Europe at risk of losing Specialty Alumina production - an Energy-Intensive Sector, essential to the Green Transition

As Europe's Clean Industrial Deal moves from ambition to implementation, the survival of some indispensable materials is at stake: specialty alumina is a critical input for Europe's green, digital and industrial value chains, yet its highly energy-intensive production is increasingly uncompetitive under Europe's structural energy and carbon cost disadvantages.

The European Producers of Specialty Aluminas (EPSA) therefore call on EU institutions to put in place targeted energy, carbon and investment safeguards that allow specialty alumina production to remain in Europe, decarbonise progressively, and continue underpinning Europe's strategic autonomy.

Executive summary

Due to its unique properties, specialty alumina is a key raw material in many strategic applications. Alumina is also recognised in the EU Strategic Raw Materials list, confirming its importance for Europe's industrial resilience and strategic autonomy. Specialty alumina directly contributes to the advancement of six out of the eight strategic net-zero technologies outlined in the Net Zero Industry Act, and is used in 10 of the 14 industrial ecosystems of the European Industrial Strategy. Above all, as a ceramic and abrasive material, it is essential to any industrial equipment manufacturing. Without it, there would be no furnaces, no high-temperature processes, no polishing, and no reliable industrial operations.

Its production is highly energy-intensive, both in gas and electricity. The structurally higher energy prices and the more stringent carbon costs in Europe put the European producers at competitive disadvantage vs. the rest of the world on both EU and non-EU markets. The disparity of the production processes and lack of long-term certainty related to electricity and hydrogen accessibility discourage investments.

These are signals driving the market to cheap, mostly high-carbon imports, and European manufacturers to relocate outside the EU. The European specialty alumina sector is seriously threatened of disappearance, which already starts materialising into

- exacerbated carbon leakage, through the demand (markets turning to cheap, high-carbon imports), but also through the supply (relocation of production outside the EU)
- an irreversible dependency of the EU toward 3rd countries, on a resource strategically relevant for the EU transition, due to the disappearance of highly specialised workforce and equipment.

EPSA
European Producers of Specialty Aluminas
A sector group of Cefic
European Chemical Industry Council - Cefic aisbl
Rue Belliard 40, b15, B-1040 Brussels, Belgium
Tel. +32.2.436.93.00 - info@cefic.be - www.cefic.org
EU Transparency Register: 64879142323-90

- weakening of the EU transition: specialty alumina is key for industrial, automotive, construction, defence and steel sectors, and to the EU's green transition and the 2050 CO_2 neutrality.

To safeguard its operations in Europe and facilitate its transition towards cleaner energy use, the specialty alumina sector necessitates:

- Short-term access to energy (gas, power) at conditions that are competitive on the global market.
- Long-term certainty on the conditions to access hydrogen and electricity.
- Access to funding for mid-sized companies, including most EPSA members, to help them comply with stricter regulations.
- A dedicated CN code for specialty alumina to enhance trade visibility and allow for carbon tracking.
- Accurate carbon footprint information on minerals imported into the EU

Comprehensive discussion

Specialty alumina, a strategic material for Europe

European specialty alumina producers are globally recognised for their leading technology and innovation in the industry, holding the largest production volumes outside China with about 618 kmt/ year across 7 sites[1], ensuring the self-sufficiency of Europe, consuming around 400 kmt annually[2]. They are among the cleanest globally, thanks to advanced production technologies, strict environmental standards and continuous investment in sustainable practices. Their exports, estimated at 128 kmt/year[3], highlight their international competitiveness and their support the Union's industrial growth.

Due to its unique properties, which include technical, chemical and thermal resistance, as well as conductivity, specialty alumina is a key raw material in many strategic applications where high temperatures and high mechanical forces are to be withstood. Its unique characteristics make it a versatile non-hazardous material widely used across various industries, and difficult to replace. By contributing actively to the advancement of six out of the eight strategic net-zero technologies[4] outlined in the Net Zero Industry Act, with significant potential to contribute to the EU's decarbonisation, and being used in 10 of the 14 industrial ecosystems of the European Industrial Strategy, specialty alumina plays a central role in the energy transition and EU industrial autonomy.

[1] Source: Cefic-EPSA survey (2023)

[2] Specialty alumina: calcined alumina and tabular alumina (estimated)

[3] Based on COMEXT data 2022, estimated part of CN 2818 20 00 representing specialty alumina (calcined and tabular alumina)

[4] See details in annex 1

Specialty alumina production[5] is highly energy-intensive, both in gas and electricity, and is made from aluminium hydroxide and from smelter grade alumina, for which energy represents an important part of their production costs as well, considering the European energy prices.

In the specialty alumina process, the energy is mainly used for the dissolution and precipitation of bauxite and hydrate, and for calcination and fusion. Most of the process necessitates natural gas, except the fusion process that uses electricity.

Specialty alumina, a sector threatened with disappearance in Europe

Energy cost disparities between Europe and other regions persist even post-crisis[6]

European specialty alumina producers face competitive disadvantages due to structurally higher energy costs and environmental policies. In 2022, a spike in electricity and gas prices increased the share of energy in production costs from under 10% to 25%, affecting product prices and exports, and leading to more imports, mainly from Asia. Despite decreases in gas and electricity prices since late 2022, significant disparities with other regions persist, with Europe's electricity prices (futures) exceeding €100/MWh in many Member States, and gas prices five times higher than in the US.

Difficult decarbonisation at sectorial level

The diversity of the existing technologies to produce specialty alumina in Europe hinders the decarbonisation at sectoral level. European producers are individually exploring hydrogen use, renewable energy, insulation optimisation and more.

Switching from natural gas to electricity for the dissolution-precipitation part is technically feasible, but the persistent higher price of electricity vs. gas will increase the operating costs differential between European and the non-European producers. Additionally, long-term uncertainties in the electricity market's direction render the needed significant investments challenging.

The calcination part is more complex and European specialty alumina producers are exploring Carbon Capture, Utilisation and Storage (CCUS) and hydrogen-natural gas mixes. But such developments require support from the authorities.

Decarbonising the sector is important, but sustaining specialty alumina production in Europe remains crucial to achieving the EU's decarbonisation targets.

Environmental pressure

In this already difficult context, the specialty alumina sector remains under sustained environmental pressure. Fit for 55 continues to drive major regulatory changes, while the EU ETS is becoming stricter

[5] See production process scheme in annex 2

[6] More information related to costs are shared in annex 3

overall, despite targeted flexibility. The Energy Taxation Directive (ETD) is also expected to add further pressure by aligning energy taxation more closely with environmental objectives.

Weakening for the twin transition, and durable damage to the EU's autonomy

The higher energy costs, the difficulties in the sectoral transition, and the increasing carbon costs have placed the European specialty alumina sector at competitive disadvantage, more than most of the other sectors.

The market is encouraged to turn to cheap materials from Asia, manufacturing at 3.5 times higher CO_2 emissions than Europe[7]. Industry is tempted to relocate operations outside of the EU, where emission rules are less stringent, and energy prices affordable.

This threatens the technological edge, R&D and production of the European specialty alumina sector, leading to a continuous increase in imports, which are gradually replacing European production until it will disappear completely[8]. Potential repercussions include:

- **Carbon leakage**: The carbon footprint of non-European specialty alumina producers is significantly higher than that of European producers, due to their reliance on a more carbon-intensive energy mix. Importing alumina to replace the European production increases Europe's indirect carbon footprint.
- **Irreversible dependency**: The loss of Europe's production capacity for these specialised aluminium oxides would result in the definitive loss of its highly specialised workforce and equipment, similar to what occurred with rare earths[9] in the 90s. This would irreversibly install Europe's dependency on Asia, particularly China.
- **Transition weakened and at risk**: Specialty alumina is indispensable for industrial processing, car production, construction activities, and iron & steel manufacturing. Its crucial role underpins the success of the green and digital transition and the 2050 CO_2 neutrality.

What European manufacturers need to remain competitive and accelerate their transition

The specialty alumina sector requires support to safeguard the continuity of its operations in Europe, for its transition towards cleaner energy use, and to remain competitive on the global market.

Competitive energy access

The European specialty alumina sector requires support to maintain its operations within the EU. This includes ensuring access to competitively priced energy, including natural gas and electricity, to curb the competitive disadvantage with non-EU competitors. Support should preferably be coordinated

[7] See comparison of available data on CO_2 emissions in annex 5

[8] See Press articles of alumina plant closures and job cuts in Annex 4

[9] Read more on the situation of Rare Earth Elements in annex 6

at the European level to ensure uniformity across the internal EU market and maintain a level playing field.

As for its transition towards electrification, the sector would like to make the necessary important investments. But even the preliminary feasibility studies bear consequent costs, and cannot be initiated without an enhanced certainty and long term visibility of the electricity market in the EU.

To further reduce CO_2 emissions on the calcination part, the specialty alumina sector will require access to hydrogen in sufficient quantities and at economically viable conditions. In this context, specific support from authorities will be necessary.

Access to funding for mid-sized companies, including most EPSA members, to help them comply with stricter regulations

Carbon costs are continuing to rise, with national CO_2 taxes, like those applied in Germany, further compounding the burden imposed by the EU ETS. The sector fully recognises the need for timely and effective action to support the objective of achieving carbon neutrality by 2050. However, its structural characteristics significantly constrain the feasibility of a large-scale transition. The sector comprises a limited number of producers, operating through diverse production processes, which limits the potential for economies of scale and makes a sector-wide transformation particularly challenging. While incremental improvements remain possible, they will not be sufficient to deliver the level of emission reductions required. Individual companies, and in particular mid-sized producers, are not in a position to finance the substantial investments needed to materially reduce their carbon footprint without targeted financial support.

Such support is therefore essential to enable the sector's transition. Without it, European specialty alumina production will disappear, increasing Europe's dependence on imports of products, mostly with a higher carbon footprint, from outside Europe.

Dedicated CN code for specialty alumina

CN code 2818 20 00 encompasses aluminium oxide (alumina), including both metallurgical grade alumina (smelter grade alumina - SGA) and chemical grade alumina (specialty alumina), without distinguishing the additional processing required to obtain specialty alumina from SGA, nor its unique characteristics. A specific CN code for specialty alumina would improve trade transparency, enable more targeted monitoring of import flows, and support appropriate measures to address carbon leakage from high-carbon specialty alumina imports from third countries. Such a distinction should remain a technical customs tool and should not affect alumina's recognition as a Strategic Raw Material under the EU framework, which reflects its broader importance for Europe's industrial resilience, green transition and strategic autonomy.

Accurate carbon footprint information of minerals imported into the EU

When production outside the EU, followed by export into the EU market, becomes more economically attractive than local European production, the full environmental cost of this shift must be properly assessed.

Lower energy costs in many non-EU regions reduce the incentive for external producers to invest in energy efficiency and in the reduction of indirect emissions. At the same time, less stringent environmental requirements outside the EU allow production to take place with lower regulatory costs and, in many cases, higher associated emissions.

European specialty alumina producers operate under some of the highest environmental standards globally. This contributes to a comparatively lower carbon footprint, but it also creates additional costs that are not borne to the same extent by many non-EU competitors.

Against this background, the EU's 2050 carbon-neutrality objective should not result in the gradual replacement of lower-carbon European production by imports of products whose production and transport have generated higher emissions outside Europe.

To address this risk effectively, any future policy instrument, including quotas, duties or other corrective measures, must be based on reliable and comparable information on the carbon footprint of imported products.

EPSA therefore calls for accurate carbon-footprint information for imported specialty alumina and related minerals. A dedicated declaration field in the relevant transport or customs documentation for CN 2818, could provide a practical first step towards greater transparency and more effective carbon-leakage prevention.

***

EPSA is a Cefic Sector Group, representing the leading producers of specialty alumina in Europe. For more information:

Peng Paternostre, EPSA Sector Group Manager, Cefic
+32.475.94.10.03, ppa@cefic.be

About Cefic

Cefic, the European Chemical Industry Council, founded in 1972, is the forum of large, medium and small chemical companies across Europe, accounting for 1.2 million jobs and 14% of the world chemicals production. On behalf of its members, Cefic's experts share industry insights and trends, and offer views and input to the EU agenda. Cefic also provides members with services, like guidance and trainings on regulatory and technical matters, while also contributing to the advancement of scientific knowledge.