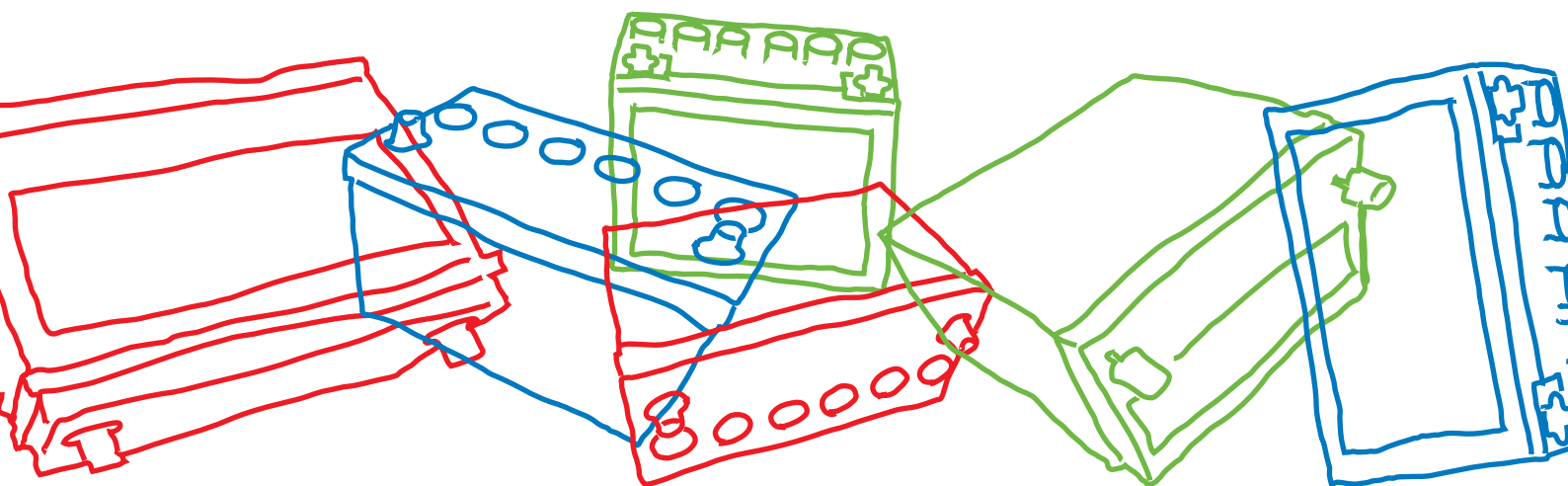


Lead Acid Battery Use, Disposal & Recycling in Australia

PLANET **ARK**

Research Report



About this Report

In 2011 Planet Ark commissioned an independent study on the lead acid battery recycling behaviour of Australians. The research was conducted by Pollinate, a specialist research company.

The Australian Battery Recycling Initiative (ABRI)¹ conducted a separate research study in 2010, *Analysis of Battery Consumption, Recycling and Disposal in Australia*.

This report presents the results of the Pollinate research but also draws on a number of key findings from the ABRI research. Unless specifically attributed to the ABRI research, the findings in this report have been drawn from the Pollinate research.

The Pollinate research focused on household usage of lead acid batteries. The ABRI research included household, commercial and industrial applications of lead acid batteries in Australia.

About Lead Acid Batteries

There are three types of lead acid batteries, which have different uses.

- **Sealed lead acid batteries** are used in a number of applications such as emergency lighting, security alarms, portable tools and consumer electronics.
- **Automotive batteries** are used for vehicle starting, lighting and ignition.
- **Large and industrial lead acid batteries** are used as backup power supplies in many situations, including storing the energy captured from solar panels.

For the purposes of this report, household usage of lead acid batteries has been defined as automotive and sealed lead acid batteries.

Although not all automotive batteries are used in household applications, approximately 80% of those purchased are used for motorcycles and passenger vehicles (ABRI, 2010). While large and industrial lead acid batteries have been excluded from this definition of household usage, increasingly these batteries are being used in conjunction with household-based photovoltaic systems as backup power sources, as well as in recreational marine vessels. As figures that strictly separate household usage from commercial or industrial usage are not available, Planet Ark has adopted the above, simplified approach.

¹ The Australian Battery Recycling Initiative (ABRI) has been formed by a group of battery manufacturers, recyclers, government bodies and environment groups to promote the collection, recycling and safe disposal of the full range of batteries. For more information visit BatteryRecycling.org.au

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Executive Summary

Key Findings

Consumption of Lead Acid Batteries in Australia

- About 9.2 million lead acid batteries are purchased in Australia each year, and 7.8 million reach the end of their useful life (ABRI, 2010).
- Australian households purchase more than 7.6 million lead acid batteries each year, and dispose of 6.4 million of them (ABRI, 2010).
- Lead acid batteries make up 91% (by weight) of the batteries disposed of nationwide. 63% of all lead acid batteries are used in cars (ABRI, 2010).
- 66% of respondents have their lead acid batteries changed by a third-party.

Methods of Lead Acid Battery Disposal

- Although car batteries have a high recycling rate, 135,000 are sent to landfill each year, and another 111,000 are stockpiled in places like household garages (ABRI, 2010).
- 25% of home alarm system batteries are placed in the household garbage bin.
- 36% of respondents reported taking their lead acid batteries to an appropriate collection or recycling location.
- 49% of respondents handed disposal responsibility to their mechanic or electrician. 39% were unsure what their mechanic or electrician would ultimately do with the battery.

Attitudes Towards Lead Acid Battery Recycling

- 93% of survey respondents thought that used lead acid batteries should be recycled.
- If there were an 'easy way to do it', 76% of respondents indicated they would 'definitely' recycle their used lead acid batteries. Another 23% said that they would 'probably' recycle them.
- When asked to identify what would motivate them to recycle their lead acid batteries, 50% of respondents said that 'knowing they would be properly recycled' would be enough of a motive. 49% indicated they would require a financial incentive
- When asked which type of recycling service they would prefer, 43% of respondents said they would prefer to use a council-provided community recycling bin

Lead Acid Battery Recycling Methods

- Reconditioning batteries was selected by 45% of respondents as the option with the greatest environmental, health and safety outcome.
- As 49% of respondents give their mechanic or electrician responsibility for disposing of their used lead acid batteries, it's important that householders ask their service provider what will happen to their batteries.

Survey Methodology

Collection Method

The quantitative survey was conducted online from 14 - 22 September 2011. The survey took each participant approximately 15 – 20 minutes to complete.

Survey Respondents

1,000 Australians aged 14 – 64 years of age responded to the survey. Respondents were recruited from a major panel provider in line with specified quotas, and are representative of the Australian population.

Males and females were represented equally. The proportions of participants in each age bracket are shown in Table 1.

Table 1: Survey respondent age distribution

| Age | |
|-------|-----|
| 14-17 | 8% |
| 18-24 | 14% |
| 25-34 | 21% |
| 35-49 | 31% |
| 50-64 | 15% |

Consumption of Lead Acid Batteries in Australia

In total, about 9.2 million lead acid batteries are purchased, and 7.8 million reach the end of their useful life in Australia every year (ABRI, 2010). By weight, lead acid batteries make up 91%, or over 120,000 tonnes of the batteries disposed of nationwide (ABRI, 2010).

Australian households purchase more than 7.6 million or 86,000 tonnes of lead acid batteries each year, and dispose of more than 6.4 million or 92,000 tonnes of them (ABRI, 2010).

Lead acid batteries are most commonly used in cars, according to both the Pollinate and the ABRI research (see Figure 1). Car batteries make up 63% of all lead acid batteries used (ABRI, 2010).

Figure 1: Lead acid battery use in Australian households

Q1: Which of the following items do you have?
Q2: Which of the following items had their battery changed MOST recently?

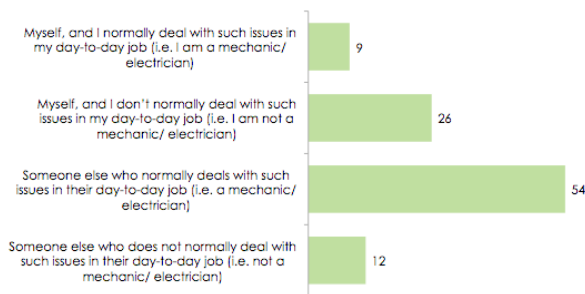
| | % | Items owned | Most recent battery change |
|--------------------|---|-------------|----------------------------|
| Car | | 87 | 80 |
| Home alarm systems | | 23 | 12 |
| Motorcycle | | 8 | 3 |
| Boat | | 8 | 2 |
| Solar panel | | 19 | 2 |
| Electric scooter | | 1 | 1 |
| None of these | | 11 | - |
| n | | 1000 | 893 |

Base: Total sample, Australians aged 14-64 (Sep-11 n=1000)

Most survey respondents (66%) have their lead acid batteries changed by a third-party, who is either a professional mechanic or electrician or a 'Do-It-Yourself' (DIY) style handyperson (see Figure 2). Most car batteries (59%) are changed by mechanics, and women are more likely to have their lead acid batteries changed by a professional (64%, compared to 43% of men). Home alarm system batteries are mostly changed by DIY handypersons (42%), who tend to be men.

Figure 2: Who changes the lead acid batteries you use?

Q3: Thinking about the most recent time the battery of your [INSERT ITEM] was changed, who changed the battery?



Base: Australians who own LAB-powered devices (n=893)

Methods of Lead Acid Battery Disposal

Fate of lead acid batteries in Australia

ABRI's research shows that end-of-life lead acid batteries in Australia are disposed of in a number of ways. These methods are outlined in Table 2, together with the percentage (by weight) of each lead acid battery category.

Table 2: Methods of lead acid battery disposal in Australia (from ABRI, 2010)

| Method of disposal | Percentage by weight of lead acid batteries | | |
|---------------------|---|------------|----------------------|
| | Sealed lead acid (handheld) | Automotive | Large and Industrial |
| Reprocessed in Aust | 37.1% | 82.3% | 80.4% |
| Legal export | 0.0% | 0.0% | 0.3% |
| Landfill | 30.3% | 2.5% | 3.1% |
| Stockpiled formal | 1.5% | 4.9% | 5.4% |
| Stockpiled informal | 31.2% | 2.1% | 2.6% |
| Rebirth | 0.0% | 1.6% | 1.7% |
| Illegal export | 0.0% | 6.6% | 6.6% |

Lead acid battery recycling rates

It is clear that some lead acid battery categories have high recycling rates. In particular, the rate of automotive battery recycling is relatively high due to well-established collection and processing infrastructure for car batteries, primarily driven by the commercial value of lead. Despite significant gains in this area, an estimated 135,000 car batteries are sent to landfill each year, and another 111,000 are stockpiled in places like household garages (ABRI, 2010). Without proper storage and processing, the potentially harmful materials inside lead acid batteries can leak out, and make their way into the land and waterways.

The survey results show that the method of lead acid battery disposal can vary, depending on the product the battery was used in. For example, 25% of home alarm system batteries are placed in the household garbage bin, compared to 2% of car batteries (see Figure 3).

When lead acid batteries of all types are considered, there is a lot of variation in the disposal methods adopted by Australians. In total, 36% of respondents reported taking their lead acid batteries to an appropriate collection or recycling location such as a collection point, a hazardous waste facility, a car battery retailer, a scrap metal dealer, a waste transfer station, or a designated car battery recycling bin (see Figure 3).

Almost half of respondents (49%) handed ultimate disposal responsibility to their mechanic or electrician, and 39% of respondents indicated they were unsure what their mechanic or electrician would ultimately do with the battery. Overall, 45% of female respondents and 27% of male respondents indicated that they gave their mechanic or electrician responsibility for safely disposing of their lead acid batteries but were unsure what would happen to them (see Figure 3).

When asked why they chose a particular disposal method for lead acid batteries, responses were similarly varied. Of the 11% who put their lead acid batteries in the household garbage bin, 41%

Figure 3: Methods of lead acid battery disposal

Q4: Thinking about the most recent time the battery of your [INSERT ITEM] was changed, what happened to the used battery?

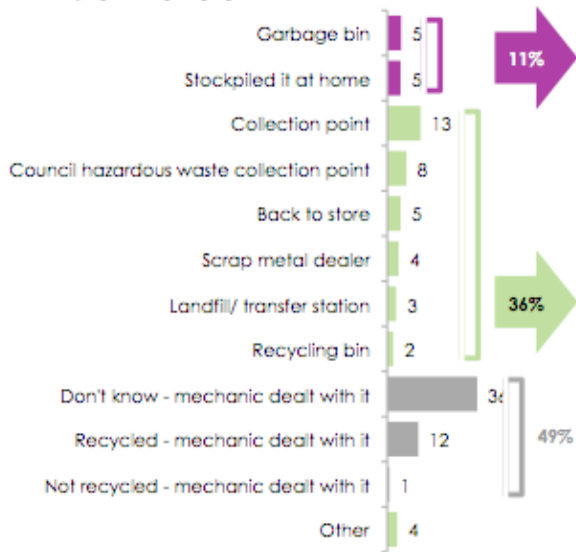
| % | Total | Who changed LAB? | | Product | | | Gender | |
|--|----------------|------------------|-------------|---------|-------------------|-------------|--------|--------|
| | Overall sample | Myself (DIY) | My mechanic | Car | Home alarm system | Motor-cycle | Male | Female |
| Garbage bin | 5 | 10 | 2 | 2 | 25 | 10 | 4 | 7 |
| Stockpiled it at home | 5 | 9 | 1 | 5 | 4 | 17 | 5 | 5 |
| Collection point | 13 | 25 | 5 | 12 | 15 | 21 | 17 | 9 |
| Council hazardous waste collection point | 8 | 14 | 3 | 7 | 7 | 14 | 10 | 6 |
| Back to store | 5 | 11 | 1 | 6 | 2 | 3 | 7 | 4 |
| Scrap metal dealer | 4 | 9 | 1 | 4 | 2 | 14 | 7 | 2 |
| Landfill/ transfer station | 3 | 5 | 1 | 4 | 4 | 0 | 4 | 3 |
| Recycling bin | 2 | 3 | 1 | 2 | 5 | 3 | 3 | 2 |
| Don't know - mechanic dealt with it | 36 | 7 | 59 | 39 | 27 | 14 | 27 | 45 |
| Recycled - mechanic dealt with it | 12 | 3 | 20 | 14 | 1 | 3 | 14 | 11 |
| Not recycled - mechanic dealt with it | 1 | 0 | 1 | 1 | 3 | 0 | 1 | 1 |
| Other | 4 | 4 | 4 | 4 | 6 | 0 | 2 | 6 |
| n | 893 | 230 | 479 | 713 | 104 | 29* | 446 | 447 |

Base: Australians who own LAB-powered devices

*Caution: low base size, avoid reporting the %'s based on these small bases – only presented for indicative purposes only

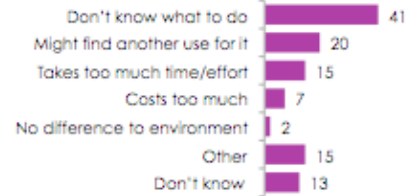
Figure 4: Reasons for / against lead acid battery recycling

What did you do with the used lead acid battery (ULAB)? (%)



Q4: Thinking about the last time the battery of your [INSERT ITEM] was changed, what happened to the used battery?
Base: Australians who own LAB-powered devices (n=893)

Why didn't you recycle the ULAB? (%)



Q6: What stopped you from returning or recycling the used battery?
Base: Those who did not recycle the used LAB, n=96

Why did you recycle the ULAB? (%)



Q5: Why did you return and/or recycle the battery?
Base: Those who recycled the used LAB, n=325

didn't know what they should do with them, and 7% (see Figure 4) indicated that other methods of disposal would cost too much, despite the widespread availability of free lead acid battery recycling locations nationwide.

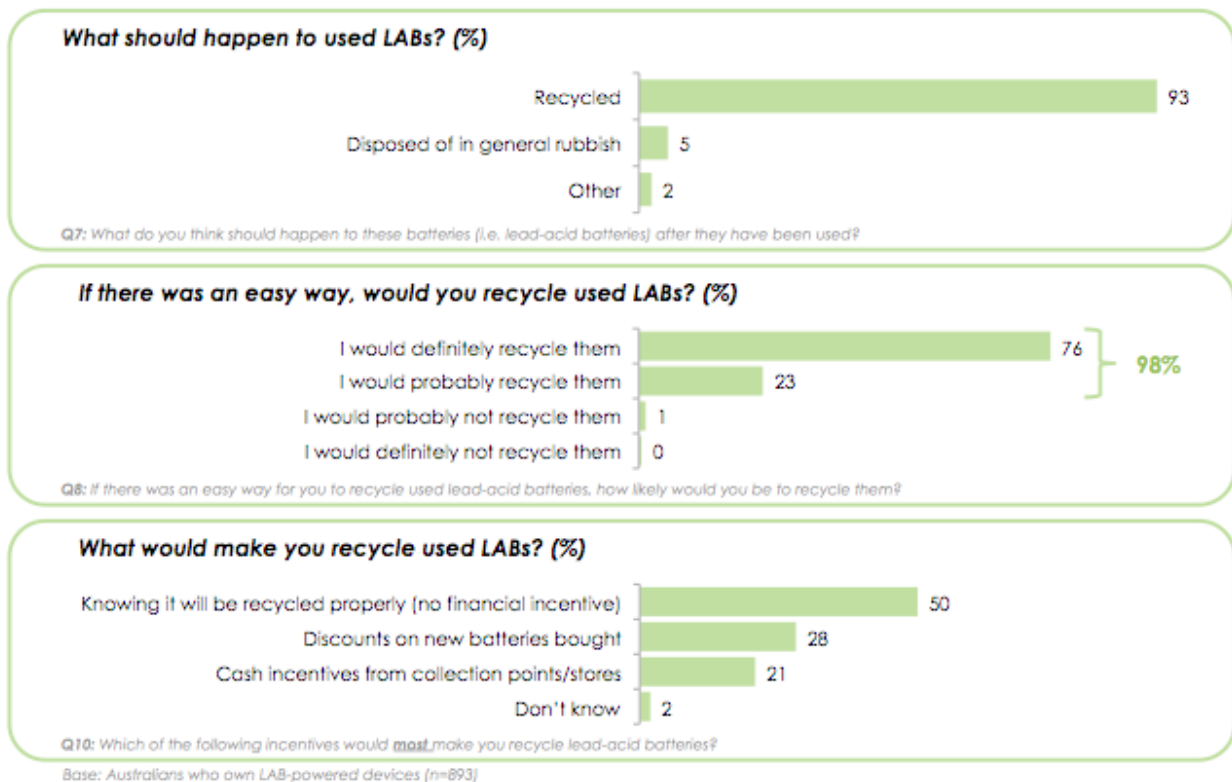
Of the 36% of respondents who chose to take their lead acid battery to a recycling or collection location, 55% did it because it was 'the right thing to do' and 35% did it due to habit. Financial incentives (cash or discounts) for recycling were important motivators for only 11% of respondents that already recycled (see Figure 4).

Attitudes Towards Lead Acid Battery Recycling

Most survey respondents (93%) thought that used lead acid batteries should be recycled (see Figure 5).

There is a significant gap between respondents' expressed attitude towards lead acid battery recycling, and their demonstrated disposal behaviour. While 93% of respondents think they should be recycled, only 48% indicated they knew their lead acid batteries were getting recycled (36% took their lead acid batteries somewhere, 12% knew their mechanic or electrician recycled them). This discrepancy may be partly due to a lack of knowledge about lead acid battery recycling options, or real or perceived inconvenience associated with recycling them.

Figure 5: Attitudes towards used lead acid battery (LAB) recycling



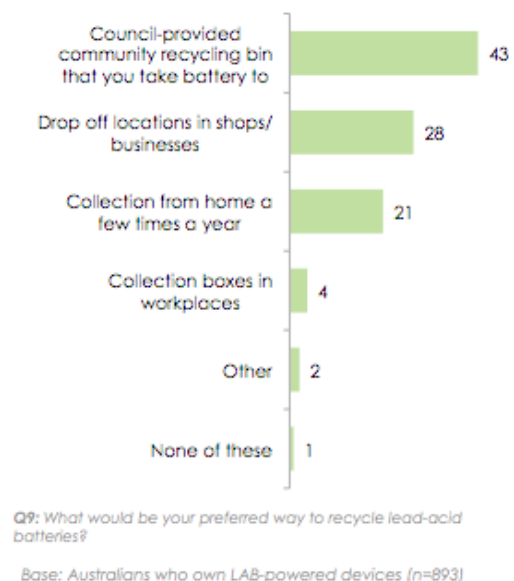
If there were an ‘easy way to do it’, 76% of respondents indicated they would ‘definitely’ recycle their used lead acid batteries. Another 23% said that they would ‘probably’ recycle them (see Figure 5).

When respondents were asked to identify what would motivate them to recycle their lead acid batteries, 50% said that ‘knowing they would be properly recycled’ would be enough of a motive. This corresponds well to the 48% of respondents already making efforts to ensure their used lead acid batteries are recycled (although 11% of these indicated financial incentives were the reason they recycled them). Interestingly an additional 49% of respondents indicated they would require a financial incentive to recycle their lead acid batteries (see Figure 5), even though 66% get their lead acid batteries changed by a third party, and any such incentive would not be directly available to them.

When asked which type of recycling service they would most prefer, 43% of respondents said they would prefer to take their used lead acid batteries

to a council-provided community recycling bin, 28% would prefer to drop them into a shop or business, and 21% would prefer a household collection a few times a year (see Figure 6).

Figure 6: Preferred system for recycling lead acid batteries



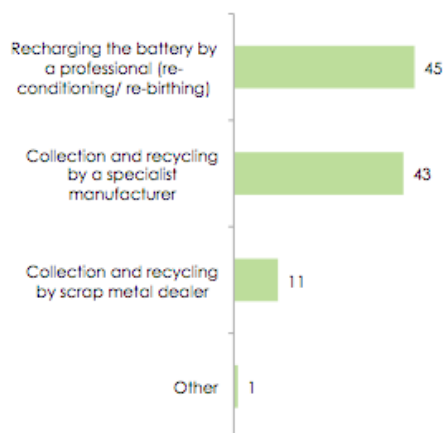
Lead Acid Battery Recycling Methods

Perceived 'correct' way of recycling lead acid batteries

Survey respondents were asked to nominate the lead acid battery recycling method with the best environmental, health and safety outcome. Recharging or reconditioning batteries was selected by 45% of respondents, and collection and recycling by a specialist manufacturer was nominated by 43%. A significant proportion (11%) believed that collection and recycling by scrap metal dealers yields the best outcome (see Figure 7).

However, while scrap metal recyclers will usually accept lead acid batteries for recycling, they often only recycle the lead component due to its high commercial value. The remaining components, including significant quantities of sulfuric acid as well as the plastic casing, may not be recycled correctly.

Figure 7: Perceptions of the 'correct' recycling method



Q11: Which process do you think has the best environmental, health and safety outcome?

Base: Australians who own LAB-powered devices (n=893)

The role of mechanics and electricians in recycling used lead acid batteries

As 49% of survey respondents give their mechanic or electrician responsibility for disposing of their used lead acid batteries, it's important that householders ask their service provider what will happen to their batteries. This is particularly important for women, as 45% of female respondents indicated they were unsure what their mechanic or electrician would do with their used lead acid batteries.

Simple questions to ask third party service providers in this area include:

- What happens to the lead acid batteries you collect?
- Do they get recycled?
- Who covers the cost to recycle them?

It's also extremely important that those professions dealing with large quantities of lead acid batteries know how to safely manage them. ABRI has prepared a short brochure outlining the basic requirements for the management of used lead acid batteries. The resource has been developed to help mechanics and electricians to manage their business risks, avoid legal prosecution, protect the health and safety of workers and the general public, and to avoid environmental damage from spills or accidents.

Responsible Recycling of Used Lead Acid Batteries: How to manage the environmental, financial and reputational risks is available for free download from [BusinessRecycling.com.au/recycle/lead-acid](https://www.businessrecycling.com.au/recycle/lead-acid).



Need to recycle your batteries from home?

The RecyclingNearYou.com.au website and hotline make it easy to find your nearest recycling service for household batteries, whether it's a drop-off point at a nearby retailer, business, or at the facilities of your local council or shire.

RecyclingNearYou can also help you find local recycling solutions for a range of other items including electronics, glass, packaging, garden clippings and light globes.

Search the website or call the RecyclingNearYou hotline on 1300 733 712*.



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* Hotlines: 9am – 5pm Monday – Friday EST.

Need to recycle batteries at work?

The BusinessRecycling.com.au website and hotline make recycling at work easy.

Specifically designed for Australian businesses, you'll find national and local re-use and recycling options for batteries as well as cardboard, food scraps, plastics, packaging, construction waste, electronics and more. The site contains information about the recyclability of every listed material as well as the contact and service details for recycling services.

The site is FREE for businesses to use. Visit BusinessRecycling.com.au

or call the Hotline 1300 763 768*.



Planet Ark's BusinessRecycling.com.au is a partnership program that has been funded by the NSW Government, the QLD Government, and Pitney Bowes.

The Australian Battery Recycling Initiative

The Australian Battery Recycling Initiative (ABRI) has been formed by a group of battery manufacturers, recyclers, government bodies and environment groups to promote the collection, recycling and safe disposal of the full range of batteries. For more information visit BatteryRecycling.org.au

