store and recycle damaged or end-of-live EV batteries.

Processing

Polestar sees an opportunity for an Australian processing and critical minerals extraction process presented by Renewable Metals (see page 4). It is our recommendation that further discussions with the company are entered into as part of this exploratory process.

Other Stewardship Schemes

Without due consideration of other schemes that have been developed to reduce, reuse and recycle various components of a vehicle, the Battery Stewardship program will become disconnected to the overall objective of reducing the automotive industry's impact on the Australian environment.

There must be harmonisation between the respective end-of-life vehicle schemes, or risk a disjointed approach that fails to reach overall targets. One overarching national plan that all stewardship schemes report into would go a long way to creating circular economy best practice.

How do we avoid greenwashing?

As part of the European Union's ambition to become the world's first climate-neutral continent, it has established the European Green Deal, which provides a 55-point roadmap to climate-neutrality[16].

As part of this transformation, the European Union has established two, key initiatives – the Corporate Sustainability Reporting Directive (CSRD) and the Green Claims Directive.

The CSRD will ensure almost 50,000 of the EU's largest companies adhere to new regulations that require full disclosure of a company's operating impact on the environment for greater transparency and to help consumers and investors make sustainable choices17. Ultimately, the CSRD levels the playing field, ensuring companies are tasked with reporting on the same ESG metrics for greater public comparability and accountability.

As a company that openly shares its annual Lifecycle Assessment (LCA) report, Polestar welcomes the new CSRD and hopes it brings greater transparency to the automotive industry.

Similarly, the Green Claims Directive proposes a new framework to prevent companies making misleading environmental statements. Claims must be substantiated and independently verified, use evidence-based data and adhere to accredited certifications[18].

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[16] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en
[17] https://normative.io/insight/csrd-explained/
[18] https://emearegulatorystrategy.deloitte.com/post/102ideq/understanding-the-proposed-eu-green-claims-directive#:~:text=The%20Directive%20aims%20to%20eliminate,their%20environmental%20impacts%20and%20performance.

In 2022, the Australian Competition and Consumer Commission (ACCC) announced it would be focussing on greenwashing[19] ahead of a well-publicised 'internet sweep of environmental claims'[20] that unearthed 'widespread concerning claims'[21]. Addressing greenwashing requires more than an ad-hoc campaign.

Polestar encourages the BSC, MTAA and FCAI to put forward the European Union's Green Claims Directive as a robust, turn-key solution to greenwashing challenges faced across industry here in Australia.

With its clear climate-neutrality vision, the European Union and its 27 member states are working towards a common goal. The vision, and subsequent roadmap, provide businesses with clarity and the certainty of regulatory targets and timeframes.

The same approach must be adopted in Australia.

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[19] https://www.accc.gov.au/media-release/businesses-told-to-be-prepared-to-back-up-their-environmental-claims
[20] https://www.accc.gov.au/about-us/publications/greenwashing-by-businesses-in-australia-findings-of-acccs-internet-sweep
[21] https://www.accc.gov.au/search?query=greenwashing&f%5B0%5D=type%3Aaccc_news

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30 June 2023

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

Introduction

Thank you for the opportunity to provide input to the Battery Stewardship Council (BSC) Stewardship Discussion Paper on Electric Vehicle Batteries.

Tesla is a member of the Electric Vehicle Council and supports its detailed submission to this consultation.

Tesla welcomes this important discussion about vehicle stewardship. However, Tesla notes with concern that in advance of completing this consultation, the BSC has made misguided and harmful comments about electric vehicle battery stewardship in national media outlets. The ABC article titled “EV batteries pose big risks — and new figures reveal how much hazardous waste they could create” contained several statements by the BSC that are not grounded in the reality of the EV industry. The BSC warned that disposable lithium batteries are causing fires in waste trucks and warned that “electric vehicles are going to take that to another level.” The implication that EV batteries will be crushed in waste disposal trucks is bizarre, and Ms Chaplin’s calls for the EV industry to “step up” and “take action now” are jarring when the EV industry has had a strong recycling and remanufacturing program in Australia for many years. The approach of the BSC has left many in the EV industry concerned that the BSC and its partners have not taken on board information provided to date about existing battery stewardship programs, and about the fundamental differences in nature, use, composition, form factor, and lifecycle economics between EV batteries and small disposable batteries. Good faith in this consultation process is undermined when the BSC makes public claims absent notice or consultation with the EV industry, and before concluding this discussion paper consultation. Tesla hopes that the BSC and EV industry can build a more constructive relationship in future.

About Tesla

Tesla's mission is to accelerate the world's transition to sustainable energy. Moreover, Tesla believes the world will not be able to solve the climate change crisis without directly reducing air pollutant emissions—including carbon dioxide (CO_2) and other greenhouse gases (GHG)—from the transportation and power sectors. To accomplish its mission, Tesla creates high-performance electric vehicles, solar generation systems, and battery storage systems

In contrast to internal combustion engines, EV technology allows for the development of a sustainable and circular supply chain. Battery materials are refined and put into a cell and will remain in the cell at the end of their life when they can be recycled to recover valuable materials for reuse, repeatedly. This is why none of Tesla's recovered lithium-ion batteries go to landfills and 100% are either utilized in the remanufacturing process or recycled.

100% of returned Tesla batteries are remanufactured or recycled

Tesla batteries, including the battery packs in our vehicles and our energy storage products, are made to last many years, and therefore, we have received a limited number of them back from the field. Most batteries that Tesla recycles today are pre-consumer, coming to us through R&D and quality control. None of our scrapped lithium-ion batteries go to landfills and 100% are recycled. Furthermore, Tesla has an established internal ecosystem to re-manufacture batteries coming from the field to our Service Centers. We actively implement circular economy principles and consider all other options before opting for battery recycling. The small number of post-consumer batteries that we receive are primarily generated from our fleet of vehicles on the road, predominantly from taxi-like vehicles that have already completed many hundreds of thousands of kilometers of driving. Since we have only been producing Model S (our oldest model) for approximately eleven years, and our energy storage products for even less time, it will likely be some time before we start receiving back vehicle batteries in larger volumes.

While Tesla Works with Third-Party Recyclers, We Also Recycle In-house

In 2020, Tesla successfully installed the first phase of our cell recycling facility at Gigafactory Nevada for inhouse processing of both battery manufacturing scrap and end-of-life batteries. While Tesla has worked for years with third-party battery recyclers to ensure our batteries do not end up in a landfill, we understand the importance of also building recycling capacity in-house to supplement these relationships. On-site recycling brings us one step closer to closing the loop on materials generation, allowing for raw material transfer straight to our nickel and cobalt suppliers. The facility unlocks the cycle of innovation for battery recycling at scale, allowing Tesla to rapidly improve current designs through operational learnings and to perform process testing of R&D products. In Australia, Tesla has a remanufacturing facility in Adelaide, and anticipates opening similar facilities across the country in coming years.

Every Tesla Battery Factory Will Recycle Batteries On-Site

As the manufacturer of our in-house cell program, we are best positioned to recycle our products efficiently to maximize key battery material recovery. With the implementation of in-house cell manufacturing at Gigafactory Berlin-Brandenburg and Gigafactory Texas, we expect substantial increases in manufacturing scrap globally. Our goal is to develop a safe recycling process with high recovery rates, low costs, and low environmental impact. From an economic perspective, we expect to recognize significant savings over the long term as the costs associated with large-scale battery material recovery and recycling will be far lower than purchasing additional raw materials for cell manufacturing.

Response to 'Top five questions'

Q1. 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?

No EV batteries should be included in the B-cycle scheme. The small batteries so far included in the B-cycle scheme are fundamentally different from large-scale battery packs used in electric vehicles. The differences in use, chemistry, and form factor are well covered in the Electric Vehicle Council's submission. Importantly, there are also fundamental differences in product economics. EV batteries are not disposable; they generally last over a decade. Even at end of life, they are high-value assets; Tesla for example tracks its vehicles and actively seeks return of its battery packs from the field, and 100% of these returned products are remanufactured or recycled. An upfront levy is completely unfit for purpose in the EV battery sector.

Q2. What are current and emerging market failures in this sector with respect to electric vehicle batteries: Ë safe and independently verified collection, disassembly, and processing; stockpiling; recovery and recycling of orphaned, damaged, or out of warranty batteries?

EV batteries at end of life are assets of considerable value to OEM and recyclers. There is no fundamental market failure to solve for in terms of creating strong economic incentives for recycling.

The major inhibiting factor for the development of the EV battery recycling industry in Australia is Australia's delayed and slow uptake of EVs relative to every other comparable country. Including EV batteries in the B-cycle scheme would only worsen this problem by increasing upfront costs for low-emission vehicles relative to polluting internal combustion engines.

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, gravitational separation and washing processes: "Black mass" which contains the critical minerals, lighter plastic casings and aluminum and copper foils. Whilst the foils and plastic are usually recycled onshore, 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 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.

Q 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?

As above, the B-cycle scheme is not fit for purpose in the EV sector.

Q 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

Efficient regulation of transport for used batteries is an important consideration. Because used batteries are often classified as riskier than new batteries for transport purposes, returning used batteries to factories overseas for remanufacturing and recycling can be prohibitively expensive or even impossible. While Tesla seeks to support and develop a domestic industry for recycling the reality is that for new or low-volume battery chemistries some batteries will have to be processed overseas.

Broader comments.

Extending Producer Responsibility for EV Batteries

The increasing expected production of batteries for electric cars, trucks, and buses prompts the need for a circular approach, enabling the sustainable management of large battery products. Such an approach is well-aligned with Tesla's mission, and Tesla generally supports well-crafted extended producer responsibility (EPR) programs that respect and reflect the unique needs of large batteries and the operational needs of the EV sector.

Tesla supports closed-loop battery recycling when batteries are determined to have reached the end of their service life. Any framework that guides or regulates the management of large batteries must provide flexibility to suit the needs of a broad range of battery types, sizes, weights, applications, and users. Likewise, any such framework needs to understand the true meaning of "end of life" as they relate to large batteries, which are valuable and often have a complex lifespan, which may include second and third life applications.

Tesla has six key recommendations to promote a strong EV battery sector:

1. Implement and maintain landfill bans for lithium-ion batteries and other chemistries;
2. Continue to support and uphold product stewardship opportunities;
3. Facilitate the collection of vehicle traction batteries through the safest and most practical channels;
4. Take the residual value of vehicle traction batteries into consideration;
5. Support vehicle manufacturer efforts to take back all the traction batteries they produce upon request when the market does not otherwise respond; *and*
6. Incentivize discharging of traction batteries to increase public safety.

First Principles for vehicle traction battery EPR framework design

	Principles	Rationale
1.	No battery should go to a landfill, including vehicle traction batteries. →	EV lithium-ion (li-ion) batteries are highly recyclable. Recovering and recycling battery materials minimizes the lifecycle environmental impacts of those products. However, vehicle traction batteries are high-voltage batteries and should be handled with care by trained professionals such as automotive technicians.
2.	Different battery types require different end-of-life collection framework →	The collection framework must take into consideration the weight and characteristics of the battery and the consumers' ability to remove such a battery from the product in which it is contained or the structure on which it is installed.

3. End-of-life EV batteries are valuable → EV li-ion batteries contain critical minerals and are very valuable even when they have reached the end of their service life. The collection framework must take into consideration the value of the battery at the end of its life, and the private ownership of that value by an EV owner. There are many competing collectors for the small number of end-of-life EV batteries available on the market.

4. OEMs should take-back unwanted batteries, on demand → Vehicle manufacturers should take back their battery packs when no other party wants to avail themselves of their value at end of life. This principle is the foundation of producer responsibility for vehicle traction batteries.

Traditionally, EPR frameworks products have used collection rates (waste volume gathered in relation to the volume placed on the market) to assess the performance of product recovery programs, as most EPR frameworks have covered products that have little to no value at end of life. A collection rate is not an adequate measure to assess the environmental performance of large battery producers. Due to the long lifespan of EV batteries, and to the rapid evolution of the EV market, there is no link between the quantity of batteries available for collection on a given year and the quantity of batteries recently put on the market. The existence of competing collectors further reduces the quantity of batteries available for collection by producers.

Vehicle manufacturers should instead be encouraged to collect the batteries they have put on the market if they are not managed by third parties and become unwanted on the market.

Key barriers to a circular EV battery economy

Very few EV batteries are available for collection and recycling at present. When a larger number of EV batteries reach end of life, it will be important for vehicle dismantlers' personnel to have proper training to remove EV batteries, and for consumers to be well informed regarding their local vehicle dismantling facilities and other repair shops that accept EVs and batteries they contain.

Tesla believes that manufacturers should be obliged to share, on an equal basis as they do with their "authorized service representatives" the same access to training, manuals and parts (fees may apply as these services cost money to deliver) to service batteries. Information should be shared with others for a fee on an equal basis as is shared with authorized service centres. However, many repair and disassembly functions cannot take place in authorized service centres (Service Centers) as they are safety-critical and require special training, processes, tools and equipment. Factory/safety critical actions should not need to be disclosed and companies seeking to disassemble EV traction batteries should have extensive professional expertise to know how to perform such actions, or do so under arrangement and with training from the original manufacturer.

Key opportunities

Battery pack life extension is the superior option to recycling for both environmental and business reasons. Before decommissioning and recycling a consumer battery pack, Tesla does everything it can to extend the useful life of each pack, including sending out over-the-air software updates to Tesla vehicles to improve battery efficiency when our engineers find new ways to do so. In addition, any Tesla battery that is no longer meeting a customer's needs can be serviced at a Tesla Service Center. Tesla also prioritises remanufacturing of its energy products such as Powerwalls and Powerpacks onshore at its Tonsley Remanufacturing Facility in South Australia, reducing the reliance on new products.

Discharging Lithium Batteries Significantly Reduces Fire Hazards and Hazmat Incidents in Transport

End-of-use lithium batteries entering the recycling system may still contain remnant energy, presenting potential hazards during collection, storage, transportation, and processing. External factors such as short circuits (internal and external), high temperatures, or mechanical deformation can trigger critical events and potentially lead to a thermal runaway. Battery discharging provides for the safe withdrawal of energy, minimizing harm to the environment and public health and rendering battery safe for further handling.

Discharged lithium batteries used in grid energy storage and electric vehicles are sealed and have a significantly reduced potential to leak or break during normal conditions of use and foreseeable emergencies, thereby reducing exposure of employees to chemicals (e.g., lithium, cobalt, graphite) which can pose health and/or physical (e.g., burns, fire) hazards. While a lithium battery cannot be discharged down to zero volts, due to the internal electrochemistry of lithium ions, discharging a lithium battery to a voltage below a specific and narrow range will eliminate the potential of the cell to undergo thermal runaway. While the current classification scheme characterizes lithium batteries by their combustible constituents (Stored Energy) and not %SOC (Kinetic Energy), it is the latter that serves as the catalyst for thermal runaway which can compromises the cell packaging and can lead to contamination and exposure.

Discharging lithium-ion batteries addresses the following potential hazards:

- Chemicals from leaking batteries can be toxic and cause burns or skin irritation (Electrolyte venting hazards due to internal short circuit is significantly reduced through discharging);
- Chemicals in batteries can be flammable and potentially explosive (Discharging leaves contained organic solvents as the primary hazard, which is a lower hazard than even IPA wipes);
- Batteries can produce sparks and be a potential ignition source (Discharging eliminates this hazard entirely); and
- Larger batteries still containing significant energy can cause electrocution (Discharging eliminates this hazard entirely).

Collection mechanisms for large batteries

While household batteries can be collected safely almost anywhere, it is more practical and appropriate for traction batteries to be collected by end-of-life vehicle management and disposal facilities, dealerships, or by producers themselves. Unlike batteries for small electronic equipment, consumers cannot and should not attempt to remove those large and generally high-voltage batteries from electric, plug-in hybrid and hybrid vehicles and transport them to a neighbourhood collection site designed to manage waste household products. Requiring them to do so would be unsafe and virtually impossible for most consumers. In fact, Tesla believes that only properly trained persons should handle the removal and transport of high voltage batteries.

Generally, when vehicle traction batteries reach the end of their useful life, they naturally flow to one of these collection pathways:

- Service Centres/Dealerships: Some EV batteries are removed from vehicles by trained professionals at automotive dealerships/retailers. This is the case for vehicles that have not reached the end of their useful life and require a replacement battery). Those batteries are sent to third party battery recyclers or to the battery producer's own recycling facilities;
- Independent vehicle repair providers: Some batteries may be removed from vehicles by automotive repair shops that are not associated with vehicle producers. Those batteries should be sent back to producers, to vehicle dismantling and recycling facilities, or to battery recyclers;
- Vehicle dismantlers: Most vehicle traction batteries are still contained within vehicles when the vehicles reach the end of their life (through natural wear and tear, or due to a major crash). Those vehicles and the batteries they contain are transported to vehicle dismantling and recycling facilities. This existing economy of vehicle recycling and dismantling is the natural place for end-of-life vehicles and all the batteries they contain (including traction batteries). It would be impractical to require vehicle owners to dispose of their end-of-life vehicle at a vehicle dismantling facility and their traction battery at a separate collection facility.
- On-demand to the producer: In very rare cases consumers may opt to return their battery to the producer directly, for example in the unlikely event they are modifying or repairing their own vehicle. In these unusual cases, the producer would work with a consumer to receive back the battery in a safe manner using producer's specified removal, diagnostic and shipping procedures.

Hybrid vehicles

While conventional hybrid vehicles are no longer considered "clean energy" technologies, their traction batteries contain minerals that are critical to the clean energy transition, such as Nickel. All vehicle traction batteries should be in scope for future circular economy policy, such as future extended producer responsibility policies.

Supporting vs requiring reuse

Government should encourage reuse and repurposing, whenever it is appropriate to do so. *Requiring* reuse and repurposing is not appropriate, both for safety and environmental reasons. Tesla EV batteries are optimised for vehicle traction and are not designed for second use in another application. As battery chemistry and technologies progress over time, the lifetime of EV batteries increases. In general, Tesla expects battery packs to outlast our vehicles' lifetime.

When vehicle batteries last that long, and new battery packs are innovating at the pace we are witnessing in the market, their second life use becomes questionable from an environmental standpoint. Indeed, the environmental benefits from keeping old, used batteries even longer in the system – outside of the original vehicle - should be questioned when noting that (1) new batteries have several times lower cobalt intensity (in g/kWh) than degraded, old ones and (2) the savings in CO_2e per kWh for second life batteries are limited. In addition, frequent changes to overall pack design can directly improve the function and safety of batteries[1]. The demonstrated environmental benefits of second life batteries have also proven to be limited to date, in part due to logistical challenges of obsolete revisions, and the second life battery sector overall is still considered niche[2].

[1] For background, in 10 years of Tesla's manufacturing of battery packs, there are hundreds of variations in structures, electronics, devices, modules, and overall pack design that directly improve the function and safety of our EV batteries.
[2] This is demonstrated in further details by Ricardo Energy & Environment in their 2019 study entitled 'Circular Economy Perspectives for the Management of Batteries used in Electric Vehicles'. https://publications.jrc.ec.europa.eu/repository/handle/JRC117790

At Tesla, we assess used battery packs' suitability for remanufacturing in line with the practical application of waste hierarchy principles, and we do everything to increase the lifespan of our batteries, in the application for which they were designed to operate (to power Tesla vehicles). If a remanufacturing or reuse operation is not possible, the assessed battery or battery parts are sent for recycling.

We believe there should be a recognition that extending the life of certain batteries through repurposing is not always an optimal or viable option. We do not believe policies should implicitly or explicitly favour extending batteries' lifetime - in other purposes than the original one - over recycling them. In other words, there should not be an artificial requirement imposing a second-hand life for batteries if recycling is the better environmental or economic choice for them.

Collection targets

In many existing EPR frameworks, the main performance metric is a product collection rate. These collection rates are not useful or appropriate measures for large batteries, for various reasons:

- Industrial li-ion batteries have a very different lifespan as compared to traditional consumer electronics. These state-of-the-art batteries have a different use profile, are thermally managed and are generally far more advanced. They are designed to last, and their lifespan is expected to continue increasing as technologies improve[3].
- The number of large batteries placed on the market increases significantly each year, and EV sales are projected to continue increasing steadily. The battery storage market is also evolving rapidly and is projected to achieve significant growth over the next few years and decades[4].
- Given the critical materials they contain, vehicle traction batteries and stationary energy storage batteries retain value. The value of waste batteries stimulates the emergence of competing collectors, which further reduces the quantity of batteries available for collection by producers.
- Extending the life of a battery pack is a superior option to recycling for both environmental and business reasons. For those reasons, before decommissioning a consumer battery pack and sending it for recycling, Tesla does everything it can to extend the useful life of each battery pack, for its original application. Extending the life of a battery pack would result in it not being counted as waste collected. Mandated collection rates would then act as disincentives to extending the life of batteries and would result in premature recycling.

But it does not mean that an EPR framework for large batteries should not set a performance measure. It is possible and necessary to use a performance measure to ensure that batteries that have reached the end of their service life are recovered by producers – but only if and when they are no longer desired by other market participants who would otherwise derive value. Requiring that producers take back their battery packs when no other party wants to avail themselves of their value at end of life can ensure that no battery is discarded or managed in an inappropriate manner. Meanwhile it ensures the market value of the battery benefits the battery owner as it moves through the end of life process. **Ensuring value is obtained by the battery owner while also ensuring no battery is left unmanaged in the event of a market failure should be the core objective of an EPR framework for large batteries.**

This performance measure is the essence of a battery take-back obligation framework. It provides a safety net ensuring that a safe and efficient pathway exists for large batteries to be recovered by producers when they are no longer desired for their reuse potential or recycling value on the market.

[3] Tesla EV batteries are covered by an 8-year warranty, but their lifespan is expected to be longer under typical use. Storage batteries are covered by a minimum 10-year warranty.
[4] Bloomberg NEF, New Energy Outlook 2020, https://assets.bbhub.io/professional/sites/24/928908_NEO2020-Executive-Summary.pdf

Labelling

Labelling requirements can support the design and implementation of extended producer responsibility policies.

While EPR policies should clearly define battery "producers", it's equally important to ensure that individual battery packs can be identified and offered back to their producers by any party that removes the battery, if it does not want to manage the end of life directly.

As part of its Advanced Clean Cars II regulations, the California Air Resources Board (CARB) has included electric vehicle battery labeling requirements. The requirements can be found in Section 1962.6, Title 13, California Code of Regulations.[5] Tesla finds the requirements reasonable, and the proposal could form the basis of an voluntary labeling program or labeling requirement. If Australia is to adopt a labelling requirement, Tesla recommends adopting California's Advanced Clean Cars II labelling requirement– the only existing labelling requirement in North America – and to do so by direct reference to ensure that labelling requirements are harmonized to the greatest extent possible. Tesla supports the California ACC2 labeling requirement (applicable from model year 2026 onward). To ensure a clear transfer of responsibility – like what the European Union has adopted via its new Battery Regulations, the labeling requirement should apply to primary producers (such as vehicle manufacturers) and to secondary producers (such as battery remanufacturers and repurpose businesses) (see Art. 38. of the EU Battery Regulations).

[5] See CARB, Advanced Clean Car II, Section 1962.6

AUTO RECYCLERS ASSOCIATION OF AUSTRALIA

ARAA SUBMISSION

in response to

BATTERY STEWARDSHIP COUNCIL DISCUSSION PAPER

re

ELECTRIC VEHICLE BATTERY STEWARDSHIP

July, 2023

AUTO RECYCLERS ASSOCIATION OF AUSTRALIA

Contents

1. ARAA Proposal

The EV battery consultation paper asks how might battery stewardship integrate with a whole of vehicle stewardship approach.

From an auto recycling industry perspective there should not be two separate systems that recyclers are required to deal with.

An ELV Product Stewardship system should be structured such that it meets the requirements of the Battery Council in regard to traceability and management of Electric Vehicle Batteries.

In response to the primary questions posed by the Battery Council relating to traceability and recovery of Batteries from end-of-life Electric Vehicles, ARAA proposes that an ELV Product Stewardship program be based upon the three Steps outlined below.

Step 1: Establish an electronic National Vehicle Dealings Register - NVDR

Every State and Territory government already requires that Licenced Motor Car Traders (LMCTs), Second hand dealers, auto recyclers and scrap metal traders (or similarly defined entities who deal with end-of-life motor vehicles) keep a Dealings Book - commonly referred to as a Police Book.

Each business across Australia who deals with end-of-life motor vehicles must keep such a book (and in almost every case does). They are required to record basic details of all transactions relating to vehicles.

In the vast majority of cases however these are paper-based books. They provide no effective basis for traceability or accountability of vehicles handled by the business. Searching is tedious and accuracy is reliant on legible handwriting and accurate VIN number recording (both of which are fraught). They are more a tool for avoidance of traceability and accountability than an enabler.

Taking advantage of regulations that already exist, ARAA suggests the following would be required to achieve effective national traceability of Electric Vehicle batteries:

> Develop a national web-based business registration and vehicle registration platform – the NVDR - that replaces the paper based Dealings Book in each State and Territory.
>
> Gain the support of each State and Territory Government in mandating use of this electronic NVDR.
>
> If possible, gain the support of AustRoads (being a forum that brings State and Territory road authorities together) for such an initiative.
>
> If possible, gain endorsement from the Meeting of Environment Ministers of ELVs as a National Priority Waste Stream.

Data fields required in an electronic version of the Dealings Book (which should also incorporate a section for recording EV Battery details) include:

EXAMPLE – VICTORIAN DEALINGS BOOK (required by MOTOR CAR TRADERS ACT 1986)

ACQUISITION DETAILS (Currently required)
Registration Number (or if Unregistered - Traders Stock Number)
Make/Model
Type of Vehicle
Electric Vehicle (Yes/No) – not that this is a new field
Built Date (If it Appears on the Vehicle Compliance Plate)
Vehicle Identification Number (if the Vehicle Identification Number is not Available - Other Number Capable of Identifying the Vehicle)
Date of Acquisition
Odometer Reading
Name, Address and Drivers Licence No of Person from Whom Vehicle Acquired
If a business – details of Business:

- Trading name, Business name, ABN, Phone, Email, Address
- Seller Contact: First name, last name, mobile, email

Name and Address of Auction Business from which Vehicle Acquired or Received
Security Interest (if any) Held By:
Security Interest (if any) Amount Paid Out in Discharge
Date Security Interest Paid (if any)
Signature of Person from Whom Vehicle Was Received
Signature of Person Authorised to Sign on Behalf of Business or Auction Business from which Vehicle Acquired or Received

DISPOSAL DETAILS (Currently required)
Sold To (Name and Address)
Date of Delivery
Odometer Reading
Roadworthiness Certificate:
    Certificate Number
    Certificate Date
Date Notice of Acquisition Sent to Roads Corporation
Date Notice of Disposal Sent to Roads Corporation
Date Registration Cancelled and Plates Returned (If Applicable)

EV BATTERY DETAILS (New section - where buyer is an auto recycler or scrap metal dealer):

- Type of EV:
    - plug-in electric vehicle (PEV),
    - hybrid electric vehicle (HEV),
    - battery electric vehicle (BEV),
    - plug-in hybrid electric vehicle (PHEV), or
    - fuel cell electric vehicle (FCEV):
- Battery ID
- Location of Battery: In vehicle/In storage
- Date battery dismantled
- Assessment of Condition of Battery: Viable (Reusable)/Non-viable (Scrap)

Sale of Battery details:

- Buyer Business: Trading name, Business name, ABN, Phone, Email, Address
- Contact: First name, last name, mobile, email
- Date of sale
- Purpose of Sale: Reuse; Scrap (Resource Recovery)

An electronic Dealer Book system should also enable existing Inventory Management systems to be able to interface with it so the above details can be uploaded from such software.

Step 2: Establish a National Automotive Recycler/Scrap Metal Trader Certification program

An ELV Product Stewardship must establish a National Certification program that specifies Environmental standards, Health and Safety standards and Vehicle Provenance standards that certified auto recyclers and scrap metal traders are required to comply with.

It should also define a Compliance Management regime that supports and ensures the integrity of the Certification program.

The Product Stewardship body may or not be the provider of the Certification program, but it should define the standards and licence such providers as it sees fit to implement the program.

The Product Stewardship body should gain the support of the following entities in only selling end-of-life vehicles (salvage vehicles) to Certified auto recycler or Certified scrap metal businesses:

- Motor Vehicle Dealers/Agents
- Licenced Motor Car Traders (LMCTs)
- Insurer(s)
- Auction Houses (Manheim/Pickles/Autorola/Grays)
- Local government (re abandoned vehicles)
- Police (re impounded vehicles)

It should also undertake a national marketing program that informs the public that scrap vehicles should only be sold to environmentally compliant Certified businesses.

Step 3: Restrict the Export of Electric Vehicle Batteries

If export of separated Electric Vehicle Batteries is allowed, this will be a significant source of leakage in terms of traceability and environmentally competent recycling of such batteries.

Australia is a signatory to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. The Basel Convention is a global control system for importing and exporting hazardous waste. Under this convention the export of motor vehicle components containing hazardous wastes should not be permitted.

If separated EV Batteries are a declared Hazardous Waste then this would provide a platform to make such export illegal.

This in conjunction with the traceability measures proposed above would significantly limit the numbers of EV Batteries being exported.

2. The Auto Recycling Industry in Australia

Successive federal governments have since 2002 allowed Australia to fall behind many other developed economies in regard to effective environmental management of the waste stream generated by over 800,00 end-of-life motor vehicles (ELVs) created in Australia each year.

There is a common misconception that because 75% of an ELV is metal, which is all recyclable, there is not a problem.

The problem lies with the 25% of hazardous material that remains after the metal has been recovered. All of this goes to landfill.

A more significant issue however is the fact that, for almost all the 800,000 processed in Australia, there is very little recovery of the refrigerant from those vehicles. The air-conditioning gas which they contain is evacuated to atmosphere.

Australia is, and has been for many years past, in breach of its international obligations under the STOCKHOLM and BASEL Conventions (see below).

The problem of hazardous waste generated from ELVs is not unique to Australia. It is an international issue and most advanced economies (and some developing economies) have in place strategies to address the problem.

In terms of regulatory compliance (environmental, workplace health and safety, and consumer law compliance) the automotive recycling industry in Australia lags significantly behind Europe, major Asian economies (Japan, Korea and China), Canada and the USA.

State and Federal Regulations are in many respects comparable to those other jurisdictions, but enforcement of these laws in Australia is lacking.

Reasons for this include:

- The industry is disparate, very multi-cultural and comprises a high proportion of very small business;
- There is a wide geographic spread between population centers in Australia, and a consequent wide geographic spread between auto recycling businesses;
- In metropolitan areas a significant proportion of businesses can be quite transient – open in one location, operate for period then move to another location;
- Local government has had difficulty enforcing planning and health standards;
- EPAs have experienced difficulty in tracking, visiting and enforcing compliance on such businesses;
- Federal agencies are ill-equipped to enforce laws relating to refrigerant recovery and hazardous fluids exports in such a disparate industry.

a. Australia's International Obligations under the MONTREAL PROTOCOL and BASEL Convention.

Montreal Protocol on Substances that Deplete the Ozone Layer

The Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol) is an international agreement made in 1987. It was designed to stop the production and import of ozone depleting substances and reduce their concentration in the atmosphere to help protect the earth's ozone layer.

Australia has implemented legislation that requires licensing for the import of ozone depleting substances (motor vehicle refrigerant), but this legislation has not required such licensees to ensure the recovery of the imported refrigerant. Over 90% of motor vehicle refrigerant imported into Australia is released to atmosphere.

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal is a global control system for importing and exporting hazardous waste.

Under this convention the export of motor vehicle components containing hazardous wastes should not be permitted. However since ratification by Australia some 30 years ago, there has been no effective action to curtail the export of such hazardous wastes.

3. Automotive Recycling Industry Metrics

Industry Metrics:

Industry Revenue -	$1.25 billion
Number of Establishments –	1800
Employment –	4500 persons
Number of Vehicles Scrapped:	840,000 units
Scrappage Growth Rate (over past 5 years):	4% per annum

Industry Concentration:

Industry is very fragmented (vast majority of businesses are owner operated);
Industry concentration is low due to ease of entry;

Products & Services of the Australian Auto Recycling Industry:

Used Parts Dealing:	50% of industry revenue
Motor Vehicle Export & Scrapping:	40% of industry revenue
Importing New & Used Car Parts	5% of industry revenue
Service, Repair and Installation	5% of industry revenue

Geographic spread of businesses:

Victoria:	29%
New South Wales:	28%
Queensland:	19%
Western Australia:	10%
South Australia:	10%
Tas, NT, ACT:	4%

4. The Auto Recyclers Association of Australia Limited (ARAA)

The Auto Recyclers Association of Australia Limited (ARAA) was formed in 2010 for the purpose of providing national representation for the auto recycling industry.

The motivation for establishing ARAA was to create an industry regulated national Certificated Automotive Recycler (CAR) program. This program would recognise (and badge) businesses who met internationally accepted auto recycling standards in terms of compliance with environmental, workplace health and safety and consumer (customer service) regulations.

This industry regulated Certification program was required to ensure the integrity of the Cleaner Car Rebate Scheme (CCRS) - colloquially termed the "Cash for Clunkers" scheme - proposed by the Federal Government in 2010.

In the end the CCRS did not proceed. It was cancelled when in January 2011 the government diverted funds from a number of environmental programs to support its Brisbane Flood relief efforts.

The national Certificated Automotive Recycler (CAR) program established by ARAA at the time remained operational, but take-up was low as it was a voluntary program.

5. ARAA PROGRAMS

a. NADI Buy-back Vehicles Recovery and Destruction Program

ARAA provided buy-back vehicle services which included collection, traceability and evidence of destruction for 7076 vehicles for the following manufacturers:

- BMW
- Ford
- Honda
- Mazda
- Mitsubishi
- Toyota

Collections were from every State & Territory capital city, from almost all regional centres through each State and Territory and from some of the most remote areas of Australia.

This involved engaging with Towing operators, Scrap yards, Council tips as well as auto recycler businesses in every corner of Australia.

Examples of remote recoveries included Flinders Island (off Tasmania), Jingellic (Snowy Mountains), Bourke (NSW), Lord Howe Island (Queensland), Thursday Island (North Queensland), Howitt (Cape York), Katherine (NT), Kununurra (WA), Broome (WA), Esperance (WA), Streaky Bay (SA).

b. Salvage Takata Airbags Recovery Program

Over a period of five years from 2018 to 2023 ARAA provided collection, traceability and evidence of destruction for some 25,000 Affected Takata Airbags and 85,000 Certificates of Destruction for the following manufacturers:

- BMW
- Chrysler
- Ford
- Holden
- Honda
- Mazda
- Mercedes Benz
- Mitsubishi
- Nissan
- Subaru
- Toyota

ARAA has worked closely with Manheim (Cox Automotive) and Pickles and assisted them in clearing many thousands of Affected Takata Airbags in auction yards in each State and Territory and many regional centres.

STATE METROPOLITAN AREA RECOVERY PROGRAMS

Throughout the operation of this Salvage Takata Airbags Recovery program ARAA has maintained a network of Field Technicians in Brisbane, Sydney, Melbourne, Adelaide and Perth.

We have also maintained Head Office and Warehouse operations in Melbourne. We continue to operate significant technology platforms including:

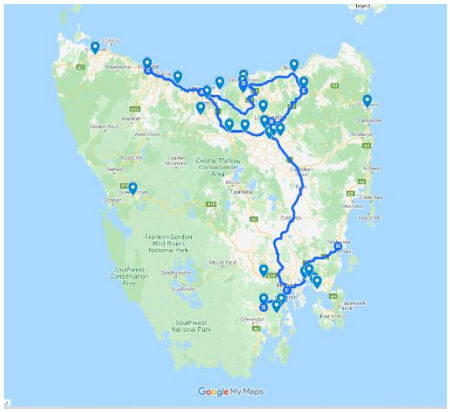
- STAR Program Management,
- NADI Vehicle Collections,
- Manheim Auction Undertakings follow-up, and
- Takata Recovery mobile and web-based VIN CHECK systems.

ARAA REGIONAL TAKATA RECOVERY PROGRAM

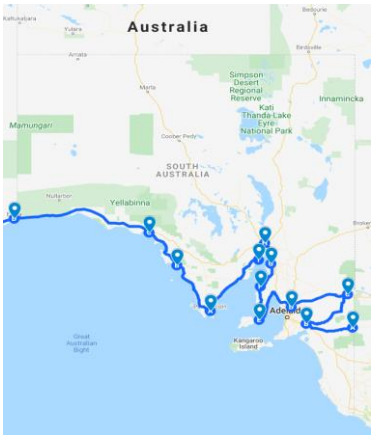
ARAA's Regional Australia recovery program covered the regional areas of each State and Territory. The following maps show the locations visited by our Field Technicians:

Victoria

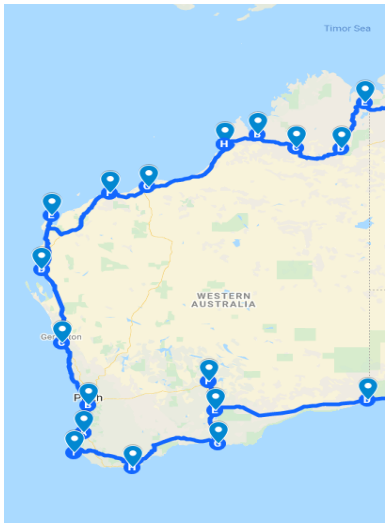
Tasmania



South Australia

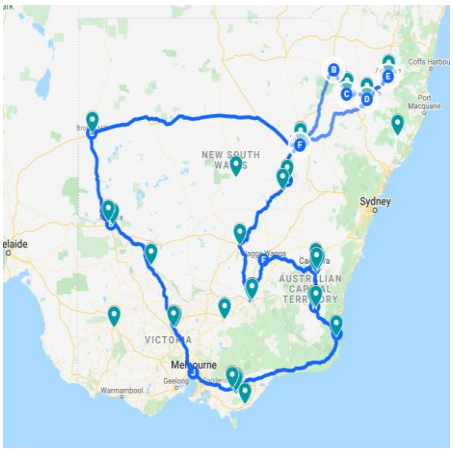


Western Australia



SA, NT and Queensland

NSW



SUMMARY OF SALVAGE TAKATA AIRBAGS RECOVERY PROGRAM OUTCOMES

ACTIVITY	OUTCOME
No. of Visits to workplaces	4880
Unique businesses visited	1971
No. of VINS Checked	1,037,138
No. of Affected VINS identified	80,030
No. of Affected Takata Airbag Inflators identified	95,740
No. of Airbags recovered	24,808
No. of Alpha Airbags recovered	524
No. of Undertakings registered	2743
No. of Certificates of Destruction/Ownership & Scrappage Issued	84,944

d. ARAA Industry Focused Technology

ARAA maintains a number of industry focused technology systems that enable the operation of its traceability and recovery programs, and provide business management support to auto recyclers. These systems include:

- Auto Recycling Industry CRM system
- Auto Recycling Industry Inventory Management System (www.hotlineinventory.com)
- Auto Recycling Industry Scrap Vehicle Auction System (www.retireyourride.com.au)
- Written-off Vehicles Reporting Register (www.arwovr.com.au)
- NADI Affected Vehicles Recovery Management System (www.nadi-registration.com)
- Takata Affected Airbags Recovery Management System (www.takatarecovery.com)
- OEM Traceability Reporting System (www.takatavinview.com)
- Parts RFQ – National Parts Locating System (www.partsrfq.com.au)
- Australian Certified Automotive Recyclers Program (www.a-car.com.au)
- International Certified Automotive Recycler Environmental Program (www.i-careauto.com)
- Electric Vehicle Training Program (Safe Handling of High Voltage Electrical Components in Electrical End of Life Vehicles)

e. ARAA National Field Technicians Network

ARAA has operated a national network of Field Technicians throughout the past 5 years, and these technicians remain in place in each capital city.

f. ARAA International Collaborations

ARAA has in place close international collaborations with the auto recycling associations in Japan, Korea, Malaysia and India. It also has connections with the auto recycling industry in China. These collaborations enable information sharing on evolving regulations and industry practices in those countries.

g. Australian Certified Automotive Recyclers Program (www.a-car.com.au)

ARAA initially established the Australian Certified Automotive Recycler (A-CAR) Program in 2011 and revamped it in 2018. The program is based on internationally accepted standards relating to:

- environmental management;
- workplace health & safety management;
- consumer protection and business process.

These standards are recognised across all significant industrialised economies including the USA, Canada, UK, Europe and leading Asian countries.

The program operates on the same management platform as the Certified Automotive Recycler program in the USA (refer https://aracertification.com)

h. Certification Compliance Partner (www.complianceexperts.com.au)

ARAA utilizes the same compliance management partner as is used by ARA in the USA. Compliance Experts Pty Ltd is a Melbourne based company that supports compliance management and industry certification programs in major corporations and government departments in Australia and internationally.

i. International Certified Automotive Recycler Environmental Program (www.i-careauto.com)

ARAA has partnered with the IOWA Auto Recyclers Association (which is the most environmentally progressive association in the US) to promote Environmental Certification at an international level, with a particular focus on Asian countries where environmental compliance is lacking.

6. ARAA Responses to Battery Council Questions

a. Traceability in the Auto Recycling (Salvage) Sector

There are at least 1800 auto recycler, scrap metal trader and vehicle exporter businesses nationally who would fall under the umbrella of a scheme introduced to require traceability of EV batteries within the salvage sector.

As noted earlier, the most common form of recording vehicle acquisitions by auto recycling and scrap metal yards is using a paper-based vehicle recording system (the Police Book or Dealings Book).

This captures basic information about a vehicle that is acquired by the yard. A copy of a typical page from a Dealings book is shown below.

This does not provide any assistance in terms of recording whether a vehicle contains an EV battery, or what happened to the Battery.

The next most common form of recording vehicle acquisitions is use of an Excel spreadsheet. This again is a local record within the business and would not be of assistance in terms of recording whether a vehicle contains an EV battery.

There are six electronic inventory management systems used in the industry, plus a few in-house developed systems:

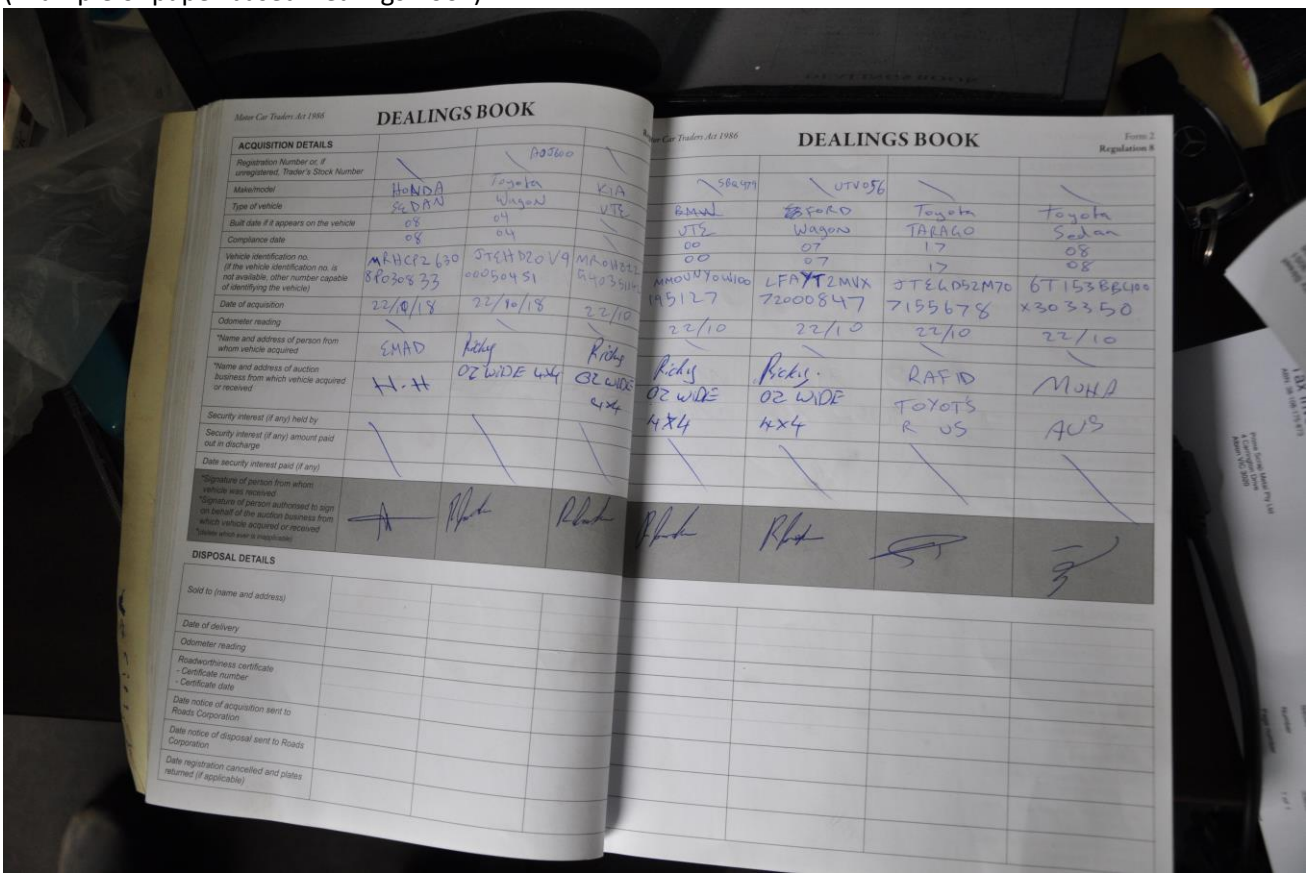
- PINNACLE
- ULTIMATE
- HOTLINE INVENTORY
- ARMs
- ADEN
- EZI PARTS
- OWNER DEVELOPED

Less than 250 of the 1800 industry businesses use one or other of these systems.

Some of these systems may be capable of interfacing with (or providing an electronic report to) a national EV Batteries reporting system, if such was to be developed.

Most systems however would require additional development effort to achieve this.

(Example of paper based Dealings Book)



The only existing system capable of being adapted to provide industry wide EV Battery Traceability is the ARAA Hotline Inventory system.

b. What level of traceability do OEMs and the Battery Council wish to achieve?

There would appear to be three options as to the approach that might be taken to provide greater traceability of EV Batteries in the salvage sector:

A low-level voluntary approach (such as through promoting and supporting changed practices in the auto recycling industry and supporting the take-up of improved traceability technology) which is better than we have now with the objective of achieving traceability of up to 50% of EV Batteries;

A high-level voluntary approach (such as through a product stewardship scheme) with some regulatory support which might achieve traceability of up to 80% of EV Batteries and that has the support of major parties by:

- changing the practices relating to sale of end-of-life Electric Vehicles of:
  - Insurers,
  - auction houses,
  - local government,
  - police
- introducing Certification and ongoing compliance management of auto recycler businesses who are able to obtain vehicles from the above agencies
- gaining cooperation and assistance with traceability from State and Territory vehicle registration agencies, and the national NEVDIS system

A compulsory approach based on nationally consistent regulation (similar to that in the UK and other European countries) that requires:

- Each State and Territory to regulate the continuing registration of motor vehicles until their registration is cancelled through the issuing of a Certificate of Destruction;
- Each State and Territory to regulate for the registration of Authorised Treatment Facilities who are licensed to issue certificates of Destruction for ELVs;
- A national compliance management system that registers businesses and ATFs and manages the ongoing verification and e-registration of such ATFs

ARAA has proposed an approach – a high level voluntary approach - that will deliver significant traceability of EV batteries in the salvage sector.

This is not as good as the compulsory approach noted above, but the compulsory approach will be very difficult to implement and will take a long while to become operational.

7. Acquisition, Recovery and Storage of EV Batteries

The consultation paper asks what information we need to capture to determine:

- Safe recovery
- Safe transportation
- Reuse and repurposing
- the fate of the used battery

For end-of-life Electric Vehicles, the information that needs to be captured includes:

Seller Business details:

- Trading name, Business name, ABN, Phone, Email, Address
- Seller Contact: First name, last name, mobile, email

Host vehicle details:

- VIN, Make, Model, Series,
- Type of EV:
    - plug-in electric vehicle (PEV),
    - hybrid electric vehicle (HEV),
    - battery electric vehicle (BEV),
    - plug-in hybrid electric vehicle (PHEV), or
    - fuel cell electric vehicle (FCEV):
- Battery ID
- Date vehicle acquired
- Location of Battery: In vehicle/In storage
- Date battery dismantled
- Assessment of Condition of Battery: Viable (Reusable)/Non-viable (Scrap)

Sale of Battery details:

- Buyer Business: Trading name, Business name, ABN, Phone, Email, Address
- Contact: First name, last name, mobile, email
- Date of sale
- Purpose of Sale: Reuse; Scrap (Resource Recovery)

8. The role of the Insurance Industry and Auction Houses

A significant proportion of End-of-Life Electric Vehicles that contain viable electric batteries come into the possession of insurers as a consequence of total loss insurance settlements. The insurer becomes the owner of the vehicle.

Insurers typically sell these vehicles through an Auction House. The Auction House is acting as an agent of the insurer.

It is totally at the discretion of the insurer as to how they dispose of such vehicles, and what conditions (if any) they place on the sale process.

It is entirely appropriate that insurers require that their agent (the auction house) only sell the vehicle they now own to a buyer who is Certified for handling Electric EVs at end-of-life.

Such a requirement may impact the price the insurer achieves at auction. This in turn might impact the cost if insuring Electric Vehicles. These are consequences need to be considered by all parties.

But in the end unless there is a requirement that Auction Houses only sell salvage electric vehicles to buyers who are Certified for handling such vehicles, then achieving traceability of the EV batteries will not be possible.

9. Training and Information

The consultation paper asks 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?

The Standards Australia publication AS 5732:2022 for Electric Vehicle Operations – Maintenance and Repair sets out requirements for the premises, and procedures for work or activity associated with:

- plug-in electric vehicles (PEVs),
- hybrid electric vehicles (HEVs),
- battery electric vehicles (BEVs),
- plug-in hybrid electric vehicles (PHEVs), and
- fuel cell electric vehicles (FCEVs):

Technicians will need to be trained on:

- Carrying out safe work practices when working on Electric Vehicle high voltage systems;
- Correct use of specialised tools and equipment;
- Overview of EV components and their functions;
- How to check if an EV is safe to work on.
- Correct procedure to safely depower and decommission a high voltage power supply;
- Correct procedure to remove a high voltage battery from an EV.

On the question of who will provide this training, there are multiple training providers already providing EV training courses. These include TAFE, industry associations and private providers.

There does not at present seem to be a mismatch between the demand for such training and available supply, but this issue should be kept under review as the volume of EVs in the market increases.

10. Possible Implications of ELV Battery Stewardship on Automotive Recycling Businesses

a. Compensation for Recyclers for removing, handling, storing and transporting EV batteries

If recyclers are required to sell batteries back to OEMs under a “buy-back” type scheme, how will compensation for recyclers for the time spent in removing, handling, storing and transporting EV batteries be determined? As an example:

Steps required of an auto recycler to prepare a battery for collection:

Business being Certified for Storing and Handling EV Batteries;
Premises to have specified tools and equipment on site;
Management to be trained in Safe Handling and Storage of EV Batteries;
Dismantler Technicians to be trained in Safe Handling and Storage of EV Batteries

Pre-removal Preparation:

Checking OEM requirements for EV Battery removal for the Make/Model at hand – 15mins
Checking status of Battery and ensuring it in a safe state for removal – 5 mins

Technician disconnecting and unbolting battery in preparation for removal – 45 mins

Technician using appropriate lifting equipment to remove battery from vehicle and place on a pallet – 15 mins

Technician wrapping battery on pallet and preparing it for storage – 5 mins

Technician forklifting battery into under cover storage location – 10 mins

Technician removing battery from storage and loading onto Battery Collection vehicle – 10mins

Time required for Safe Removal and Storage: 1hr 45mins @ $150 per hour = $257.50

b. Economic Impact on Auto Recyclers of Transition from IC vehicle to EVs

The transition from Internal Combustion vehicles to Electric Vehicles may have a significant on the viability of automotive recycling businesses.

A number of questions arise as to the impact a ELV Product Stewardship scheme on such businesses. These include:

- Will a Battery Stewardship scheme, through an ACCC authorisation, establish a pricing regime for the sale of secondhand EV batteries?
- Under the umbrella of an EV Battery Stewardship program, will OEMs operate a “buy-back” program for EV batteries of their brand?
- Once a Battery Stewardship scheme is operational, will recyclers be able to sell EV batteries in the open market, or will they be required to sell batteries back to the OEM under a buy-back program?
- If international market prices for EV batteries are higher than domestic market prices, will auto recyclers be able to export EV batteries?
- Will second-hand Electric or Hybrid vehicles still containing a Battery be able to be exported?
- Will end-of-life EV vehicles still containing Battery be able to be exported?
- Will separated EV Batteries be able to be exported?
- Will EV Batteries be legally able to shredded by shredders in Australia?

At present, a significant proportion of the income of an auto recycler business comes from the sale of the engine, transmission and related mechanical components of a salvage vehicle.

Do we expect that the income a recycler receives from the sale of a Battery and other related EV components will be equivalent to the income from engine and transmission sales?

Example of Economics of a Combustion Engine ELV

Purchase		$3000	
Transporting, Handling		$500	
Cost:			$3500
Parts Sales:			
Engine	$2000		
Transmission	$1500		
Doors & Panels	$2000		
Lights and Mirrors	$800		
Other	$800		
		$7100	
Scrappage of Shell:		$400	
Income:			$7500

These are issues that ARAA will be seeking to address during the establishment of an ELV Product Stewardship scheme.

11. Impact of Exporters

The National Motor Vehicle Theft Reduction Council reported in late 2021 that the rate of exportation of vehicle parts and accessories from Victoria has been on a steady increase during the past decade, with a total value of $71M in 2019-20, being Victoria's third highest export.

End-of-life vehicles are being exported in significant numbers to the United Arab Emirates (UAE), Egypt and Lebanon. These are longstanding centres for automotive trade due to the absence of taxes or import/export duties along with geographical accessibility to buyers around the globe.

It is probable that over recent times there has been some rationalization and a smaller number of businesses are engaging in a higher volume of exportation.

ARAA believes it is likely that the international market for Electric Vehicle components, and particularly EV batteries, will be at least as strong as the market for IC Vehicle components, and it may be greater.

An example of the rate of expansion in exporter activity in one outer Melbourne area can be seen in Appendix 2. This scenario is being repeated in outer metropolitan Sydney and Brisbane.

As noted earlier the management of export of EV Batteries will be an important element of the work of an ELV Product Stewardship program and the Battery Stewardship Council.

Appendix 1 - ARAA Response to Product Stewardship Consultation Paper – 2011

ARAA has advocated for over 12 years for the establishment of a Product Stewardship program for End-of-Life vehicles.

In 2011 ARAA provided the following submission in response to the Product Stewardship Consultation Paper:

1. Motor vehicles are arguably the most complex and environmentally damaging consumer products on the planet. From the cradle to the grave, motor vehicles use up substantial stores of natural resources and can create significant pollution. End-of-Life Vehicles (ELVs) are those that have reached the end of their useful service and are considered to be waste. At this point in time they are in effect a very large combination of recyclable materials and hazardous substances.

2. It is estimated that 650,000 ELVs will have entered the waste stream in Australia in 2010. Recycling of their steel content has saved about 1.6 million tonnes of carbon dioxide, since it is more energy-efficient to manufacture steel products from scrap steel than it is to produce new steel from iron ore. In addition, the environmentally responsible depollution of these vehicles would have ensured that the following estimated volumes of hazardous materials were recovered and recycled in an appropriate manner rather than being released into the environment, where they can cause damaging environmental impacts:

   - 8.5 million litres of oil and lubricants;
   - 6.5 million litres of radiator fluid (including coolant, rust-inhibitor and antifreeze);
   - 9 million kilograms of lead;
   - 3.25 million tyres;
   - 13 million litres of petroleum;
   - 1.3 million litres of windshield washer fluid; and
   - 520,000 kilograms of refrigerants equivalent to more than 1 million tonnes of carbon dioxide (assuming 10% of ELVs contain R-12 refrigerant).

   [Source -- Auto Recyclers Association of Australia, Auto Recycling Industry National Code of Practice - February, 2011].

3. Only a very small proportion of the 650,000 vehicles were depolluted and recycled in an appropriate manner. The bulk of the environmental damage reflected above would in fact have occurred. At present, there is no over-arching regulation covering the environmental management of ELVs in Australia. Rather than dealing with the whole vehicle, and adopting a strategy that deals with the effective depollution and recycling of the total entity, the current Australian regulatory framework attempts to deal with specific substances or products (such as tyres, hydrocarbon refrigerants, oils and batteries). Whilst differing forms of regulation exist at a national level covering the collection, disposal or recycling of these substances or products, the enforcement of compliance with the federal standards is left to State environment protection agencies.

4. Based on the information available to us, the actual level of recovery of refrigerants, tyres and oils from ELVs seems to be very low, and there is little environmental management of the other hazardous substances described above. It is certainly the case that there is no national data available from the EPAs, the automotive manufacturers or the auto recycling industry in Australia that would indicate the level of compliance with various international obligations, such as the Basel Convention, insofar as they relate to the environmental management of ELVs.

5. ARAA has undertaken discussions with vehicle manufacturers, with a view to establishing processes that will enable a higher level of environmental compliance in the management of ELVs.

Comments on the Consultation Paper

6. There are a number of references to ELVs in the Consultation Paper, and ARAA believes that this presents an opportunity to consider the promotion of treatment regimes aimed at reducing their environmental impact.

7. This particular waste stream is deemed to be of such priority in Europe that it was the first to enshrine the concept of extended producer responsibility and the second, after packaging waste, to be the subject of quantified re-use, recycling and recovery targets. The European Union took the view that vehicles were products whose characteristics justified legislative attention aimed at reducing their environmental impacts at the disposal stage – they contained a number of hazardous materials, were often poorly handled, and generally had 25% of their weight consigned to landfill.

8. The resulting Directive, on End-of-Life Vehicles, (2000/53/EC), took the opportunity not just to tackle environmental concerns but also embrace other vehicle-related policies. In short, the Directive contained provisions which:

   required vehicle manufacturers and professional importers to:
   - reduce their use of potentially hazardous materials such as mercury, lead, cadmium and hexavalent chromium
   - provide dismantling information to ATFs
   - mark components to aid identification, dismantling and recycling
   - guarantee convenient "free take-back" of ELVs (thereby reducing the risk of abandoned vehicles)
   - incorporate increasing quantities of recyclate in their vehicles
   - design their vehicles so as to facilitate high levels (this provision, which was adopted in a daughter Directive, is referred to on page 12 of the Consultation Paper)

   required Member States to:
   - allow only licensed "Authorised Treatment Facilities" (ATFs) to treat ELVs
   - introduce a "Certificate of Destruction" to trigger the removal of scrapped vehicles from the national vehicle register
   - achieve quantified re-use, recycling and recovery targets – 85% of the weight of ELVs scrapped, 2006-2014, rising to 95% from 2015

   required ATFs to:
   - meet specified site and operational standards
   - depollute ELVs by removing fluids, and certain components, before shredding and recovery

9. Vehicles seem to meet all of the criteria set down in the Consultation Paper for identifying candidates to be the subject of product stewardship and extended producer responsibility regimes. A system which incorporated the features of the EU regime would result in reduced environmental impacts at the ELV treatment and disposal stages, and have the additional benefit of reducing the opportunities for vehicle crime.

10. The Consultation Paper refers to government intervention in the form of legislation as a response to regulatory and/or market failure. In our submission the problems associated with environmental management of ELVs in Australia are reflective of failure in both areas.

11. Whilst the federal government has sought to put in place a national framework for management of some of the environmental hazards posed by ELVs, this "piecemeal" approach seems insufficient to address the complexity of the market within which the automotive recycling industry operates, and does not seem to provide the States with a platform that enables them to achieve a satisfactory level of compliance. Australia does not yet seem to be enjoying the benefits from the reductions in waste, the level of hazard reduction and the level of resource recovery through recycling that other industrialised economies are achieving through the effective management of ELVs.

Appendix 2 – Images of Export Type Businesses

This cluster of businesses operate in an outer metropolitan area of Melbourne. But we can point to similar operations in outer metropolitan areas of each capital city.

They generally do not have infrastructure for vehicle depollution and collection of hazardous materials.

They generally do not meet environmental standards, but Councils and EPAs have difficulty in achieving compliance by such operators.

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April, 2022

April, 2023

While it may appear to be a single operation, it is made up of a number of separate entities: