National Renewable Energy Laboratory (NREL)

Evaluation Role: Second-Life Analysis
Location: Golden, Colorado
Facility: Electrochemical Energy Storage Lab
Contact Name & Email: Matthew Keyser
Matthew.Keyser@nrel.gov

NREL conducts a wide range of battery research and development spanning the materials, cell, pack, and system levels. A recognized leader in battery thermal analysis and characterization, NREL evaluates electrical and thermal performance of battery cells, modules, and packs, full energy storage systems, and the interaction of these systems with other vehicle components. In addition, NREL provides a comprehensive and detailed focus on the science of battery safety that integrates multiscale, multi-domain models with sophisticated experimental characterization capabilities to develop an extensive understanding of battery failure mechanisms, risks posed during failure, and the influence of cell design on failure mechanisms.

Evaluation Capabilities: NREL

Applications: consumer electronics, EVs, stationary storage
Material Forms Accepted: manufacturing scrap material, damaged, defective, and recalled material, end-of-life material

	Cells	Modules	EV Packs	Black Mass
Minimum Quantity Needed	3	2	2	10 grams
Maximum Quantity Accepted	45	10	4	100s of grams

Special Requirements: Shipping should be done according to DOT regulations.

Argonne National Laboratory (ANL)

Evaluation Role: Second-Life Analysis
Location: Lemont, IL
Facility: Electrochemical analysis and Diagnostics Laboratory (EADL)
Contact Name & Email: Brian Ingram
ingram@anl.gov

Argonne National Laboratory works in every link of the battery's value chain. From modeling and analysis to materials discovery and characterization, from scale-up to tear down and recycling. Argonne is relied upon to build and test all types of cells and has a well-known standardized testing facility. The capabilities, facilities and expertise can be used to help Prize recipients improve and progress their research in many areas such as cell building, cycling, and aging. Argonne also developed the EverBatt model for cost and environmental impacts at the various stages of a battery's life including collection, transportation and recycling. Lastly, Argonne is the home of the Vehicle Technologies Office's battery recycling program, ReCell. The ReCell laboratories house materials processing, recycling equipment and related tools and expertise.

Evaluation Capabilities: ANL

Applications: consumer electronics, EVs, stationary storage
Material Forms Accepted: End-of-life material

	Cells	Modules	EV Packs	Black Mass
Minimum Quantity Needed	Able to evaluate a single cell, module, or pack. Typically requires a minimum of 3 samples for statistical evaluation.			N/A
Maximum Quantity Accepted	~12-15	3-6	1-2	N/A

Special Requirements: Shipping by DOT regulation, listing chemistry and hazards. Working knowledge of cell capacity and nominal voltages, etc.

Oak Ridge National Laboratory (ORNL)

Evaluation Role: Second-Life Analysis
Location: Oak Ridge, TN
Facility: Battery Manufacturing R&D Facility
Contact Name & Email: Ilias Belharouak
belharouaki@ornl.gov

The Battery Manufacturing R&D Facility (BMF) at ORNL was launched in 2010. The facility's core mission is to expedite innovations in advanced battery materials research, battery manufacturing, and cell prototyping that enable low-cost, high-energy, safe, and long-life cells capable of fast charging. The facility provides the ability to analyze every aspect of battery cell development, from raw materials and electrode dispersion preparation to finished product and performance testing. BMF also provides the ability to integrate any component into a complete battery and analyze how well it works and how it can be improved. The facility houses the equipment and instrumentation necessary to research every step in the battery manufacturing process with an emphasis on advanced materials, electrode formulation chemistry, rheology of slurries, innovative coating technology, and high-performance electrode architectures. In addition, BMF develops efficient recovery processes for the separation of black mass from current collectors. The separation processes use green solvents that are inexpensive, nontoxic and do not cause water and/or air pollution, and do not incur a penalty in terms of damages to active materials and current collectors. The recovery of cathodes and anodes from spent lithium-ion batteries have high peeling-off efficiency and are cost effective, scalable, energy efficient and environmentally friendly.

Evaluation Capabilities: ORNL

Applications: consumer electronics, EVs, stationary storage
Material Forms Accepted: manufacturing scrap; damaged, defective, and recalled material; end-of-life material

	Cells	Modules	EV Packs	Black Mass
Minimum Quantity Needed	1 kg	1 kg	1 kg	1 kg
Maximum Quantity Accepted	50 kg	50 kg	50 kg	50 kg

Special Requirements: Appropriate labeling, safety, notice, documentation

Idaho National Laboratory (INL)

Evaluation Role: Second-Life Analysis
Location: Idaho Falls, ID
Facility: Battery Test Center
Contact Name & Email: Matthew Shirk
matthew.shirk@inl.gov

Battery research at INL includes the Critical Materials Institute Lithium-ion Batteries Recycling, Battery 500 Consortium, enabling extreme fast charging program, enabling advanced diagnostics, prognostics and life prediction for improving battery performance and safety, and physics-based machine learning. INL's Battery Test Center conducts electrochemical testing for life and performance characterization on a wide range of devices, from R&D coin cells to large automotive battery packs.

Evaluation Capabilities: INL

Applications: consumer electronics, EVs, stationary storage

Material Forms Accepted: end-of-life material

	Cells	Modules	EV Packs	Black Mass
Minimum Quantity Needed	6	2	1	N/A
Maximum Quantity Accepted	30	10	3	N/A

Special Requirements: Full specification sheets need to be submitted with materials prior to evaluation. Packaging and transportation must be done in accordance with DOT regulations.

Excel Engineering

Evaluation Role: Second-Life Analysis
Location: Mt. Ayr, Iowa
Contact Name & Email: Matt Sobotka
matt.sobotka@excelengineering.org

We provide testing services for batteries and electric power train solutions. We have been a 3rd party test lab for 20+ years, primarily service ICE testing and development. Fortunately, we can leverage the vast expertise in the battery world and have as we enter our 2nd year.

Applications: Electric vehicles, stationary storage
Material Forms Accepted: End-of-life material

Special Requirements: SDS sheets, materials must be in a safe state and working condition.

Stress Engineering

Evaluation Role: Second-Life Analysis
Location: Houston, TX
Contact Name & Email: Michael Padilla
Michael.Padilla@Stress.com

Applications: consumer electronics, EVs, stationary storage
Material Forms Accepted: end-of-life material

Special Requirements: We request SDS and/or spec sheet indicating LIB chemistry, voltage, energy, capacity, and description of first-life usage/application.

American Battery Technology Company (ABTC)

Evaluation Role: Recycler
Location: Reno, NV
Contact Name & Email: Tiffany Moehring
info@batterymetals.com

ABTC is a company in the battery materials industry and has developed technologies for both the recycling of lithium-ion batteries and for the manufacturing of battery grade lithium hydroxide from US-based claystone sedimentary resources.

Applications: consumer electronics, EVs, stationary storage
Material Forms Accepted: end-of-life material; manufacturing scrap material; damaged, defective, and recalled material

Special Requirements: We have bench scale operations that can accept material quantities as low as ~10 kgs, and we also have commercial operations that require a minimum of 10 MT of material.

Ecobat Solutions

Evaluation Role: Recycler
Location: Dallas, TX
Contact Name & Email: Colin Pelletier
colin.pelletier@ecobat.com

Our group is focused on Li-ion battery recycling and research & development on battery recycling. We have 2 sites actively recycling batteries and should have our third by Q3 this year. We also have diagnostics, discharge, & disassembly as well as 2nd life activities.

Applications: consumer electronics, EVs
Material Forms Accepted: end-of-life material; manufacturing scrap material; damaged, defective, and recalled material

Special Requirements: We are currently limited by our ability to store batteries so we can only receive ~20 tons at a time. Of that we would be limited to 4 tons of DDR batteries. We would expect that limitation to be lifted ~Q3 2024.

Ascend Elements

Evaluation Role: Recycler
Location: Westborough, MA
Contact Name & Email: Roger Lin
rlin@ascendelements.com

Ascend Elements is an independent manufacturer of advanced battery materials using valuable elements reclaimed from spent lithium-ion batteries. Our patented Hydro-to-Cathode® direct precursor synthesis process transforms today's waste into high-value materials for tomorrow's EV batteries — a giant step up in sustainability for the entire industry.

Applications: consumer electronics, EVs
Material Forms Accepted: end-of-life material; manufacturing scrap material; damaged, defective, and recalled material

Special Requirements: Packaged and Labeled according to DOT Requirements. Additional requirements will be dependent on the specifics of the evaluation.

Cirba Solutions

Evaluation Role: Recycler
Location: Charlotte, NC
Contact Name & Email: Katie Bobick
kbobick@cirbasolutions.com

Cirba Solutions is the most comprehensive and only fully vertically integrated domestic battery recycling management and materials Company. The Company has developed the processing technology, global reverse logistics capabilities, expert disassembly services, a commercial-scale sorting operation, and an expansive service network to be involved in every step of the battery recycling supply chain.

Applications: consumer electronics, EVs
Material Forms Accepted: end-of-life material; manufacturing scrap material

Special Requirements: Can't accept DDR at the moment. Companies need to follow all packaging, labeling, and transportation regulations.