

A close-up photograph of an electric vehicle's charging port. A black charging cable is plugged into the port, which is a dark, hexagonal shape. The car's body is white and visible on the right side. A green semi-transparent banner is overlaid on the left side of the image, containing the title text.

Better Ways to Handle Black Mass

February 2023

Li-Ion Component Hazards

“Very toxic material”

“Suspected of causing cancer”

“LD50<5000 mg/kg”

“Provide appropriate exhaust ventilation at point where dust is formed”

“Flammable”

“Hazardous decomposition products”

“Vapors form explosive mixture with air”

“Flash Point: 61 °F”

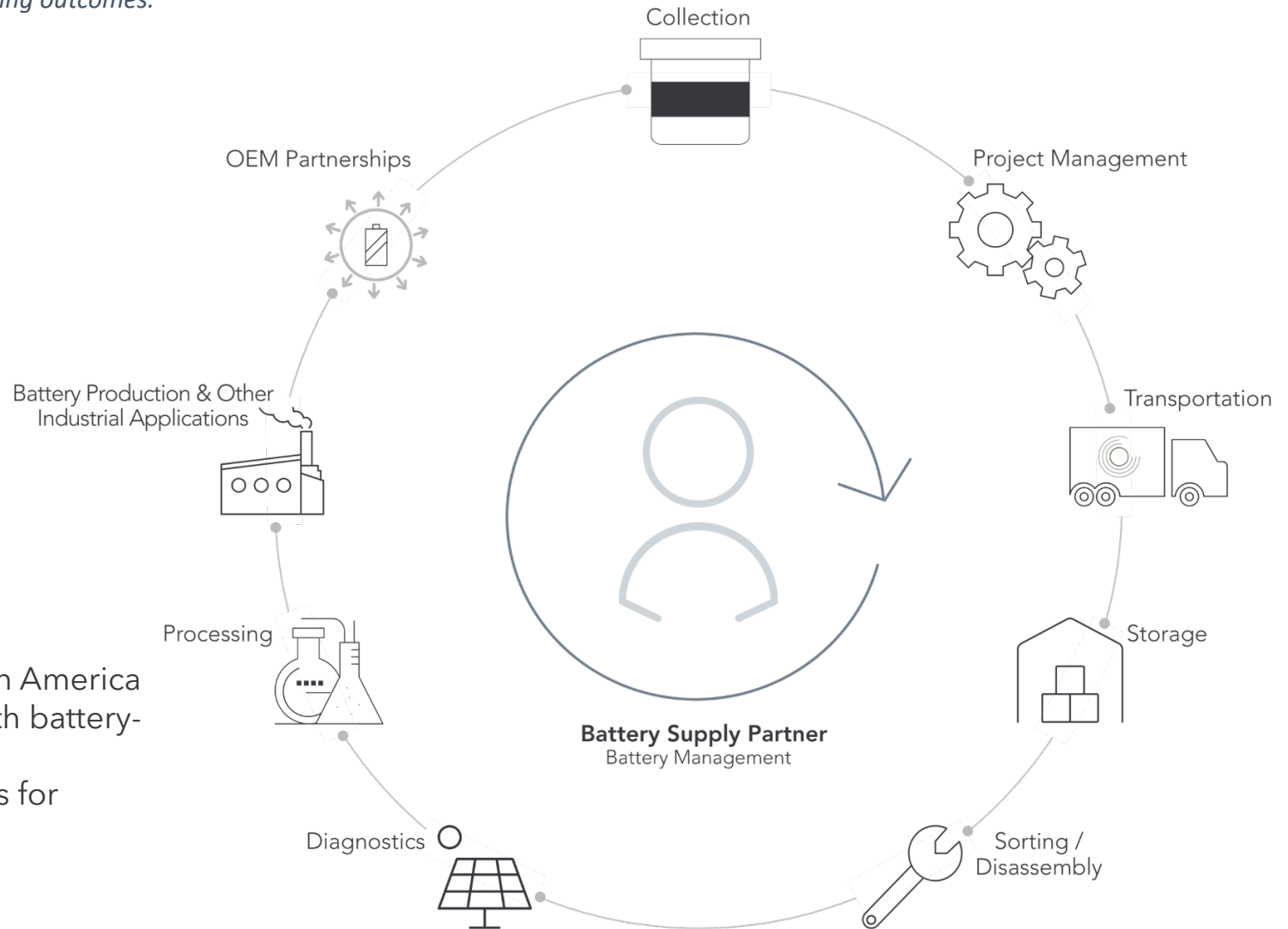
“LEL: 4.22%”

“TWA .02000 mg/m³”

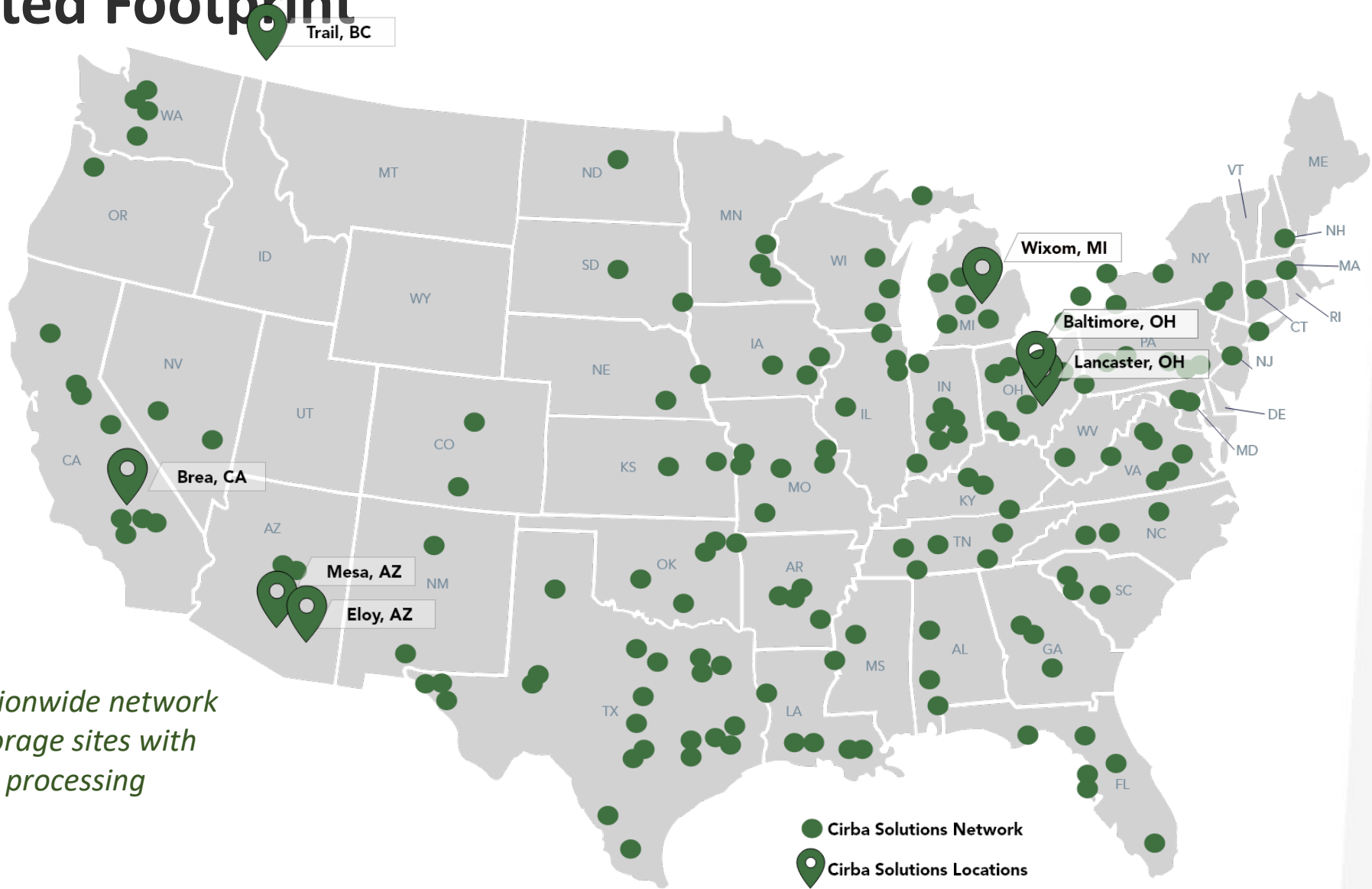
Enhancing the battery supply chain

Innovating the most advanced cross-chemistry battery recycling outcomes.

- 30+ years of experience
- Fully vertically integrated
- 6 strategic locations throughout North America
- Broad network for battery pickups with battery-centric logistics capabilities
- Advanced hydrometallurgical process for material upgrading



Differentiated Footprint



We bring a vast nationwide network of collection and storage sites with multiple lithium-ion processing facilities.

Processing Facilities Overview: Existing

Two lithium-ion processing facilities already in operation with clear rollout plan for nationwide coverage to supply hydrometallurgical centers of excellence



Mid West



Wixom, MI

Michigan
Date of Operation: 1991

South West



Mesa, AZ

Arizona
Date of Operation: 2007

North West



Trail, BC

Canada
Date of Operation: 1993

South West



Eloy, AZ

Arizona
Expected Date of Operation: 2023

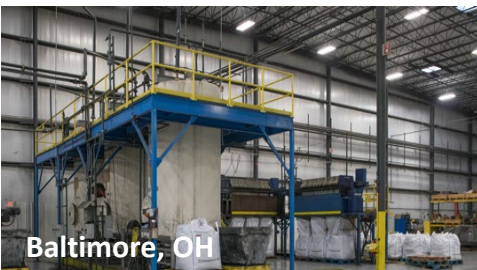
East Coast



Lancaster, OH

Ohio
Date of Operation: 2000

East Coast



Baltimore, OH

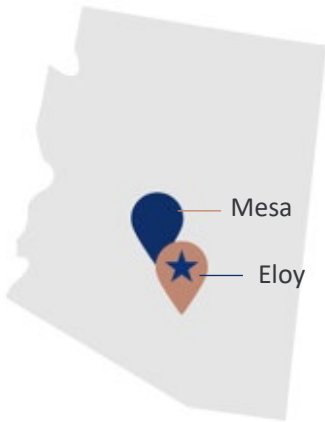
Ohio
Date of Operation: 1998

West Coast



Brea, CA

California
Date of Operation: 2015



Existing Site New Location

Balance Required to Scale Responsibly

Target: North America must scale recycling of lithium-ion batteries including integrating black mass production with hydrometallurgical processing

1. Technology Readiness Levels & Innovation
2. Talent & Experience Mix
3. Entrepreneurial & Structured Organization Mindsets
4. Targeted Approaches by Battery Type

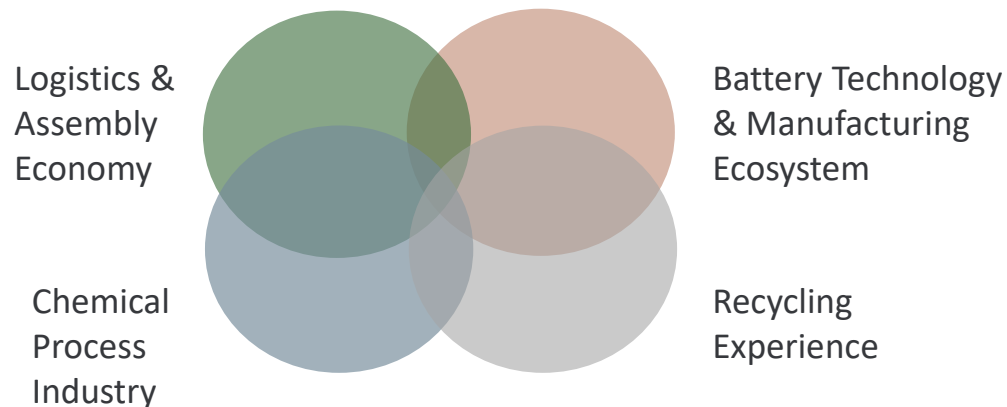


Delivering what you need today and planning for what you need tomorrow.

1. Manage Risk w/ Phases of Technology Deployment

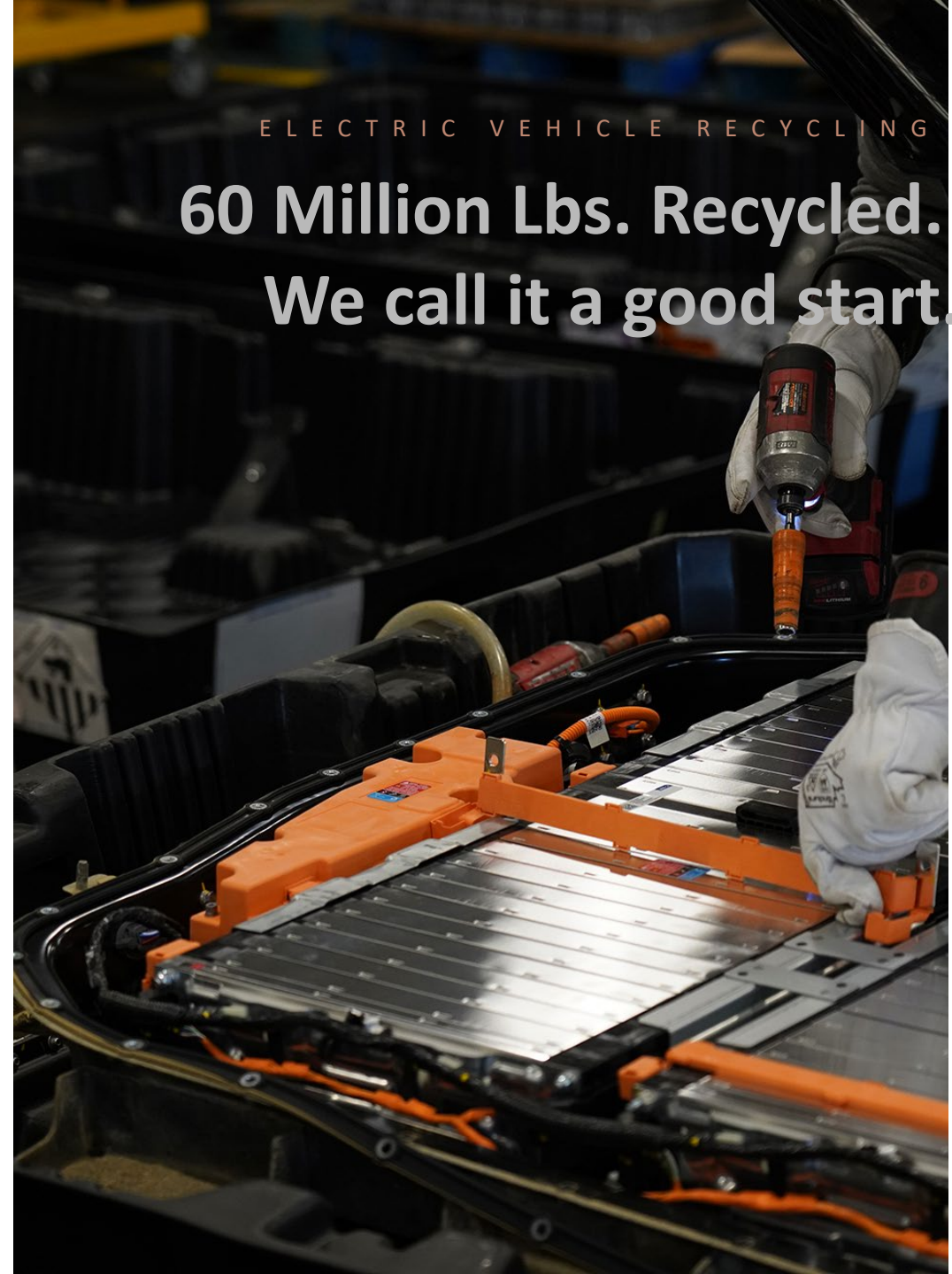
- Supply chain can't wait for years of R&D and development to result in perfect manufacturing processes
- North America need leaders who can design and operate effective assets now while driving toward future innovation.

2. Optimal Talent & Experience Mix



ELECTRIC VEHICLE RECYCLING

60 Million Lbs. Recycled.
We call it a good start.



EV Recycling



3. Entrepreneurial Mindset Supplemented with Structure

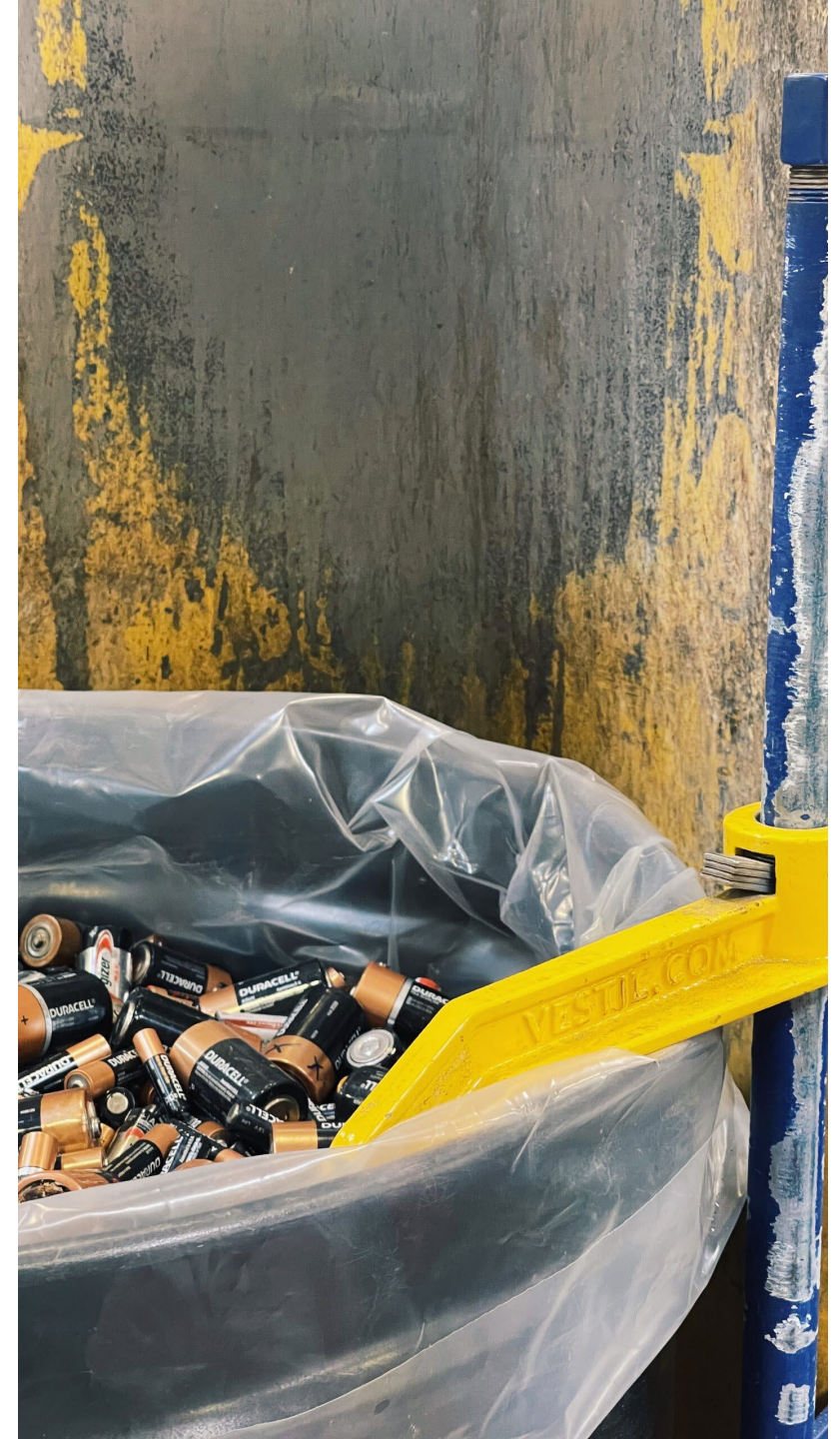
- Entrepreneurial mindset needed to rapidly expand and innovate
- Safety, Environmental, and Operational Excellence are the result of introduction of appropriate level of structure.

4. Target Approaches Based on Feed Type

- One aspect recycling shares with the chemical industry: single site scale and logistics are not always the answer
- Targeted investments based on asset efficiency can create significant value

Looking to the Future

- Continued best in class logistics, inventory, and disassembly service offering
- Significant expansions across multiple sites already announced for black mass production.
- Vertical integration in multiple phases for hydrometallurgical products; commercial scale starting in 2023.
- R&D across multiple areas to evolve with the North American supply chain.



We are Cirba Solutions.

Real Experience & Proven Results.

- Industry is at a tipping point. The market needs **REAL** solutions
- We are a **REAL** business that has decades of relevant experience and a roadmap to deliver products and services
- Now is the time for **REAL** partnerships to meet the needs of organizations and help create a greener world



Thank you!

Kraig Houser

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