LITHIUM BATTERIES IN THE RECYCLING STREAM

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OVERVIEW: the Call2Recycle® Program

- Founded in 1994 by industry to address the emergence of EPR legislation.
- In the U.S., funded primarily by rechargeable battery stewards and, more recently, fee-based services.
- In the U.S., we’re primarily a voluntary program except in certain states (e.g., Vermont, Minnesota, New York) where collections of some (but not always all) chemistries is mandated.
- In Canada, Call2Recycle® is primarily a mandatory program financed via Environmental Handling Fees (EHFs) applied at point of sale.
- Collected over 144 million pounds of consumer batteries since from over 30,000 publicly accessible sites; collected over 30 million pounds of lithium ion (Li-Ion) since inception.
What are our Responsibilities?

• **Reverse Logistics Management.** Manage collection, pick-up, transport, sorting and processing.

• **Education & Promotion.** Beyond educating consumers, collection sites and businesses on why and how to recycle, we convince opinion leaders that we do things right.

• **Administration & Performance Reporting.** Regulatory submittals, voluntary reporting, certifications, downstream verification, etc.

• **Customer Service.** Inbound and outbound call center that manages 10,000 inquiries per month.
The BIGGEST Issue
Safe Handling of Batteries (June 2017)

Reference: https://youtu.be/AIff-fKTBYE
The Dynamic Lithium Battery Market

• **More Products with Batteries.** As more products using batteries (e.g. toys, tools, electronics) are sold, more batteries flood the recycling market.

• **Identifying Battery Types.** Battery chemistries can be hard to identify so it’s hard to protect the most hazardous ones.

• **Increasing Energy Density.** As the power of batteries increases and their size shrinks, the chances for severe incidents goes up.

• **More Non-OEM Batteries Sold.** The sale of counterfeit batteries, which are more likely to cause safety incidents, are increasing.
The Dynamic Lithium Battery Market (Cont.)

Electric dreams
Manufacturing capacity
Gigawatt-hours per year

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<thead>
<tr>
<th>Company</th>
<th>2017</th>
<th>2020</th>
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<td>Panasonic* (Japan)</td>
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<td>Samsung SDI (South Korea)</td>
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Sources: Cairn ERA; US Department of Energy

5.6 Billion Lithium Ion Cells Sold in 2016

Battery cost
Worldwide, $/kWh

Battery energy density
Watt-hours per litre

FORECAST

*Includes Tesla gigafactory
Identifying Lithium Primary Batteries (Lithium Metal)

- **Increasing Market Share.** Lithium primary batteries are growing in sales with consumers. More power over a longer period of time.

- **Sizes Vary.** They *MAY* come in the following sizes: 9v, AA, AAA, C, D, Coin/Button cell

- **Unique Identifiers/Markings *MAY* be there.** Lithium primary batteries could be marked - ‘Lithium’ or ‘Lithium cells’; marked as “CR###”

- **Recycling Arrows.** Recycling arrows are not typically printed on these types of batteries.
Identifying Lithium Rechargeable Batteries (Lithium Ion)

• **Increasing Market Share.** Lithium rechargeable batteries are growing in sales and allow manufacturers to power products they never dreamed could be powered by batteries.

• **Sizes & Shapes Vary Greatly.** Lithium rechargeable batteries come in all shapes and sizes, i.e., power tool, cell phone, and coin cell batteries.

• **Unique Identifiers/Markings MAY be there.** Lithium rechargeable batteries could be marked – “Lithium Ion” or Abbreviation “LI-ION”, “Li-ion”, “LiPo” (lithium polymer); Button/coin Cell – “LIR#####”

• **Recycling Arrows.** Recycling arrows are often printed on these types of batteries.
What Products Use Lithium Batteries?
Where are the batteries?
Charge Up Safety!™ Campaign

- **Foster Employee Leadership.** Improve our knowledge, culture and commitment to safety to enable us to serve as leaders and influencers with customers.

- **Improve Collection Site & Sorter Performance.** Increase visibility, accountability and behaviors surrounding safe handling, storage and transport of batteries.

- **Drive Consumer Awareness.** Improving the visibility and knowledge of safe practices.

- **Engage Stakeholders.** Build relationships with other like-minded organizations to influence public and government debate on relevant safety issues.
Charge Up Safety!™ Campaign

• Consumer Education. Consumer centric materials were developed, such as a Safety Video and portal, as well as consumer outreach events.

• Collection Site Education and Training. Collection site partners were provided additional shipping guidelines and are now required to take safety training to remain an active site.

• Operational Improvements. Several operational improvements were made, from random collection box audits to site suspension / retraining. Also a new fire retardant box liner was developed and in use.
 Avoid the Spark™ Pilot & Campaign

• **Partnership for Safe Battery Handling** – With support of five industry groups, Call2Recycle piloted the *Avoid the Spark. Be Battery Safety Smart.*™ campaign to generate awareness with stakeholders and residents on battery safety.

• **Focus Area** – Alameda, Marin, San Francisco, San Mateo and Santa Clara, CA. Each county offers curbside battery recycling and has high recycling collection rates, making them.

• **Phase One** – May 2018. 177 total media mentions (print, online and radio), 196.7M+ total reach, $257K+ total publicity value, YOY July unprotected terminal rates down in focus area.

• **Phase Two** – Oct. 2018. Engagement & activation of safe battery practices, including handling, transport and disposal. Launch of [www.aviodthespark.com](http://www.aviodthespark.com)
Proper Handling of Batteries
- Terminal Protection -

- Residual Charge. Many batteries hold a residual charge even when they appear dead.

- Battery Terminals MUST be Protected. You must prepare batteries for shipment according to U.S. DOT & Program guidelines.

- Bagging Individual Batteries. The quickest and easiest way to protect battery terminals – ONE battery per bag.

- Taping Battery Terminals. Use tape (i.e., clear packaging tape) to cover the positive terminal (the one with the bump) or charging terminals.
Proper Handling of Batteries - Damaged, Defective or Recalled Batteries -

Do NOT place damaged Lithium Ion or Lithium primary batteries in normal collection bins. Immediately place in absorbent, non-flammable material (sand or cat litter) in a cool, dry area.
Managing Batteries at YOUR Facility!

- **Contract with a Recycler.** DO NOT WAIT – battery volumes are only going to increase! Partner with a reliable battery recycler to ensure batteries are properly handled & recycled (R2 2013).

- **Choose a Container Type.** Recycling programs offer several different sizes and types of containers. Choose one that best addresses your needs – space, volumes, desired accumulation time, etc.

- **Designate a Storage Area.** Determine where and how collected batteries will be stored at your facility (often dictated by size and type of facility) –
  - Isolate away from other materials (i.e., recyclables = fuel)
  - Limit exposure to the elements (i.e., extreme temperature, rain, etc.).
Managing Batteries at YOUR Facility! (Cont.)

• Develop Standard Operating Procedures.
  • Used Batteries. Identify the battery, terminal protection, take to the storage area, add to correct storage container.
  • Damaged or Defective Batteries. Isolate the battery (i.e., kitty litter or sand in its own container), ship using US DOT approved DDR container and process.
  • Thermal Event. If possible, a battery on fire should be isolated from all other materials and DRENCHED with water and MORE water. Follow established emergency protocol.

• Train Employees. Train, train and train again. Use visuals to show examples of what to look for and review SOPs, and then train again.
Questions and Answers

Please type your messages into the “Q&A” section on the right hand side.
thank you!

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