



European Advanced Carbon and
Graphite Materials Association



Graphite

A European Phoenix

ECGA Annual Report 2023

FOREWORD

2023 was a year of the change for ECGA.

In 2023 the General Assembly unanimously decided to change the name of the association to **European Advanced Carbon and Graphite Materials Association** asbl (ECGA). This change reflects the evolving scope and ambition of the association, signalling a renewed focus on advanced materials and technologies within the carbon and graphite sectors. Importantly, the abbreviation 'ECGA' remains unchanged, maintaining continuity and recognisability in the industry and among stakeholders. This rebranding is not just a name change, but a reaffirmation of the association's commitment to leading the industry towards innovative, sustainable practices and technologies.

We welcomed new members in 2023 Talga Resources (Sweden), Jastrzębska Spółka Węglowa S.A. (Poland), Hycamite TCD Technologies (Finland) and Ferrolobe (France) and continue to attract new ones for 2024.

The new ECGA Board elected during the General Assembly meeting in Madrid, in October 2023 reflects our growing membership and the industry's increasing significance:

- PRESIDENT **Mr. Juan Antonio Aranzabal**, Graftech Iberica S.L. (Spain),
- VICE-PRESIDENT **Mr. Dirk Schneider**, Tokai Erftcarbon (Germany),
- **Dr. Bénédicte Allard**, Tokai Cobex (France),
- **Mr. Eugen Hofer**, Resonac Graphite Austria GmbH (Austria),
- **Dr. Marc Oliver Loeh**, Schunk Kohlenstofftechnik (Germany),
- **Dr. Stian Madshus**, Vianode (Norway)
- and **Dr. Johannes Spring**, SGL Carbon Group (Germany).

We would like to thank the outgoing Board members for their engagement and support during the last three or more years.

Like many other sectors in the EU the carbon and graphite industry has been suffering from the geopolitical changes and the resulting energy policies as well as from an unlevel international playing field which puts severe strains on its international competitiveness. On the other hand, these changes as well as the EU's policy responses provide opportunities to showcase the remaining



Mr. Dirk Schneider



Dr. Bénédicte Allard



Mr. Eugen Hofer



Dr. Marc Oliver Loeh



Dr. Stian Madshus



Dr. Johannes Spring

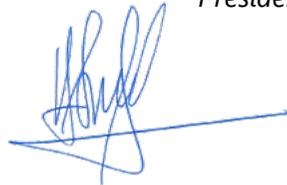
EU producers as champions in their field of carbon management and as enablers for Europe's industrial fabric, be it renewables, e-mobility, digitisation, or circular economy to save resources. The overall demand forecast for the sector's products is good and the sector will embrace the challenge put forward by the Critical Raw Materials and the Net Zero Industry Act to provide a much higher percentage of material to the EU economy "Made in Europe".

It is with this in mind that the ECGA set up the European Strategic Partnership for a Sustainable Graphite Supply Chain in October 2023 which will unfold its activities in 2024.

I would like to thank all members for their active engagement throughout the past year and look forward to a very active 2024!



Juan Antonio Aranzabal
President



Securing the Future: Graphite's Strategic Role in the EU Economy	4
The Strategic Nature of Graphite Recognised in the EU	6
Made in Europe: Sustaining Excellence in the Carbon and Graphite Sector	8
ECGA's Role in the Carbon and Graphite Value Chain	10
Launch of the European Strategic Partnership for a Sustainable Graphite Supply Chain	10
ECGA Embraces Due Diligence Guidance for a Sustainable Future	12
ECGA's Commitment to Sustainable EHS Practices	13
Improving Environmental Performance	13
ECGA's Contributions to Shaping Europe's Competitive Edge	16
Chips Act: Graphite's Role in Semiconductor Supply Chains	18
Heat Pump Production Made in Europe?	18
Carbon Brushes: Waste from Electrical and Electronic Equipment Directive	18
Graphite for Sustainable Transport: the Combined Transport Directive	19
Carbon Fibres: Promoting Lightweighting	20
Carbon Fibre in Renewables: Challenges in Wind Energy Expansion	20
Graphite Tooling for Solar Energy's Ascendant Trajectory in the EU	21
Natural and Synthetic Graphite: The EU's New Battery Regulation: A Game-Changer	22
Battery Graphite: Towards Certified CO2 Footprint Datasets	23
Trade and International Competitiveness: The Level Playing Field?	24
Trade Restrictions in Critical and Strategic Raw Materials	26
Path to a Green Transition: Energising the Carbon and Graphite Sector	28
Electricity Market Reform	30
Attempting a Level-playing Field: The Carbon Border Adjustment Mechanism ("CBAM")	31
Emissions Trading System: Amendment on the Allocation of Free Allowances	33
ETS 2 – Pricing CO ₂ Emissions for Industrial Sectors not Covered by the Current ETS	34
Energy Taxation Directive (Revision) – Reducing Energy Consumption	34
Energy Efficiency Directive (Revision) – Limiting Emissions at Source	35
Sustainability and Circular Economy: Carbon and Graphite as Key Enablers	36
The European Carbon and Graphite Industry's Alignment with SDGs	38

Securing the Future: Graphite's Strategic Role in the EU Economy

1

CHAPTER

The EU Green Deal Industrial Plan, published on 1 February 2023 by the European Commission, promotes the creation of a more supportive environment for deploying the clean tech manufacturing capacity required to meet Europe's ambitious green targets. The Plan builds on previous initiatives and relies on the strengths of the EU Single Market, complementing ongoing efforts under the European Green Deal and REPowerEU. It is based on four pillars: a predictable and simplified regulatory environment, speeding up access to finance, enhancing skills, and opening trade for resilient supply chains.



THE STRATEGIC NATURE OF GRAPHITE RECOGNISED IN THE EU

Critical Raw Materials Act

The ECGA welcomed the objectives set by the Commission and is ready to continue delivering one of the key materials the European Union needs for its transition to a climate-neutral economy: that is graphite, whether natural or synthetic. The European carbon and graphite industry fully supports the goal of increasing Europe's economic resilience and ensuring the security of supply.

The sector is fully committed to providing an increased percentage of graphite for batteries, fuel cells, windmills, solar energy, electrolysers as well as steel recycling. However, the framework conditions need to be right in order to do so. It was therefore welcomed that the Commission established a priority list of critical and strategic raw materials to improve permitting and financing for both new and existing production, with a particular focus on natural graphite projects, and providing affordable energy for the industry.

Given the sector's electricity consumption, specifically, the synthetic graphite industry belongs to the energy-intensive industries and requires competitively priced electricity to survive in a highly competitive global economy, this is key to future development.

Following a presentation to the EESC (European Economic and Social Committee, which issued an opinion on the CRM Act and following contacts with Parliamentarians and Member States the ECGA was pleased to see that in November 2023 the Council and Parliament agreed on the comprise text of the CRM Act and the listing of raw materials as critical and some as strategic including natural graphite as a critical and synthetic graphite as a strategic material.

The Net-Zero Industry Act

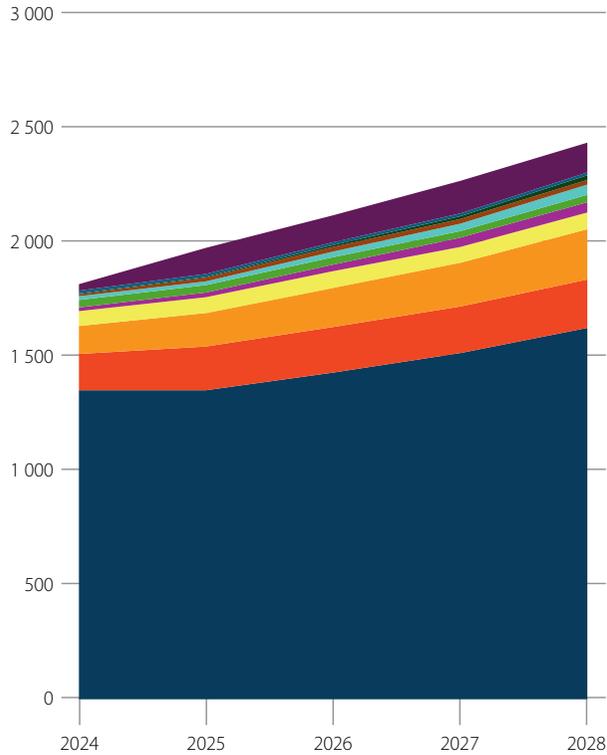
The European Commission's proposal of the Net-Zero Industry Act (NZIA) on 16 March 2023 marks an important step towards strengthening Europe's manufacturing capacity in net-zero technologies. Aimed at overcoming existing barriers and enhancing competitiveness, the NZIA is set to transform the European Union's approach to achieving a sustainable, carbon-neutral future.

Central to the NZIA are strategic sectors and technologies critical for the transition to net-zero emissions, including solar technologies, renewable energy sources, battery storage, heat pumps, electrolysers, fuel cells, sustainable bio-gas/biomethane, carbon capture and storage (CCS), and grid technologies. The Act makes a clear distinction between net-zero and strategic net-zero technologies, with the latter identified as key contributors to decarbonisation by 2030 and poised for market entry. These strategic technologies stand to gain from additional benefits like prioritisation in auctions and accelerated permitting processes as Net-Zero strategic projects.

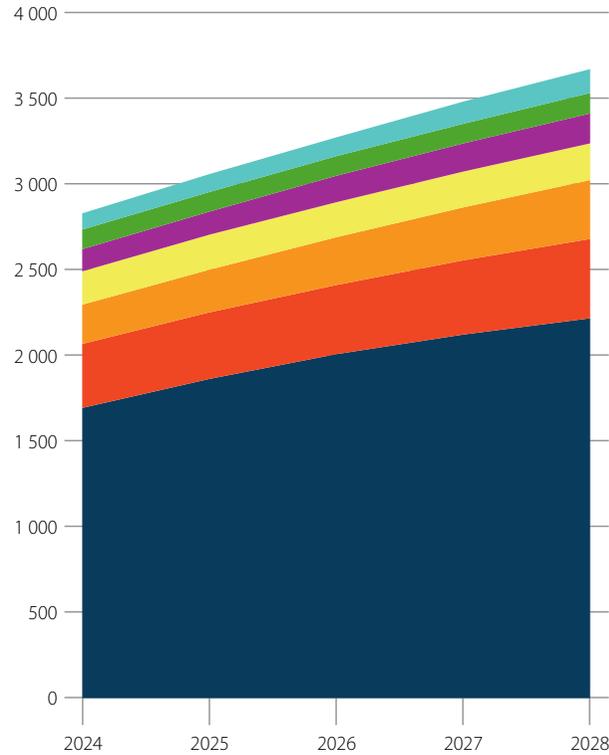
For the carbon and graphite industry, the introduction of the NZIA is a significant development. As suppliers of essential materials for many of the net-zero technologies highlighted in the Act, the industry is uniquely positioned to support Europe's green transition.

The carbon and graphite industry plays an integral role in Europe's energy transition. By aligning with the Act's goals, the sector can contribute significantly to the EU's ambitions for a resilient and sustainable energy future, reinforcing its importance in the evolving landscape of net-zero technologies.

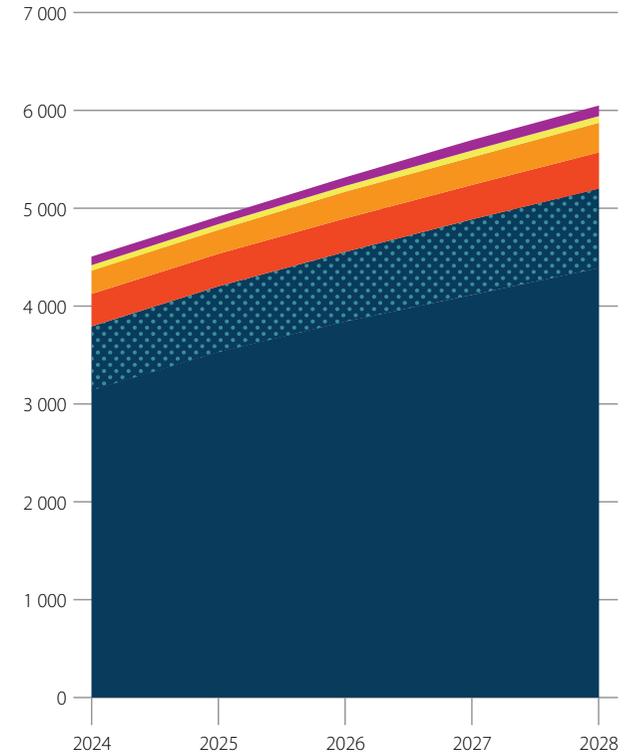
Graph: Natural Supply by Country (kt)



Graph: Synthetic Supply by Country (kt)



Graph: Total Graphite Demand by Country (kt)



- China
- Mozambique
- Madagascar
- Brazil
- India
- Russia
- Canada
- Ukraine
- Tanzania
- Norway
- Other

- China
- Japan
- India
- USA
- Russia
- Europe
- Other

- Asia / China
- Asia / Other
- Europe
- North America
- South America
- Other

Source: Wood Mackenzie

Made in Europe: Sustaining Excellence in the Carbon and Graphite Sector

2

CHAPTER



ECGA'S ROLE IN THE CARBON AND GRAPHITE VALUE CHAIN

In 2023, ECGA as a sector organisation introduced the European Strategic Partnership for Sustainable Advanced Carbon and Graphite Supply Chain, targeting self-sufficiency and sustainability amidst global supply uncertainties. This initiative aims to secure a significant portion of graphite supplies domestically by 2030, underscoring efforts to diminish reliance on imports and advance environmental goals.

Complementing this, ECGA's implementation of the OECD's Due Diligence Guidance reflects a strong commitment to sustainable and ethical practices within the sector, aligning with EU regulations. Through these actions, ECGA is shaping a resilient, sustainable, and autonomous European graphite industry, prepared for future growth and environmental stewardship.

Launch of the European Strategic Partnership for a Sustainable Graphite Supply Chain



In October 2023, the ECGA took a courageous step towards securing Europe's future in the strategic carbon and graphite sector with the launch of the European Strategic Partnership

for Sustainable Advanced Carbon and Graphite Supply Chain. This initiative comes at a critical moment, just as the world learned of China's decision to restrict its graphite exports, highlighting the urgency and relevance of the partnership's goals.

The Partnership's mission is clear: to address the shortage of natural graphite, synthetic graphite and carbon products vital for Europe's industries, from



technology to renewable energy. By fostering a sustainable supply chain within Europe, the initiative aims to reduce the continent's dependency on imports and ensure a steady supply of these critical materials.

Key objectives and actions of the partnership are designed to navigate through the complexities of trade, investment, employment, and environmental challenges. A cornerstone goal is to secure at least 40% of the natural and synthetic graphite supply from EU sources by 2030, a target that promises to enhance the EU's strategic autonomy and resilience.

To achieve these ambitions, the partnership has laid out a comprehensive plan encompassing several strategic areas:

Trade Issues: The initiative aims to reduce Europe's reliance on non-EU sources for carbon and graphite products by securing a significant portion of supply from within the EU. This involves trade complexities and fostering cooperation with non-EU countries where beneficial.

Investment and Permitting: Recognizing the need for growth, the partnership seeks to increase sectoral investment and streamline permitting processes, thereby enhancing the European supply chain's efficiency and profitability.

Employment: By focusing on upskilling and expanding the workforce, the partnership aims to bolster employment opportunities within the sector, ensuring a skilled workforce ready to meet future challenges.

Environment: A commitment to environmental sustainability is at the heart of the partnership, with ambitious plans to halve the CO₂ footprint of carbon and graphite products in the EU. This involves promoting EU-produced materials, advancing technology, and implementing carbon capture and utilization strategies.

The partnership's comprehensive approach also includes addressing EU tariff suspensions, tackling dumping and subsidy disputes, and adhering to Due Diligence Guidance and ESG standards. Collaboration with the European Car-

bon Association on education and research, development of best practice guidelines for mining and processing, and a focus on carbon capture technology are among the key initiatives designed to ensure the success of this strategic partnership.

As we look forward to 2024, we expect further growth of the partnership and its initiatives. The next key event is already scheduled for October 2024, promising to bring together stakeholders and partners to review progress and chart the course for future developments. Through these multifaceted efforts, the European Strategic Partnership for Sustainable Advanced Carbon and Graphite Supply Chain aims not only to secure Europe's supply of these essential materials but also to lead the way in sustainable and responsible industry practices. This initiative represents a crucial step towards a more resilient and environmentally conscious European industrial landscape.

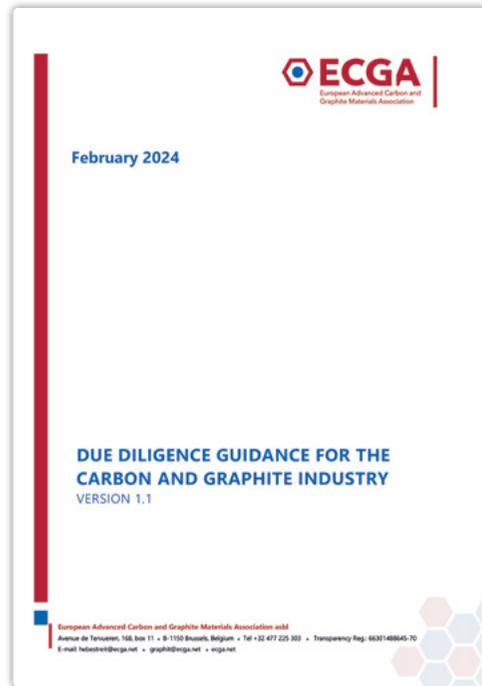


ECGA Embraces Due Diligence Guidance for a Sustainable Future

On the occasion of the OECD Forum on Responsible Mineral Supply Chains in April 2023, the ECGA proudly announced its adoption of the Due Diligence Guidance for the Carbon and Graphite Industry. This initiative signifies a major leap towards harmonising the industry's efforts in addressing the environmental and social challenges associated with graphite production and sourcing.

Graphite, often subjected to scrutiny in environmental and policy circles, faces challenges on two fronts: the carbon-intensive process of graphitisation and the unsustainable mining conditions in major producing regions like China. These concerns have contributed to graphite's reputation as a "dirty" material, a perception ECGA is determined to change.

The goal of adopting sector-specific Due Diligence Guidance is twofold. Firstly, it aims to consolidate the varying due diligence policies across individual firms into a cohesive industry-wide approach. Such unification is crucial for elevating the industry's standards and practices, ensuring that all members adhere to a high level of environmental and social responsibility.



Secondly, this collective stance is expected to enhance the industry's image by effectively communicating its efforts to policymakers and the public, demonstrating a commitment to sustainability and ethical practices.

The guidance comes at a time when navigating the EU's regulatory environment is increasingly complex. The industry is faced with the challenge of complying with a host of new reporting requirements emanating from various directives and regulations, including the Directives on Corporate Sustainability Reporting, Corporate Sustainability Due Diligence, the Sustainable Finance Disclosures Regulation, the Forced Labour Regulation, the Battery Regulation, and the Critical Raw Materials Act. The ECGA's Due Diligence Guidance is designed to prepare its members for these challenges, ensuring readiness to meet all compliance requirements promptly.

By advocating for an industry-wide adoption of due diligence standards, the ECGA seeks to streamline the communication of its members' sustainability efforts. This unified approach not only facilitates transparency but also positions the industry as a leader in responsible mineral supply chain management. It acknowledges the importance of addressing the stigmatisation of graphite by showcasing the proactive measures taken by ECGA members to mitigate environmental impacts and improve mining conditions.

The ECGA's initiative is a testament to the industry's resolve to confront and overcome the challenges associated with graphite production and sourcing. By embracing the Due Diligence Guidance, the ECGA and its members are taking significant steps towards ensuring a sustainable and responsible future for the carbon and graphite industry. This effort not only aligns with global sustainability goals but also reinforces the industry's commitment to ethical practices, setting a benchmark for others to follow.

ECGA'S COMMITMENT TO SUSTAINABLE EHS PRACTICES

In 2023, the ECGA continued to pursue active environmental, health and safety activities, also responding to the revision of the EU's Industrial Emissions Directive and updates in the EU's chemical policy under REACH and CLP. By engaging in initiatives like addressing the challenges of using substances of high concern, such as coal tar pitch or PFAS and advocating for sustainable raw material sourcing, the sector demonstrates its dedication to sustainability and regulatory compliance. These activities are part of a broader strategy to foster a safe, environmentally responsible carbon and graphite industry in Europe, engaged in innovation and sustainable development.

Improving Environmental Performance

EU's Industrial Emissions - Directive and BAT

In 2023 the revision of the Industrial Emissions Directive was discussed at EU level, and it is expected that after a political agreement was achieved towards the end of the year the new text will be published in 2024. Governing the permits of industrial installations this directive is of considerable importance for the sector. The changes in the scope of sectors covered, new environmental parameters and candidate key environmental indicators (KEIs) to be reported, to lowering of BAT-AELs, the establishment of a new EU Emission Portal and the processes for establishing a consensus on BAT deserved all the attention of many sectors.

The carbon and graphite sector will be covered in the new Batteries BREF as well as in the revision of the Non-ferrous Metals BREF note. The sector is preparing for future discussions and is awaiting the announcement of the Commission's work plan for the new BREF revision cycle.



Keeping up with the EU's Chemical Policy – REACH and CLP

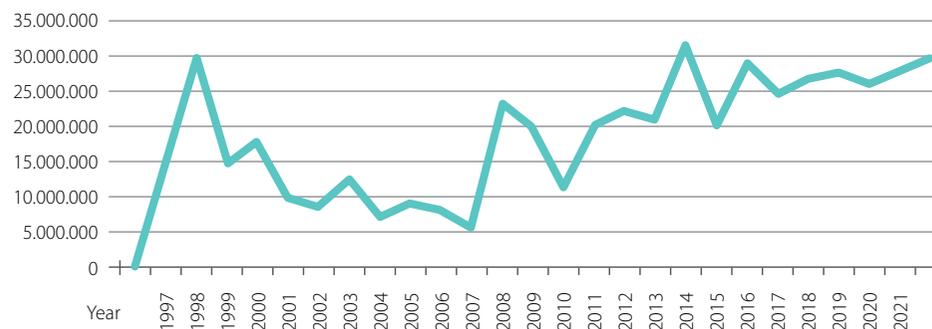
The overall revision of the EU's REACH regulation could have a considerable impact on the carbon and graphite industry since it touches on the status of one of its key raw materials: the coal tar pitch that is required for the production of synthetic graphite.

It is here where EU policies seem to clash: natural graphite from EU sources will not satisfy the demand forecasted even in the medium term and for technical reasons cannot satisfy the overall demand for graphite for the wide variety of products. However, synthetic graphite is also not sufficiently produced in the EU and here again Europe is heavily dependent on Chinese material. To ensure sufficient synthetic graphite supply, the EU producers need two raw materials, needle coke and coal tar pitch (CTPht). The latter being classified as a substance of very high concern needs to be managed in a safe and sustainable manner, but since it is essential for the production, further restrictions, authorisations or banning are completely counterproductive to achieving the security of supply. The very well-managed status of an "industrial intermediate" is therefore very important. In order to maintain relevant scientific information. The sector engaged with Cefic to update the CTPht REACH dossier and also launched its own survey of occupational PAH exposure data in order to submit new data to the REACH dossier as well as to a DG Employment study on the need to set new OELs for PAHs. The ECGA's health and safety experts are jointly working on a guidance note for monitoring, sampling and analysing BaP in the industry due to the varying national and local requirements. The guidance is expected to be finalised in 2024.

Closely linked to that the sector began a new assessment of the current situation with regard to research and emerging patents for replacing CTPht in total or parts during the production process. This work will be continued in 2024 to ensure that any new technological developments are monitored closely.

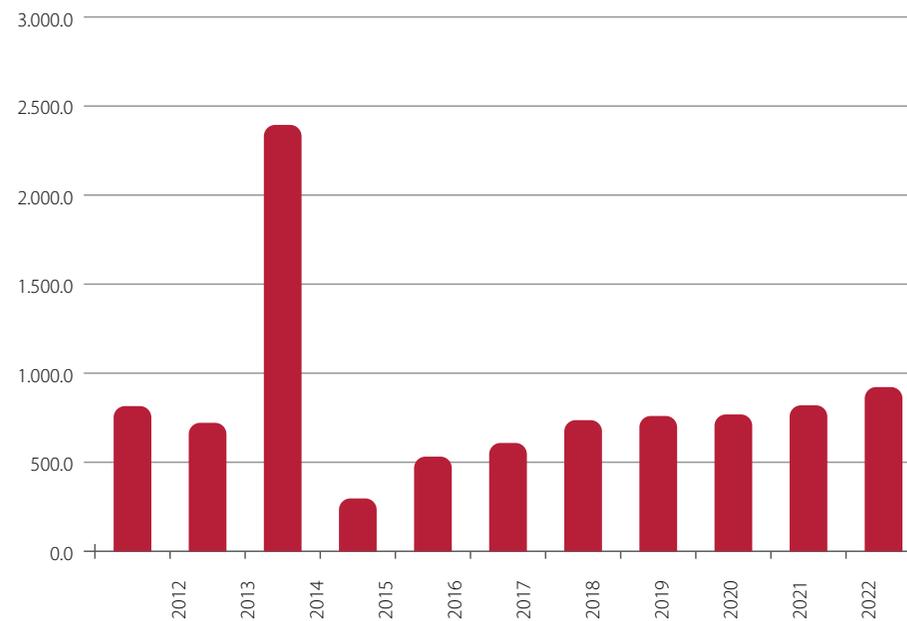
It should be noted that in 2022 for the first time since 2014, the sector reached again 30,000 hours, but with a much lower safety performance index.

HOURS worked in the European Carbon and Graphite industry 1997-2022



Safety Performance Index for ECGA members

(the overall performance independently of the number of employees)



Updating the Graphite-related EU REACH Dossiers

In compliance with the current REACH requirements, the graphite-related consortia updated the graphite, the acid-treated and the sulphuric acid-treated graphite dossier. A further update on the "uses" mentioned in the graphite dossier is underway. And throughout the year data sharing agreements with other countries implementing REACH-like legislation (Turkey, the UK or Korea) were concluded in order to ensure data consistency.

The Proposed Ban of PFAS

A second case of clash between strategic objectives of the EU and its regulatory initiatives can be seen in the proposed blanket ban of all PFAS. Based on the proposals of Denmark, Germany, the Netherlands, Norway and Sweden the proposal to restrict the manufacturing and use of around 10,000 per- and polyfluoroalkyl substances (better known as PFASs) in the EU aims at reducing PFAS emissions into the environment and make products and processes safer for people through substitution. This is driven by the assumption that all PFASs compounds are very persistent in the environment hence once released they accumulate, and people, plants and animals will be increasingly exposed. The ban would be broad and apply to the manufacturing, placing on the market and use of PFAS as such, as constituent in other substances, in mixtures, and in articles above a set concentration limit and be implemented after an 18-month transition period.

However, so far there are no substitutes available for the same PFAs and there are studies providing that not all PFAS are the same and have the same impacts. Some carbon and graphite members have been using and require certain PFAS for their products such as fuel cells which would be better solutions for example for heavy-duty vehicles, replacing batteries.

The carbon and graphite industry is hoping that a more targeted and justified approach will be taken with regard to these substances and their uses.



ECGA's Contributions to Shaping Europe's Competitive Edge

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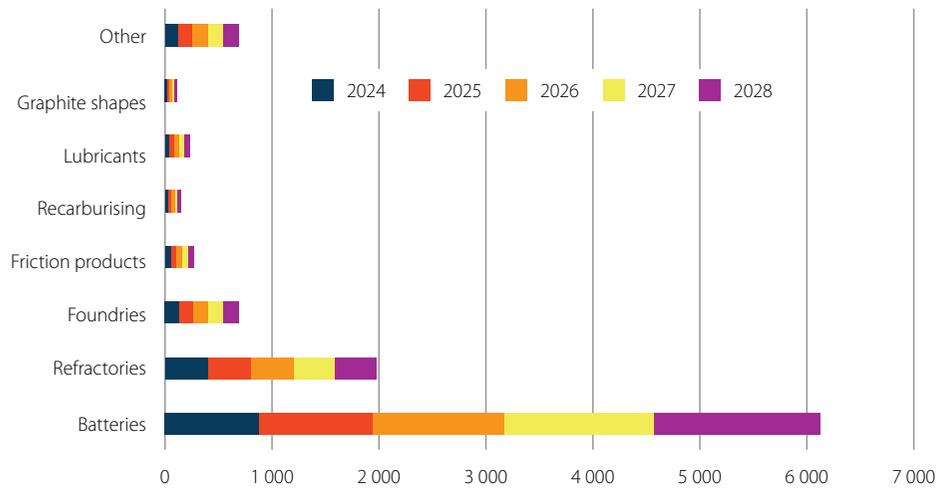
CHAPTER

ECGA as a sector organisation assists its members through a period marked by significant regulatory shifts and initiatives, from advocating the critical role of graphite in the semiconductor industry through the European Chips Act to promoting sustainability in the battery and heat pump sectors. Every time it addresses regulatory developments such as the Renewable Energy Directive or the Eco-design for Sustainable Product Regulation, ECGA highlights the sector's vital contribution to Europe's sustainability and technological advancement.



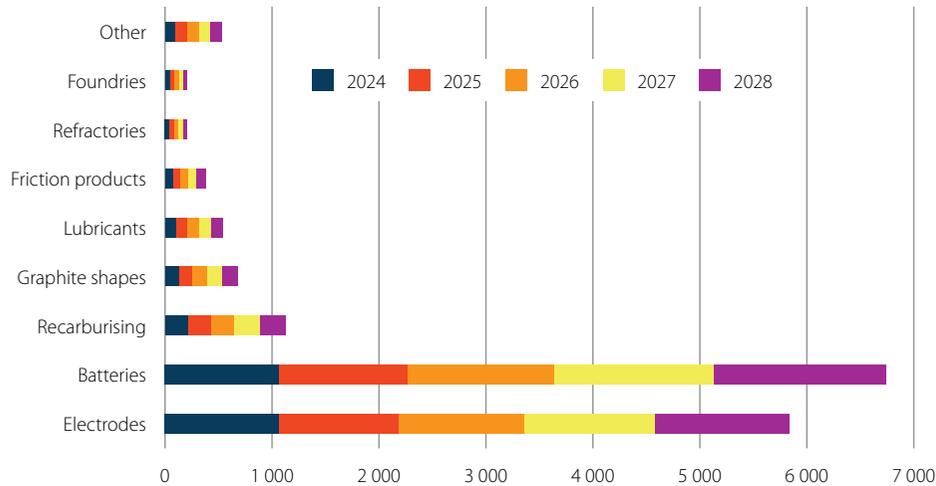
Natural Graphite Demand by Application (kt)

Source: Wood Mackenzie



Synthetic Graphite Demand by Application (kt)

Source: Wood Mackenzie



Chips Act: Graphite's Role in Semiconductor Supply Chains

The European Chips Act, effective from late September 2023, introduces a new European framework to enhance the EU's semiconductor industry across three pillars: fostering industrial innovation, supporting cutting-edge production facilities for supply security, and coordinating semiconductor sector monitoring and crisis management. This Act presents an avenue for ECGA to emphasize graphite's critical role in semiconductor manufacturing, particularly in silicon production. Graphite's strategic importance for a resilient supply chain in the EU semiconductor sector should be widely recognised.

Heat Pump Production Made in Europe?

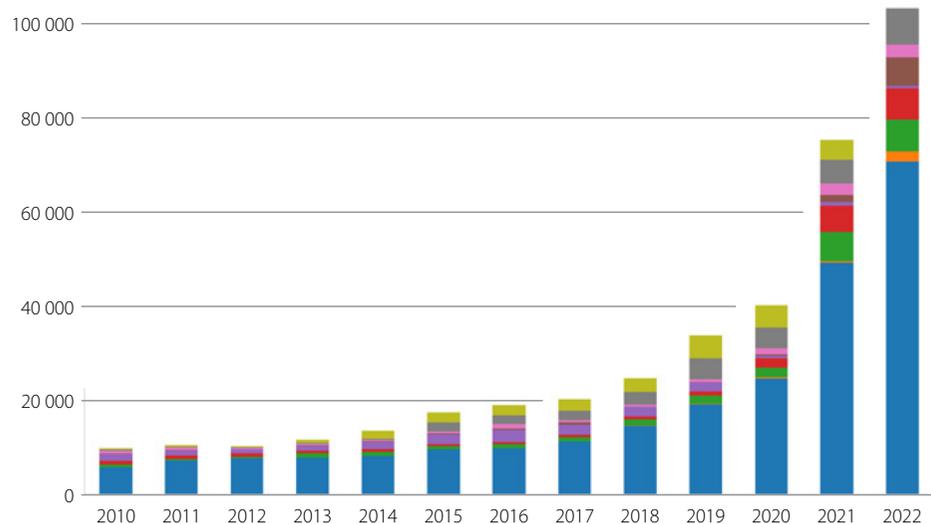
In response to the European Commission's April 2023 call for evidence to fast-track heat pump deployment in the EU, ECGA proactively highlighted the significance of graphite in thermal exchangers.

ECGA's position paper proposed two main changes to upcoming regulations. First, stringent sustainability criteria should be applied to the raw materials used in technologies falling under the scope of the Net-Zero Industry Act, such as heat pumps. Second, heat pumps should be regulated quickly under the Eco-design Sustainable Product Regulation. Awaiting updates, ECGA remains committed to ensuring that the EU's clean energy transition is supported by environmentally and socially responsible practices.

Carbon Brushes: Waste from Electrical and Electronic Equipment Directive

On the 16th of June 2023, the Commission opened a consultation to ask for potential avenues of improvement for the existing WEEE Directive, which was last updated in 2003. The two main goals of the WEEE Directive are (1) to

Imports into the EU of Heat pumps (tons)



Source: Eurostat

reduce the amount of electronic waste within the EU, and (2) to increase the level of reuse, recycling and recovery of End-of-Life electronic devices.

Since many household appliances contain carbon brushes that become worn out and cause the device to fail, this consultation was relevant for ECGA.

In that context, the secretariat proposed to the Commission that carbon brushes should be considered as replaceable wear-parts for most household

appliances. This new classification would have resulted in the obligation for appliance manufacturers to stock up on replacement parts for the planned lifespan of their products.

As of December 2023, the Commission had not followed up on ECGA's suggestion. Instead, the regulatory efforts of the Commission have focused on increasing the recovery and recycling rates of solar panels in the EU.

Graphite for Sustainable Transport: the Combined Transport Directive

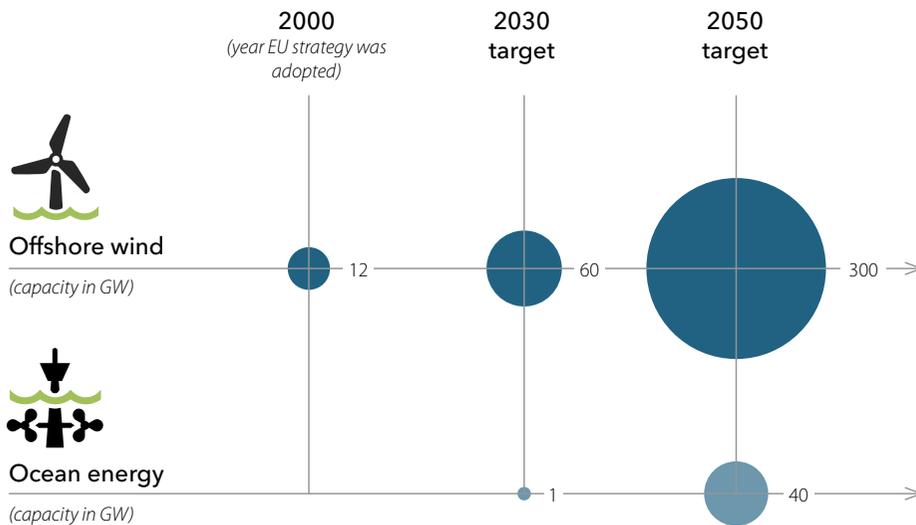
On the 7th of November 2023, the Commission published a potential revision to the Combined Transport Directive, and asked stakeholders to comment on its proposal. This Directive aims at increasing the use of rail- and waterways. ECGA expects this shift to raise the demand for carbon brushes and power-transfer devices both within transport hubs and on the trains and boats themselves.

In its response to the call for comment from the Commission, ECGA insisted on the necessity to assess the contribution of European domestic industries to the decarbonisation drive of the transport sector. Indeed, in its proposal, the Commission made no mention of the origin of train and boat parts. The only objective of the revised Directive would have been to initiate a modal shift. No attention was paid to the sustainability of the whole supply chain. However, parts imported from third countries will always feature a higher CO₂ footprint and a lower social performance than EU-made products.

Carbon Fibres: Promoting Lightweighting

In May 2023, ECGA co-organised the European Lightweight Event at the permanent representation of Bavaria in Brussels together with Composites United. Shortly after, in June, ECGA participated in the 3rd European Lightweight Network organised in Sweden by the national innovation agency. These participations enabled ECGA to make new connections with researchers and startups in this field, with the goal of promoting carbon fibres during the 4th edition of the event, which will be organised in Belgium in Liège.

Large quantities of carbon fibres will be necessary to reach the offshore renewable energy targets set by the EU



Source: ECA, based on the EU ORE Strategy.

Since the 2024 event in Liège takes place under the auspices of the Belgian presidency of the EU, ECGA expects several Belgian and EU officials to be present at the conference, and to learn more about the contribution of carbon fibres to sustainability in the EU. ECGA's message will be all the more audible that lightweighting has been recognised as an important green technology under the Net-Zero Industry Act, because it allows manufacturers to reduce the energy consumption of their products.

Carbon Fibre in Renewables: Challenges in Wind Energy Expansion

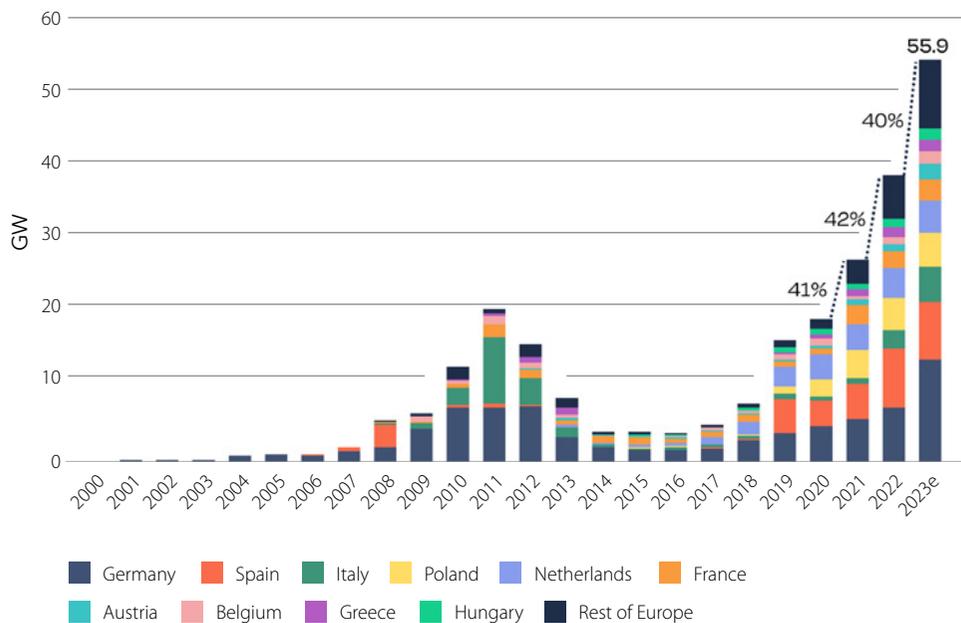
In October 2023, the European Commission's launch of the Wind Power Action Plan and the revision of the Renewable Energy Directive (RED) marked significant steps towards enhancing Europe's wind energy sector, setting ambitious renewable energy targets. Despite these initiatives, the sector faces challenges due to the decentralized nature of energy infrastructure management across Member States. Public opposition to wind power plants is preventing an uptake in renewable energy. The RED aims at overcoming this resistance by considering that renewable installations are in the "overriding public interest". However, the translation of that directive is contingent upon its incorporation into national laws, a process influenced by local political climates and election outcomes.

Meanwhile, the wind energy sector, including leading turbine manufacturers like Ørsted, faces tangible setbacks as prolonged permitting timelines necessitate the revision of growth targets and the withdrawal from planned projects. This situation has direct repercussions for the European carbon fibre industry, since carbon fibres are used in wind turbine blades.

Graphite Tooling for Solar Energy's Ascendant Trajectory in the EU

In 2023, the European Union witnessed a historic expansion in solar energy, with installations increasing by 40% from the previous year, adding 55.9 GW of new capacity. This growth powered an additional nearly 17 million homes, despite a slowdown in the final months of the year. Solar Power Europe anticipates a more modest growth of 11% for 2024, marking a potential end to the trend of 40% annual growth seen over the last three years.

EU-27 Annual Solar PV Installed Capacity, 2000-2023



SOURCE: European Market Outlook for Solar Power 2023–2030, Solar Power Europe

However, the regulatory landscape continues to favour solar energy's expansion. The Renewable Energy Directive (RED) and a new Strategic Energy Technology (SET) plan aim at bolstering solar power through streamlined permitting and enhanced support for research and development. Key actions include promoting low and medium voltage direct current technologies for microgrids, advancing solar heat for industrial use, and fostering collaboration among industrial alliances to facilitate the deployment of green technologies. These measures signal a strong ongoing commitment to solar energy's role in the EU's renewable energy future.



Natural and Synthetic Graphite: The EU's New Battery Regulation: A Game-Changer

Effective from 17 August 2023, the EU's new battery regulation marks a significant step toward enhancing the sustainability of the battery sector. It aims to bridge investment gaps and improve the transparency of raw material sourcing. Under this regulation, battery manufacturers are now required to:

- Issue carbon footprint declarations for electric vehicle (EV) batteries, batteries for light means of transport (LMT), and industrial batteries with a capacity above 2 kWh.
- Ensure that portable batteries are easily removable by consumers.
- Provide digital passports for larger batteries.
- Conduct comprehensive due diligence on their suppliers.
- Achieve higher waste collection targets: for portable batteries - 45% by 2023, 63% by 2027, and 73% by 2030; for LMT batteries - 51% by 2028 and 61% by 2031.
- Incorporate recycled content and/or materials recovered from waste batteries for lithium, cobalt, copper, lead, and nickel.

This overhaul introduces significant new reporting obligations, increasing the administrative burden on European raw material producers. The digital passport will require battery manufacturers to detail the composition of batteries, including materials used in the cathode, anode, and electrolyte. These details must be accessible to those with a legitimate interest and the Commission. The term "detail" suggests that raw material percentages may need to be disclosed, though the exact requirements remain undefined. ECGA intends to seek clarification from the Commission in 2024, as the Commission holds the authority to define the specifics through delegated acts (Article 77).

Nevertheless, this regulation represents progress by levelling the playing field against unfair and unsustainable imports. The establishment of new recovery

and recycling targets anticipates significant volumes of end-of-life batteries and secondary raw materials, including graphite. European manufacturers and recyclers are preparing to integrate these materials, signalling a new phase in the EU's dedication to sustainable battery production and the circular economy.

It is crucial to note that this landmark regulation is one among several initiatives aimed at enhancing the sustainability of the EU's mobility industry. In 2023, negotiations also progressed on the Waste Shipment regulation and a proposal to revise the current End-of-Life Vehicle Directive. These texts have a direct impact on improving the Battery regulation's effectiveness by influencing the collection rate of End-of-Life cars and their batteries – the first by restricting hazardous waste exports and the second by setting collection targets for End-of-Life vehicles.



Battery Graphite: Towards Certified CO₂ Footprint Datasets

In 2023, ECGA emphasised the importance of battery manufacturers employing company-specific data to accurately report the CO₂ footprint of anode materials. This advocacy stems from the potential risk that imprecise reporting poses to the European industry's competitiveness and its ability to highlight significant strides made in reducing environmental impact. Recent years have seen the European graphite industry leverage investments, supported by Important Projects of Common European Interest (IPCEIs) and the European Investment Bank (EIB), to substantially lower the CO₂ emissions of its products.

A notable concern is the environmental performance discrepancy between European and mainstream Chinese production processes. The latter often rely more heavily on coal and fossil fuels for energy, employ less energy-efficient manufacturing technologies, and suffer from significant material losses during the graphitisation and processing stages. This results in a CO₂ footprint that is considerably larger than that of European counterparts.

Current Life Cycle Assessment (LCA) benchmarks worsen this issue by inaccurately assuming the widespread adoption of a less emission-intensive production method, known as the block route. Contrary to these assumptions, the majority of battery anode manufacturers in regions like China utilize the energy-intensive powder route, leading to higher emissions. This discrepancy highlights the urgent need for updated and accurate benchmarking that reflects the true environmental performance of global producers, ensuring a level playing field for the European graphite industry.



Trade and International Competitiveness: The Level Playing Field?

4

CHAPTER

The carbon and graphite sector finds itself increasingly impacted by regulatory changes and global trade dynamics and their impact on the sector's competitiveness and addressed tariff challenges and export restrictions. Through advocacy and engagement with institutions like the OECD or the European Commission, ECGA represents the interests of the European carbon and graphite manufacturers. The association's efforts in promoting fair trade practices and sustainability, against the backdrop of international competitiveness, play a critical role in shaping a resilient and forward-looking European carbon and graphite industry.



TRADE RESTRICTIONS IN CRITICAL AND STRATEGIC RAW MATERIALS

The OECD published in February 2023 a report entitled “Raw materials critical for the green transition: Production, international trade and export restrictions”. From 2022 until 2023, ECGA contributed to that report by underlining crucial differences between natural and synthetic graphite that the report was initially ignoring. In the end, the staff from the OECD decided to clarify that their report was only dealing with natural graphite, and thus removed synthetic graphite from the scope of their inquiry.

This little example highlights a common phenomenon: academics, politicians and consultants rarely have a clear idea of the similarities and differences between natural and synthetic graphite and their uses. They tend to conflate the two or to ignore one of them. Thus, part of ECGA’s work consists of sharing our expertise on the topic.

Tariff Suspension on Imports of Synthetic Graphite

For three years now, the EU has suspended tariffs on synthetic graphite for batteries. In order to repeal that suspension, ECGA and its members contacted both the Commission and Member States at Council level. However, these efforts were so far not successful. Sweden, in particular, was against any raise of tariffs on graphite, since it would lower the profitability of their new battery industry.

China Imposing New Restrictions of Graphite Exports

In December 2023, China introduced new export restrictions on graphite, a critical material for the European and global industries, particularly for batteries, electric vehicles, and semiconductor technologies. This move necessitated several discussions with DG Grow and DG Trade to assess the implications on supply chains. With China being the primary



source of natural graphite, supplying over 70% globally and refining more than 90% of EV batteries’ anodes, ECGA has emphasised the need to reduce dependency on Chinese graphite to ensure the resilience of Europe’s battery and semiconductor production.

The sector’s repeated messaging about the necessity of developing a domestic graphite industry did help the European industry when China suddenly imposed export restrictions on several products. The Commission and Member States recognised that this material is not only critical in its supply structure but also strategic. In 2024, ECGA will continue to insist on the necessity to shield the increasing EU production from unfair foreign competition.

Anti-Dumping Duties on Graphite Electrodes from India and China

So far at least in the area of graphite electrodes the Commission had recognised the unfair trade practices. In June 2023, the Commission extended anti-dumping duties on Indian graphite electrodes for five more years after confirming ongoing dumping practices. These measures aim to protect the EU industry from unfair pricing that could harm its economic stability.

Additionally, an uptick in artificial graphite imports from China under suspicious codes was noted, suggesting attempts to bypass the EU’s anti-dumping duties set in April 2022.

Trade in Black Mass: A Looming Conflict between the New Waste Shipment Regulation and the Critical Raw Materials Act

According to a November 2023 agreement between the Council and the Parliament, the Critical Raw Materials Act will require at least 25% of the EU’s annual consumption of raw materials to come from recycling. For batteries only, this would amount to a target of 200.000 tons of recycled graphite by 2035.

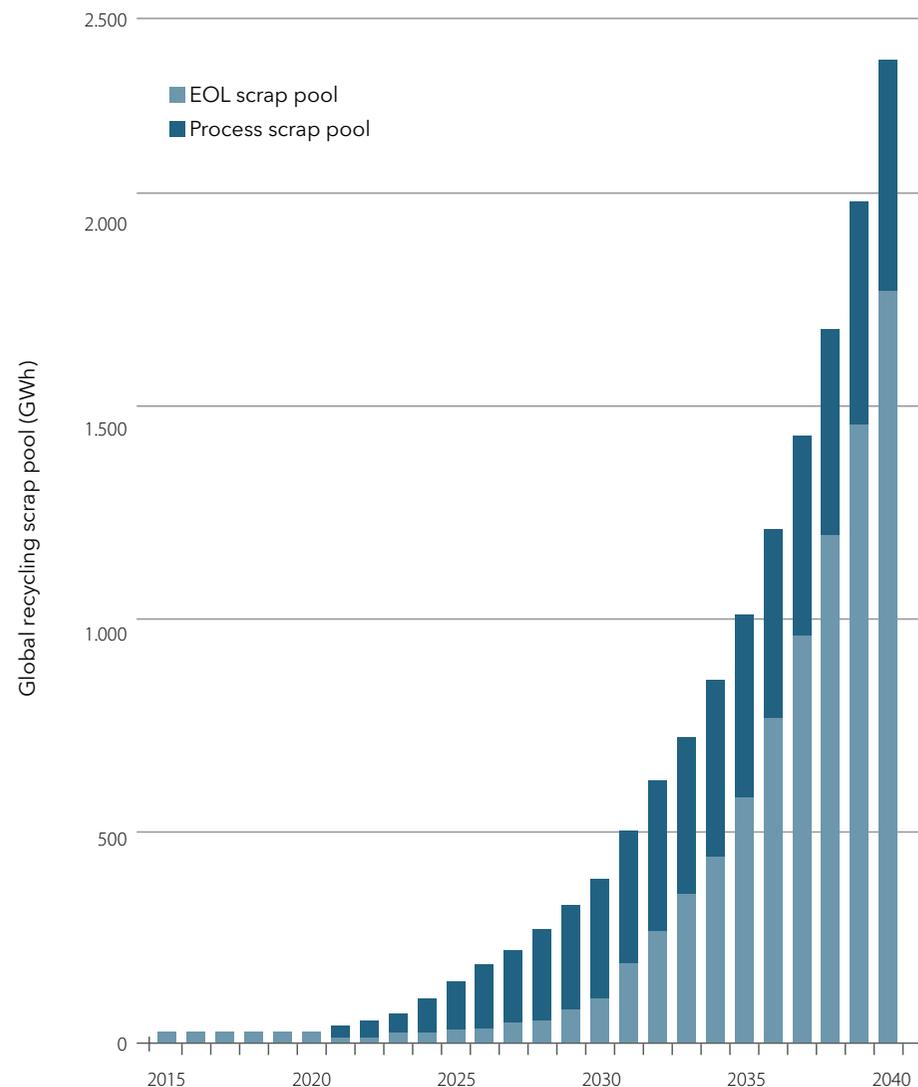
As shown the graph represents the evolution of battery scrap in the upcoming years, the recycling of end-of-life Li-Ion batteries will substantially contribute to achieving that target. The graph refers to the global supply of scrap for recycling and not just European supply, but it clearly shows a trend that will be valid for Europe too, an increasing contribution of EoL batteries to the scrap availability, especially after 2035.

However, the accessibility of this scrap might be hampered by the update to the EU Waste Shipment Regulation negotiated last year between the Council and the Parliament. Under the new version of this regulation, hazardous waste will be systematically required to obtain prior written consent for shipment within the EU. This will affect black mass, the result of battery dismantling if it is to be considered hazardous waste. If black mass cannot be freely traded within the EU, it will most likely fetch a lower resale value, delay the built-up of economy-of-scale quantities, and thus discourage the recycling of its cheaper constituents such as graphite.

Downstream Users: EU and US Extend Steel and Aluminium Tariff Suspension to 2025

In a significant move towards fostering trade cooperation and addressing environmental concerns, the EU and the US have agreed to an extension of the suspension of tariffs on steel and aluminium products until March 31, 2025.

Announced in December 2023, this decision not only mitigates immediate trade tensions but also paves the way for strategies like the Tariff-Rate Quota (TRQ) system, allowing specific quantities of EU metals into the US without tariffs. This development, occurring amidst key political events, signifies a concerted effort to harmonise trade policies with sustainability goals, including the proposal of a 'green steel club' aimed at reducing the carbon footprint of metal production.



Source: Benchmark Q2 2022 Recycling Report

Path to a Green Transition: Energising the Carbon and Graphite Sector

5

CHAPTER

The carbon and graphite sector stands at the forefront of a significant shift towards sustainability and a demand for a reduced carbon footprint. This transition is shaped by a series of regulatory changes and initiatives designed to promote energy efficiency, reduce emissions, and foster sustainable industry practices. The sector's key role is highlighted against the backdrop of key EU policies including the electricity market reform, the introduction of the Carbon Border Adjustment Mechanism (CBAM), and the amendment as well as extension of the EU Emissions Trading System (ETS). Through embracing innovation and aligning with these regulatory frameworks, the carbon and graphite industry is not only navigating challenges but also capitalizing on opportunities to drive forward the EU's green agenda, reinforcing its critical contribution to Europe's net-zero aspirations.





Electricity Market Reform

On 14 March 2023, the Commission presented a proposal aimed at introducing targeted changes to the design of the EU electricity market. The proposal presents incentives for the uptake of long-term electricity price contracts.

It also aims at ensuring that customers can engage in fixed-term, fixed-price contracts and share energy, while suppliers would be required to implement appropriate hedging strategies. The proposal would provide for a supplier of last resort regime in each Member State and protection to vulnerable customers from electricity disconnections, in addition to authorising additional public interventions in electricity price setting during a price crisis emergency.

On the key political issues, the provisional agreement between the European Parliament and Council reached before the end of 2023 included:

- (a) Direct price support schemes in the form of two-way Contracts for Difference (CfDs), mandatory only for investments in new power-generating facilities.
- (b) Power Purchase Agreements (PPAs). The agreement foresees a balanced approach for the uptake of PPAs by preserving technological neutrality while simultaneously underlining the role of renewables. References to the promotion of PPAs protecting competition and liquidity of electricity markets have been complemented with a cross-border dimension. In addition, guarantee schemes for PPAs backed by Member States shall include provisions to avoid lowering the liquidity in electricity markets and shall not provide support to the purchase of generation from fossil fuels.
- (c) Declaration of an electricity price crisis. The Council may decide on the declaration of an electricity price crisis. The Commission will make this proposal when the conditions are met, namely a high average wholesale electricity prices with a minimum threshold of 180 Euros per Megawatt hour, or an increase in retail prices in the range of 70%. Once a crisis has

been declared, Member States would be able to apply price interventions targeting households, including vulnerable and energy-poor customers, and Small and Medium Enterprises.

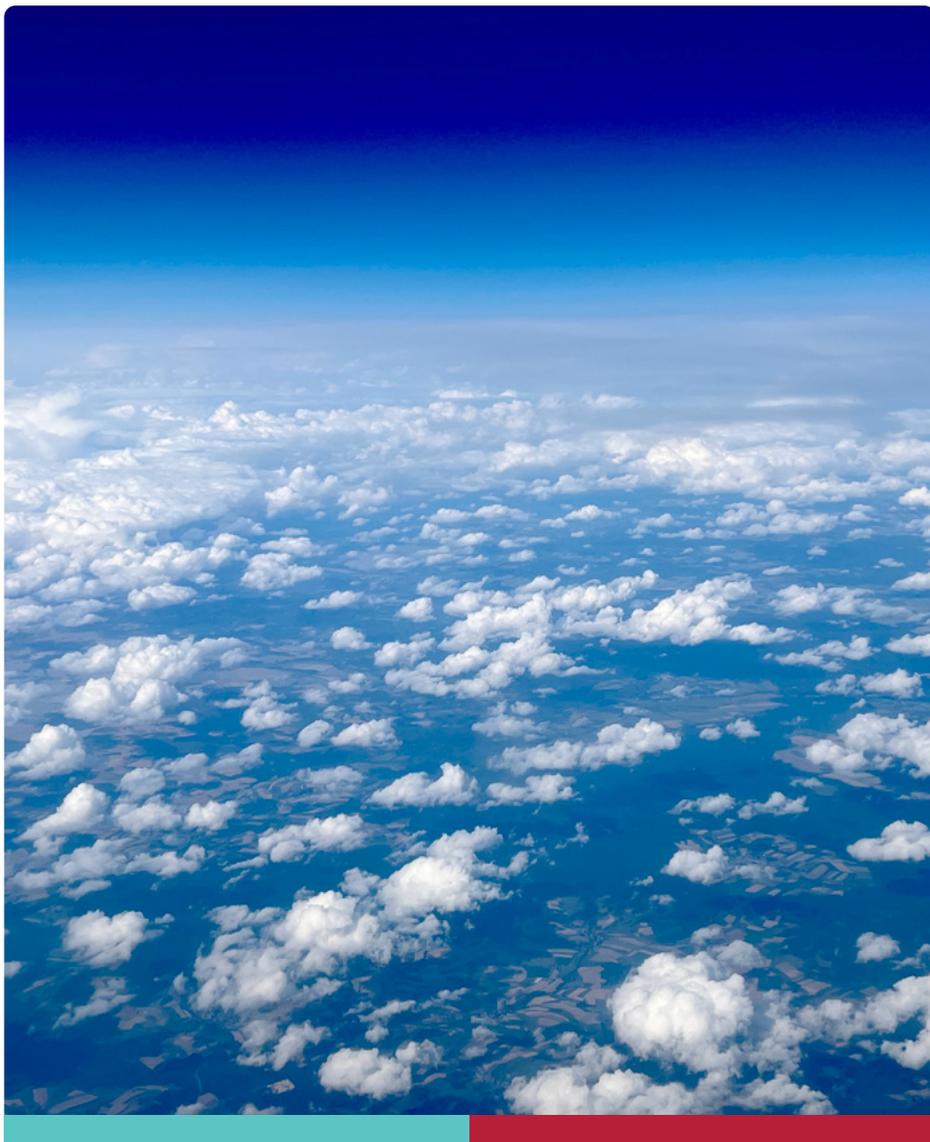
The final act is expected to be adopted before the end of March 2024 and enter into force on the twentieth day following the publication.

Implications for the Sector

This reformed market design establishes a foundational policy framework that enhances the carbon and graphite sector's access to more predictable and financially sustainable electricity contracts. Key benefits include:

- Enhanced Stability through PPAs: By fostering long-term private agreements between energy producers and consumers, the sector can mitigate price volatility and secure investment in renewable energy, crucial for high-energy-consuming industries like synthetic graphite production.
- Support for Renewable Energy Investments: The introduction of two-way Contracts-for-Difference (CfDs) by Member States guarantees a stable price for energy producers and consumers. This mechanism not only encourages renewable energy investments but also redistributes excess revenues to support sectors and individuals in need.

For the carbon and graphite industry, which is fundamental in supplying materials for renewable energy technologies and high-efficiency batteries, these reforms could mean lower operational costs and enhanced investment in sustainable production processes. Moreover, the promotion of renewables through these policies aligns with the industry's commitment to support the EU's green transition, emphasizing the strategic importance of securing affordable and stable energy sources for its continued growth and competitiveness.



Attempting a Level-playing Field: The Carbon Border Adjustment Mechanism (“CBAM”)

The European carbon and graphite sector, while not currently covered by the scope of the European Union's Carbon Border Adjustment Mechanism (CBAM), plays a critical role in the supply chains of industries that are, such as steel and aluminium production. This positioning highlights the sector's significance as an upstream contributor to areas directly affected by CBAM. Anticipation grows around the potential expansion of CBAM's reach, which could, from 2030 at the earliest, envelop carbon and graphite materials. This possible inclusion underlines the importance of ongoing projects aimed at calculating the embedded emissions within goods currently within CBAM's purview. Furthermore, starting from 2026, the carbon and graphite sector will be tasked with the responsibility of monitoring and reporting these embedded emissions to downstream industries, a move that underscores the increasing emphasis on transparency and accountability in emissions reporting.

Europe's CBAM is intended to complement the EU Emissions Trading System (EU ETS) and ensure that imported goods are subject to the same emissions prices as products produced within the EU. With this, CBAM is aimed at preventing "carbon leakage". CBAM imposes a carbon price on the import of certain goods produced outside the EU based on the associated carbon emissions, ultimately reducing global emissions, and helping reach the targets of the Paris Climate Agreement as well as balancing out the competitive disadvantages of domestic companies who produce emission-intensive goods inside the EU.

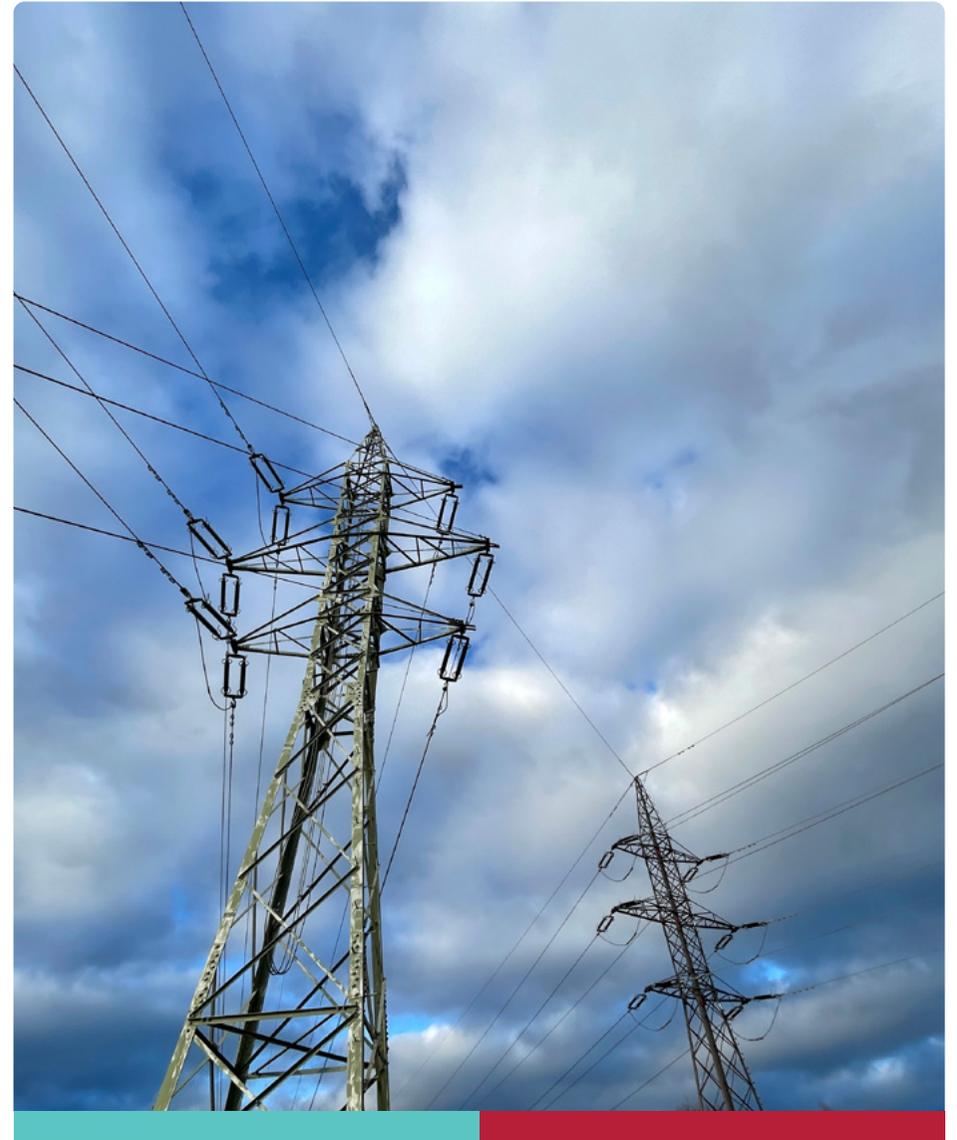
The initial scope of the CBAM includes iron and steel, cement, fertilisers, aluminium, electricity, and hydrogen production. An extension of the CBAM to other products at risk of carbon leakage will need to be evaluated by the Commission before the end of the transitional period for implementing the carbon border tax. In particular, the future revision of the CBAM scope will

have the objective of including all goods covered under the EU ETS in the carbon mechanism by 2030.

As of 1 January 2026, the permanent and complete CBAM system enters into force. From then on, importers will have to comply with extensive obligations as follows:

- Importers in the scope of the Regulation will have to apply for the status of authorized CBAM declarant. CBAM goods may only be imported into the customs territory of the EU by authorized CBAM declarants.
- The calculated embedded emissions will need to be verified by an accredited auditor.
- CBAM certificates will have to be purchased for a fee. The price of the certificates will be calculated depending on the weekly average auction price of EU ETS allowances expressed in EUR/ton of emissions emitted. CBAM declarants have to surrender a number of CBAM certificates that correspond to the embedded emissions declared in their reports.
- Importers must prepare and submit an annual CBAM declaration by 31 May of each calendar year for the emissions associated with the goods imported in the previous calendar year. The corresponding number of CBAM certificates must also be submitted by this deadline.

CBAM will also account for cases where the importer has already paid a carbon price in a third country. The importer may then claim a reduction in the number of CBAM certificates to be surrendered to take into account the carbon price paid in the country of origin for the declared embedded emissions. This is intended to avoid a double burden and motivate third countries to introduce their own taxes and levies on emissions that they can collect themselves.



Emissions Trading System: Amendment on the Allocation of Free Allowances

Following the successful conclusion of the revision of the EU ETS Directive by the co-legislators, the Commission has been asked to prepare the delegated/ implementing acts providing legal certainty on the detailed operations of the EU ETS well ahead of the start of the second half of the fourth trading period (Phase 4) from 2026 to 2030.

The internal discussions and negotiations regarding the Free Allocation Rules (Regulation) were finalised at the end of 2023, with the Free Allocation regulation expected to be published in early 2024.

With regards to the carbon and graphite sector, more specifically NACE 23.99 Manufacture of other non-metallic mineral products n.e.c. including:

- PRODCOM 23.99.14.00 Artificial graphite, colloidal, semi-colloidal graphite, and preparations Carbon and graphite feedstock
- PRODCOM 23.99.19.70 Non-electrical articles of graphite or other carbon Machined carbon and graphite

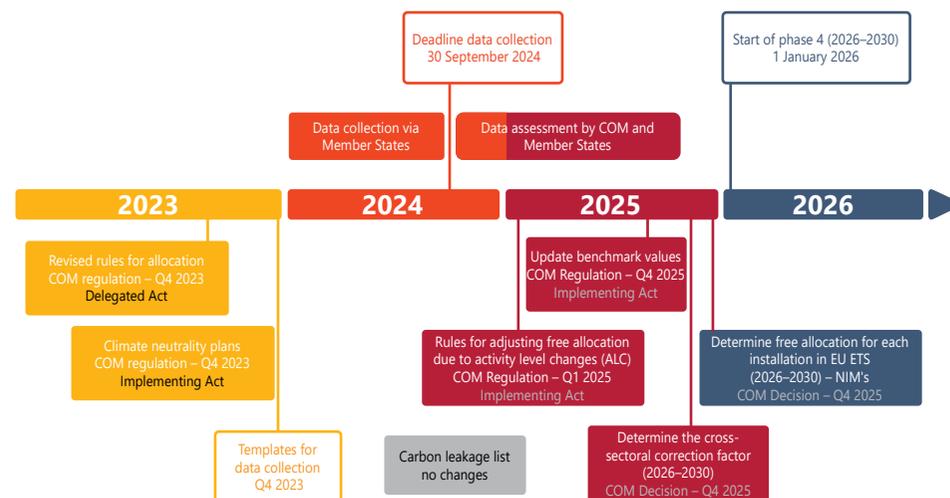
the final process emissions factor, used to calculate the number of free allowances/subinstallation has been set at 0,97 for the years until 31 December 2027 and by 0,91 for the years 2028 and onwards;

At the same time, the allocation of emission allowances to installations that are required to conduct an energy audit or implement a certified energy management system under Article 8 of the Energy Efficiency Directive will be reduced by 20% if those installations cannot demonstrate that they have implemented recommendations from those energy audits or certified management systems. If the costs of investments for implementing the recommendations are too high or if the pay-back time of investments related to the recommendations is more than three years, a reduction will not be applied.

This is also the case if the operator of the installation demonstrates that it has implemented alternative measures that lead to GHG emission reductions that are equivalent to reductions achieved with the energy efficiency recommendations concerned.

The next steps include the elaboration of necessary guidelines for calculating the free allowances, the updated values of the benchmarks, including the heat and fuel fallback ones as well as the CCU impact on the emissions trading system as per the timeline below:

Implementation of FA framework timeline





ETS 2 – Pricing CO₂ Emissions for Industrial Sectors not Covered by the Current ETS

In a significant move to widen the scope of its carbon pricing mechanisms, the European Union is set to implement two distinct carbon market systems: the EU ETS1 and the newly proposed EU ETS2. The EU ETS1 is already operational, targeting emissions from electricity and heat generation, energy-intensive industries, aviation within the European economic area, and maritime transport. This existing framework has been pivotal in the EU's efforts to curb emissions from some of its most carbon-intensive sectors.

The forthcoming EU ETS2 represents an expansion of this approach, extending the emissions trading system to include sectors not previously covered. Specifically, ETS2 will encompass fuel combustion emissions from buildings, road transport, and smaller industrial sectors yet to be included under the ETS umbrella, such as the carbon and graphite industries. This expansion reflects the EU's commitment to achieving a comprehensive and equitable carbon pricing strategy across more sectors of its economy.

Scheduled to be operational by 2027 at the earliest, the EU ETS2's implementation could be delayed to 2028, contingent upon energy price trends in the coming years. The design of the EU ETS2 is currently under discussion, leaning towards a model akin to a carbon tax. A notable feature of this new system is the establishment of a maximum price level of 45 EUR/ton for carbon emissions, at least until 2030, without a predefined price cap.

To ensure ambitious emissions reductions, the EU ETS2 will adopt a high annual linear reduction factor (LRF) of more than 5% from 2024 onwards. This aggressive reduction trajectory aims to cut total emissions from the sectors compliant with the ETS2 by approximately 60% by 2030, relative to 2005 levels. If the price of allowances under the EU ETS2 exceeds 45 EUR/ton over a sustained period, the system will release additional allowances to bolster supply and stabilise the market.

This extension of the EU's emissions trading system to cover a broader array of sectors underscores the EU's proactive stance on climate action. By pricing carbon emissions more comprehensively, the EU ETS2 aims to drive significant emissions reductions across previously unregulated sectors.

Energy Taxation Directive (Revision) – Reducing Energy Consumption

In line with its objectives, ECGA is actively working to ensure that mineralogical processes remain exempt from the purview of the revised Energy Taxation Directive. The ECGA's efforts are concentrated on securing a place for these processes in the list of exemptions outlined in Article 3.1(b) of the Directive, thereby safeguarding the sector from potential financial burdens that could impact its competitiveness and sustainability.

In 2023, discussions around the Directive's revision highlighted the European Commission's objectives to eliminate disparities and exemptions in energy product taxation among Member States, reduce fossil fuel subsidies, lower electricity taxes, and allow taxation on aviation fuel kerosene. These talks were propelled forward during an exchange between Members of the European Parliament (MEPs) and Mr. Wopke Hoekstra, the nominee for Commissioner for Climate Action, underscoring the revision's significance in harmonizing energy taxation with environmental objectives.

The legislative journey is progressing, with a critical vote on the draft Report and proposed amendments by the European Parliament anticipated tentatively in March 2024, followed by a Resolution adoption and forwarding to the Council, expected in April 2024. This period marks a pivotal opportunity for the ECGA to advocate for the carbon and graphite sector's interests, aiming to secure a conducive operational environment through strategic exemptions in the Directive.

Energy Efficiency Directive (Revision) – Limiting Emissions at Source

The European Union has made a significant leap towards enhanced energy efficiency with Directive (EU) 2023/1791, effective from 10 October 2023. This legislation mandates a collective reduction in final energy consumption of at least 11.7% by 2030 across Member States, compared to projections made in 2020. This initiative underscores the EU's commitment to environmental sustainability and reducing emissions at the source.

Member States are required to outline their contributions to this ambitious goal in their national energy and climate plans, with a flexible formula for calculating these contributions that permits a deviation of up to 2.5%. From 2024 to 2030, an incremental annual energy savings target is set, starting at 1.49% and reaching 1.9% by the end of the decade. The directive accommodates a range of measures to achieve these targets, including those related to buildings' energy performance and the EU emissions trading system.

Implications for the sector

For the carbon and graphite sector, the directive introduces critical requirements related to energy management systems and energy audits:

- Enterprises consuming more than 85 TJ of energy annually over the past three years are mandated to implement a certified energy management system by an independent body, aligning with European or international standards, by 11 October 2027.
- Those with an annual consumption exceeding 10 TJ, and not adopting an energy management system, will be subject to an energy audit.
- ECGA members that have certified environmental management systems, which include energy audits, will be exempt from these new mandates, highlighting the directive's flexibility and support for existing sustainable practices.

Furthermore, energy audits, whether standalone or part of broader environmental audits, may need to assess the feasibility of connecting to district heating or cooling networks, broadening the scope of energy efficiency measures.



Sustainability and Circular Economy: Carbon and Graphite as Key Enablers

6

In response to the crucial sustainability issues, ECGA has embraced a leadership role in directing the carbon and graphite sector towards alignment with the United Nations' Sustainable Development Goals (SDGs). This highlights the industry's comprehensive approach to sustainability, integrating environmental responsibility with social and economic advancement.

CHAPTER



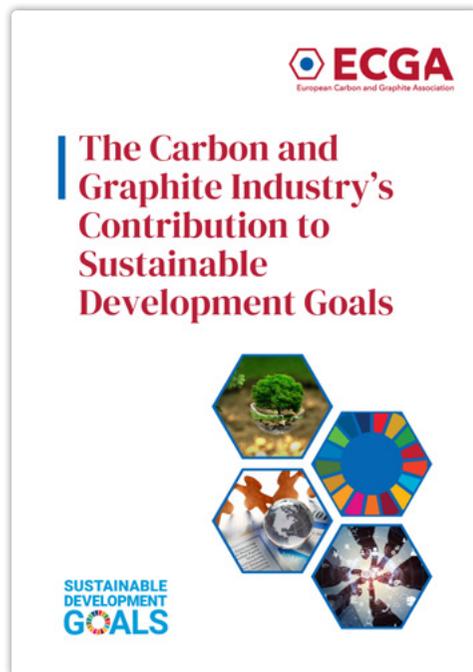
THE EUROPEAN CARBON AND GRAPHITE INDUSTRY'S ALIGNMENT WITH SDGS ••

In the face of rising global challenges and the urgent call for sustainable development, the Carbon and Graphite Industry has taken significant steps towards aligning its operations with the United Nations' Sustainable Development Goals (SDGs). The industry recognizes its influential role in shaping a sustainable future, acknowledging the growing demand for graphite and its responsibility to meet the highest standards of environmental and social governance.

The industry's commitment is complex, aiming to enhance sustainability across various dimensions. From fostering economic growth and job creation in Europe to ensuring safe and healthy working conditions, the sector is making tangible contributions to a broad spectrum of SDGs. Notably, it plays a crucial role in advancing clean energy technologies, reducing emissions, and promoting resource efficiency, directly contributing to the goals of affordable and clean energy, industry innovation, and climate action.

Moreover, the sector's initiatives extend beyond environmental impact to address social and governance challenges. By promoting gender equality, supporting community development, and upholding high standards of corporate governance, the industry demonstrates a holistic approach to sustainability.

This commitment to sustainability goes beyond mere regulatory compliance, it entails driving positive change through innovation, collaboration, and



a profound sense of responsibility towards the planet and its people.. As the Carbon and Graphite Industry continues to evolve, its dedication to the SDGs will undoubtedly play a pivotal role in building a more sustainable world.

More Sustainable Products Eco-design

In March 2022, the Commission published its proposal for an update to the existing Eco-design directive. The new regulation, which would supersede the former directive, aims to replace the former Ecolabel used for washing machines and other household appliances and to extend to virtually every product sold in the EU. This new regulation entails a large effort to collect and report data from both private and public actors.

At the beginning of 2023, the Commission launched a consultation to collect feedback about its proposal. ECGA's reply to that consultation revolved around three main axes:

1. International competitiveness: while the EU carbon and graphite industry is happy to improve its sustainability profile, it would like the Commission to make sure that compliance efforts are not uneven across the board, with importers facing close to no scrutiny, as opposed to domestic producers.
2. Low-hanging fruits: if the Commission wants to improve the sustainability of its domestic industry, it should focus on a few key sectors like steel, where recycling rates should be increased, or non-ferrous metals, where crucibles can be recovered and reused.
3. Implementation hurdles: in the initial draft of the Commission, several provisions were underspecified. For example, the draft mentioned the possibility of benchmarking the performance of products but did not mention what type of criteria those benchmarks should take into account. Likewise, it was not clear whether the regulation would apply to individual products, or to entire batches at once.

For this purpose, the ESPR introduces a Digital Product Passport (DPP) that should facilitate the information of end-consumers, while also ensuring better tracking of substances hindering recyclability along the supply chain. This DPP will require companies to gather data for their clients working in the following industries: iron, steel, cement, aluminium, textiles (notably garments and footwear), furniture, tyres, detergents, paints, lubricants, chemicals, and electronics.

On the one hand, some changes have made the upcoming regulation more burdensome for private actors, such as the now explicit requirement for supply chain actors to «provide information on their supplies like quantity and type or chemical composition of materials used or production process employed, on the other hand, the agreed compromise text now directs the Commission to take unfair competition from abroad into account when drafting Eco-design requirements. It also gives more time to manufacturers during the drafting process. Those changes will rather benefit European producers.

As of December 2023, the European Parliament and the Council had struck a provisional agreement on the text that should then be submitted for final approval to the plenary in Strasbourg. Some of ECGA's concerns about the reporting workload had been alleviated under this last version, but not all of them. The association expects that many details will need to be settled at the implementation stage when the Commission will propose sector-specific delegated acts.

Product Category Rules for Graphite Released

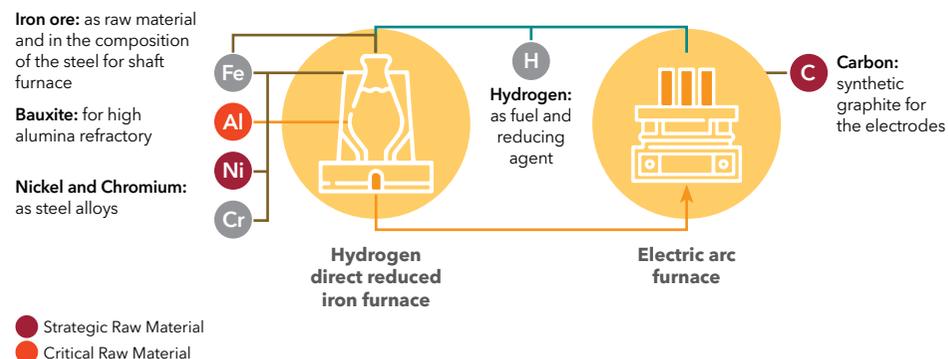
In May 2023, EPD International AB published the inaugural Product Category Rules (PCR) for Graphite Products. This comprehensive document spans the entire supply chain, outlining detailed methodologies for conducting life-cycle analysis for graphite and its potential alternatives. Prepared throughout 2022, the PCR was the result of a collaborative effort between LCA consultancy Minviro and members of ECGA.

The implementation of this PCR document is anticipated to significantly enhance environmental benchmarking across various graphite sources. Prior to this, the industry relied on broad ISO norms that offered considerable interpretive leeway to producers, often leading to varied life-cycle assessment (LCA) outcomes. With the introduction of these specific rules, ECGA members expect to see a standardisation in LCA evaluations, reducing discrepancies and establishing a uniform benchmark.

Moreover, third-party auditors tasked with examining the environmental footprints of graphite producers will now have access to a shared framework. This common set of rules will not only ensure consistency but also bolster the credibility of environmental reporting within the industry.

Figure 52

Selection of raw materials used in H₂-DRI ironmaking and EAF steelmaking and their function



Source: 2023 Strategic Foresight Report: Sustainability and people's wellbeing at the heart of Europe's Open Strategic Autonomy

THE EUROPEAN CARBON AND GRAPHITE INDUSTRY'S ALIGNMENT WITH SDGS

Review of Steel Decarbonisation Pathways

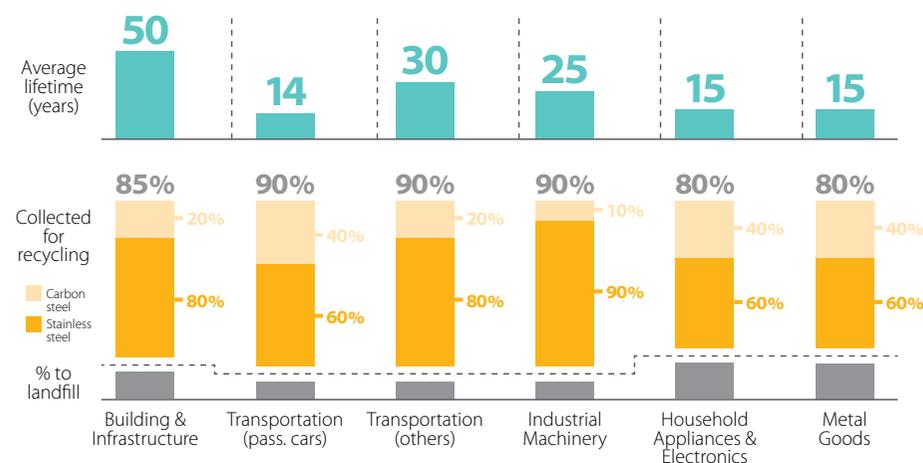
In 2023 the ECGA's Steel Committee had an intensive look at the technological developments driven by market and policy. The EU's Clean Steel initiative and the industry's efforts to describe the metal industries' pathways to decarbonisation have also consequences for its supplier industries, such as the carbon and graphite industry.

According to the EU's Joint Research Centre's (JRC) Foresight study published in 2023, the preferred technological route for the production of steel will still require graphite electrodes. And with an increasing switch from blast furnaces to electric arc furnaces the need for graphite electrodes will rise.

The JRC expects graphite electrode production to go from 1 million tonnes a year in 2020 to 5.7 million tonnes by 2050. However, the year 2023 saw an apparent steel consumption contracting further, with a steeper rate of decline than previously foreseen (-3%, revised downwards from -1%). This marked the fourth annual recession in the past five years. Overcapacity worldwide is a growing issue. Of the world total of 166.1 MMT of capacity currently underway or in the planning stages for completion over the next three years, BOF projects account for 55.4% of the total while EAF projects make up 40.6% of the total. The remaining projects, for which the technology is unknown, amount to 4% of the total. The global capacity utilisation rate declined by 4.4 percentage points in 2022, to 74.5%, also impacted by high energy costs which have led to production stoppages in many steel-producing countries. Utilisation rates this low are not compatible with an economically viable and sustainable steel industry according to the OECD Report on Latest Developments in Steelmaking Capacity 2023.

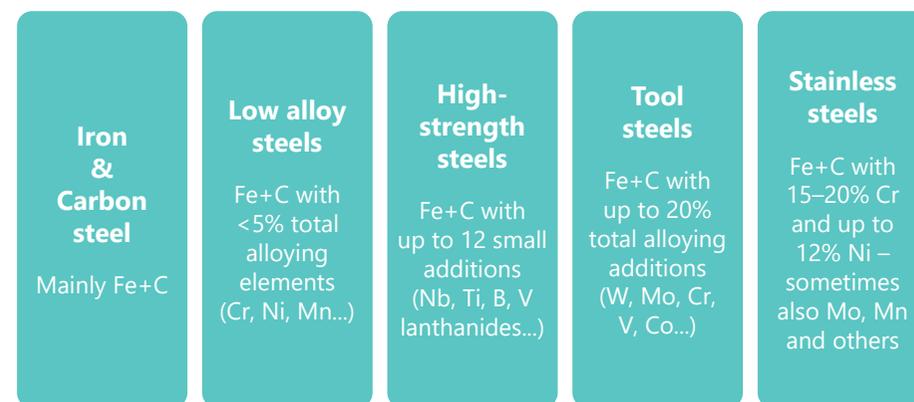
Metals are "permanent" and can be recycled without loss in properties (as long as not diluted). The vast proportion of metal mined to date is still in use but will eventually need to be continually recycled.

End use sector specific end-of-life flows



Source: Eurofer

Steel (ferrous) alloys



Source: Eurofer

Recycling metals typically uses between 5 and 30% (depending on the metal) of the energy that is needed to produce “new metal” from using only raw materials (with no recycling). High recycling rates of metals in future will deliver very large environmental benefits – for example reduced energy consumption and associated emissions.

While carbon and graphitised cathodes and anodes (aluminium) as well as recarburisers (steel) are primarily used for the production of primary metals graphite electrodes are used for the production of recycled steel. Furthermore, increasingly used steel technology with submerged furnaces will require also an increased quantity of Soederberg electrodes.

Europe’s dependency on cheaper imports also in this industrial segment has increased over the past years and the European graphite suppliers find themselves again and again faced with unfair and heavily subsidised competition. The industry therefore welcomed the continuation of the anti-dumping/anti-subsidy case against Indian electrodes and the anti-dumping against Chinese electrodes. Increasingly though EU policy measures addressing CO₂ emissions within the EU also need to take into account the carbon footprint of competing imported products. And here, methodology and auditing of provided Footprint data will be key to maintain a level playing field. The sector is monitoring closely the development of CBAM, particularly for the steel industry.

The BASTILLE Project's Path to Sustainable Battery Use in Ireland

In summer 2023 the BASTILLE project led by Trinity College Dublin, in partnership with ECGA, was approved by the Irish EPA.

BASTILLE focusses on Ireland's approach to the Circular Economy, particularly focusing on bat-



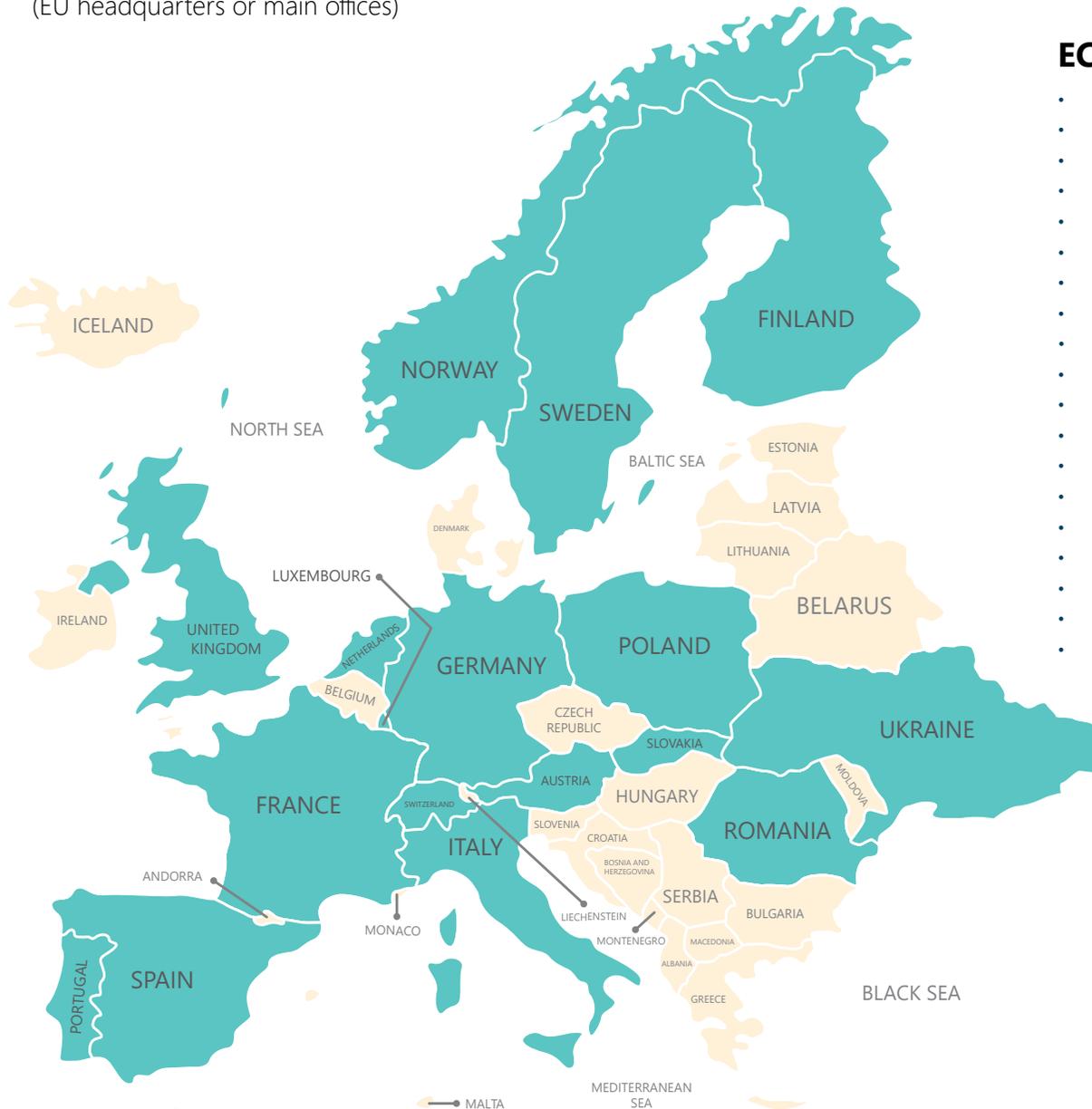
tery-grade graphite used in electric vehicles (EVs) and energy storage solutions. This three-year initiative aims to dismantle barriers and leverage enablers for increasing the circularity of graphite, contributing to Ireland's sustainability goals.

BASTILLE aims to offer an in-depth understanding of the material's potential for circularity, in exploring the lifecycle of battery-grade graphite, innovative advancements in graphite processing, and the socio-technical factors influencing stakeholder participation in circular economy initiatives. The project's ambition extends beyond technical analysis; it seeks to advance societal readiness for sustainable practices, informing an evidence-based roadmap and policy framework that will guide Ireland's transition to a more circular, low-carbon economy. Through BASTILLE, Ireland not only attempts to position itself as a leader in sustainable battery usage but also sets a benchmark for circular economy initiatives globally, aligning with broader environmental strategies such as the OECD Urban Study and the European Commission’s Green Deal.

The BASTILLE project is important to the ECGA as well as the researchers from Trinity College Dublin as it directly supports the industry's commitment to sustainability and the circular economy in a country where there is currently no graphite production or recycling activities. This collaboration not only positions the sector in Ireland at the forefront of sustainable practices but also strengthens its role in shaping a more resilient and environmentally conscious market landscape for the future and is in line with ECGA's proactive engagement with the European Commission's Eco-design for Sustainable Products Regulation (ESPR), demonstrating a holistic commitment to environmental ethics and regulatory compliance.

ECGA PRESENCE

(EU headquarters or main offices)

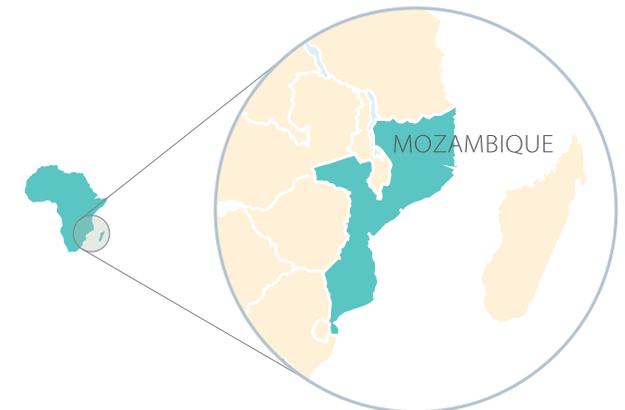


ECGA members:

- AMG KROPF MUHL GMBH
- ASBURY GRAPHITE & CARBONS NL B.V.
- ELKEM ASA CARBON
- ELSID CARBON ENGINEERING S.A.
- GRAFTECH INTERNATIONAL LTD.
- IMERYS GRAPHITE & CARBON SWITZERLAND LTD.
- MERSEN CORPORATE SERVICES SAS
- MORGAN ADVANCED MATERIALS PLC
- RHEINFELDEN CARBON PRODUCTS GMBH
- SANGRAF ITALY SRL
- SCHUNK KOHLENSTOFFTECHNIK
- RESONAC EUROPE GMBH
- SUPERIOR GRAPHITE EUROPE LTD
- SGL CARBON GMBH
- TOKAI COBEX GMBH
- TOKAI COBEX SAVOIE SAS
- TOKAI COBEX POLSKA SP. Z O. O.
- TOKAI ERFTCARBON GMBH
- VIANODE AS

Associate members:

- BAWTRY CARBON LIMITED
- BGV GROUP MANAGEMENT
- FERROGLOBE PLC
- GRAFINTEC OY
- GRAPHITE COVA GMBH
- HYCAMITE OY
- JSW SA
- OXBOW ENERGY SOLUTIONS BV
- PHILLIPS 66 PLC
- SYRAH GLOBAL DMCC
- TALGA AB & TALGA BATTERY METALS AB



ECGA Members:

AMG KROPFMUEHL GMBH

(Hauzenberg, Germany)

ASBURY GRAPHITE & CARBONS NL B.V.

(Maastricht, Netherlands)

ELKEM ASA CARBON

(Vaagsbygd, Kristiansand, Norway)

Other EU manufacturing locations:

- Žiar nad Hronom, Slovakia

ELSID CARBON ENGINEERING S.A.

(Ilfov, Romania)

GRAFTECH INTERNATIONAL LTD.

(Bussigny, Switzerland)

Other EU manufacturing locations:

- Calais, France
- Ororbia, Spain

IMERYS GRAPHITE & CARBON SWITZERLAND LTD.

(Bodio, Switzerland)

MERSEN CORPORATE SERVICES SAS

(Paris, France)

Other EU manufacturing locations:

- Amiens, France
- GENNEVILLIERS, France
- PAGNY-SUR-MOSELLE, France

MORGAN ADVANCED MATERIALS PLC

(Windsor, United Kingdom)

Other EU locations:

- Luxembourg

RHEINFELDEN CARBON PRODUCTS GMBH

(Rheinfelden, Germany)

SANGRAF ITALY SRL

(Narni Scalo, Italy)

SCHUNK KOHLENSTOFFTECHNIK

GMBH (Heuchelheim, Germany)

Other EU manufacturing locations:

- Steeg, Austria

RESONAC EUROPE GMBH

(Wiesbaden, Germany)

Other EU manufacturing locations:

- La Coruna, Spain
- Steeg, Austria

SUPERIOR GRAPHITE EUROPE LTD

(Sundsvall, Sweden)

SGL CARBON GMBH

(Wiesbaden, Germany)

Other EU manufacturing locations:

- Bonn, Germany
- Meitingen, Germany
- Levradio, Portugal
- Chedde, France
- Nowy Sącz, Poland

TOKAI COBEX GMBH

(Wiesbaden, Germany)

TOKAI COBEX SAVOIE SAS

(Vénissieux, France)

Other EU manufacturing locations:

- Notre Dame, France

TOKAI COBEX POLSKA SP. Z O. O.

(Racibórz, Poland)

Other EU manufacturing locations:

- Nowy Sącz, Poland

TOKAI ERFTCARBON GMBH

(Grevenbroich, Germany)

VIANODE AS

(Oslo, Norway)

Associate Members:

BAWTRY CARBON LIMITED

(Austerfield, United Kingdom)

BGV GROUP MANAGEMENT

(Kyiv, Ukraine)

FERROGLOBE PLC

(Chambéry, France)

GRAFINTEC OY

(Vaasa, Finland)

GRAPHITE COVA GMBH

(Röthenbach, Germany)

HYCAMITE OY

(Kokkola, Finland)

JSW SA

(Jastrzębie-Zdrój, Poland)

OXBOW ENERGY SOLUTIONS BV

(Rotterdam, The Netherlands)

PHILLIPS 66 PLC

(London, United Kingdom)

SYRAH GLOBAL DMCC

(Dubai, United Arab Emirates)

TALGA AB & TALGA BATTERY METALS AB

(Luleå, Sweden)



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