

Electrochemistry for strategic autonomy

Boosting Innovation and Startups in Europe's Green Tech Future

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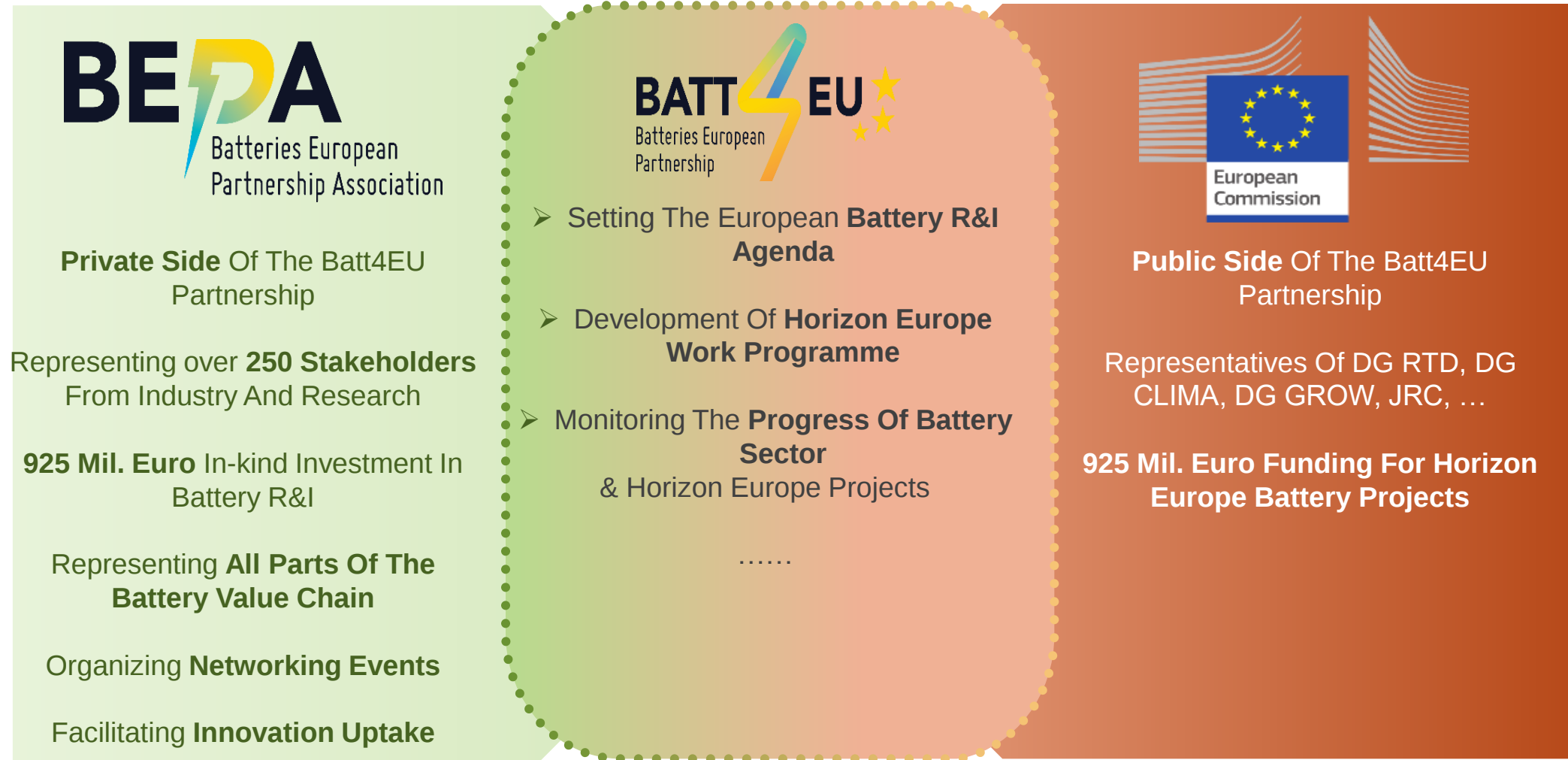


Overview

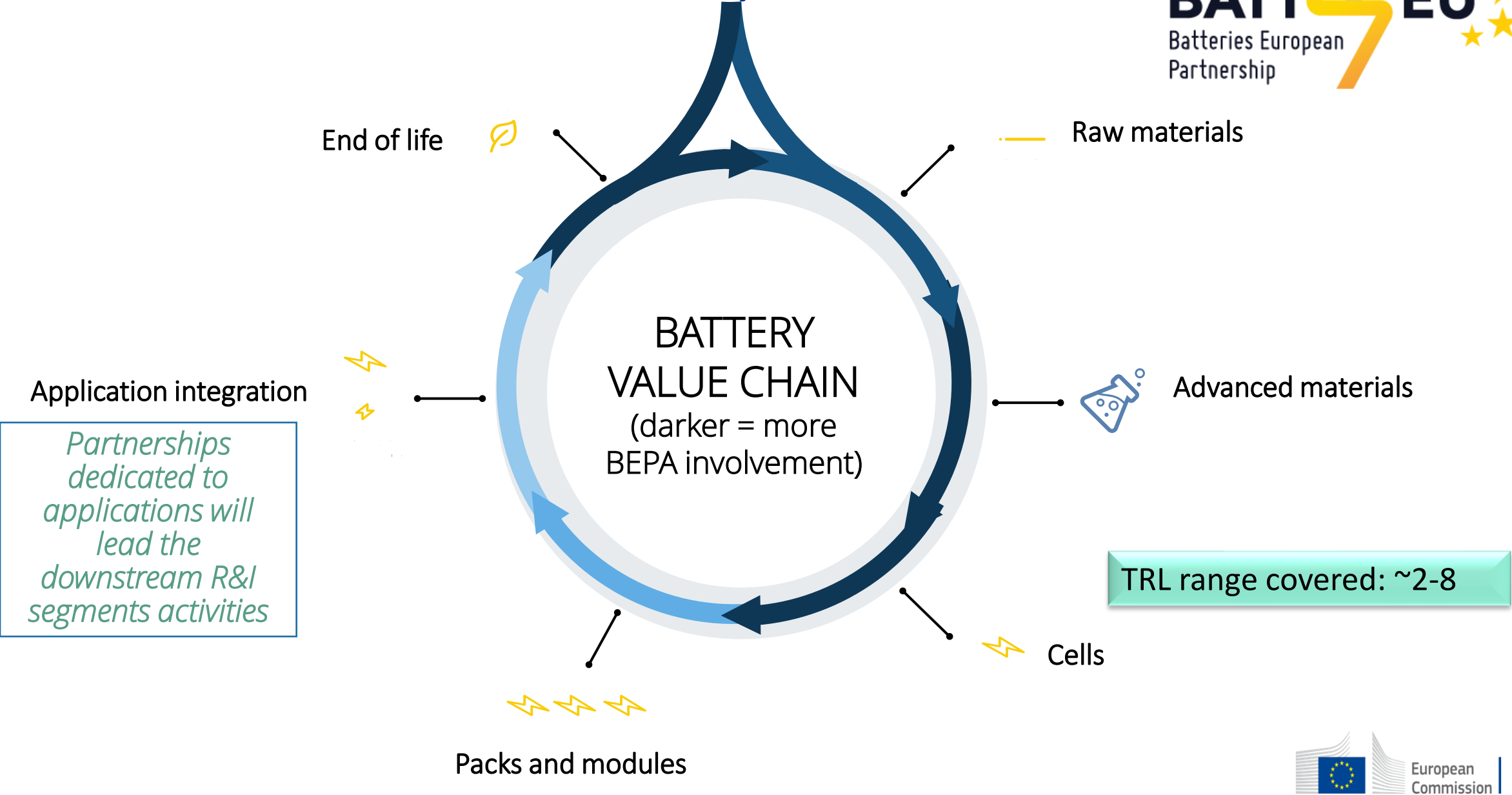
- R&I Support for electrochemistry under Horizon Europe:
 - Batteries
 - Hydrogen
- Complementary funding sources
- Startup support
- SET-Plan update



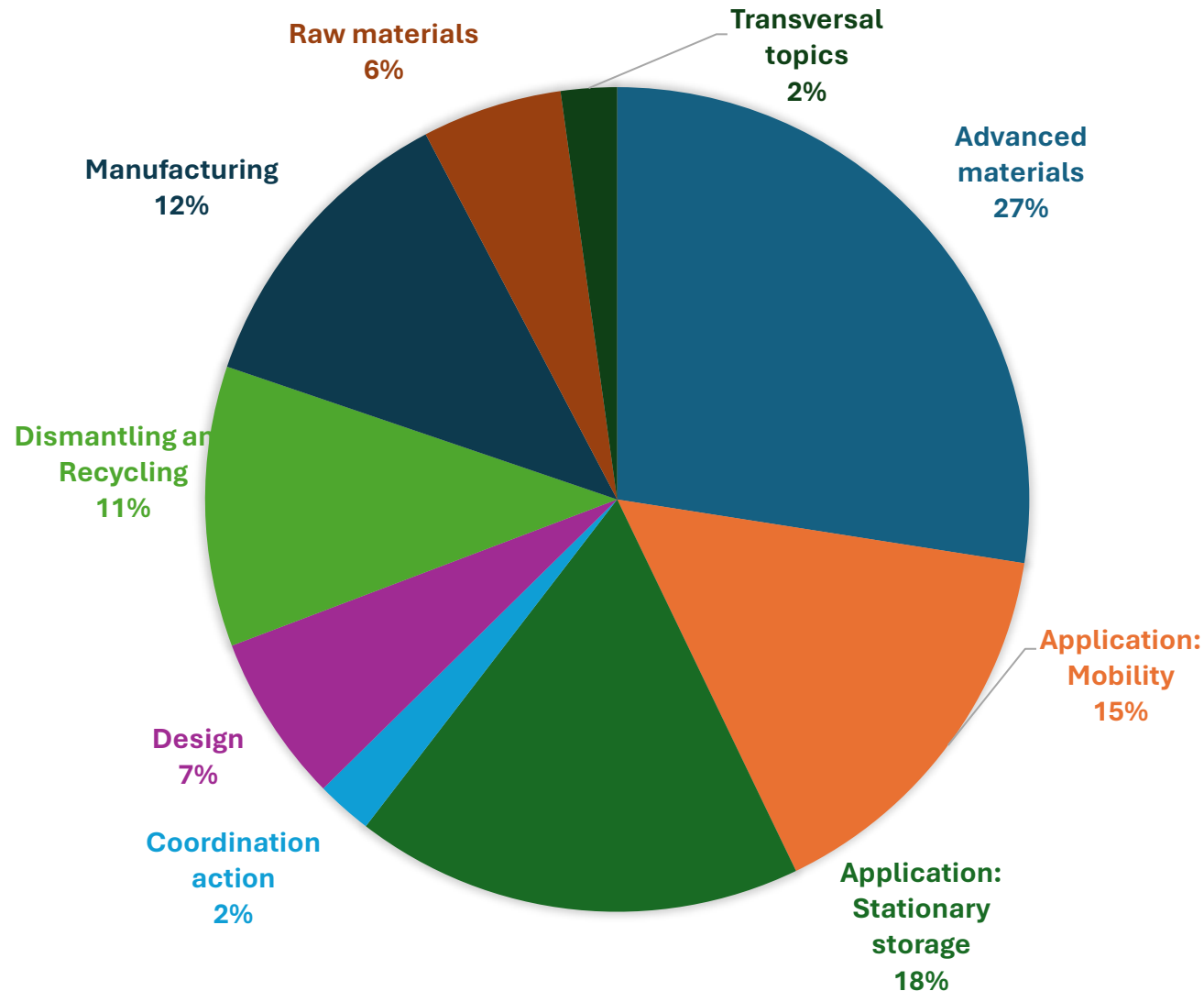
Battery R&I main instrument under Horizon Europe : Battery Partnership BATT4EU



Focus of Batt4EU Partnership



Range of BATT4EU projects up to now



- 85 running projects for value of EUR 514M
- WP 2025: 6 topics, EUR 107M, proposals under evaluation or not yet started
- WP 2026-27: 8 topics, EUR 275M. Adoption foreseen Dec 2025

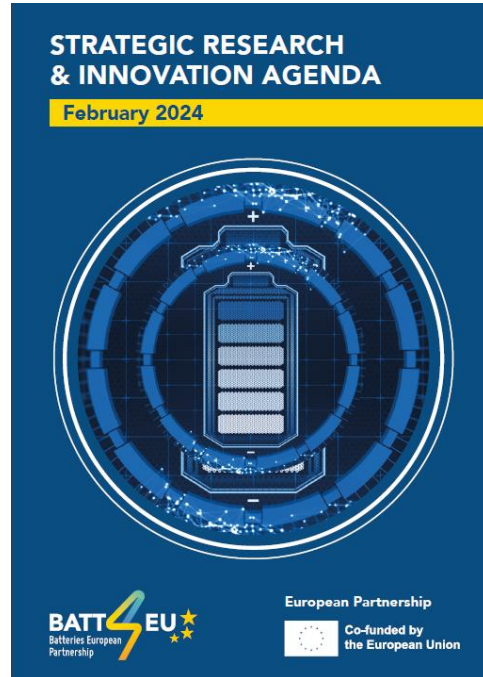


Project examples with SI participation

- **PSIONIC** – High voltage, room temperature single-ion polymer electrolyte for safer all solid state lithium metal batteries
→ electrochemical materials (*)
- **TEMPEST** - Lighter European batteries for safer, more sustainable transport
→ advanced electrochemistry and AI for lighter and safer batteries (*)
- **SALAMANDER** – Smart sensors and self-healing functionalities embedded for battery longevity with manufacturability and economical recyclability
→ smart batteries that can repair damage (*)
- **NEXTCELL** – New gellified cell concept for high-voltage applications
→ high density, high safety and cost-efficient batteries (+)
- **HAVEN** – High performance hybrid energy storage system for multi-service provisioning
→ hybrid stationary storage, digital modelling (+)



Strategic Research & Innovation Agenda

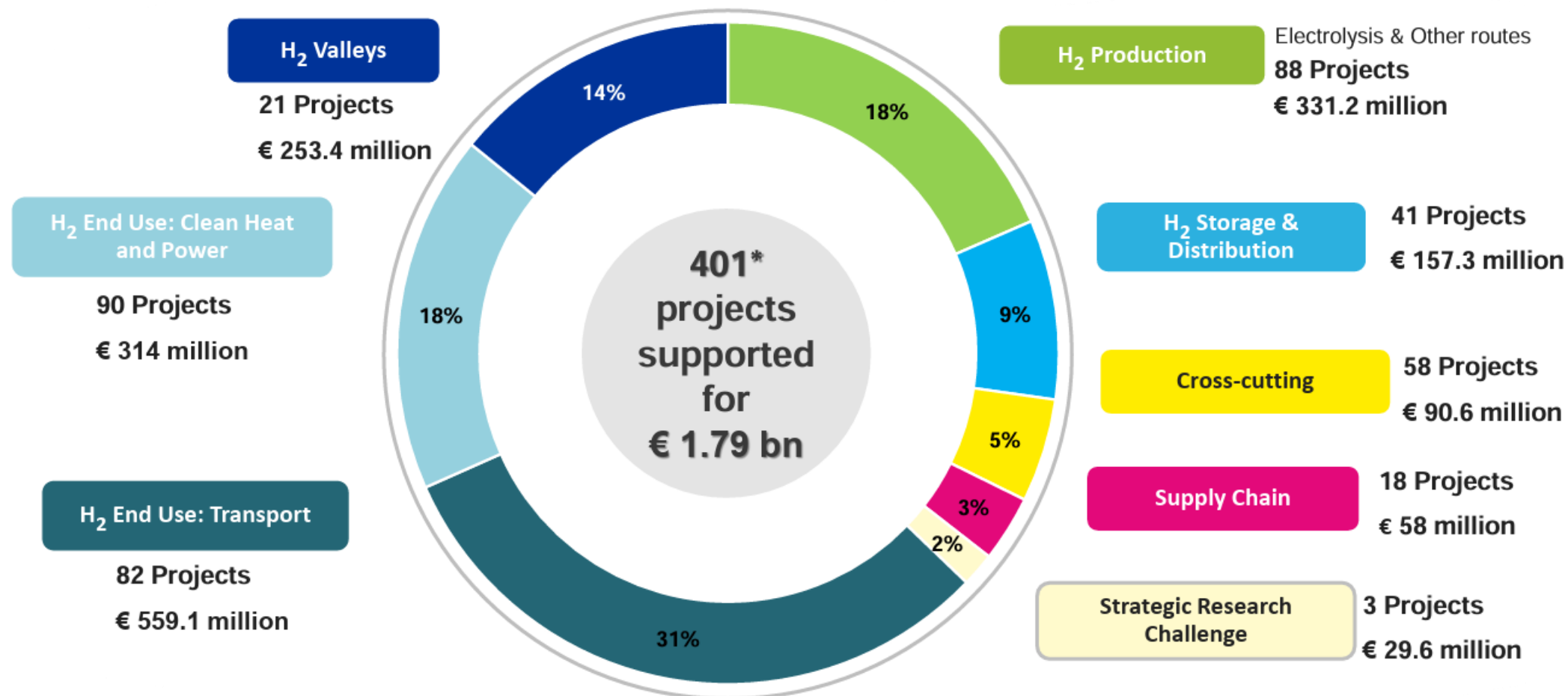


- Strategic Research and Innovation Agenda (SRIA) created in 2021, updated in 2024
- Agreed between EC and BEPA members, lays out priorities 2021-2027
- Also shared with Member States and Regions
- Alignment with policy priorities:
 - Focus on alternative chemistries → EU strategic autonomy
 - Recycling efficiency → Batteries Regulation
 - Holistic approach for novel battery types → EU competitiveness



Clean Hydrogen Joint Undertaking

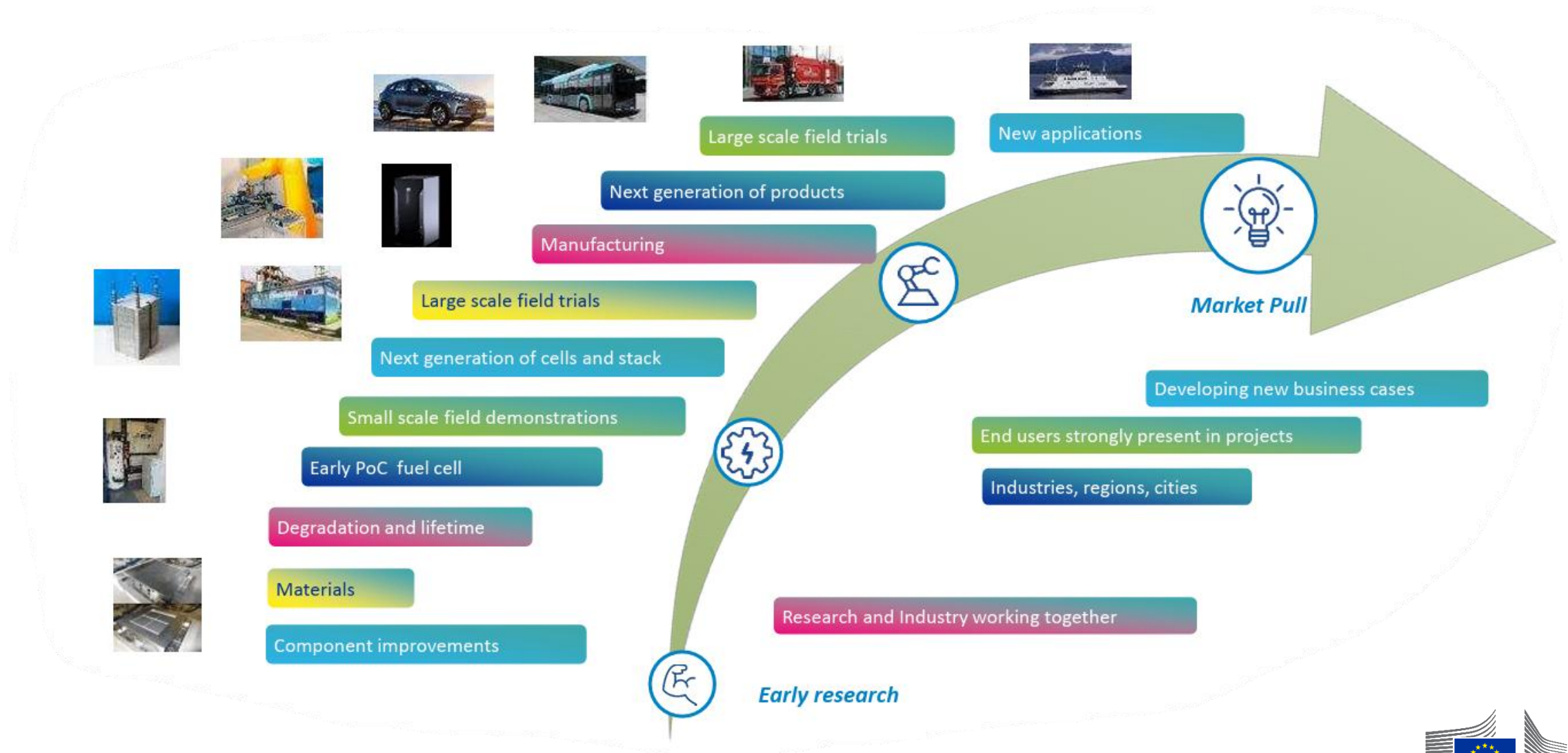
Cumulative figures 2007-2024:



* Not all projects from Call 2024 are included as they are still under preparation



CHJU coverage



CHJU success stories

PROTOSTACK

TUBULAR PROTON CONDUCTING CERAMIC STACKS FOR PRESSURIZED HYDROGEN PRODUCTION

Project ID	101101504
PRR 2024	Pillar 1 – Renewable hydrogen production
Call topic	HORIZON-JTI-CLEANH2-2022-01-02: Development and validation of pressurised high temperature steam electrolysis stacks (proton conducting ceramic electrolysis)
Project total costs	EUR 2 497 013.75
Clean H ₂ JU max. contribution	EUR 2 497 013.75
Project period	1.1.2023–31.12.2025

PROJECT AND GENERAL OBJECTIVES

Protostack will create a radically new, compact and modular proton-conducting ceramic electrolyte stack design with integrated hot box for operation and delivery of hydrogen up to 30 bar. The stack will be demonstrated at 5 kW and provide a pathway for further scale-up to systems of hundreds of kW. These achievements will be an important proof of technological feasibility that will attest to the advancement of proton-conducting ceramic electrolyte technology from technology readiness level 2 to 4. To achieve its ambitious goals, the project consortium has gathered research and industry partners that are world-leading within proton ceramic technologies, with recognised expertise related to the research and development of electrolyzers, membrane reactors, materials, electrochemistry and process engineering.

HYSCALE

ECONOMIC GREEN HYDROGEN PRODUCTION AT SCALE VIA A NOVEL, CRITICAL RAW MATERIAL FREE, HIGHLY EFFICIENT AND LOW-CAPEX ADVANCED ALKALINE MEMBRANE WATER ELECTROLYSIS TECHNOLOGY

Project ID	101112055
PRR 2024	Pillar 1 – Renewable hydrogen production
Call topic	HORIZON-JTI-CLEANH2-2022-01-05: Scaling up of cells and stacks for large electrolyzers
Project total costs	EUR 5 295 799.25
Clean H ₂ JU max. contribution	EUR 5 295 799.25
Project period	1.6.2023–31.5.2027

PROJECT AND GENERAL OBJECTIVES

The Hyscale project aims to upscale an advanced alkaline membrane water electrolysis technology to produce economic green hydrogen at significantly higher current densities than state-of-the-art (SOA) electrolyzers. The technology is free of critical raw materials, fluorinated membranes and ionomers, meeting a significant fraction of the 2024 key performance indicators at the lab scale. Unique materials and design allow for cost-effective upscaling. The project focuses on optimising material synthesis – especially membranes, ionomers, electrodes and transport layers – in line with Europe's circular economy plan. A 100 kW stack with an active surface area of 400 cm² will be developed, capable of high-dynamic-range operation at 2 A/cm² at 1.85–2 V and 60 °C, producing hydrogen at 15 bar. The final goal is a functional electrolyser system with a capital expenditure target of EUR 400 kW, validated at technology readiness level 5 in an industrially relevant environment, accelerating technology development and promoting sustainability in Europe.

Complementary funding sources



European Research Council

Established by the European Commission

European
Innovation
Council



- Low TRL
 - **European Research Council**
 - European Innovation Council Pathfinder
- High TRL
 - **European Innovation Council**
 - Transition
 - Pre-Accelerator
 - Accelerator
 - STEP Scale-up



Boosting deployment for startups

A more efficient funnel



- **Startup and Scale-up Strategy:**
 - Improved access to finance
 - Simple and predictable regulatory environment
 - Enabling access to markets
 - Enhancing access to talent
 - Facilitating access to R&T Infrastructures
- **European Innovation Act 2026**
- **Next MFF:**
 - Enhanced role of EIC
 - New European Competitiveness Fund



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Alignment with Member States



- Strategic Energy Technology Plan (**SET Plan**) update:
 - Reduced fragmentation & stronger alignment of policies and investments (EU, MS)
 - Accelerated development and deployment of competitive clean energy technologies
 - Clearer & more efficient governance mechanisms
 - **Common Implementation and Investment Plan (CCIP)**
 - Thematic Vision
 - Strategic R&I Agenda
 - Implementation Commitments
- Potentially greater role for MS in future partnerships, tripartite arrangements being considered

Thank you for your attention!

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