Innovative battery technologies and recycling of EV batteries

SustainableSolutionsMatch

Welcome!

Session Agenda

- Welcome & Introduction
- Pitch Presentations:
  - Pitch 1: ACCUREC-Recycling GmbH (DE)
  - Pitch 2: Blowin' in the wind SL (BLOWIND) (ES)
  - Pitch 3: Cellavie (BE)
  - Pitch 4: Catalonia Institute for Energy Research (ES)
  - Pitch 5: LOHUM Cleantech Private Limited (IN)
  - Pitch 6: Napptilus Battery Lab (ES)
  - Pitch 7: Battery-Network ReLioS e.V. (DE)
- Closing Remarks

Welcome & Introduction

Who's moderating?

Wolfgang Treinen

Berlin Partner for Business and Technology

Senior Project Manager Innovation EEN

SustainableSolutionsMatch

Welcome & Introduction

Let’s play by the rules: smooth sailing for our session!

- **Mute Policy:** Please remain muted unless speaking to avoid background noise.
- **Q&A Time:** After each pitch, there will be 1–2 minutes for questions. Please use the chat to ask questions.
- **Session Recording:** This session will not be recorded.
- **Time management**: Pitchers, please keep track of your time. We will inform you if 5 minutes have passed.
- **Technical Issues:** If you encounter issues, use the chat to notify the host.

Pitch Presentations

Time to meet the innovators!

Pitch 1

ACCUREC-Recycling

Simon Hilgendorf

SustainableSolutionsMatch

ACCUREC‘s CLIMA-process: Sustainable Lithium Recovery in Europe

ACCUREC-Recycling GmbH

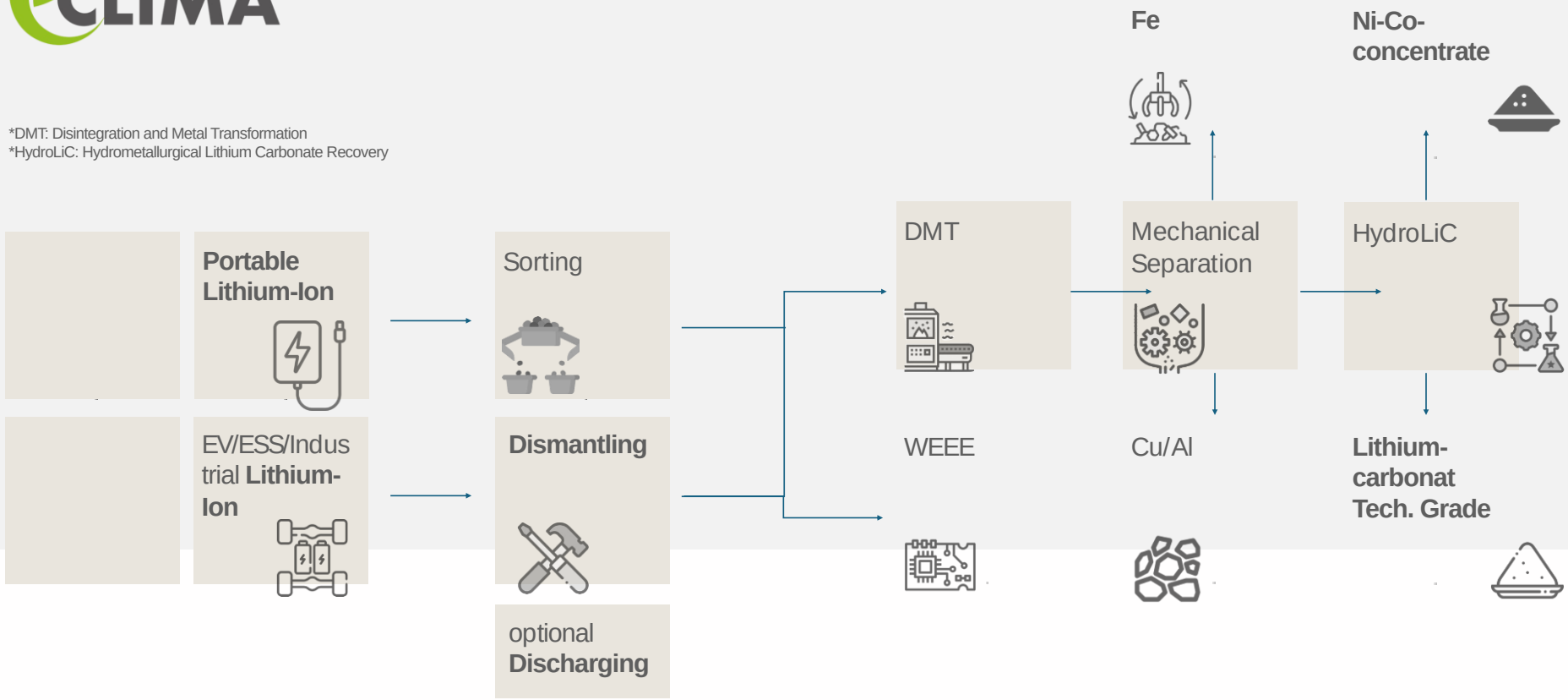
Simon Hilgendorf
Head of Development

enterprise europe network

Up2Circ

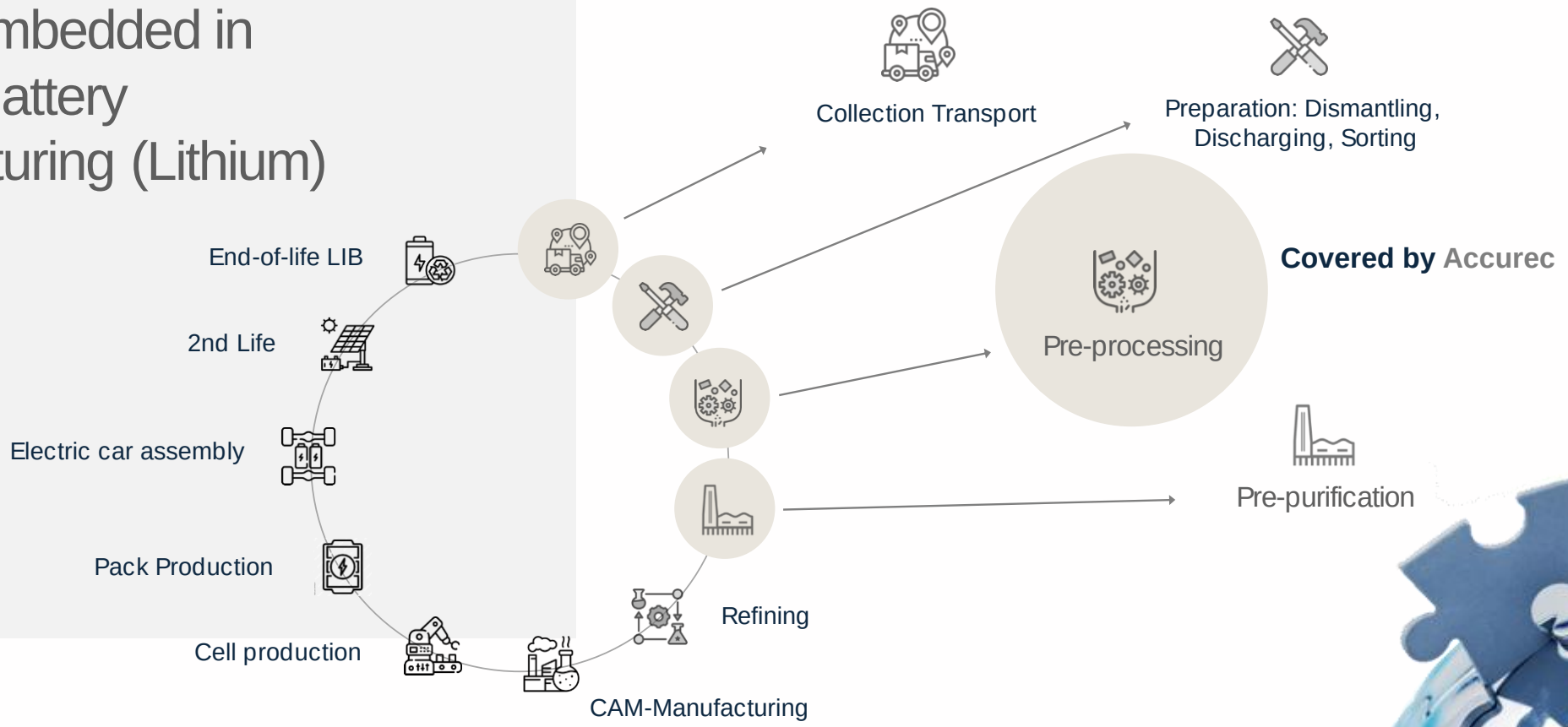
CLIMA®

*DMT: Disintegration and Metal Transformation
*HydroLiC: Hydrometallurgical Lithium Carbonate Recovery



SustainableSolutionsMatch

CLIMA embedded in circular battery manufacturing (Lithium)



SustainableSolutionsMatch

Highly diversified input stream

High quality products

Vertical market integration

Deep process knowledge
and continious development

Low Cost Processing

Optimum: CAPEX, OPEX,
product revenues

Negligible raw material losses

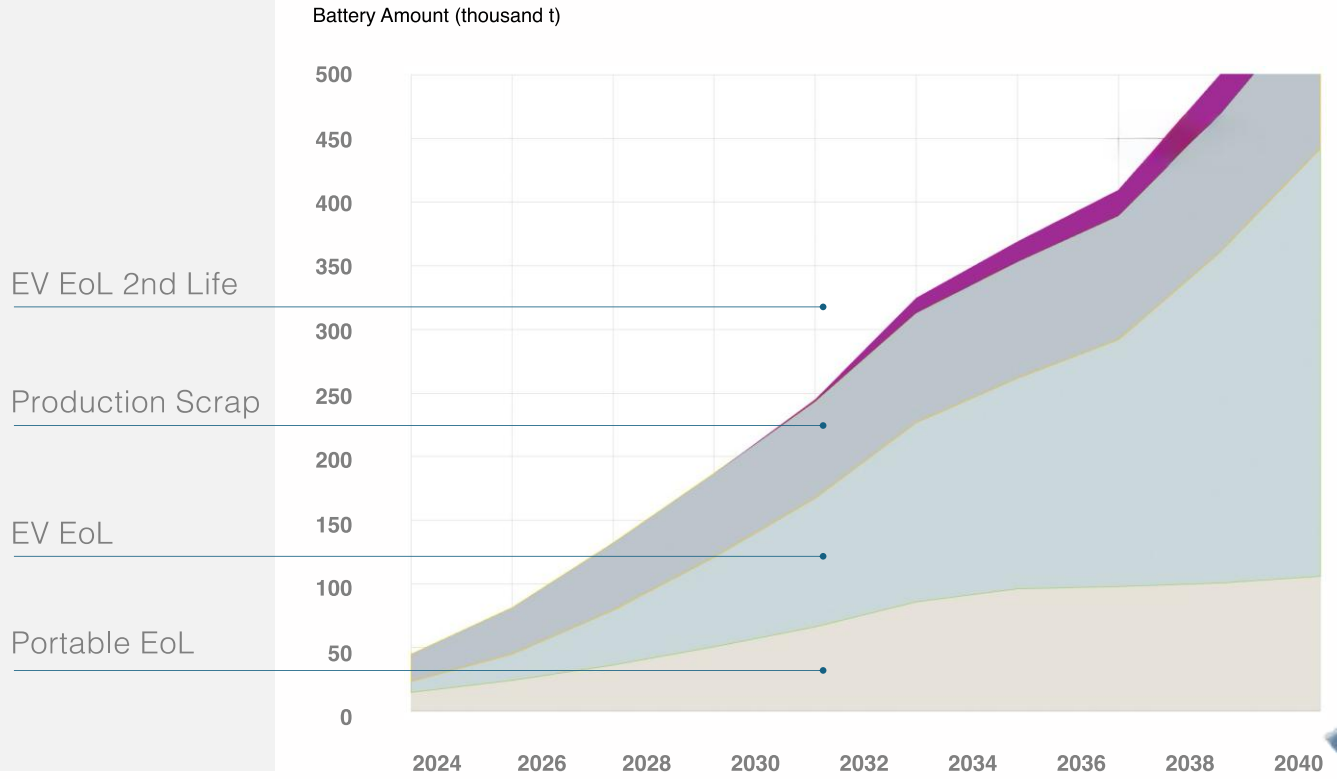
Li % > 50 %
Ni, Co, Cu > 95 %

Minimised CO_2 emission and energy consumption

4,8 kg CO_2/kg LCE
5,2 kWh /kg LCE

SustainableSolutionsMatch

Recycling market: available volumes (EU)



Prod. Scrap & EV EoL: Dubois, Walker: Circularity in automotive: Maturity and growth opportunities, IARC, 2024.
Portable EoL: Internal Accurec Projection
Installed & Announced Capacity: battery-news.de

SustainableSolutionsMatch

- **Possible Partners**

  Technology Providers

  Complementary Recyclers/Refiners/Pre-Processors

  Academia (Metallurgy, Chemical and Electrical Engineering)

SustainableSolutionsMatch

#EENCanHelp

Book a meeting with: ACCUREC-Recycling GmbH

Simon Hilgendorf
Head of Development
ACCUREC-Recycling GmbH
simon.hilgendorf@accurec.de

een.ec.europa.eu

ACCUREC

Up2Circ

enterprise europe network

Pitch Presentations

Time to meet the innovators!

Pitch 2

BLOWIND

Antonio Gutiérrez González

SustainableSolutionsMatch

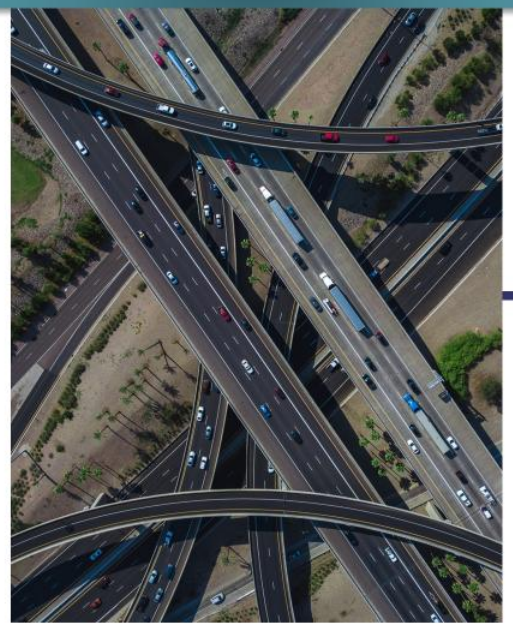
3 MW CHARGER FOR HEAVY ELECTRIC VEHICLES

BLOWIND

Antonio Gutiérrez González
CTO

THE PROBLEM

+30% CO2 EMISSIONS PRODUCED BY ROAD TRANSPORT



MOBILITY SECTOR

SLOW TRANSITION TO THE ELECTRIC VEHICLE (+HEAVY VEHICLES)

INSUFFICIENT RANGE BATTERY

POOR CHARGING INFRASTRUCTURE FOR HEAVY E.V.

blowind

SustainableSolutionsMatch

OUR SOLUTION

PRODUCTS DEVELOPMENT FOR HEAVY ELECTRIC VEHICLES

Megawatt Charger (MCS)

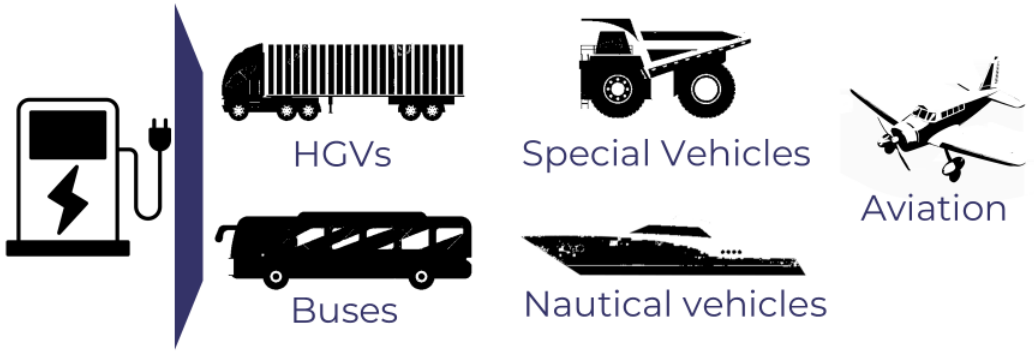
- **RANGE IMPROVEMENT**
- **COST REDUCTION**
- **LOWER RECHARGING TIMES**

*"We reduce the number of batteries required by **optimizing recharging times**, thus reducing the tare weight and at the same time enabling their **use over long distances.** This is possible by using superconducting cables which **reduces the diameter and weight of the recharge hose**."*

blowind

SustainableSolutionsMatch

MEGAWATT CHARGER



Equalize the recharging time between a combustion vehicle and an electric vehicle.

A charger designed for professional use, with time slot reservation for charging; optimized charging based on the state of the vehicle's batteries and travel plan needs.

Route optimization using AI algorithms based on infrastructure and incidents on the roads.

3 MW CHARGER: ~x3 AS OTHER CHARGERS IN THE MARKET

2400 A PEAK

1250 V PEAK

500 kWh IN 16'

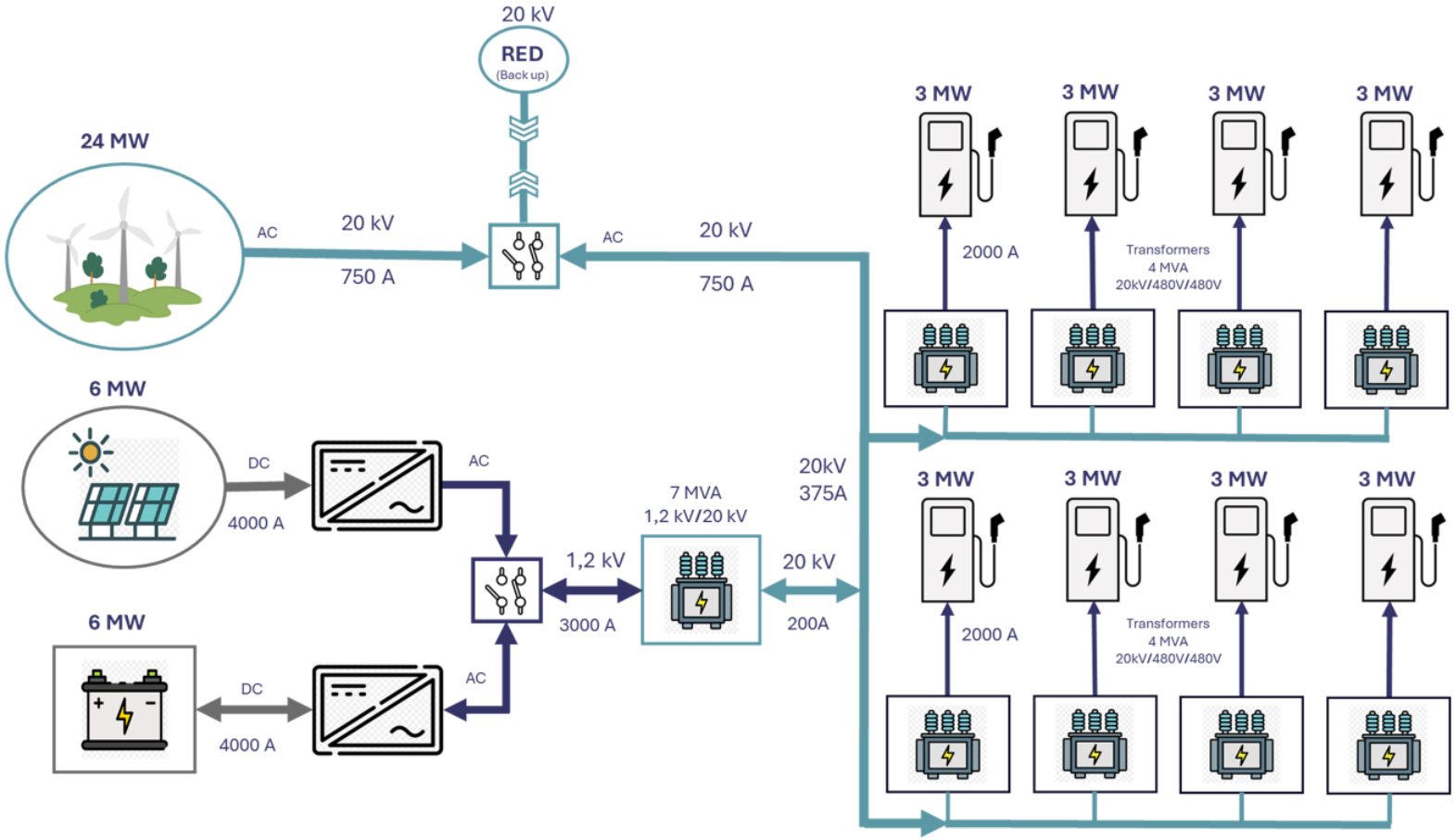
SOLUTION FOR SOLID STATE HYBRID BATTERIES

ADDITIONAL TAILORED BATTERY MANAGEMENT SYSTEM DEVELOPED IN HOUSE

blowind

SustainableSolutionsMatch

AUTONOMOUS CHARGING HUB



Network of charging hubs:

- Fleet depots
- Strategic route stops

Key stakeholders:

- Logistic operators
- Energy suppliers
- Electrical equipment manufacturers

blowind

SustainableSolutionsMatch

SUSTAINABILITY IMPACT

UN SDG ALIGNMENT ACCORDING TO EXTERNAL AUDIT (UPRIGHT PROJECT BY EIT URBAN MOBILITY)

UN SUSTAINABLE DEVELOPMENT GOAL	% OF MISALIGNMENT	% OF ALIGNMENT
7 - Affordable and Clean Energy		100.0%
8 - Decent Work and Economic Growth		25.0%
9 - Industry, Innovation and Infrastructure		100.0%
11 - Sustainable Cities and Communities		100.0%
13 - Climate Action		50.0%

Upright model release **1.5.0**
on 6th Sep. 2024 at 12:20 GMT

SustainableSolutionsMatch

#EENCanHelp

Book a meeting with: BLOWIND

Antonio Gutiérrez González
CTO
BLOWIND
antoniogutgon@blowind.es

een.ec.europa.eu

blowind

Up2Circ

enterprise europe network

Pitch Presentations

Time to meet the innovators!

Pitch 3

Cellavie

Anthony Ferrando

SustainableSolutionsMatch

Battery Deep Discharging Solutions

CELLAVIE

Anthony Ferrando
CEO

SUSTAINABLE SOLUTION

EMPOWERING THE BATTERY RECYCLING INDUSTRY

Regenerative battery and modules discharging equipment

replacing traditional liquid or resistive deep discharging processes

- FAST / HIGH POWER DEEP DISCHARGE WITH THERMAL IMAGING
- HIGH EFFICIENCY POWER CONVERSION
- LOWERS CARBON FOOTPRINT

SustainableSolutionsMatch

TECHNOLOGY – PROCESS

Full Silicon Carbide (SiC) Conversion:

Market proven, grid compliant battery

inverter

High efficiency 0-800V DC-DC converter

+

Safer and Seamless operations:

Thermal camera power derating

Simple – User friendly interface

CONNECT

CONFIGURE

MONITOR

PEAK EFFICIENCY

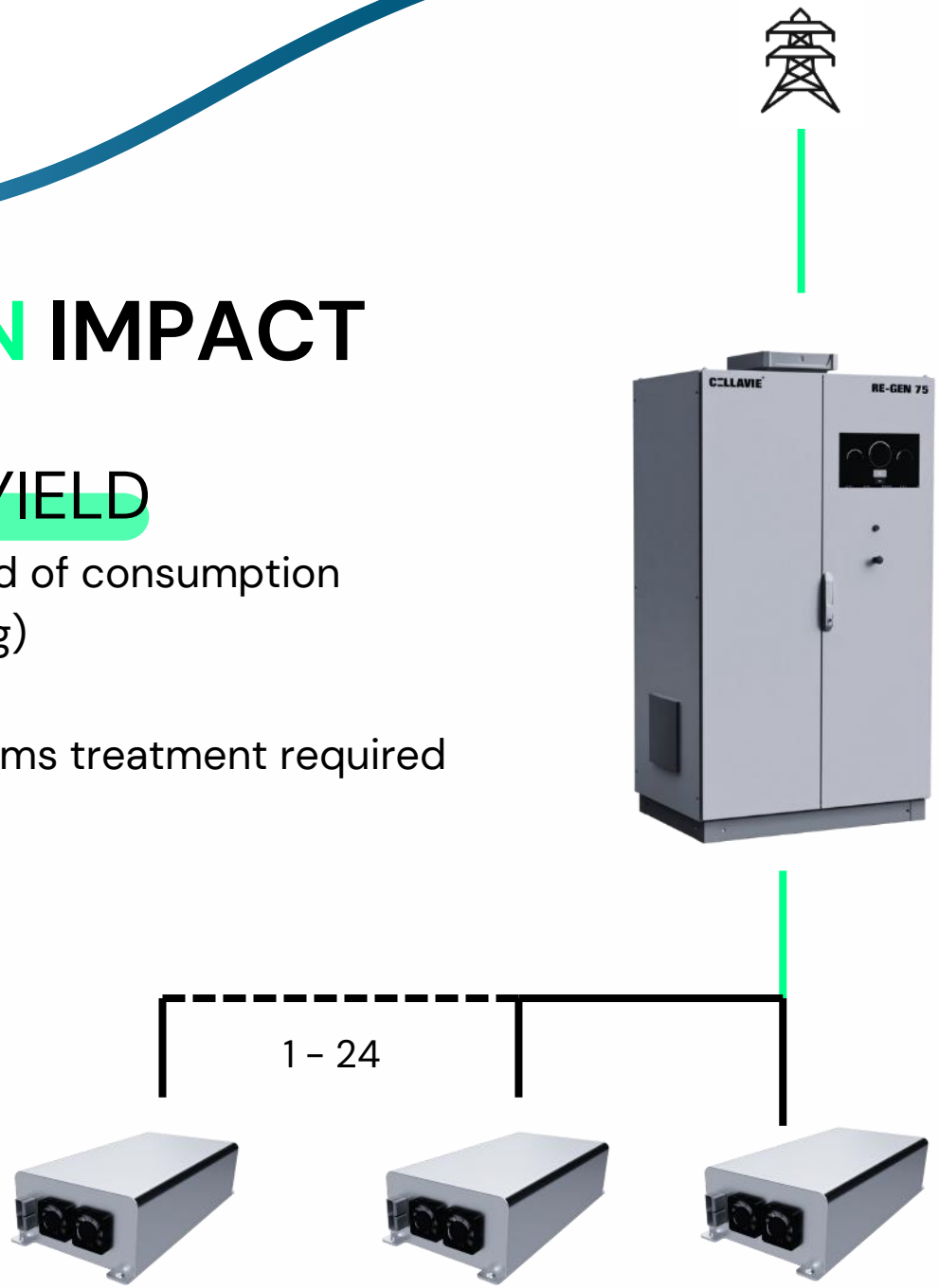
SustainableSolutionsMatch

THE RE-GEN IMPACT

HIGH ENERGY YIELD

Energy **recovery** instead of consumption
(vs. resistive discharging)

No polluted waste streams treatment required
(vs. liquid discharging)



OPTIMIZATION

Resources **sharing battery inverter** for battery **and** module dischargers

IMPROVED SAFETY

Infrared camera controls the discharge power

SustainableSolutionsMatch

TARGET AUDIENCE

- **Pretreatment facilities (black mass producers and recyclers)**
- Battery reverse logistics stakeholders:
  - Electric Vehicle OEMs, Service Centers and Dismantlers
  - Research Centers / Universities

NETWORKING OPPORTUNITIES

Besides customers, we are interested in meeting with

Automation companies

Digital integrators

Software developers

#EENCanHelp

Book a meeting with: CELLAVIE

Anthony Ferrando
CEO
CELLAVIE
anthony@cellavie.be

een.ec.europa.eu

CELLAVIE®

Up2Circ

enterprise europe network

Pitch Presentations

Time to meet the innovators!

Pitch 4

Institute for Energy Research

Gabriela Benveniste

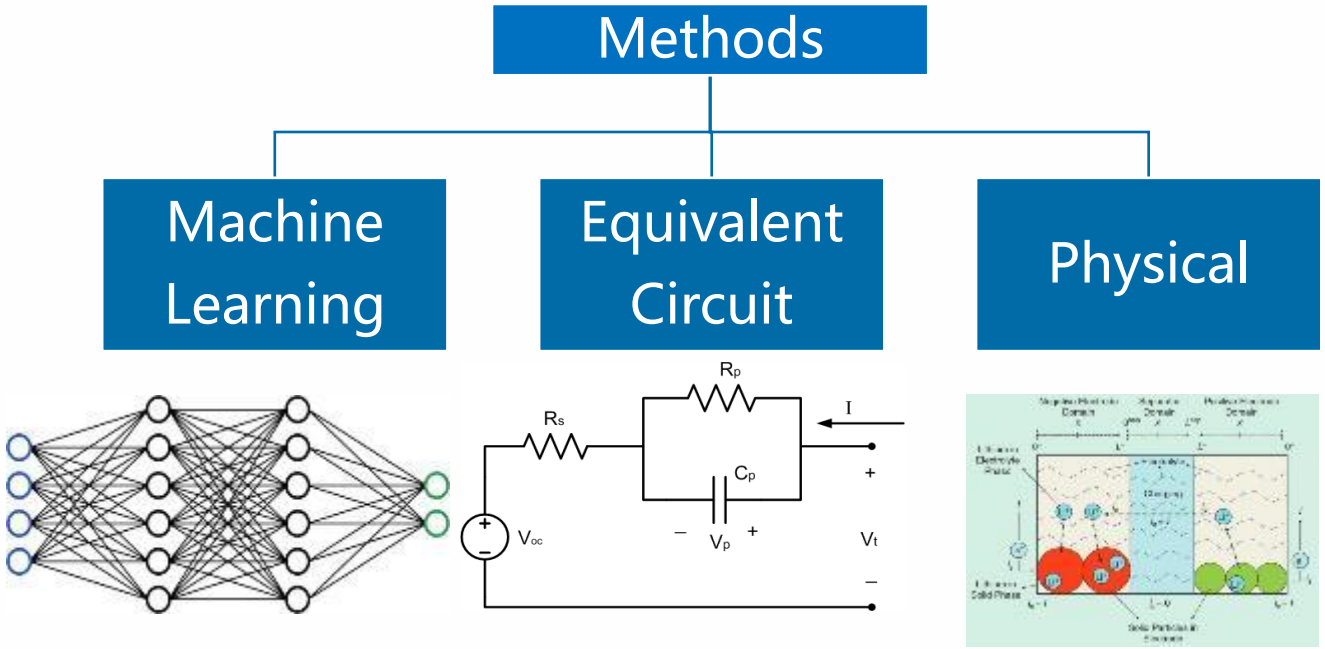
SustainableSolutionsMatch

Batteries assessment for sustainability: information of Digital Batteries Passport

IREC-Catalonia Institute for Energy Research

Gabriela Benveniste
PhD, Senior Researcher

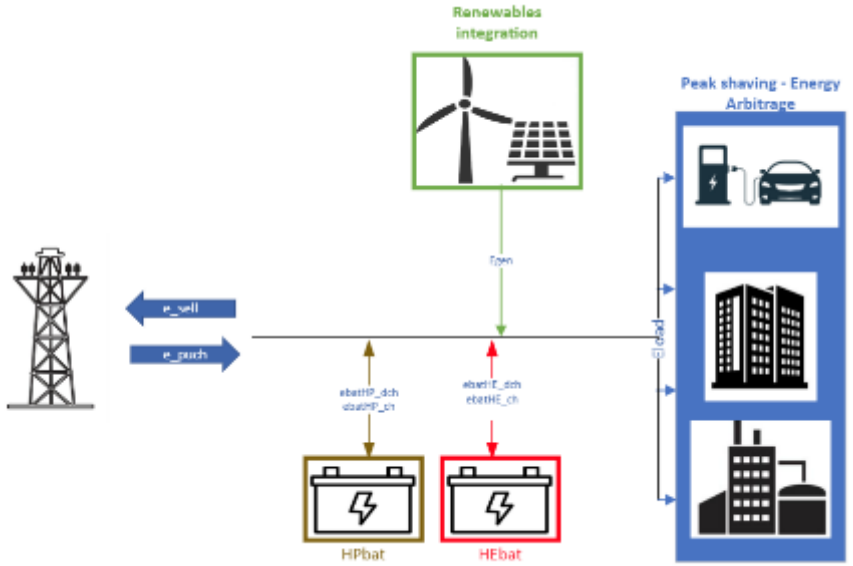
- State of Charge and State of Health:

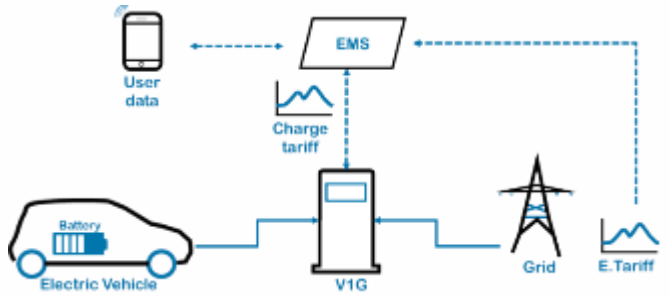


Projects:

- BMS integration
- Cloud Integration
- Offline Simulation
- BMS integration

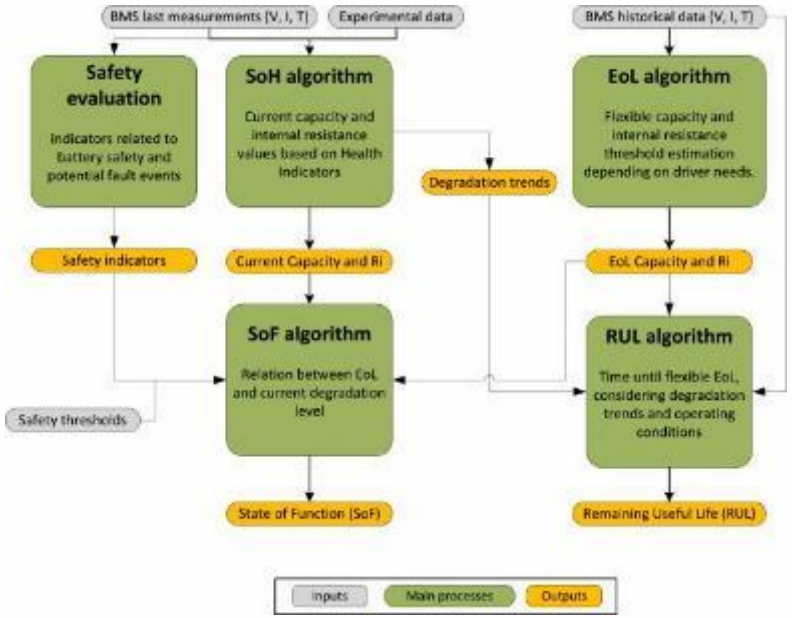
- Battery degradation integration in optimization:
  - Sizing: Number of batteries to install
  - EMS : Real-time use

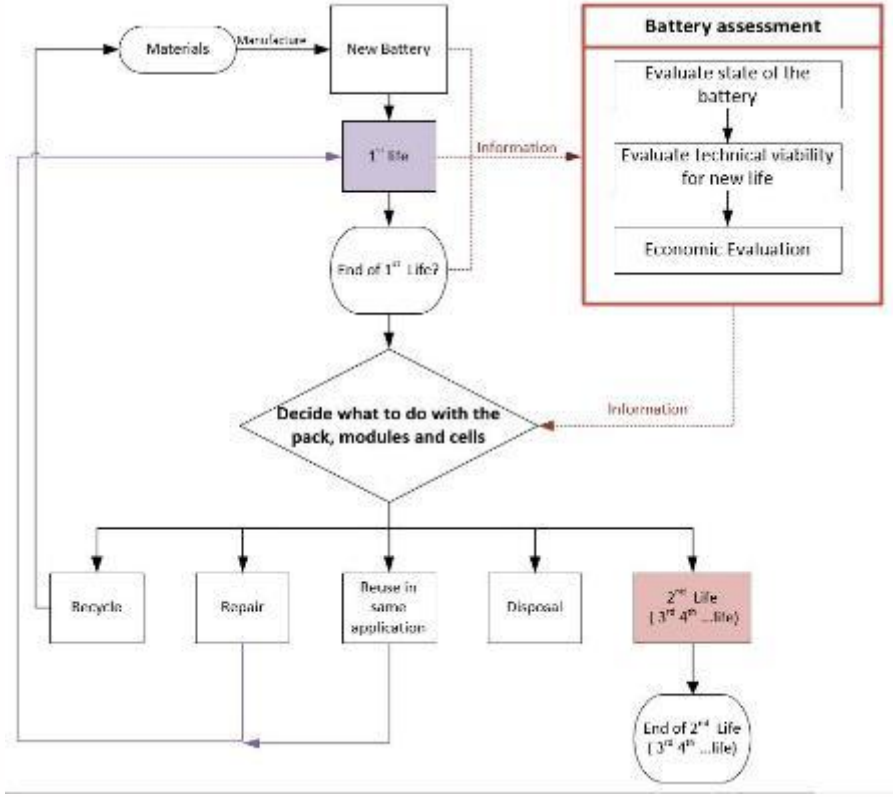




SustainableSolutionsMatch

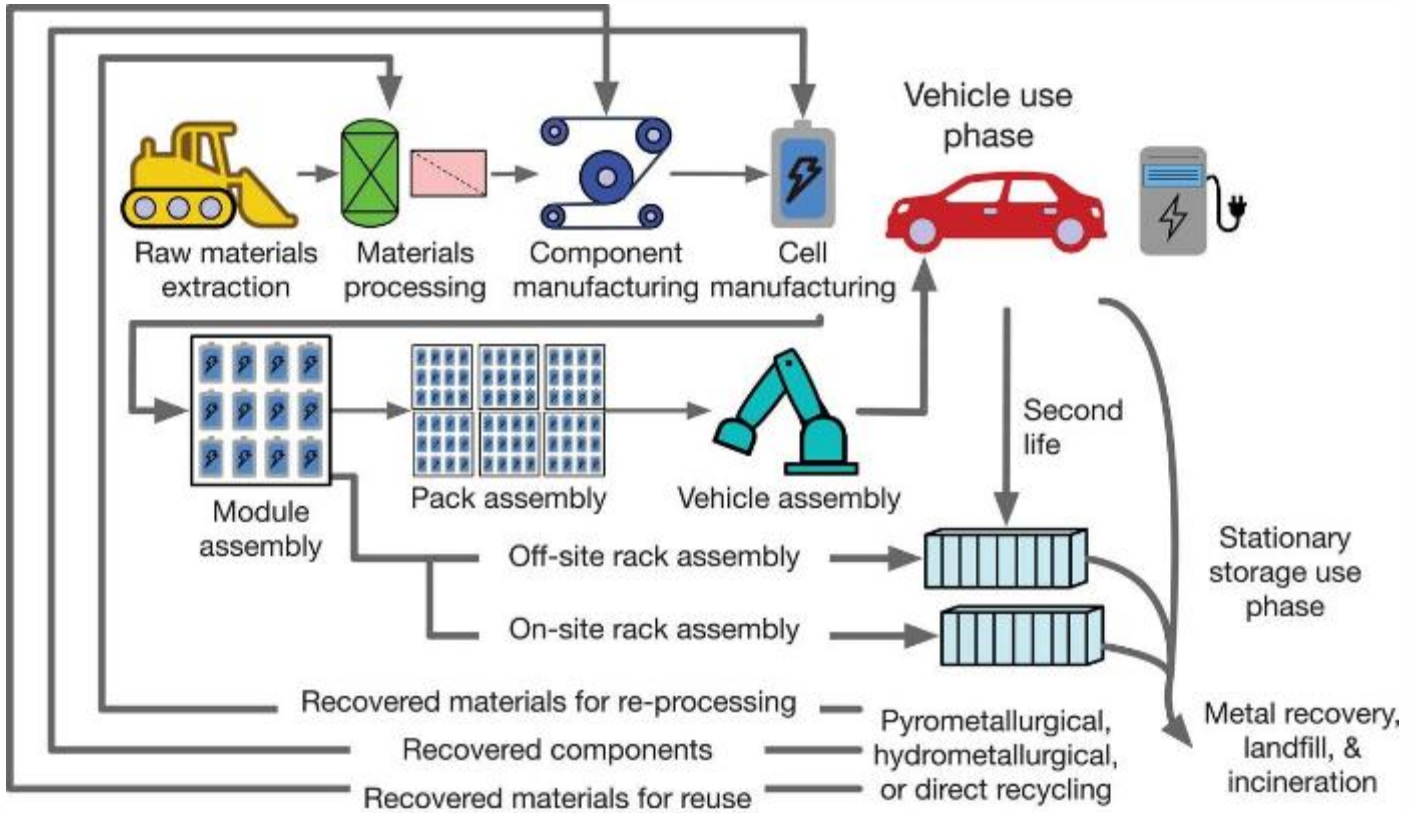
- End of Life and 2nd life analysis
  - State of Function and Remaining Useful Life
  - 2nd life analysis
  - Fast SOH assessment for batteries





SustainableSolutionsMatch

- Life Cycle Assessment (LCA), Life Cycle Costing (LCC) and Social Life Cycle Assessment (SLCA)



SustainableSolutionsMatch

- # Market/Target audience – Who can apply your solution?

Batteries manufacturers

IT digital product Passport developers

Research centers

#EENCanHelp

Book a meeting with: Company name

Gabriela Benveniste
Senior Researcher
Catalonia Institute for Energy Research-IREC
gbenveniste@irec.cat

een.ec.europa.eu

IREC
Shaping Energy for a Sustainable Future

Up2Circ

enterprise europe network

Pitch Presentations

Time to meet the innovators!

Pitch 5

LOHUM Cleantech

Pratyush Sinha

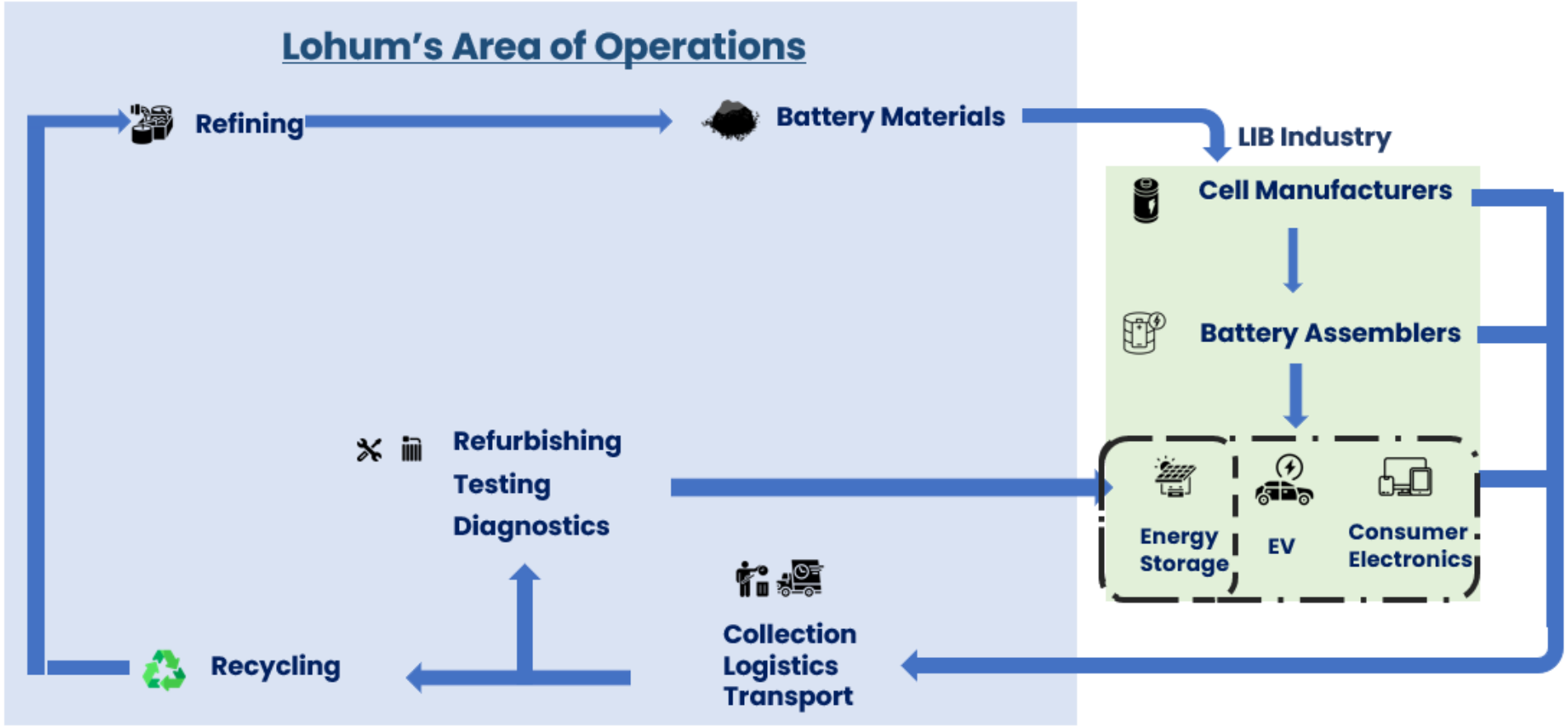
SustainableSolutionsMatch

Li-Ion Battery Recycling & Critical Materials Refining

LOHUM Cleantech Private Limited

Pratyush Sinha
VP – Special Projects

Our Solution: India's Largest Producer of sustainable critical minerals & Li-ion battery recycler



We empower the Li-ion Battery and EV industries at every stage

Diverse feedstock sources

	Secondary			
Material	**Batteries**	**Petrochemical**	**Automotive**	**Pharma**
Lithium	✓			✓
Cobalt	✓	✓		
Nickel	✓	✓		✓
Platinum Group Metals (PGM)		✓	✓	✓
Rare Earth Elements (REE)		✓	✓	

SustainableSolutionsMatch

India Footprint: Integrated Metal Refining and Battery Repurposing Facilities

5 GWh overall capacity

Cobalt Refinery 1200 MT

Cathode Active Material 150 MWh

Innovation Centre 80+ Strong Staff

Lithium Refinery 1,000 MT

Al, Cu, Fe Refinery 2500 MT

Battery Dismantling 300 MWh

Battery Reassembly 300 MWh

Nickel Refinery 1,000 MT

Operating the largest Li-ion battery recycling facility, Lithium Refinery and Cobalt Refinery in India

SustainableSolutionsMatch

LOHUM's differentiator and Impact

High Scalability & Low-cost structures
Proven at Industrial Scale to be competitive with best in-class recyclers globally

State of the Art Recovery Rates: Li >90% | Co & Ni > 95%
Achieving battery grade purity **>99.8%** with controlled impurity profile

Versatile Input & Output
Process input with metal content ranging between **5-40%** and fulfill various customer demands.

Agility
Plant lead times **<12 months** due to Modular set up

Operational Know-how
Well defined SOPs in place with internationally recognized logistics partner, experience in importing material from EU,UK,US & Africa

CO_2 Emissions Saved

Currently: **125,000+ MT/annum**

By 2030: **1,000,000+ MT/annum**

Wide Range of Solutions: Trusted by 200+ Partners

OEM's

Producer responsibility fulfillment

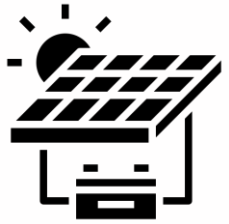
Cell Manufacturers

- Recycle cell production waste
- Provide Cathode Active Materials

Recyclers

Offtake Black Mass & Other waste streams for further refining

Energy Storage System



Deploy ESS for various applications (Telecoms, EV Charging stations, Grid connectivity etc.)

Insurance & Finance

Offer residue value models to estimate Remaining useful life and monetary buyback value

Replicate the solution model across various industries

Possible Cooperation Partners

Sourcing & Selling Partnerships	Source variety of feedstock including battery waste (of all forms) & industrial waste (spent catalysts, steel scrap, electroplating waste, etc) Sell variety of outputs including Metal Salts, Pure Metals, Mixed Metal salts, etc.)
R&D Partnerships	Partnerships with EU R&D Labs and academic institutions for development of: • Next-gen Direct Lithium extraction process • Specialized products made from battery materials such as Cathode Active materials • Materials required for next generation energy storage technologies such as Platinum group metals (PGM)
Government & Regulatory bodies	Work with EU policymakers on battery passport & critical minerals regulations to foster collaboration between India & EU
Licensing Partnership	License technology/solutions for other critical minerals such as PGM's & REE from EU industry leaders to tap into a new market/geography.
Strategic Partnership	Explore a potential JV to set up a battery recycling & critical minerals refining solution in a new geography within EU

#EENCanHelp

Book a meeting with: Company name

Prayush Sinha
Vice President – Special Projects
LOHUM
Pratyush.sinha@lohum.com

een.ec.europa.eu

LOHUM

Up2Circ

enterprise europe network

Pitch Presentations

Time to meet the innovators!

Pitch 6

Napptilus Battery Lab

Daniel Rueda García

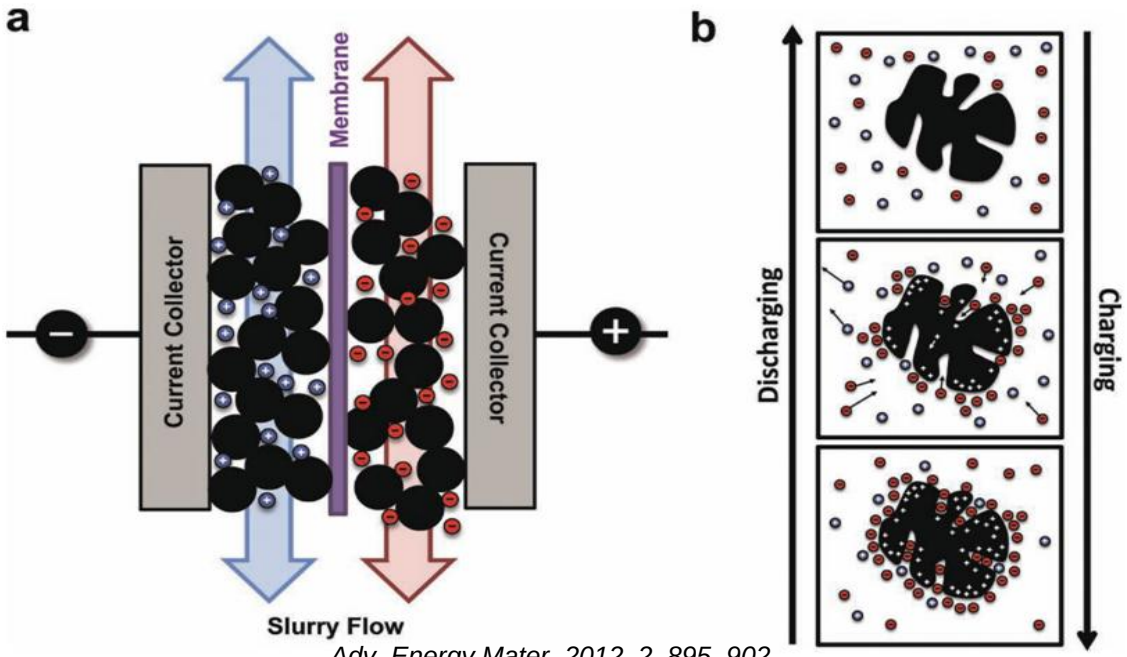
SustainableSolutionsMatch

Hybrid paste electrodes for a sustanible energy storage solution

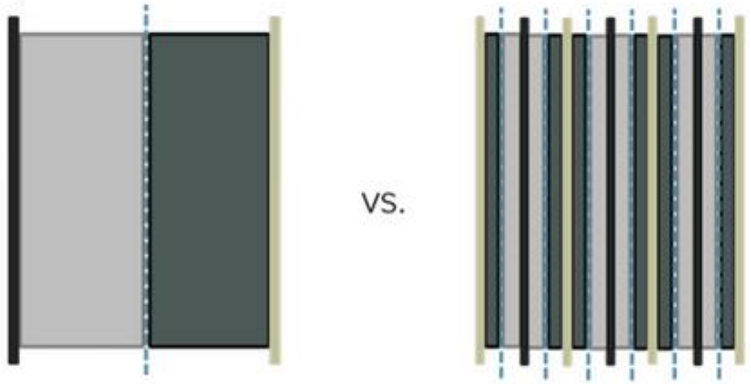
Napptilus Battery Labs

Dr. Daniel Rueda García
CTO

Paste electrodes



Adv. Energy Mater. 2012, 2, 895–902



International Journal of Production Economics 232 (2021) 107982

Integral solution

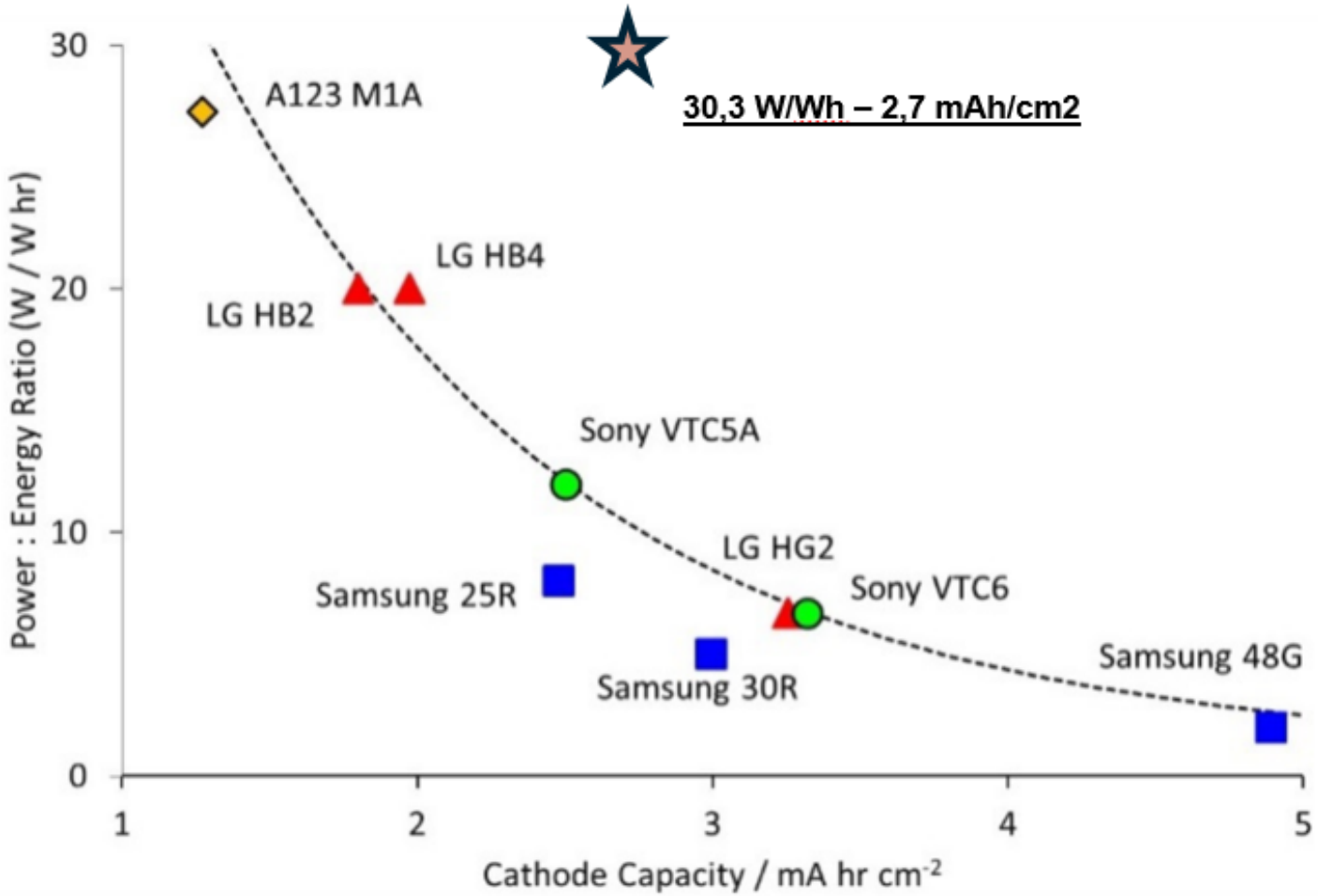
370mg/cm² (5-15mg/cm² commercial cells).

Paste electrode ambient atmosphere prepared.

Ambient atmosphere cell assembly.

Non-flammable electrolyte

No Li, Co, Ni, Mn, noble metals, rare earths.



Batteries **2019**, *5*(4), 64; https://doi.org/10.3390/batteries5040064

SustainableSolutionsMatch

Massive implementation of renewable energy is being limited by current batteries

High price

Battery price is the main capex driver for utility-scale projects, specifically small ones.

Low life cycle

Current batteries life cycle is short, thay are not an efficient solution fc an intermittent energy source like renewables.

Hard to recycle

Recycling process of current batteries is very complex and expensive.

Constrain materials

Current batteries need elements like Li, Ni, Co, Cu, Mg, Mn which are already constrain and it is expected to be more constrain into the future.

Low power

Batteries have low power, thus, are a bad solution to balance a complex grid, like and smart grid based on renewable sources.

Applications

Urban Mobility Electric Vehicles

High-end transportation

Drones, Industrial Vehicles and Logistic Robots

Power grid stabilization

SustainableSolutionsMatch

Sustainable and circular innovation needs good networks along the whole value chain. What kind of cooperation partners would you like to connect to beyond finding new customers?

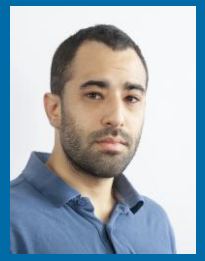
We are looking for investment and collaboration projects

SustainableSolutionsMatch

#EENCanHelp

Book a meeting with: Napptilus Battery Labs

Dr. Daniel Rueda García
CTO
Napptilus Battery Labs
drueda@napptilus.com



een.ec.europa.eu

Napptilus Battery Labs

Up2Circ

enterprise europe network

Pitch Presentations

Time to meet the innovators!

Pitch 7

ReLioS

Carl-Ernst Forchert

SustainableSolutionsMatch

enterprise europe network

RE-USE AND RE-CYCLING OF LI-ION-BATTERY SYSTEMS

ReLioS

Up2Circ

Automated inspection and repair of traction batteries

Battery-Network ReLioS e.V.

Carl-Ernst Forchert
Chairman

SustainableSolutionsMatch

Electromobility is growing, and with it the number of traction batteries used in electric vehicles, e-buses and other electric means of transport is increasing. However, these batteries have a limited lifespan and are subject to wear and tear due to charging cycles, temperature fluctuations and mechanical stress.

Challenges:
* *High costs for new battery production and replacement*
* *Sustainability problems due to disposal and resource consumption*

→ Main uncertainty factor in the decision to purchase an electric vehicle, one of the most ***relevant market obstacle***

Todays-Bottleneck:
* *Lack of automated and standardized repair methods*

Solution:
* *automated removal from the vehicle, diagnosis, disassembly, repair, re-assembly and functional check for traction batteries with the support of digital tools and information (battery pass)*

SustainableSolutionsMatch

Solutions differential value and sustainable impact

*Approach of **flexible, self-learning automation** for different battery types and different maintenance states, with*

* *consideration of **possible hazard situations** caused by potentially defective batteries*
* ***quick decision** through sophisticated battery inspection systems as to **whether a repair is worthwhile***
* ***utilization** of information from the battery **passport**, if necessary supplementation of previously unavailable data through a smart component recognition and disassembly strategy*
* ***powerful partner constellation** of business and scientific partners, **access** to the **latest Korean diagnostic systems***

SustainableSolutionsMatch

Market/Target audience – Who can apply your solution?

Who would benefit most from this solution?

* *Vehicle Manufacturer (Car, Commercial Vehicle, Railway)*
* *Battery manufacturer*
* *Fleet operators & logistics companies*
* *Recycling & refurbishment companies*
* *Manufacturers & users of stationary battery storage*
* *Suppliers of testing technology & automation*
* *Consumers & end customers*

What kind of cooperation partners would you like to connect to beyond finding new customers?

* *Vehicle manufacturer*
* *Battery manufacturer*
* *Recycling and refurbishment companies*
* *Logistics specialists for collection, sorting & storing of used batteries*
* *Suppliers of testing technology & automation*
* *Experts in Battery Pass*

SustainableSolutionsMatch

#EENCanHelp

Book a meeting with: ReLioS e.V.

Carl-Ernst Forchert
Chairman
Battery-Network ReLioS e.V.
forchert@relios.org; www.relios.org

een.ec.europa.eu

RE-USE AND RE-CYCLING OF LI-ION-BATTERY SYSTEMS

ReLioS

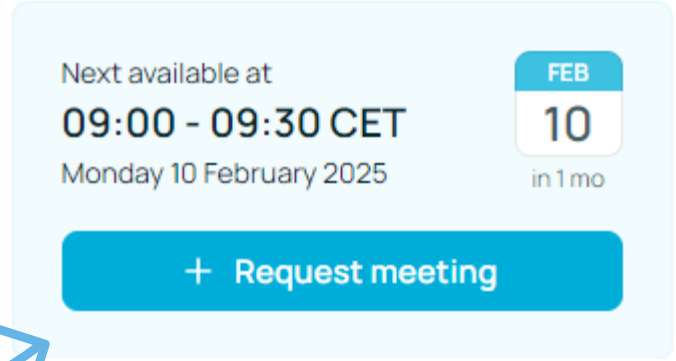
Up2Circ

enterprise europe network

Closing Remarks

A big thank you to all pitchers and attendees!
We appreciate your participation today.

If you'd like to connect with any of the pitching companies, please use the matchmaking tool to **book a meeting**!



Need support? **Enterprise Europe Network is here to help!**

Reach out to your local Network partner:

https://een.ec.europa.eu/local-contact-points

Session Agenda

- Welcome & Introduction
- Pitch Presentations:
  - Pitch 1: ACCUREC-Recycling GmbH (DE)
  - Pitch 2: Blowin' in the wind SL (BLOWIND) (ES)
  - Pitch 3: Cellavie (BE)
  - Pitch 4: Catalonia Institute for Energy Research (ES)
  - Pitch 5: LOHUM Cleantech Private Limited (IN)
  - Pitch 6: Napptilus Battery Lab (ES)
  - Pitch 7: Battery-Network ReLioS e.V. (DE)
- Closing Remarks

#EENCanHelp

Thank you!

Wolfgang Treinen
Senior Project Manager Innovation EEN
Berlin Partner for Business and Technology
wolfgang.treinen@berlin-partner.de

een.ec.europa.eu

BERLIN

BERLIN PARTNER
for Business
and Technology

Up2Circ

enterprise
europe
network