



AUSTRALIAN BATTERY RECYCLING INITIATIVE

# ACHIEVING BATTERY STEWARDSHIP IN AUSTRALIA

## POSITION PAPER

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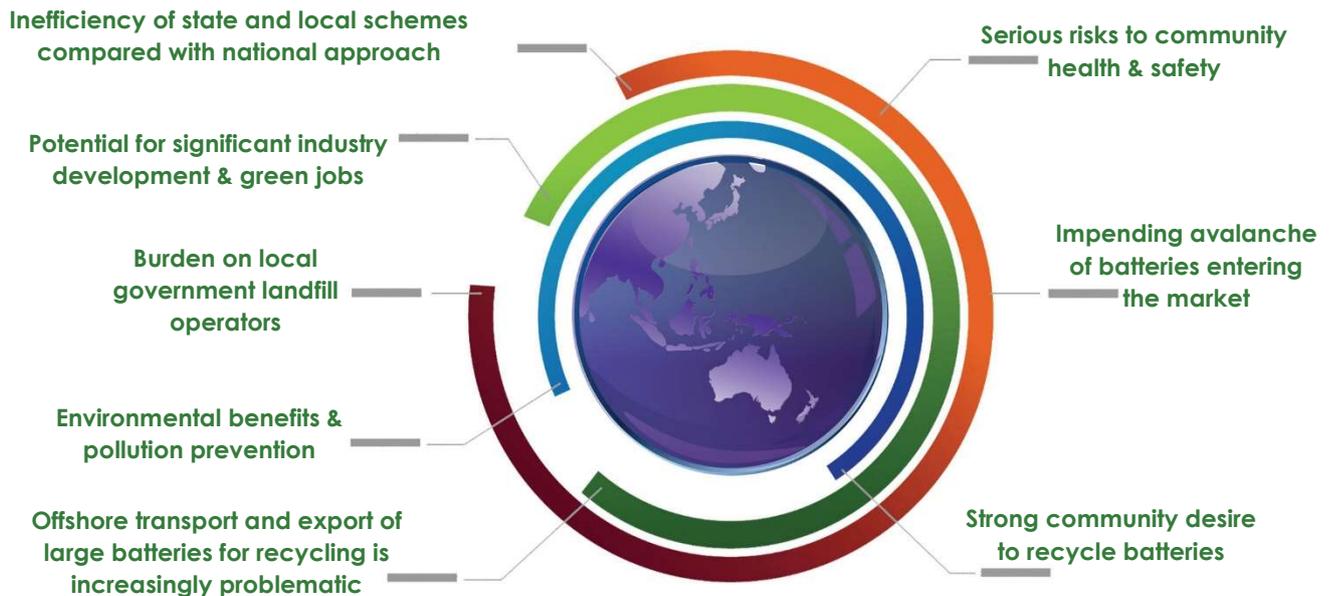
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## 1. BATTERY STEWARDSHIP FOR AUSTRALIA - TOGETHER WE CAN CREATE A SUCCESS!

Action is needed to bring Australia into the 21<sup>st</sup> century and achieve responsible management of handheld batteries at the end of their life. Together, government and industry can create a practical streamlined and efficient battery stewardship scheme to reduce risks to the community and increase recovery of valuable resources from e-waste including precious metals and high-quality plastics.

## 2. NEED FOR RESPONSIBLE MANAGEMENT OF ALL BATTERIES IN AUSTRALIA

ABRI believes that time for action is now to ensure that *all* used batteries are included in planned product stewardship efforts. The reasons for this are compelling.



## 3. GOVERNMENT ACTION IS URGENTLY NEEDED

By supporting the Industry recommendations and also committing to including all batteries in the scheme, the government will fulfill its responsibility for responsible management of resources and community safety. By doing so, the government will ensure that Australia is well placed to:

- ◆ Manage the potentially very serious impact on community health due to battery generated landfill fires,
- ◆ Responsibly manage the impending avalanche of batteries entering the market,
- ◆ Improve child safety by creating a culture of recycling for lithium ion batteries,
- ◆ Reduce the burden on local government landfill operators,
- ◆ Protect the environment and reduce toxins being released into the environment,
- ◆ Facilitate increased resource efficiency by redirecting materials currently going to landfill into new commodities and products, and
- ◆ Realise green jobs in the collection, sorting, and processing of waste batteries that will be generated if batteries are included in the product stewardship scheme.
- ◆ Support growth in the emerging local battery recycling industry

### 3.1. SERIOUS RISKS TO COMMUNITY HEALTH & SAFETY

The grounds for prioritizing battery stewardship are particularly compelling when put in the context of the health effects resulting from landfill fires. Lithium ion and some 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 landfills in Australia continue to grow. The environmental and community health impacts associated with a landfill fire are very serious and continue well past the initial event.

These incidents result in emissions of toxic fumes in surrounding communities, are a danger to fire fighters and landfill operators, and are costly to control. Studies showing 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.

### Child safety

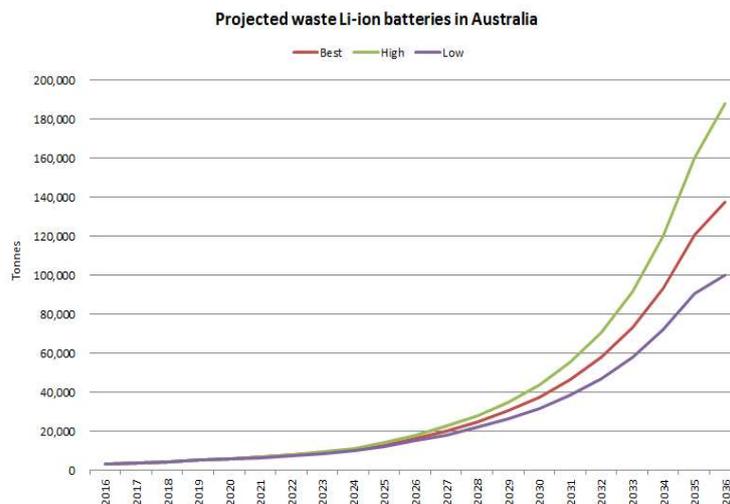
Small lithium coin batteries, such as those contained in remote controls and toys, are also a health and safety hazard to children. The ACCC reports that 5 children are reporting to hospitals each week with button cell battery related injuries. This is clearly a terrible outcome from a child safety point of view, but it has serious impacts on other state budgets such as the health budget.

We have had cases of children who have died after ingesting a lithium battery in Australia. These batteries are extremely dangerous if swallowed because saliva triggers the batteries to generate an electric current, resulting in chemical burns. ABRI is collaborating with a range of stakeholders in the medical profession and child safety organisations to develop solutions for safe disposal and recycling.

### 3.2. IMPENDING AVALANCHE OF BATTERIES ENTERING THE MARKET

Batteries have become a ubiquitous part of our daily lives and our reliance is only accelerating. One of the fastest growing markets for these batteries is energy storage to support renewable power.

The quantity of lithium ion batteries entering the waste stream is a particular concern. A recent report estimating that it will grow by upwards of 300% each year by 2036<sup>1</sup>, and result in waste battery generation of between 100,000 and 187,000 tonnes per year.



187,000 tonnes<sup>2</sup> is a big number, but not always easy to visualise. This image is provided for a reality check. The Opera House weighs approximately 165,000 tonnes.

In other words, we will be wasting the Opera House's weight in batteries each year in the near future, unless we prepare now for a resource recovery approach.

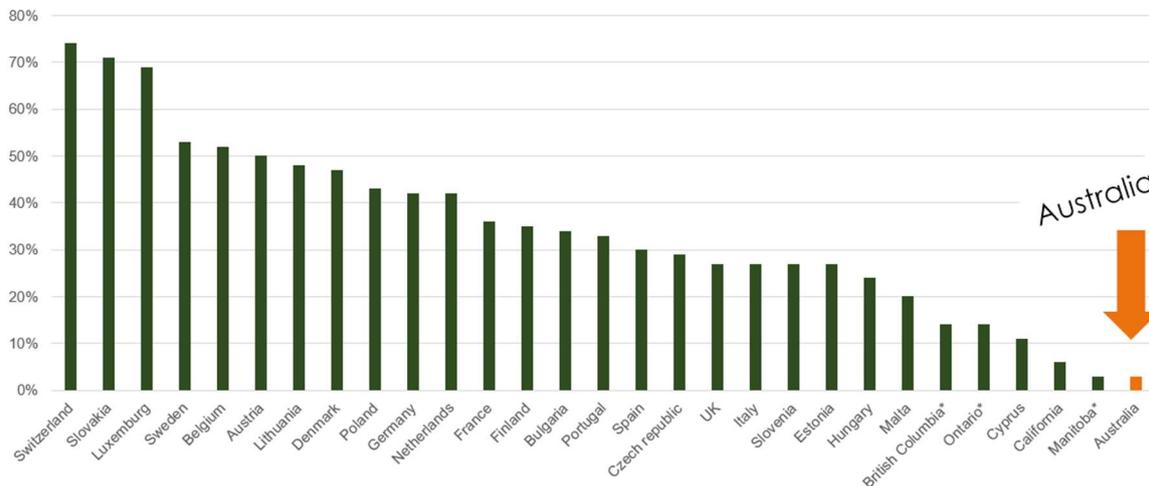


<sup>1</sup> Blue Environment, Ascend and REC (2015), Hazardous waste infrastructure needs and capacity assessment, Final report to Department of the Environment

<sup>2</sup> Randell Environmental Consulting Pty Ltd & Blue Environment for the Hazardous Waste Section Dept of the Environment July 2016

Australia currently has a very low recovery rate for handheld batteries, there is now a need for direct action to prepare for this rapidly expanding and problematic waste stream.

In comparison to other OECD countries, Australia lags behind other OECD countries as can be seen in the figure below. Examples of successful programs are plentiful and



### 3.3. STRONG COMMUNITY DESIRE TO RECYCLE BATTERIES

Public support for battery recycling (Planet Ark, 2016) is a consistent theme of research in this area. The Planet Ark Pollinate survey found that “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”. In addition, the community is actively seeking options for recycling with a significant proportion of inquiries to Planet Ark’s information line. According to Planet Ark, batteries consistently feature in the top 5 searched materials in the recyclingnearyou website.

### 3.4. BURDEN ON GOVERNMENT LANDFILL OPERATORS

Environmental hazards associated with batteries are well known. Many contain heavy metals that are toxic and have the potential for significant impact to humans and the environment, particularly water resources. Although landfill technologies are now able to prevent leaching to a large extent, they are expensive to build and rehabilitate and they are not infallible, and fire management remains a constant risk management concern.

### 3.5. ENVIRONMENTAL BENEFITS & POLLUTION PREVENTION

The inclusion of batteries in the Victorian landfill ban will lead to significant environmental benefits and pollution prevention. In her thesis, Anna Boyden (2016) draws from a wide range of research and concludes that the benefits are numerous, and include:

- ◆ Increased recovery of non-renewable resources, reduced environmental impacts associated with mining, manufacturing of virgin materials, and landfill operations (Lewis, 2010),
- ◆ Reductions in energy consumption (Gaines, 2010), and
- ◆ Reductions in greenhouse gas emissions, and 51.3% natural resource savings (Dewulf, 2010).

Many batteries contain toxic heavy metals such as mercury, lead or cadmium that could leach into the natural environment over the extended life of a landfill. Toxicity is a particular concern for large vented nickel cadmium batteries, automotive and industrial batteries (lead acid), power tool and emergency lighting batteries (mostly nickel cadmium), and some older household batteries that may contain mercury.

### Resource efficiency & materials recovery

Almost all batteries can be recycled to recover metals and other valuable components as shown in the table below.

Processing of Battery Type	Contents (may vary depending on application/battery type)
Lithium-ion	Phosphate, cobalt (heavy metal), lithium, carbon, Silicon, graphite, manganese, tin, iron, copper, nickel, plastic
Lithium metal / Lithium Primary	Lithium perchlorate (possible), organic solvents
Nickel-metal hydride	Nickel (heavy metal), potassium hydroxide, Zinc, Aluminium, Cobalt, Manganese, Misch Metal (rare earth)
Nickel Cadmium	Nickel oxide hydroxide, cadmium (toxic heavy metal),
Some button cell batteries	Lithium ion, Mercury, alkaline, silver oxide, manganese, silver
Alkaline batteries	Zinc, manganese, potassium hydroxide, casing materials, separator materials, plastic, plastic, aluminium, mercury (in older batteries_
Lead acid	Lead, carbon black, barium sulphate, separates (wood, glass, plastic, rubber, glass, cellulose or PVC)

The value of materials recovered from batteries varies. Resource recovery is particularly important for some of the scarcer materials, but in general there is no doubt that the majority have real value that is lost for the foreseeable future once it enters the landfill.

Recent studies by the Battery University found that the viability of recycling is dependent on battery type.

This table provides an indication of this variation and highlights the inhibitors for market forces to responsibly manage the lower value batteries such as lithium ion and nickel cadmium.

Battery Chemistry	Recycling
Lithium cobalt oxide	Subsidy needed
Cobalt	Subsidy needed
Lithium iron phosphate	Subsidy needed
Lead acid	Profitable
Nickel	Subsidy needed
Cadmium	Subsidy needed

### 3.6. INDUSTRY DEVELOPMENT & GREEN JOBS

A landfill ban in Australia would divert hazardous materials from landfill, support the development of a viable recycling industry in Australia, and complement the objectives of e-waste and battery stewardship programs. New technologies and green jobs are emerging in response to this growing waste stream. Green jobs from increases in collection, sorting, and processing of waste batteries will be generated if batteries are included in the Victorian landfill ban.

There is a well-established collection and recycling infrastructure for lead acid batteries, and markets for most other battery types either in Australia or overseas. A reprocessing facility for lithium ion (Li-ion) and nickel metal hydride batteries has recently been commissioned in Melbourne and we have a new member in WA developing innovative processing technologies for lithium batteries.

### 3.7. INEFFICIENCY OF STATE AND LOCAL SCHEMES COMPARED WITH NATIONAL APPROACH

Industry regularly indicates that a national approach is the preferred framework for battery stewardship as it ensures a cost effective and efficient environment in which to operate. The current lack of leadership at the national level is resulting in state and local governments taking action to investigate or implement a range of approaches including landfill bans, battery deposit schemes, and other arrangements. While these local and state based programs have merit, they are not able to provide a coordinated approach, do not take advantage of economies of scale, and hinder the necessary community awareness and education. This fragmented approach will lead to duplication of effort for many stakeholders, result in additional costs for retailers and manufacturers, and provide an uncertain investment environment for recyclers.

**END**