CIRCULAR BATTERY CLUSTER

Beyond of the 1st Life: European Collaboration for a Sustainable Battery Future

Jefferson Palas Chungata, Eurecat

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Who I am

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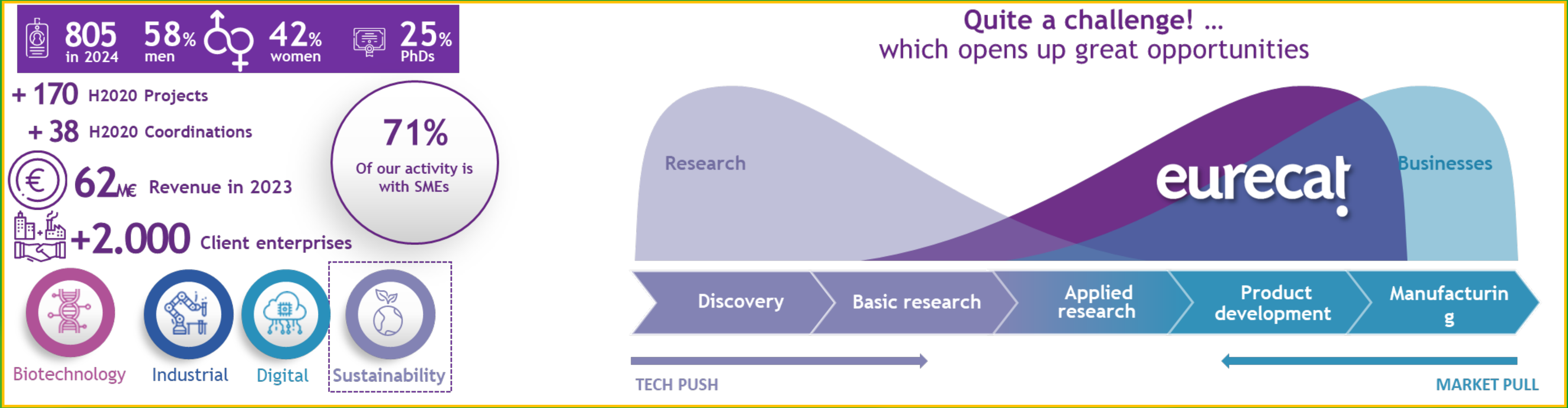
BATTERY REVERSE



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European Circular Battery Cluster Collaboration

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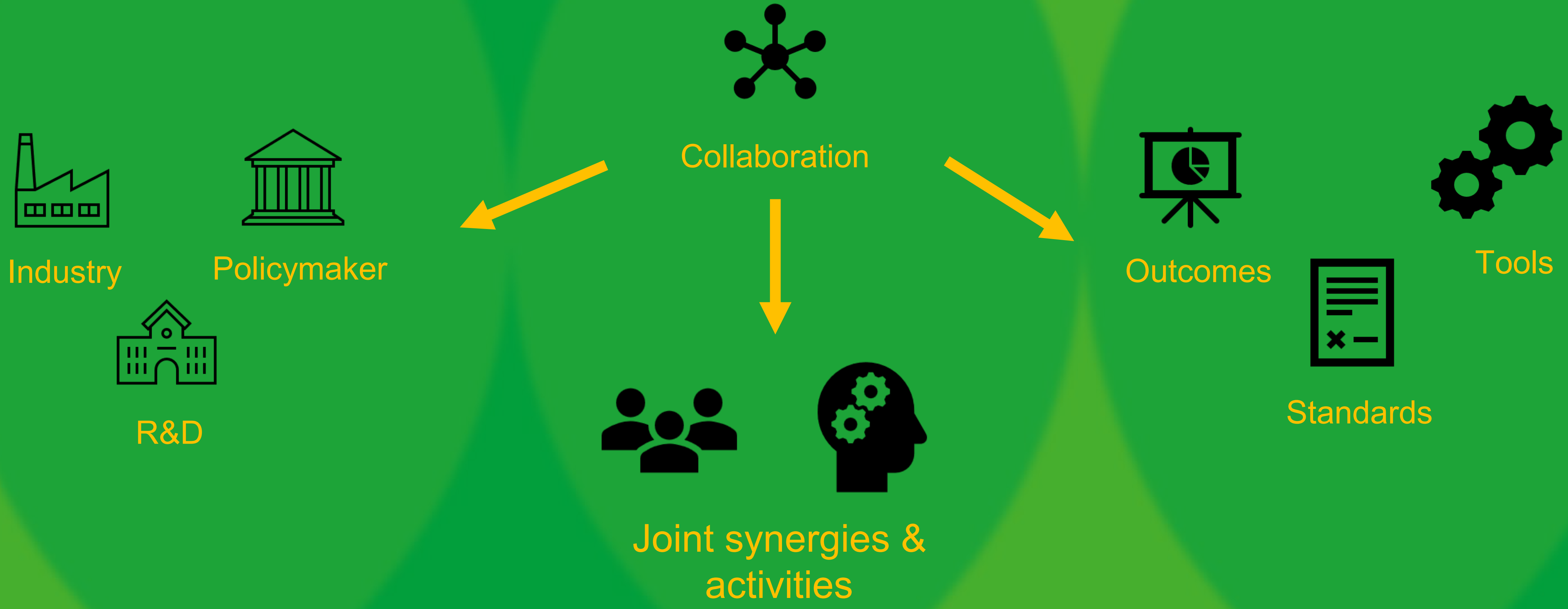
What is the Circular Battery Cluster?



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Why the circular battery cluster?

Industrial & Society Challenges

- High amount of EoL batteries (EV & ESS)
- Non-standardized method & safety hazards
- No virtual Space & Limited traceability
- Manual dismantling
- Limited EoL Infrastructure
- Missing Circular BMs for 2nd Life & reuse

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Outcomes

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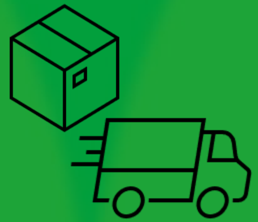
- 2nd life & high recycling rates
- Enable circular economy
- Revolutionize recycling
- Create Circular BMs
- European Community
- Improve safety (and less accidents) via automation processes

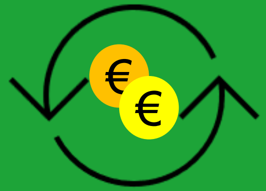
Innovations

BATTERY ASSESSMENT & DIAGNOSIS



SAFETY STORAGE & TRANSPORTATION

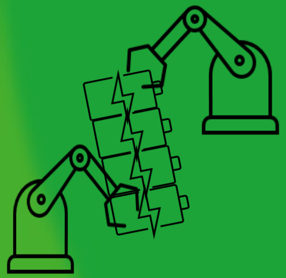
BATTERY DATA SPACE & PASSPORT



CIRCULAR & SUSTAINABLE MODELS

SAFETY PROTOCOLS

AUTOMATED DISMANTLING



AUTOMATED DIS(RE)-ASSEMBLY

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OUTCOMES

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Automated Dismantling: Reduces labor, cost, and safety risks, enabling scalable recovery and reuse of battery cells.

Accurate SoH Checks: AI-driven monitoring increases confidence in second-life applications and reduces testing costs.

Sorting & Provenance: Rapid, precise sorting enhances reuse efficiency and supports recycling with full material traceability.

Life Cycle Assessment: Baseline LCA enables measurement of environmental benefits and guides sustainable battery value chains.

Battery Passport & Marketplace MVP: Creates trust and transparency, helping stakeholders efficiently trade and repurpose batteries across Europe.

OUTCOMES

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Ultra-fast ENA diagnostic (<5 min, <2,000 €) for smart sorting into 2nd life vs. recycling.

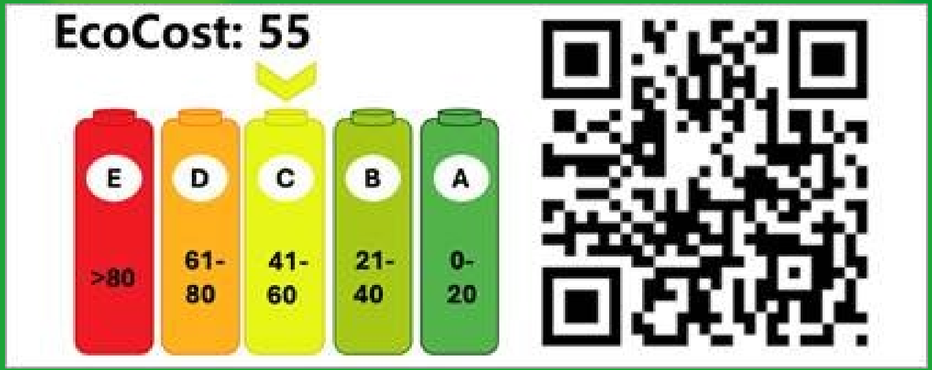
Autonomous EV disassembly: adaptive robotics learning real actions (unscrewing, cutting, grasping).

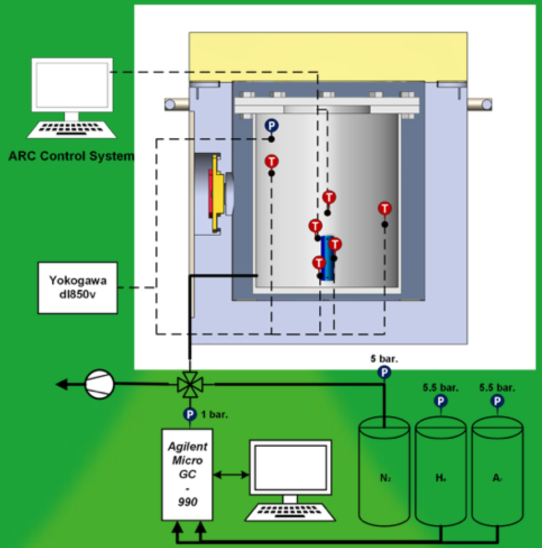
Intelligent LEV dismantling: object-aware robotics using physical + semantic battery data.

Next-gen safety & logistics: smart Li-ion container with sensors, active prevention & deep-discharge.

Unified battery labelling + Passport: +30% efficiency, 60–80% lower environmental impact.

Real demonstrators: EV robotic line, LEV semi-automation, 2nd-life lighting prototype.





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OUTCOMES

Fast SoH assessment and discharging: Facilitates faster decision-making about next steps: recycling or repurposing/reusing

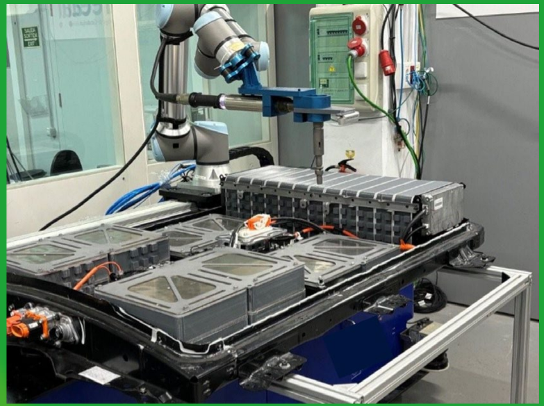
Automated dismantling: A prototype built using 3D localisation and screw tracking and identification

Li-ion Battery Transport Box: Award-winning prototype of safety box that has passed mechanical and fire tests

Battery data space with battery passport functionalities: Prototype on based blockchain technology, allows a decentralised system where data is distributed amongst stakeholders and entities.

Stakeholder consideration: Stakeholders consulted when designing prototypes for BatteReverse innovations

Denios Lithium-Ion Battery Transport Box XL



Eurecat's unscrewing robotic station

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OUTCOMES

Optimised logistics: Safe & smart collection enabling battery monitoring during transport.

SoH diagnostics: Processing allowing assessment time to be ↓75% & errors ↓50%

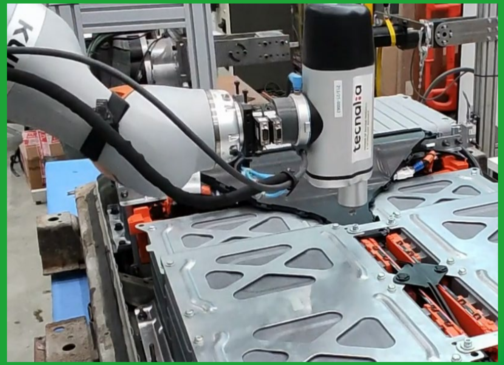
Automated dismantling and sorting: Pack-to-module, module-to-cell, cell-to-electrode.

Battery passport: Passport traceability for 2nd- and 3rd-life battery users.

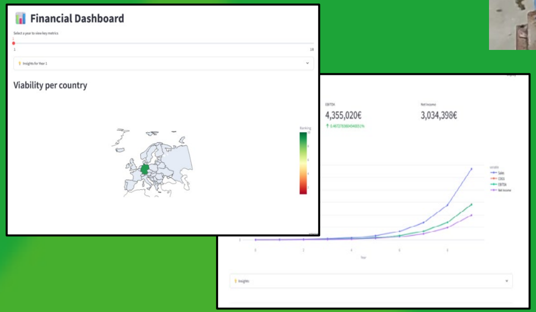
Circular & sustainable business models: Development of a BM simulation platform demonstrating REINFORCE strategy

Smart container for reverse logistics

Automated dismantling



BM Simulation platform



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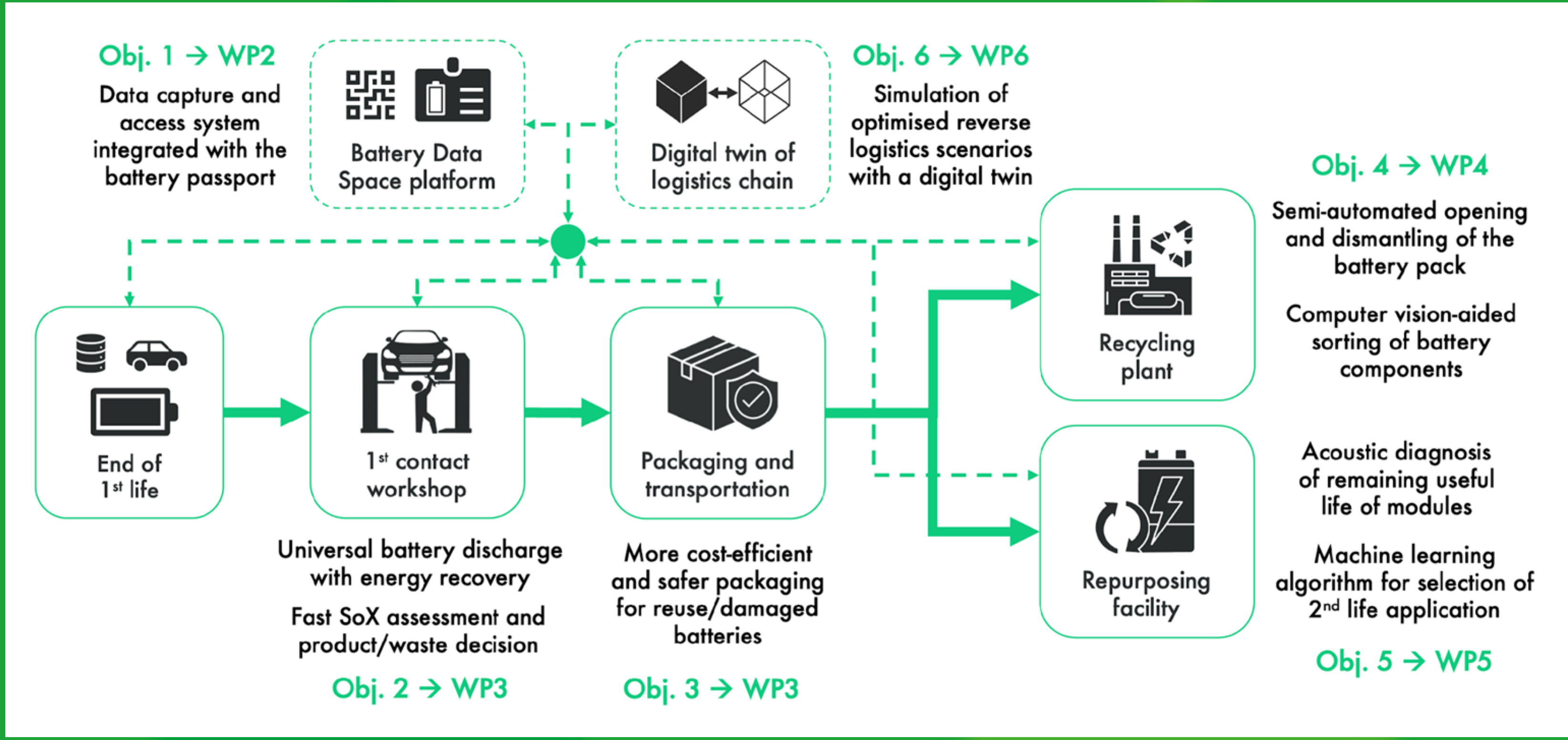
Discharging Tool & 1st Fast Assessment of a Battery Pack

Developing a next-generation RL process based on innovations in each of the four main RL stages is complex. This is how we do it:



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Discharging Tool & 1st Fast Assessment of a Battery Pack

CHALLENGES

Extract CHG/DSCG properties

Integration SoX algorithms

DSCG Standard Methods

Historical Battery Data

Battery Passport

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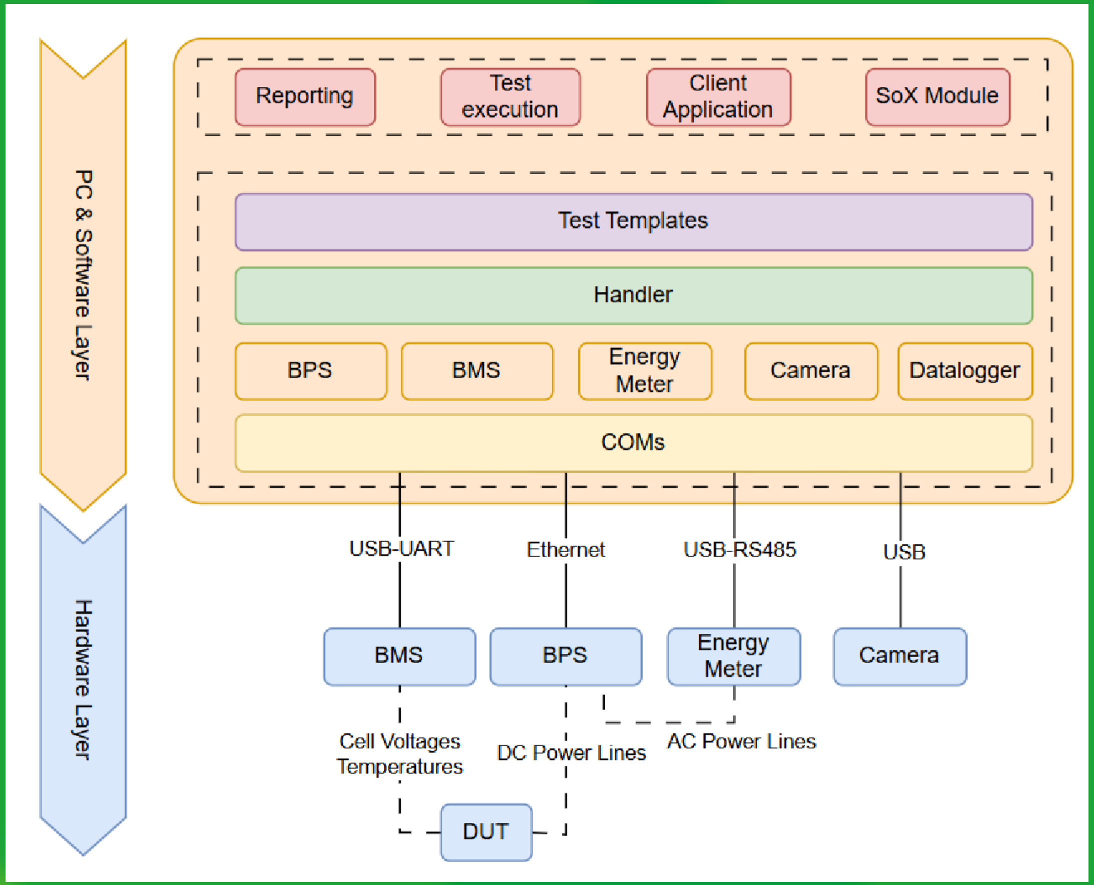
Discharging Tool & 1st Fast Assessment of a Battery Pack



- Battery-agnostic CHG/DSCG Process
- Efficient Energy Recovery
- Fast SoX Assessment
- Logging & Reporting
- Battery DataSpace Platform Integration
- Cell, module & Battery Pack Level

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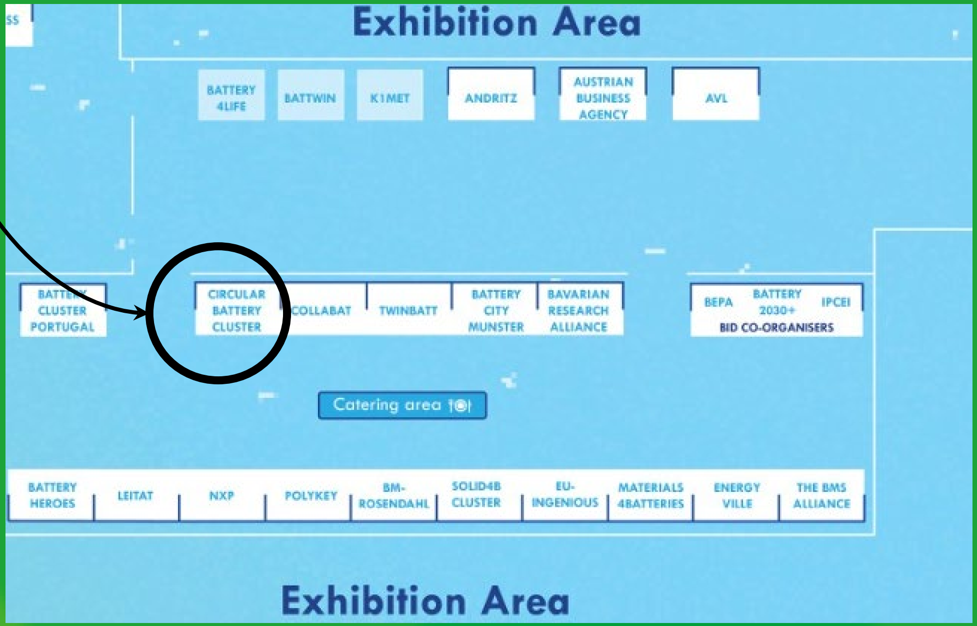
Are you ready to collaborate?

Circular Batter Cluster
Booth
Exhibition area



Discover our latest innovation

A **Centria expert** will be at the stand showcasing a demo video of one of our key project outcomes. Don’t miss it!

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Thank you!

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