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The Strategic Position of Aluminium in Europe: Policy Frameworks and Industrial Actions

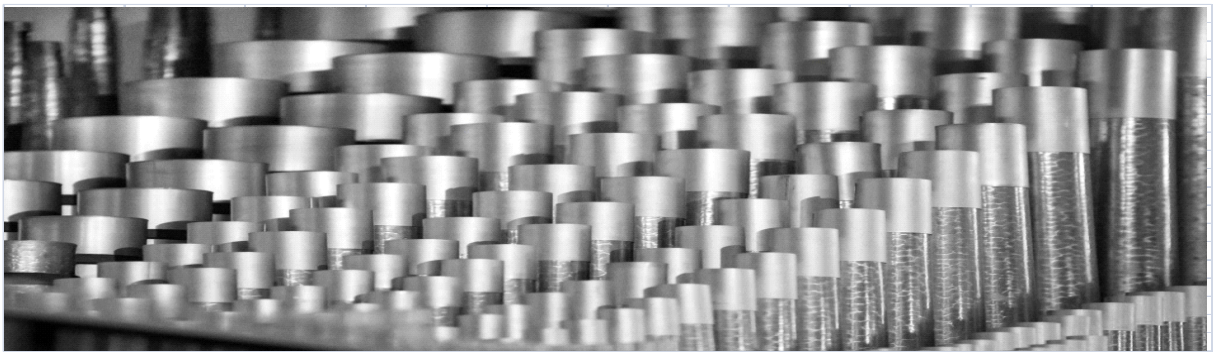
Aluminium is a key material for European industry in terms of both traditional production capacity and green and digital transformation objectives. Owing to its light weight, conductivity, durability, and almost unlimited recyclability, it constitutes a fundamental input across a wide value chain ranging from renewable energy infrastructure and electric vehicles to the defence industry and aviation. These characteristics make aluminium an indispensable element for Europe's energy transition, technological sovereignty, and strategic autonomy.

However, the European aluminium sector has been facing serious structural pressures in recent years. High and volatile energy costs, intensifying global competition, tightening trade policies, and uncertainties created by carbon pricing mechanisms are weakening primary production capacity in particular. New tariffs introduced in the United States and the acceleration of industrial policies at the global level have made Europe's vulnerability in this field more visible. The loss of aluminium production capacity has the potential to directly affect not only the sector itself but also a broad industrial ecosystem extending from automotive and defence to renewable energy and advanced technology manufacturing.

Against this backdrop, the European Union's approach to aluminium increasingly points to a search for a more comprehensive strategy that goes beyond regulation alone. While the Carbon Border Adjustment Mechanism (CBAM), critical raw materials policy, and re-industrialisation strategies reflect different dimensions of this search, the innovation agenda that has come to the fore in recent years stands out as one of the main levers that will shape the future of aluminium. Electrification, hydrogen-based production,

advanced recycling, carbon capture, and carbon-neutral production solutions are largely available from a technical perspective; the fundamental question is whether these solutions can be scaled up to an industrial level within Europe. Consequently, aluminium strategy has become a policy domain in which industrial capacity, the investment environment, and technological transformation are addressed together, rather than being framed solely around environmental objectives.

This study analyses the de facto strategic framework that emerges at the intersection of these two levels by examining the European Union's aluminium-related regulations together with the sector-oriented action plans developed by European Aluminium.



Re-industrialisation, Strategic Autonomy, and the Position of Aluminium

Supply chain shocks experienced in the post-pandemic period, geopolitical tensions, and intensifying global competition have led to a clear shift in the European Union's industrial policies. The re-industrialisation strategy is positioned not only as a tool for economic growth and job creation, but also as one of the main instruments in the pursuit of strategic autonomy, supply security, and resilience to crises. Within this new framework, the EU's objective is not to relocate all production back to Europe, but rather to preserve and rebuild production capabilities in critical sectors and for strategic inputs.

Aluminium is one of the sectors located at the centre of this re-industrialisation debate. Despite its wide range of applications and its indispensable role in the green transition, aluminium production in Europe displays a fragile structure under high energy costs and intense global competition. The contraction observed in primary production capacity in recent years has made the risk of re-industrialisation goals remaining at the level of rhetoric more visible. This situation necessitates an assessment of industrial policies not only through normative targets, but also through concrete production capacity, access to energy, and the investment environment.

The strategic importance of aluminium is clearly reflected in the broad spectrum of products and sectors it supports. Extending from automotive and electric vehicles to household appliances; from construction and green buildings to energy transmission infrastructure; and from defence, aviation,

ship and yacht building to packaging and advanced engineering applications, this spectrum makes aluminium a fundamental input that simultaneously supplies multiple sectors in modern industrial economies. This multi-sectoral structure demonstrates that any loss of capacity in aluminium would not only affect the metal sector itself, but would also have cascading effects across a broad industrial ecosystem dependent on it. Therefore, aluminium should be considered not as an isolated sector within European industrial policy, but as a critical infrastructure input that holds together numerous strategic value chains.

In this context, aluminium provides a critical example of how Europe's re-industrialisation strategy will function in practice. Failure to maintain production capacity in an energy-intensive yet strategic sector such as aluminium would weaken the implementation strength of the re-industrialisation narrative. Conversely, sustaining a low-carbon, competitive, and scalable production model in Europe would demonstrate that industrial policy operates not merely as a regulatory framework, but also as an instrument capable of enabling structural transformation.

The Strategic Role of Aluminium in the Context of Industrial Policy

The European Commission's Raw Materials Information System (RMIS) is an official information infrastructure that provides a comprehensive overview of production, supply, trade, circular economy, and sustainability indicators for aluminium and other critical raw materials. By tracking both primary and secondary (recycled) raw material flows, this system enables the EU's raw materials policies to be designed on a data-driven basis, while ensuring that regulatory instruments such as aluminium policy and the Carbon Border Adjustment Mechanism (CBAM) are grounded in a traceable and comparable framework.

The European Union's recently reshaped industrial policy has moved away from a protectionist approach aimed at bringing all stages of production back to Europe, instead focusing on preserving production capabilities in critical sectors and managing strategic dependencies. Intensifying geopolitical competition, the increasing transformation of economic relations into instruments of power, and the growing use of supply chains as strategic tools have placed industrial policy at the centre of the strategic autonomy debate. Within this framework, industrial policy has evolved beyond its market-regulation function to become a policy domain directly linked to energy security, technological sovereignty, and economic resilience.

In policy discussions on the aluminium sector, the clearer differentiation between the structural characteristics of primary and secondary production has become increasingly important. While primary aluminium production exhibits a highly energy-intensive structure and is therefore more sensitive to carbon costs, secondary (recycled) aluminium production, with its lower

energy requirements and carbon profile, is associated with different policy instruments and incentive mechanisms. This distinction provides a determining framework for both the design of CBAM and the effectiveness of trade and industrial policies.

Energy market design plays a critical role in the competitiveness and transformation capacity of the aluminium industry. Long-term electricity supply contracts, capacity mechanisms, and the management of grid constraints are among the key factors determining the sustainability of primary production within Europe. Consequently, the future of aluminium is directly linked not only to carbon pricing and trade instruments, but also to the structuring of energy markets in a manner compatible with industrial needs.

At the same time, the acceleration of renewable energy investments in the European Union in recent years, and the fact that electricity generation from wind and solar sources is expected to surpass fossil fuels for the first time as of 2025, indicate that a structural transformation towards the decarbonisation of energy supply has begun. However, the extent to which this development is translated into competitive and predictable prices for energy-intensive industries continues to depend on the effectiveness of grid capacity, flexibility mechanisms, and long-term, industry-specific energy regulations.

Within this context, aluminium stands out as one of the key sectors that concretely embody Europe's new industrial policy approach. Due to its high energy intensity, strong economies of scale, and advanced technology requirements, aluminium production tends to concentrate globally in a limited number of production hubs. The loss of this capacity entails the risk not only of relocating metal production, but also of permanently shifting the associated know-how, supply networks, and innovation ecosystems to other regions. For this reason, aluminium represents a strategic asset that shapes Europe's long-term industrial and technological capacity.

The search for a balance between climate objectives and the preservation of industrial capacity constitutes one of the core policy tensions the European Union faces with respect to aluminium. When applied in isolation, carbon pricing, trade defence instruments, and regulatory standards may increase the risk of production shifting outside Europe. By contrast, preserving production capacity strengthens the structural foundations of Europe's green and digital transformation objectives. In this framework, aluminium emerges as a concrete policy domain in which the debate on strategic autonomy, particularly for energy-intensive sectors, moves beyond an abstract concept and is tested directly through production capacity.

European Action Plan for Aluminium: From Strategy to Implementation

The Action Plan for the European aluminium sector demonstrates that recognising aluminium's strategic importance in policy documents alone is not sufficient; this recognition must be supported by concrete, coordinated, and sector-specific interventions. Developed by European Aluminium, this framework addresses aluminium as a strategic asset positioned at the intersection of Europe's industrial, energy, and climate objectives. The core premise of the plan is that, even under current conditions characterised by high risks, viable policy instruments remain available.

The Action Plan groups the structural challenges facing the European aluminium sector around five key priorities.

1. **Addressing energy costs and supporting decarbonisation**

   Given the electricity-intensive nature of aluminium production, access to low-carbon, reliable, and predictably priced energy emerges as a decisive factor for maintaining the sector's competitiveness and production capacity. Accordingly, the plan treats the acceleration of renewable energy investments and the design of long-term energy supply mechanisms in favour of industry as a strategic necessity.

2. **Strengthening protection against carbon leakage**

   While supporting the core objectives of the Carbon Border Adjustment Mechanism (CBAM), the Action Plan underlines that the current design does not fully reflect the specific conditions of energy-intensive sectors such as aluminium. It emphasises that mechanisms implemented without adequately considering indirect emission costs, asymmetries in scrap trade, and global market realities may accelerate the relocation of production outside Europe rather than reduce global emissions.

3. **Treating aluminium scrap and the circular economy as strategic resources**
   Aluminium's ability to be recycled repeatedly offers a significant advantage in terms of both emission reductions and security of raw material supply. However, the uncontrolled diversion of scrap outside the EU undermines this potential and conflicts with Europe's circular economy objectives. The Action Plan therefore argues for a reassessment of scrap policies in alignment with industrial and climate goals.
4. **Ensuring a determined and balanced stance in trade policies**

   In the face of rising global protectionism, excess capacities, and industrial subsidies, it is clearly stated that Europe needs effective trade defence instruments to protect aluminium producers against unfair

competition. Within this framework, trade policy is not treated as a field separate from environmental and industrial policies, but as an integral component of industrial strategy.

5. **Providing structural support for aluminium products and value chains produced in Europe**

   The "Made in Europe" approach encompasses not only final products, but also integrated value chains supported by investments in electrification and circularity, as well as technical know-how, skills, and innovation capacity. When assessed together with the Net Zero Industry Act, the Critical Raw Materials Act, and related industrial policy instruments, this framework shows that aluminium's role in European industry is being addressed not as a temporary intervention, but as a long-term strategic orientation.

At the same time, the implementation of the "Made in Europe" approach is shaped within the legal boundaries defined by the European Union's World Trade Organization rules, state aid regime, and public procurement legislation. For this reason, the approach gains practical applicability not through direct protectionist tools, but through financing mechanisms, investment incentives, the redesign of public support schemes, and value-chain-based policy instruments. This tension between policy discourse and legal and institutional feasibility constitutes one of the key testing grounds of industrial policy in strategic sectors such as aluminium.

CBAM and Scrap: Structural Challenges for Aluminium

The European Union's Carbon Border Adjustment Mechanism (CBAM) aims to prevent carbon leakage and ensure coherence between climate policies and trade instruments. However, in electricity-intensive sectors such as aluminium that are deeply integrated into global value chains, the design of the mechanism is discussed not only as a technical carbon pricing tool but also as a regulation with significant industrial policy implications. At the centre of these discussions are questions regarding the extent to which the current scope of CBAM is sufficient to prevent carbon leakage, the potential impacts of a possible extension to downstream products on competitive balances, and how scrap should be positioned within the mechanism.

Studies conducted within the European Commission have shown that limiting CBAM solely to primary metals is insufficient to fully prevent carbon leakage risks that may arise along the value chain. In this context, the Commission has put forward a regulatory proposal envisaging the inclusion, as of 1 January 2028, of approximately 180 downstream products with a high content of iron, steel, and aluminium within the scope of CBAM. While this proposed scope

expansion will be finalised subject to the completion of the legislative process, it points to the Commission's clear and institutionalised policy direction towards extending CBAM to cover more advanced stages of the value chain. This development transforms the 2026–2028 period into not merely a compliance phase, but also a critical preparation stage in terms of data infrastructure, supply chain transparency, and emissions traceability.

With the implementation of CBAM, the European Union has taken a significant step towards internalising carbon costs in industry. However, debates over whether the mechanism alone is sufficient to safeguard industrial competitiveness have prompted a search for a more comprehensive framework within EU industrial policy. In this context, the proposed Industrial Decarbonisation Accelerator Act treats decarbonisation not merely as a regulatory burden, but as a strategic transformation area that strengthens industrial competitiveness. Accelerating permitting procedures, supporting strategic clean technology investments, and integrating resilience criteria into industrial policies aim to balance the cost pressures created by CBAM with production transformation. For countries such as Türkiye, which have deep trade integration with the EU, this development necessitates not only compliance with CBAM, but also the repositioning of industrial policies in the medium and long term.

Another prominent aspect of CBAM design concerns the methodological choices related to the calculation of embedded emissions. The current approach does not focus on the final production or assembly stages of products, but rather on the emissions of precursor inputs covered by CBAM. While it includes traceable steel and aluminium scrap generated during the production process, it excludes scrap generated at the end of a product's life cycle that lies outside supply chain control. Although this choice aims to enhance the administrative and technical manageability of the mechanism, it also raises debates regarding whether full alignment with circular economy objectives has been achieved.

Indeed, from the perspective of the aluminium sector, scrap is not merely a secondary input, but a strategic element for the expansion of low-carbon production and the strengthening of raw material supply security within Europe. Nevertheless, the Commission's cautious approach to scrap stems not only from industrial policy preferences, but also from technical and legal constraints related to traceability, verification, the risk of double counting, and the control of cross-border scrap flows. As a result, the position of scrap within CBAM emerges as a complex policy area that requires careful balancing between environmental objectives and implementation capacity.

Recent assessments shared by the European aluminium sector indicate that CBAM should not be viewed as a standalone tool for preventing carbon leakage, but rather as part of a broader policy set that must be addressed together with energy policies, trade instruments, and industrial strategies.

When energy costs, global capacity expansions, and asymmetries in scrap trade are taken into account, CBAM appears to have become one of the main policy domains in which the balance between Europe's climate objectives and its ambition to preserve industrial capacity is being tested in the specific context of aluminium.

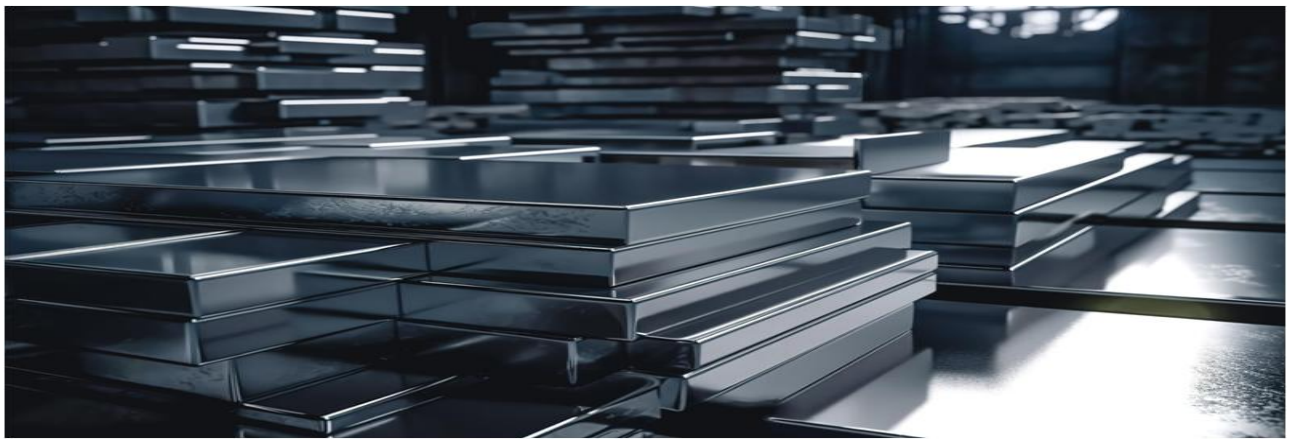
The European aluminium industry is under significant pressure not only from environmental obligations and high energy costs, but also from deepening imbalances in the global trade system. Analyses published by Aludium show that Europe's primary aluminium production has declined markedly over the past decade and that the resulting gap has largely been met through imports. This process has created conditions in the European market in which producers with structural advantages in terms of costs, scale, access to energy, and public support are positioned more competitively.

Türkiye, through its Customs Union relationship, is deeply integrated into the EU market and stands as a significant industrial actor at the regional level, with a strong production infrastructure, advanced recycling capacity, and export capability. However, remaining outside the European Union's network of Free Trade Agreements and the increasing determinative role of CBAM-related regulations bring about the need for a more comprehensive assessment of how this position can be preserved and strengthened. The new industrial and trade policies shaped by the European Union's "Made in Europe" approach are redefining competition not only through cost factors, but also through structural criteria such as production geography, carbon alignment, coordination with industrial policies, and value chain integrity. In this context, it is becoming increasingly critical for the current structure of the Customs Union to be reconsidered through a comprehensive approach that jointly addresses trade, industry, climate, and investment dimensions in alignment with this new policy strategy.

Within this framework, the strategic options for Türkiye in the coming period gain importance as they are evaluated under different policy scenarios. With the full implementation of CBAM, it is likely that cost pressures will increase for carbon-intensive production facilities, while firms with low-carbon and strong secondary production capacity may gain a relative competitive advantage. Similarly, potential restrictions on scrap trade may create short-term pressures on raw material flows, but could encourage the acceleration of circular economy investments in Türkiye in the medium term.

In this context, the choice between producing and investing within Europe and preserving production capacity outside the EU will, for firms, be shaped not only by costs but also by factors such as carbon alignment, access to finance, and long-term market security. Therefore, the strategy to be developed for Türkiye should have the character of a flexible and multidimensional industrial policy capable of adapting to different scenarios.

Accordingly, the sustainability of aluminium exports for Türkiye appears to depend on further strengthening the existing robust industrial infrastructure through a comprehensive industrial and trade approach based on high technology, low-carbon production, circular economy principles, and recycling capacity.



Conclusion and Assessment

Europe's aluminium policy has, in recent years, been reshaped beyond the boundaries of environmental regulation, in line with the objectives of preserving industrial capacity and strengthening strategic autonomy. Aluminium's central role in the green and digital transition is now accepted without dispute; however, this role remains fragile unless it is supported by concrete policy instruments that ensure the retention of production capacity within Europe. In this respect, the aluminium sector constitutes a tangible indicator for measuring the success of Europe's industrial transformation.

While the Critical Raw Materials approach, CBAM, and the re-industrialisation narrative bring different dimensions of aluminium policy to the agenda, it is becoming increasingly clear that these instruments are not sufficient on their own. Although CBAM provides an important framework against carbon leakage, when it is designed without adequately accounting for the specific conditions of electricity-intensive sectors, indirect emission costs, and scrap flows, it carries the risk of accelerating the relocation of production outside Europe. Similarly, while the critical raw materials policy avoids directly targeting aluminium, this indirect form of protection remains limited unless it is complemented by an industrial approach that encompasses the entire value chain.

At this point, the Action Plan and the Net-Zero by 2050 roadmap put forward by European Aluminium clearly demonstrate that the future of aluminium will be determined not solely by regulation, but by the coordination of energy, investment, and innovation policies. Technical solutions are largely available; what is decisive is the creation of predictable energy prices, financing mechanisms, and an investment environment that enable these solutions to

be scaled up to an industrial level within Europe. Accordingly, the debate has shifted from the question of "can aluminium be decarbonised?" to "can Europe achieve this transformation within its own industrial base?"

The recent shift observed in the European Union's industrial policies signals a new era in which interdependence between countries is treated not merely as an economic advantage, but as a strategic instrument. The "Made in Europe" approach represents a concrete reflection of the intention to redefine supply chains geographically and to strengthen industrial capacity within the Union's borders. In this context, the widening gap in the field of Free Trade Agreements in Türkiye–EU relations indicates that the current structure of the Customs Union is becoming increasingly restrictive for Türkiye. While the European Union deepens its FTA network to safeguard its industrial ecosystem, Türkiye faces the risk of remaining outside this emerging structure.

The Action Plan developed specifically for aluminium also illustrates how this transformation is being institutionalised at the sectoral level. Access to low-carbon energy, scrap and circularity policies, trade defence instruments, and the emphasis on "production in Europe" elevate aluminium to a priority that is not only environmental, but also strategic and macroeconomic. This situation is relevant for Türkiye not only in relation to the aluminium and metal sectors, but across all branches of industry, indicating that competition is no longer shaped solely by cost and quality, but increasingly by production geography, origin perception, and the capacity to align with industrial policies. For this reason, it is of critical importance for Türkiye to update the gains achieved through the Customs Union in a manner aligned with the reshaped FTA mechanisms and industrial policy instruments.

In conclusion, aluminium serves for Europe as a test case that examines the coherence of industrial policy, the balance between climate objectives and competitiveness, and the credibility of the claim to strategic autonomy. The European Commission's projected economic contribution targets for steel and aluminium also demonstrate that these sectors are being addressed as macroeconomic priorities within Europe's industrial strategy.

In this context, while alignment with the axes of energy, circularity, decarbonisation, and value chain integrity defined in the European Union's Action Plan for the aluminium sector is critical, the ongoing geoeconomic fragmentation at the global level necessitates a broader perspective. Indeed, recent realignment trends observed in global trade reveal that industrial policies are being reconfigured beyond cost- and efficiency-based approaches, increasingly around production geography, geoeconomic resilience, and strategic value chains. This places the European Union's industrial and trade approach to aluminium within the context of a wider global transformation. Within this framework, it becomes evident that Türkiye's industrial and trade policies need to be addressed within a comprehensive

and forward-looking strategic framework that takes into account the reshaping of the global geoeconomic structure and emerging conditions.

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