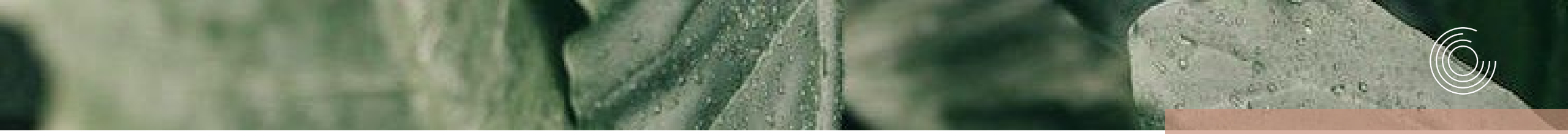
Hazardous Materials in the Waste Stream: *Impacts & Mitigation Strategies*

Cirba Solutions

Battery Management & Materials

Canada · Arizona · Indiana · Michigan · North Carolina · Ohio · South Carolina

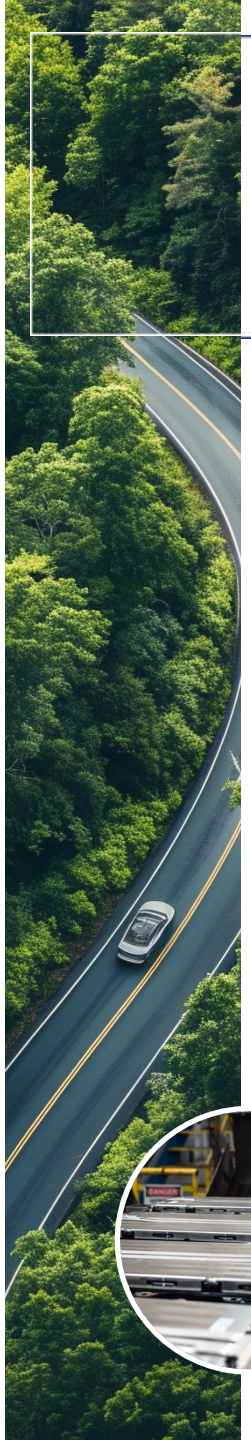


Cirba Solutions: *Battery Recycling Leader*

Cirba Solutions Recycling Facilities

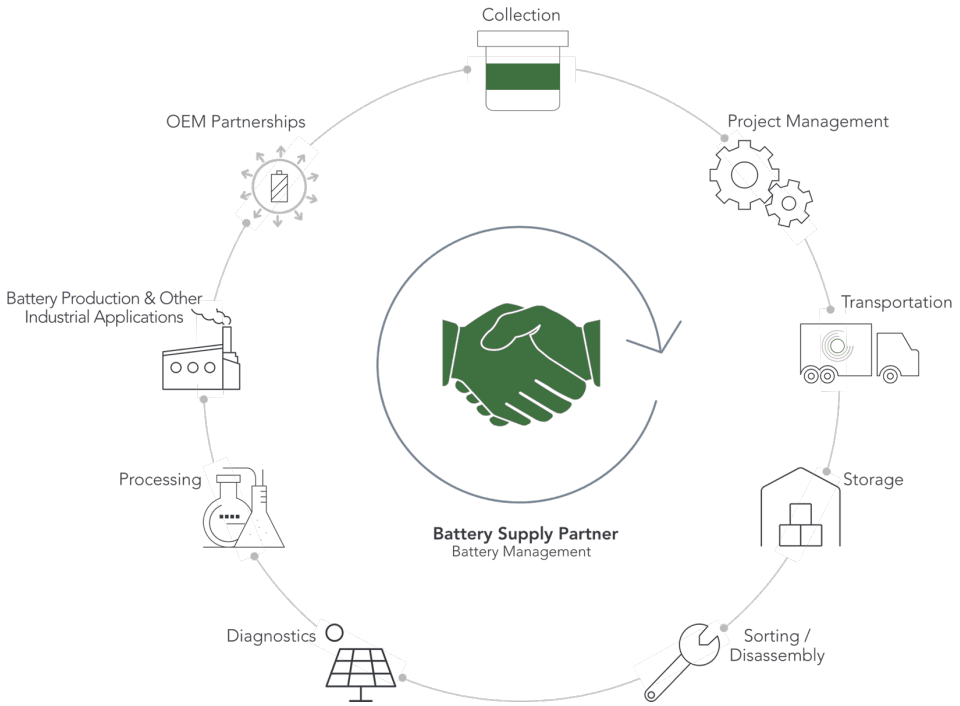
Overview

- Founded in 1991 (30+ Years of Experience)
- Headquartered in Charlotte, NC, USA
- 5 Strategically Located facilities *(with a 6th coming soon)*
- Handle all battery formats and chemistries
- Feedstock EOL batteries, EV batteries, production scrap, portable electronics, post-consumer, energy storage systems, healthcare and more
- Shredding and Hydrometallurgy processing approach
- Return Critical Minerals (Li, Ni, Co, Mn) back into the Domestic Battery Supply Chain



Comprehensive Solutions for the Battery Supply Chain

Value-Added Products and Services



Serving All Battery Formats

Type	Illustrative Battery Form Factors
Lithium Ion	
Lithium Primary	
Lead Acid	
Nickel Cadmium	
Nickel Metal Hydride	
Alkaline and Others	

The most advanced battery management solution in the industry that enables a true closed loop supply chain.

There are multi-battery waste streams, and they need high-touch services, Cirba Solutions' proven ability to provide a comprehensive solution is an advantage in ensuring batteries are responsibly recycled.

Battery Formats

Portable (Small)

- Primary: A battery that weighs no more than 4 lbs.
- Rechargeable: a battery that weighs no more than 11 lbs. and that has a rating of no more than 300 watt-hours.

Common Household Batteries

Electronic Replacement Batteries

Power Tool Packs

Drone Batteries

Medium

- Primary: A battery that weighs more than 4 lbs. but not more than 25 lbs.
- Rechargeable: A battery that weighs more than 11 lbs., or that has a rating of more than 300 watt-hours, or both, but that does not weigh more than 25 lbs. pounds or have a rating of more than 2,000 watt-hours

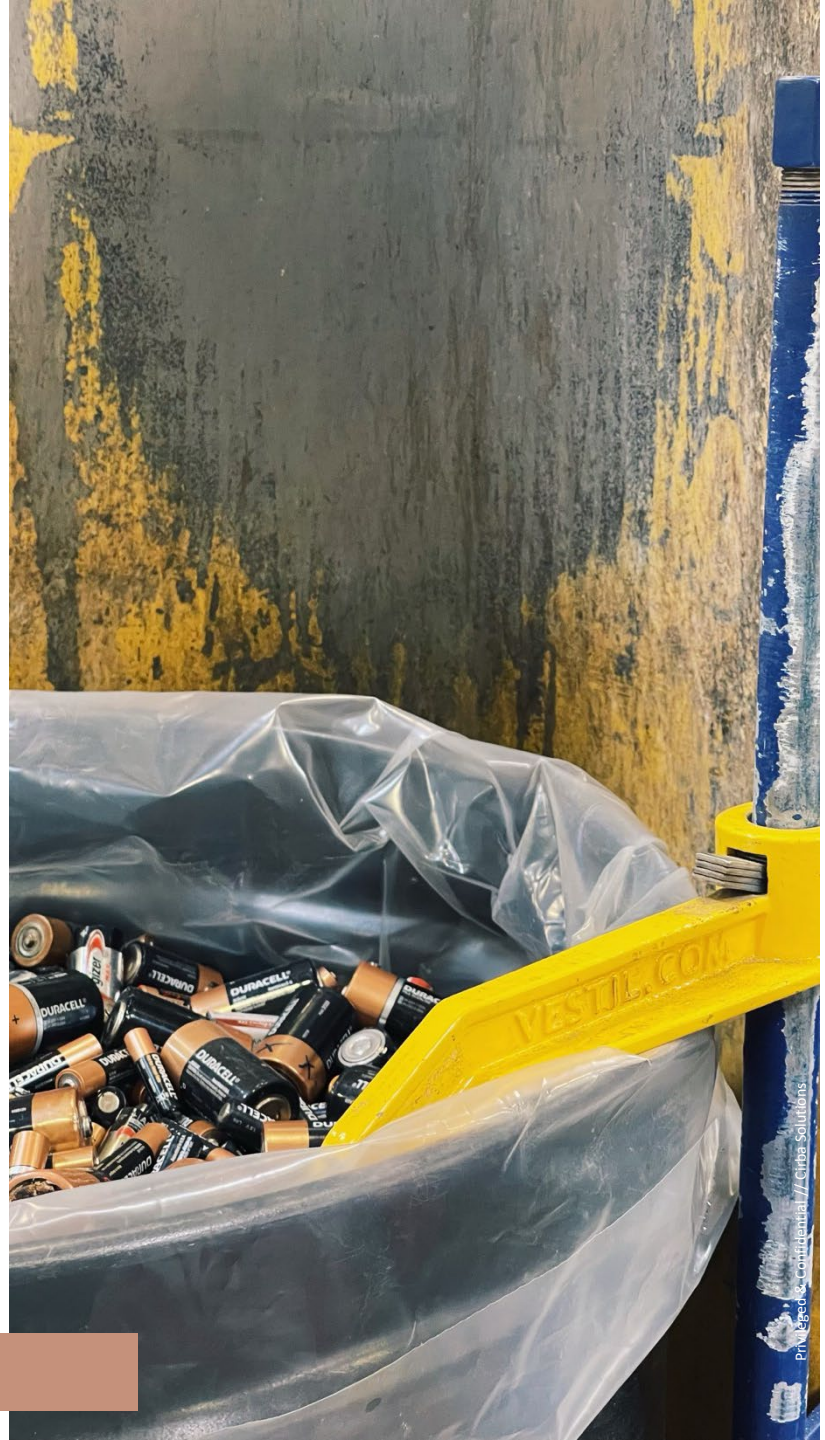
Car Batteries

E-Mobility

Power Storage

Power Banks

Images not to scale



Battery Formats

Large

- Vehicle Batteries: These large, user-friendly batteries power vehicles, motorcycles, boats, and other motorized vehicles.
- Energy Storage Systems such as backup power for data centers.
- Industrial Batteries: Power heavy-duty applications like machinery, utilities, or telecommunications.

Electric Vehicle

Forklifts /
Industrial Machinery / Etc.

Emergency Power /
Telephone Systems /
Etc.

Embedded

- A battery in a product that is not intended or designed to be easily removed by the user with no more than commonly used household tools.

Game
Controllers

E-Readers

Bluetooth
Speakers

Images not to scale

Batteries In Our Everyday Lives

Batteries can be found all around you

Rechargeable

Nickel-Cadmium (NiCd)
Small dry-cell batteries,
sealed, and rechargeable. Found in power tools.

Lead Acid
Small to medium, dry-cell batteries, sealed,
rechargeable. Found in cars, golf carts, scooters.

Lithium-ion (Li-ion)
Small dry-cell batteries, sealed, and rechargeable.
Found in laptops, cell phones, electric toothbrushes.

Nickel Metal Hydride
Small dry-cell batteries, sealed, rechargeable.
Found in older cell phones, older laptops, cameras.

Non-Rechargeable

Alkaline & Zinc Carbon
Includes AA, AAA, C, D, 9-Volts
Found in remotes, flashlights, toys, etc.

Primary Lithium
Found in smoke detectors, remote controls,
toys, flashlights, watches, etc.

Button Cell
Found in key fobs, small medical devices, singing
greeting cards, etc.

Cirba Solutions

Lithium Batteries: *Powering Our Daily Lives*

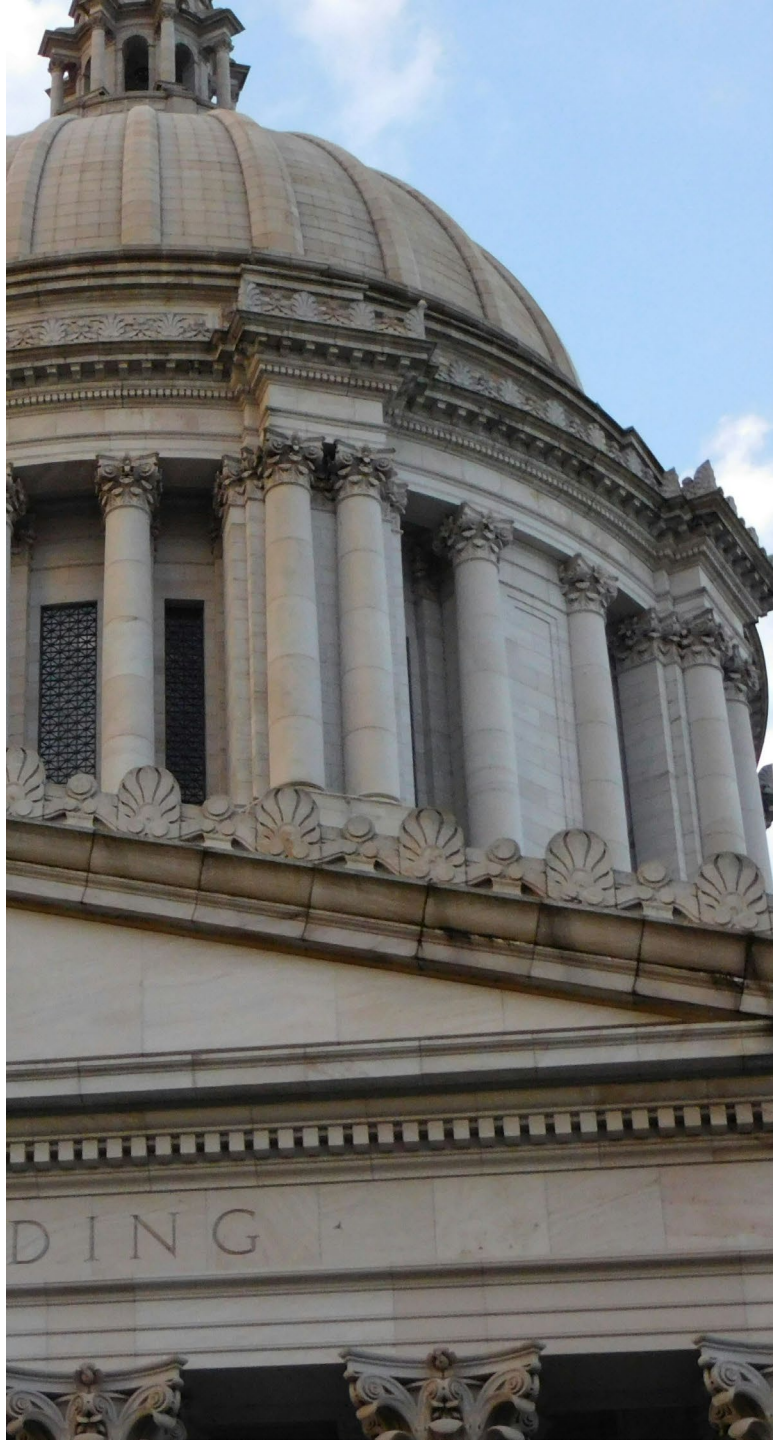
Given the prominence of lithium batteries used in consumers' devices throughout daily life, better understanding of proper recycling practices is critical not only for the environment but creating a more stable domestic supply chain of critical materials.

- **98% of Americans** use lithium battery-powered devices daily.
- **37% of respondents** did not know lithium batteries can be recycled.
- **More than half** of the individuals surveyed do not know where to recycle batteries.

Source: Cirba Solutions

Policy & Legislation

- **Evolving state policies** targeting battery and hazardous waste management.
- Emerging **Extended Producer Responsibility (EPR)** laws.
- **Transportation and labeling requirements** for hazardous materials.
- Local initiatives **improving public education and collection programs**.

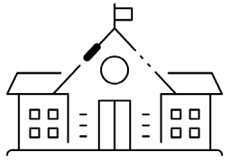


Leaders in Battery Recycling **Global Logistics**

Small / Medium Format

Government Sites & Facilities

Municipalities



Office Buildings

Retailers

Large Format

Dealerships

Manufacturing

Distribution Centers

Data Storage

Field Pick Up

Pick up from ***Anywhere***

Collecting batteries drive critical elements for the supply chain

WeRecycle Kits

- UN approved collection unit
- Pre-paid shipping
- Pre-paid recycling
- Instruction sheet for how to recycle batteries
- Free Confirmation of Reclamation

WeRecycle DDR Kits

- DOT/R2/RIOS regulatory compliance
- UN-approved container
- Cushioning material
- Instruction sheet for how to recycle damaged batteries
- Anti-static bags and ties

WeRecycle Battery Box

- UN approved collection unit
- Pre-paid shipping
- Pre-paid recycling
- Instruction sheet for how to recycle batteries
- Free Confirmation of Reclamation

Battery Recycling Kiosk

- Stand-alone kiosk help promote recycling among your community and employees

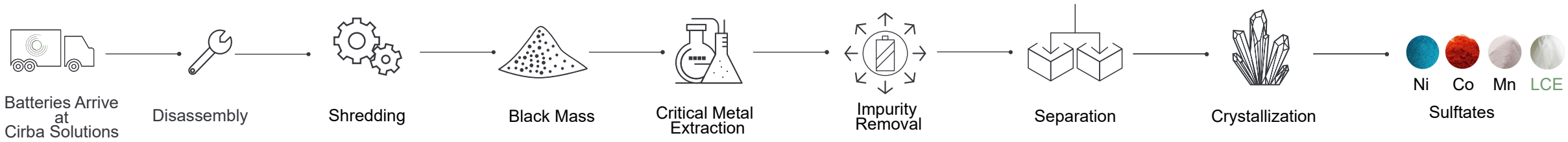
Electric Vehicle Containers

- Sizes available for modules or packs

THE PROCESS

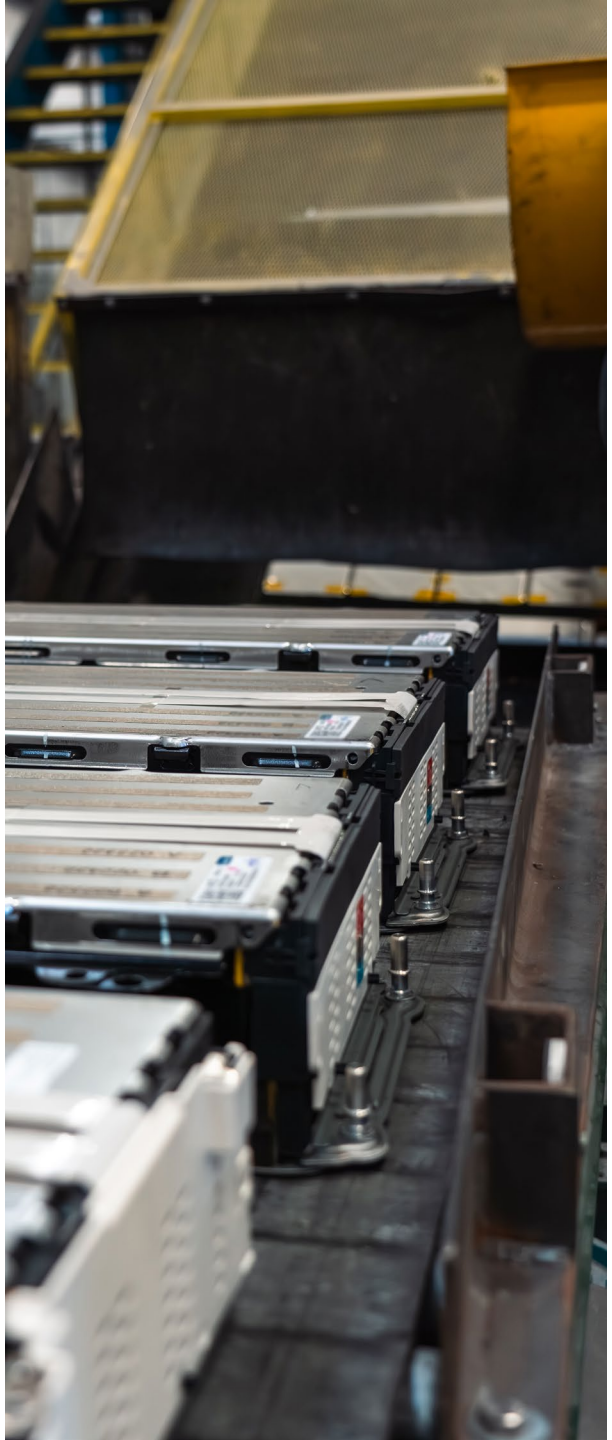
End-to-End Approach to Battery Recycling

Processing is a core and proven capability of Cirba Solutions, and our demonstrated technologies allow us flexibility and adaptability to meet changing market needs.



This approach enables a closed loop supply of critical battery materials.

Questions




Cirba® Solutions
Battery Management & Materials
The Future is Electrified.
Our standards set us apart.
Our services & technologies move you forward.
Real experience and proven results.
cirbasolutions.com