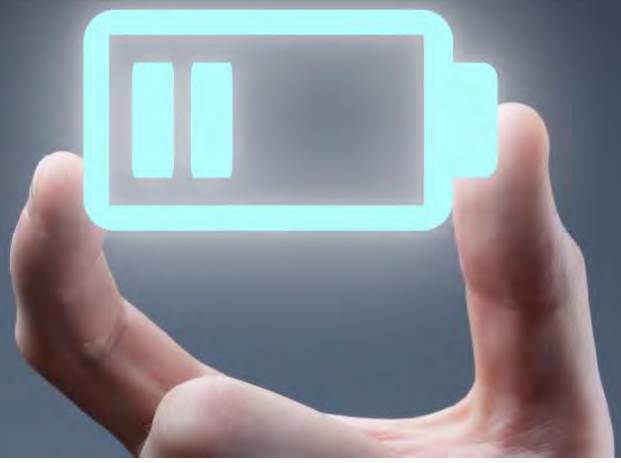
BatteryStewardshipCouncil

Creating a national stewardship scheme for batteries



PROPOSED STEWARDSHIP SCHEME FOR BATTERIES

November 2019

This fourth and final version of the proposed Stewardship Scheme for batteries was prepared by Gerry Morvell, Chair of the Battery Stewardship Council and Libby Chaplin, CEO of the Battery Stewardship Council. It includes input from the BSC Leadership Team, and it addresses points raised by BSC members during the consultation process.

BSC Leadership Team: Gerry Morvell, Brett Buckingham: Panasonic, Libby Chaplin, Australian Battery Recycling Initiative, David Stout: National Retailers Association, Jeremy Stewart: Trade Tools, and Kylie Hughes: QLD Department of Environment and Science.

BSC thanks all in industry, academia and government who generously contributed their knowledge, ideas, and positive and constructive responses to initial Scheme design ideas.

BSC thanks the QLD Department of Environment and Science which is leading the inter-jurisdictional contribution and funding on behalf of the Meeting of Environment Ministers.

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1 SUMMARY

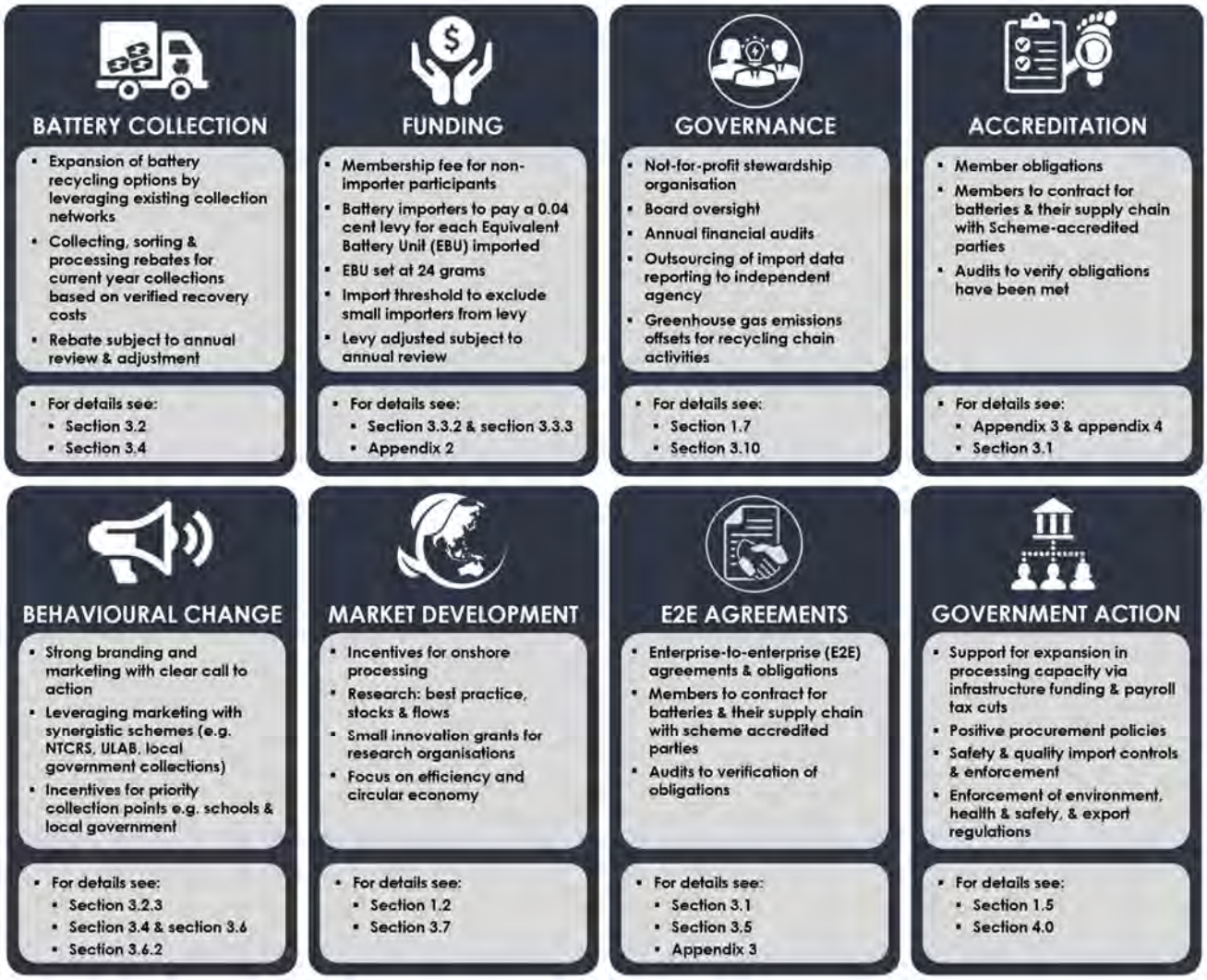
It is proposed that an industry-led stewardship scheme be established to enable responsible management of all types of used batteries. In 2014, it was estimated that Australia was generating 17,500 tonnes of waste batteries, or 700 million batteries based on an equivalent battery unit, and 97% were being inappropriately disposed of to landfill and impacting on the environment. Preliminary data from a new stocks and flows that is underway indicates that the total tonnage is now more than 19,000 tonnes of waste batteries, 800 million batteries based on an equivalent battery unit, with 10% collection rate.

Automotive lead acid batteries are exempted from the proposed Stewardship Scheme for Batteries (the Scheme) on the basis that there is an effective market already in place. The Scheme has been designed to enable inclusion of e-bike, electric vehicle and energy storage batteries; however, timing would be dependent on discussions with industry and government. Changes between Version 3 and this version have been documented in Section 1.2 and Briefing Note #7 which can be downloaded from the BSC website.

1.1 OVERVIEW OF THE SCHEME

Figure 1 provides a high-level overview of the approach taken. This should be read in conjunction with the related sections shown below and the table of contents, as there are important details associated with each element.

Figure 1. Core elements of the proposed Scheme



1.2 CHANGES SINCE VERSION 3

There have been a number of significant changes as a result of discussions and feedback from industry and member consultation. The following table is provided as a summary of the changes.

Figure 2. Changes since Version 3

Change	Section
▪ Clarification that the BSC will work with interested parties involved in the import of embedded batteries not covered by other schemes to identify the most appropriate solution. Options include that they be part of the National Television and Computer Recycling Scheme or inclusion in the BSC Scheme	**2.4**
Membership fee	**3.3.5**
▪ Clarified that importers will only be required to pay the levy and will not be required to pay a membership fee.	
▪ Removed the requirement for a government contribution fee. Government agencies may join as associate or financial members should they desire.	
▪ Removal of membership fee for collection points.	
▪ Clarification that franchise owners can either pay one fee (with one vote and a guarantee performance of their franchisees (BSC preference), or franchisees can choose to join on an individual basis, they would get a vote for per membership.	
▪ Clarification that a membership fee has been included to reflect the principles of shared responsibility and to facilitate the supply chain governance framework. To establish a Board with supply chain experience and knowledge.	
Levy	**3.3.2**
▪ Introduction of a net levy for companies who provide take back services for their products. In those cases, a net levy (levy less rebate for take back programs) would be calculated based on immediate past performance and other criteria. The scheme is designed to put downwards pressure on the 4 cents / EBU levy amount by providing industry certainty for investment and by encouraging innovation.	
▪ Inclusion of a provision to enable identification of the levy obligation at the beginning of the cycle, but with payments made monthly, quarterly, or annually to accommodate the sales regime of various importers.	
▪ Confirmation that the scheme design includes a commitment from members to pass on visibility of the levy to consumers.	
▪ Clarification that even with the import threshold, very small importers are not excluded from the scheme. The enterprise-to-enterprise commitments still apply and thus they could choose to join.	
▪ Confirmation that the levy will be subject to GST as it is a legal requirement in Australia.	
Rebate	**3.4**
▪ The proposed scheme will include four rebates levels. Metropolitan collections: $2.50, regional collections: $3.50, sorting: $1.00, and processing $1.00	
▪ It is proposed that initially, Tasmania, Western Australian and the Northern Territory will be eligible for regional rebates to overcome additional logistics costs.	
▪ Clarification that a collection point could access part of a rebate through their commercial arrangements with a collector who will be the primary recipient of the rebate.	
▪ Clarification that the rebate can only be paid once for a each battery.	
▪ Clarification that the rebate will only be available to accredited members who can demonstrate delivery to another accredited member (collector or recycler) prior to receiving a rebate.	

Change	Section
Rebate (continued)	**3.4**
▪ Confirmation that once the scheme is initiated, operational procedures will be developed to ensure there is no double counting and traceability is ensured.	
▪ Clarification that a local council could establish its own integrated recycling chain and work with its contractors to distribute the rebate; or contractors could apply directly for the rebate. This would be an either or scenario.	
▪ Clarification that BSC will work with each state jurisdiction to ensure that current arrangements can be transitioned to ensure the goals of the scheme and the needs of state governments are met. States will be able to access the rebate if that is desirable for them, or arrangements could be made with existing state contractors to ensure an equitable approach is found.	
▪ Clarification that a state government Household Chemical Collection (HCC) Program could be eligible for the rebate, so long as they joined the scheme as a member and met quality, health and safety, and traceability obligations are met.	
▪ It is proposed that the Scheme require that circuit boards in power tool batteries are either destroyed or treated in a manner that protects the importers intellectual property in the circuitry and prevents illegal reuse.	**3.3.2**
Container	**3.2.5**
▪ Clarification that use of a BSC container will not be a condition of participation but is offered as a stand-alone solution or may be used to complement any other approved collection box systems. Members may use their own systems if they have demonstrated that they meet the Australian Dangerous Goods Code requirements	
Performance measures	**3.7**
▪ BSC will develop performance measures and protocols for implementation.	
▪ It is the goal of the scheme to collect as many batteries as possible rather than set an arbitrary target.	
▪ Recyclers will be required to meet minimum diversion rate from landfill. The intention is for the diversion rate to be established at > 90% for most chemistries. It is recognised that the diversion rate may need to be lower for some problematic chemistries such as Nickel Cadmium batteries. The diversion rate will be set by the BSC Board based on chemistry and in consultation with industry.	
Audits	**3.8.3**
▪ Confirmation that the BSC will develop audit protocols and tools once the ACCC determination has been achieved. This will include traceability requirements to demonstrate the source of collections.	
▪ Confirmation that the BSC will conduct unannounced audits of the recycling chain.	

1.3 TRANSITIONAL ARRANGEMENTS

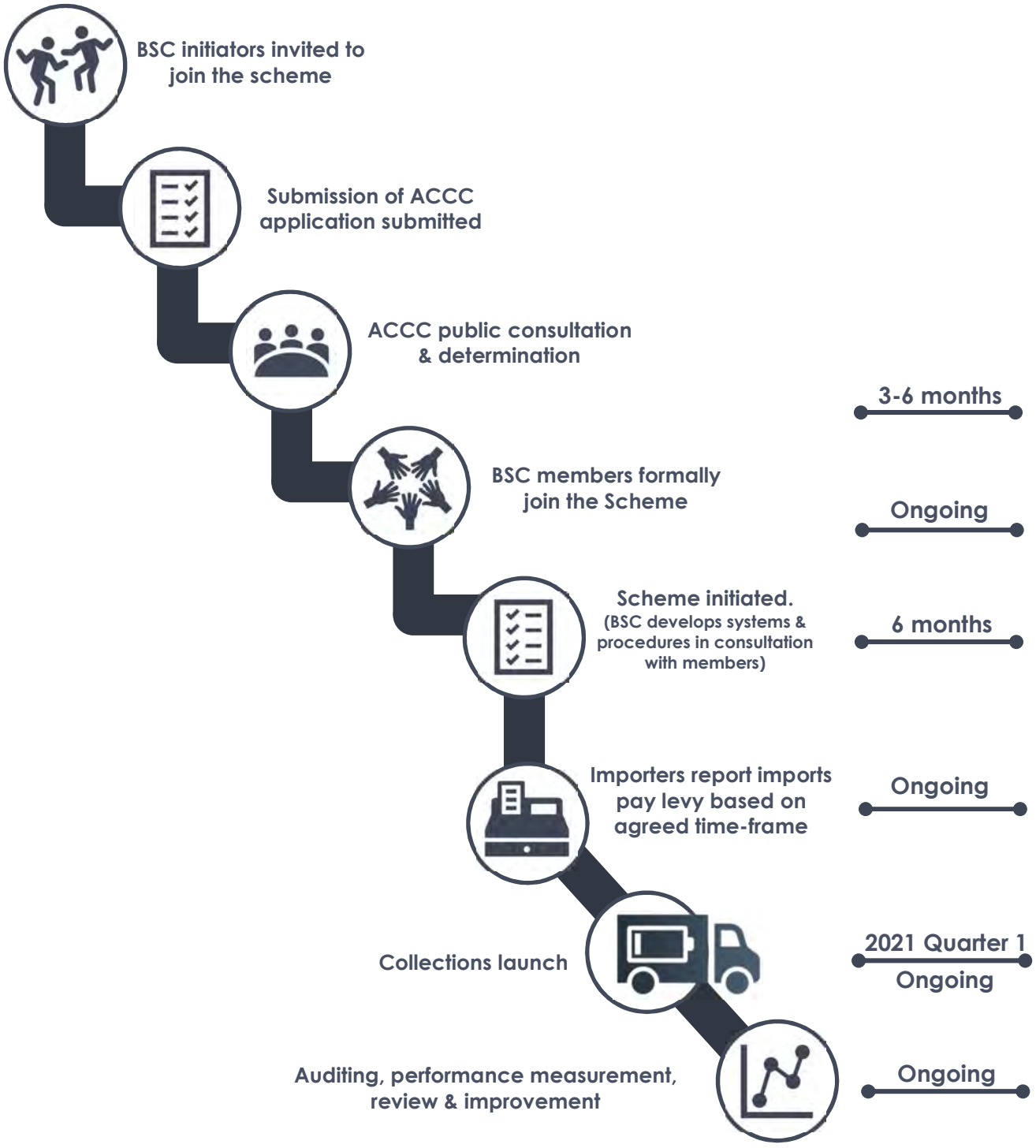
With the design phase of the proposed scheme now complete, the next step involves endorsement by members (initiators) and the application to the ACCC for the necessary authorisations for the levy and enterprise-to-enterprise agreements. In parallel with the ACCC process which is expected to take 3-6 months, work will commence on development of detailed operational procedures in consultation with members.

Subject to funding decisions, consultation will also continue with industry and government to resolve outstanding issues relating to the inclusion of energy storage, electric vehicle and embedded batteries in toys.

Once the ACCC authorisations are approved, it is proposed that there is a six-month commencement phase during which time companies that have a levy liability will be required to determine their levy obligation and pay a lesser amount to cover scheme costs in this period.

Payment of the full levy will be required as the rebate system begins after this initial six-month period. The operational systems and administrative arrangements will be completed during this transitional period and the accreditation and education elements will commence.

Figure 3. Pathway to deployment



1.4 SCHEME PRINCIPLES

Principle	Key Scheme Features
Shared Responsibility	▪ All organisations in the supply chain (manufacturers, importers, retailers, consumers, regulators, collectors, researchers & recyclers) have a contribution to make. ▪ Accredited members make commitments to meet the aim of the Scheme relevant to their place in the supply chain. ▪ Free riding is reduced through enterprise-to-enterprise agreements, brand marketing, transparency and harmonised regulation. ▪ Government support for expansion in processing capacity & best practice technologies, infrastructure funding & improved safety, quality, import controls & enforcement. ▪ Increased enforcement of environmental, health & safety, import & export regulations.
Improved Environmental Outcomes	▪ Eliminates batteries from landfill to avoid environmental and health impacts. ▪ Increases battery collection for recycling from the current low rate of 10%. ▪ Maximises resource recovery from waste batteries. ▪ Uses a leveraging collection model to reduce emissions.
Circular Economy	▪ Improves the economics of recycling batteries. ▪ Supports expansion of collection, sorting and processing capacity. ▪ Creates markets for materials derived from recycled batteries. ▪ Increased of battery materials availability for remanufacturer into batteries & other products. ▪ Facilitates positive procurement policies in industry & government.
Fair and Equitable Funding Model	▪ Levy to be imposed on imports up to $0.04[1]/Equivalent Battery Unit (EBU). ▪ Levy to be designed to cover costs with a suitable safety net. ▪ Levy to be subject to adjustment by the board based on annual review of costs. ▪ Equivalent Battery Unit to be set at 24 grams (approximately the size of a AA battery).
Increased Competition, Innovation, & Efficiency	▪ Leveraging model enabling existing well-established collection networks to access the rebate for collections and sorting. ▪ Continual improvement approach with the long-term goal of collecting all batteries available for collection. ▪ Research to support program development: best practice, innovation, stocks & flows. ▪ Addresses the known barriers to increased recovery of waste batteries using a rebate to offset market failures. ▪ Accredited members providing evidence of collections, sorting, processing, EH&S performance, downstream shipments and costs. ▪ Board to adjust the rate of rebate to meet cost recovery / safety net goal based on an annual review of costs.
Transparency & Accountability	▪ Good governance through a not-for-profit battery stewardship organisation with board oversight and annual financial audits. ▪ Annual performance measures established by the board in place of arbitrary targets. ▪ Effective program design based on cost, not profit. ▪ Outsourcing of import data reporting to independent agency. ▪ Verification and auditing of member commitments.
Focus on Behavioural Change	▪ Strong branding and marketing with a clear call to action. ▪ Incentives for priority collection points e.g. schools & local government. ▪ Leverage marketing with synergistic schemes.

[1] Based on previous research conducted by Pacific Environment

1.5 SCHEME OBJECTIVES

The objectives of the Scheme are to:

- increase resource recovery and recycling and minimise the environmental, health and safety impacts of end-of-life batteries in Australia
- achieve a net benefit for the broader recycling system by removing a potentially significant contaminant
- ensure that the whole supply chain participates in the stewardship of batteries in the Australian market
- develop an efficient and innovative domestic battery recycling industry
- create new job opportunities, including jobs with social outcomes
- foster a circular economy where batteries are recovered for recycling and reused to make batteries or other products.

The intention is to bring battery supply chain companies together to significantly reduce the volume of batteries going as waste to landfill by increasing collection and recycling rates and developing a domestic battery reprocessing capacity.

1.6 INDUSTRY ENGAGEMENT

The Scheme will engage the entire battery supply chain through:

- a levy on imported batteries which will be passed on to consumers in battery prices
- a membership fee for non-importing members
- accreditation and commitments from members specific to their role in the supply chain, e.g.:
  - appropriate labelling
  - recycle chain tracking transparency
  - environmental, health and safety and/or quality reporting
  - audits specific to an organisation's role in the supply chain
  - agreement to contract only with accredited members of the Scheme supply chain
- expansion of a domestic battery processing industry
- collaboration with relevant industry associations to access expertise
- promotion of the Scheme and the corporate responsibility of members.

Figure 4. Illustration of enterprise interactions

1.7 GOVERNMENT CONTRIBUTIONS

It is proposed that industry actions be complemented by actions from governments, including for example:

- providing support for infrastructure investment and other incentives for the establishment and/or expansion of domestic processing facilities
- harmonising storage and transport requirements for all batteries
- contributing to improved standards for transport and recycling
- import restrictions to ensure battery quality and safety
- regulatory enforcement actions
- ensuring the participation of government agencies in the Scheme
- assigning procurement priority to batteries from accredited members of the Scheme
- controlling and enforcing export restrictions to prevent illegal exports and to streamline the legal export permit process.

Recent government contributions to address barriers to battery stewardship

Government has recognised it has an important role to play in creating solutions to address this problem waste, including support for the development of an industry-led Scheme, as evidenced by:

- government funding from all state and federal environment departments for Scheme development and consultation
- government funding for infrastructure
  - $500,000 infrastructure grant for optical sorting machine in Victoria
- government funding for Innovation
  - $3,317,500 for a research hub to focus on small-scale processing of materials produced from waste batteries
  - $25,000,000 for a Future Battery Industries Cooperative Research Centre to address industry-identified gaps in the battery industries value chain. In addition, this CRC has commitments of $28 million in cash from industry and $82 million in kind from industry, government and research partners.

1.8 CONSUMER CONTRIBUTION

Consumers play a key role in battery stewardship and will continue to do so as the Scheme evolves. Consumer action could include:

- choosing product types and increasing demand for batteries containing recycled content & rechargeable batteries
- paying for products (the price of which will include the approved levy)
- safe storage of used batteries in the home
- demonstrating a preference for responsible management
- taking used batteries to Scheme collection points.

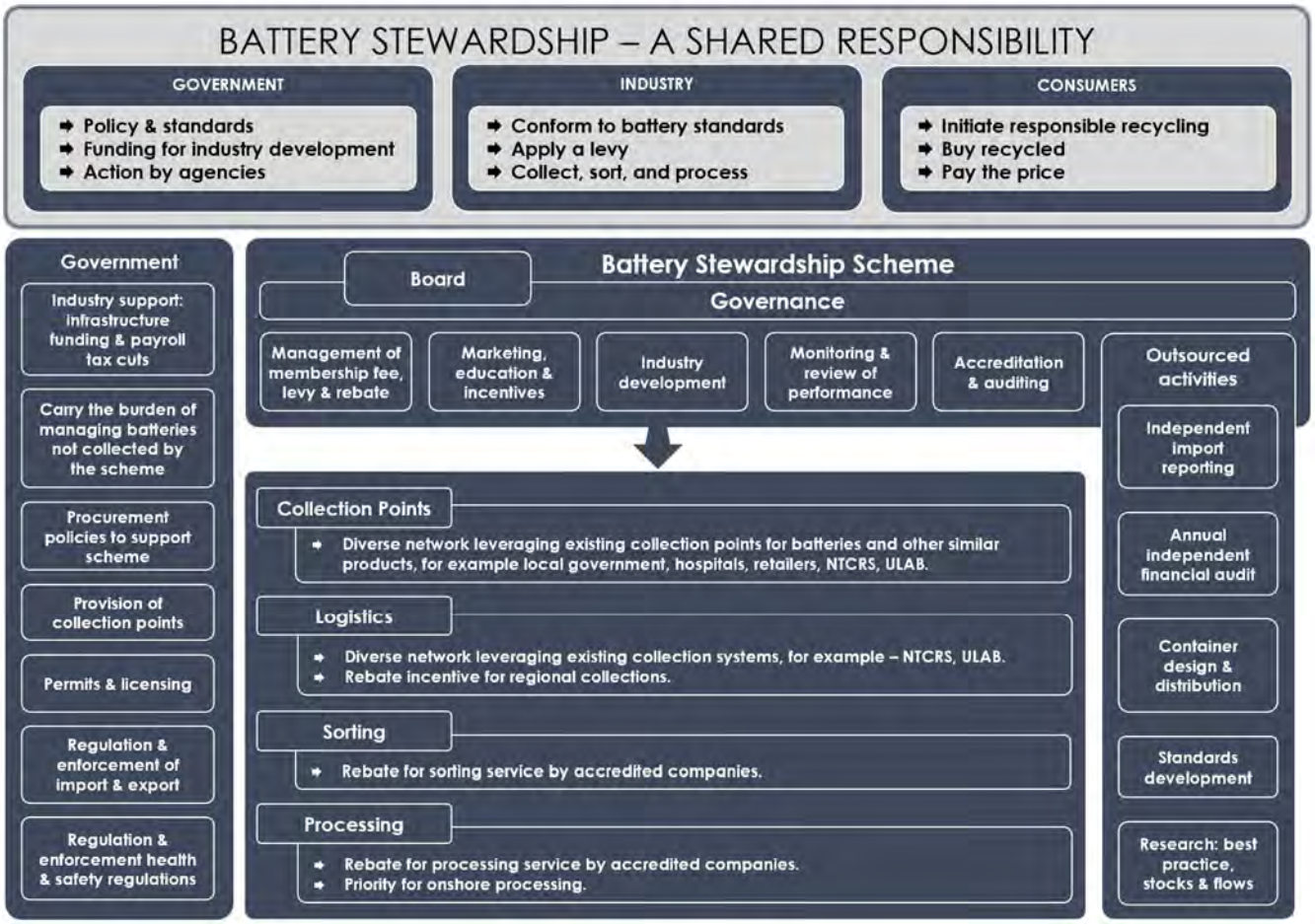
1.9 ESTABLISHMENT OF A BATTERY STEWARDSHIP ORGANISATION

It is proposed the Scheme be implemented by a not-for-profit battery stewardship organisation, the Battery Stewardship Council (BSC), which will be responsible for:

- setting the strategic direction for the Scheme
- setting Scheme performance indicators to ensure desired objectives are achieved
- oversight of accreditation and audit process
- branding, marketing and awareness
- education and incentives
- establishing quality and safety protocols for collection containers
- management of a proposed the levy with collection, sorting and processing undertaken by external organisations
- provision of rebates and other measures to address market failures
- leveraging and utilisation of existing battery collection and sorting schemes
- conducting regular reviews and adjusting the levy and rebate regime where necessary to ensure the cost effectiveness of the Scheme
- development of quality, environmental, and health and safety standards for the recycling chain.

1.10 SCHEME AT A GLANCE

Figure 5. Scheme overview



1.11 HISTORY OF BATTERY STEWARDSHIP

Over the past 7 years, government and industry have been working together to further the goal of implementing battery stewardship in Australia. The time for action has arrived. The Battery Stewardship Council has prepared a series of briefing notes to describe action to date, which can be downloaded from resources menu of the BSC website[2]. The Meeting of Environment Ministers (MEMs) has endorsed the development of an industry-led battery stewardship scheme (see the MEMs website[3] for history). In 2018 MEMs decided to broaden the scope of the Scheme to cover all batteries where a market failure is identified.

1.12 SCHEME OPTIONS

At the Battery Industry Briefing in February 2018, it was decided there were two viable options for the establishment of a battery stewardship scheme:

- inclusion of all batteries in the review of the National Television and Computer Recycling Scheme
- development of an industry-led scheme with ACCC authorisation.

Given the significant cost savings associated with taking an industry-led approach, the BSC leadership team decided to initially focus its efforts on the pursuit of an industry-led scheme authorised by the ACCC. Government has given a strong indication that it prefers an industry-led approach through its endorsement at the 2018 and 2019 Meetings of Environment Ministers.

1.13 BENEFITS OF AN ACCC-AUTHORISED SCHEME

ACCC-authorised schemes are unique to Australia and provide a leading tool for industry to meet community and government expectations for environmentally and socially responsible outcomes, and to demonstrate corporate leadership.

The authorisation enables industry to:

- obtain protection for activities that would otherwise be deemed anti-competitive if they are demonstrated to be for public benefit or to avoid public detriment
- reduce free riding by enabling enterprise-to-enterprise contracting for the supply of battery goods and services
- create the ability to pass on the cost of a levy to consumers
- reduce the need for a regulated battery stewardship scheme, resulting in significantly lower levy rates and reporting and compliance costs
- enable greater flexibility to adjust direction according to market imperatives and performance outcomes.

It is important to note that the Scheme operations are not regulated by the ACCC. The ACCC regulates those activities related to anti-competitive behaviours i.e. the levy and adherence to the enterprise-to-enterprise agreements.

ACCC-authorised schemes are also eligible to apply to be recognised as industry-led schemes under the Product Stewardship Act, 2011.

2 www.bsc.org.au
3 http://environment.gov.au/about-us/mem

2 PROPOSED SCOPE OF THE SCHEME TO ADDRESS MARKET FAILURES

There is a diverse range of battery chemistries (APPENDIX 5) and applications (see Figure 1) used in today's energy intensive world, and each type has differing environmental and health impacts if not recycled or disposed of in a proper manner.

Governments have decided that all battery chemistry types be included in the scope of the Scheme, except automotive lead acid batteries as a viable market already exists for their waste products.

Figure 6. Battery applications

It is intended to provide a system-wide solution while recognising that additional battery types may be added in the future. The intention is to enable practical integration with existing and emerging stewardship schemes for related products such as mobile phones, computers, televisions, energy storage and electric vehicles.

2.1 GOVERNMENT SUPPORT FOR BATTERY STEWARDSHIP

Governments have indicated that the landfill option for e-waste is no longer acceptable and they are taking steps to ban e-waste, including batteries, from disposal in landfill. Victoria was the first jurisdiction to announce such a regulatory ban covering all batteries, and others are expected to follow.

Without swift action to establish an industry-led scheme for all batteries, the trend toward a fragmented system of state-based approaches will continue. The result will be higher costs, market confusion and increased reporting and compliance requirements.

The reasons for the increased attention by state and Commonwealth agencies include:

- the projected rapid increase in this problematic waste stream
- the fact that local security of waste management services has become front-of-mind due to the recent constraints on the export of waste plastic and a recognition that transporting batteries overseas for disposal or processing presents a risk for insurance companies
- Federal government move to ban export of waste from Australia by 2030
- emerging state policies and regulations aimed at stewardship, the elimination of recyclable resources going to landfill, and the promotion of a circular economy (i.e. batteries components are fully recyclable into new batteries or other products)
- health and environment impacts (varies by battery chemistry) (see APPENDIX 1)
- experience of existing collection systems which indicates Australian consumers are unlikely to separate batteries by type and arrange disposal in different ways
- a recognition that current collection systems are ad hoc and have limited impact on collection rates. The cost of such schemes is being borne by socially responsible companies, private organisations and government agencies.

2.2 AUTOMOTIVE LEAD ACID BATTERIES EXCLUDED FROM CURRENT SCOPE

Used lead acid batteries (ULABs) have not been included in the Scheme scope at this time as there is currently no market failure for these batteries. Commodity prices are such that collection and recycling of ULAB batteries are near universal in Australia. This market provides an excellent circular economy success story, as much of the lead recovered is used in the manufacture of automotive batteries in Australia and overseas. The Scheme design allows for this exclusion to change if the market fails at any time in the future due to a downturn in commodity prices or other factors.

2.3 ALL HANDHELD BATTERIES IN SCOPE

Following extensive BSC consultation and the decision of the Meeting of Environment Ministers, the scope of the proposed Scheme includes all batteries subject to market failure and excludes embedded batteries covered by other schemes. Reasons for this include:

- near universal feedback in support of a broad scope, particularly as current battery collection programs accept all battery chemistries
- the banning in some jurisdictions of batteries (and other e-waste) from landfill
- insights from Europe indicating the collection of mixed batteries reduces fire risk, while consolidation of more flammable chemistries poses greater risk
- local and state governments' strong support for a system-wide solution to battery waste,
- the importance of shared responsibility for a growing waste stream
- independent evidence that the inclusion of all batteries in the scope will avoid negative impacts to human health and the environment
- the reduction in greenhouse gas emissions due to the proposed leveraging model and the decision to offset remaining greenhouse gas emissions
- the significant cost associated with managing contamination from out-of-scope batteries if a limited scope were to be adopted
- the crucial need for straightforward and simple messaging to empower the community to embrace the Scheme and achieve rapid increase in recovery rates
- the fact that consumers do not distinguish between different battery chemistries and are not knowledgeable about how to separate batteries by chemistry.

2.4 EMBEDDED BATTERIES

Embedded batteries fall into two categories, as shown in the table below:

Type	Approach
Batteries embedded in products subject to an existing stewardship scheme (e.g. MobileMuster or the National Television & Computer Recycling Scheme).	▪ Procedures will be established to clarify reporting protocols so that collection, sorting and recovery rates can be tracked. ▪ Liable parties will not be subjected to double payment for batteries collected.
Batteries embedded in products that are not subject to an existing scheme, e.g. toys and appliances.	▪ Work with industry to determine the most appropriate scheme for these products, e.g. NTCRS or BSC. ▪ Importers of these products could be invited to join the Scheme. ▪ The levy and rebate could apply only to the batteries contained in the product. ▪ Providers of collection, sorting and recycling services could be required to accept or reject the product based on their own commercial decisions as they do now for related schemes, for example the NTCRS.

2.5 ENERGY STORAGE AND ELECTRIC VEHICLE BATTERIES

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 proposed 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. Discussions have been initiated with the Clean Energy Council and the Electric Vehicle Council to ground truth the current Scheme to determine any adjustments needed to ensure an efficient and effective integration.

2.6 ONLINE SALES

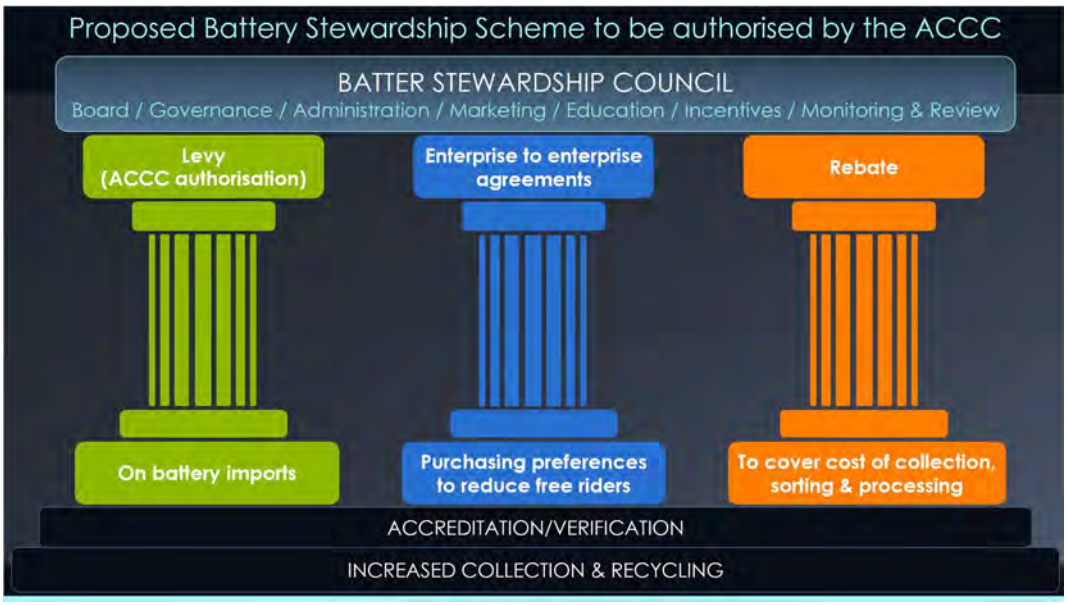
The intention is for online sales to be included in the Scheme, however many small sales would most likely fall below the proposed import threshold for the levy. It is recognised that there is a risk in this area of large volumes of one-off purchases impacting the stewardship arrangements. This is a rapidly evolving issue for many products, and methods available to identify and capture such small-scale imports have yet to be identified.

It is proposed that a working group be established with relevant government departments and other industry sectors that are also seeking to ensure responsible importation of products via online sales. The goal will be to determine mechanisms that can be used to capture such sales.

3 CHARACTERISTICS OF THE SCHEME OPERATIONS

The purpose of this section is to outline the proposed design of the Scheme operations. It is important to realise that operational details will be developed once the Scheme is initiated. The figure below provides an overview of the foundations of the Scheme design.

Figure 7. Essential foundations



3.1 SUPPLY CHAIN ACCREDITATION AND COMMITMENTS

An important mechanism for engaging the resources and willingness of battery supply chain companies for focused action to increase the recycling rate of batteries is a system of accreditation which includes commitments to actions. A summary of Scheme obligations is provided in the figure below and they are described in detail in APPENDIX 3 and APPENDIX 4.

Figure 8. Summary of Scheme obligations

Under this Scheme, accreditation is designed to be a simple process whereby the CEO or authorised officer of a company commits to a course of action relevant to their position in the supply chain.

To obtain accreditation, each company will be required to make a series of general commitments relevant to all supply chain participants (see APPENDIX 3) and a number of specific commitments relevant to the particular role it has in the supply chain, depending on whether it is a government agency, supplier, retailer, collector or processor (see APPENDIX 4).

These commitments may be given effect through action already underway or through the development of an annual action plan identifying three or four specific actions that the company proposes to undertake.

A key commitment which requires ACCC authorisation is the use of enterprise-to-enterprise contracting for the supply of battery-related goods and services. This commits parties to only contracting with other accredited parties and is intended to provide purchasing preferences to encourage participation in the Scheme and remove market opportunity for companies to free-ride on other participants.

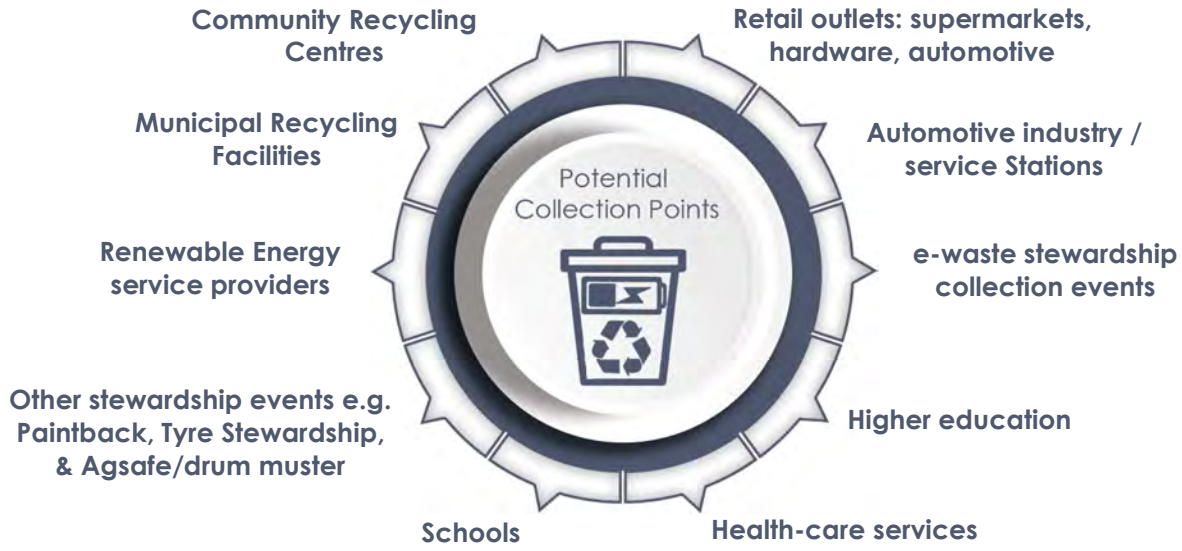
3.2 ADDRESSING MARKET FAILURE IN BATTERY RECYCLING

As a result of the consultation process, the Battery Stewardship Council has determined that a current market failure exists around the collection, sorting and processing of batteries with the exception of used lead acid batteries. The following sections describe how this market failure will be addressed.

3.2.1 Expansion of the collection point network

It is proposed that collection be dramatically expanded by leveraging existing collection points and incentivising new entrants into the market. Examples of potential collection points are shown in the figure below.

Figure 9. Potential collection points



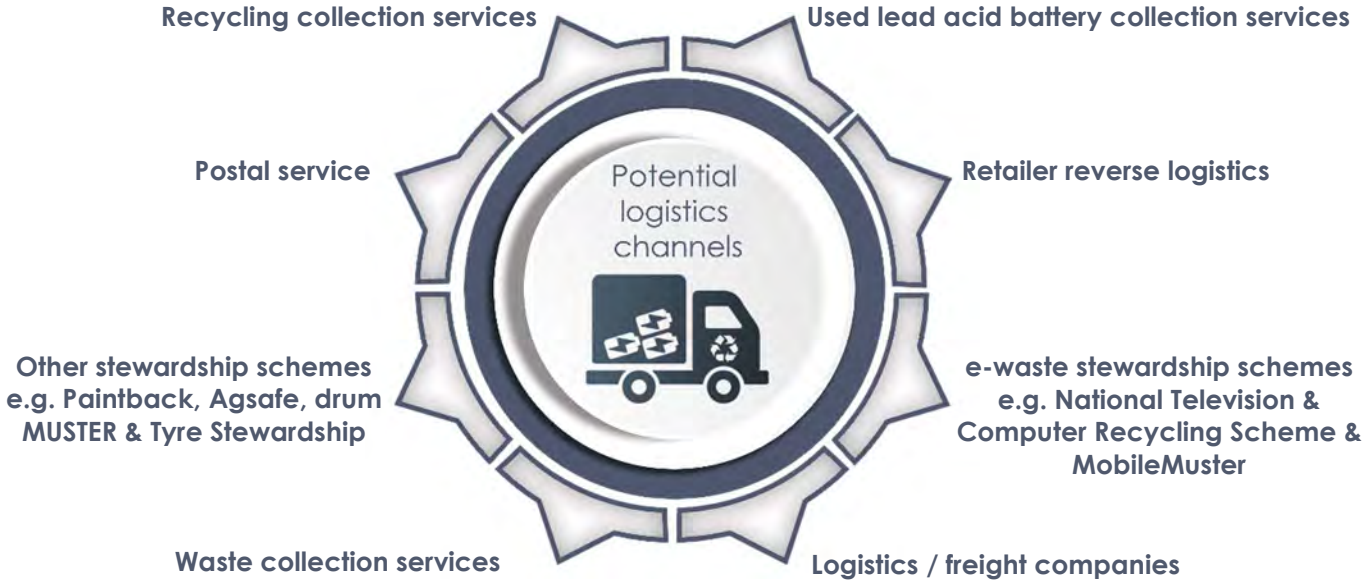
3.2.2 Leveraging existing logistics channels

Rather than establishing a new collection arrangement, it is proposed to stimulate growth by leveraging existing collection channels and to encourage new entrants into the market as illustrated below. This will be done using a rebate to offset the costs associated with collection, sorting and processing until such time as the volumes of batteries being collected improve the economics of battery recycling. The collection rebate will only be available to organisations that can demonstrate that the recycling chain has been completed.

Figure 10. Examples of collection channels in the proposed leveraging model

The Institute for Sustainable Futures was commissioned to conduct a study of the range of collection channels that would be available to support battery stewardship. This work has formed the basis of Scheme design to establish an equitable network with regional access. The figure below shows networks that could be leveraged.

Figure 11. Potential logistics networks



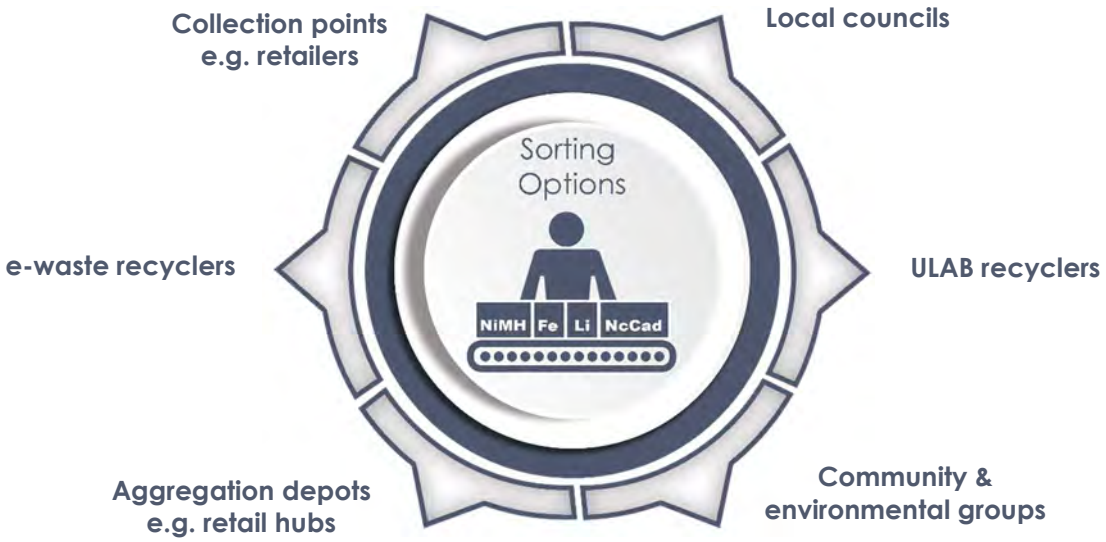
It is proposed that reporting protocols be established with partnering schemes to avoid duplication and double counting and to ensure supply chain transparency. Given the diverse nature of potential collection channels and the competition for marketing space in stores, consideration may be given to providing incentives to retail collection points, for example service station shopfronts.

3.2.3 Facilitating sorting by chemistry

To improve the efficiency of processing, a rebate will be made available to facilitate the sorting of batteries by chemistry. The sorting rebate will only be available to organisations that can demonstrate that the recycling chain has been completed by passing on sorted batteries to accredited processors.

The figure below identifies some potential options; however, it is envisaged that the sorting rebate will encourage new entrants or the development of a vertically integrated recycling chain. This will see enterprise-to-enterprise agreements being used to streamline arrangements between collection points, logistics providers, sorters and processors. Stakeholder input has indicated that this vertical integration can provide an important incentive for collection point participation.

Figure 12. Sorting options



3.2.4 Improving the economics and innovation in the processing sector

In recent years, the pricing of commodities has changed such that the economics of processing has become marginal and varies by chemistry type. Consultation with industry has determined that a processing rebate is needed to ensure that batteries with difficult chemistries are not stockpiled or dumped. While a processing rebate was not proposed in the initial design of the Scheme, the subsequent consultation established a clear need for rebate support until such time as battery volumes collected begin to positively impact the economies of scale.

Although the emphasis of this Scheme is on building a domestic recycling industry, it is recognised that it may be necessary for the continuation of some export for recycling as an interim measure. Governments and industry in Australia are investing in significant innovation activities through research funding with the aim of facilitating a viable circular economy for batteries within Australia (see Section 4).

3.2.5 Collection containers

To ensure quality, safety and brand recognition, it is proposed that appropriate container systems be deployed. Members may use their own bins provided they meet Scheme standards and transport compliance requirements. It is also envisaged that the BSC could work with industry partners to establish a recognisable system of containers that meets designated environmental, health and safety standards.

The benefit of using Scheme containers is that it will provide a very public promotional opportunity and create important visibility for the Scheme and its partners. This system may include a simple bin system or a more complex system involving a display indicating when the bin is full and digital communication to the collector.

3.3 SCHEME FUNDING

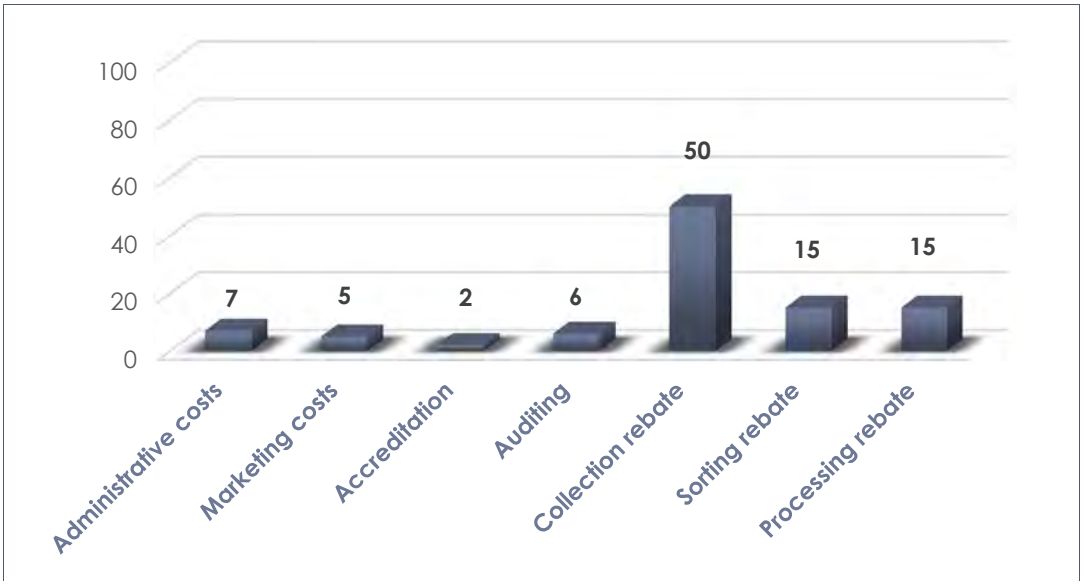
3.3.1 Projected budget

Based on the independent research and BSC consultation with industry to identify the costs associated with the scheme, it is proposed that the initial rate of the levy be set at 4 cents per EBU. Assuming that initial support for the Scheme in the first year of full operation will be at 75% of the total of 17,500[4] tonnes of handheld batteries currently coming into the Australian market, the levy would raise $22,000,000 annually. This would enable the establishment of the infrastructure and collateral required for successful Scheme deployment. The levy amount would be monitored and reviewed annually by the Board and adjusted as necessary to ensure that the commitment to cost recovery is maintained.

It is proposed that a transition arrangement for the levy will be put in place for the first year to manage the start-up process.

Based on stakeholder input and economic modelling, it is anticipated that ongoing expenditure will be allocated in the following manner.

Figure 13. Indicative full year expenditure (%)



3.3.2 Levy

To fund the stewardship Scheme, it is proposed that an annual levy be imposed on all imports of batteries included in the Scheme scope. It is intended that subject to ACCC authorisation, the levy would be passed through the supply chain to the consumer in a transparent manner as a visible fee. This methodology is consistent with other stewardship schemes and would be applicable whether a scheme was industry-led or regulated.

[4] SRU (2014) "Stocks & Flows of Handheld Batteries"

Basis of levy calculation

As the type and size of batteries vary, the key challenge when determining the nature and rate of a levy is to establish a common metric that enables the objective to be met while remaining fair and equitable to the companies that contribute. The most common metric in use in the battery industry is weight, as it is used for imports, collection, transport and recycling.

It is therefore proposed to establish a new metric based on the weight of batteries for use in this Scheme – an Equivalent Battery Unit (EBU) – which provides a consistent standard against which all batteries can be compared. The basis of the EBU is described in detail below.

The EBU calculation applies to loose batteries or batteries contained within battery packs or products. EBU calculations exclude plastic casings and circuitry. Processing of plastic casings and circuitry remains a contractual matter between the collector and the service providers.

An issue which arose during consultation was the treatment of circuit boards collected as part of a battery recycling scheme. It is proposed that the Scheme require that these circuit boards are either destroyed or treated in a manner that protects the intellectual property in the circuitry and prevents illegal reuse.

Impact of levy on member company cash flow

As a result of consultations, it is proposed that two measures be implemented to assist member companies in meeting their levy obligations:

- enabling those levy paying members that offer battery take-back schemes to pay a net levy (i.e. levy minus rebate) subject to the provision of documentary evidence of collection and recovery rates, and downstream transparency and due diligence
- a quarterly payment regime subject to the identification of the company's annual obligation at the beginning of the period.

The proposed Equivalent Battery Unit (EBU)

It is proposed that the EBU be set at 24 grams or any multiple of that depending on whether the battery cell is larger or smaller than the EBU.

The EBU of 24 gm provides the basis for the levy.

For example, a AA rechargeable battery typically weights 24 grams, while a typical AAA alkaline battery weighs 14 grams. This essentially means that a AAA alkaline battery weighing 14 grams would be subject to a levy of approximately 2 cents.

The figure below shows some examples of battery weights and APPENDIX 2 provides a preliminary sampling of battery weights and their corresponding EBUs. The actual levy would depend on the weight of the specific battery being imported.

Figure 14. Indicate levy weights

Battery	Average weight	Example EBU	Indicative levy
AAA Alkaline	10	.44	$0.02
AA Alkaline	23	.97	$0.04
AA Rechargeable	24	1	$0.04
9V Alkaline	42	1.8	$0.07
C	64	2.7	$0.11
D	113	4.7	$0.19
Button cell	2	.1	$0.00
Lantern 6V	574	24.1	$0.96
Power tool	741	31.2	$1.25
Mobile phone battery	60	2.5	$0.10
Laptop/tablet battery	343	14.4	$0.58
Light industrial battery	361	15.2	$0.61
e-Bike	2769	116.5	$4.66

The use of an EBU will reduce the complexity and cost of Scheme implementation, ultimately leading to lower levies overall. This will enable companies with a levy obligation to assess their liability against a standard unit.

It is anticipated that further analysis could be conducted to establish standard EBUs for specialty products with embedded batteries such as toys. It also allows maximum industry control with lowest cost compliance reporting while at the same time allowing industry to maintain control and influence on the effectiveness and direction of the Scheme.

A comparison chart with the EBU equivalent for each battery type is included in APPENDIX 2 to assist importers to estimate their potential liability in a given year.

3.3.3 Overlap with related stewardship schemes

Liable parties will not be required to pay a second time for batteries collected by other schemes. It is proposed that the levy allocation method be carefully designed to reflect the reality that there are related stewardship schemes that currently include batteries in their scope. Many batteries are imported within products (televisions, computers phones, toys etc.) and these may be covered under the current or perhaps an expanded scope of the National Television and Computer Recycling Scheme.

It is proposed that guidelines be developed to ensure quality, health, safety and downstream due diligence requirements of the Scheme are met while at the same time avoiding double-charging with a levy.

3.3.4 Import threshold

Although all batteries (except automotive lead acid) are within the scope of the Scheme, it is proposed that a threshold be established to exclude very small importers from levy obligations as the administrative cost of pursuing these entities could significantly outweigh any levy revenue. Such entities would, however, not be excluded from participating in the Scheme if they chose to do so.

It would be a mistake to assume that very small players would not wish to join the Scheme as many companies, retailers in particular, may want to demonstrate to their commitment to sustainability and environmental protection to customers.

An initial import threshold of 1000 EBU/annum is proposed. The threshold would be established based on an understanding of the market and kept under review.

3.3.5 Membership fee

Although it is intended that the costs of the Scheme will be met through the levy, a membership fee for non-levy paying members is proposed to provide:

- an equitable funding arrangement given the range of participating organisations
- eligibility of members for voting rights for BSC Ltd.

While the Board will determine the quantum of the membership fee, it is proposed that for non-levy paying members and contributors the membership fee initially be established at $1,000 per annum.

In addition to financial membership, it is proposed to establish a category of Associate Member with no fee and no voting right to enable BSC Ltd to engage with a broad base from industry as well as the community and research and government organisations.

3.3.6 Annual review and adjustment

It is proposed to review the levy annually and make adjustments as needed to ensure the program is operating on a cost-recovery basis. Changes will only be introduced after appropriate consultation with the membership of BSC and ACCC.

3.4 REBATE TO ADDRESS MARKET FAILURE

Currently, the most significant barrier to an effective battery recycling regime is overcoming the cost of the collection and sorting of batteries. The market failure restricting recovery of batteries occurs in the collection, sorting and processing stages to varying degrees. The board of the BSC will closely monitor rebate implementation to ensure it is meeting the objective of addressing the market failure.

Although it is recognised that there may be several entities involved in the recycling chain, the rebates allocated for collection, sorting and processing will only be paid once for each battery.

3.4.1 Basis of the rebate

Following extensive consultation on the best way to address the market failure associated with battery recycling, it is proposed to use most of the revenue from the levy to provide a rebate to reduce the costs associated with collection, sorting and processing. Initially, the rate of the rebate will be as follows.

Figure 15. Proposed initial rebate

Collection in metropolitan areas	$2.50/kg
Collection in regional / remote areas	$3.50/kg
Sorting	$1.00/kg
Processing	$1.00/kg

The rebate will not be used to collect or sort existing stockpiles. Members will be required to demonstrate that batteries were collected or sorted in the specified time period. It is proposed that excess revenue would be held to meet future program costs, and that they be taken into account in the annual review of costs of the Scheme, including adjustment in the rate of the levy as appropriate.

3.4.2 Reasonable access

The metropolitan/regional differential in the rebate is intended to provide for reasonable access to battery recycling opportunities. It is recognised that current collection points located away from the east coast are disadvantaged due to their being further away from logistics networks and processing facilities, thus requiring very long and / or expensive logistics chains. To further support reasonable access, it is proposed that initially Tasmania, the Northern Territory and Western Australia be eligible for the regional collection rebate of $3.50/kg. This will be reviewed on an annual basis to ensure equity and access objectives are being met.

3.4.3 Tracking and reporting by rebate recipients

To access rebates, recipients will be required to provide evidence to verify:

- that collected batteries have been passed on to an accredited participant in the Scheme
- conformity with other Scheme requirements including:
  - environmental, health and safety controls and legal compliance
  - the costs of the service
  - the tracking of shipments
  - a performance measure appropriate to each category of rebate.

This information will provide an important element in the annual reviews to ensure the Scheme is operating in a cost-effective manner and meeting its objectives. It will also indicate whether adjustments are required for the levy.

3.4.4 The collection dilemma

The Australian battery market is small by international standards and the distributed geographic nature of the market serves to reinforce the high cost of collection systems. This cost is high in any event because of the relatively low volumes, the small size of products and the lack of a market signal or incentive to collect on a large scale.

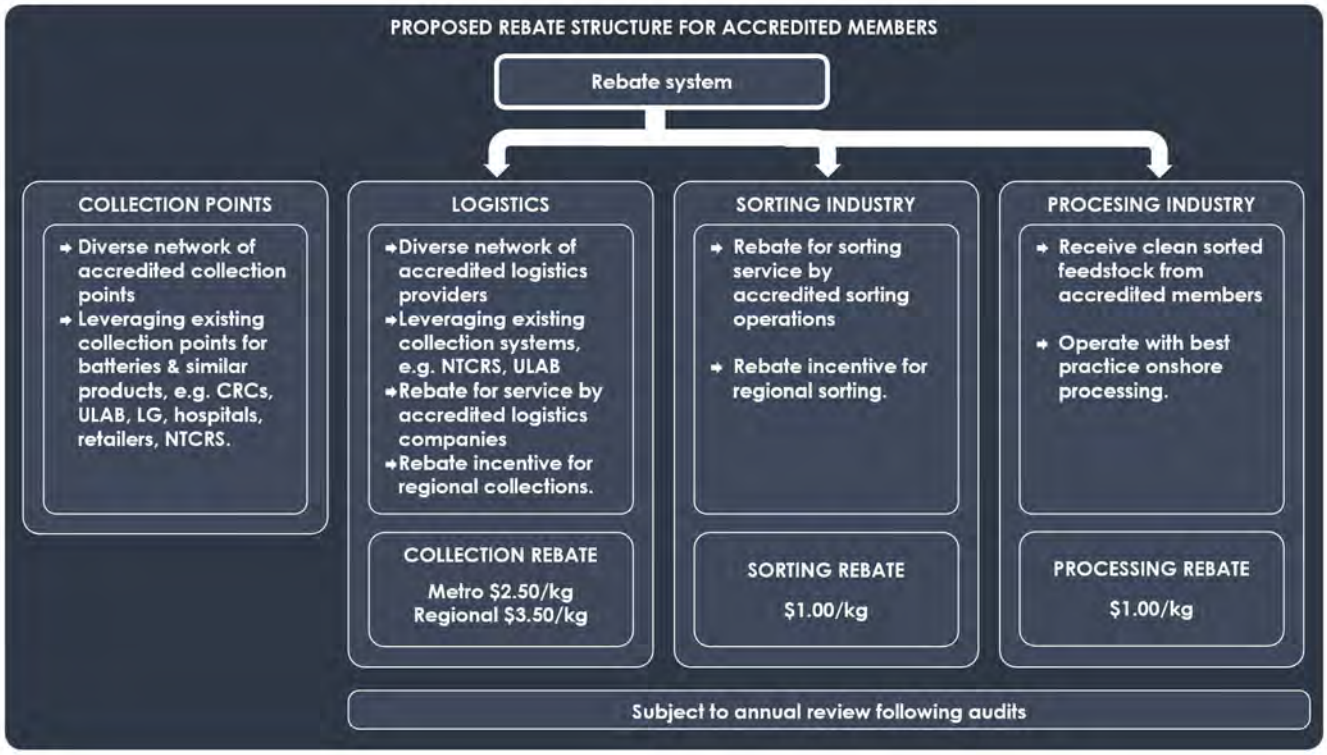
A collection rebate is proposed to address this key barrier. Most of the funds from the levy on imports will go to paying the collection rebate. A system of rebates based on actual cost of collection will enable support to be provided to organisations that currently have systems they wish to expand as well as providing an incentive for new entrants.

By providing a market signal to encourage the growth of an industry, this approach shifts the burden from the administering organisation to the market to fill the gap in the national system and it avoids the need for an alternative system to be established at cost to the Scheme.

3.4.5 Rebates to facilitate cost-effective collection

Accredited members will be eligible to receive a rebate based on actual and verifiable costs submitted by the service providers. The initial rebate has been set at a level below current programmatic costs (which are based on a 3% collection rate) to recognise the cost reductions associated with economies of scale. This will be reviewed on a annual basis to maintain the focus on cost recovery.

Figure 16. Proposed rebate structure



The Scheme will recognise existing collection arrangements between some retailers and processors without an intermediate collector or sorter (e.g. some power tool companies). These arrangements would be eligible for a rebate if they conform to Scheme accreditation requirements.

3.4.6 Applying sorting rebates to facilitate cost-effective processing

Based on current experience with battery collection initiatives, consumers are not able to make the appropriate decisions on battery type and separate batteries into different streams at the point of collection. In any event, few collection points offer a facility to sort by chemistry type.

The result is that batteries arrive as a mixture of chemistry types at processing facilities and need to be sorted into separate streams of clean feedstock for the processing stage. One of the most expensive aspects of an effective battery recycling scheme is the need to sort batteries by chemistry in order to ensure safe and economic processing at the final stage.

This sorting, which is currently done with manual labour in Australia, is necessary to reduce the cross contamination of commodities arising from the processing. By facilitating sorting of different chemistries, processing costs will reduce, and the resulting cleaner materials have a higher value in in the market. This will assist in reducing the cost of the scheme over time.

It is recognised that there is a significant potential for reducing the costs of sorting and thus the scale of the rebate as a result of new technology and importer support for improving the identification of chemistries.

3.4.7 Applying processing rebates to support cost-effective processing of all chemistries

Processing costs vary depending on chemistry, size, regulatory requirements, toxicity, flammability, commodity pricing and availability of domestic processing facilities. A key objective of the Scheme is to enable a growth in battery recycling and to ensure that all batteries collected can be responsibly processed.

A rebate is necessary to cover current costs that are over and above the revenue received from the value of the commodity on the open market.

While the initial rebate for processing is proposed as a flat rate for simplicity purposes, this will be monitored closely to ensure that the variation in processing costs between chemistries is not distorting the processing market or creating an uneven playing field. Adjustments in the structure of the processing rebate may therefore be necessary in the future.

3.4.8 Availability of rebate for existing stewardship schemes

Existing collection programs provided by stewardship schemes, such as MobileMuster or the NTCRS, will be eligible for rebates in order to facilitate rapid expansion of the collection network. Such programs collectively have a national footprint involving thousands of collection points. They include stewardship arrangements (e.g. MobileMuster, NTCRS), and collection programs offered by brands, large retail chains, ULAB collections and local government resource recovery sites. Such schemes and programs could become accredited under the Battery Stewardship Scheme and would then be eligible to receive the rebate for batteries not covered within the scope of their own scheme.

As the cost of collecting batteries included in existing e-waste is already covered in some of these schemes, it will be necessary to develop arrangements which prevent double counting through the use of contracts and a system of audits.

Some battery chemistries may be exempt from the Scheme if the market is providing a viable recycling outcome. It is proposed that used lead acid batteries from the automotive sector will be exempt from the Scheme as approximately 97% of all used lead acid batteries are currently being diverted from landfill in Australia due to the value of the commodity.

However, this will be kept under review and such exemptions may be lifted if, for example, domestic recycling operations fail, or if export options are no longer available.

3.4.9 Audit of member commitments

To be effective, any stewardship scheme requires a regime for data collection, monitoring, auditing and review by the administering organisation. The audit function is a fundamental element of this system because it provides an incentive for all participants to meet their commitments and provides independently verified data to assist in the monitoring and continual improvement of the Scheme.

It is proposed that a regime of independent audits be established to ensure accredited parties comply with the commitments they have made, and that their activities continue to support the objectives of the Scheme.

An annual audit plan will be developed by the administering organisation. It is proposed that the audit regime include annual audits for parties with a levy contribution obligation or facilities physically handling batteries. In addition, tactical and unannounced audits will be conducted, particularly where information indicates potential non-compliance.

Subject to appropriate governance controls, audit reports would be made available to the board of the administering organisation to assist with annual reviews of the Scheme.

3.5 MARKETING AND EDUCATION

It will be essential that consumers be made aware of:

- the Scheme brand
- drop-off options in their area
- the importance of battery recycling.

In its initial period, the BSC will promote the Scheme to the battery industry and the public to increase awareness of the impacts of end-of-life battery disposal and encourage participation in the Scheme.

Addressing current lack of awareness

For most consumers, batteries represent a throw-away commodity. Current collection projects that rely on consumers making decisions on either where to take batteries for recycling or how to separate battery chemistry types are failing to achieve either of these objectives.

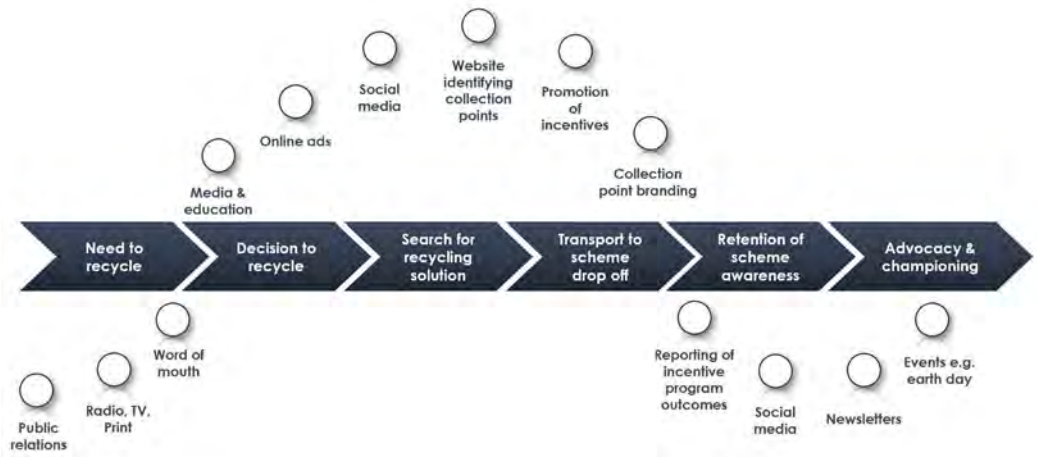
Batteries that are placed in local government waste or recycling collection systems generally end up as landfill.

Batteries that are collected through related e-waste schemes (TVs and computers, mobile phones) end up being recycled in Australia or offshore but this represents a very small proportion of batteries in the marketplace.

3.5.1 Branding and marketing strategy

A branding and marketing strategy will be developed and implemented. The figure below provides an indicative pathway to broad Scheme awareness, with the ultimate goal of empowering community advocates and champions to support expansion of the Scheme.

Figure 17. Indicative pathway for broad Scheme awareness



This will include a website that will include a list accredited members, information on the benefits of the Scheme and an easy and accessible on-line accreditation and reporting portal.

Given the importance of scaling up the Scheme quickly and the need for ownership by participating members, it is proposed that co-branding of marketing materials and containers be implemented. This will maximise exposure to the program while at the same time ensuring members see value for their own brand and operations.

An education program will be designed to improve consumer decision-making and to provide retailers and other collection organisations with the necessary information on how to correctly recycle batteries. Awareness of the stewardship scheme and the opportunities that it provides for companies in the supply chain will be one of the keys to ensuring its success. Awareness will not only enable members to be more effective in their business; it will also reduce the potential for free riding that arises through lack of knowledge of the opportunity.

3.5.2 School education and incentives

An education program would be created to inform students and the community about batteries in general, but also of the risks and benefits of recycling batteries. It is anticipated that these efforts will leverage existing state-based education programs.

It is proposed that the education program be linked to an incentive program where schools that participate in battery collections could receive credits toward educational materials and possible other infrastructure, such as learning labs or energy storage units.

This method has been used extremely effectively in other jurisdictions and it has equipped students with the knowledge needed to manage risks associated with battery collection and storage. This process has also been shown to encourage significant returns of batteries into the Scheme's collections.

There is a significant opportunity to improve community awareness of battery safety and responsible disposal by engaging schools in the collection process. This will be carefully crafted to provide a safe collection regime.

3.6 MARKET RESEARCH AND DEVELOPMENT

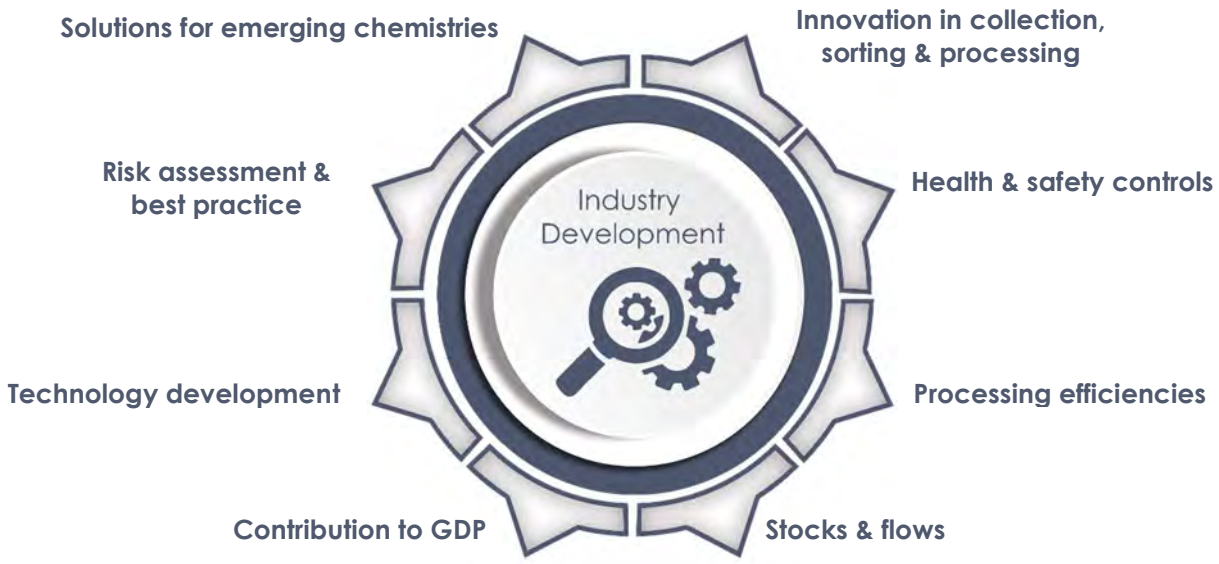
It is proposed that market research and development activities, such as those shown in the figure below, be undertaken to support successful implementation and to evaluate performance on a broad level, as shown in the figure.

These industry development activities will be important to foster innovation and efficiencies, but more importantly to facilitate the rapid scaling up of infrastructure necessary to significantly increase the recycling rate for handheld batteries from 3%, and to facilitate a higher proportion of onshore processing.

It is proposed that work be done to establish best practices, understand stocks and flows, and foster innovation. This will include small innovation grants for industry or universities to focus on innovation and efficiency in priority areas such as collection, sorting and processing.

0 provides some examples of the types of market research and development projects that would be undertaken to ensure that the objectives of the Scheme are met.

Figure 18. Examples of market research and development projects



3.6.1 Current challenges faced by the recycling sector

Offshore processing presents several challenges including:

- the high cost of transport, export licenses and insurance
- a cumbersome process that means permits must be renewed on an annual basis
- environmental, health and safety impacts of transport, sorting and processing
- exposing the Australian market to vulnerabilities associated with changes in risk mitigation by insurance companies (particularly with Lithium batteries which have a higher rate of catching on fire)
- the changing policy settings of governments in receiving countries.

The recent problems with the export of plastic waste due to the receiving countries no longer being willing to accept Australia's waste has reinforced the need for a domestic capability to process batteries. This has the added advantage of the resultant commodities being used in Australia or through safe and legal export. This need for some level of domestic processing capability is a key issue that governments indicated needs to be addressed in any battery stewardship scheme.

3.6.2 Collection and sorting: improving practices and technology

Collection infrastructure is largely in place, however there may be a need to investigate best practices in collection and transport as chemistries change and information emerges regarding best practices and legal requirements. There is also a need to increase the volume of clean feedstock sorted by chemistry. Investment in best practice sorting practices and technology will be facilitated through partnerships with government and other institutions.

3.6.3 Processing: Improving practices and technology

Once the Scheme is established, it is anticipated that processing facilities will increase the viability and efficiency of their operations, thus reducing the need for a rebate. The key to industry development in this sector will be enabling the scaling up of facilities to meet increased demand.

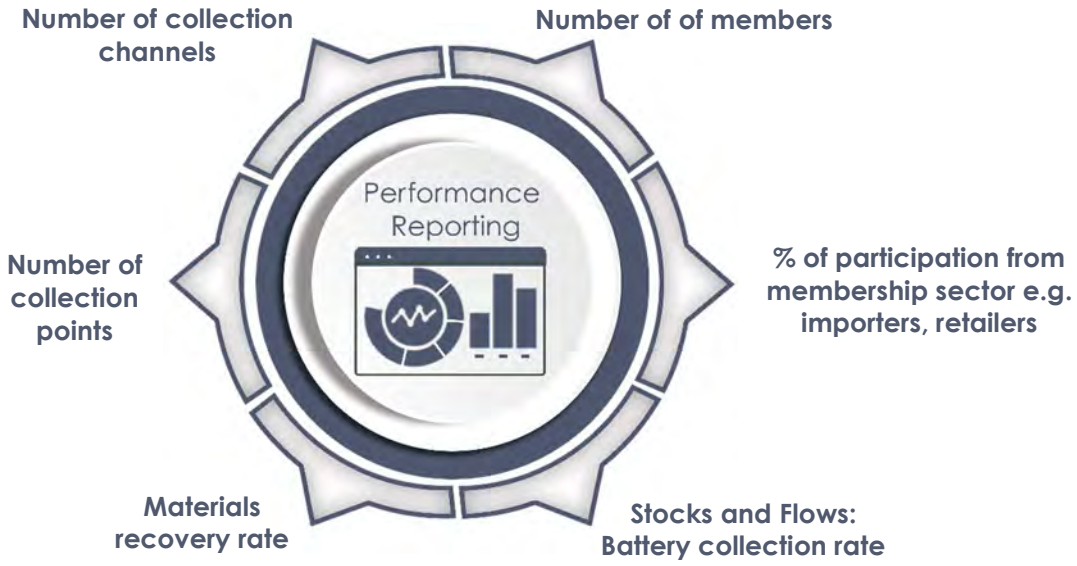
It is anticipated that this will be achieved with support from government infrastructure funding and other tax incentives to support the acquisition of plant and equipment.

This type of support, combined with higher volumes of sorted feedstock, will improve the commercial viability of such processing facilities. Given that this strategy is intended to build an industry from a low base, this aspect of the Scheme will need to be kept under review to ensure the growth objective is being met.

3.7 PERFORMANCE MEASURES

It is proposed that the Scheme operate with maximum transparency. Scheme performance shall be measured using indicators determined by the Board, however it is anticipated that such measures would include those shown in the figure below.

Figure 19. Examples of performance reporting against indicators



It is envisaged that performance reporting will be included as a commitment for participants in the scheme. Aggregated data will be published in a BSC annual report on the website detailing expenditure and outcomes against each performance criterion.

Arbitrary collection targets have not been identified as part of the Scheme as the long-term goal is to collect all batteries available for recycling. Given that the underlying purpose of the Scheme is to recycle batteries, a landfill diversion target of 90% of collected material will be required as part of a recycler's obligation.

3.8 SCHEME GOVERNANCE

3.8.1 Governance

The Battery Stewardship Council has been established as a not-for-profit company limited by guarantee to administer the Battery Stewardship Scheme. The principal objectives of the Council are to:

- implement the product stewardship scheme for end-of-life batteries
- administer the accreditation of members of the Scheme
- monitor, audit and report on the development of the Scheme
- undertake education, awareness and information activities to promote the Scheme and the value of end-of-life battery utilisation
- collect and manage funds received to meet the objectives of the Scheme.

It is proposed the Council be managed by a Board of Directors who are elected or appointed by the members of the Scheme. It is envisaged that the Board will broadly represent the interests of Scheme members, as shown in the following figure.

Figure 20. Scheme Board of Directors

The Board may establish advisory committees to provide specialist or expert advice and may allow government observers to participate at meetings where deemed appropriate.

The Board will be responsible for determining the most effective and efficient arrangements for administration but may include establishment of a small office headed by a chief executive officer, and/or outsourcing of elements of the Scheme to other organisations which may have experience or other resources to apply to meeting the objects of the Scheme.

3.8.2 Annual independent import reporting

In order to maximise protections for importer concerns for market share analysis, it is proposed that an independent organisation be engaged for reporting imports. The levy amount for each liable party would be determined on the basis of that report.

3.8.3 Assurance of best practice in quality, environment, health and safety

It is essential that the Scheme operates with responsible quality, environmental, health and safety best practice at its core. It is anticipated that standards would be developed for:

- import calculations
- collection point quality, health and safety
- safe and legal storage and transport
- sorting facility quality, environmental, health & safety management systems
- processing facility QEH&S management systems
- downstream tracking of materials
- calculation of collection, sorting and recovery rates.

3.8.4 Protection of confidentiality and privacy

In compliance with relevant legislation, BSC will have measures in place to:

- protect the privacy of applicants and members of the Scheme
- maintain confidentiality of information obtained during verification activities
- protect the privacy of parties involved with the processes involved with administering funds and maintain the confidentiality of all information acquired through those processes.

3.9 GREENHOUSE GAS EMISSIONS OFFSET

There are greenhouse gas emissions resulting from collection, sorting and processing of batteries, however these will be significantly reduced due to the leveraging nature of the collection network.

Given the Scheme's objective of minimising environmental impacts, it is proposed that a greenhouse gas offset arrangement be established to cover the transportation of end-of-life of batteries collected under the Scheme. A study will also be commissioned to investigate the options for offsetting greenhouse gas emissions associated with onshore processing.

4 COMPLEMENTARY MEASURES BY GOVERNMENT

In order to address the emerging waste management problem arising from the rapid uptake of battery powered products, action from both industry and government will be needed.

The most important complementary measure available to governments is adoption of the correct policy settings to achieve the desired outcome. In the case of batteries, governments in Australia have collectively decided that batteries have unacceptable environmental health or safety impacts. They have placed batteries on the priority list for a stewardship arrangement and some governments have gone further and decided that landfill disposal of e-waste (including batteries) is no longer acceptable.

4.1 INFRASTRUCTURE FUNDING AND OTHER INCENTIVES

Governments have established programs to provide infrastructure funding and other support to assist with the establishment or expansion of commercial sorting and recycling plants. As batteries have been identified by governments as a priority for recycling, it is likely that infrastructure funding will be available to support new or expanded facilities subject to such applications meeting other programmatic criteria. Such funding would give industry an appropriate market signal and incentive to invest in recycling plants.

It is anticipated that this would not represent a high cost to government as the market size for recycling batteries is such that only a small number of commercial operations would be viable. The high cost of transporting low volumes of batteries from remote and regional areas would suggest that small operations in each state may be a desirable outcome to optimise commercial viability of a domestic industry in the short term. In the longer term, as volumes increase, a domestic recycling market could be expected to change as it matures. There may be a role for the BSC in providing assistance with the assessment of applications for infrastructure funding.

4.2 CONTINUED MANAGEMENT OF BATTERIES NOT COLLECTED IN THE SCHEME

State and local government will continue to bear the burden for management of waste batteries until such time as the Scheme reaches a collection rate of 100% of batteries. Given we are currently only collecting 3% of waste batteries, it is likely that government expenditure in the management of landfill operations and illegal dumping will continue to be significant for both in-scope and out-of-scope batteries.

4.3 IMPORT STANDARDS AND RESTRICTIONS

The development of standards and appropriate regulations is crucial to reducing the volume of poor quality or dangerous batteries from entering the market and causing problems for both consumers and the recycling industry. Whilst there are some standards in place, they apply to the transport logistics of batteries, and there is gap in the quality standard to be met by importers in Australia. It is therefore proposed that the Commonwealth Government support the development of such a standard.

4.3.1 Import restrictions

Through poor quality or design, some batteries can cause problems in the community or in the marketplace and go into the waste stream earlier. They are often unbranded or counterfeit models. Such batteries represent a safety issue for consumers and retailers. They are problematic as they give no indication of chemistry type or the problems that may occur during disposal to landfill, transport and recycling.

It is proposed that the Commonwealth Government investigate options for imposing controls to restrict imports of poor quality, counterfeit and unbranded batteries into Australia.

4.4 RESEARCH

The commodities obtained from the recycling of batteries are generally all recyclable although the commercial value may be low. A number of research institutions are collaborating with industry to investigate recycling technologies and processes to obtain commodities with a higher commercial return.

The Commonwealth Government, through its funding for universities and CSIRO, taxation concessional support for research and development and industrial grant programs, is well placed to encourage a greater effort on research and development by setting batteries as a priority for a period. In particular, the Commonwealth Government has recently awarded funding for innovation project such as:

- $3,317,500 for a Research Hub to focus on small-scale processing of materials produced from waste batteries
- $25,000,000 for a Future Battery Industries Cooperative Research Centre to address industry-identified gaps in the battery industries value chain. In addition, this CRC has commitments of $28 million in cash from industry and $82 million in kind from industry, government and research partners.

4.5 PROCUREMENT

Through the implementation of sustainability requirements in the procurement of goods and services, governments are in a strong position to send appropriate market signals to the battery industry. The Commonwealth Government has recently announced its intention to implement a procurement policy to support the development of the recycling industry. During the BSC consultation process, industry indicated that they would like governments to consider establishing battery quality minimum standards for purchasing and the inclusion of recycled content as a criterion in any such procurement program.

5 KEY ISSUES

5.1 REGULATED OR VOLUNTARY SCHEME

One issue that has arisen in the early consultations has been the question of the nature of an industry-led scheme versus one which has a regulatory base. The Product Stewardship Act 2012 allows for schemes in which industries act to reduce the impact of their products on the environment and people's health and safety. In such schemes, industries agree to form product stewardship arrangements. These industry-led schemes are called "voluntary".

5.1.1 Industry-led vs. mandatory

Where industry-led action is not taken for products that have been identified as a public concern by the governments of Australia, governments have the option of imposing regulations in the form of either a mandatory scheme (generally for products that have potential serious impacts) or a co-regulatory scheme.

5.1.2 How does an industry scheme work

In an industry scheme, it is a matter for individual companies to decide to work together for their collective and individual benefit. To be effective, such schemes need to include most if not all participant companies in the relevant supply chain. Such schemes are not cost free and parties need to agree on some form of funding, such as a levy, to cover costs.

5.1.3 Benefits of an industry-led approach

As a rule of thumb, industry-led schemes lead to lower levy rates, lower reporting and compliance costs, greater flexibility to adjust direction in response to changes in the market, and less bureaucratic industry governance arrangements. In 2018, Pacific Environment Ltd estimated the costs associated with the National Television and Computer Recycling Scheme as a basis for comparing the cost of an industry versus a co-regulated scheme. The conclusion was that an industry-led scheme would cost less than half.

Figure 21. Costs of regulated vs. voluntary stewardship (Pacific Environment, 2018)

Scenario	NPV of cost to govt * ($m)	NPV of cost to industry ($m)	Total ($m)
Option 1. Shared responsibility	$2.7	$14.4	$17.1
Option 2. Free rider regulation	$6.4	$16.5	$22.9
Option 3. Government Regulated Program	$17.0	$37.6	$54.6

NPV: Net Present Value

A further benefit to industry is that the ACCC authorisation provides:

- the application of a levy by industry participants with the cost of the levy to be passed on to the consumer
- protection for companies to take actions which have been deemed to have public benefit and not be treated as anti-competitive.

To protect the public and corporate interests, industry-led schemes involving collective action need to be authorised by the Australian Competition and Consumer and Commission (ACCC) and may also be accredited under the Commonwealth Product Stewardship Act.

5.1.4 Implications of a failure of industry to act

Without an industry-led approach, a complex multi-jurisdictional regulatory environmental will emerge. In the absence of an industry-led battery stewardship arrangement, environment ministers have indicated that a regulatory approach will be implemented in the foreseeable future. Based on initial discussion between industry and governments, a regulatory approach for batteries could include a variety of measures such as:

- inclusion under the National Television and Computer Recycling Scheme (which is not fit for purpose for batteries)
- a stand-alone regulation for a dedicated Battery Stewardship Scheme
- state-based regulations including state stewardship initiatives and e-waste landfill bans.

Such a mixed regulatory approach is not ideal in the national retail markets that operates in Australia and would inevitably lead to higher costs which would be passed on to consumers.

5.2 MANAGEMENT OF FREE RIDING

Free riding is the term given to those potential participants in a product stewardship scheme who decline to participate and in effect leave others to foot the bill for the recycling of their products. No stewardship scheme can survive if this group is not kept to a minimum. In the initial consultations on battery stewardship, the issue of free riding has been raised as a key issue for some market players and we have endeavoured through BSC membership to identify as many potential participants as possible with a view to bringing them into the Scheme.

5.2.1 Current levels of free riding

In the current market there is already degree of free riding as the environmental, health and economic costs of battery recycling are being left to the actions of local government and a limited number of companies and other organisations which are currently collecting, sorting and recycling a small proportion of the batteries in the market.

5.2.2 Fair share approach to Scheme design

This Scheme is designed in such a manner that participants with responsibility for a levy contribution are only required to pay their fair share based on the weight of product they import into Australia. They are not being asked to pay the way for free riders.

The process of establishing the BSC and the call for membership has highlighted the fact that awareness of the opportunity to participate in the development of a stewardship arrangement is not universally known. It is therefore highly likely that the proposed awareness and education initiatives under the Scheme would lead to a high take-up of the opportunity.

5.2.3 ACCC model offers significant disincentive to free riders

Squeezing non-participants from the market is a unique element of the ACCC authorisation which allows accredited parties to only contract for battery-related goods and services with other accredited parties. This removes market opportunities for recalcitrant parties and is modelled on the scheme developed for tyres. It requires ACCC authorisation but has the advantage of using market forces.

The proposed Scheme design includes measures intended to provide a "carrot and stick" approach to ensure that once the Scheme is endorsed, the number of non-participants is kept to a minimum.

This goal is to be achieved through the following:

- making the benefits of joining the Scheme attractive through careful design
- the comprehensive nature of the proposed Scheme with its focus on market lead
- accreditation of the whole supply chain
- awareness and education
- independent auditing
- a rebate system to leverage and grow existing businesses encourage new entrants.

5.2.4 Regulatory support for capturing free riders

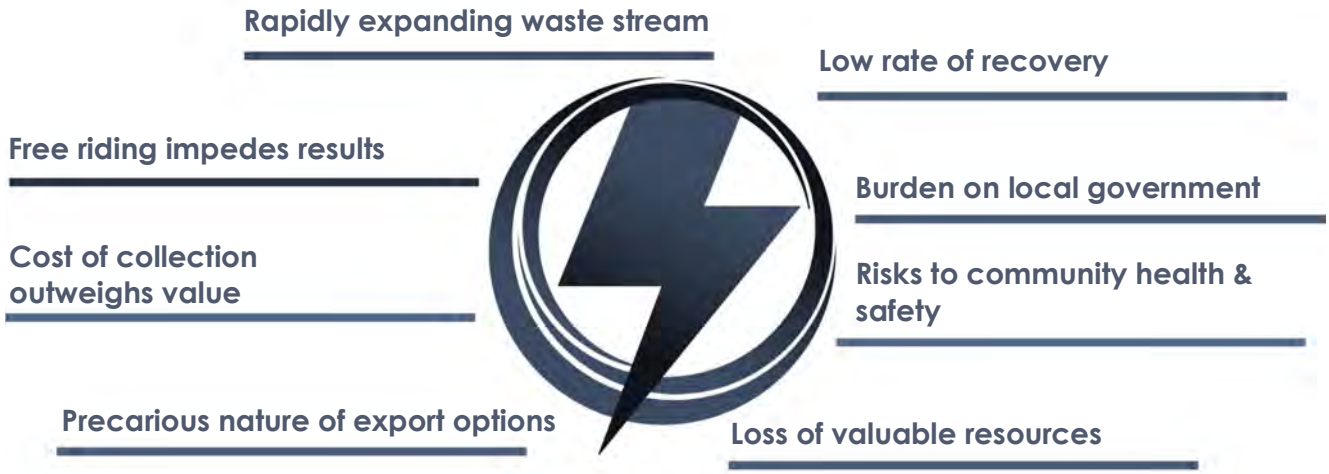
The BSC Chair has made a submission to the review of the Product Stewardship Act proposing an amendment to provide for the Commonwealth Government to either impose a penalty levy on companies that decline to join an accredited stewardship scheme or establish their own stewardship scheme which is also accredited under the Act.

APPENDIX 1. NEED FOR A SCHEME: CHALLENGES AND OPPORTUNITIES

CHALLENGES: PUBLIC DETRIMENTS

There is an urgent need for a battery stewardship scheme for several compelling reasons.

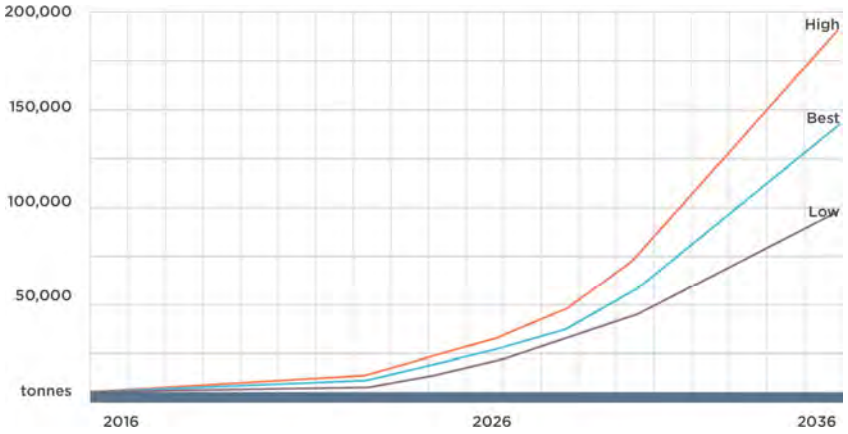
Figure 22. Drivers for establishing a secure and viable battery recycling scheme



Rapidly expanding waste stream

Australians are becoming increasingly reliant on batteries in small handheld devices, and in electric vehicles and renewable energy systems. In 2014, it was found that Australia generated 17,500 tonnes or over 700 million waste batteries each year (EBU equivalent). By 2036 it is projected we will generate 137,000 to 186,000 tonnes (or 7,700 million EBU) of waste Lithium batteries each year – the weight of the Sydney Opera House!

Figure 23. Projected exponential rise in generation of waste Lithium batteries[8]

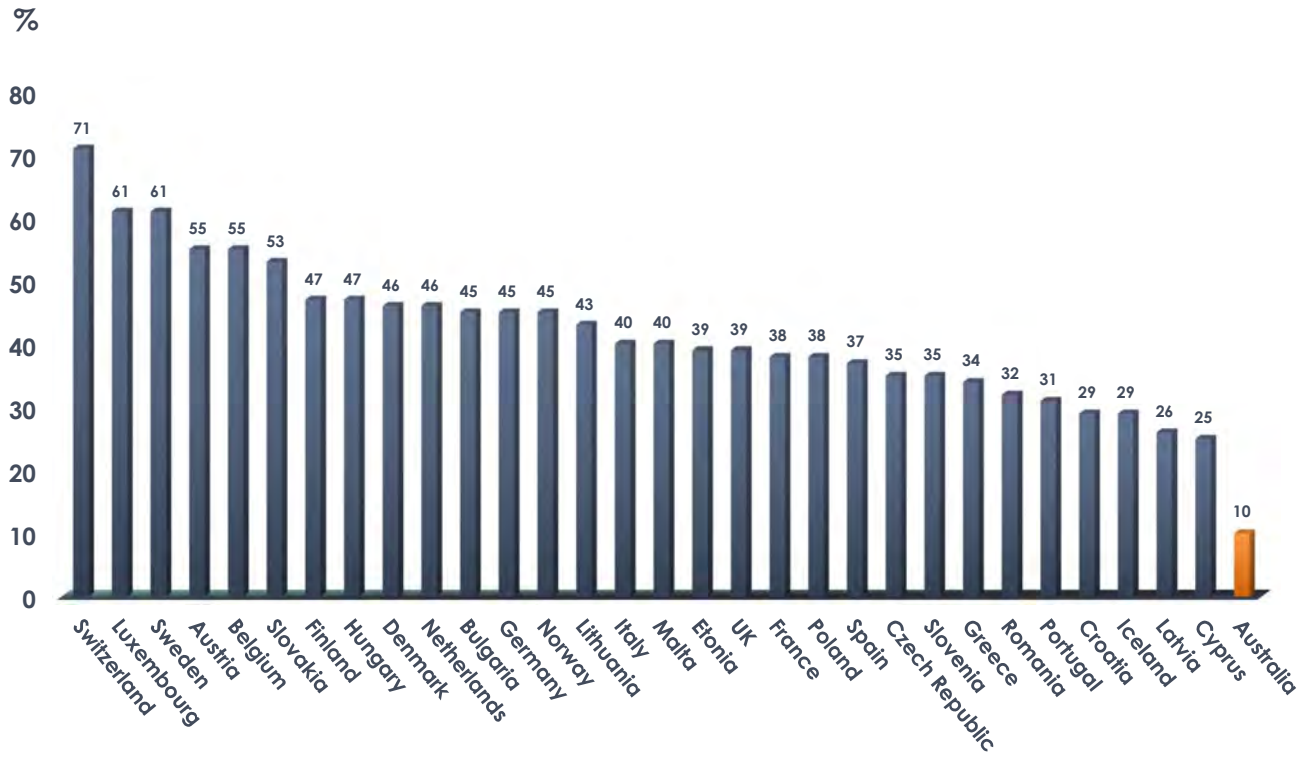


Low rate of collection

Except for automotive batteries, Australia currently has a very low collection rate. According to the 2014 stocks and flows report, Australia's collection rate for non-automotive batteries was less than 3%. Preliminary data indicates that this has now risen to 10%. When put in the context of other OECD countries, Australia's poor performance is apparent as it lags far behind other OECD countries, as can be seen in the figure below.

[8] Randell Environmental Consulting & Blue Environment "Waste Lithium-ion battery Projections" (2016) Hazardous Waste Section Dept of the Environment

Figure 24. Battery collection comparisons with OECD countries and or states[9]



Product stewardship in Australia has been delivering results for products such as computers, televisions and mobile phones. Similar schemes have been operating in Europe since 1991 and more recently in the US. We can build on the experience of these schemes to create an effective and efficient scheme for batteries to improve Australia's performance.

Burden on local government

Currently, the responsibility for and cost of managing batteries disposed of inappropriately to landfill falls to local government. This burden is exacerbated by the low recycling rate which means that high numbers are being disposed of to landfill.

It is important to realise that nearly all batteries are hazardous. Although in an ideal world landfills would be lined and well maintained, this is not always the case.

Further risk and significant costs arise from the flammable nature of some batteries. If Lithium ion batteries are damaged or subjected to high temperatures, they can spontaneously combust. The result is fire – whether it be in a recycling collection truck, a transfer station or a landfill. The cost of managing these fires can be high and is a burden on local councils.

Export options

As has been reported in the media recently, countries which have been importing Australia's waste for recycling are no longer doing so. The export of used Lithium batteries is particularly problematic as shipping lines are introducing restrictions on the shipping of batteries due to the risk of fires.

In recent years port fires caused by batteries have raised alarm bells. The trend is to disallow export, reducing access to overseas solutions. Local certainty and investment are needed to secure onshore solutions.

[9] Sources:
O'Farrell, K., et al (2019) Australian Battery Market Analysis, prepared on behalf of the Battery Stewardship Council
Perchards & SagisEPR "Study for on waste portable batteries collection rates" (2016), prepared on behalf of the European Portable Battery Association

OPPORTUNITIES: PUBLIC BENEFITS

Ability to address the challenges or public detriments

A national industry-led battery stewardship scheme will ensure:

- management of the impending and rapid increase of battery use in Australia
- improvement in our recovery rates to acceptable levels in a short time frame
- diversion of batteries from other recycling destinations and landfills, leading to significant improvements in safety and community health
- Secure onshore processing of batteries, reducing the need for:
  - reliance on other countries agreeing to accept Australia's used batteries
  - approval of international insurance brokers who are less willing to ship Lithium batteries or mixed loads of batteries to export markets
- a reduction in the number of batteries stored in the home – improving safety and resource recovery.

Industry development and jobs

Currently, the battery recycling sector is relatively small, however it is clear from consultations that the industry is poised to scale up if certainty for investment can be provided. A new stocks and flows report which is due in October 2019 will estimate the current size and value of the battery market.

Management of difficult chemistries

The establishment of a national stewardship scheme will facilitate a collection system that is focused not only on batteries with a high resource recovery value (lead acid) but also on problematic batteries such as Lithium and nickel cadmium.

ASSESSMENT OF PUBLIC BENEFIT OF THE PROPOSED BATTERY STEWARDSHIP SCHEME

Under the National Environmental Protection Act 1994, governments have identified a number of priority environment protection measures. In developing the battery stewardship scheme, these measures were taken into account in determining the public benefits of a stewardship scheme. It is in this context that the following assessment has been made of benefits of the Scheme against these identified measures:

- the maintenance and improvement of ambient air quality
- the maintenance and improvement of ambient marine, estuarine and fresh-water quality
- the minimisation of environmental impacts associated with hazardous wastes
- an improvement in the sustainable use of resources
- provision of environmental protection for all Australians.

The following sections discuss each of these in more detail.

Maintenance and improvement of ambient air quality

A national battery stewardship scheme will contribute to the maintenance and improvement of ambient air quality by reducing the incidence of landfill fires. Lithium ion and other batteries represent a safety hazard in storage, transport and disposal due to the risk of explosion or fire if not managed carefully. The incidence of battery fires in Australia will continue to grow unless a responsible dedicated collection scheme is established.

The environmental and community health impacts arising from air pollution associated with a landfill fire are very serious and continue well past the initial event. These incidents result in the emission of toxic fumes in surrounding communities, are a danger to fire fighters and landfill operators, and are costly to control.

Studies showing the community health impacts of landfill fires are numerous. One recent study found that air emissions resulting from landfill fires include dioxins/ furans, polycyclic aromatic hydrocarbons and volatile organic compounds (Weichenthal et. al. 2015). These toxins are known to be extremely harmful to human health and the environment. It is also important to note that the collection of mixed batteries (both single use and rechargeable) further reduces the fire risk associated with a collection program.

Maintenance and improvement of ambient marine, estuarine and fresh water quality

The establishment of a national battery stewardship scheme will contribute to the maintenance and improvement ambient marine, estuarine and fresh water quality. Given that only 3% of batteries are recycled, most of the 720 million equivalent battery units (weight of imports/24 grams) end up in landfill or elsewhere in the environment.

A large number of landfills in Australia are unlined, further increasing the environmental risk to ground water, surface water and the marine environment.

The impact of batteries as a water contaminant has not been quantified. However, given that batteries contain hazardous and/or toxic materials such as mercury, lead and cadmium, it is highly likely that they are leaching into the natural environment over the extended life of a landfill. This means that waste batteries are probably contributing to the pollution of water resources across Australia.

Minimisation of environmental impacts associated with hazardous wastes

The establishment of a national battery stewardship scheme will contribute to the minimisation of environmental impacts associated with hazardous wastes. Some batteries contain toxic substances, while others contain substances which are hazardous for other reasons.

A number of materials in batteries are known to be hazardous. The main hazard for each chemistry type is shown in the figure below.

Figure 25. Hazards associated with different battery chemistries

Contents/Type	Hazard
Lithium	Flammable
Lead, Mercury, Copper, Cobalt, and Cadmium	Toxic to human health and the environment
Electrolyte	Corrosive
Button cell batteries	Internal burns if swallowed or ingested by children or vulnerable adults

Currently, most used batteries are either stored in homes, businesses and institutions or they are disposed of to landfill. With the exception of recycling, other final destinations are subject to significant environmental impacts.

Battery casings eventually corrode and at that point, chemicals may leach into the soil and move into rivers, water supplies and oceans. Contamination of soil, water and air from these pollutants can result from leaching or from atmospheric pollutants released by landfill fires.

Improvement in the sustainable use of resources

The establishment of a national battery stewardship scheme will contribute to improvements in the sustainable use of resources. Almost all batteries can be recycled to recover metals and other valuable components, as shown in the table below.

Figure 26. Battery contents by chemistry

Battery Type	Contents (may vary depending on application/battery type)
Lithium	Phosphate, Cobalt, Lithium, Lithium Perchlorate, Carbon, Iron, Silicon, Graphite, Manganese, Tin, Copper, Nickel, plastic and organic solvents.
Nickel Metal Hydride	Nickel (heavy metal), Potassium Hydroxide, Zinc, Aluminium, Cobalt, Manganese and Mischmetal (rare earth alloy).
Nickel Cadmium	Nickel Oxide Hydroxide, and Cadmium.
Button cell batteries	Lithium ion, Mercury, Zinc, Silver Oxide, Manganese and Silver.
Alkaline batteries	Zinc, Manganese, Potassium Hydroxide, Graphite, casing materials, separator materials, plastic, Aluminium and Mercury (in older batteries).
Lead acid	Lead, Graphite, Barium Sulphate and separators (wood, glass, plastic, rubber, glass, cellulose or PVC).

The value of materials recovered from batteries varies. Battery component materials have real value that is lost for the future once it enters the landfill. Resource recovery is particularly important for many of the scarcer materials.

Figure 27. Viability of recycling by chemistry type

Recent studies by the Battery University (https://batteryuniversity.com) found that the viability of recycling is dependent on battery type.

This table provides an indication of this dependence and highlights the barriers which act to prevent market forces from enabling the recycling of materials from the lower value batteries such as Lithium **ion and** N**ickel** C**admium.**

Battery Chemistry	Recycling
Lithium	Subsidy needed
Cobalt	Subsidy needed
Lead acid	Profitable
Nickel	Subsidy needed
Cadmium	Subsidy needed

An important consideration in resource recovery is the beneficial impact of reducing the reliance on virgin materials in both sustainable and unsustainable practices.

Cobalt mining in particular has been identified internationally as problematic due to unethical mining practices involving slavery and child labour in some countries.

Environmental protection for all Australians

The use of batteries is ubiquitous across Australia. The impacts on air, water or soil pollution that arise from the lack of recovery services and inappropriate disposal are also ubiquitous and affect communities everywhere.

These impacts are exacerbated by the very limited options for recovery of batteries in regional and remote areas.

The National Battery Stewardship Scheme has been designed ensure greater equity in access to recycling options in both metropolitan and regional communities. The Scheme will leverage existing collections across Australia – for example used lead acid batteries from the automotive sector which have an estimated 15,500 collection points across Australia.[10]

The key design feature that will increase protections for regional Australia is this leveraging model combined with increased rebates for regional collections. In this way, the Scheme will significantly contribute to the establishment of equivalent protections for all Australians from air, water or soil pollution associated with the end-of-life management of batteries.

[10] Wakefield-Rann, R., Florin, N., Jazbec, M., (2018) *Characterisation of battery collection channels in Australia.* Prepared for the Battery Stewardship Council, November, 2018

APPENDIX 2. EQUIVALENT BATTERY UNIT

The figure below is the outcome of a research project which analysed different battery types and chemistries and provided a sample analysis of battery characteristics with their equivalent battery units. The table assigns an indicative EBU to each battery. The EBU is calculated by dividing the weight of the battery in grams by 24. The number 24 has been chosen since a 24 grams battery is considered to have an EBU of 1. These figures are estimates, as it is anticipated that importers will make their own calculations.

Figure 28. Preliminary analysis of EBU equivalents to be used as a guide for importers.

Type / Category	Make	Chemistry	Weight (grams)	# Cells	Model notes	Indicative EBU
AA	Duracell	ALK	24	1	1.5 V Alkaline	1.00
AA	Activ Energy ALDI	ALK	28	1	1.5 V Alkaline	1.17
AA	Energizer	ALK	23.5	1	1.5 V Alkaline	0.98
AA	Wincell	ALK	23	1	1.5 V Alkaline	0.96
AA	Camelion	ALK	14	1	1.5 V Alkaline	0.58
AA	Golden Power super	ALK	16.5	1	1.5 V Alkaline	0.69
AA	Black & Gold	ALK	18	1	1.5 V Alkaline	0.75
AA	Eveready Gold	ALK	24	1	1.5 V Alkaline	1.00
AA	unknown	ALK	24	1	1.5 V Alkaline	1.00
AA	Ikea	ALK	23	1	1.5 V Alkaline	0.96
AA	Pairdeer	ALK	23	1	1.5 V Alkaline	0.96
AA	Varta	ALK	23	1	1.5 V Alkaline	0.96
AA	Sanyo Eneloop	NiMH	26	1	2100mAh	1.08
AA	no brand	NiCd	12	1	150mAh	0.50
AA	Power Up Lithium	Li-ion	14.5	1	2900MAh	0.60
AA	DSE	NiCd	16.5	1	700mAh	0.69
AA	Ultracell	NiMH	30	1	2500mAh	1.25
AA	Duracell	NiMH	30.5	1	2650mAh	1.27
AA	Duracell	NiMH	28.5	1	2450mAh	1.19
AA	Coles Recharge	NiMH	28	1	2200mAh	1.17
AA	No brand	NiMH	16	1	600mAh	0.67
AA	Eveready Rechargable	NiMH	26.5	1	2000mAh	1.10
AA	U&T Rechargable	NiMH	23.5	1	1400mAh	0.98
AA	No brand	NiCd	18	1	600mAh	0.75

Type / Category	Make	Chemistry	Weight (grams)	# Cells	Model notes	Indicative EBU
AA	Powertech	NiMH	28	1	2400mAh	1.17
AA	UniRoss	NiMH	29.5	1	2500mAh	1.23
AA	Panasonic	Li-ion	19.5	1	640mAh	0.81
AA	DSE	NiMH	29.5	1	2450mAh	1.23
AA	unknown	NiCd	18	1	potential electrolyte leakage	0.75
AA	Electrolux	NiMH	26	1	1300mAh	1.08
AA	Energizer	NiMH	27.5	1	2500mAh	1.15
AA	Activ Energy ALDI	NiMH	27.5	1	2300mAh	1.15
AAA	Rapid	ALK	7.5	1		0.31
AAA	Eveready Gold	ALK	11.5	1		0.48
AAA	Eveready	ALK	9	1		0.38
AAA	Activ Energy ALDI	NiMH	11	1		0.46
AAA	Energizer	ALK	11	1		0.46
AAA	Varta	ALK	11	1		0.46
AAA	Doro	NiMH	12	1		0.50
C	Energizer	ALK	67.5	1		2.81
C	Duracell	ALK	69	1		2.88
C	Activ Energy ALDI	ALK	71	1		2.96
C	Polaroid	ALK	41.5	1		1.73
C	EcoAlkalines	ALK	68	1		2.83
C	Eveready Gold	ALK	67.5	1		2.81
D	Arlec	NiCd	70.5	1		2.94
D	EverReady HD	ALK	94	1		3.92
D	Varta Extra LL	ALK	136.5	1		5.69
D	Duracell	ALK	135.5	1		5.65
D	Panasonic	ALK	98	1		4.08
D	Energizer Ind.	ALK	142	1		5.92
9V	Duracell	ALK	46.5	1		1.94
9V	Procell	ALK	45.5	1		1.90
9V	Energizer Ind.	ALK	47.5	1		1.98
9V	Panasonic	ALK	37	1		1.54
9V	Battery World	ALK	36	1		1.50

Type / Category	Make	Chemistry	Weight (grams)	# Cells	Model notes	Indicative EBU
9V	GP Powercell	ALK	35	1		1.46
9V	Eveready Gold	ALK	46	1		1.92
Button	GP	SiO	1.5	1	76E	0.06
Button	Energizer	ALK	3	1	CR2032 3V	0.13
Button	unknown	ALK	1	1	?	0.04
Button	Maxell	ALK	2.5	1	LR44	0.10
Button	Energizer	ALK	2	1	A76	0.08
Button	unknown	ALK	2.5	1	CR2025	0.10
Button	unknown	ALK	1	1	CR1220	0.04
Lantern 6V	Eveready	ALK	570	4		23.75
Lantern 6V	Duracell	ALK	670	4		27.92
Lantern 6V	Panasonic	ALK	559.5	4		23.31
Lantern 6V	Woolworths	ALK	496.5	4		20.69
Power Tool	Ryobi	Li-ion	757	15	Lithium 18V One+ 2.4Ah	31.54
Power Tool	Rockwell	Li-ion	391	5	3.7V 1865BE cells	16.29
Power Tool	Bosch	NiCd	705	10	12V 2,0Ah	29.38
Power Tool	Milwaukee	Li-ion	1,086.50	15	M18 9.0Ah	45.27
Power Tool	Ryobi	Li-ion	739	15	18V 5Ah Lithium+	30.79
Power Tool	Ryobi	NiCd	667	10	12V	27.79
Power Tool	Ryobi	NiCd	869.5	15	18V One+	36.23
Power Tool	Ryobi	NiCd	673	12	14.4V	28.04
Power Tool	Black & Decker	NiCd	752	12	14.4V Firestorm	31.33
Power Tool	Black & Decker	NiCd	438	8	9.6V KC 96 BP	18.25
Power Tool	Black & Decker	NiCd	641.5	10	12V firestorm	26.73
Power Tool	GMC	NiCd	1190	20	24V	49.58
Power Tool	Makita	NiMH	797.5	12	14.4V 3.0Ah	33.23
Power Tool	Makita	Li-ion	643.5	10	18V 3Ah	26.81
Power Tool	Makita	NiCd	731	12	14.4V 2.0Ah 1422	30.46
Power Tool	Makita	NiMH	712	10	14.4V CS-MKT142PW	29.67
Power Tool	Unknown	NiCd	706	12	14.4V bronze Series	29.42
Power Tool	Unknown	NiCd	845	13	_	35.21

Type / Category	Make	Chemistry	Weight (grams)	# Cells	Model notes	Indicative EBU
Mobile Phone	Nokia	NiMH	74.5	bag	BMS-2S 3.6V	3.10
Mobile Phone	Nokia	NiMH	53	bag	BMC-3 3.6V	2.21
Mobile Phone	Nokia	NiMH	53.5	bag	BML3 2.4V	2.23
Mobile Phone	Apple	Li-ion	57.5	bag	iPhone 4 Extra 4	2.40
Mobile Phone	Samsung	Li-ion	27.5	bag	BST1178S 3.7V	1.15
Mobile Phone	Motorola	Li-ion	151	bag	NNTN7035A	6.29
Mobile Phone	Motorola	Li-ion	125	bag	JMNN4024C	5.21
Mobile Phone	Motorola	NiMH	46	bag	M4DM06T1MDGA	1.92
Mobile Phone	Motorola	NiMH	46	bag	A3ZAAA11LEFA	1.92
Mobile Phone	Motorola	NiMH	59.5	4	AB1905A 4.8V	2.48
Mobile Phone	Sony Ericsson	Li-ion	30.5	bag	BST-41	1.27
Mobile Phone	Ericsson	NiMH	121.5	bag	BKB 193 108 R1A	5.06
Mobile Phone	Panasonic	NiMH	61	bag	EB-BS520	2.54
Mobile Phone	Panasonic	NiMH	46	3	HHR-P104 3.6V	1.92
Mobile Phone	Panasonic	NiMH	31	2	HHR-P105 2.4V	1.29
Mobile Phone	BlackBerry	Li-ion	28.5	bag	C-X2	1.19
Mobile Phone	BlackBerry	Li-ion	19.5	bag	C-M2	0.81
Laptop / Tablet	Dell	Li-ion	498.5	6	1865 DB1	20.77
Laptop / Tablet	Dell	Li-ion	260.5	bag	CB1C13	10.85
Laptop / Tablet	Dell	Li-ion	342.5	3	1865 DB1	14.27
Laptop / Tablet	Hewlett Packard	Li-ion	272	bag	717376-001	11.33
Laptop / Tablet	Hewlett Packard	Li-ion	154	bag	AO02XL	6.42
Laptop / Tablet	Hewlett Packard	Li-ion	339	6	RO06XL	14.13
Laptop / Tablet	Hewlett Packard	Li-ion	220	4	14.6V	9.17
Laptop / Tablet	Hewlett Packard	Li-ion	147	bag	HV02XL	6.13
Laptop / Tablet	Hewlett Packard	Li-ion	169	bag	BP02XL	7.04
Laptop / Tablet	Lenovo	Li-ion	472	9	Think Pad 10.8V 7.14Ah	19.67
Laptop / Tablet	Lenovo	Li-ion	334.5	6	Think Pad 10.8V 5.2Ah	13.94
Laptop / Tablet	Compaq	Li-ion	426.5	8	Series PP2061H 18650	17.77
Light Industrial	GME Radio Beacon	Li-ion	410	NA	EPIRB	17.08

Type / Category	Make	Chemistry	Weight (grams)	# Cells	Model notes	Indicative EBU
Light Industrial	Kti mini sat alert	Li-ion	209	2	EPIRB Lithium Primary BR-C 3V	8.71
Light Industrial	Pains Wessex mini Res Sat	Li-ion	238.5	2	EPIRB Lithium Primary BR-C 3V	9.94
Light Industrial	AEGIS R Cell	Li-ion	1,148	3	Data Beacon	47.83
Light Industrial	AEGIS - R Cell inc. Meter	Li-ion	1,191	3	Data Beacon	49.63
Light Industrial	Engenio Information Technologies	Li-ion	515.5	6	1.5 VDC - 2.5VDC	21.48
Light Industrial	AWA	NiMH	309	8	PDV 200 Power supply	12.88
Light Industrial	GE Medical	Li-ion	438	bag	Medical Logic Q 14.8V	18.25
Light Industrial	Master Instruments	NiMH	34	3	Cordless phone CTB45	1.42
Light Industrial	Master Instruments	NiMH	80.5	3	Cordless phone CTB44	3.35
Light Industrial	Uniden	NiMH	24.5	2	Cordless phone BT694	1.02
Light Industrial	unknown	NiMH	34	3	Cordless phone 27910 3.6V	1.42
Light Industrial	Wintonic	NiCd	326.5	8	Exit Light 9.6V 1300mAh	13.60
Light Industrial	V.L.M	NiCd	516	4	Exit Light 4.8V 4Ah	21.50
Light Industrial	Mpower	NiCd	244.5	5	Exit Light 6V 1800MAh	10.19
Light Industrial	BYD	NiCd	232.5	5	Exit Light 6V 1.5Ah	9.69
Light Industrial	V.L.M	NiCd	246.5	2	Exit Light 2.4V Ah	10.27
Light Industrial	Ronda	NiCd	474.5	4	Exit Light 4.8V 4Ah	19.77
Light Industrial	BYD	NiCd	185.5	4	Exit Light 4.8V 1.5Ah	7.73
E-Bike	Unknown	Li-ion	1,843	36	18650 cells HJ 32	76.79
E-Bike	Samsung	Li-ion	3,810	70	18650 cells	158.75
E-Bike	Unknown	Li-ion	3,125	bag	30 bags encased Aluminium	130.21
E-Bike	Unknown	Li-ion	1,901	6	steel encased bag cells	79.21
E-Bike	Unknown	Li-ion	3,168	10	steel encased bag cells	132.00

APPENDIX 3. INDICATIVE MEMBER COMMITMENTS

(Insert name of Member) (Insert name of relevant category/ies)

As a Member of the Scheme, we support the objectives of the Battery Stewardship Scheme to:

- increase resource recovery and recycling and minimise the environmental, health and safety impacts of end-of-life batteries generated in Australia, and
- develop Australia's battery recycling industry and markets for battery-derived products.

We are committed to meeting our obligations as a Participant in the Scheme, as set out in the Guidelines, and to:

- deal transparently and ethically with others involved in the battery supply chain, including consumers
- contract for the supply of battery-related goods and services only with other accredited members to the Scheme
- where current contract arrangements require dealings with a non-accredited party, participants must still ensure that all end-of-life batteries generated are provided to an accredited battery recycler for environmentally sound disposal
- promote the Scheme to the community, other businesses and organisations, including through the development and implementation of an individual action plan
- use the Scheme's branding and logo as appropriate and adhere to the conditions that apply to that use
- comply with relevant laws and practices, including those that apply to the environment and occupational health and safety
- cooperate with surveys that are undertaken from time to time, and with random or risk-based audits as instigated by BSC. This includes retaining and, on request, providing to BSC the documentation specified in the relevant guidance on documentation in these Guidelines
- undertake regular reviews of arrangements with collectors and recyclers to ensure they comply with these commitments to the Scheme.

All Members in the Scheme also commit to contributing appropriately by:

- giving priority to the purchase of batteries manufactured using recycled content
- collection and recycling of end-of-life batteries
- taking responsibility for the environmentally sound disposal of the end-of-life batteries we generate through our own operations
- ensuring the environmentally sound use of commodities obtained from the recycling of batteries
- eliminating the inappropriate disposal and export of batteries from Australia
- monitoring and reporting battery recycling outcomes
- eliminating the disposal of batteries to landfill (except where no viable alternative is available and subject to state and territory and local government regulations).

APPENDIX 4. INDICATIVE SECTOR-SPECIFIC COMMITMENTS

Government agencies

- Prepare and implement a battery stewardship action plan, which might include:
  - incentives to local sorting and recycling companies to scale up operations to the level needed to meet increased rates of recycling and recovery
  - disincentives to discourage free riders
  - support for onshore industry development in battery collection, sorting and processing
  - battery import standards
  - appropriate import controls on single use batteries or minimum power output levels on these batteries
  - support for onshore industry development in battery collection, sorting and processing
  - policy initiatives such as landfill bans to prohibit the disposal of batteries to landfill
  - measures to reduce battery waste to landfill in waste management strategies and projects
  - collection points in council buildings and libraries as appropriate
  - reporting of fire incidents to a central repository to better understand the risk
  - the application of collection point standards if collection points are provided.

Importers

- Prepare and implement a battery stewardship action plan to improve battery quality, safety and labelling to improve recycling outcomes.
- Contribute funding through an annual levy based on weight of imports to support the implementation of the Scheme as set out in this paper.
- Provide data on the types and numbers of batteries imported.
- Only import batteries that are compliant with the relevant Australian standards, whether the batteries are imported as loose replacements or included in new equipment.
- Promote participation in the Scheme to businesses and other organisations to which they supply and purchase batteries.
- Commit to passing on the levy costs as a visible fee to consumers.

Retailers

- Take responsibility for the environmentally sound disposal of batteries left with retailers by consumers.
- Use approved containers at collection points.
- Commit to passing on the levy costs as a visible fee to consumers.
- Conform to collection point standards if collection points are provided.
- Report fire incidents to a central repository to enable a better understanding of the risk.

Community/Corporate drop-off locations

- Conform to collection point standards if collection points are provided.
- Promote participation in the Scheme by local communities.
- Use approved containers at collection points.
- Report fire incidents to a central repository to enable a better understanding of the risk.

Sorting providers

- Provide sorting services that conform to quality, environment, health and safety standards.
- Report fire incidents to a central repository to enable a better understanding of the risk.
- Maximise use of onshore battery processing.
- Ensure accurate tracking of batteries received and sorted.
- Retain records of downstream shipments of batteries.
- Ensure downstream due diligence and tracking to enable verification that the recycling chain complies with international trade law.
- Report sorting rates by chemistry.
- Support supply chain transparency.

Logistics providers

- Provide logistics services that conform to logistics standards for quality, environment health and safety, (e.g. packing, tracking, safety & quality assurance).
- Maximise onshore battery sorting and processing.
- Report fire incidents to a central repository to enable a better understanding of the risk.
- Ensure accurate tracking of batteries collected for transport.
- Retain records of downstream shipments of batteries.
- Ensure downstream due diligence and tracking to enable verification that the recycling chain complies with international trade law if export is involved.
- Report collection rates by chemistry (if known).
- Support supply chain transparency.

Onshore processors

- Provide processing services that conform to processing standards for quality, environment health and safety.
- Report fire incidents to a central repository to enable a better understanding of the risk.
- Ensure accurate tracking and material balance of incoming and outgoing materials.
- Maximise the use of domestic markets for process outputs.
- Retain records of downstream shipments of batteries.
- Ensure downstream due diligence and tracking to enable verification that the recycling chain complies with international trade law if export is involved.
- Report collection rates by chemistry (if known).
- Report recycling / recovery rates by chemistry.
- Support supply chain transparency.
- Guarantee all end-of-life batteries received go to an environmentally sound disposal site.
- Provide data to BSC on the quantity and fate of batteries processed and sold or otherwise provided for an environmentally sound use.

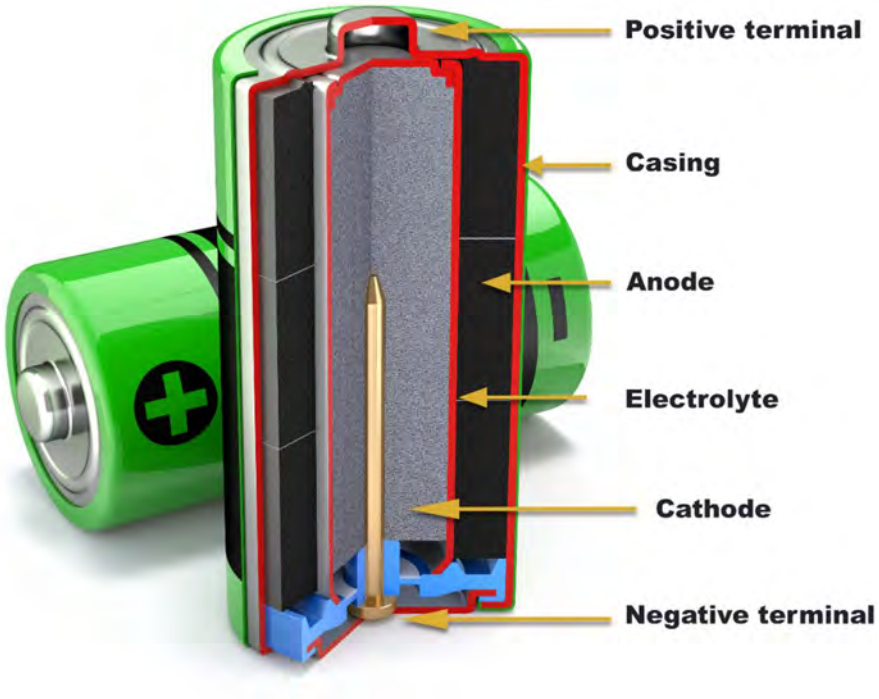
APPENDIX 5. THE WORLD OF BATTERIES

Batteries have been part of the global economy for a long time. Archaeologist Wilhelm Konig discovered some peculiar clay pots near Baghdad in Iraq which are thought to be ancient batteries dating back to 200 B.C. These days, batteries have become part of our everyday lives and our use of them is growing exponentially as new product types are developed.

Anatomy of a battery

Batteries can comprise one or more cells. Each cell primarily consists of a casing, a cathode, an anode, an electrolyte and two terminals that together act as a source of energy. Battery types vary depending on their chemistry and intended applications. Each cell has an external casing, usually made from metal or plastic, which has two terminals affixed to it – one positive and one negative.

Figure 29. Illustration of the anatomy of a battery



Placement of the terminals vary – they may be side by side or there may be one on each end of the battery. Inside, the positive terminal is connected to the cathode and the negative terminal is connected to the anode.

The types of materials that make up the cathode and anode for batteries vary depending on the chemistry types. Electrons can flow between the anode and cathode in an electrolyte medium .

Typical materials used are shown in the following table.

Figure 30. Typical materials in batteries by chemistry

Battery type	Acronym	Type	Cathode	Anode	Electrolyte
Alkaline		Single use (primary)	Manganese dioxide	Zinc	Aqueous alkaline or potassium hydroxide
Lead acid	ULAB	Rechargeable (secondary)	Lead dioxide	Lead	Sulfuric acid
Zinc Carbon		Single use (primary)	Manganese dioxide	zinc	Ammonium chloride
Lithium	Li-ion	Rechargeable (secondary)	Metal oxides of iron, cobalt, nickel, aluminium, or manganese	Carbon	Lithium salt in an organic solvent
Nickel metal hydride	NiMH	Rechargeable (secondary)	Nickel oxyhydroxide	Hydrogen absorbing alloy	Potassium hydroxide
Nickel cadmium	NiCad	Rechargeable (secondary)	Nickel oxyhydroxide	Cadmium	Potassium hydroxide

Typical applications

Applications for batteries are numerous and expanding all the time. The table below provides an indication of typical applications for different types of batteries.

Figure 31. Battery applications by chemistry

Chemistry	Applications	% sales[15]
Lead acid	▪ Automotive ▪ Energy storage	24%
Alkaline	▪ Single-use batteries used for handheld devices such as remote controls, toys, torches	30%
Lithium	▪ Energy storage ▪ Rechargeable batteries for small portable electronic devices	25%
Zinc carbon	▪ Handheld devices such as remote controls, torches, clocks and transistor radios	20%
Button cell	▪ Small portable electronics devices, for example hearing aids, wrist watches, pocket calculators, toys, automobile keyless entry transmitters	Not available
Nickel metal hydride	▪ Rechargeable batteries used in a broad range of handheld devices, e.g. digital cameras ▪ Some electric vehicles	1%
Nickel cadmium	▪ Rechargeable batteries used in a broad range of handheld devices ▪ Portable power tools, photography equipment, torches, emergency lighting and portable electronic devices	1%

[15] SRU Stocks and Flows, 2017

Handheld batteries in the Australian market can be divided into two categories, single use and rechargeable, as shown in the figure below.

Figure 32. Handheld battery sales by single use / rechargeable[16]

Battery size	Number ('000 batteries)	Weight (tonnes)	Weight (%)
Single use (Primary)	358,300	8,660	49.5%
Rechargeable (Secondary)	42,000	8,830	50.5%
Totals	400,300	17,490	100.0%

The battery supply chain

The battery supply chain is complex and involves a diverse range of industry, government, and consumer organisations, as shown in the figure below. The roles of these organisations will be important to the success of the Scheme.

Figure 33. The battery value chain

[16] SRU (2014) "Stocks & Flows of Handheld Batteries"

APPENDIX 6. GLOSSARY

For the purposes of this document:

Term	Meaning
Accreditation	Recognition by the Battery Stewardship Australia (BSC) that a business or organisation has made a commitment to, and meets the requirements of, the Scheme.
Accredited industry-led scheme	An industry-led product stewardship scheme accredited by the Australian Government under the voluntary product stewardship provisions of the Commonwealth Product Stewardship Act 2011.
Action plan	A timeline detailing the steps that the applicant proposes to undertake to meet the commitments of the category(ies) nominated by the applicant. This includes how the applicant will promote participation in the Scheme to businesses and other organisations.
Applicant	A business or organisation that is a legal entity with an ABN or ACN and has applied to become a Participant in the Scheme.
Battery	A container or cell which primarily consists of casing, cathode, anode, electrolyte, and terminals that together act as a source of energy.
Battery importers	Businesses or organisations that are engaged in importing batteries or other products that include batteries and are first to supply a battery to the domestic Australian market.
Battery Product Stewardship Scheme (the Scheme)	An arrangement between parties in the battery supply chain to share responsibility for the long-term management of end-of-life batteries in Australia, as set out in this document.
Battery recycler / re-processor	Any business or organisation that recovers metals, metallic compounds (including those of Lithium, cobalt, nickel, cadmium, potassium, steel, copper, etc.), graphite, plastic and other component materials and processes them into a form whereby they can be used as intermediate products in the manufacture of derived products.
Collector	An individual, business or organisation that collects and/or transports end-of-life batteries in any part of Australia for recycling, reuse or disposal. For the purposes of the Scheme, a transporter is a collector.
End-of-life battery	A battery that is deemed no longer capable of performing the function for which it was originally made.

Term	Meaning
Environmentally sound use	The use of whole, part or recovered components of end-of-life batteries for applications that minimise or prevent environmental, health and safety damage or harm.
Equivalent Battery Unit (EBU)	A unit of weight which enables batteries of different sizes to be compared. For the purposes of this Scheme, the assumed weight of one new EBU is taken to be 24g which is approximately a AA Lithium rechargeable battery. APPENDIX 2 provides the list of EBU ratios for different types of batteries that could apply for the purposes of importer and recycler reporting under the Scheme.
Fleet operator	An entity that owns or operates a fleet of vehicles, including private and government fleet operators.
Landfill	Waste disposal sites used for the authorised deposit of solid waste onto or into land.
Participant	A business or organisation that has received accreditation from the Battery Stewardship Council and made a commitment to meet the requirements of the Scheme.
Parties to the Scheme	The members of the Battery Stewardship Council which came together to develop and approve these guidelines.
Product stewardship	Any policy approach recognising that manufacturers, importers, retailers, governments and other entities have a shared responsibility for the environmental impacts of a product throughout its full life cycle. A product stewardship scheme establishes a means for relevant parties in the product chain to share responsibility for the products they produce, handle, purchase, use and discard.
Recycling	A process to recover constituent materials from end-of-life batteries and use those materials to produce new products.
Resource recovery	The process of extracting materials or energy from a waste stream through reuse, recycling or recovering energy from waste.
Retailer	A business or organisation that offers products for sale at retail through any means, including sales outlets, catalogues, or the Internet.
Reuse	The use of a collected battery for the same or a similar purpose as the original purpose without subjecting the battery to a manufacturing process that would change its physical appearance.

APPENDIX 7. ACRONYMS

Figure 34. Table of acronyms

Acronym	Terminology
ABN	Australian Business Number
ABRI	Australian Battery Recycling Initiative
ACCC	Australian Competition and Consumer Commission
ACN	Australian Company Number
BSC	Battery Stewardship Council
CRC	Cooperative Research Centre
CSD	corporate sustainable development
EBU	Equivalent Battery Unit
E2E	enterprise-to-enterprise
EU	European Union
MEMs	Meeting of Environment Ministers
NEPC	National Environmental Protection Council
NTCRS	National Television and Computer Recycling Scheme
PSO	Product Stewardship Organisation
OECD	Organisation for Economic Co-operation and Development
ULAB	used lead acid batteries (automotive)