



CONSORTIUM FOR
BATTERY
INN+VATION-

Supporting Europe's Sustainable Energy Future: Advanced Lead Batteries

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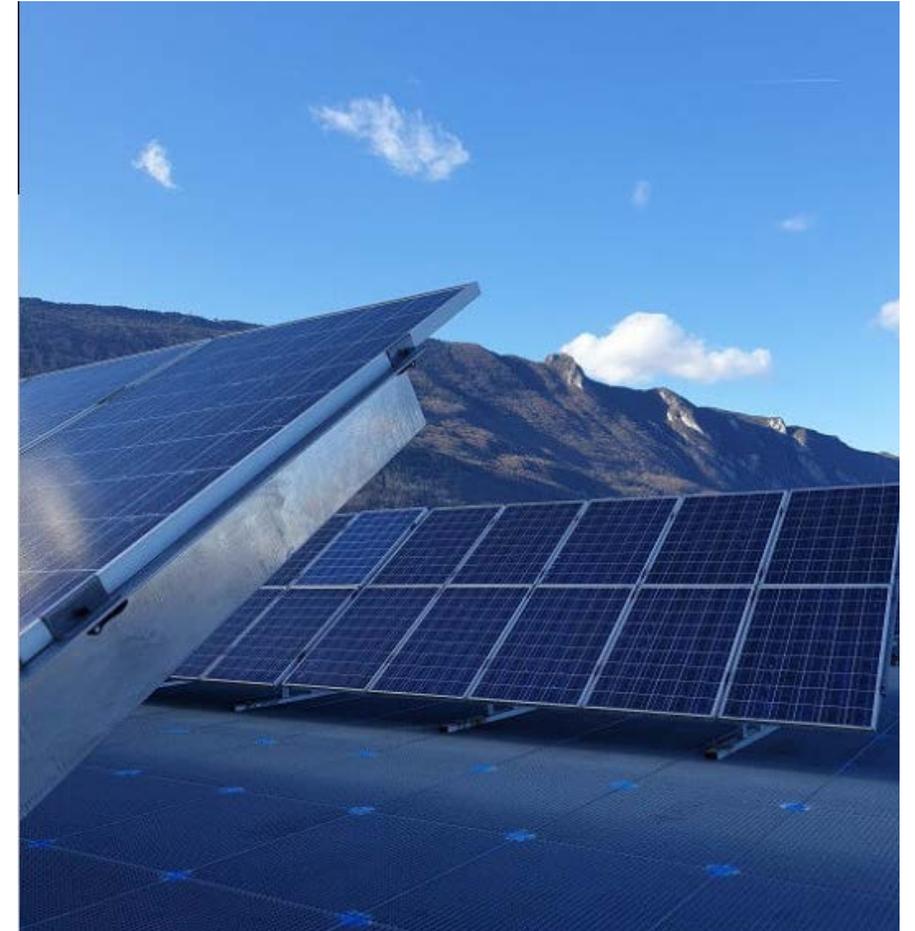
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A golden age: Sustainable economies need batteries and lots of them

As global warming continues to have a dramatic impact on the world's climate, the imperative for decarbonization is accelerating

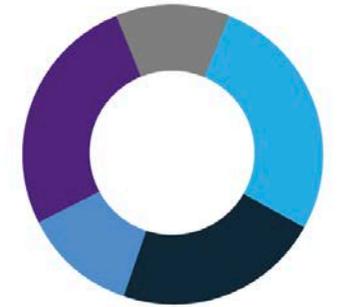
- Battery energy storage is a pillar in the move to electrification. We are seeing soaring demand; a golden age for batteries
- From clean energy storage to hybrid and electric vehicles, demand for high-performing and sustainable batteries is driving research and development across the globe
- End-users across the automotive, energy storage, industrial and motive power sectors want greater performance.
- To deliver on the sustainable targets set by governments across the globe, high-performing, innovative, next-generation batteries will be needed
- The Consortium for Battery Innovation is ensuring advanced lead batteries continue on their innovation journey...





Map of Members and Partners

CBI member representation



- Battery manufacturers
- Industry suppliers
- Research & testing institutes, universities, end users
- Lead producers
- End-users



Overview & Introduction

European Union Goals

B Key European Goals:

- Key targets
- Overlap with Pb batteries
- Need for immediate action

CBI Roadmap

High Level Ambitions

Innovation Areas

Fundamentals & Targets

A Our Roadmap:

- Applications
- Targets
- KPIs
- Research
- Future innovation

C Summary:

- Funding / R&I Landscape
- “Horizon 3”
- Importance of Pb batteries



Future innovation in advanced lead battery technology

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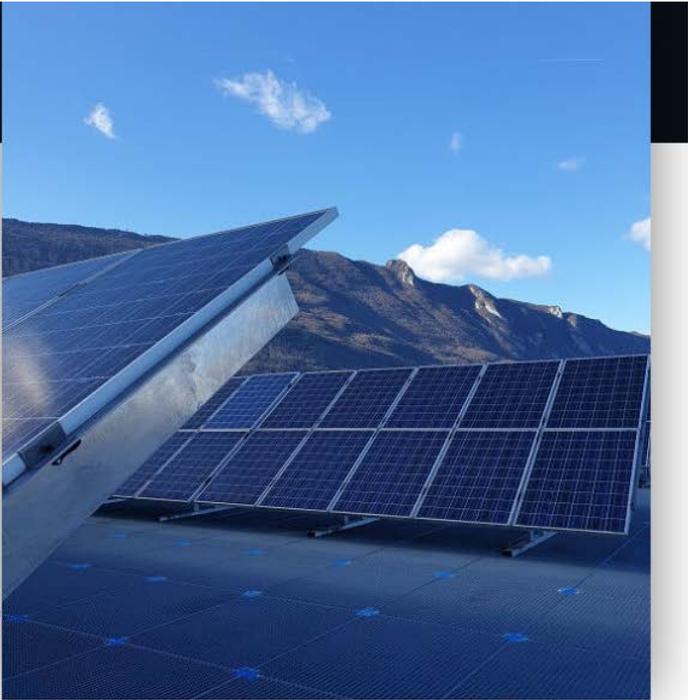
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Visit our website and download the 2021 CBI Technical Roadmap



2021 Technical Roadmap

Research and innovation pathways for next-generation advanced lead batteries

Building on the ambitious goals set in 2019, the new areas for innovation identified by CBI membership in the Technical Roadmap will be used to develop future research programs and launch projects that will deliver the performance enhancements needed for advanced lead batteries.

With continued performance improvement and technological advances, the opportunities for the global lead battery industry to provide sustainable, reliable and high-performing batteries to achieve global electrification and decarbonization targets are limitless.

[View the 2021 Technical Roadmap](#)



CBI Roadmap: Specific goals & KPIs to grasp opportunities in key markets

“This is the golden age for lead battery technologies. CBI’s Technical Roadmap is setting out the research pathways, guided by market assessment for the upcoming decade”

+ **Automotive**
(start-stop/micro-hybrid)

Ensure that recent improvements in Dynamic Charge Acceptance (DCA) are maintained, whilst improving high-temperature performance and ensuring no trade-offs in key parameters such as Cold Crank Amps (CCA) and water loss.

+ **Automotive**
(low-voltage EV)

Improve DCA and charge acceptance, whilst increasing charging efficiency and lifetime.

+ **Energy Storage Systems**

Improving cycle life, calendar life and round-trip efficiency whilst reducing acquisition and operating costs.

+ **Industrial applications**

Improving cycle and calendar life, whilst reducing battery costs.

+ **Motive Power**

Lowering TCO by increasing cycle life, recharge time, and producing maintenance-free batteries.

+ **Other applications**
(including e-bikes)

Improving gravimetric energy density, recharge capability and service life.



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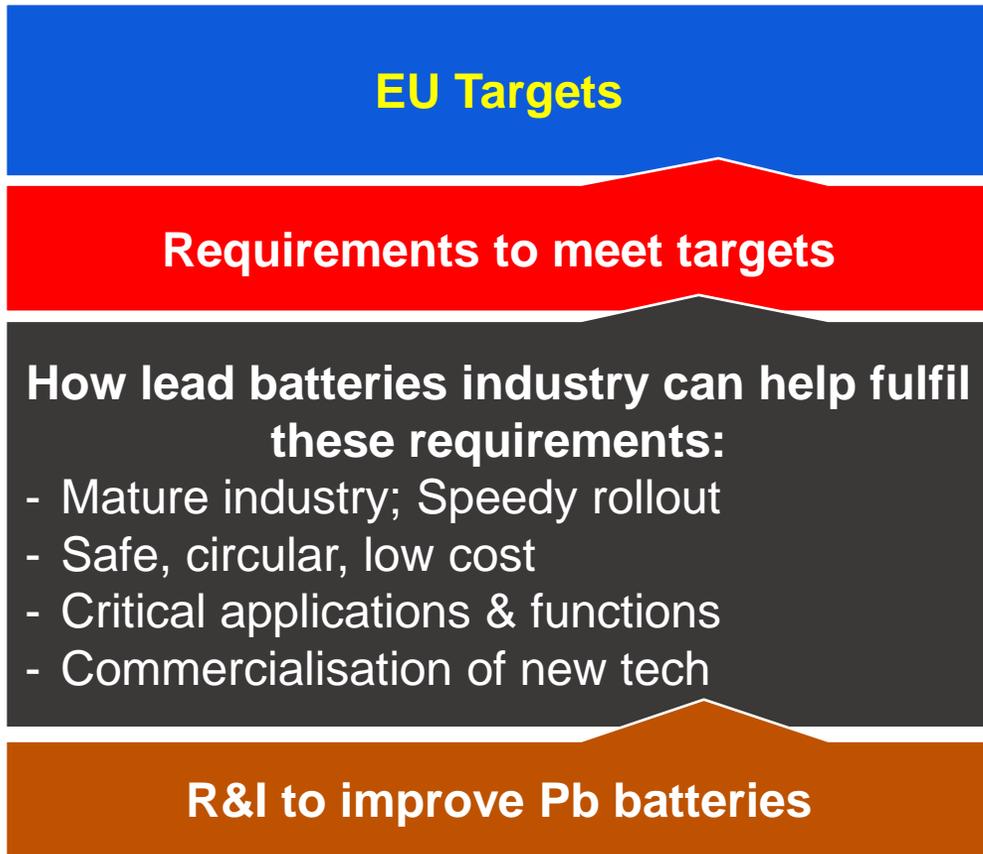


We must act *immediately* if ambitious targets for climate action and circularity are to be met.... Pb-batteries are a near-off-the-shelf option

	Today	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Beyond 2040	
European Union Targets	Climate action (Rapid reduction in GHG emissions)	Reduced by ~25% vs. 1990 (2018-2020)	European Green Deal (EGD) & European Climate Law						Reduction of GHGs by 55% vs 1990 by 2030				Net Zero by 2050				
	Circularity	Linear economy dominates	EGD: Circular Economy Action Plan						* Reduce municipal waste by 50% (2030) * 2030 Sustainable Development Goals				Achieve a circular economy by 2050				
	Eliminating pollution	An issue for health & biodiversity loss	EGD: Zero pollution action plan						30-50% reduction in air-pollution deaths, waste, plastic/microplastic, noise				Achieve zero pollution vision by 2050				
	Buildings & renovations	75% of buildings are energy inefficient	EGD: Renovation Wave (decarbonisation of HVAC); New European Bauhaus						Double energy renovation rates				Climate neutral building stock				
	Clean energy	Around 20% renewables	European Green Deal: Clean Energy Policy area including renewables deployment (offshore wind, hydrogen), integration & networks.														Over 80% renewables by 2050
	Sustainable mobility	Mobility accounts for 25% of emissions	EGD: Strategy for Sustainable & Smart Mobility					30m zero-emission cars; 100 climate neutral cities; zero-emission marine vehicles; high-speed rail				2050: TEN-T; 100% net zero road vehicles					
	Sustainable industry	Industry accounts for 20% of GHGs	EGD: Circular Economy Action Plan & EU Industrial Strategy; reduce strategic dependencies														Achieve a circular economy by 2050
	Prevent unfair competition from climate leakage	ETS established	European Emissions Trading Scheme (ETS) + Carbon Border Adjustment Mechanism (could include additional taxes and duties)														Net Zero by 2050
Requirements	Mass-market energy storage	Multiple tech available (many imported)	Establish before 2025 to enable timely impact			<div style="background-color: #002060; color: white; padding: 10px; text-align: center;"> <p>OPINION</p> <p>The European Union has ambitious 2030 targets for decarbonisation and circularity. Realistically, these targets can only be achieved in this short timescale by deploying multiple technologies. Pb batteries are an enabler for rapid deployment of energy storage across mobility, industry, and the built environment in general.</p> </div>											
	Safe methods of energy storage	Pb batteries	Establish before 2025 to enable timely impact														
	Secure battery circular supply chains	Pb batteries	Establish before 2025 to enable timely impact														
	Commercial battery recycling industry	Pb batteries	Establish before 2025 to enable timely impact														
	Established domestic manufacturing	Pb batteries	Establish before 2025 to enable timely impact														
	Diverse R&D activities	Focus on Li-ion R&D	Develop multiple battery technologies and explore synergies (Li-ion, solid-state batteries, Pb batteries, Na batteries, flow batteries)														



Clear synergies between EU targets and Pb-battery R&I



European Union Targets

- A **Climate action** (Rapid reduction in GHG emissions)
- B **Circularity**
- C **Eliminating pollution**
- D **Buildings & renovations**
- E **Clean energy**
- F **Sustainable mobility**
- G **Sustainable industry**
- H **Prevent unfair competition from climate leakage**

Lead battery applications

- A1 **Hybrid, electric, and fuel-cell vehicles (xEVs)**
- A2 **Vehicle charging (buffers)**
- A3 **Telecommunications backup**
- A4 **Grid & microgrid storage (incl renewables)**
- A5 **Low-voltage traction applications**

Ultimate Target ("Horizon 3")	Enables	Today
Carbon negative	Mitigate climate crisis Sustainable prosperity for Europe	Reduced by ~25% vs. 1990 (2018-2020)
100% circular		Linear economy dominates
Zero		An issue for health & biodiversity loss
100%		75% of buildings are energy inefficient
100%		Around 20% renewables
100%		Mobility accounts for 25% of emissions
100%		Industry accounts for 20% of GHGs
100%		ETS established
Mainstream	ABF	Aux batteries available
Mainstream	ABF	First Generation Available
Mainstream	ABFH	Available
Mainstream	ABDEGH	First Generation Available
Mainstream	BE	Available



Making a difference: In addition to the projects we will discuss later....

About the project

- **Systems Sunlight SA** deployed energy infrastructure through Sierra Leone’s Rural Renewable Energy Project, in a project with UNOPS and UK FCDO
- First phase installed solar power mini-grids at 54 community health centres; Second phase provides electricity to houses, schools, business in 50 rural villages
- Over 2200 Sunlight OPzV cells connected to a hybrid system of 90 mini grids

Applications and advantages

- Enables sustainable electrification of 50 rural communities, improving essential services for 364,000 people, enabling Ebola recovery efforts
- Sunlight’s batteries suited to renewable energy due to long, reliable power cycles
- It is a sustainable, circular, cost-effective solution; Fully recyclable at end-of-life.

Overlap with European Green Deal objectives

Climate action (Rapid reduction in GHG emissions)	Circularity	Eliminating pollution	Buildings & renovations	Clean energy	Sustainable mobility	Sustainable industry	Prevent unfair competition from climate leakage
YES	YES	YES	YES	YES	POSSIBLY	YES	YES





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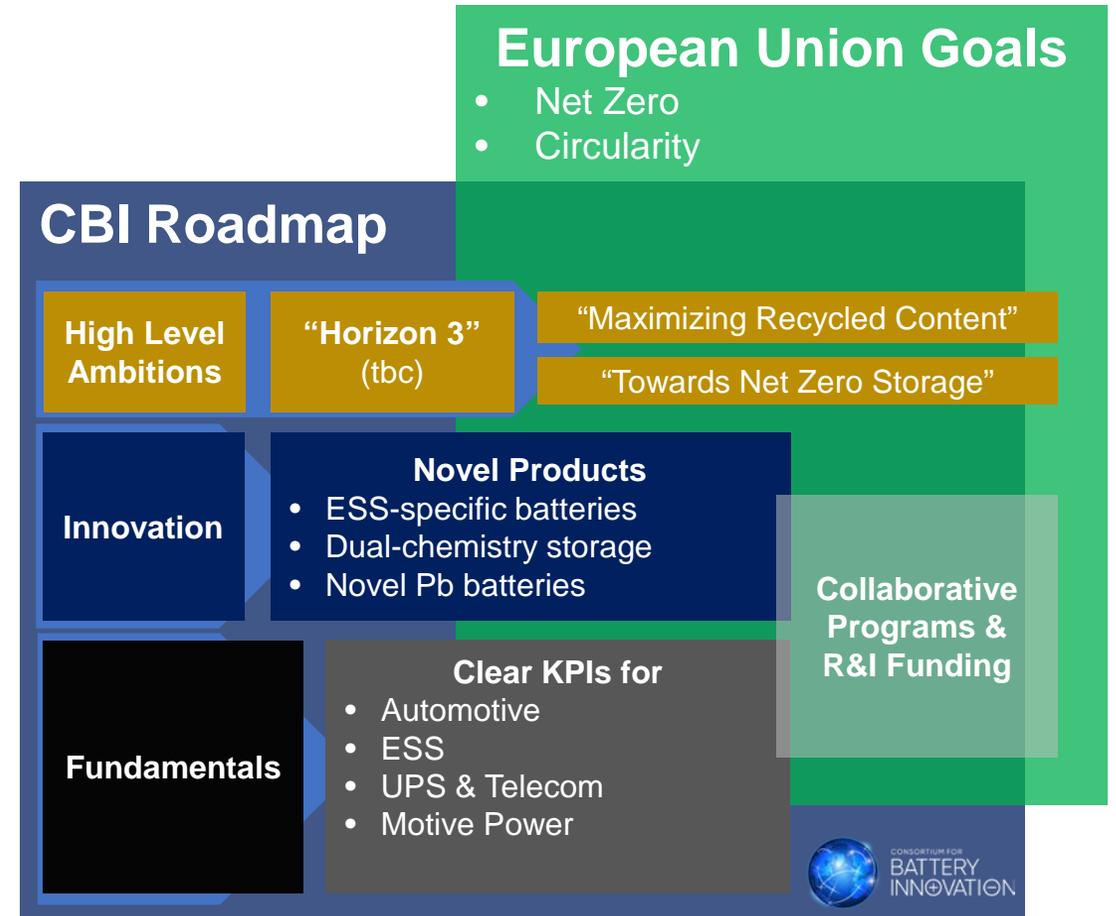
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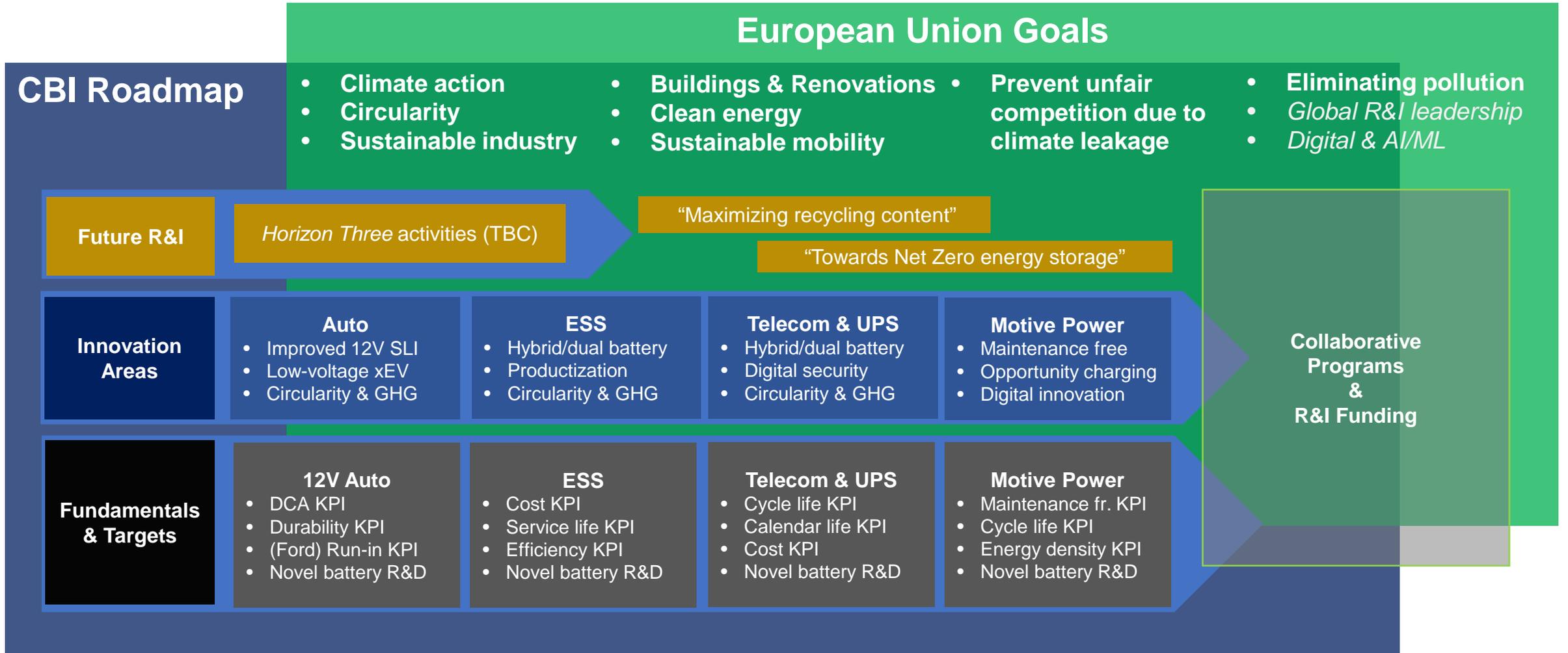
Lead battery projects to enable a sustainable future

- CBI reviewed extensive European-funding and project landscape
- Determined 7 opportunity areas where lead batteries can make a real difference
- These areas align with the new CBI roadmap
- Project proposals will be developed for these calls in following areas:
 - **Energy storage systems**
 - **Low-voltage EV batteries**
 - **EV charging batteries**
- We are looking for industry & academic partners
- Contact **Carl Telford** to get involved





Conclusion: Lead batteries are key to a sustainable energy future





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