

Matchmaking Event

For the Horizon Europe Batt4EU Calls July 9, 12:30 - 14:00 CET Lunch with BEPA and find your perfect match



Welcome and Practical aspects

- □ The meeting is **recorded**.
- Please mute your microphone and switch off your camera when you are not speaking.
- □ During the Q&As (if time allows): please post your questions in the chat. If you would like to speak, please raise your hand (by clicking on « ... » in « Participants »).
- □ The slides will be shared with participants after the meeting.

□ If you encounter any technical issue, please send a message in the chat.



AGENDA

TIME	ITEM	SPEAKER(S)
12:30-12:40	1. Welcome & Introduction: the BATT4EU Partnership	Philippe Jacques , BEPA Secretary General
12.40-13.00	2. Introduction of the Horizon Europe battery calls for 2021	Kurt Vandeputte, Umicore Franz Geyer, BMW
13:00-13:10	3. Presentation of the BEPA matchmaking tool	Capucine Vannoorenberghe, BEPA Office
13:10-13:50	4. Pitching session Several BEPA members present their project idea or concept for a Horizon Europe call (5mn per speaker).	Including speakers from OCSiAL, Orano Mining, TÜBITAK RUTE, RISE, etc.
13:50-14:00	5. Closing remarks	Michael Lippert, BEPA Chair



Welcome & Introduction: the BATT4EU Partnership





What is the BATT4EU Partnership?

Launched officially on June 23rd 2021

A co-programmed Partnership under Horizon Europe which gathers – on the public side – **the European Commission**, and - on the private-side – **the Batteries European Partnerships Association (BEPA)** bringing together all the European battery stakeholders interested to get involved in Horizon Europe.





Calls are open to <u>all</u> (to BEPA members and to non-members)

BATT4EU objectives

General objectives



Contribute to **making Europe the first climate-neutral continent by 2050**, by widespread adoption of e-mobility and stationary electrical energy storage



Enable **European leadership in the battery industry across the value chain,** creating economic growth and jobs in a circular economy, by supporting the development of an innovative, competitive and sustainable battery manufacturing industry in Europe



Contribute to achieving **a zero-pollution ambition for a toxic-free environment**, by providing safer and more sustainable batteries and processes (including recycling)



BATT4EU objectives

Specific objectives



Support the development of **differentiating technologies in battery materials, cell design and manufacturing and battery recycling**, leading to demonstrations of new chemistries, cells, production lines and proof of concept of recycling logistics and methods



Accelerate the development and deployment of **sustainable and affordable battery solutions for clean mobility**, by building a strong innovation ecosystem with downstream partnerships leading to joint demonstrations in different transport modes



Enable a **cost-effective integration of renewable energy sources in the power grid**, by developing affordable batteries for stationary energy storage applications, leading to demonstrations of different scales of storage systems



Scope of the BATT4EU Partnership





Packs and modules



Introduction of the Horizon Europe battery calls for 2021





Kurt Vandeputte, Umicore Franz Geyer, BMW

HORIZON-CL5-2021-D2-01-01: Sustainable processing, refining and recycling of raw materials



Expected EU contribution per project: 6-7 m€



Type of Action: **Research and** Innovation Action







In few words: Decreasing dependency of Europe on imported battery chemicals and raw materials



- European low-grade deposits and secondary material are taken into use, reducing the European dependency on important materials
- Battery grade intermediates are competitively produced and refined in Europe in a sustainable and socially acceptable way
- Reduced carbon emissions, increased energy efficiency, and more efficient resource use and yield
- New business opportunities and models for the European industry creating additional jobs from increased processing and refining capacity



HORIZON-CL5-2021-D2-01-02: Advanced high-performance Generation 3b (high capacity / high voltage) Li-ion batteries supporting electro mobility and other applications



Expected EU contribution per project: 6-8 m€



Type of Action: **Research and** Innovation Action



TRL: 6 and higher



In few words: Advanced Li-ion batteries with improved performances and reduced cost.

2 approaches: Higher capacity or Higher voltage.



- Advanced Li-ion batteries delivering on cost, performance, safety, sustainability and recyclability, with clear prospects
- Increase in energy density and hence increasing driving distance at reduced cost on module and pack level
- Broader user acceptance leading to a significantly broader market penetration, helping to reduce GHG emissions of the transport and industry sectors



HORIZON-CL5-2021-D2-01-03: Advanced high-performance Generation 4a, 4b (solid-state) Liion batteries supporting electro mobility and other applications



Expected EU contribution per project: 8-9 m€



Type of Action: **Research and** Innovation Action



TRL: 5



In few words: Advanced Li-ion batteries with improved performances and reduced cost.

2 approaches: Generation 4a/ Generation 4b



- Advanced Li-ion batteries delivering on cost, performance, safety, sustainability and recyclability, with clear prospects
- Increase in energy density and hence increasing driving distance at reduced cost on module and pack level
- Broader user acceptance leading to a significantly broader market penetration, helping to reduce GHG emissions of the transport and industry sectors



HORIZON-CL5-2021-D2-01-04: Environmentally sustainable processing techniques applied to large scale electrode and cell component manufacturing for Li ion batteries



Expected EU contribution per project: **5 m€**



Type of Action: **Research and** Innovation Action



TRL: **5-6**



In few words: Innovative low carbon footprint techniques for a sustainable European battery production





Expected outcomes:

- Provide European a leadership position in production of batteries with lower carbon footprint
- New sustainable electrode and cell manufacturing techniques and scalable, safer, cheaper, cleaner and less energy consuming cell manufacturing processes
- Electrode coating

production techniques completely eliminate organic solvents and implementation of dry manufacturing techniques

Industrialising closed loops and process design to return low-value chemicals from manufacturing processes to high-value

HORIZON-CL5-2021-D2-01-05: Manufacturing technology development for solid-state batteries (SSB, Generations 4a - 4b batteries)



Expected EU contribution per project: 6-7 m€



Type of Action: **Research and** Innovation Action



TRL: **5-6**



In few words: Next generation SSB manufacturing technologies for mass-production of Gen4 in Europe



- Position Europe at the industrial production lead in the next generation SSB technologies
- Generation of a technological knowledge portfolio of industrially scalable manufacturing solutions for the different approaches to SSB
- Contribute to climate neutral transport via the development of breakthrough technology in SSB batteries
- Enable cost effective, low carbon footprint and low-emission mass production of Gen4 technology in Europe



HORIZON-CL5-2021-D2-01-06: Sustainable, safe and efficient recycling processes



Expected EU contribution per project: 9-10 m€



Type of Action: **Research and** Innovation Action



TRL: **5-6**



In few words: Next generation recycling processes and technologies to strengthen competitiveness of the European battery value-chain



- Strengthened European raw material independency by increased circularity of material flows and use of the secondary raw materials
- European competitiveness in battery recycling technologies and up-scalable solutions
- Reduced recycling cost and environmental impacts through new and disruptive concepts for very high efficiency recycling.
- □ Improved health and safety aspects of recycling
- Industry prepared to meet the new recycling regulatory targets



HORIZON-CL5-2021-D2-01-07: Support for establishment of R&I ecosystem, developing strategic forward-looking orientations to ensure future skills development, knowledge and technological leadership for accelerated disruptive technology exploration and uptake



Expected EU contribution per project: 3 m€



Type of Action: Coordination and Support Action



In few words: Supporting initiative to boost a pan-European cooperation on battery research and innovation





- Consolidated Battery R&I community
- Facilitated access to information for all -enabled European "one-stop shop" on Battery R&Linfo
- Reduced time to market of technologies and improved European competitiveness through established research-industry collaborations and info sharing
- Synergies and research results efficiently shared, attracted talent and competences, provided scientific evidence for policymakers.
- Increase and reinforce international collaboration

Joint call with 2ZERO

HORIZON-CL5-2021-D5-01-04: LCA and design for sustainable circularity – holistic approach for zero-emission mobility solutions and related battery value chain



Expected EU contribution per project: **4 m€**



Type of Action: Coordination and Support Action



In few words:

Coordinated initiative supporting the creation of a harmonised LCA approach, especially enabling the design of zero emission vehicles





- A consensus concept for a harmonised, robust, transparent and real-data based LCA approach
- New tools to drive an approach to the design of ZEV
- □ Harmonised strategy for **sustainability by design**
- A commonly accepted ontology for a Europeanwide LCI database for zero emission vehicles and batteries
- Increased awareness and acceptance of a European-wide, battery and road transport specific LCA approach and LCI database

Additional 2021-22 calls that can be connected to batteries



Some related topics not covered by the BATT4EU calls but through other HE calls developed independently or by other Partnerships.

- HORIZON-CL5-2021-D5-01-03: System approach to achieve optimised Smart EV Charging and V2G flexibility in mass-deployment conditions (2ZERO): Optimal smart charging concept and bidirectional charging solutions, system integration level.
- HORIZON-CL5-2021-D5-01-11: Hyper powered vessel battery charging system (ZEWT Partnership): To facilitate the fast charging of larger on-board batteries for a wide range of vessel types.
- HORIZON-CL4-2022-RESILIENCE-01-24: Novel materials for supercapacitor energy storage
- HORIZON-CL4-2022-DIGITAL-EMERGING-02-18: 2D materials-based devices and systems for energy storage and/or harvesting



Deadline to submit a proposal: 19 October 2021.







Capucine Vannoorenberghe, BEPA Office

Book 1:1 meeting and find your project partners until 10 August!

Objective of the platform: provide a place where all battery stakeholders interested to participate in a Battery Horizon Europe call (for 2021) can meet to create relevant collaborations.

How to use the platform:

- **Step 1:** Create your profile
- **Step 2:** Explain what you are looking for / what you can offer
- **Step 3:** Find relevant collaborators and book meetings



How to register and create your profile

Register to the BEPA match-making platform via this link. **Deadline** to use the platform and book some meetings: 10 August 2021.



Describe your expertise and explain what you are looking for

Possibility to **describe your expertise** via: type of organisation, area of activity, short description.

Select the 2021 BATT4EU calls you are interested in.

Fill in a "Project Cooperation" or a "Request" in the market place.

	You have 1	Booking phase has started! pending meeting request. You can request or accept up to 100 meetings. The booking phas closes on August 10, 2021.	Look fo
Capucine Vannoorenberghe BEPA Brussels, Belgium		See meeting requests	X, Y, Z.
Edit my profile View my profile	в	Online participants / Association or government agency	Call
	Batteries Euro	BEPA pean Partnership Association	Туре

PROJECT COOPERATION	
Look for a Consortium on battery topic X	
would like to find a Consortium for the call 0000. My company and I can provide expertise specific- ally on the following topics:	
Χ,	
Υ,	
Ζ.	
Call	
Sustainable processing, refining and recycling of raw materials (HORIZON-CL5-2021-D2-01-01)	
Туре	
Partner seeking for consortium/coordinator	

Find relevant collaborators and book one-to-one meetings

Europe Battery Calls Matchmaking Event , 2021	Home Participants larket	olace Agenda Meetings 🚺 Messages
	You are signed in as an organiser. Logout	
Participants		Relevance
PERSON ORGANIZATION		
17 Participants found	Mirella BERRY CCI Occitanie BLAGNAC, FRANCE	Request meeting
Search Q	View full profile →	
BOOKMARKED		
MATCHMAKING	Dominique SCHEIDER Industry strategy transportation EMEA at Ro	Request meeting
ORGANIZATION TYPES	CLERMONT FERRAND, FRANCE	

Find relevant collaborators and book one-to-one meetings

You are	re signed in as an organiser. Logout	
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Contact us if you need help!

Need help to use the platform? Contact the BEPA Office: <u>c.vannoorenberghe@bepassociation.eu</u>



Pitching session





Pitch 1

Oscar Blanco Fernandez Technical Sales Manager-Battery applications, OCSiAl





TUBALL™ STRONG & CONDUCTIVE NETWORK



TUBALL IN SI ANODES TODAY ENABLING THE INDUSTRY TARGETS



BREAKING THE LIMITS HIGHEST ENERGY DENSITY

1

Full SiO thanks to TUBALL™



"graphite may not be necessary when electronic conductivity and mechanical integrity are maintained by the use of SWCNT conductive additive"

Journal of power sources – Argonne National Laboratory, January 2020 (<u>link</u>)

Early work - Full Si anodes



"The effectiveness of OCSiAI SWCNT in stabilizing the milled SiOx and the commercial SiO has reintroduced the idea of using pure Si without oxides or composite supporting structures"

Dalhousie University – Jeff Dahn's research group – December 2020 (<u>link</u>)

Anwar Ahniyaz, Senior Researcher, RISE

RI SE



Market-near next-generation high voltage lithium-ion batteries (NEXTHIGH)



Innovation 1 Novel Si/C

Innovation 2 Advanced graphite and composite anode

Innovation 3: Novel HV cathode engineering

Innovation 4 Novel separator

What is missing?

- Pilot scale coating of nano-Si (5 kg).
- Pilot scale production of HV cathode (5kg)
- HV Electrolyte engineering (lab and pilot 3-5L).
- LCA/LCC.

Deadline 19th of Oct. 2021.



HORIZON-CL5-2021-D2-01-02: Advanced high-performance Generation 3b (high capacity / high voltage) Li-ion batteries supporting electro mobility and other applications, €8M, TRL 6, RIA

European Li-ion battery manufacturing for electric vehicles with No VOC emission (NoVOC)

Material s	 WP1 Raw Materials manufacturing Anode/binder Cathode/binder Electrolyte/ and separator Current collectors 	Innovation 1. Si/C/graphite composite Innovation 2 Novel conductive additive/binder	
Electrod e manufa cturing	 WP2 Electrode manufacturing Electrodes coating (for aqueous or dry manufacturing or 3D printing processes) Electrode surface inspection 	Innovation 3. PVDF and NMP replacement or removal Innovation 4	 What is missing ? Pilot scale coating of nano-Si (5 kg).
Cell manfact uring verificat ion	• WP3 Cell manufacturing and verification	Innovation 5 3D printing of electrodes	 Electrolyte engineering (lab and pilot 3-5L). LCA/LCC.
End of life Mange	WP4 Batteries end of life management Recycling WP5 LCA/LCC	Innovation 6. Novel recycling approach	 3D printing of electrode.
Manage ment	 WP6:Exploitation and dissemination WP 7:Consortium management (RISE) 	D	eadline 19 th of Oct. 2021



Call: HORIZON-CL5-2021-D2-01-04: Environmentally sustainable processing techniques applied to large scale electrode and cell component manufacturing for Li ion batteries (Batteries Partnership), TRL 4-5, 5-6 M€, RIA

Contact: anwar.ahniyaz@ri.se RISE Research institutes of Sweden (RISE)

In both proposals, we are looking for a partner to join.

If you want to know more about the details of te proposals or set up a meeting, please contact :

- NOVAC adresses the call HORIZON-CL5-2021-D2-01-04 (Manufacturing)
- NEXTHIGH adresses the call :HORIZON-CL5-2021-D2-01-02 (Advanced Materials)
- Consortium closes: 14th of June



Pitch 3

Mehmet Nurullah Ateş, Chief Scientist and Principal Investigator, TÜBITAK RUTE







- Another technology (anode-less), could also be developed by designing current collectors for reversible electrodeposition of lithium. Current collector coating strategies which regulate lithium deposition and improve cycling performance can also be developed.
- Improving interface design to ensure efficient charge-transfer and electromechanical stability and improved cell mechanical stability.
- o Bipolar batteries.

Horizon Europe - Work Programme 2021-2022 Climate, Energy and Mobility

Commercial metallic foam- very low surface are





High surface area

RUTE micro porous-metallic foam

RUTE nano porous-metallic foam



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Anode-less Lithium Ion Battery Technology @ TRL 3 & 4 HORIZON-CL5-2021-D2-01-03 Li-Rich NMC/Cu foil anode-less battery, 4.8-2V @RT, C/10 and C/5 rates



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cathode material yielded similar cycle life performances. Pouch cells were built to indicate the feasibility of this process for commercialization.

Eliminating hazardous NMP and expensive recovery system



Thicker loading without cracking and delamination



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Justo Garcia, R&D Manager, Orano Mining









FULI-RESPECT Flexible and Universal Li-Ion batteries REcycling Solution for a comPetitive, circular, and sustainable European battery manufaCTuring industry

HORIZON-CL5-2021-D2-01-06: Sustainable, safe and efficient recycling processes

BEPA Match-making event FRIDAY, 09 JULY 2021







FULI-RESPECT Flexible and Universal Li-Ion batteries REcycling Solution for a ComPetitive, circular, and sustainable European battery manufaCTuring industry

Our main objective is to develop an innovative and green recycling process for Li-batteries that will contribute to the sustainable and holistic recycling processes in Europe and Increase global competitiveness of the European battery ecosystem.

Use existing and new recycling units based on innovative and green processes	 Holistic and flexible recycling process (full hydrometallurgical processes + pre-treatment) Direct material recycling routes from scrap materials Close recycling loops Address high recovery rates Address health risks, environmental impacts, safety hazards and new safety practices related to developed processes 	
Products to be considered	 Used Li-ion batteries of all chemistries (NMC, LFP, NCA, LMO) from different applications (EV + stationary), Gen 3a, 3b Production scraps from gigafactory or manufacturing (cells, modules and electrodes) New batteries generations : Gen4 with lithium metal (existing chemistries/ existing unit processes) 	
Scope of materials recovery	 ☑ Li ☑ Transition metals: Ni, Co, Mn ☑ Al ☑ Cu ☑ Electrolyte (salt + carbonate) 	

Batteries European Partnership Association FULI-RESPECT Flexible and Universal Li-Ion batteries REcycling Solution for a ComPetitive, circular, and sustainable European battery manufaCTuring industry



Batteries European Partnership Association

Patrick Peter, CEO, Circunomics

CO



Circunomics is a leading circular supply chain platform for Lithium-ion batteries.

Founded 2019 Frankfurt

Team Size

10

Funds raised 2M €

Market Size 2030 30B €

Platform & Product

Location

Circunomics is the Circular Intelligence Platform for the Battery Economy. We predict when batteries become available for re-use or recycling, assessing their circular value and finding the right buyers and recyclers. We establish scalable digital processes to facilitate millions of batteries into secondary applications and recycling - being 10x more efficient than current solutions.

Business Model

OEMs are paying a fee of 1€/kWh (= 60€ Ø electric vehicle) to create a Circular Twin, enabling the automated management of batteries. Recyclers and re-users of batteries pay a transaction fee. By making second life and recycling tendering a standard, the profitability of batteries is increased by up to +20%.

Market & Impact

With a 40x growth rate of used batteries (vs. 'only' 10x new batteries), a tsunami of battery waste is emerging - overpowering existing processes of OEMs. Circunomics' vision is to enable the industry to re-use and recycle according to a zero-waste principle.

References & Voices

"Circunomics would unlock a billion-dollar market for the battery ecosystem."

BloombergNEF

'One of the top 5 circular economy startups worldwide."

Dr. Will Ritzrau SAP Former Director Sustainability

"Circunomics payes the way for the battery economy to successfully build circularity into their products."

Dr. Peter Mertens, Investor Former CTO Audi AG, Volvo Cars and multiple Board member

Partner Network & Ecosystem

Mobility & Energy OEMs Second User Recycling Auditing

Logistics Provider Mobility Provider Mining EU Institutions

circunomics



Circunomics is an end-to-end supply chain platform to manage batteries after their first life at scale.



Circular **Twin**

The circular identity of a Li-ion battery

Performance & in-Depth Material Data

- Material & Component Tracing
- Sustainability & CO₂ Data

Circular Analytics

The dashboard for managing batteries

- Second Life Matching & Decisions
- Recycling Quota Simulation
- CO₂ Footprint Mitigation

Circular Marketplace

The B2B-marketplace for batteries

- Second Life Storage & Recycling
- Added Services (Logistics, Insurance, Factoring)
- Carbon Credits



Our contribution to HORIZON-CL5-2021-D2-01-06: Sustainable, safe and efficient recycling processes.



- We are experienced in both participating in or leading academic & industry consortia
- We enable projects in the context of Circularity of material flows and use of secondary raw materials in new batteries produced in Europe, by providing
 - RFID product track & trace
 - digital analytics platform
 - battery data and testing
 - process knowledge (testing, logistics, declaration)

✓ We help you with

storing, analyzing, and exchanging information

on sustainability, battery data on state of health and expected lifetime, waste declaration, and material composition to meet new regulatory targets for recycling.

optimizing and handling the end-oflife management

to solve issues with extended producer responsibility, collection targets and obligations, targets for recycling efficiencies and levels of recovered materials.



Closing remarks





Closing remarks

What are the next steps to take part in BEPA activities?

- □ Find project partners for your Horizon Europe proposals and/or create synergies via our match making platform until 10th August (*via this link*).
- □ Join BEPA now to get involved in the definition of the HE 2023-24 Work Programme which will start in September with the SRIA update. (To apply for BEPA membership, <u>follow this link</u>).
- Register in BEPA Technical Working Groups to identify, prioritise and draft the next battery R&I priorities and topics. (To register in a TWG, <u>follow</u> <u>this link</u>).



BEPA Technical Working Groups

Join BEPA TWGs and provide recommendations for the next HE Work Programmes



- Update the long-term Strategic Research and Innovation Agenda (SRIA)
- □ Identify, prioritise and draft the Battery **R&I topics for the calls** of the Horizon Europe Work-Programmes
- **Craft potential joint calls with other European Partnerships**
- **Further deliverables** that will follow from the monitoring and reporting framework



ENERGY Thank you

BEPA info@bepassociation.eu

BEPA website https://bepassociation.eu/

