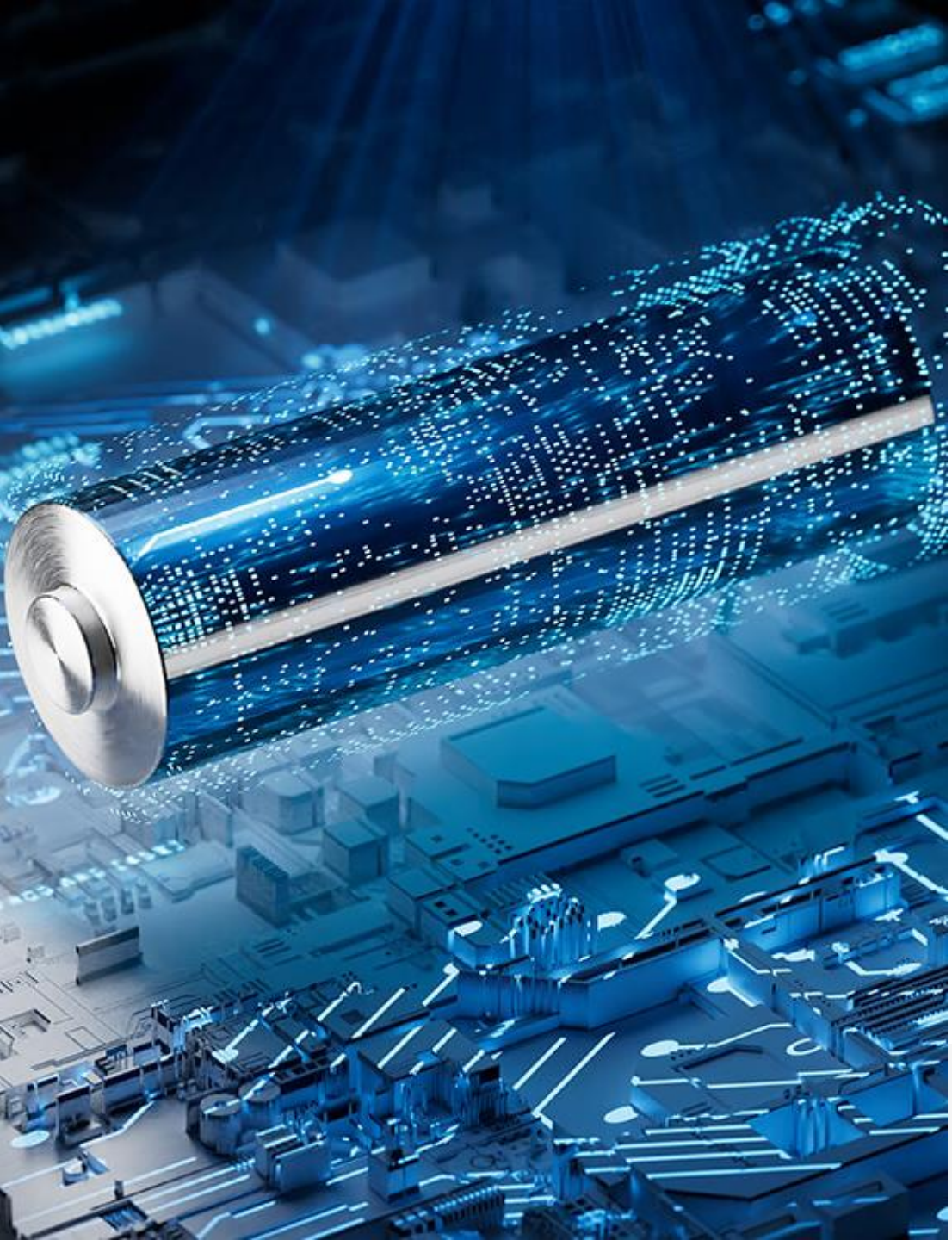

BENCHMARK DEPOSITORY OF 2NDLIFE PRONE LIB & ACCEPTANCE CRITERIA AND GUIDELINES

Watt4Ever SRL
DevEngineer
Edvarts Emersons

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Watt4Ever SRL

- Management of end-of-life EV batteries
- Building of new battery stationary systems

Founded in 2020
#Team: 10
Based in: Belgium
Offices: Beringen and Brussels

Team

Aimilios Orfanos, co-CEO

Mechanical Engineer, 10-y experience in energy services and electricity networks

Niels Vandeput, COO

Mechanical Engineer, 8-y experience in automotive technology

Customers/Partners

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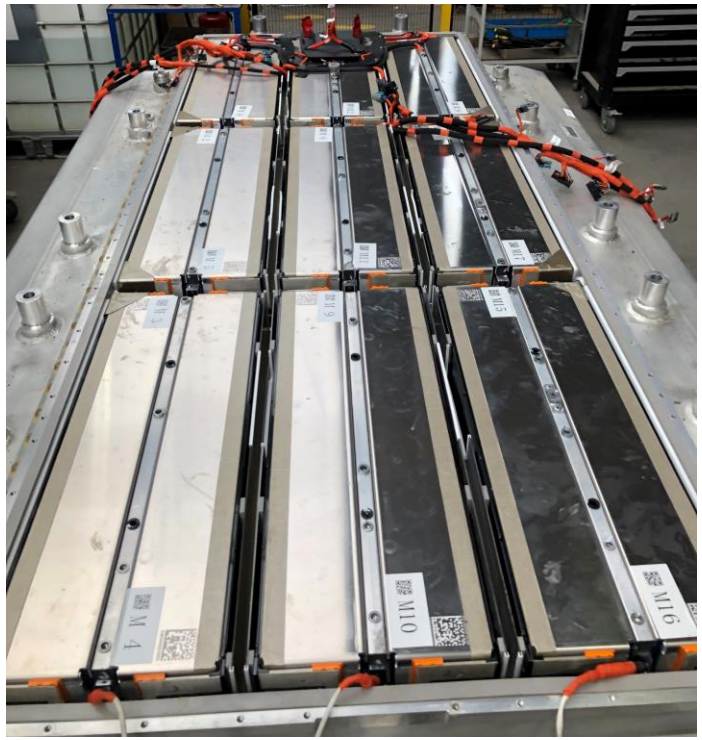
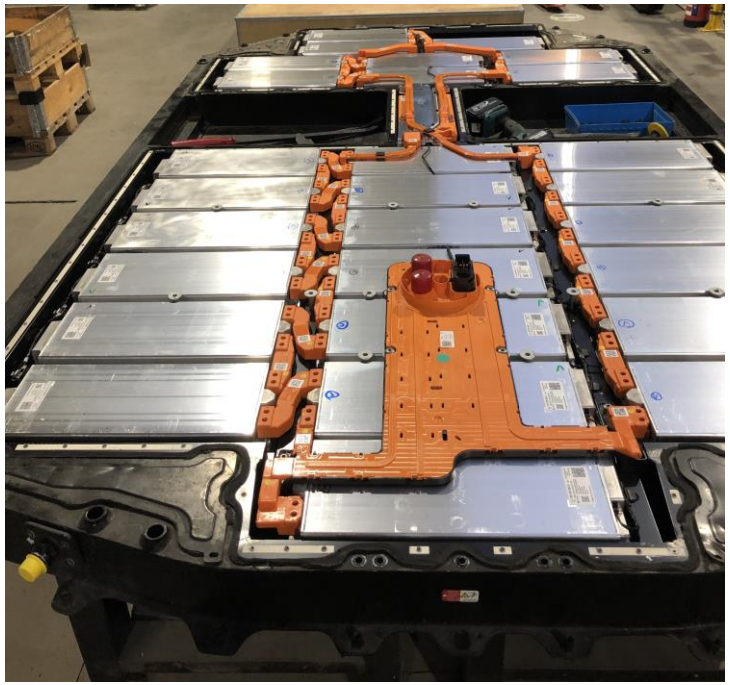
Dismantling Challenges





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PARAMETER IDENTIFICATION

Table 1. 1st life identification section

Type	Make	Model	Model Year
PHEV	FORD	KUGA	2019
BEV	PORSCHE	TAYCAN	2020

Table 2. Pack Level section

Physical properties				Nameplate specifications					
Weight	Length	Width	Height	Nominal voltage	Nominal energy content	Nominal capacity	Cooling Type	# modules	Module configuration
530	2830	1772	127	375	80	15	Liquid	30	15s2p
213	1200	1723	143	350	14	3	Forced Air	7	7s1p

Table 3. Module level section

Physical properties							Electro mechanical properties		
Weight	Length	Width	Height	# cells	Cell config.	Casing	CMU	Communication protocol	Busbar connector
12	35	15	11	12	12s1p	Open top	External multi module	CAN	M6
13	39	15	11	444	6s2p	Alu jacket	Internal	CAN	M6

Table 4. Module level section

Nameplate specifications			
Nominal voltage	Nominal energy	Nominal capacity	Cooling type
44	2.05	108	Heatsink
22	2.86	240	Heatsink

Table 5. Cell level section

Physical properties						Chemical properties		
Weight	Length	Width	Height	Cell shape	Diameter	Cathode	Anode	Ratio
914	30	80	123	Prismatic	-	External multi module	CAN	-

Table 6. Cell level section

Nameplate specifications	
Nominal voltage	Nominal capacity
3.75	21

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CRITERIA SELECTION

Criteria for LV 48V system

- **Casing-** Open top or Alu Jacket
- **Size**: 350*150*120 mm ± 100 mm on all axis
- **CMU:** External multimodule, external single module or internal and all can be reused if OEM CMU unit communications gateway is possible.
- **Cell amount:** 3s-12s
- **Voltage:** 10V-30V
- **Chemistry**: NMC or LFP.

Criteria for HV system

- **Size**: >350*150*120 mm ± 100 mm on all axis
- **Cell amount:** 12s-30s
- **Voltage:** 40V-100V

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Testing and Evaluation Challenges

LG CHEM 12kWh/36S/150V 70KG .

How to test it?

Voltage check, resistance check?

Custom CMU needed, OEM CMU is locked

Then HV Cycler needed to cycle.

Reuse-HV or LV systems if manual reconfiguration can be done...

LG CHEM 2.86 kWh/6S/24V 12KG .

Voltage check, resistance check?

Internal CMU, OEM BMS is locked

3rd part BMS needed, build a system around it and cycle with LV inverter

Reuse- HV or LV systems

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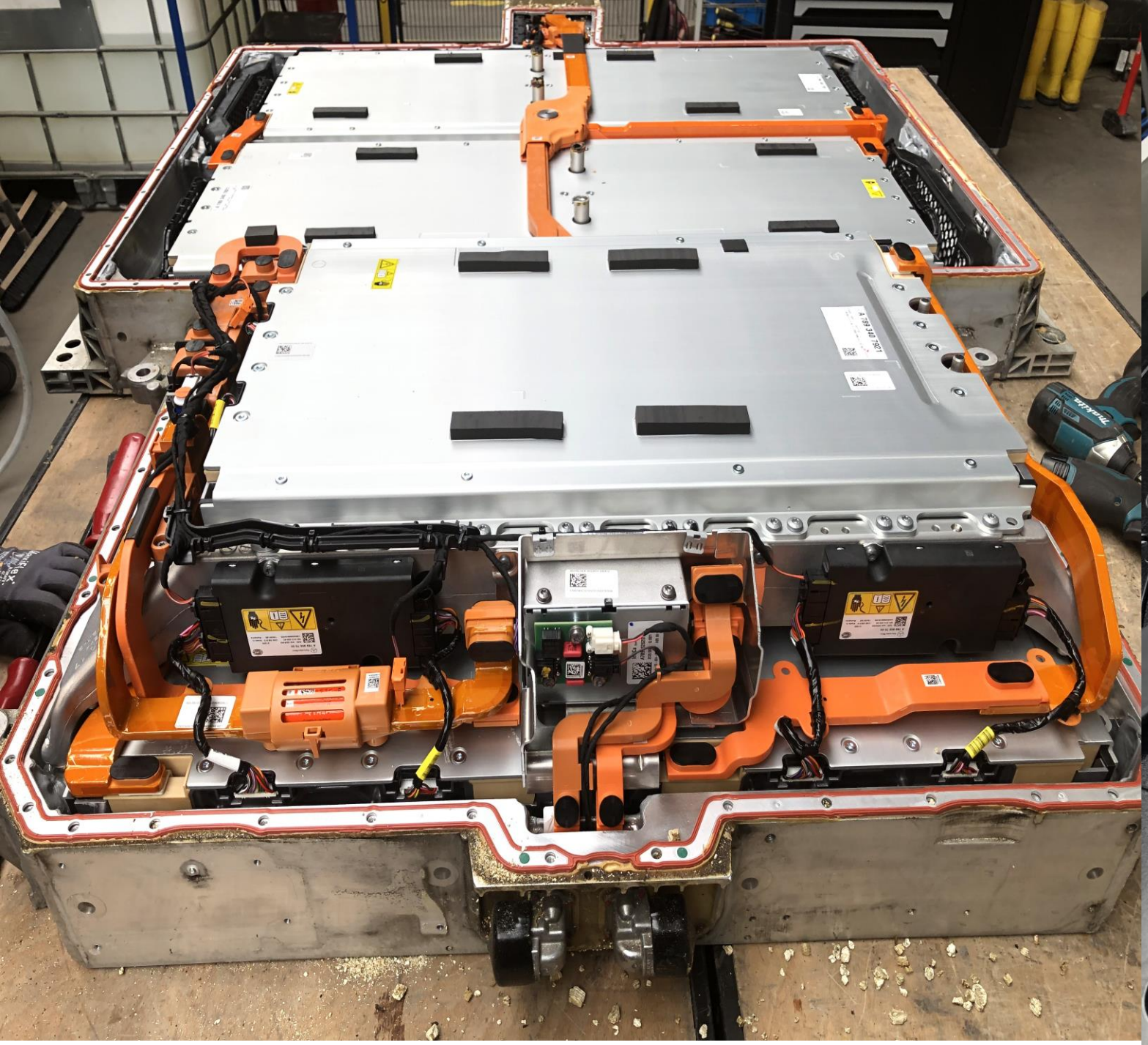


EMS
CAN
BATTERY
CAN
WHEEL

Watt4Ever Systems

Battery modules coming from reused EV batteries + Battery Energy Storage Solutions for businesses (BESS)

- **EV battery modules** ➔ stationary, e-mobility
- **Plug & play stationary BESS's** ➔ balance the electricity system, store (cheap) energy to consume when prices are higher, avoid consumption peaks, or provide backup energy in case of blackout.

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D2. 1 – BENCHMARK DEPOSITORY OF 2NDLIFE PRONE LIB & ACCEPTANCE CRITERIA AND GUIDELINES

CONTINUITY OF WORK

Partners have used different data sources to put in necessary makes, models and parameters on different level, thus, there is a lack of data consistency as some of the parameters are left blank, project partners agree to do their best to acquire information to fill the missing information. Database is kept updated till 2025.

CONCLUSIONS

Based on the DB, a Benchmark depository was obtained, giving an overview of the most relevant parameters for 2nd Life. The most important parameters as module size, capacity, cell amount, CMU and power terminals were selected. Researched have tried to gather as much data as possible, but for some entries in the Module and Cell parameter level no publicly available information was found to fill. Yet database provides insights on Pack – Module - Cell level sizing, capacities and chemistries for dismantling optimization, while also providing necessary information for second life integration.

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Respect

FOR A COMPETITIVE, CIRCULAR AND SUSTAINABLE EUROPEAN BATTERY MANUFACTURING INDUSTRY.

Materials for Batteries Cluster Hub Annual Meeting 2023

16th November 2023

Benjamin P. Wilson

Aalto University, Finland

Respect

FOR A COMPETITIVE, CIRCULAR AND SUSTAINABLE EUROPEAN BATTERY MANUFACTURING INDUSTRY.

RESPECT NUMBERS AND FIGURES

European Climate, Infrastructure and Environment Executive Agency
Project number: 101069865

COORDINATOR

Orano Mining

Justo Garcia

Coordinator

DURATION

July 2022- June 2026

48 months

TOPIC

Recycling

Sustainable, safe and efficient recycling processes ID:

HORIZON-CL5-2021-D2-01-06

Type of action:

RIA

BENEFICIARIES

from 9 countries

15 organisations

+ 3 associated partners

BUDGET

8 906 936 €

from Horizon Europe

+ Associate partner funding:

1 000 000 CHF SERI

790 000 € UKRI

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MAP OF THE PARTNERS

NORWAY

MORROW
Vianode

SWEDEN

CHALMERS
UNIVERSITY OF TECHNOLOGY

FINLAND

Aalto University

M:O

GREAT BRITAIN

Addible

WMG
THE UNIVERSITY OF WARWICK

BELGIUM

CLERENS

CLEPA
European Association of Automotive Suppliers

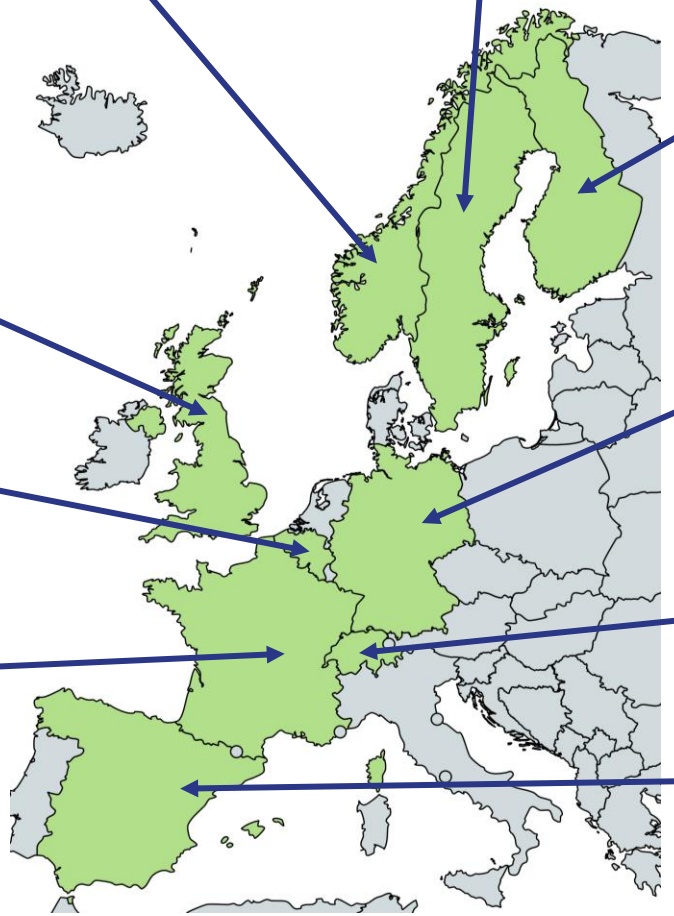
FRANCE

orano

cea

ceva LOGISTICS

COUP'INDUS



GERMANY

Fraunhofer ISC

meet

SWITZERLAND

KYBURZ

SPAIN

LOMARTOV
[Applied Innovation Engineering]

cidetec
energy storage

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RESPECT OVERVIEW

RESPECT's aim is to achieve efficient, sustainable, innovative and safe battery recycling processes in the EU encompassing new processes capable of achieving > 90% wt recovery rate/efficiency and supporting Li-ion battery manufacturing in Europe.

OUR OBJECTIVES

Implementing efficient logistic solution for Li-ion batteries management and sorting

Full recovery and high valorisation of resources within batteries

Enabling LiBs safe deactivation at the industrial scale while limiting environmental impact, raw material resources and cost

Low CO_2 hydrometallurgy

Using innovative separation technologies for improving active materials access

Innovative and low-carbon direct recycling

Improved life Cycle Assessment of each segment of the battery value chain

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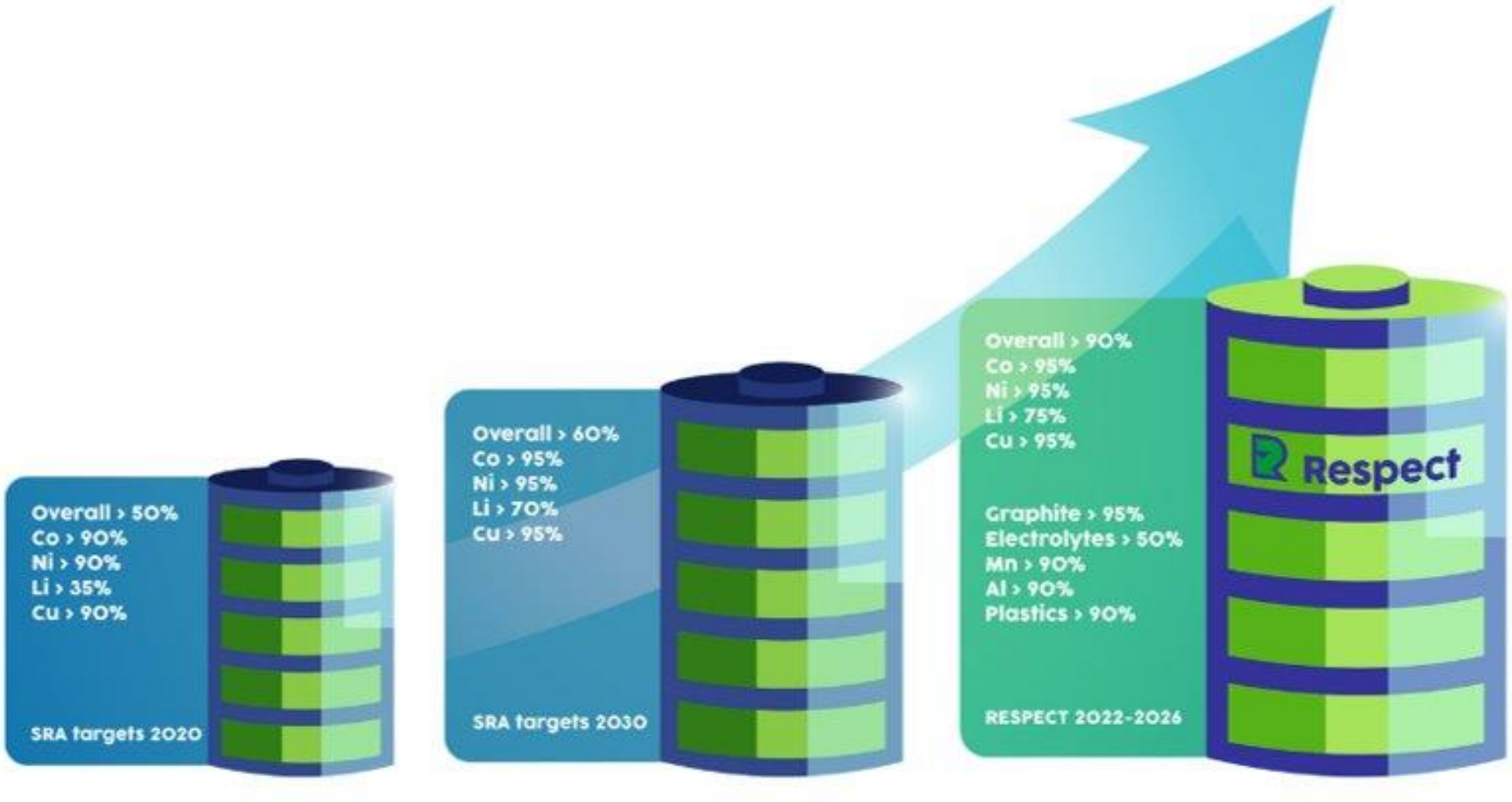
RESPECT OVERVIEW

KPI Recycling efficiency Li-ion batteries



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Some Innovative points of the RESPECT project

Work package		Main innovative points			
1	Battery supply and deactivation	Treatment of modules with variable charge	Treatment of damaged modules	No thermal treatement or inert gas	Reusable reagents for discharge
2	Pre treatment for material concentration	Battery cutting and electrodes air ejection	Extraction of casing without mixing	Concentrated active mass purified from graphite	All materials are recoverable
4	Direct recycling and active material synthesis	Cathode recovery without destruction	Less reagents needs	Less effluents quantity	Less steps to obtain CAM

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The RESPECT consortium partners appreciate the collaboration with the EU-funded projects under the Cluster Hub!

Potential Topics for Collaboration:

- Battery Passport
- Logistic aspects and transportation
- Separation and treatment for graphite and other battery materials
- Life cycle sustainability assessment of End of Life (EoL) batteries

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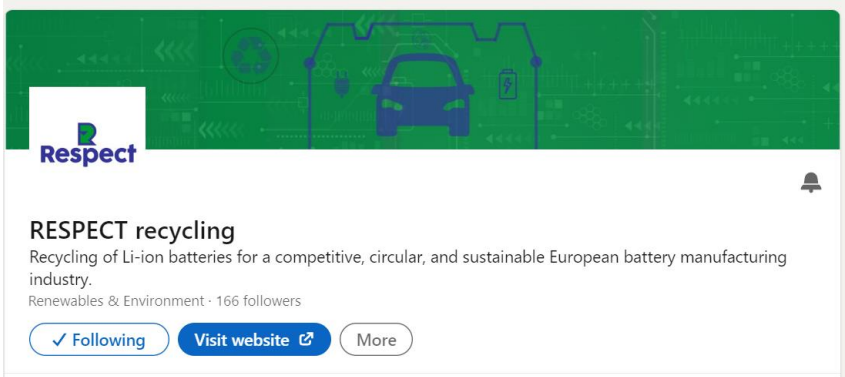
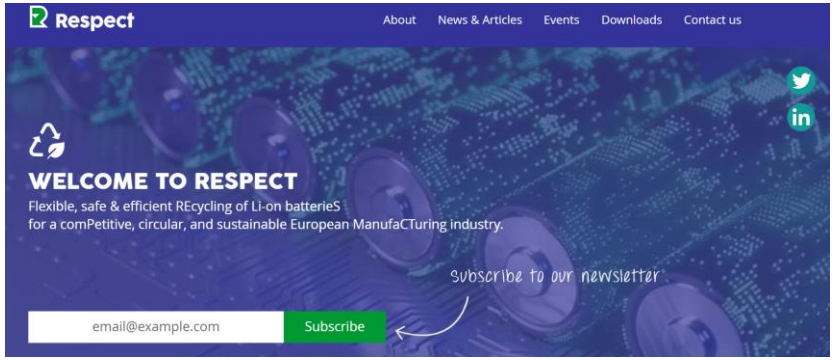
Social Media of the RESPECT project

Follow us on Social Media!





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Subscribe to our Newsletter!

THANK YOU!

Email: ben.wilson@aalto.fi

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