



Bu proje Avrupa Birliđi ve Türkiye Cumhuriyeti tarafından finanse edilmektedir  
This project is co-funded by the European Union and the Republic of Türkiye



Technical Assistance for Turkey in Horizon 2020 Phase-II  
EuropeAid/139098/IH/SER/TR

# Focus Group Training 17

*Dimitrios Papageorgiou*  
Istanbul, 09 May 2022

# Session 1: Overview of the Batteries Partnership Call 2022

# Batteries Partnership in Horizon Europe



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## Pillar II: Global Challenges & European Industrial Competitiveness

### Cluster 5: Climate, Energy and Mobility

- **Destination D2** - Cross-sectoral solutions for the climate transition: **supports** different cross-cutting technologies and solutions for climate, energy and mobility applications
- **2022: 10 topics** for Batteries Partnership (7 RIA; 2 IA; 1 CSA)
- **2022 for BP topics: Overall indicative budget: 133M€** (23 projects; on average 5.8M€ funding per project)

# HORIZON EUROPE

## SPECIFIC PROGRAMME IMPLEMENTING HORIZON EUROPE & EIT\*

*Exclusive focus on civil applications*



### Pillar I EXCELLENT SCIENCE

European Research Council

Marie Skłodowska-Curie

Research Infrastructures



### Pillar II GLOBAL CHALLENGES & EUROPEAN INDUSTRIAL COMPETITIVENESS

Clusters

- Health
- Culture, Creativity & Inclusive Society
- Civil Security for Society
- Digital, Industry & Space
- **Climate, Energy & Mobility**
- Food, Bioeconomy, Natural Resources, Agriculture & Environment

Joint Research Centre



### Pillar III INNOVATIVE EUROPE

European Innovation Council

European Innovation Ecosystems

European Institute of Innovation & Technology\*

## WIDENING PARTICIPATION AND STRENGTHENING THE EUROPEAN RESEARCH AREA

Widening participation & spreading excellence

Reforming & Enhancing the European R&I system



# New approach to European Partnerships

New generation of objective-driven and more ambitious partnerships in support of agreed EU policy objectives

## Key Features

- Strategic orientation
- Systemic approach
- Simple architecture and toolbox
- Common set of criteria for the life-cycle

### CO-PROGRAMMED

Based on Memoranda of Understanding/contractual arrangements; implemented independently by the partners and by Horizon Europe

### CO-FUNDED

Based on a joint programme agreed and implemented by partners; commitment of partners for financial and in-kind contributions

### INSTITUTIONALISED

Based on long-term dimension and need for high integration; partnerships based on Art 185/187 of TFEU and the EIT legal acts for 2021-2027

**Webpage on europa.eu:**  
[https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/european-partnerships-horizon-europe\\_en](https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/european-partnerships-horizon-europe_en)

# Destination 2: Cross-sectoral solutions for the climate transition (1/3)



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## Scope:

Thematic areas which are **cross-cutting** by nature and can provide key solutions for climate, energy and mobility applications

**Batteries** is one of these thematic areas

# Destination 2: Cross-sectoral solutions for the climate transition (2/3)



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## Contribution to Key Strategic Orientations (KSOs) of HE Strategic Plan:

- (C) Making **Europe** the first digitally enabled circular, climate-neutral and sustainable **economy** (transformation of mobility, energy, construction and production systems)
- (A) Promoting **open strategic autonomy\*** by **leading**; digital and green transitions through human-centred technologies and innovations
- (D) **Creating a more resilient, inclusive** and democratic **European society** (threats and disasters; inequalities; empowering citizens to act in the green and digital transitions)

\* 'strategic autonomy while preserving an open economy'

# Destination 2: Cross-sectoral solutions for the climate transition (3/3)



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## Relevant **impact areas:**

- **Industrial leadership** in key and emerging technologies that work for people
- Affordable and clean **energy**
- Smart and sustainable **transport**

# Batteries Partnership in Destination 2 (1/3)



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Batteries will enable the rollout of zero-emission **mobility** and renewable **energy storage**

## Strategic pathway:

- **Short to medium term:** Europe rapidly regains technological competitiveness and captures significant market share of rechargeable battery market
- **Long term:** invest in research on future battery technologies to establish Europe's long term technological leadership and industrial competitiveness

# Batteries Partnership in Destination 2 (2/3)



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## Main impacts:

- Increased **global competitiveness** of **European battery ecosystem** through generated knowledge and leading-edge technologies in battery materials, cell design, manufacturing & recycling
- Accelerated growth of innovative, competitive and sustainable **battery manufacturing industry in Europe**
- Accelerated roll out of electrified mobility through:
  - Increased attractiveness for citizens and businesses
  - Offering lower price
  - Better performance and safety
  - Reliable operation of e-vehicles
  - Increased grid flexibility
  - Increased share of renewables integration

# Batteries Partnership in Destination 2 (3/3)



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## Main impacts (continued):

- Increased **overall sustainability** and improved Life Cycle Assessment of each segment of the battery value chain
  - ✓ Developed and established innovative **recycling network** and technologies
  - ✓ Accelerated roll-out of circular designs and holistic **circular approach** for funded innovations
- Increased exploitation and reliability of batteries through **demonstration of innovative use cases** of battery integration in stationary energy storage and vehicles/vessels/aircrafts (in collaboration with other partnerships)

# 2021 vs 2022 Call Topics (1/2)



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**2021:** LCA in battery value chain

**HORIZON-CL5-2021-D5-01-04 (CSA)**

LCA and design for sustainable circularity - holistic approach for zero-emission mobility solutions and related battery value chain



**2022:** Manufacturing value chain

**HORIZON-CL5-2022-D2-01-04 (IA)**

Towards creating an integrated manufacturing value chain in Europe: from machinery development to plant and site integrated design

**2021:** R&I ecosystem

**HORIZON-CL5-2021-D2-01-07 (CSA)**

Support for establishment of R&I ecosystem, developing strategic forward-looking orientations to ensure future skills development, knowledge and technological leadership



**2022:** Large-scale initiative

**HORIZON-CL5-2022-D2-01-08 (CSA)**

Coordination large-scale initiative on future battery tech

**2021:** Sustainable processing & recycling

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

**HORIZON-CL5-2021-D2-01-06**

Sustainable, safe and efficient recycling processes



**2022:** Sustainable processing & pre-recycling

**HORIZON-CL5-2022-D2-01-01 (IA)** Sustainable processing and refining of battery grade graphite

**HORIZON-CL5-2022-D2-01-10**

Streamlined collection and reversed logistics, fully automated, safe and cost-efficient sorting, dismantling and second use before recycling

# 2021 vs 2022 Call Topics (2/2)

## 2021: Li-ion batteries chemistries

### HORIZON-CL5-2021-D2-01-02

Advanced high-performance Generation 3b (high capacity / high voltage) Li-ion batteries supporting electro mobility and other applications

### HORIZON-CL5-2021-D2-01-03

Advanced high-performance Gen 4a, 4b (solid-state) Li-ion batteries ... electro mobility and other applications

### HORIZON-CL5-2021-D2-01-04

Environmentally sustainable processing techniques applied to large scale electrode and cell component manufacturing for Li ion batteries

### HORIZON-CL5-2021-D2-01-05

Manufacturing technology development for solid-state batteries (SSB, Gen 4a-4b)



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## 2022: Battery tech

### HORIZON-CL5-2022-D2-01-02

Interface and electron monitoring for the engineering of new and emerging battery technologies

## 2022: Modelling & automatic characterisation

### HORIZON-CL5-2022-D2-01-03

Furthering the development of a materials acceleration platform for sustainable batteries (combining AI, big data, autonomous synthesis robotics, high throughput testing)

## 2022: Battery systems

### HORIZON-CL5-2022-D2-01-05

Next gen technologies for high-performance & safe-by-design battery systems for transport-mobile applications

### HORIZON-CL5-2022-D2-01-06

Embedding smart functionalities into battery cells (embedding sensing & self-healing functionalities to monitor & self-repair battery cells)

### HORIZON-CL5-2022-D2-01-07

Digitalisation of battery testing, from cell to system level, including lifetime assessment

### HORIZON-CL5-2022-D2-01-09

Physics and data-based battery management for optimised utilisation

# Terminology & sources (1/2)



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## Raw materials

- [List of critical raw materials](#): economic importance, supply risk
- [Circular Economy Action Plan](#)
- Tailing (residues from mining)
- Precursor materials (pCAM)

## Battery technologies - materials

- [Materials Acceleration Platforms](#): to accelerate materials discovery
- Inverse design (start from functionality/property and find the suitable material)
- Scale bridging

## Manufacturing

- Scalable technologies
- Large-scale manufacturing (GWh production)
- 'Design to Manufacture'
- Generation 3b (high capacity / high voltage) Li-ion batteries
- Generation 4a, 4b (solid-state) Li-ion batteries

# Terminology & sources

## Topics (2/2)



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### Recycling - Circularity

- Waste valorization
- Recovery/re-use/re-purposing/reconditioning
- Upscaling
- Sorting, dismantling, second use
- Circular business models
- Circularity by design

### Battery management

#### Safety

- Safe-by-design

**Digitalisation** – moving to a digital business, economy

**FAIR data** (Findable, Accessible, Interoperable, Reusable)

*Note:* For non-battery experts:  
[Understanding battery specifications](#)

# Batteries Partnership HE 2021-22: Wordcloud



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# Battery research on H2020



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## Projects (Cordis search)

- [SPIDER](#): Low-cost, high-density lithium-ion battery technology for electric vehicle. The new, low-cost battery is expected to bring energy density to 450 Wh/kg and power density to 800 W/kg by 2030
- [3beLiEVe](#): Delivering the 3b generation of LNMO cells for the xEV market of 2025 and beyond
- [BIG-MAP](#): Battery Interface Genome - Materials Acceleration Platform
- [ASTRABAT](#): All Solid-state Reliable BATTERY for 2025. Economically viable and environmentally friendly mass production
- [LOLABAT](#): Long LASTing BATTERY System. New promising battery chemistry, RNZB (rechargeable NiZn Battery)
- [ECO2LIB](#): Ecologically and Economically viable Production and Recycling of Lithium-Ion Batteries
- [SPARTACUS](#): Spatially resolved acoustic, mechanical and ultrasonic sensing for smart batteries.

# HE Battery Projects



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## Indicative Projects

- Development of ADVAnced next GENeration Solid-State batteries for Electromobility Applications (HORIZON-CL5-2021-D2-01)
- Scalable and Sustainable Pilot Line Based on Innovative Manufacturing Technologies Towards the Industrialisation of Solid-state Batteries for the Automotive Sector (HORIZON-CL5-2021-D2-01-04)

## Indicative Projects

- Hyper powered vessel battery charging system ([HYPOBATT](#)) (HORIZON-CL5-2021-D5-01-11)
- Super-HEART: a fault-tolerant and highly efficient energy hub with embedded short-term energy storage for high availability electric power delivery (Super-HEART) (HORIZON-EIC-2021-TRANSITIONCHALLENGES-01-02)

### Where to find them? (if available)

- At the 'Funding opportunities portal': Look at the closed calls for HE with keyword 'batteries'

### What information is available?

- Project title & acronym, abstract, topic, keywords, coordinator/ participants names of organisations & PIC

# Food for thought & Q&A SESSION



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☐ Are you aware of the 2023 call topics? [Draft Work programme 2023-2024 of Cluster 5](#)



- ✓ Battery-grade materials
- ✓ Recycling processes
- ✓ Materials/ cells for Gen4 solid-state
- ✓ Production process
- ✓ Digital twins
- ✓ Hybrid electric storage
- ✓ Safety in Gen 3
- ✓ Digital passport to track materials
- ✓ Pre-processing for recycling
- ✓ CAD for next-gen redox flow batteries
- ✓ Testing for aging
- ✓ Circularity & resilience of value chain





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# Teşekkür ederim!

# Thank you!

Learn more: Horizon Europe info-days: [https://ec.europa.eu/info/research-and-innovation/events/upcoming-events/horizon-europe-info-days\\_en](https://ec.europa.eu/info/research-and-innovation/events/upcoming-events/horizon-europe-info-days_en)



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Contact:

Office Address

*Turkey in Horizon 2020 Project  
And Sokak 8/12 Akasya Apt. 06680 Çankaya  
06520 Çankaya/Ankara, Turkey*

*Tel: +90 312 467 61 40*

*<http://www.turkeyinh2020.eu/>*

*info@TurkeyinH2020.eu*