



# Improving Safety and Effectiveness of Battery Recycling through Collection Best Practices and Voluntary Labeling Guidelines

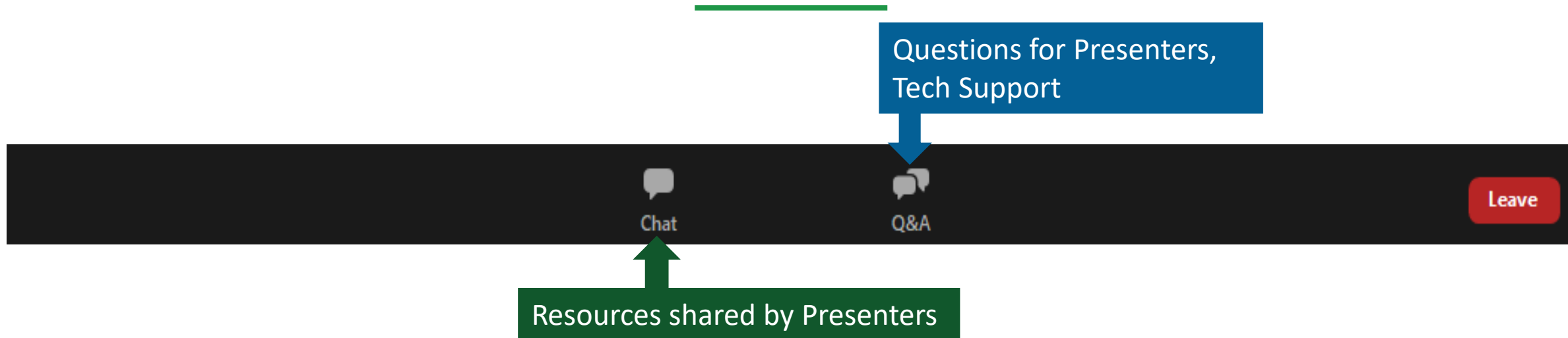
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March 19, 2024

U.S. Environmental Protection Agency (EPA)



# Webinar Logistics



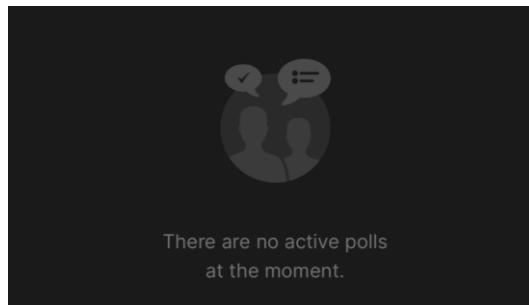
- **To ask a question:** Type your clarifying questions in the Q&A box.
- **Technical difficulties?** Please send a message through the Q&A or email [Kyra.Hall@erg.com](mailto:Kyra.Hall@erg.com).
- **Recording:** The slides and recording of this presentation will be posted on the EPA website.



# How to Use Slido

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- Two ways to access Slido:
  - Scan the QR code or
  - Go to [www.slido.com](http://www.slido.com), enter code 1029 977
- Poll questions begin later in this presentation, there are no active polls now
  - The Slido screen will show this:



# Agenda Overview

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1. EPA welcome and overview of circular economy work
2. Project background and landscape
3. Conversation timelines
4. Next steps



# Who's Who

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**Nena Shaw**

*Director*

Resource Conservation  
and Sustainability  
Division

U.S. EPA



**Ellen Meyer**

*Batteries and Critical  
Minerals Senior Scientist*

Resource Conservation  
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**Pat Tallarico**

*Facilitator*

Eastern Research Group  
Support Team



# EPA Welcome

**Nena Shaw**

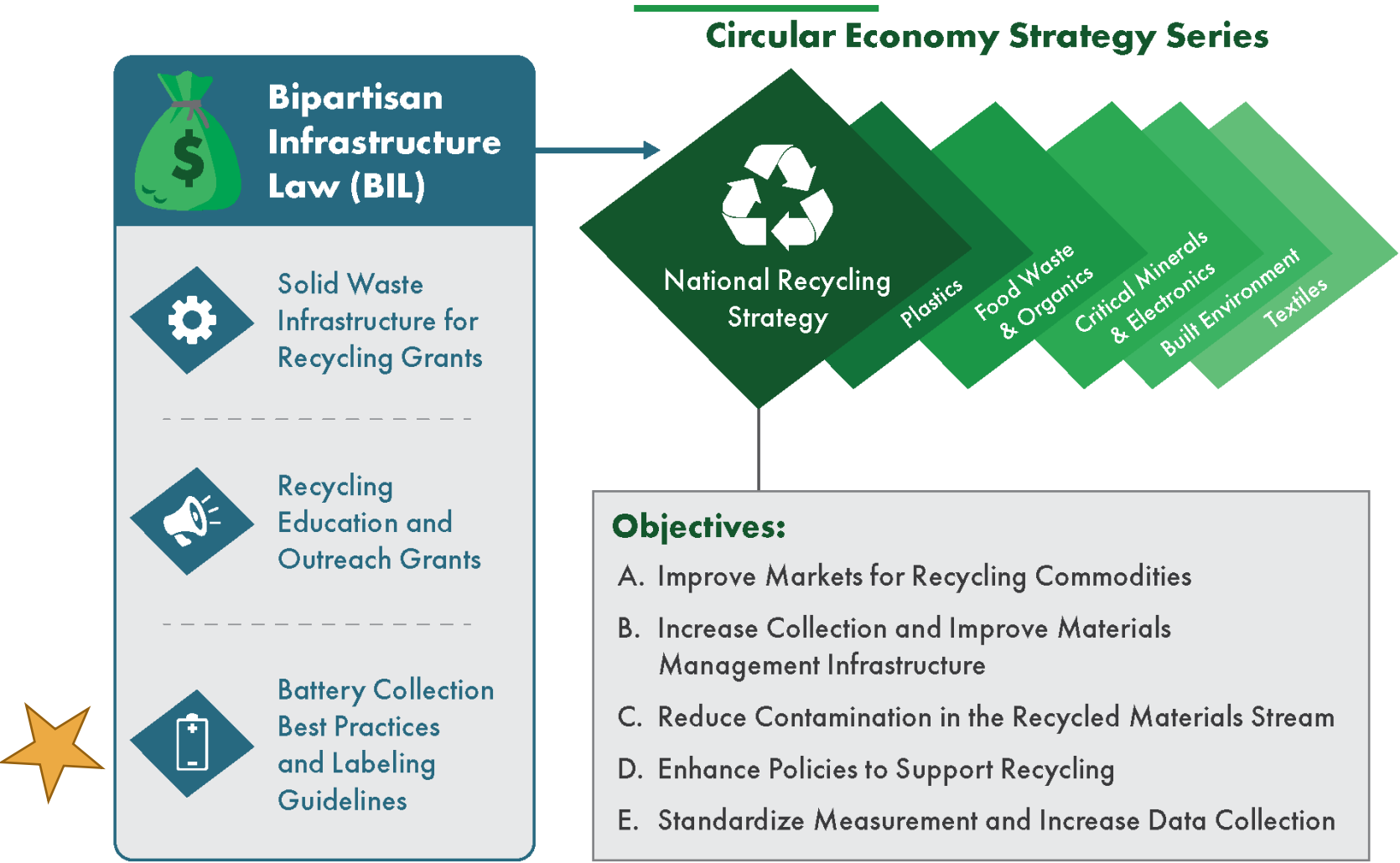
*Director*

Resource Conservation and Sustainability Division

U.S. EPA



# EPA's Circular Economy Initiatives



# Project Background and Landscape

**Ellen Meyer**

*Batteries and Critical Minerals Senior Scientist*

Resource Conservation and Sustainability Division

U.S. EPA





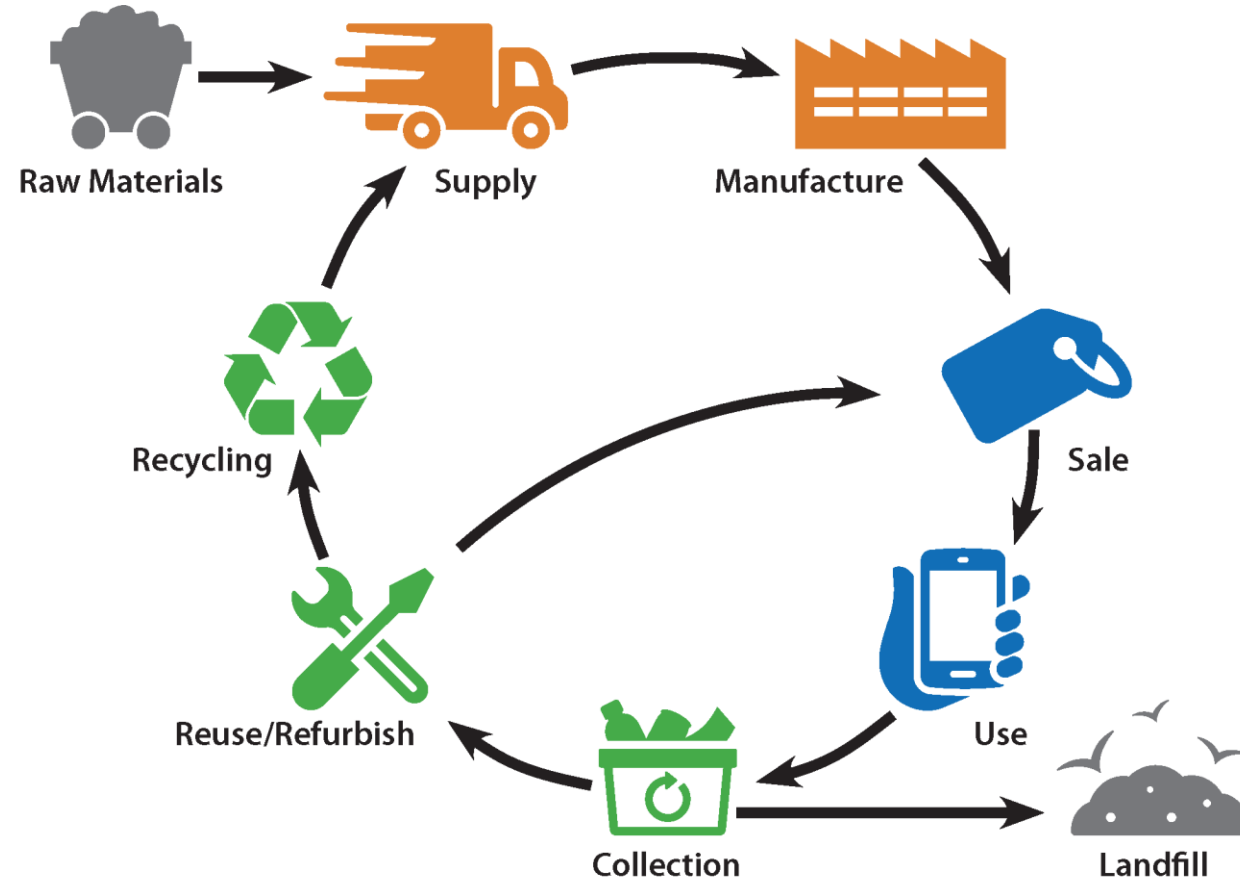
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**Which stage of the battery life cycle does your organization support? (check all that apply)**

**i** Start presenting to display the poll results on this slide.

# The Battery Life Cycle



# Collection Best Practices

## Best practices will focus on:

- Identifying and increasing accessibility to battery collection locations
- Promoting consumer education
- Reducing hazards from improper disposal (fires)

## Best practices will be:

- Technically and economically feasible
- Environmentally sound and safe for workers
- Beneficial to increasing the recovery of critical minerals



# Battery Labeling Guidelines

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Labeling guidelines will be designed to improve battery collection and reduce battery waste by:

1. Identifying battery collection locations and increasing accessibility to those locations.
2. Promoting consumer education about proper battery management.
3. Reducing safety concerns relating to improper disposal of batteries.



# Scope of Batteries

Category	Small format consumer electric and portable batteries		Mid-format batteries	Large format vehicle and motive equipment batteries	Large format stationary storage batteries
<b>Type</b>	Single use (Primary)	Rechargeable (Secondary)	Rechargeable	Rechargeable	Rechargeable
<b>Use</b>	Removable or embedded in electronics and electric devices, such as watches, hearing aids, cameras, key fobs, toys, portable radios, flashlights.	Removable or embedded in electronics and electric devices, such as phones, computers, appliances, small uninterruptable power supplies (UPS), power tools, power banks.	E-mobility including e-bikes, e-scooters. Outdoor power equipment. Portable power stations.	All scales of automotive starting and motive vehicle batteries. Materials handling equipment (forklift, crane, etc.) Recreational (golf carts, marine equipment, recreational vehicles, etc.)	Residential, including power wall, backup generators. Grid, including utility, solar, wind. Off grid and microgrid. Commercial, including building systems, data centers, server rooms, medical and hospital equipment, retail backup power.



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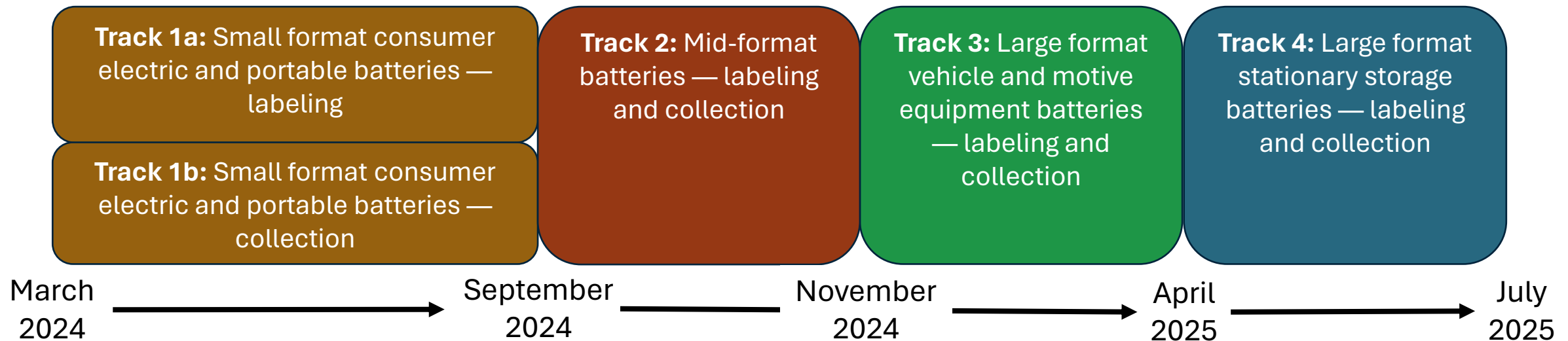


**Is there any battery type or use missing from the categories identified?**

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# Conversation Timeline

- A sequenced approach to conversations
- Small format labeling and collection conversations will proceed concurrently
- Leveraging existing, in-person industry meetings to test ideas and share updates



# Vision for EPA's Resources & Guidance

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## Battery Collection Best Practices\*

- EPA will develop best practices for state, tribal, and local governments to recycle batteries in a manner that is:
  - Technically and economically feasible
  - Environmentally sound and safe
  - Optimizing value and use of materials, including critical minerals
- Vision for Resources, published in 2025 and 2026
  - Best practices guidelines
  - Outreach materials
  - Case studies

*\*Section 70401(b) of the Bipartisan Infrastructure Law*





# Vision for EPA's Resources & Guidance

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## Voluntary Battery Labeling Guidelines\*

- EPA aims to develop guidelines for labels that will:
  - Identify battery collection locations
  - Educate consumers about recycling opportunities
  - Reduce safety concerns from improper disposal
- Vision for Resources, published in 2025 and 2026
  - Sets of written guidelines for various battery categories
  - Guidance will build on existing standards; emphasize good ideas; and address inconsistencies.

\*Section 70401(c) of the Bipartisan Infrastructure Law



# Conversation Tracks

**Pat Tallarico**

*Facilitator*

Eastern Research Group Support Team





## **Track 1: Small Format Consumer Electric and Portable Batteries**

# Scope of Consumer Electric and Portable Batteries

Category	Single Use (Primary)	Rechargeable (Secondary)
Use	Removable or embedded in electronics and electric devices, such as watches, hearing aids, cameras, key fobs, toys, portable radios, flashlights.	Removable or embedded in electronics and electric devices, such as phones, computers, appliances, small uninterruptible power supplies (UPS), power tools, power banks.
Chemistries	Alkaline Carbon-zinc Silver oxide Lithium metal	Lithium ion (including lithium polymer) Nickel-cadmium (Ni-Cd) Nickel-metal hydride (Ni-MH) Nickel-zinc (Ni-Zn) Small sealed lead acid
Weight Range	Up to 4.4 pounds	Up to 11 pounds
Watt-hour Rating	Up to 300Wh	Up to 300Wh
EOL Management Responsibility	Consumers	Consumers



# Track 1a: Small Format Consumer Electric and Portable Batteries–Labeling

## Purpose

- Identify potential guidelines for battery label contents building on existing standards and guidance.
- Identify a range of options for conveying battery label information to different audiences.
- Identify information needs by audience that may go beyond labels to enhance recycling effectiveness.

## Upcoming Meetings

Meeting Date	Format	Focus
June 4, 2024	Virtual	Tentative prep call for in-person meeting participants.
June 12–14, 2024	In-person in Arlington, VA	Label contents and messaging. Participation will be limited.
July 16, 2024	Virtual	Report out from in-person meeting; additional input.





# Track 1a: June In-Person Meeting

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- Potential topics will include:
  - Information and messaging needs throughout the battery life cycle.
  - Label contents.
  - How best to convey information/label contents.
  - Vetting and testing the guidelines.
  - Promoting and marketing label use.
  - Additional policy actions that may be needed.
  
- Interested in joining us in-person? Fill out this form by April 5:  
<https://forms.gle/sTVdnFgK2QtzFUwE6>



# Relevant Standards & Policies for Labeling

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- 1996 Mercury-Containing and Rechargeable Battery Management Act (The Battery Act)
  - Ni-CD, small sealed lead acid, and mercury-containing batteries
- EU Regulation 2023/1542
  - All batteries
- SAE J2936 – Electrical Energy Storage Device Labeling Recommended Practice
  - Labeling for any device used for energy storage
- Call2Recycle Lithium-Ion Recycling Seal and shipment labeling (DOT)
  - Lithium-ion and rechargeable battery chemistries



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**What other existing standards should we look at?**

ⓘ Start presenting to display the poll results on this slide.



# Track 1b: Small Format Consumer Electric and Portable Batteries–Collection

## Purpose and structure

- Learn about and expand on current battery collection practices, including successes and challenges.
- Identify opportunities for further research and conversation.
- A few presenters followed by discussion and additional input from participants.

## Upcoming Meetings

Meeting Date	Format	Focus
April 11, 2024	Virtual	Collection systems and locations.
May 14, 2024	Virtual	Safe collection, storage, and transport.
June 20, 2024	Virtual	Education and outreach.
Fall 2024	In-person	Concept testing.



# Track 1b: Collection

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- Additional conversations:
  - Island communities
  - Tribal communities
    - EPA Tribal Waste Management Webinar (May 2, 2024)
    - [Anticipated] Tribal Lands and Environment Forum (August 12–15, 2024)
  - Rural/remote communities



# Track 1b: Collection

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- Do you have an interesting story to tell about:
  - Collection systems and locations;
  - Safe collection, storage, and transport; or
  - Education/outreach?



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**Do you have a story to share about any of these topics:**

ⓘ Start presenting to display the poll results on this slide.

# Track 1b: Collection

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- Email [batteries@epa.gov](mailto:batteries@epa.gov) and put the topic in the subject line.
  - Collection systems
  - Safe storage, transport and recycling
  - Education/outreach



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**Are there other topics that should be covered?**

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## **Track 2: Mid-Format Batteries**

# Scope of Mid-Format Batteries

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<b>Category</b>	Rechargeable (Secondary)
<b>Use</b>	E-mobility including e-bikes, e-scooters. Outdoor power equipment. Portable power stations.
<b>Chemistries</b>	Lithium-ion Small sealed lead-acid
<b>Weight Range</b>	11 to 25 pounds
<b>Watt-hour Rating</b>	300Wh to 2000Wh
<b>EOL Management Responsibility</b>	Consumer





# Track 2: Mid-Format Batteries Labeling and Collection

- Purpose
  - Identify unique labeling needs associated with mid-format batteries.
  - Assess current and desired practices for safe collection and recycling.
  - Discuss fraudulent labeling and what impact this may have on guidelines.
- Engagement events
  - September–November 2024
  - Meeting dates and locations TBD
  - Likely virtual



# Relevant Standards & Policies

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- Call2Recycle Lithium-Ion Battery Labels and Recycling Seal
  - Lithium-ion and rechargeable battery chemistries
- 1996 Mercury-Containing and Rechargeable Battery Management Act (The Battery Act)
  - Ni-CD, small sealed lead acid, and mercury-containing batteries.
- EU Regulation 2023/1542
  - All batteries
- Standard EN 15194:2017
  - Markings for manufacturer, standard met, serial number
- SAE J2936 - Electrical Energy Storage Device Labeling Recommended Practices
- *San Francisco new safety standards for Personal Mobility Devices*



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**What other existing standards should we look at?**

ⓘ Start presenting to display the poll results on this slide.



## **Track 3: Large Format Vehicle and Motive Equipment Batteries**

# Scope of Large Format Vehicle and Motive Equipment Batteries

<b>Category</b>	Rechargeable (Secondary)
<b>Use</b>	All scales of automotive starting and motive vehicle batteries. Materials handling equipment (forklift, crane, etc.) Recreational (golf carts, marine equipment, recreational vehicles, etc.)
<b>Chemistries</b>	Lithium-ion Lead-acid Ni-Mh
<b>Weight Range</b>	More than 25 pounds
<b>Watt-hour Rating</b>	More than 2000Wh
<b>EOL Management Responsibility</b>	Licensed, industry professionals



# Track 3: Large Format Vehicle and Motive Equipment Batteries Labeling and Collection

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- Purpose

- Identify gaps in existing labeling standards for vehicle batteries.
- Identify opportunities to improve collection and recycling.

- Engagement Events

- November 2024–March 2025
- Meeting dates and locations TBD
- Likely virtual
- In-person attendance at relevant industry conferences



# Relevant Standards & Policies

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- SAE J2984 – Chemical Identification of Transportation Batteries for Recycling
- SAE J2936 – Electrical Energy Storage Device Labeling Recommended Practice
- SAE J3071 – Automotive Battery Recycling Identification and Cross Contamination Prevention
- EU Regulation 2023/1542
- EU Directive 2066/66/EC and amendments to (EU) No 2019/1020
- BCI Battery Labeling Manual (2020)
- ISO 17840-4:2018 – Road Vehicles
- MOBI Battery Identification Number (BIN) Technical Specifications
- New Jersey and California Laws
- *California Lithium-ion Car Battery Recycling Advisory Group report and California Air Resources Board Advanced Clean Cars II regulation (TBD)*



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**What other existing standards should we look at?**

ⓘ Start presenting to display the poll results on this slide.





## **Track 4: Large Format Stationary Storage Batteries**

# Scope of Large Format Stationary Storage Batteries

<b>Category</b>	Rechargeable (Secondary)
<b>Use</b>	Residential, including power wall, backup generators. Grid, including utility, solar, wind. Off grid and microgrid. Commercial, including building systems, data centers, server rooms, medical and hospital equipment, retail backup power.
<b>Chemistries</b>	Lithium-ion
<b>Weight Range</b>	More than 25 pounds
<b>Watt-hour Rating</b>	More than 2000Wh
<b>EOL Management Responsibility</b>	Qualified Industry professionals



# Track 4: Large Format Stationary Storage Batteries Labeling and Collection

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- Purpose

- Identify unique labeling needs associated with large-format stationary batteries.
- Identify gaps in current labeling standards or requirements.
- Assess collection and recycling practices and potential improvement opportunities for safer collection and recycling.

- Engagement events

- April–July 2025
- Likely virtual



# Relevant Standards & Policies

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- UL 9540 Energy Storage System Requirements
  - Marking requirements (aligned with NFPA 70)
  - Use in habitable/non-habitable spaces (aligned with NFPA 855)
- NFPA 70 National Electric Code
  - Markings on electrical equipment
- NFPA 855 Improving Energy Storage System Safety
  - Contact information for service provider
  - Location of signage and signage standard (per ANSI Z535)
- ANSI Z535
  - Hazard labeling standards (consistent with ISO 3864)
- UN/DOT
  - Labeling of packaging containing batteries for transport



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**What other existing standards or policies for labeling of stationary storage batteries should EPA consider?**

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# Next Steps



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**Which of the following best represents your level of interest in this process?**

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# Upcoming Small Format Consumer Electric and Portable Batteries Working Sessions

Meeting Focus	Meeting Topic	Meeting Date	Meeting Time	Format
✓ Labeling and Collection	Kickoff: Current Landscape and Engagement Overview	March 19, 2024	2:00-3:30 PM EDT	Virtual
Collection	Collection Systems and Locations	April 11, 2024	2:00-4:30 PM EDT	Virtual
Labeling and Collection	Tribal Waste Management Webinar	May 2, 2024	1:00-3:00 PM	Virtual
Collection	Safe Collection, Storage, and Transport	May 14, 2024	2:00-4:30 PM EDT	Virtual
Labeling	In-Person Meeting Participant Prep Call (placeholder)	June 4, 2024 (TBD)	TBD	Virtual
Labeling	In-person Intensive Session: Label Contents	June 12-14, 2024	9:00 AM-4:00 PM EDT	In-Person
Collection	Education and Outreach	June 20, 2024	2:00-4:30 PM EDT	Virtual
Labeling	Report Out from In-Person Intensive and Additional Input	July 16, 2024	2:00-4:00 PM EDT	Virtual





# Next Steps

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- Register for the April 11 collection systems and locations meeting: <https://www.zoomgov.com/meeting/register/vJItdOutqDIqGmnhzagIGvPW8r87x0nQczw>
- Fill out the interest form for the June in-person meeting: <https://forms.gle/sTVdnFgK2QtzFUwE6>
- Email [batteries@epa.gov](mailto:batteries@epa.gov) if you have an interesting story to tell about education/outreach; collection systems; or safe storage, transport, and recycling.



# Questions?

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- Email [batteries@epa.gov](mailto:batteries@epa.gov)

