BATTERY RECYCLING EQUIPMENT SOLUTIONS FOR OEMS

For shredding, crushing, granulating, and separating equipment

ENGINEERED TO OUTRUN

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Battery recycling industry

Current and future overview

Current positioning

- **Technology:** The current sorting process is typically manual or semi-automated for mixed battery types
- **Supply chain:** Battery recycling often relies on linear processes with limited reuse, leading to dependence on virgin materials and higher waste
- **Hydrometallurgical process:** Hydrometallurgical recycling is used but often lacks precise control, leading to variable recovery rates and higher reagent use

Future trends

- **Technology advancements:** The integration of AI and automation in sorting by chemistry type and processing is optimizing extraction efficiency
- **Supply chain improvements:** Closed-loop systems enable material recovery and reuse, reducing costs and building a sustainable supply chain
- **Hydrometallurgical optimization:** Optimization through controlled leaching, advanced separation, and multi-stage purification boosts efficiency and metal recovery

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Technology topology

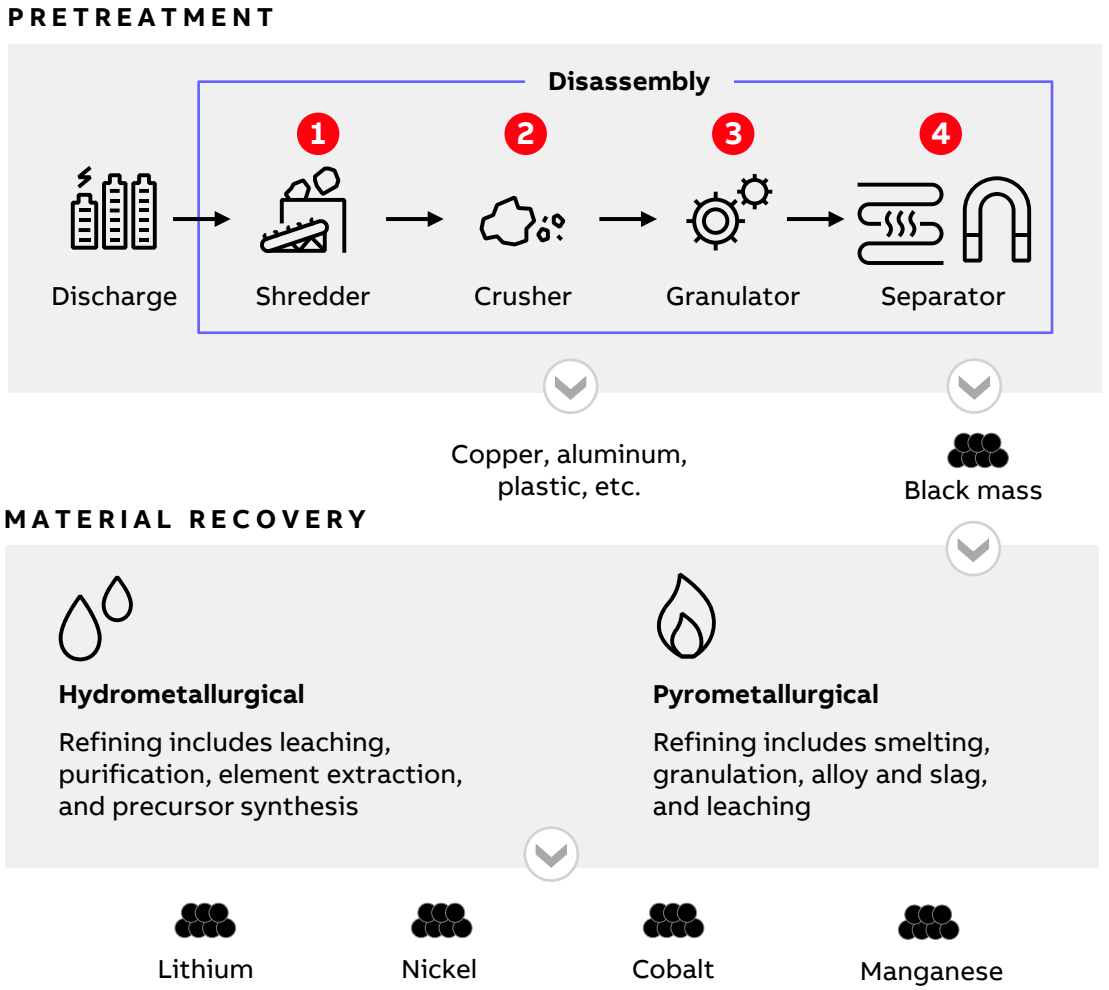
Lithium-ion battery recycling processes

The process begins with sorting end-of-life batteries by chemistry type to support efficient material recovery.

Pretreatment includes discharge and mechanical disassembly using shredders, crushers, granulators, and separators. These steps vary depending on battery type and chemistry, which can influence downstream recovery efficiency.

1. **Shredders**
   Break down the battery packs into smaller components, allowing for further processing
2. **Crushers**
   Reduce the components to a uniform size using high-strength blades and screens for controlled output size
3. **Granulators**
   Further reduce the size of the crushed material to a finer, more uniform granularity, thereby increasing the efficiency of the separation and purification processes
4. **Separators**
   Isolate recyclable components from non-reusable components

Recovered materials are then typically processed through hydrometallurgical or pyrometallurgical methods.



Sources: 1. Frontiers in Sustainable Resource Management (2023); 2. Lithium-Ion Battery Recycling – Overview of Techniques and Trends

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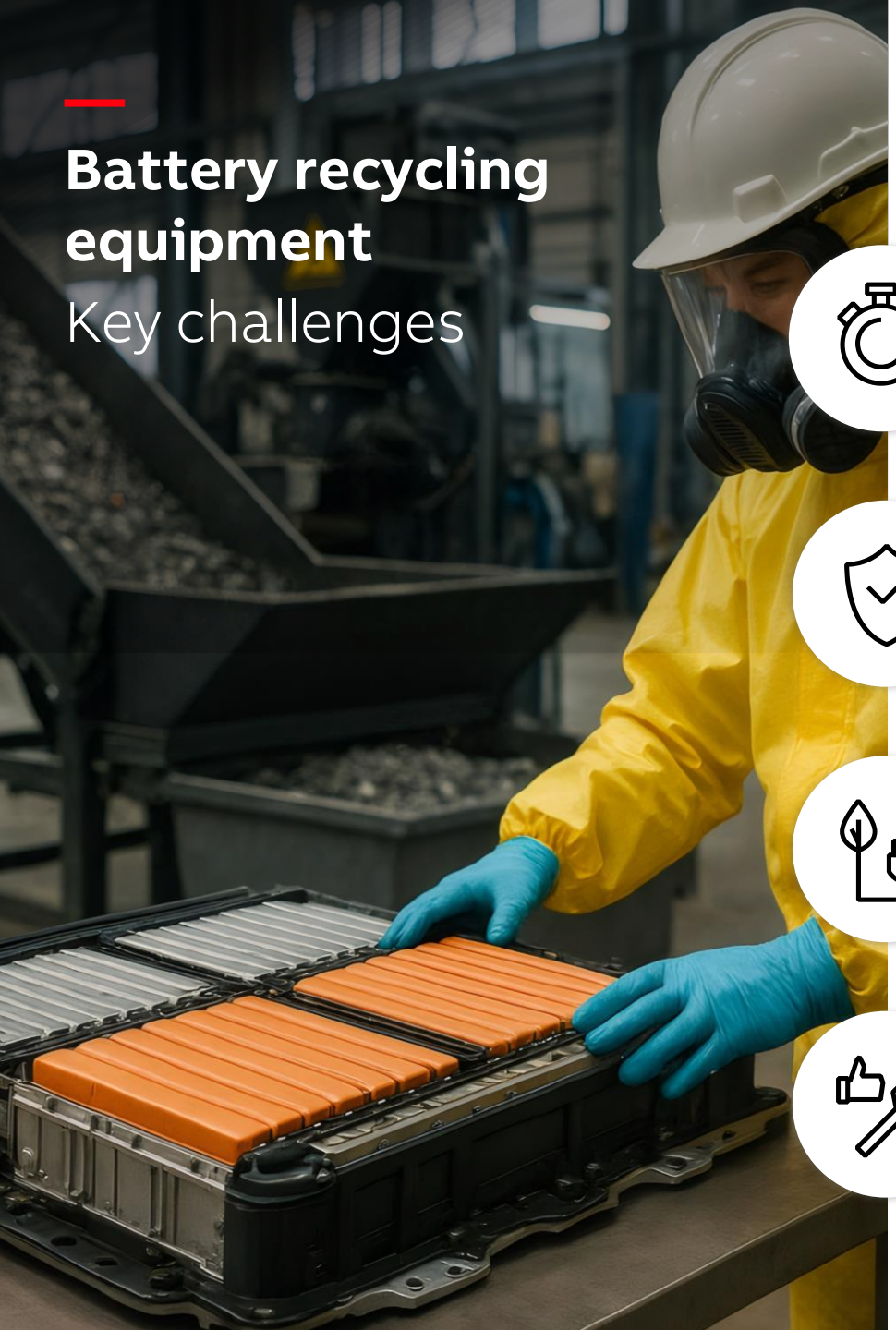
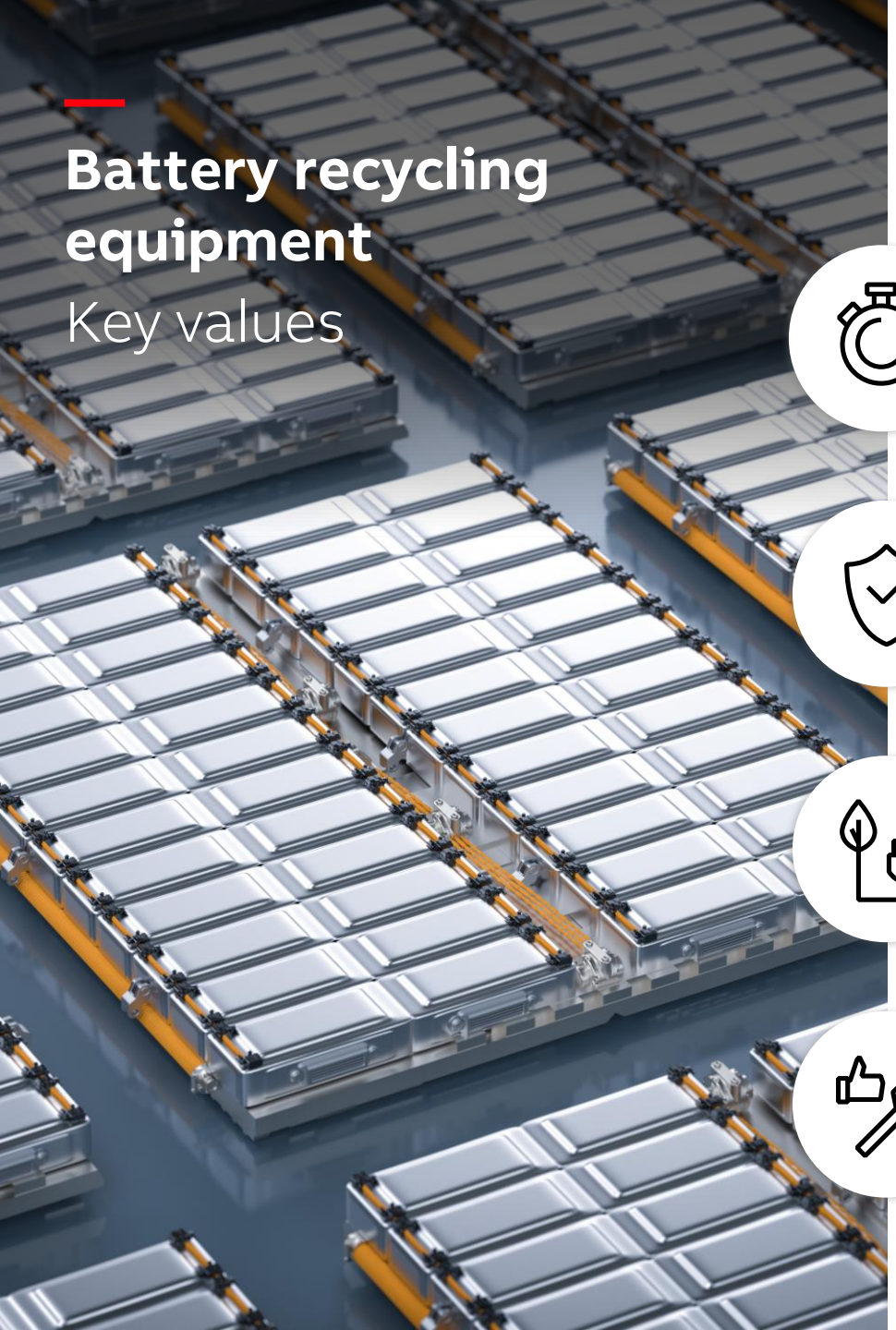


Battery recycling equipment

Key challenges

- Managing interruptions and downtime from voltage instabilities, overloads, or short circuits
- Reducing risks of hazards, fires, and downtime from power quality issues, flammable materials, and thermal stress
- Maintaining required energy efficiency due to increased energy consumption and heat during machine operation
- Managing time-consuming product installations and space constraints in electrical installations



Battery recycling equipment

Key values

Continuous operation

Intelligent protection and control solutions, including circuit breakers, softstarters, and monitoring relays, safeguard equipment and help maintain uptime.

Safety & protection

Enhance safety and thermal management, reduce the risk of hazards and fires, and prevent downtime using circuit breakers, surge protective devices, monitoring relays, or safety components.

Energy-efficiency

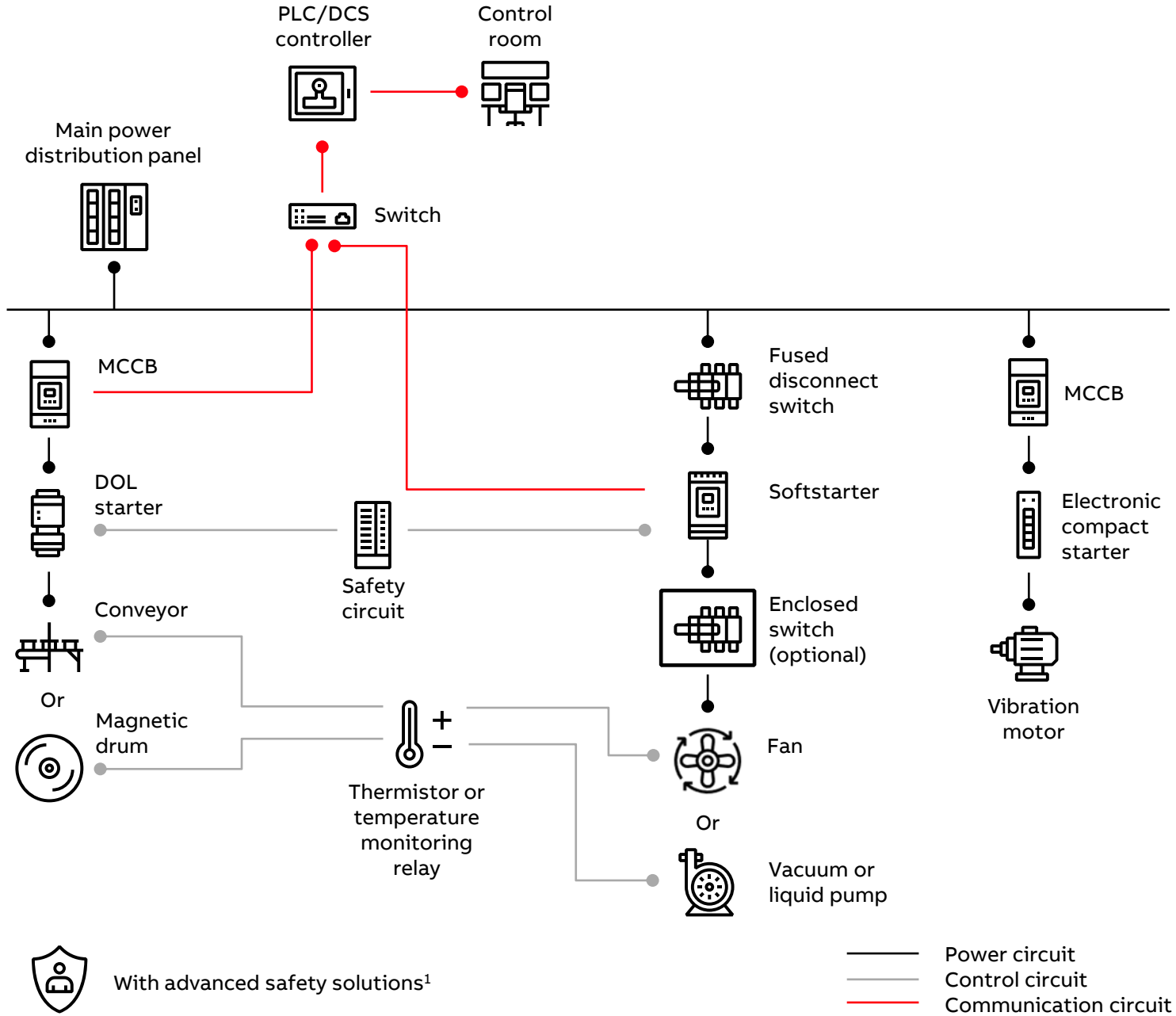
Boost control panel energy efficiency with our AF coil technology, which reduces energy consumption and dissipates less heat, resulting in a lower temperature rise and increased panel density.

Compact & easy to install

Compact designs and user-friendly installation features help reduce setup time and save valuable space in control panels.

Battery recycling equipment

Key components
for shredders, crushers,
granulators, & separators



Note: 1. See the Battery Recycling Product Portfolio for detailed component solutions.

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Battery recycling equipment solutions

Collaborative innovation

National and global connectivity

Continuous product improvement

Quality and innovation

Local distribution support

ABB and customer collaboration and support

Strategically focused on segment trends and solutions

Battery recycling equipment
Resources and tools

Product portfolio: Battery recycling solutions for shredding, crushing, granulating, and separating equipment

LINK

Application note: Power and control solutions for shredders, crushers, and granulators

LINK

Application note: Power and control solutions for separators

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Industry paper: Closing the loop | Building the industrial backbone for a circular battery economy

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ABB Application Configurator

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Mt. Juliet distribution center stocking guide

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ABB OEM battery recycling equipment manufacturer page

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ABB Sustainability & EcoSolutions™

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