End-of Life Lithium-ion Battery Work at EPA ORCR

Suppliers Partnership, Responsible Battery Work Group Meeting

Jessica Young, *Chief, Recycling and Generator Branch*

EPA Office of Resource Conservation and Recovery

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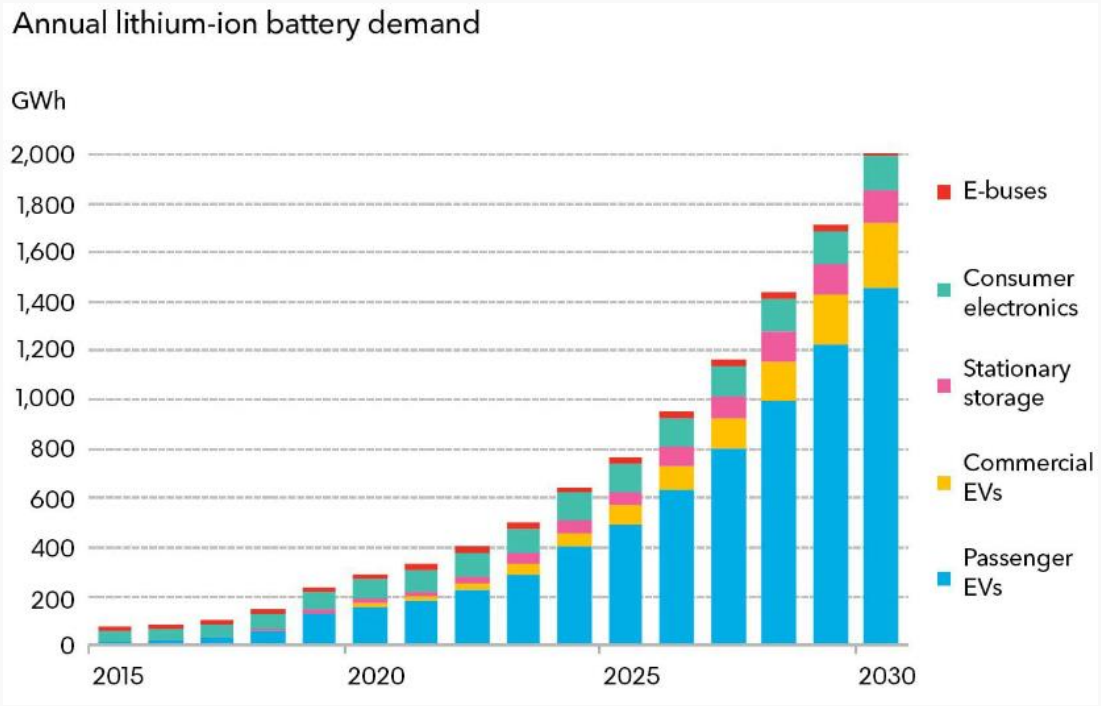
Projections for Use of Lithium-ion Batteries (LIBs)



https://news.bloomberglaw.com/environment-and-energy/electric-vehicles-to-drive-massive-battery-demand-bnef-chart?context=search&index=3

- Lithium-ion batteries (LIBs) are an important part of the transition to clean energy and clean transportation
- LIBs are in a large, and growing, number of products:
  - Consumer electronics (headphones, cell phones, tablets, etc.)
  - Electric vehicles
  - Energy storage
- LIBs are also a growing component of the waste stream
  - Brings challenges and opportunities

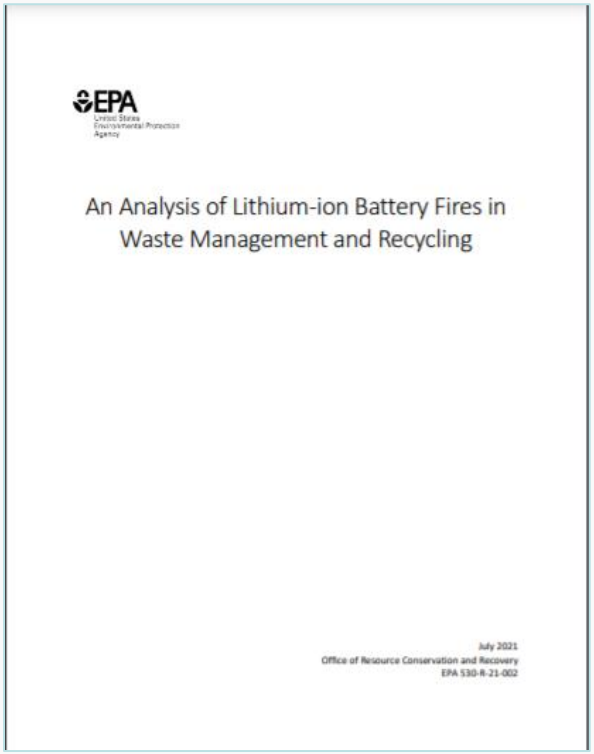
Lithium-ion Battery Fires

Smoke from the Morris, IL fire (July 2021)

- Fires related to LIBs are on the rise
- Example:
  - July 2021 incident in Morris, IL; warehouse storing about 200,000 pounds of LIBs caught on fire, causing 5,000 nearby residents to evacuate
  - This is an example of unlicensed and unpermitted storage of end-of-life batteries

Lithium-ion Battery Damage Case Report

- July 2021 report analyzing fires at waste management facilities caused by LIBs
- Response to EPA and stakeholder concerns about increasing numbers of fires and their impacts on health and safety and waste operations

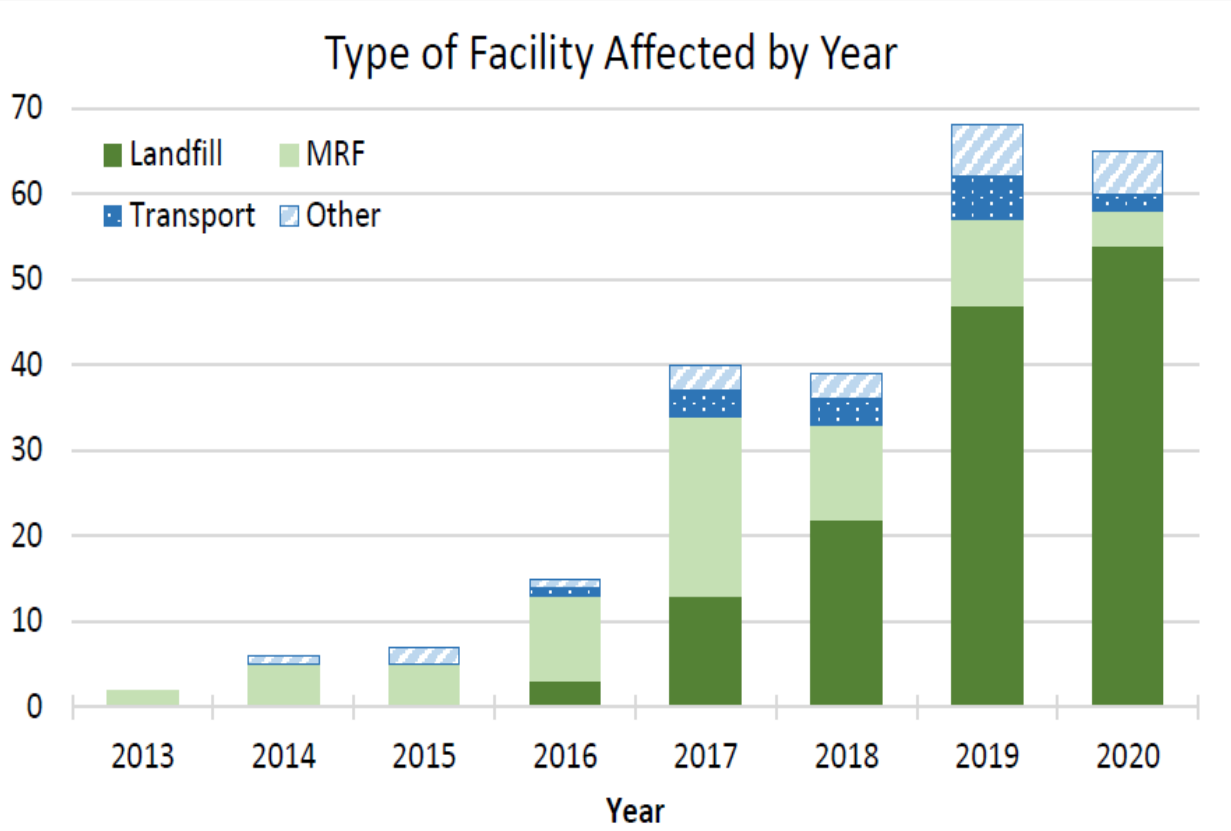


Report Methodology

- Report compiles fires caused by, or likely caused by, lithium-ion and lithium primary batteries
- Fires across the waste management process were included (municipal recycling facilities[MRFs], landfills, garbage trucks, scrap yards, etc.)
- Internet research was used to find incidents
  - Sources included news articles and waste facility websites
  - Not a systematic report of all battery fires
- EPA also conducted interviews with waste management experts to gain additional perspectives
- Four common fire impacts were identified:
  - Injury
  - Service disruption
  - Monetary losses
  - Emergency response

Results of Analysis

- Report documents 245 fires at 64 facilities between 2013-2020
- Landfills and MRFs experienced the most fires
  - Interviews support this finding
- Most common sources of fires were batteries from cell phones, laptops, and tablets
- EV/ hybrid batteries do occasionally end up at these facilities



Stakeholder Workshop

- EPA Lithium-ion Battery Disposal and Recycling Virtual Stakeholder Workshop, October 5 & 19, 2021
  - Brainstorming strategies to reduce fires in waste management and municipal recycling in 4 areas:
    - Education
    - Collection/logistics
    - Labeling
    - Design
  - Examining strategies to promote battery collection, recycling, and reuse for small consumer batteries and large-format EV and storage batteries
- 86 attendees from various stakeholder groups, including battery and electronic recyclers, battery collectors, hazardous and municipal waste managers, household hazardous waste managers, manufacturers, insurance agents, associations, and state, local, and federal government officials

Workshop Takeaways

- Very engaged and knowledgeable stakeholder group
- Wide variety of potential solutions
- Ultimate solution will require action from multiple parts of the battery lifecycle and management chains
- More stakeholder engagement is needed

Examples of Stakeholder Feedback from Workshop

Category	Key Message
Design	Design batteries to have easily removable batteries, stronger cases to protect against damage, and/or stronger internal separators to prevent short circuiting. Incentivize manufacturer-led design and systematic changes through extended producer responsibility, minimum recycled content requirements or by adding LIBs to the battery chemistries covered by the 1996 Mercury-Containing and Rechargeable Battery Management Act.
Labeling	Use QR codes, color codes for repairability, and/or labels with information on how to manage LIBs (e.g., direct users to send them to a specific type of recycler).
Education	Develop education tool kits for consistent messages on the risk of fires and where/how to dispose of LIBs and support state/local government outreach efforts.
Collection	Make recycling more convenient by expanding the number of collection sites. Create incentives for recycling batteries through deposits or other mechanisms.
Recycling	Clarify and streamline permitting and regulations, including updating the Universal Waste Rule for LIBs specifically or creating an exemption for waste LIBs that are recycled.

Bipartisan Infrastructure Law Investments

- The November 15, 2021, Infrastructure Investment and Jobs Act ("Bipartisan Infrastructure Law") provided non-grant funding for EPA to develop end-of-life battery management deliverables:
  - SEC. 70401(b): Best Practices For Collection of Batteries to be Recycled- $10 million for this work and to be done in coordination with State, Tribal, and local governments and relevant nongovernmental and private sector entities
  - SEC. 70401(c): Voluntary Labeling Guidelines- $15 million to develop voluntary labeling guidelines for batteries and communication related to this labeling

Thank you!

Jessica Young

Chief of the Recycling and Generator Branch

EPA Office of Resource Conservation and Recovery

Young.Jessica@epa.gov

202-566-0052