



BATTERY ANODE MATERIALS (BAMS): POWERING THE FUTURE OF ENERGY, MOBILITY, AND MILITARY APPLICATIONS

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EUIndTech2025: Green Materials – Sustainable Choice for a Competitive European Economy

ABOUT ECGA

Established in 1995 and headquartered in Brussels, ECGA represents EU carbon and graphite producers.



**> 3,011 billion Euros
Turnover in Europe**

WE REPRESENT
100%
of EU-based production of



Natural Graphite



Soderberg
Anodes &
Pastes



Cathodes
(Aluminium
Industry &
Foundries)



Graphite
Electrodes
(Steel ind.)



Battery Anode
Material

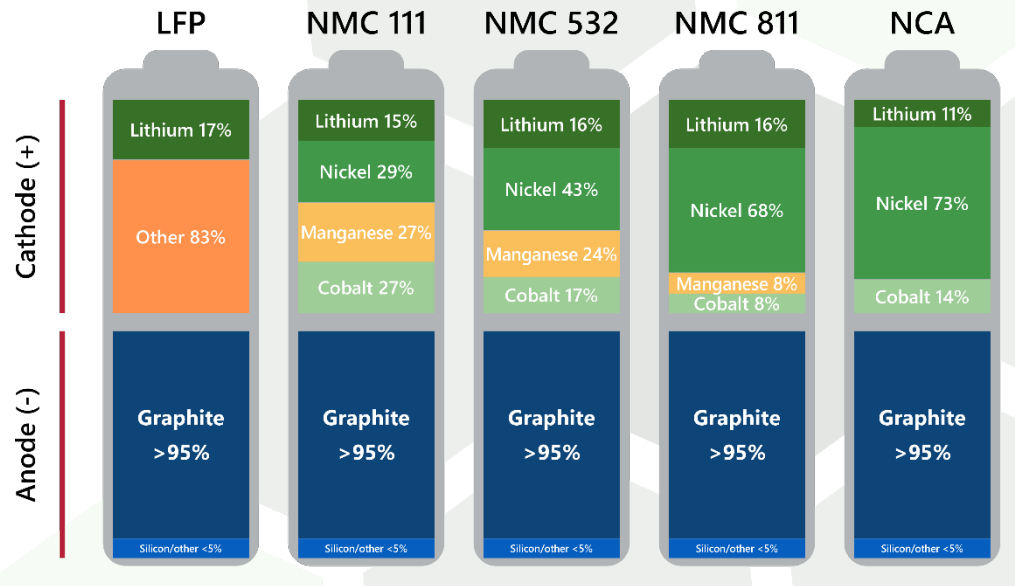


WHAT ARE BAM_s AND WHY THEY MATTER

Battery Anode Materials (BAMs) are graphite-based materials used in every lithium-ion battery. They:

- Make up ~25% of a battery's weight, impacting up to 60% of performance.
- Determine charging speed, lifespan, and energy density

Graphite is fundamental to every battery



Source: Pallinghurst - Traxys battery analysis



BAMs are critical to powering:

- ❑ **Energy storage:** stationary batteries stabilising renewable grids
- ❑ **E-mobility:** from electric vehicles to buses, rail and aviation electrification
- ❑ **Military systems:** drones, radar power, submarines, autonomous land vehicles, and mobile energy packs

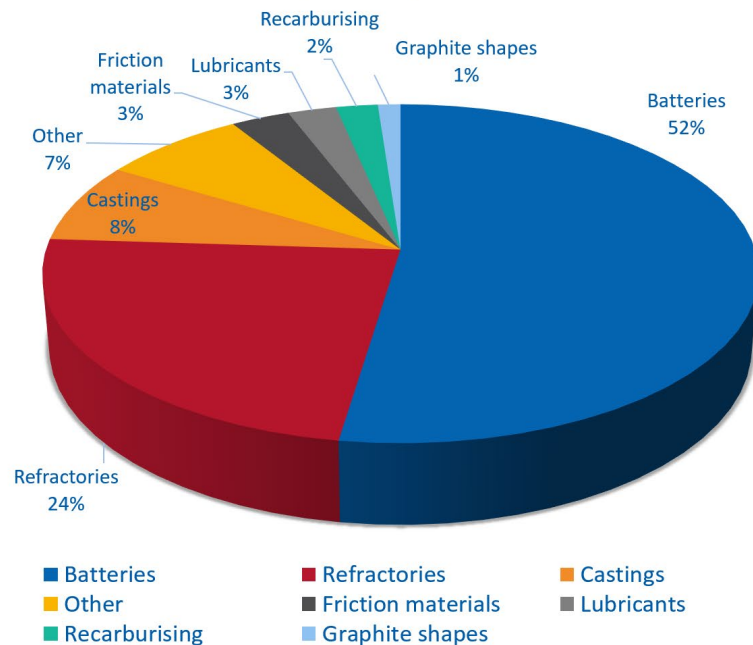
BAM_s FOR ENERGY STORAGE

BAMs are essential for:

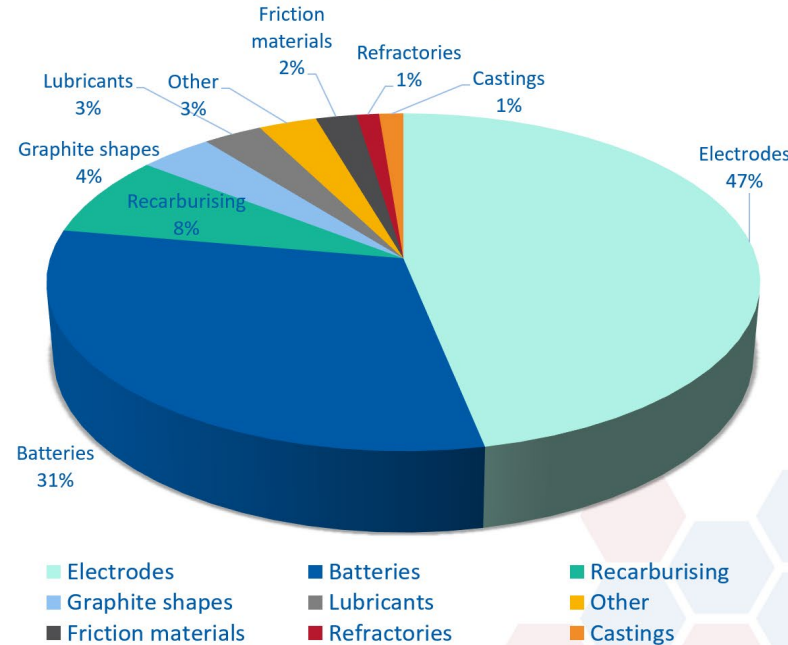
- ❑ Stationary batteries supporting renewable energy integration
- ❑ Grid-balancing, load-shifting, and backup systems
- ❑ Decentralised power and off-grid solutions

Sector-based graphite demand

**Natural Graphite Demand by application 2024
(worldwide)**



**Synthetic Graphite Demand by application 2024
(worldwide)**



BAMs FOR CLEAN MOBILITY



Competitiveness Compass

*How do we close the
EU competitiveness
gap?*

*What does it mean in
terms of industrial
policy and how can we
fund it?*



Clean Industrial Deal

*What is the role of a
domestic battery
ecosystem in the
future of the European
automotive sector and
beyond?*



Automotive Action Plan

BAMs are indispensable to Europe's e-mobility transition:

- 50–70 kg of graphite-based BAMs in every EV battery
- Directly impact charging speed and battery durability
- Help extend vehicle lifespan and reduce lifetime costs
- Local BAM supply strengthens the full EV value chain

BAMs IN DEFENCE & CRITICAL INFRASTRUCTURE

Supply risk for critical raw materials in military applications



Fighter Aircraft

Aluminium Graphite	Beryllium Chromium Cobalt	Copper Dysprosium Germanium	Iron/Steel Lanthanum Nickel	Neodymium Platinum Praesodymium	Samarium Tantalum Titanium	Tellurium Terbium Tungsten	Vanadium Yttrium	Barium Borates Cadmium	Gallium Indium Lead	Lithium Manganese Molybdenum	Niobium Silver Tin	Thorium Zinc Zirconium	Gold Hafnium Selenium
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Main Battle Tank

Aluminium Graphite	Beryllium Chromium Copper	Germanium Iron/Steel Neodymium	Nickel Tantalum Tellurium	Titanium Tungsten Vanadium	Yttrium	Borates Cadmium Gallium	Indium Manganese Molybdenum	Selenium Thorium Zinc	Hafnium
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Missile

Aluminium	Chromium Cobalt Copper	Dysprosium Iron/Steel Neodymium	Nickel Praesodymium Samarium	Silicon Metal Tantalum Titanium	Tungsten	Borates Lead Lithium	Niobium Molybdenum Zirconium
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Submarine

Aluminium Graphite	Chromium Cobalt Iron/Steel	Platinum Samarium Titanium	Tungsten Vanadium	Barium Lead Lithium	Manganese Niobium Silver	Hafnium
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Corvette

Aluminium Graphite	Cobalt Chromium Copper	Iron/Steel Nickel Samarium	Titanium Tungsten	Barium Lead Lithium	Molybdenum Manganese	Gold
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Artillery

Aluminium Graphite	Beryllium Chromium Copper	Germanium Iron/Steel Neodymium	Nickel Tantalum Tellurium	Vanadium Yttrium	Cadmium Molybdenum Manganese	Indium
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Ammunition

Aluminium Graphite	Beryllium Copper Germanium	Neodymium Tantalum Tellurium	Titanium Yttrium	Cadmium Indium
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Torpedo

Aluminium	Chromium	Lead Lithium Manganese	Zirconium Silver
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Assault Rifle

Iron/Steel Vanadium

BAMs are used in:

- UAVs and guided missiles
- Submarines and surface ships (electronics, propulsion)
- Mobile radar and communication systems
- Lightweight, heat-resistant components for military aircraft and land vehicles

Legend

- Very high risk
- High risk
- Medium risk
- Low risk

WHAT MAKES BAMS "GREEN"?

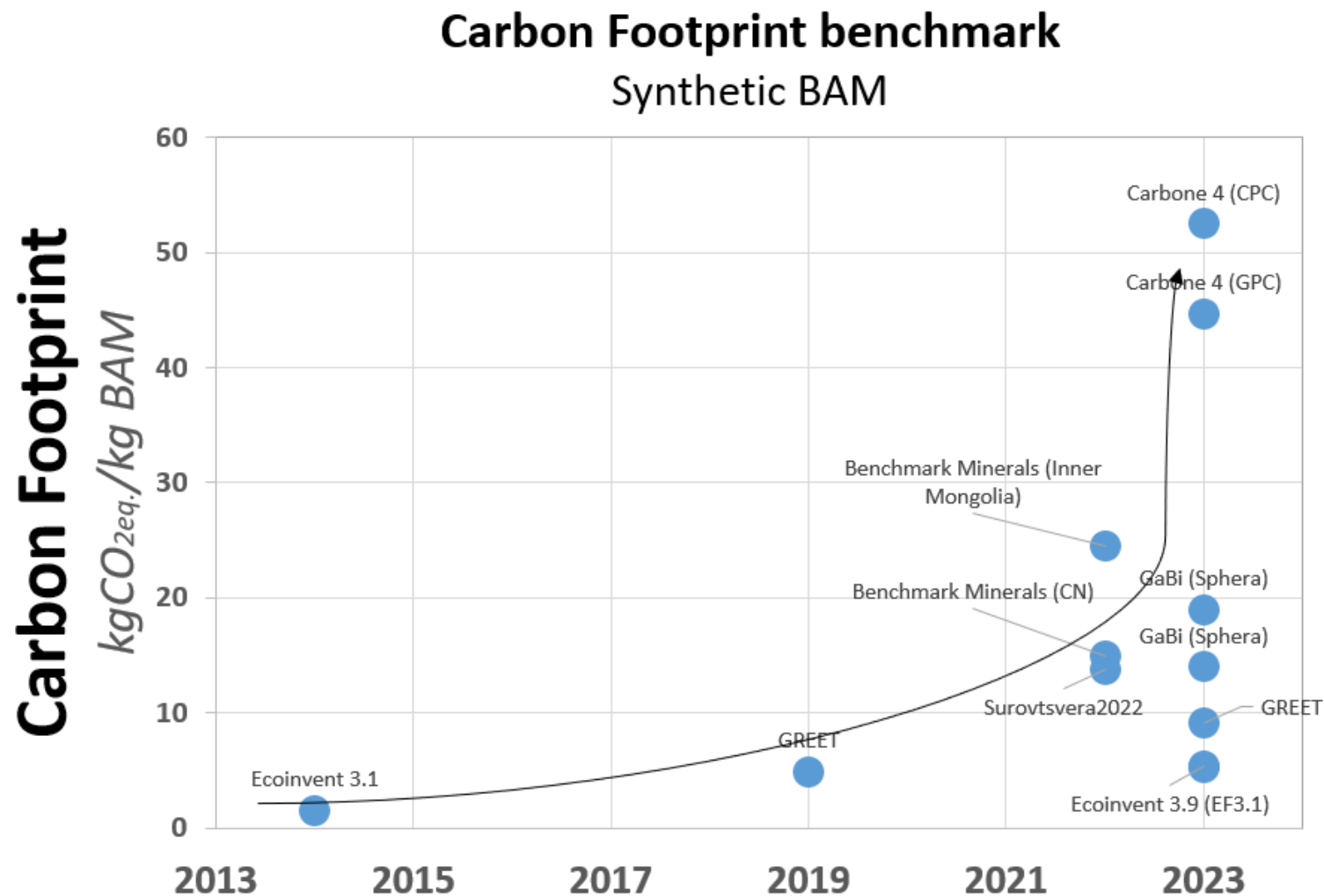


European BAMS are designed for low carbon impact and circularity.

- Produced with renewable electricity (hydro, wind, nuclear)
- Use water-based purification, avoiding toxic acid leaching
- Enable graphite recovery from black mass for closed-loop recycling
- Innovations like nano-coatings and silicon blends enhance performance
- Up to 15x lower CO₂ footprint vs. coal-based Chinese production

Policy support is needed to scale EU production and close the loop.

WHAT MAKES BAMS "GREEN"?



Sources:

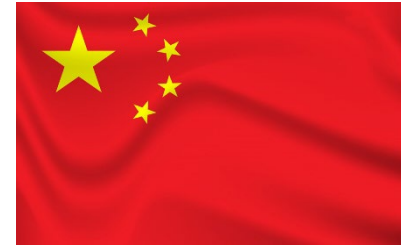
- Ecoinvent database
- Sphera MLC (ex-GaBi)
- GREET database
- Benchmark Minerals
- Carbone 4

EUROPE'S STRATEGIC CHALLENGE: BUILDING BAM_s SUPPLY

Despite Europe's ambition to lead in battery manufacturing and green technologies, it produces less than 1% of global synthetic BAMs – a critical weak point in its supply chain.

1. Severe supply concentration: China currently accounts for:

- 97% of global synthetic graphite supply
- 69% of natural graphite supply
- ~96% of all refined graphite growth since 2020 (IEA 2025)



2. Refined graphite is one of the most concentrated battery inputs, making BAMs one of the highest-risk materials for Europe's energy, mobility, and defence sectors

- Today, the only operational EU project (e.g. Herøya, Norway) produces just 2,000 tonnes/year
- This is far from sufficient to support EU ambitions for EVs, grid storage, and electrified defence

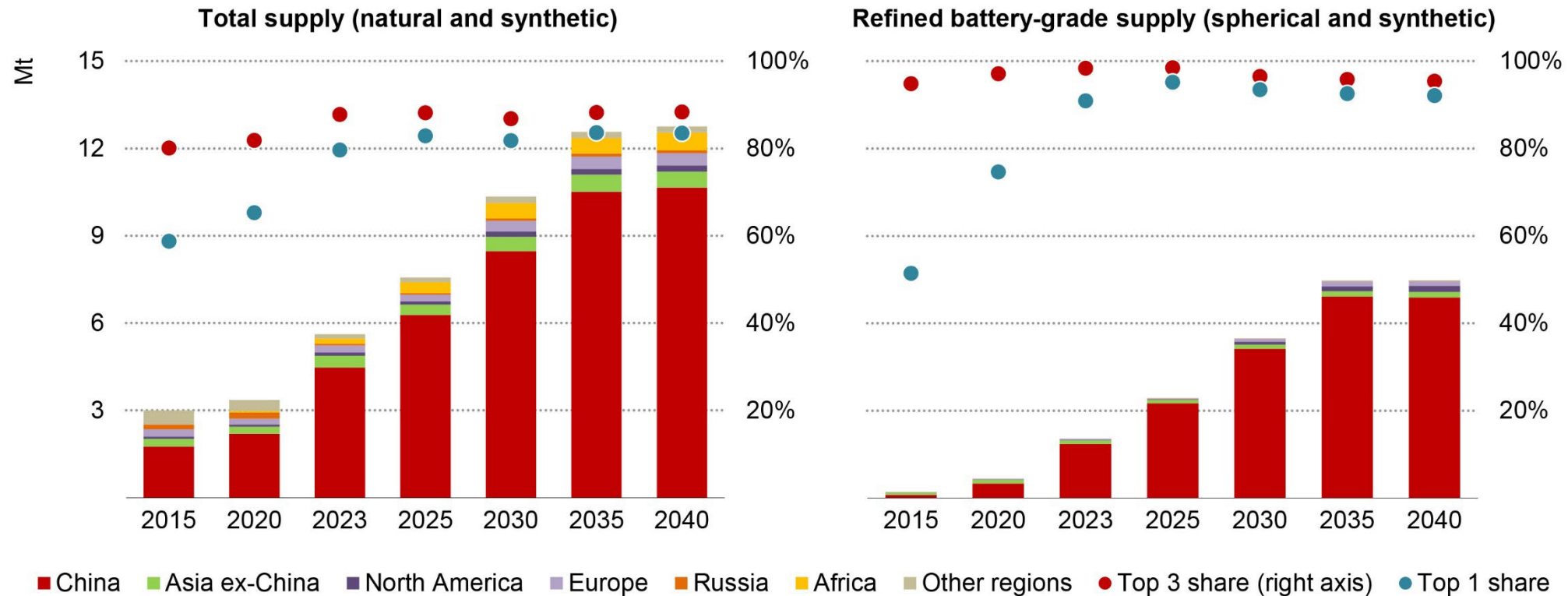


3. Targeted investment, policy visibility, and infrastructure access are needed now to close the gap between ambition and industrial reality.

EUROPE'S STRATEGIC CHALLENGE: BUILDING BAM_s SUPPLY

Supply: New natural graphite mining projects emerge in diversified regions, notably in Africa, but the production of battery-grade graphite remains highly concentrated

Total and battery-grade graphite supply from existing and announced projects in the base case



IEA. CC BY 4.0.

Notes: Total supply includes all grades of mined and synthetic graphite. Refined battery-grade supply includes spherical graphite made from natural flake graphite and synthetic anode production.

UNLOCKING THE BAM POTENTIAL: THE EU MUST ACT **NOW!**



- Recognise BAMs in the Net-Zero Industry Act, CBAM, and strategic frameworks
- Support scale-up through Innovation Fund, IPCEIs, and targeted public investment
- Secure clean energy access for BAM plants via long-term PPAs
- Accelerate permitting for both primary raw materials and black mass recovery
- Foster innovation in alternative graphite sources and production technologies
- Incentivise procurement based on carbon footprint, recycled content, and EU origin
- Introduce financial guarantees and demand aggregation tools to de-risk investment
- Create a customs code for BAMs to enhance traceability
- Ensure trade fairness through environmental and social import benchmarks

BUILD EUROPE'S FUTURE FROM THE ANODE UP

To scale BAMs, the EU must:

- Recognise BAMs in strategic frameworks (NZI Act, CBAM, CRMA)
- Fund scale-up via Innovation Fund & IPCEIs
- Secure clean energy access for BAM plants (PPAs)
- Speed up permits for raw materials & black mass recovery
- Boost innovation in alternative graphite sources
- Reward low-carbon & recycled content in procurement
- Create BAM customs code for traceability
- Ensure fair trade with social & environmental benchmarks

Strategic action now = resilient, low-carbon supply tomorrow.



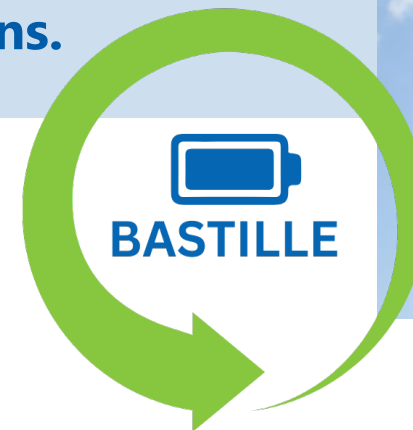
BASTILLE PROJECT

CIRCULAR BATTERIES, COMPETITIVE EUROPE

BASTILLE promotes battery recycling to strengthen Europe's circular economy and reduce dependency.

- Focus on black mass recovery and safe, sustainable processes
- Supports implementation of the EU Battery Regulation
- Addresses real-world gaps in collection, ownership & permitting
- Graphite recovery = strategic autonomy + environmental gain

Circular materials = resilient, competitive supply chains.



GRAPHIREC PROJECT

TURNING WASTE INTO VALUE



GRAPhiREC develops innovative ways to recover graphite from end-of-life batteries.

- EU LIFE project with cross-border expertise
- Demonstrates graphite's recyclability at industrial scale
- Enables green, closed-loop battery value chains
- Showcases how waste can power tomorrow's technologies

LIFE GRAPHIREC

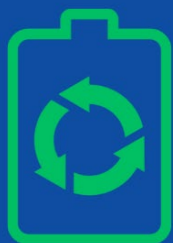
Empowering Europe's Battery Recycling

Project 101147368 – LIFE23-ENV-IT-LIFE GRAPhiREC
Waste GRAPHite REcycling for new lithium and alkaline batteries



Co-funded by
the European Union

From waste to value – real innovation for a greener Europe



LIFE
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THANK YOU!

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