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Battery Stewardship Council
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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]

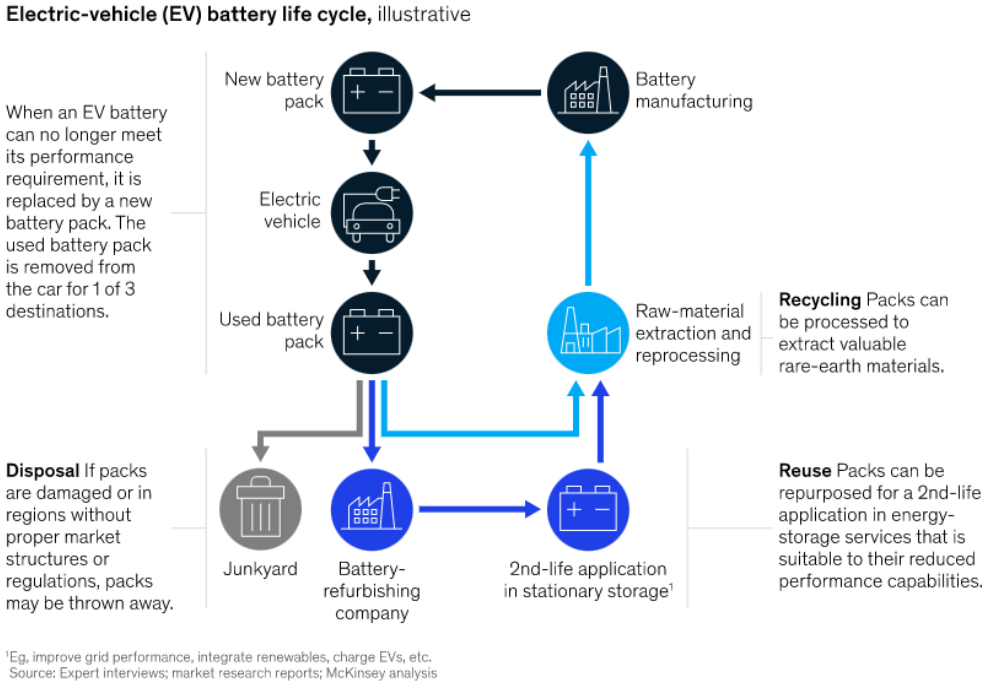

***Figure 1**. EV battery lifecycle including second-life and recycling (2019) McKinsey*

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

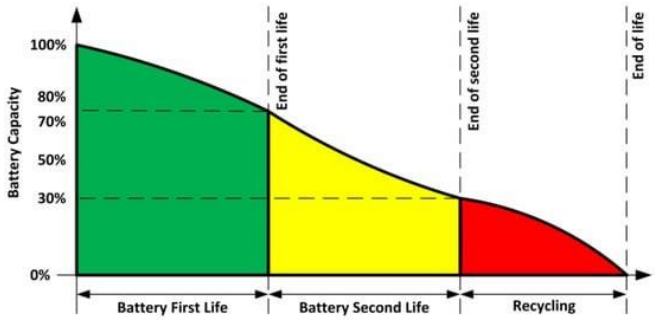

Figure 2. *Plot of EV battery life range as function of battery capacity (2023)* Font et al.

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.

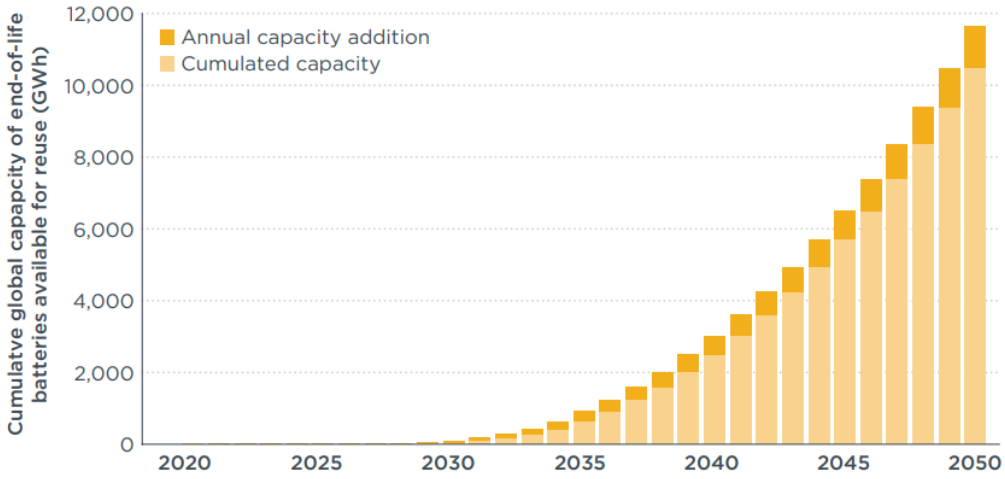

Figure 3. Global capacity for end of life EV batteries available for second-life applications. *ICCT (2023).*

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.

If you have any questions on this submission, please do not hesitate to contact Natalie Thompson at: office@evc.org.au.

Thank you for your consideration of our submission.

Yours sincerely,

Behyad Jafari

Chief Executive Officer

Electric Vehicle Council

[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.