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WSIS FORUM 2023

13-17 March 2023

Virtual Workshops in April & May

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Midac SpA

Midac is in Soave (VR) – Italy
European leader on the manufacturing of energy accumulators.

Midac has two Factory Plants in Soave (VR) and Cremona (CR):

Lead-Acid Batteries for:
- **AUTOMOTIVE**
- **INDUSTRIAL / MOTIVE POWER BATTERIES**
- **STANDBY BATTERIES**

Lithium Batteries for:
- **INDUSTRIAL / MOTIVE POWER BATTERIES**
- **RESIDENTIAL ENERGY STORAGE SYSTEM**

MIDAC holds two R&D Centers: *Soave (VR) and Civitanova Marche (MC)*

MIDAC Branches: *GERMANY, FRANCE, NETHERLAND, UK, SWEDEN and AUSTRALIA*

Total Turnover *> 240 Mil€*
Personnel (Italy) *~ 600*
Total floor area of building (Soave + Cremona): *51.000 m2*

MIDAC IPCEI Program

*In seven years, MIDAC will invest **130M€** among Lithium Battery value chain to close the value chain loop :*

- ***Development of «Second Life» Technology:***

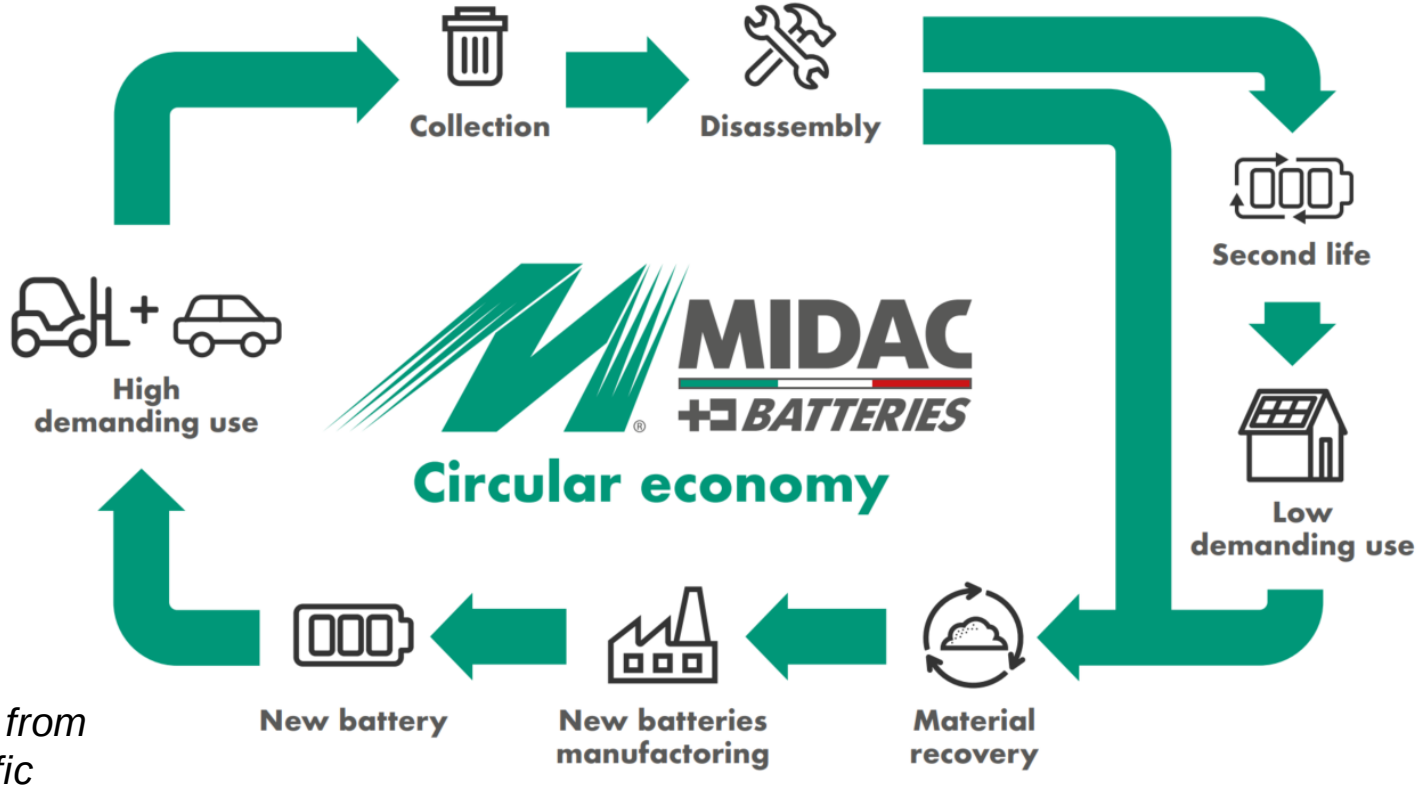
Reuse spent motive power modules to design a «Second Life» Residential Energy Storage solutions

- ***Recycling spent Lithium Batteries :***

Design, Procure and install an industrial recycling plant for Lithium batteries with a low environmental impact and reduced energy Consumption

- ***Battery Pack and Lithium Cell production:***

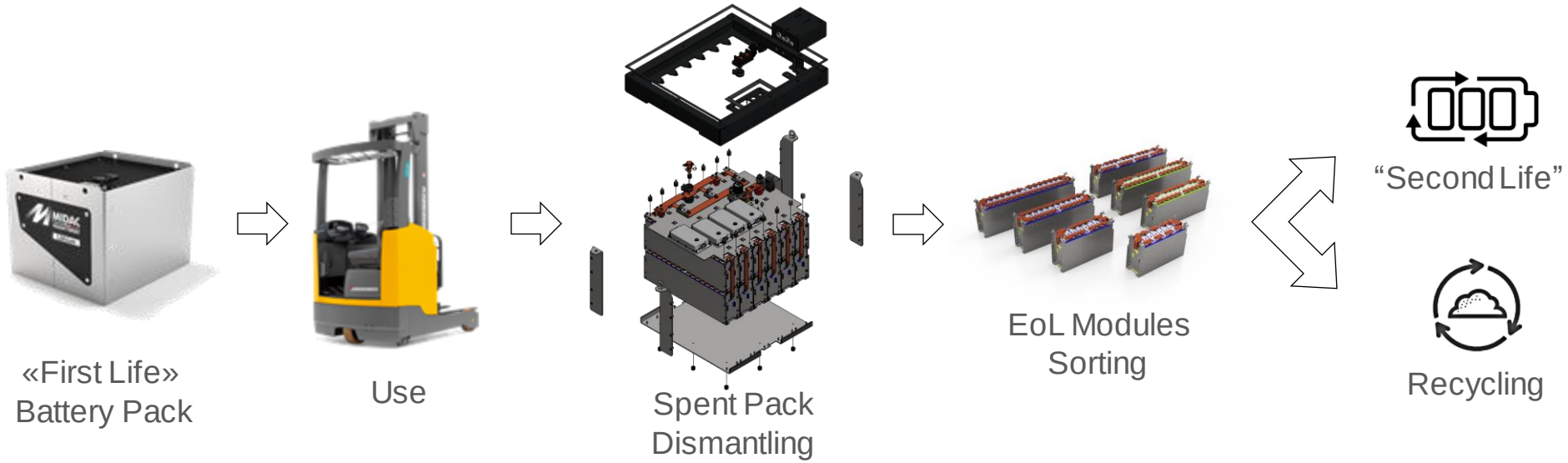
Design and produce an enhanced Lithium cell, starting from the recycled secondary raw materials, to provide specific solutions for the industrial market. Design an advanced Lithium Battery Pack with increased recyclability.



Disassembly

Disassembly

Usually, a lithium battery pack ends its primary function when it is no longer able to supply the necessary power to the system; this does not mean that the battery pack no longer has storage capacity and can be used for less intensive purposes (e.g., stationary applications).

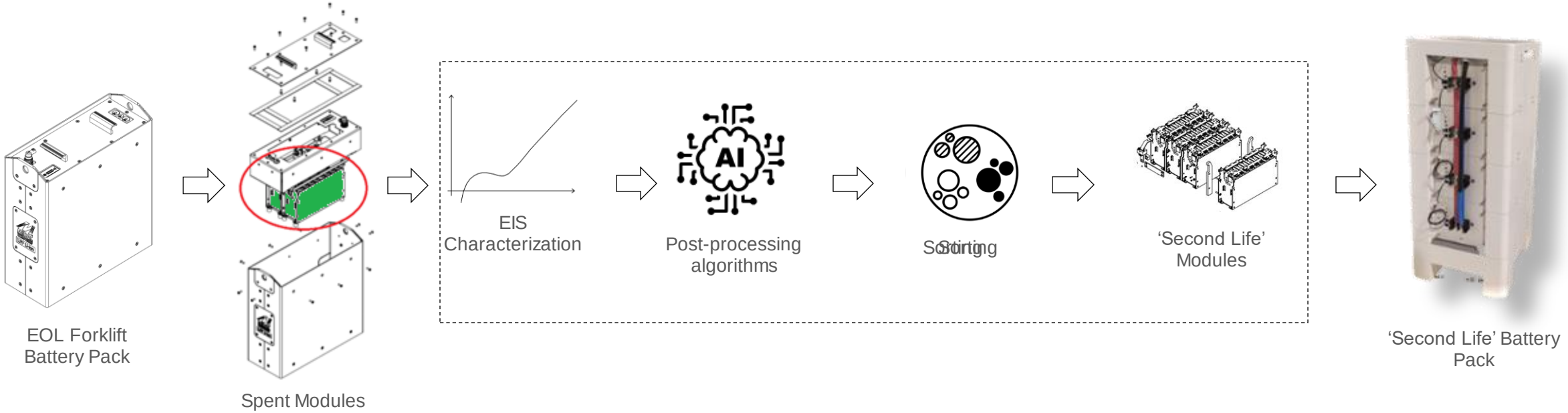


Lithium battery packs will be designed to be used for a "Second Life" and easily to be disassembled for the recycling process.

"2nd Life"

"Second Life"

Exhausted battery modules are analyzed through EIS characterization techniques. Through artificial intelligence algorithms, they are grouped and selected to be used in "Second Life" batteries. Proposed method can estimate, in a fast way (few seconds), the modules suitable for a "Second Life" and sorting to manufacturing a "New" battery. Proposed method is tested with MIDAC batteries, and it will be extended to the OEM's ones.



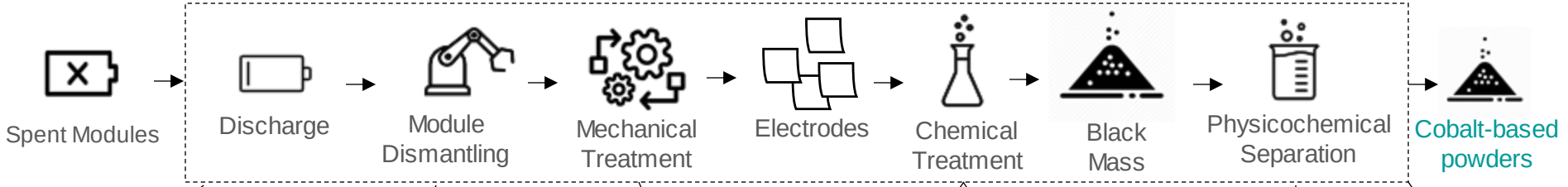
Fast sorting algorithm

Low Environmental Impact

Low process and energy costs

Recycle

When modules cannot be used in a «Second Life» application, they are processed using mostly mechanical treatment and green solvents. The differences in material properties are exploited in order to separate battery components.



Energy recovery during module discharge

Safe semi-automatic module dismantling

Safe material processing and inertization

Binder

Al, Cu

Graphite

LFP

Black Mass

Current collectors

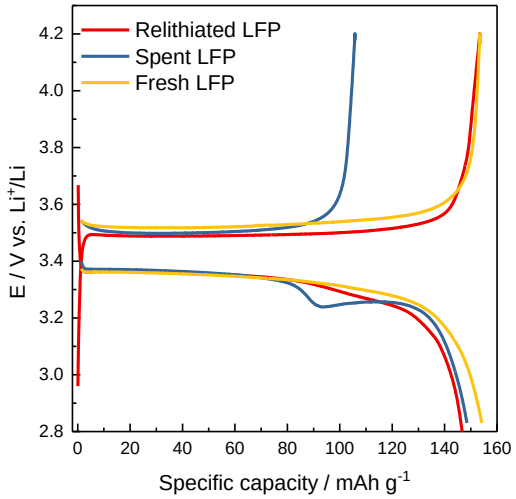
LFP Cathode Materials

Recycled LFP

PATENT PENDING

LFP Cathode rigeneration method

Regenerated LFP



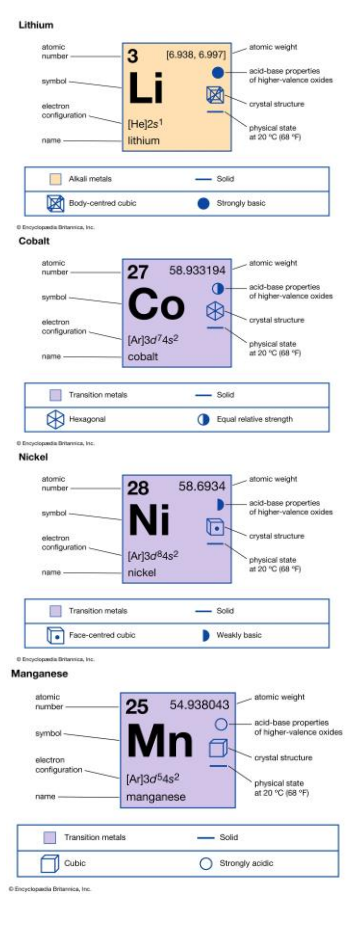
Cobalt-based Cathode Materials

Cobalt-based powders

Hydrometallurgical Process

Secondary Raw Materials

Critical/strategic raw materials



Project TimeLine

Pilot Line
Up to 200 tons/y

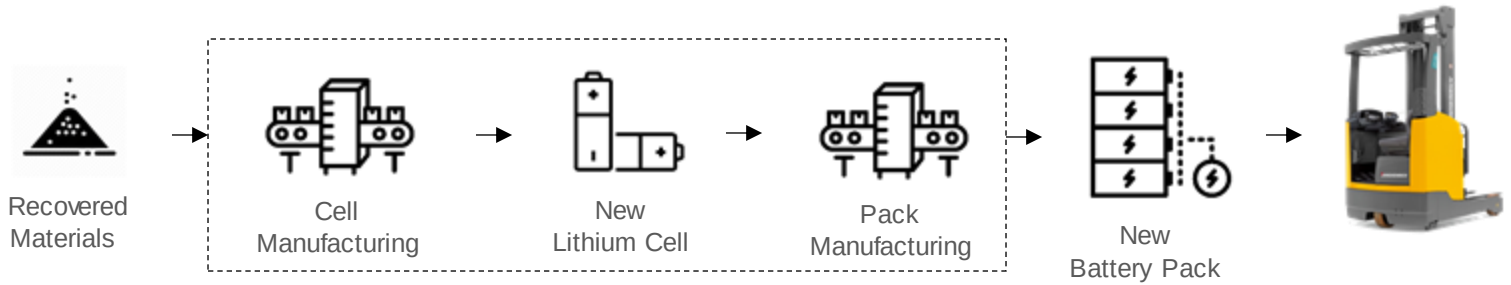
End of 2024

Industrial Plant
Up to 12.000 tons/y

Start from 2026

New Cells

Manufacturing of gen 3b cells from recycled materials
Cells designed to improve energy density, thermal and mechanical resistance
Lithium battery pack and module integrated in the value chain (easily to recycle)
Lithium battery pack designed to be integrated in the value chain



LNMO
(Cobalt-free high-voltage spinel)

Deployment of a Lithium cell manufacturing plant with a productive capacity of 500 MWh/years to produce 30.000 battery packs by 2028.

Thanks!

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