

Towards a National Recycling Scheme for Rechargeable Batteries

Pilot project highlights the importance of a shared approach to stewardship for rechargeable batteries

February 2017



A two-month pilot has been conducted in Toowoomba to investigate the feasibility of collecting handheld rechargeable batteries for recycling through a diverse range of collection channels. The results of the pilot are being used to inform the development of future rechargeable battery recycling programs and schemes.

Why this pilot was needed

A national recycling program for used rechargeable batteries is being developed by the Battery Implementation Working Group (BIWG). Members include the Australian Battery Recycling Initiative (ABRI), the Queensland Department of Environment and Heritage Protection (DEHP), battery manufacturers, retailers and key industry associations. BIWG is conducting a series of pilots to inform the design of a national scheme for recycling rechargeable batteries.

Key issues explored

The pilot was designed to determine whether a permanent national scheme for rechargeable batteries would be viable and to ask the following questions:

1. Are consumers motivated to participate in a rechargeable battery recycling program and are they willing to pay?	CONSUMER PARTICIPATION
2. What are the most effective methods of educating consumers to separate rechargeable batteries for recycling?	EDUCATION OPTIONS
3. Are consumers willing to tape or bag Li-ion batteries prior to drop-off?	WILLINGNESS TO SEPARATE
4. Are retailers willing to check all Li-ion batteries have been taped or bagged prior to collection?	RETAILER WILLINGNESS
5. Which collection channels are the most efficient in terms of cost (cash and in-kind), consumer participation, contamination levels, operational issues etc.?	COLLECTION CHANNEL EFFICIENCY
6. What are the likely ongoing costs of collection, transport and recycling??	LIKELY COSTS
7. Are there benefits of a targeted program for power tool batteries through hardware stores (e.g. efficiency, participation levels, marketing)?	TARGETING HARDWARE STORE COLLECTION
8. What can be expected in terms of levels of contamination (non-rechargeable batteries, other) and costs of disposal?	CHALLENGES
9. If a voluntary scheme is implemented, is it likely that non-participating battery brands would benefit from “free riding” causing additional costs to participating brands?	IMPACT OF FREE RIDERS

Design of the pilot

PROMOTION	<ul style="list-style-type: none"> ▶ The pilot was promoted through local media, community radio announcements, paid advertisements in the Toowoomba Chronicle, a brochure delivered to around 45,000 residents, the Planet Ark website, and social media posts. ▶ Each location was provided with supporting information, including posters at each site, an information sheet for staff and a brochure for consumers.
COLLECTION BINS	<ul style="list-style-type: none"> ▶ Bins were placed at these sites for eight weeks between July 2016 and September 2016.
COLLECTION	<ul style="list-style-type: none"> ▶ Batteries were collected from 14 sites in Toowoomba, a large regional centre in Queensland., including: <ul style="list-style-type: none"> ▶ 9 retail stores (Bunnings, Trade Tools, Battery World, IGA, Lifeline, Officeworks, Super Cheap Auto (2 sites) and Wilsonton Betta Electrical) ▶ 3 local council sites (Greater Toowoomba Waste Management Facility, Pittsworth Waste Facility and Kleinton Waste Facility) and ▶ The University of Southern Queensland.
DATA ANALYSIS	<ul style="list-style-type: none"> ▶ Data was compiled on the types of batteries collected during the pilot: by the site where they were dropped off, by their chemistry and by brand.
SURVEY OF CONSUMERS	<ul style="list-style-type: none"> ▶ A face-to-face survey was conducted with the general public to determine attitudes toward, and knowledge of battery recycling resulting in 120 responses.
SURVEY OF RETAILERS	<ul style="list-style-type: none"> ▶ Collection partners were also surveyed towards the end of the pilot to gather feedback on operational and marketing issues resulting in 12 responses.

What we discovered

The pilot was designed to inform BIWG members on key issues that could impact delivery of an effective rechargeable recycling battery program, with the following questions being explored.

QUESTION 1: Are consumers motivated to participate in a rechargeable battery recycling program?

The pilot gave a strong indication that consumers are willing to recycle if options are provided, with a total of 372.3kg (1,358 units) rechargeable batteries collected: comprising mostly NiCd (194kg), Li-ion (81.8kg), and Lead Acid (59kg).

WILLINGNESS TO PAY

The recent Pollinate and Planet Ark consumer survey on recycling behaviour (September 2016) “The Pulse” supported this finding. Importantly for this project, The Pulse found “most Australians don’t mind paying a little more for rechargeable batteries to cover their recycling. Only about 10% of Australians wouldn’t pay extra”. The Pulse also found that while willingness to pay drops slightly when talking about more expensive laptop batteries, 63% of those that are extremely concerned about the environment would be completely willing to pay \$0.50.

QUESTION 2: What are the most effective methods of educating consumers to separate rechargeable batteries for recycling?

The consumer survey indicated that the most common sources of marketing and publicity for consumers were radio announcements, the letterbox flyer, word of mouth and collection site signage. The combined impact of these efforts resulted in a clear understanding that the intention was to drop off rechargeable batteries, which in turn resulted in very little contamination by single-use batteries.

QUESTION 3: Are consumers willing to tape or bag Li-ion batteries prior to drop-off?

Observations based on actual batteries collected and feedback from collection store staff, indicate that consumers are unwilling to tape or bag batteries prior to drop-off, with 62% of collection site staff believing that batteries with exposed points were not taped or bagged. As part of the trial collection sites were supplied with plastic bags for purposes of bagging batteries.

QUESTION 4: Are retailers willing to check Li-ion batteries are taped or bagged prior to collection?

Officeworks staff reported that they checked and taped or bagged batteries after they were dropped off by consumers. There is no evidence to indicate that other sites did the same.

QUESTION 5: Which collection channels are the most efficient in terms of cost (cash and in-kind), consumer participation, contamination levels, operational issues etc.?

Not all collection channels were well patronised by the public (Figure 1):

- ▶ Battery World was ‘head and shoulders’ above all other sites in terms of units collected and weight, most likely influenced by their pre-existing mixed battery recycling program.
- ▶ The Regional Council sites also performed relatively well, as did Bunnings and Officeworks.
- ▶ The University site and all three Super Retail sites (BCF and Supercheap Auto), collected the *least* batteries.

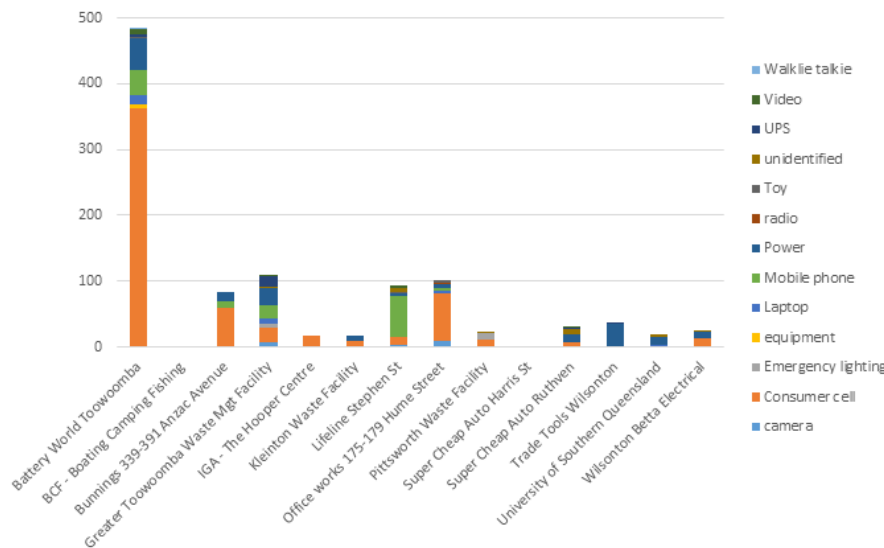


Figure 1: Batteries collected by site and type of batteries, by count

A preliminary conclusion is that retailers that sell batteries are more likely to be optimal drop-off points for collecting used batteries.

QUESTION 6: What are the likely ongoing costs of collection, transport and recycling?

The costs of collection and handling were relatively high given the agreed logistics regime for the pilot i.e. weekly collections from all sites regardless of whether the bins were full or not. The average collection cost was \$30 per site; and with an average shipment weight of 3.3 kg equating to just over a \$9.03/kg.

Indicative costs of collecting, sorting and recycling batteries are shown in **Table 1**. This compares actual costs for the pilot, expected costs of an ongoing scheme based on achieving economies of scale, and ‘best practice’ costs based on the recommendations in this report.

Table 1: Cost summary: Collection, sorting & recycling

SERVICE	Pilot (\$/ kg)	Ongoing \$	Best practice
COLLECTION	\$9.03	\$0.80	\$0.10
SORTING	\$0.30	\$0.23	\$0.10
RECYCLING	\$2.00	\$1.50	\$0.50
SUB-TOTAL	\$11.33	\$2.53	\$0.70

ASSUMPTIONS AND IMPLICATIONS OF COST DATA

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| <ul style="list-style-type: none"> ▶ The use of reverse logistics of retailers such as Bunnings back to a distribution centre would substantially reduce this cost to something in the order of \$0.10 kg ▶ The cost of sorting product into respective chemistries is costed at \$0.30 per kg ▶ Cost of recycling for chemistries was set for this trial at \$2.00 per kg. This price point was at low end of costings at the time of quotation. This price point would be expected to reduce by over 50% with time with increased volumes and further competition. | <ul style="list-style-type: none"> ▶ Currently, sorting is undertaken manually, which increases the error rate in sorting. Contamination of sorted streams can lead to increased wastage and potential OH&S issues. ▶ With adequate markings by industry using a uniform system, sorting costs could be more than halved on the basis commercial volumes were available. ▶ With an automated sorting using a universal marking system it would be possible to reduce the cost of sorting significantly and improve the error rate. |
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It is important to note that recycling costs must be viewed in light of best practice and transparency. The recycling services utilised were all licenced by relevant authorities and held all requisite licences permits and compliance to environmental standards.

QUESTION 7: Are there benefits of a targeted program for power tool batteries through hardware stores (e.g. efficiency, participation levels, marketing)?

One of the channels – Trade Tools – collected power tool batteries only, while other channels collected mixed rechargeable batteries. This pilot was not able to conclude whether or not a targeted program for power tool batteries would be beneficial compared to including these batteries in a broader scheme. Overall 38% of batteries collected at the Trade Tools site were from power tools compared to the intended 100% of batteries collected at Trade Tools.

QUESTION 8: What can be expected in terms of levels of contamination (non-rechargeable batteries, other) and costs of disposal?

By weight only 8% of batteries collected were single-use (primarily alkaline), which highlights a relatively low contamination rate and associated cost of disposal and processing.

QUESTION 9: If a voluntary scheme is implemented, is it likely that non-participating battery brands would benefit from “free riding” causing additional costs to participating brands?

While brands involved with BIWG accounted for a significant volume of the batteries collected, many brands collected that are not currently engaged in the BIWG process or members of ABRI. The pilot:

- ▶ Determined that 104 brands accounted for 90% of collections by count
- ▶ Concluded that the balance and the largest grouping was ‘no brand’ - 10% by weight
- ▶ Found the top 20 brands accounted for 80% by weight; or 52% of collections by count (excludes ‘no brands’)
- ▶ Concluded that the diverse range of battery brands in this waste stream would make it difficult to achieve industry-wide participation in a voluntary. In other words, free riders are likely to become a significant issue in any voluntary take-back or Product Stewardship program.

Feasibility of a Rechargeable Battery Recycling Scheme

The results of the pilot indicate an ongoing program to collect and recycle used rechargeable batteries would be viable subject to the ongoing interest of key brands, suppliers & retailers

Free riding may be a significant issue if the program is voluntary, particularly given the high number of brands and suppliers not currently participating in the BIWG process. Government support to encourage participation in a voluntary scheme would provide an important key to minimizing the impact of the free-rider issue. The pilot has provided some important insights for the design of a future ongoing program as shown below.

Select collection sites to maximise recovery rates

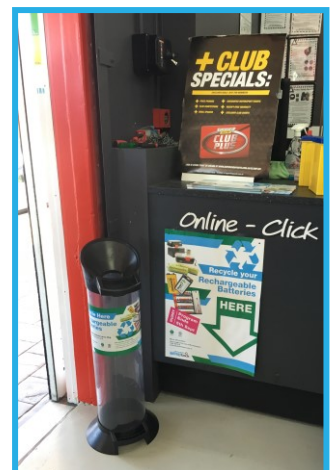
- ▶ Any future program will need to carefully identify and select collection partners with a view to ensuring relevance, commitment, resourcing and long-term participation. The willingness and enthusiasm of partners is vital to the success of any permanent scheme.
- ▶ Local and regional government collection partners are a reliable and known channel and it is important that they are involved at the outset as a priority partner when developing and implementing a permanent national scheme.
- ▶ Retailers directly involved in the supply of batteries will need to be considered as priority collection partners in the development and implementation of a permanent national scheme e.g. Bunnings, Officeworks, Battery World, Coles, Woolworths, Kmart, Target, convenience store chains, etc.

Streamline collection and transport logistics

- ▶ Utilise reverse logistics services managed by retailers to reduce costs of collection where relevant.
- ▶ Reconsider the design of collection bins and inner containers to minimise contamination, enable ease of inspection and avoid manual lifting or other safety issues.
- ▶ Ensure effective and easily repeatable training and induction for all collection partners and their staff, preferably using online tools and systems.
- ▶ Provide an effective Helpdesk resource to answer queries and receive program improvement suggestions from Collection Partners, their staff and their customers/users.
- ▶ Ensure collections are regularly emptied to allow for ongoing drop-off for waste batteries.

Focus on effective marketing and communication

- ▶ Maximise the use of site-based signage as well as other communications and publicity that supports ‘word-of-mouth’ promotion of battery recycling.
- ▶ Increase marketing, promotions and consumer education.
- ▶ Adequately resource future programs to develop, implement and evaluate an integrated communications plan that supports collection, recycling & education.
- ▶ Provide effective signage, posters and floor stickers, collection bin decals, and associated FAQ info sheets available via the site.
- ▶ Develop a communications plan in close consultation with key collection partners to ensure buy-in and proactive engagement with the public and consumers.
- ▶ Involve local and regional councils and retailers such as Battery World, Bunnings, Officeworks, Coles, Woolworths, Kmart, JB HiFi and Target in program promotion.
- ▶ Ensure the fundamentals of why batteries should be collected and recycled are explained to the wider public in plain English. The basic rationale or reason underpinning battery recycling requires clarity and purpose i.e. resource recovery, landfill diversion, management of hazardous waste etc.



Promote improved battery labelling

- ▶ Work with relevant consumer groups and other relevant parties to promote the need for more accurate and consumer friendly markings, labels and symbols appear on batteries and their packaging with a view to making chemistry type easily identifiable.

Engage battery brands, suppliers and retailers in program design

- ▶ Engage and consult as many brands and suppliers as possible in the program design process.
- ▶ Encourage battery brands, suppliers and importers to ensure consistent messaging, marks and identification symbols on their products and packaging to support effective recycling of rechargeable batteries.

Call to Action and next steps

Get involved and share your views about the future of battery recycling in Australia. The BIWG welcomes your input and encourages you to make contact with members of the BIWG.

For more information visit the ABRI website for contact details:

<http://www.batteryrecycling.org.au/pilot-projects>

Email: secretariat@batteryrecycling.org.au

Acknowledgements and publication details

This pilot was sponsored by the Queensland Department of Environment and Heritage Protection with additional contributions from Battery World, Canon, Duracell, Energizer, Officeworks and Panasonic. The pilot was undertaken by ABRI members Infoactiv, MRI (Aust) Pty Ltd and Planet Ark. Thanks to the staff from Toowoomba Regional Council, BCF, Bunnings, IGA, Lifeline, Officeworks, Super Cheap Auto, Trade Tools, University of Southern Queensland and Wilsonton Betta Electrical who participated in the pilot.

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