call2recycle®
Leading the charge for recycling.™

Embedded Battery Research Summary

A report commissioned by Call2Recycle, Inc.
Research conducted by Kelleher Environmental

OVERVIEW

In September 2017, Call2Recycle engaged Kelleher Environmental to carry out a research project to explore the different policy options to address the end-of-life disposal of consumer batteries particularly in products such as WEEE (waste electrical and electronic equipment). These items include traditional e-waste such as laptops, tablets and smart phones in addition to broader products like power tools and electronic toys, etc. The study sought to determine the potential implications, particularly environmental impact, of different policy approaches.

Study Research: Interviews, Literature Search and Web Research

A total of 29 representatives of different organizations were interviewed as part of the study research. Interviews were carried out with four battery manufacturers, eight state and provincial officials, seven WEEE recyclers, three companies in the reuse/refurbishment business, two auditing and standards representatives and two downstream processors. Information from the interviews informed study conclusions and policy development, complemented by extensive literature review and web related research.

REPORT FINDINGS

WEEE and Consumer Battery Legislation in the U.S. and Canada

In the U.S. 25 states have some type of WEEE legislation, and nine states have some type of consumer battery legislation. The products covered in the WEEE legislation vary from some states with a short list of products to others with more extensive lists. Consumer battery legislation varies from Vermont, where separate primary batteries only are regulated, to other states where only specific chemistries of secondary batteries are regulated.

All provinces in Canada have some form of WEEE regulations in place. British Columbia has the most extensive list of regulated WEEE, as their legislation is modeled after the European WEEE Directive and contains virtually all the categories in the WEEE Directive, including power tools and toys. Other provinces such as Alberta have a simple list of regulated products only including

televisions, monitors, laptops, PCs and printers currently. Canadian and U.S. legislation also varies in terms of identifying the party responsible for financing the recycling of WEEE and batteries. Generally speaking, the responsibility falls to the brand owner or first importer of the consumer battery or product containing the consumer battery.

EPR (Extended Producer Responsibility) Policy Considerations for Included Consumer Batteries

Over the past 10 years, there has been huge growth in the integration of batteries within all EEE (electrical and electronic equipment) and consumer EEE, such as mobile phones, laptops and tablets. Consequently, included consumer batteries – alkaline, lithium primary and lithium ion, in particular – are a much bigger issue than they were just few years ago. Public policy and recycling practices are attempting to adjust to this growth.

Many consumer batteries are not removable from devices by a consumer without specialized tools and training. This leads to the question as to whether the batteries should be addressed from the perspective of public policy as a consumer battery or as a component of a consumer product.

Unlike primary batteries, most rechargeable consumer batteries are sold with a product (such as a smart phone) and, unless it is a replacement battery, not as a separate item. This makes them different than other products subject to EPR (extended producer responsibility) legislation, in that batteries always "travel" with another product.

Given this unique status for consumer batteries, there is no clear policy direction as to how EPR policy should address overlapping products such as consumer batteries, although examples exist such as the EPR legislation for end-of-life vehicles in the European Union that address this issue. The European WEEE and battery directives also address this issue and, in some situations, compliance schemes such as WEEE Ireland manage obligations for both battery and WEEE producers through the same company.

The fate of included consumer batteries at end-of-life is not always clear. There needs to be greater assurance and sufficient transparent tracking to confirm that they are properly managed to achieve high environmental outcomes and, where possible, to ensure that the consumer battery or its components are re-introduced into the circular economy.

Health and safety concerns (particularly from fires and explosions of lithium batteries) are an increasing concern with more lithium batteries contained in end-of-life electronics and other products. Greater assurance is needed that sufficient best practices for health and safety are in place for consumer battery collection recycling and processing locations along the supply chain.

Criteria to Identify Preferred Policy Approaches for Consumer Batteries Included in Products

The following criteria were used to identify the preferred policy options:

- Diversion Potential – Recognizing the commitment to a circular economy and sustainable materials management (SMM): Options that eliminated primary batteries were excluded, as primary batteries make up a large percentage of the total end-of-life consumer battery stream; and, options that excluded rechargeable batteries were eliminated as they miss a significant opportunity to re-introduce materials such as nickel and cobalt into the circular economy;

- Complexity of Differentiating Between Removable and Non-Removable Batteries – Given the complexity for consumers and the outreach necessary to potentially obligated producers, policy options that differentiated between removable and non-removable consumer batteries were considered too challenging to monitor and enforce. Developing and then enforcing clear definitions was considered problematic for a variety of reasons, therefore only policies that addressed all consumer batteries - removable as well as non-removable - were retained;

- Level Playing Field –An important feature of public policy is to create a level playing field so that products and applications of those products are treated in a similar fashion. Creating different obligations for primary versus rechargeable batteries would create a differing playing field for producers, therefore any options that only addressed either primary or rechargeable batteries but not both were eliminated from further consideration;

- Eliminate Free Ridership – Choosing policy options that achieve good environmental outcomes and minimize the opportunity for free ridership of obligated producers is necessary to ensure the financial sustainability of the collection and recycling program;

- Marketplace Dynamics – Given the growth of rechargeable batteries in products, it is important to ensure that this segment of the consumer battery market is included in the program. In addition, given the growth in primary batteries included in products, this segment of the market should also be addressed by any policy measures;

- Ease of Compliance – Important criteria for evaluating the policy options is the ability of each option to achieve high compliance by the obligated parties. This is relevant for both the financial resources available to the stewardship organization as well as the staff and tools necessary for the regulatory authority to ensure compliance with the program requirements.

The research concluded that the optimal policy option should have the following attributes:

- Encompass both primary and rechargeable consumer batteries to divert a larger amount from disposal;
- Include both removable and non-removable consumer batteries to create a level playing field;
- Obligate either the battery manufacturer or the product producer for consumer batteries within products while recognizing that in some cases, it is more practical to obligate the product manufacturer (specifically for consumer batteries sold with toys);
- To maximize collections, there needs to be an equitable mechanism to ensure that costs to collect are ultimately distributed to those who manage the batteries;
- Where the battery manufacturer is not visible or traceable and cannot be identified, obligate the product brand owner for the included consumer battery.

On this basis, two options which address all consumer batteries, primary and rechargeable, and include non-removable batteries are considered the most comprehensive options which will achieve the greatest diversion of consumer batteries. In one case battery producers are responsible for all batteries. In the other, the obligation is split between battery and product producers. Either approach could work but rules regarding proper tracking of battery mass balances and fair payment of overlapping responsibilities need to be clear in the dual responsibility option. This is discussed in more detail in the next section.

Comprehensive and Transparent Data Tracking

Data on the amounts of consumer batteries recovered from WEEE is currently measured and tracked by WEEE recyclers but is not reported publicly because there is often not a regulatory requirement to do so.

Regulations need to be expanded to ensure proper tracking of data on consumer battery recycling by organizations responsible for WEEE. Doing so ensures a clear chain of custody to facilitate the collection of complete consumer battery flow information through the end-of-life supply chain. This information is needed for many reasons:

1. Accurate Recycling Rates – When the flow of all consumer batteries from both WEEE and consumer battery recycling programs is identified, it will lead to greater accuracy of the actual recovery (collection) and recycling efficiency rates;

2. Reuse of Consumer Batteries – Reuse should be included in the end-of-life data reporting system, to account for consumer batteries that enter the reuse supply chain after end of first life. This activity is believed to be increasing and needs to be tracked by appropriate reporting mechanisms to ensure proper management;

3. Proper Chain of Custody – A monitoring, tracking and reporting system should ensure that double counting does not occur, and recycling of the same battery is not reported twice. The monitoring, tracking and reporting system will allow for greater accuracy of data, and is necessary to monitor program progress, as well as to target investments in education and collection and processing infrastructure;

4. Prevents Dual Responsibility – A proper and audited chain of custody and reporting system ensures that consumers and product/battery producers are not paying twice for the management of the same product at end-of-life to meet obligations when consumer batteries are included in a consumer product;

5. Fair Compensation – When one program handles consumer batteries that were paid for by a second entity, fair compensation can be negotiated if there is full and transparent tracking and sharing of battery flow information, facilitated through proper data tracking;

6. Encourage Collections – A more transparent system where collection costs are compensated by fees collected from producers will encourage more collections because concern about unreimbursed costs will be mitigated.

Reconciling Data and Costs

An equitable system is needed to fairly compensate a program that incurs the cost of recycling consumer batteries but where the producer fees have been paid to another program to fulfil the obligations. No stewardship organization should assume the costs of managing batteries and not receive the fees paid for these efforts. As an example, consumers often drop obligated WEEE into Call2Recycle boxes at retailer stores that are intended and financed for solely batteries.

With the introduction of competition to the producer responsibility marketplace in Ontario in particular, multiple organizations operating on behalf of producers may be involved in the management of consumer batteries in WEEE in the future. Some type of clearinghouse mechanism, as is common in the EU for several product categories, may be needed to ensure that each of these future organizations is fairly compensated for the legitimate and verified consumer battery recycling which they accomplished.

The reporting of the amount of consumer batteries by chemistry that is managed as part of WEEE, in North America in particular, is not widespread. Reporting requirements need to be imposed on entities that process and recycle WEEE and consumer batteries to report on the weight managed to improve the data available on the collection and recycling of consumer batteries.

Updating Legislation

Most of battery-related statutes in the U.S. were enacted in the 1990's with a different market context for batteries, as well as the number of products sold with batteries. The lack of concrete compliance and enforcement provisions in many of the laws present a challenge for both state regulatory authority oversight and program operators.

The legislation and rules regarding consumer batteries need to change and be updated as the market for products containing batteries changes rapidly. Modifying laws and regulations is often a slow process and generally cannot keep up with the rapid pace of introduction of new products and devices into the consumer market.

Battery legislation was initially developed to ensure the proper management of toxic metals such as mercury, cadmium and lead. However, public policy has not kept up with the evolution of products powered by batteries and the emergence of non-toxic battery chemistries – particularly lithium-based batteries – that serves as a considerably less harmful material. Public policy needs to be revisited to ensure that material is handled safely, diversion rates are optimized and producers are ultimately treated equitably.