Battery stewardship and recycling update

Presentation to Waste Expo, 16 October 2014

Helen Lewis

Australian Battery Recycling Initiative
Panel members

- Helen Lewis, Australian Battery Recycling Initiative (ABRI)
- Jade Barnaby, Sustainability Victoria
- Steve Morriss, Close the Loop Ltd

Q&A / Discussion
Outline

- About ABRI
- Why battery stewardship matters
- Recycling challenges
  - Handheld batteries
  - Automotive & industrial batteries
ABRI’s vision

Effective stewardship of all end-of-life batteries

Zero batteries to landfill
We cover all battery types

**Handheld batteries (< 1kg)**
- Single use
  - Alkaline manganese
  - Zinc carbon
  - Zinc air
  - Silver oxide
  - Manganese dioxide
  - Lithium
- Rechargeable
  - Nickel cadmium
  - Nickel metal hydride
  - Lithium ion
  - Lead acid

**Automotive batteries**
- Rechargeable
  - Lead acid
  - Emerging technologies (e-mobility)

**Large and industrial batteries**
- Rechargeable
  - Lead acid
  - Nickel cadmium
  - Nickel metal hydride
  - Lithium ion
  - Lithium polymer
We cover all battery types

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- Single use
  - Alkaline manganese
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Automotive batteries
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Large and industrial batteries
- Rechargeable
  - Lead acid
  - Nickel cadmium
    - Nickel metal hydride
    - Lithium ion
    - Lithium polymer

Processed in Australia
Why recycle batteries?

**Safety hazards**
- Lithium – risk of fires and explosions
- Button and coin cells – risks from swallowing

**Impacts in landfill**
- Toxic materials – lead, mercury, cadmium

**Recover non-renewable resources**

**Maintain supply of critical materials**

**Meet consumer expectations**

**Contamination of other recycling programs**

**Organics (AWTs), e-waste, packaging**
Handheld batteries
Recovery rate is low by world standards

- Recycled: 3%
- Landfill: 97%

14,300 tonnes to landfill each year

Source: SRU et al (2014) Study into market share and stocks and flows of handheld batteries in Australia
BUT ...the collection network is growing

- MobileMuster AMTA
  - 1998

- Battery World
  - 2003

- ALDI
  - 2006

- WA local government
  - 2007

- BatteryBack (SV)
  - 2012

- City of Sydney
  - 2013
Industry services are also expanding

- A number of other ABRI members provide a commercial collection service for single use and rechargeable handheld batteries

- MobileMuster collects phone batteries

- Batteries in TVs & computers are collected through those schemes

www.batteryrecycling.org.au/recycling/handheld-batteries
ABRI guidelines to support recycling

Packaging

Safety guidelines
ABRI information sheets

- Q&A on handheld battery recycling
- Why recycle?
- Benefits of recycling handheld batteries
- Recycling efficiency for alkaline batteries
- Community attitudes and behaviour
- Regulations around the world
- Benefits of an all-battery scheme
- Handling used lead acid batteries

ABRI publications available at
www.batteryrecycling.org.au/recycling/handheld-batteries
Negotiations for a national scheme

The Product Stewardship Act (2011) – 3 options

Voluntary certification
Mobile phones, fluorescent lighting approved (2014)

Co-regulation
Televisions and computer regulations (2012)

Mandatory

‘Priority list’ for 2014/15 includes: EOL handheld batteries < 5kg
Battery Implementation Working Group

BIWG members

• Russ Martin, Chair
• Tony Roberts, Department of Environment and Heritage Protection (QLD)
• Kylie Hughes, Department of Environment and Heritage Protection (QLD)
• Declan O’Connor-Cox, Department of the Environment (Commonwealth)
• Jade Barnaby, Sustainability Victoria
• Helen Lewis, Australian Battery Recycling Initiative (ABRI)
• Ian McAlister, Consumer Electronics Suppliers Association
• Rose Read, Australian Mobile Telecommunication Association (MobileMuster)
• Rebecca Brown, Western Australia Local Government Association
• Sharon Kennard, Australian Information Industry Association
• Tennant Reed, Australian Industry Group

Industry participants

• Janet Leslie, Canon
• Chris Redfern, Samsung
• Ampie Cabangon, Proctor and Gamble
• Lok-Man Shu, OfficeWorks
Progress to-date

- April 2013 – Minister’s agreed to develop voluntary product stewardship scheme for handheld batteries
- June 2013 – Handheld batteries listed on product stewardship priority list
- August 2013 – stakeholder workshop (Brisbane)
- September 2013 – BIWG established and commenced development of a model voluntary product stewardship scheme for handheld batteries
- March 2014 – discussion paper released
- May-July 2014 – bilateral discussions (18) with peak bodies, battery brand owners, retailers and recyclers
- June 2014 – Re-commitment to product stewardship for handheld batteries on product list
- **July 2014 onwards – development of options paper**
Scope and themes

• Handheld batteries are batteries of any chemistry up to 5kg in weight
  o embedded batteries and automotive batteries are excluded

• Key areas scheme needs to address:
  o Free-riders
  o Cost-effectiveness
  o Meeting community expectations
  o Synergies with other schemes

• In-principle support for a phased approach – starting with rechargeable then expanding to primary
Next steps for BIWG

• Continued development on detail around various options

• Continued engagement with brand owners and key stakeholders

• Options paper: anticipated release February 2015

• Consultation on options paper: anticipated February/March 2015

• Anticipated report to Ministers: anticipated June 2015

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Challenges for handheld batteries

- Economics of recycling – industry support required
- National stewardship discussions – a lot of support but no agreement yet
- Growth in lithium batteries – safety and transport issues to be managed
- No local recycling markets for some battery types
- Export permits for alkaline batteries unnecessary
Automotive & industrial batteries
Existing technologies

• Established infrastructure for lead acid battery recycling and high recycling rate ~ 95%
  – Enirgi Metals Group
  – Hydromet
  – V Resource
  – Dodd & Dodd Group (export)

• Other chemistries
  • Vented NiCd (MRI, export)
  • Lithium ion, NiMH (export)
ABRI promotes responsible recycling

Packaging standard for transport

Brochures to promote best practices

ABRI publications available at www.batteryrecycling.org.au
ABRI promotes responsible recycling

Information sheets on ULAB recycling

www.batteryrecycling.org.au
New technologies

World: Electric vehicle production and lithium demand for electric vehicle batteries, 2008 - 2020

Source: Roskill

http://seekingalpha.com/article/2343505-lithium-sector-powering-up-to-new-highs-on-major-mergers-and-acquisitions-deals
Energy storage and e-mobility batteries

- Strong growth expected

- New battery technologies being developed to improve performance and reduce costs, particularly lithium

- Recycling lithium batteries a challenge – safety, recycling efficiency
  - Issues paper being developed for consultation

- ABRI is undertaking research & developing partnerships to ensure recycling is built into future growth
  - Clean Energy Council Energy Storage Working Group
  - Australian Energy Storage Alliance
Conclusions

• ABRI is actively working to improve the infrastructure and regulatory frameworks for recycling

• We encourage you to join ABRI to help us achieve safe and responsible recycling for all batteries

• Battery brand owners, distributors, retailers and installers all share responsibility for battery stewardship
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Sustainability Victoria – Battery stewardship
Waste Expo 16 October 2014

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SV’s function and obligations

Under Sustainability Victoria Act 2005

OVERARCHING OBJECTIVE

To facilitate and promote environmental sustainability in the use of resources.

s. 6 and s. 7(a) Sustainability Victoria Act 2005

- Reduced environmental harm
- Greater economic return on investment to Victoria
- A healthier and more liveable Victoria
SV2015

- **SV2015 Outcome:** Increased recovery of priority products and materials that contribute weight, that pose a risk and / or are a valuable resource.

- Victorian Waste and Resource Recovery Policy - *Getting Full Value*

- Enhance stewardship of products and reduce the amount recyclables currently going to landfill.
What is Product Stewardship?

A shared responsibility for managing impacts of products

Manufacturers
- Business Case
- Marketability
- Liable parties

Importers / Distributers
- Liable Parties
- Levy – Free riders
- Reverse Logistics

Retailers
- Drop-off points
- Transport
- Communication

Consumers
- Behaviour change
- Willingness to pay
- Consumer pressure

Processors
- Technology
- Aggregating volume
- Market price
Tools

- Getting Full Value
- Takeback Programs
  - Batteryback
  - Hazardous Household Chemical Collection Program
- Information and reports
- Support national product stewardship schemes
  - Voluntary
  - Co-regulatory
  - Mandatory
Batteryback Model

In 2013 we commenced Batteryback program expansion, increasing accessibility and service delivery of battery recycling ‘retail’ drop-off locations.

**Number of Collection Sites**

- **2008**: 4
- **2014**: 35

**Program Partners**

- **2012/13**: +50%
- **2013/14**
As anticipated, Batteryback program reach and collections have increased.

**Potential Program Reach**
- 4.25 million (2012/13)
- 19 million (2013/14)

**Monthly Collections**
- +68% (Per month)
  - 2012/13
  - 2013/14

sustainability.vic.gov.au
While also decreasing total program costs and increasing the efficiency of program costs to put more funds into actual battery recycling.
Other benefits

- High retailer engagement
- Cross industry support
- Influence national work towards battery stewardship (brand analysis, collection data)
- Valuable public safety and health information - Safety Guidelines
For consideration and leverage

- Consider the life cycle of products and materials used, particularly end-of-life upfront
- Test collections systems and infrastructure
- Ease and appropriateness of disposal
- Provide public safety and disposal information
- Identify and fill gaps in data
- With along industry supply chain
- Support national work
80% Alkaline
Strong growth in collections
Evidence that consumers want more access to drop off batteries

Collected through the BatteryBack™ program

<table>
<thead>
<tr>
<th>Year</th>
<th>Grand Total (kgs)</th>
<th>Alkaline</th>
<th>Buttons</th>
<th>Lead-Acid</th>
<th>Li-ion</th>
<th>Lithium Primary</th>
<th>NiCad</th>
<th>NiMH</th>
<th>Rubbish</th>
<th>Unknowns</th>
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<tbody>
<tr>
<td>2010</td>
<td>557.3</td>
<td>466.3</td>
<td>3.7</td>
<td>11.4</td>
<td>28.3</td>
<td>1.4</td>
<td>18.2</td>
<td>15.8</td>
<td>12.3</td>
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<tr>
<td>2011</td>
<td>2,346.7</td>
<td>1,872.7</td>
<td>24.3</td>
<td>141.5</td>
<td>106.2</td>
<td>23.7</td>
<td>72.7</td>
<td>63.9</td>
<td>41.7</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>2,605.5</td>
<td>2,119.6</td>
<td>21.7</td>
<td>147.1</td>
<td>117.8</td>
<td>27.4</td>
<td>72.9</td>
<td>66.5</td>
<td>32.5</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>6,416.5</td>
<td>4,938.0</td>
<td>29.5</td>
<td>320.5</td>
<td>358.6</td>
<td>49.5</td>
<td>282.3</td>
<td>248.4</td>
<td>28.2</td>
<td>161.5</td>
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<tr>
<td>2014*</td>
<td>8,454.3</td>
<td>6,873.0</td>
<td>103.4</td>
<td>361.7</td>
<td>301.7</td>
<td>73.6</td>
<td>279.3</td>
<td>224.5</td>
<td>44.7</td>
<td>192.4</td>
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<tr>
<td></td>
<td>Grand Total (kgs)</td>
<td>20,380.3</td>
<td>16,269.6</td>
<td>182.6</td>
<td>982.2</td>
<td>912.6</td>
<td>175.5</td>
<td>619.1</td>
<td>72.8</td>
<td>440.3</td>
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* 2014 is a forecast based on Jan-Sept figures

Collected through CtL's other collection programs

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<th>Year</th>
<th>Kgs</th>
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<tr>
<td>2012</td>
<td>1,985.7</td>
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<tr>
<td>2013</td>
<td>2,070.1</td>
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<tr>
<td>2014</td>
<td>2,045.0</td>
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</table>
In December 2013, CtL conducted an audit of the battery brands received from 3 Bunnings sites, 3 Coles sites, 3 Officeworks sites and the Michaels Camera Store. The summary of results was:

- Duracell account for 22% of batteries collected
- Energizer 16% of batteries collected
- Eveready 13% of batteries collected
- ‘Other Brands’ account for 49% all batteries collected.

Other brands include Varta, Ultracell, Woolworths, Panasonic and many more.
• CtL collects, sorts, and repacks for export
• A case for processing in Australia

• Technology to recover resources from Alkaline batteries does exist.
• All the raw materials can be recovered and reused in country.
• Build a plant and the collected volumes will increase rapidly.
• Economies of scale
  • Need min. 2000 tonne / year for ROI of 3 years
  • Assumes approx. $1.00 / KG gate fee
  • And approx. AU$0.15c / KG sale price for outputs

• Custom built smaller plant
  • Assume 1000 tonne / year for 3.5 yr ROI

• Current collections
  • CtL (SV) – 8.5 tonne
  • CtL other – 2.0 tonne
  • Other programs - ??
  • Total – 136 tonne

• Battery sales
  • Total handheld batteries ~ 400M units
  • 80% alkaline = 320M units or 8,500 tonnes

• We need to collect approx. 10% of alkaline batteries sold to make a recycling plant viable in Australia
  • At the moment we are collecting < 2%
• A call to action
  • We can either wait until manufacturers volunteer to manage the EoL of batteries
    • We could be waiting awhile!
  • Or, we can incentivise them with ………
    • Product Stewardship legislation like tyres, oil and paint (that works!)
    • Voluntary stewardship like Cartridges 4 Planet Ark and Mobile Muster
    • Purchasing guidelines (like EPEAT), which also work
    • Consumer demand

• EoL management of consumer products is becoming part of a company's license to operate
  • Leading brands in other sectors embrace the circular economy as an opportunity, not a cost
  • It's a matter of when not if.