



# Towards a clean industrial deal

A workable pathway  
for medium-sized energy  
intensive industries in  
transition.



Welcome to RHI Magnesita's magnesite underground mine in Breitenau/Austria. This mine is one of the few hubs for alpine magnesite in Europe.



RHI Magnesita is a global, Austria-headquartered medium-sized, energy-intensive industrial company and market leader in refractory solutions and heat management. 20,000 employees around the globe (5,000 based in Europe) are mining key raw materials and producing specialty industrial ceramics out of magnesite, dolomite, and other essential minerals enabling the development of our modern civilization.

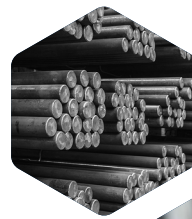
The company operates over 50 plants globally, of which 28 plants and mines in Austria, Germany, France, Czech Republic, Slovenia, and Sweden. This White Paper discusses achieved progress, remaining challenges, and fresh ideas for the next 5-years EU political cycle and should serve as a basis for private-public exchange and cooperation with policymakers and stakeholders.

# Recognising refractories as a critical part of industrial value chains in Europe.

## Introducing our business

Refractories are the backbone of all of civilisation's building blocks such as steel, copper, cement, aluminium, chemicals, glass, and others all of which are produced at very high temperatures. These highly technical ceramics materials protect plants and people from extreme heat and chemical attack that occur during their manufacturing, which means that without refractories no such building block is possible. They constitute a critical/strategic part of industrial value chains in Europe. Steel plants, and with it the whole construction, manufacturing, and energy industries, would stand still within a few weeks only, if RHI Magnesita stops its production. Refractories are also needed for recycling of metals and materials as those processes are equally heat-intensive. In this sense, refractories are also essential for a circular industrial economy and will be crucial for the green transition of the EU's industry.

The process and recycling of European lithium, copper and titanium is contingent upon sufficient quantities of magnesia.



**1 tonne of STEEL**  
demands ~ 10-15 Kg  
of refractories



**1 tonne of CEMENT**  
demands ~ 1 Kg  
of refractories



**1 tonne of GLASS**  
demands ~ 4 Kg  
of refractories



**1 tonne of COPPER**  
demands ~ 6 Kg  
of refractories



**1 tonne of ALUMINIUM**  
demands ~ 6 Kg  
of refractories

Magnesia is a crucial element for EU strategic autonomy.



*The rotary kiln in Breitenau/  
Austria sinters magnesite at over  
1900 degrees Celsius.*

## The processing and recycling of European lithium, copper and titanium is contingent upon sufficient quantities of magnesia. What use is all the European lithium, copper or titanium if we have no magnesia to process or recycle it?

- ▶ Refractory Magnesia is a crucial element for EU strategic autonomy.
- ▶ 50% of the 17 strategic raw materials need magnesia for processing or recycling: aluminium, bismuth, cobalt, copper, manganese, nickel, platinum metals and titanium.
- ▶ 35% of all critical raw materials need magnesia for processing or recycling: antimony, aluminium, bismuth, cobalt, copper, manganese, nickel, niobium, platinum metals, tantalum, titanium and vanadium.

Globally, over 63% of magnesite is mined in China and supplied as sintered magnesite (i.e., Refractory Magnesia) to all continents. Refractory Magnesia is a globally traded good and a key material for the EU's green transition and competitiveness. As a backward integrated company, RHI Magnesita operates its own mines in Europe and around the globe as well as the process of sintering magnesite, ultimately producing Refractory-grade Magnesia. Despite the EU having one of the highest independence quotas in Magnesite and Magnesia compared to other regions outside of China, the European steel, aluminium, copper, cobalt, titanium, recycling industries e.g. demand for Refractory Magnesia cannot be met by European production alone.

The EU Critical Raw Materials Act sets the right focus on strategically important raw materials needed to achieve the Green Deal objectives. However, it is crucial to consider Magnesite and Refractory Magnesia as part of the next revision of EU's list of strategic and critical raw materials. RHI Magnesita urges the European Commission to extend the scope of the Critical Raw Materials list by considering the whole supply chain of critical and strategic raw materials. This will ensure the sustainable self-control of the entire industrial value chain in Europe.

# Make decarbonisation a business case.

Strengthening the business case for companies to invest and decarbonise in Europe is paramount.

*EU Energy Commissioner Kadri Simson on site at our CCU pilot plant in Australia, holding carbon neutral material in her hand.*

RHI Magnesita is at the forefront of the sector's testing and deployment of technological innovation to reach net zero by 2050 at the latest.



As such, RHI Magnesita supports the message of the Antwerp Declaration<sup>1</sup> of decarbonising Europe without de-industrialising it. The upcoming Clean Industrial Deal and linked Competitiveness Fund proposed by EU Commission President Ursula von der Leyen in her Political Guidelines<sup>2</sup> should support the EU industrial ecosystem by reducing regulatory burden and allowing financial incentives to support EU-based innovation. Strengthening the business case for companies like RHI Magnesita to invest in Europe while allowing them to deliver on the implementation of the Green Deal is paramount.



<sup>1</sup> <https://antwerp-declaration.eu/>

<sup>2</sup> [https://commission.europa.eu/document/download/e6cd4328-673c-4e7a-8683-f63ffb2cf648\\_en?filename=Political%20Guidelines%202024-2029\\_EN.pdf](https://commission.europa.eu/document/download/e6cd4328-673c-4e7a-8683-f63ffb2cf648_en?filename=Political%20Guidelines%202024-2029_EN.pdf)

# Enabling the sustainable decarbonisation of European Energy Intensive Industries

RHI Magnesita is committed to keep investing in technological innovations to lower the CO<sub>2</sub> intensity of refractory production in Europe<sup>3</sup>. As the global leader in our industry, with strong roots in Austria, RHI Magnesita fulfils its duty.

Refractory production is a hard to abate, energy intensive process with a high CO<sub>2</sub> intensity. The company's overall CO<sub>2</sub> emissions have already decreased from 6.2 to 4.6 Mt globally in 2022

driven by the development of novel recycling<sup>4</sup> and fuel switch. In the future, Carbon Capture and Utilisation (CCU)<sup>5</sup> technologies will support cutting process emissions. For instance, RHI Magnesita is collaborating with the Australian Green Tech Start-Up MCI Carbon to develop the first of its kind CCU technology for the refractory industry<sup>6</sup>. This technology transforms CO<sub>2</sub> from industrial processes into chemically stable industrial minerals that can be used for building materials such as concrete and cement but also ceramics, fertilisers and papers without any CO<sub>2</sub> release.

With a first pilot plant planned for 2028, RHI Magnesita intends to convert its process emissions into commercial products by 2030, also reducing its customers' carbon footprint.

<sup>3</sup> For example, the production of 1 ton of refractories typically emits 1.7 tons of CO<sub>2</sub> (Scope 1, 2 and 3), mostly coming from raw material production. Through aggressive increase of recycling and optimised energy use, the company already reduced its overall CO<sub>2</sub> emissions to 4.6 million tonnes in 2022 (down from 6.2 million tonnes).

<sup>4</sup> Aim at reaching a recycling rate of 15% in Europe, with a potential to go up to 20-25% in the future

<sup>5</sup> Currently investing €50 million in research and development, the subsequent capital investment in Europe is estimated at >€500 million over several years to achieve zero CO<sub>2</sub> emissions.

<sup>6</sup> <https://mcicarbon.com/home/technology/>

*Refractories are produced at extreme temperatures. Achieving these temperatures requires an enormous energy density. Green Hydrogen is the only sustainable alternative to gas.*



# Current policy challenges.

## High Energy and Raw Materials Costs

As identified by Mario Draghi in his recent report on the Future of European Competitiveness<sup>7</sup>, high energy, raw material and emission costs are the main determinants of the struggling competitiveness of EU Energy Intensive Industries (EIs), challenging investment opportunities on the continent especially when compared to global competitors such as the U.S. and China. These are some of the factors leading to EIs often lacking a clear business case in Europe, coupled with limited public funding support for decarbonising assets and processes (e.g., through ETS revenues). In addition, lengthy permitting procedures, existing red tape and bureaucratic hurdles for companies often impact Europe's attractiveness.

<sup>7</sup> [https://commission.europa.eu/topics/strengthening-european-competitiveness/eu-competitiveness-looking-ahead\\_en](https://commission.europa.eu/topics/strengthening-european-competitiveness/eu-competitiveness-looking-ahead_en)

*In Europe RHI Magnesita runs two underground and two open mine pits. To serve the European demand on magnesite, we need to open up new mining sites.*

## Refractory Magnesia

European industry is dependent on sufficient amounts of refractory magnesia. So important is this industrial mineral that any shortage of it would bring steel, copper or aluminium industries in Europe to a standstill within a few months. A lack of data on this strategically important material and too little knowledge about its importance have led to magnesia's omission from CRM list under the Critical Raw Materials Act. To protect Europe's industries that are so important to the Green Deal, European magnesia must be given the status it deserves and be seen as strategically important raw material.





## Carbon Capture and Utilisation

RHI Magnesita aims at rolling out its novel CCU technology in its Hochfilzen site (Tyrol/Austria) with a first pilot in 2028. Building this first commercial CCU test plant will additionally require CAPEX investment of around €100 million. Furthermore, the CCU business case will rely on the recognition of the industrial minerals produced via CCU as carbon-free from a regulatory perspective, as the CO<sub>2</sub> is bounded in the product.

## Carbon Capture and (Intermediate) Storage

Producing refractories results in currently unavoidable process emissions stemming from the CO<sub>2</sub> present in raw materials (e.g., magnesite rocks) rendering CC(I)S and CCU essential options for future low-emission production in Europe. However, the lack of CO<sub>2</sub> transport and storage infrastructure in the EU poses serious challenges to develop and make use of these technological solutions.

## Carbon Pricing

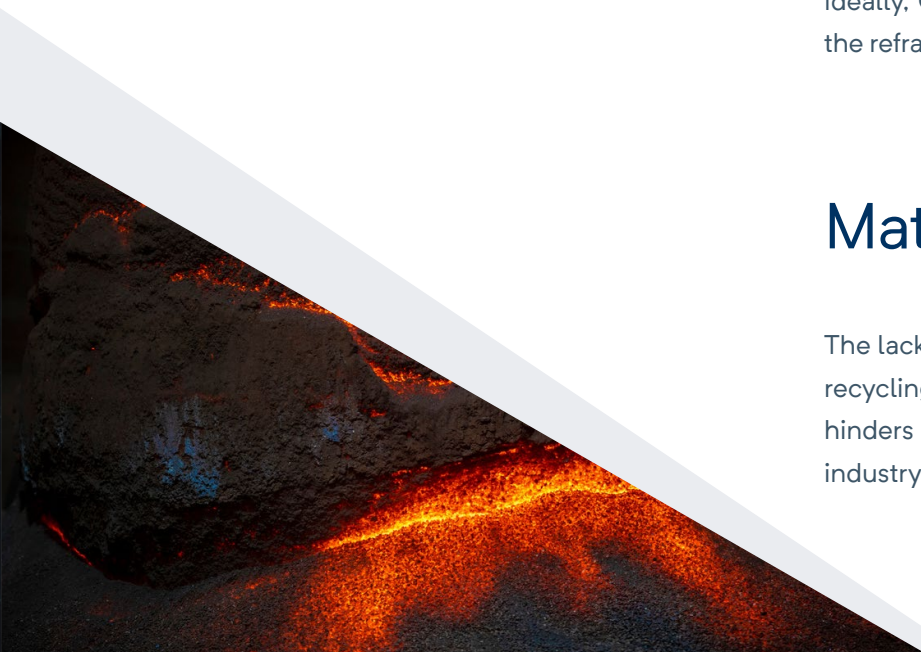
While acknowledging its importance in driving behavioural change in industries, rising carbon prices and the gradual phase out of free allowances for process emissions will inevitably lead to additional financial burden for companies like RHI Magnesita. For European companies that operate globally, carbon leakage is a serious threat that needs to be avoided.

## Carbon Border Adjustment Mechanism

Refractories are currently not covered by CBAM, while their most important users such as steel and cement are. The possible inclusion of all ETS sectors under CBAM by 2030 poses challenges for the refractory industry, particularly if a solution for EU export is not found. Europe is a powerhouse for refractory exports, with about 40% of mostly higher-value products being exported outside of the EU. The lack of an export solution will lead to a significant competitive disadvantage on the world market as products will become more expensive. Ideally, CBAM should be avoided in its entirety for the refractory industry.

## Materials recycling

The lack of harmonized EU regulations on materials recycling complicates cross-border transport and hinders the recycling process in the refractory industry.



# Hydrogen

The high intensity of refractories production requires extremely high temperatures that cannot be achieved by the direct use of electricity but only with the direct combustion of few fuels. Low-carbon and green hydrogen is a viable option for RHI Magnesita to replace fossil fuels. However, many industries — especially those operating outside of large industrial clusters in decentralised operations such as RHI Magnesita — currently struggle to access hydrogen infrastructure and sufficient volumes at the required price level.

► **Alternative fuels usage:**

For the reasons outlined above, a transitional period of alternative fuels (synthetic or fully bio) must be developed in the short-/medium-term. These fuels (e.g., charcoal, biomass, CxHy-fuels) allow the reduction of fossil CO<sub>2</sub> footprint but their availability is currently very limited (e.g., in Austria, biogas 0.6 permille available) and are more expensive compared to fossil fuels by a factor of 5-6x.

*Firing up a new tunnel kiln in one of our plants is a special moment.*





Recycling is one of the biggest levers to reduce CO<sub>2</sub> at RHI Magnesita.

# Policy recommendations for the next EU political cycle

01.

## Develop a Concrete Industrial Policy for Europe

RHI Magnesita welcomes the commitment of President von der Leyen and the new team of Commissioners to develop a Clean Industrial Deal in the first 100 days of the new mandate. For the success of an EU plan integrating decarbonisation and competitiveness, streamlined access to public funding and the mobilisation of private capital should on the one hand support the timely deployment of all available clean energy sources (from renewables to hydrogen and carbon capture technologies) while providing Energy Intensive Industries (EII) with sufficient financial support to adapt and innovate industrial processes (e.g., industrial conversion). For instance, RHI Magnesita supports the proposal in the Draghi report to earmark a larger share of EU ETS revenues to EII. Moreover, the company welcomes the increased attention to reducing administrative burden and complex regulation identified as one of the greatest challenges to EU competitiveness.

02.

## Recognise Magnesite/ Refractory Magnesia as a Strategic Raw Material

As one of the few producers in the EU, RHI Magnesita urges the European Commission to review the list of strategic and critical raw materials bearing in mind the criticality of Refractory Magnesia in terms of economic importance in the value chain for EU industry. Today, Europe already depends on the import of Chinese Magnesia to cover European industry's demand, and increasing this dependence should be avoided given intensifying geo-economic and geopolitical tensions.

## 03.

### Ensure Effective Carbon Pricing

RHI Magnesita considers carbon pricing as a key enabler to incentivise CO<sub>2</sub> emissions reduction, but targeted financial incentives (for R&D spending, for investments and for operating costs) should be considered. Support via early seed funding for new industrial-scale CCU technologies can help to bridge the gap while carbon costs are rising and maintain global competitiveness for EU based companies. Additionally, as a sector falling under the EU ETS, being able to access funding provided from the EU Innovation Fund is essential. However, small and medium-sized, landlocked plants often cannot compete with the cost efficiency of large-scale projects. As such, a dedicated call for medium-sized companies operating in remote areas of Europe will help to address some of the challenges medium sized companies like RHI Magnesita have been facing and granting them fair access to these schemes.

## 04.

### Monitor the Effectiveness of CBAM

As recommended by Mario Draghi in his report<sup>8</sup>, the effectiveness of CBAM in its current design should be monitored ahead of its entry into force with financial adjustment in 2026. While refractories are not yet in scope, RHI Magnesita stresses the importance to close the remaining loopholes such as the inclusion of downstream products and raw materials covering entire value chains. A future inclusion of refractories under CBAM should consider refractory raw materials as precursors for finished refractories (like the current policy proposal for steel). Moreover, a solution for exports under CBAM should be found. Without it, the potential inclusion of refractories under CBAM will lead to a significant competitive disadvantage on the world market as European products will become more expensive, and significantly hit companies like RHI Magnesita exporting 40% of products outside the EU.

<sup>8</sup> [https://commission.europa.eu/document/download/ec1409c1-d4b4-4882-8bdd-3519f86bbb92\\_en?filename=The%20future%20of%20European%20competitiveness\\_%20In-depth%20analysis%20and%20recommendations\\_O.pdf](https://commission.europa.eu/document/download/ec1409c1-d4b4-4882-8bdd-3519f86bbb92_en?filename=The%20future%20of%20European%20competitiveness_%20In-depth%20analysis%20and%20recommendations_O.pdf)

*In 2028 the first of its kind CCU pilot plant in the refractory industry will be built in Hochfilzen/Austria. With this plant 50.000t of CO<sub>2</sub> can be captured and mineralized.*



## 05.

### Support the Timely Deployment of CCU Technologies

The deployment of CCU technologies as a decarbonization pathway for hard-to-abate sectors needs more attention from a regulatory perspective. The recent Delegated Act under the EU ETS Directive only recognizes as “non-emitted” the CO<sub>2</sub> contained in construction materials as being “permanently chemically bound” in such products. As CCU technologies are currently undergoing testing, creating a predefined “whitelist” of CCU applications may have limitations. Instead, to realize the full potential of CCU technologies, all applications should be incentivized regardless of whether they are considered to store CO<sub>2</sub> permanently or for a limited time.

The timely deployment of all CCU applications should be supported as serving the goal of emissions savings. As such, the EU should facilitate and incentivize research and innovation partnerships, especially with countries that are also advanced in R&D and deployment of these technologies. The EU might consider supporting pre-investment feasibility studies for pilot projects to encourage businesses to generate technological knowledge and solutions like CCU. These can provide an important basis for companies to ask for low-cost funding as they would provide evidence on expected economic and environmental outcomes, strengthening the bankability aspect of projects.

## 06.

### Recognise the role of CC(I)S solutions in the short-term

As recognised by the Industrial Carbon Management Strategy<sup>9</sup> adopted by the European Commission in February 2024, carbon capture and storage technologies will play a significant role in reducing emissions, especially in hard-to-abate sectors, in line with the EU's targets for 2030, 2040 and climate neutrality by 2050. As such, building the necessary CO<sub>2</sub> transport and storage infrastructure is of utmost importance for energy intensive companies to tackle their unavoidable process emissions in the short-term. The EU needs to mobilise and incentivise investments and establish a monitoring system to track the development of CO<sub>2</sub> pipelines. In this context, it will be crucial to ensure infrastructure access to energy intensive companies that operate outside of big industrial clusters.

<sup>9</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2024%3A62%3AFIN>



Plant Radenthein/Austria is RHI Magnesita's digital flagship plant.

## 07.

### Enhance the Availability and Accessibility of Hydrogen

Companies like RHI Magnesita will need large volumes of affordable green and/or low-carbon hydrogen (competitive to natural gas) to make the transition to net zero possible. Investments in non-CO<sub>2</sub> emitting hydrogen production within and outside the EU will help to achieve the production of large volumes at economically attractive cost levels. The EU needs to accelerate investments in clean hydrogen production, streamlining and aligning multiple, parallel, and overlapping efforts across the EU. The use of green hydrogen requires the conversion of existing processes and facilities or the construction of entirely new ones. This involves high initial investments, for which CAPEX and OPEX support at both EU and national levels will be necessary.

Furthermore, access to vast amounts of clean hydrogen at affordable prices through accessible infrastructure. For companies like RHI Magnesita, which will be a major industry off taker, access to hydrogen infrastructure is key. The public sector needs to ensure that also medium-sized energy intensive companies operating outside of large industrial clusters can gain access to green hydrogen.

## 08.

### Streamlining Materials Recycling

As a global company exporting 40% of its products outside the EU, RHI Magnesita faces significant challenges in recovering materials from third countries. Harmonizing EU legislation on “waste transport for products in the B2B industrial value chain” is essential for improving recycling. Inconsistent national regulations, with varying definitions of „waste,“ complicate logistics and hinder the recycling of refractory materials, which often need to be transported across borders.

For RHI Magnesita, it is crucial that its recycling company, MIRECO, is recognized as a legitimate recycler across Europe. With over 100 years of experience, MIRECO collects used refractory materials from steel plants and transports them to recycling hubs in different countries. Cross-border transport is vital to ensure effective recycling. A unified regulatory framework would ensure vast amounts of CO<sub>2</sub> savings and raw material.

To achieve the EU's 25% recycling target for critical raw materials, harmonized waste transport rules and global cooperation on minerals and metals trade are necessary. Establishing clear, EU-wide standards for recyclers would improve resource efficiency, reduce environmental impact, and support a circular economy across the industry.

*RHI Magnesita employs 20.000 team members worldwide.*





RHI MAGNESITA

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