

Novelis

From critical material dependency
to leaders in circularity:

A True Industrial Recycling Strategy for Europe

Reversing the loss of critical and strategic raw material sovereignty - Aluminum.

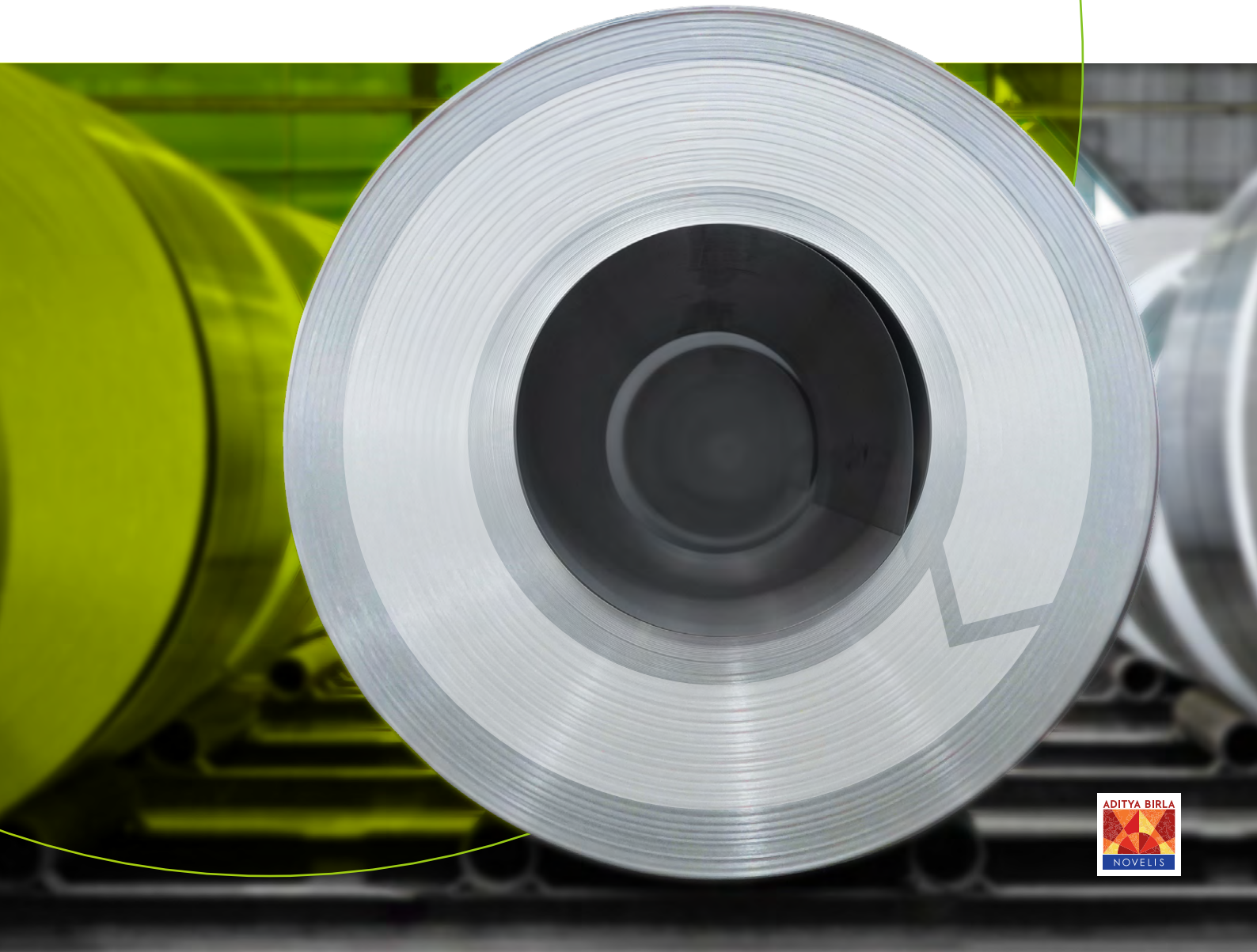


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Executive Summary

Europe faces a strategic challenge in securing aluminium supply while simultaneously meeting decarbonization and industrial competitiveness objectives. Global aluminium demand is rising sharply, driven by electrification, automotive lightweighting, construction, and packaging. At the same time, Europe has lost a significant share of its primary aluminium production capacity and has become increasingly import-dependent. While secondary (recycled) aluminium production has grown and now exceeds primary production in Europe, the full potential of circularity remains unrealized due to structural, regulatory, and market failures.

The paper calls for a coordinated European industrial recycling strategy centered on retaining, upgrading, and valorizing aluminium scrap in Europe.

Competitiveness – The Key for Success

- Scale world-class recycling capacity through targeted public-private investment in R&D, advanced sorting, and industrial deployment.
- Align the EU Emissions Trading System (EU ETS) with a methodology that supports circularity.
- Ensure the Carbon Border Adjustment Mechanism does not penalize the recycling of certain scrap types compared to others, and does not further exacerbate existing methodological inconsistencies in the calculation of the carbon footprint of aluminium products in a way that would discourage full circularity from production to end of life.
- Embed “Made in Europe” incentives that recognize aluminium recycled and transformed in Europe (EU27, EFTA, and the UK) as a strategic, low-carbon resource.
- Secure affordable, decarbonized energy via industrial energy policy, long-term power contracts, grid investment, and continued indirect ETS cost compensation.

Facilitated Access to and Incentivizing the Use of Scrap – the Enabler

- Facilitate access to scrap by introducing a fee on exports of aluminium waste and scrap to other regions, strengthen traceability through more granular trade codes, and enforce more robust controls on exports outside of Europe.
- Promote the use of all types of scrap, both pre-consumer (also called post-industrial) and post-consumer scrap, which leads to lower CO₂e emissions when assigning zero carbon emission burden to pre- and post-consumer scrap, and decreases dependency on imported aluminium.
- Embed circular economy principles at the product design stage via ambitious yet realistic recycled content targets that integrate both pre- and post-consumer scrap.
- Promote carbon and recycled content accounting methodologies that incentivize the recycling of both pre- and post-consumer scrap, by counting both types of scrap towards the recycled content of aluminium, and by allocating all carbon emissions to the functional products produced and no emissions to aluminium scrap.
- Expand and harmonize Extended Producer Responsibility to additional sectors.
- Harmonize and strengthen environmental legislation, ensuring that waste and scrap of critical and strategic raw materials are duly recognized and treated as such.

A true industrial recycling strategy for aluminium is essential to Europe’s climate goals, industrial competitiveness, and raw material sovereignty. By treating scrap as a strategic resource and aligning industrial, energy, trade, and carbon policies to the objective of fully leveraging circularity, Europe can move from dependency to leadership in circularity - retaining value, reducing emissions, and securing its industrial future.



Status Quo - Aluminium Demand and Sourcing

The Global Picture

Most of us use or interact with aluminium every day, often without realising it. As its applications have expanded across multiple sectors, from the technology in our hands to the structures within our office buildings, global demand has grown substantially. Aluminium consumption spans a wide range of product forms, including extrusions, rolled products, and castings, which all support the manufacturing sector. In 2024, global aluminium demand exceeded 116 million tonnes, with approximately 64% supplied by primary production (around 74 million tonnes) and the remaining 36% met by secondary, recycled aluminium (around 42 million tonnes).¹ Although secondary aluminium production continues to grow - driven by its contribution to sustainability, circularity and energy efficiency - the global industry still relies heavily on primary production to meet overall demand.

According to the International Aluminium Institute, total consumption of aluminium is projected to rise by around 40% between 2020 and 2030, requiring an additional 33.3 million tonnes across all sectors.² Notably, two thirds of this demand growth is expected to come from China. Over the last 25 years, primary aluminium production hubs have shifted. In the early 2000s, North America, Europe, and Russia were the top producers of primary aluminium, but by 2010 China was outproducing all three regions.³ At present, China produces about 60% of global primary aluminium due to its large bauxite reserves, while other major producers include India, Russia, Canada, and the United Arab Emirates.⁴

This surge in demand has been driven by advances in aluminium processing and applications which have increased its attractiveness to more industries. Aluminium's unique properties - strength, light weight, versatility, corrosion resistance, and high recyclability - have encouraged some in the automotive and aerospace sector to shift away from heavier metals like steel in

favour of aluminium. Growth projections suggest that global electric vehicle production is forecast to raise aluminium demand significantly, reaching 31.7 million tonnes by 2030, up from 19.9 million tonnes in 2020.⁵ Aluminium used in solar panels and in power transmission and distribution will require an additional 5.2 million tonnes by 2030 and the construction sector is projected to need a further 4.6 million tonnes by the end of the decade.⁶ For fast moving consumer goods, particularly food and beverage packaging, demand is expected to grow from 7.2 million tonnes in 2020 to 10.5 million tonnes in 2030, supported by the rising popularity of canned beverages and a broader consumer shift towards recyclable, low carbon packaging.⁷

Within these growth projections, secondary (recycled) aluminium's share of global supply is forecast to rise from 29% in 2020 to 36% by 2030.⁸ Utilizing aluminium scrap into the production of secondary aluminium provides both environmental and supply chain resilience advantages. It uses around 95% less energy to process than primary production and reduces reliance on bauxite mining - located in a small number of countries - and alumina refining. With the right processing, the aluminium already in circulation could be utilized again - approximately 75% of the 1.5 billion tonnes of aluminium ever produced remains in circulation today.⁹ For the aluminium-based products now, product design (or design for circularity) will become more important in allowing the product to retain the value of the material when dismantled and reducing the cost of recycling. Retaining the value (e.g. keeping the alloys separated) enables old products to be remade into new. Although primary aluminium will continue to play an essential role in meeting global demand, scaling up secondary production is essential for unlocking sustainable, resilient and resource-efficient growth.

1 International Aluminium Institute | [Alucycle database](#) (2024) (accessed March 2026)

2 International Aluminium Institute | [Report Reveals Global Aluminium Demand to Reach New Highs After Covid](#) (accessed March 2026)

3 See table - International Aluminium Institute | [Primary Aluminium Production](#) (accessed March 2026)

4 Ibid

5 International Aluminium Institute | [Report Reveals Global Aluminium Demand to Reach New Highs After Covid](#) (2022)

6 Ibid

7 Ibid

8 Sourced from CRU

9 International Aluminium Institute | [Facts About Aluminium](#) (accessed March 2026)

The European Dilemma

European demand for aluminium has closely mirrored global trends, with Europe's energy transition projected to increase European annual demand for aluminium by around 5 million tonnes by 2040 - representing growth of roughly 30%.¹⁰ How this demand will be met is uncertain. Over the last 20 years, European primary production has steadily declined.¹¹ In 2002, Europe produced 4.9 million tonnes of primary aluminium and imported 2.6 million tonnes to meet demand. By 2025, this trend had reversed with domestic primary production having fallen to 3.4 million tonnes, while primary imports have risen to 4.4 million tonnes.¹² For European Union (EU27) production, the picture is even worse. In the last two decades, the EU27 has lost almost 60% of its primary

aluminium production, falling from 2.9 million tonnes in 2005 to approximately 1.2 million tonnes in 2025.¹³ With production falling by half between 2021 to 2023 due to the European energy crisis. By contrast, European secondary (recycled) aluminium production has expanded significantly from 3.9 million tonnes in 2002 to 4.8 million tonnes in 2024, exceeding primary production from 2012 onwards.¹⁴ Demand for secondary aluminium has grown as manufacturers incorporate higher recycled-content material across more applications, which in turn has improved scrap collection and sorting efficiency and driven investment in new alloys capable of absorbing a wider range of scrap streams. With the packaging and the automotive industry leading the way in adoption.

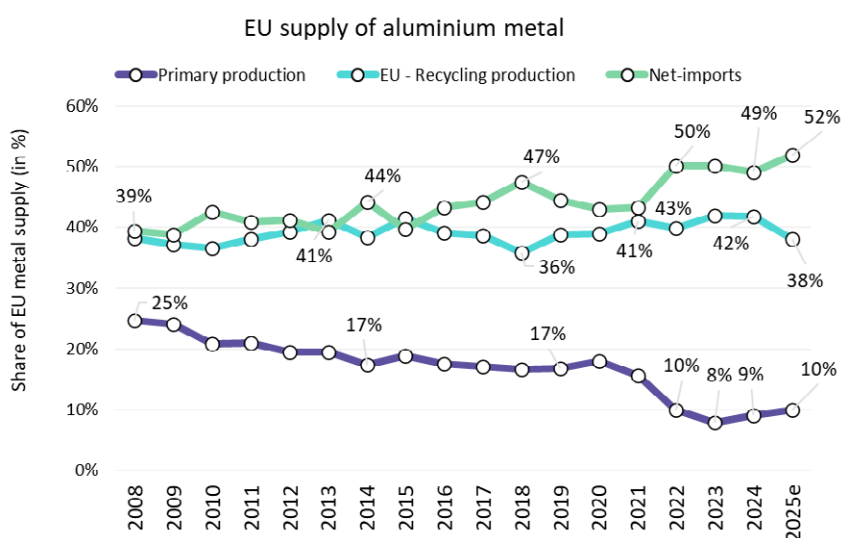


Figure 1 - The latest 2025 figures show that 52% of the aluminium metal placed on the EU market is imported, while recycling meets 38% of demand and EU primary production accounts for 10%. Note on this graph: EU15 data until 1999, EU25 data for 2000-2004, EU27 data for 2005-2013, EU28 data for 2014-2020 and EU27 data from 2021. Source: European Aluminium

The European Aluminium association attributes much of Europe's aluminium production challenges to structural cost pressures. The main pressure being electricity costs, which now account for around 40% of production costs.¹⁵ Since 2021, the Union's primary smelters have curtailed or shut down entirely nearly 50% of their production due to high gas and power prices. High production costs

also harm secondary producers who require gas to fuel melting furnaces and electricity to power rolling capabilities. For primary aluminium, regions with access to industrial hydroelectricity capacity, such as Norway, Iceland, and the United Kingdom, have been better able to sustain production, though not at levels sufficient to meet overall European demand.¹⁶

¹⁰ KU Leuven and commissioned by Eurometaux | [Metals for Clean Energy: Pathways to solving Europe's raw materials challenge](#) (2022)

¹¹ Europe = EU27 + EFTA + UK.

¹² Sourced from European Aluminium

¹³ Sourced from European Aluminium

¹⁴ See table - International Aluminium Institute | [Alucycle database](#) (2024) (accessed March 2026)

¹⁵ European Commission | [Study on energy prices and costs](#) (2024)

¹⁶ European Aluminium | [Environmental Profile Report](#) (2024) - In 2023, imported primary aluminium carried an average emissions intensity of 12.9 kg CO₂e/kg, more than twice the 6.3 kg CO₂e/kg associated with European production

As decarbonization pressures on European industry mount, long term competitiveness will depend on securing large, stable volumes of affordable low carbon electricity. With gas-fuelled production becoming increasingly unaffordable, the aluminium recycling industry is exploring alternative electricity-based technologies, including plasma-based processes.¹⁷ These processes, however, remain energy intensive and require substantial upfront investment. In the short to medium term, a flexible transition pathway will be essential – one that allows producers time to gradually shift towards decarbonized energy and to adjust their energy mix in response to seasonal price fluctuations. Such flexibility is necessary both to safeguard competitiveness and to support Europe’s wider decarbonization objectives.

More poignantly, if global aluminium demand is supposed to rise by nearly 40% by 2030, global primary supply is unlikely to keep pace – impacting import-dependent regions like Europe. China – the world’s biggest producer – is fast approaching its self-imposed 45 million tonnes capacity cap, and

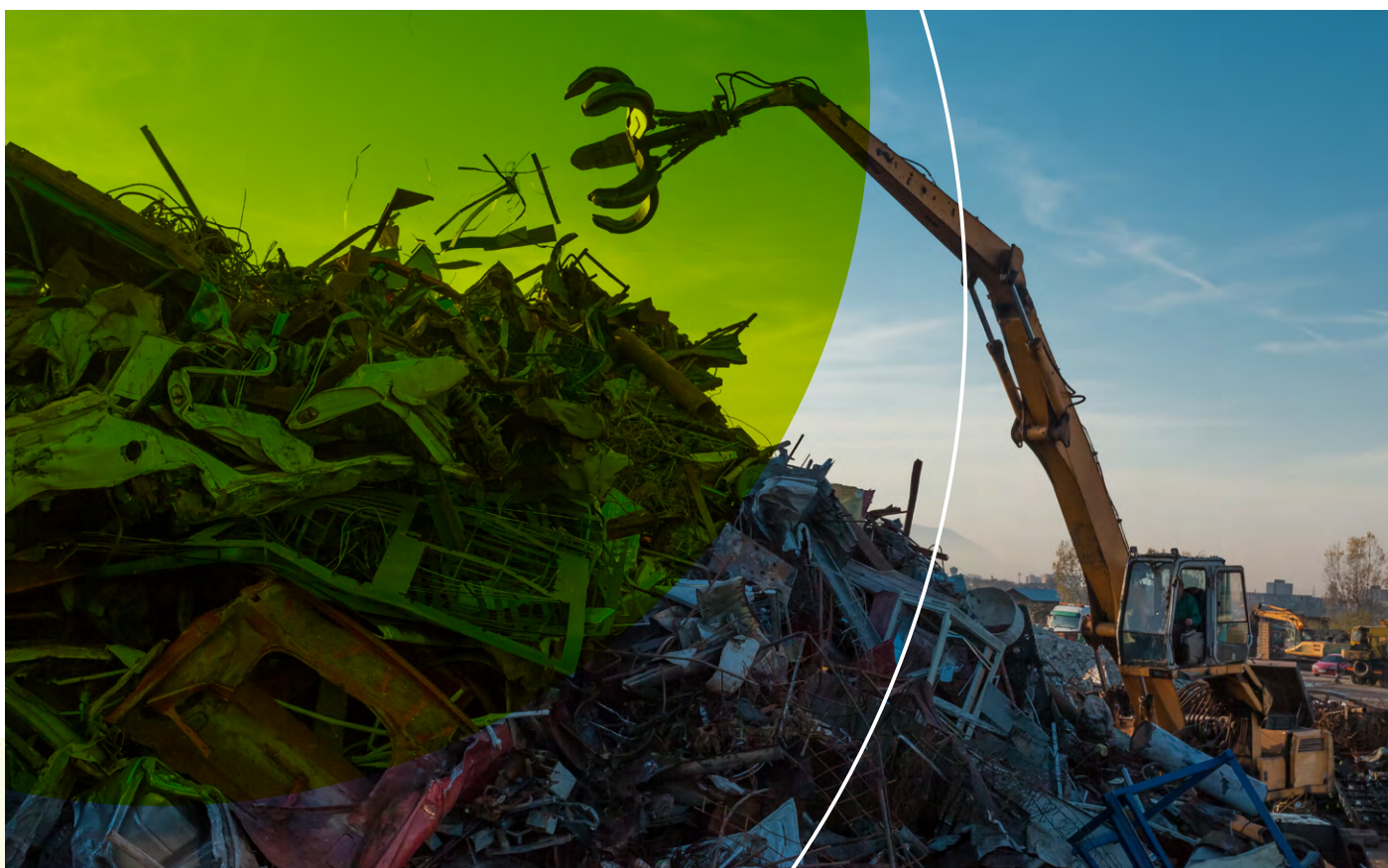
investment elsewhere in new furnaces remains insufficient to fulfil demand – raising the possibility of a global supply deficit.¹⁸ In this context, major producing regions may prioritise their own industrial and environmental needs, potentially constraining Europe’s access to aluminium and presenting Europe with an important question around the resilience of its domestic supply.

Although, Europe is likely to remain import-dependent on other regions to meet its demand for primary aluminium for the foreseeable future, it does have a clear opportunity to strengthen its existing secondary (recycled) aluminium production. Already today, the aluminium industry generates approximately €40 billion in annual revenue and directly employs around 250,000 people, of which 90% of the jobs are found in downstream production (recycling and semi-finished), with a further one million jobs supported indirectly across the value chain.¹⁹ Maintaining the capacity that is currently available is a good first step, tackling the structural challenges to create economic growth and fully leveraging secondary production is the next.

¹⁷ Initial trials into hydrogen use in an aluminium melting process has shown to be technical feasibility in the United Kingdom. More investigation is required into long-term reliability and viability (price).

¹⁸ Wood Mackenzie | [Aluminium at a crossroads: synchronising supply growth with decarbonisation](#) (2025)

¹⁹ European Aluminium | [The Strategic Role of European Aluminium](#) (2024)



Structural Challenges

Competition from Outside

In March 2024, Luca de Meo, then CEO of Renault Group, published a public letter to European leaders highlighting what he described as “an imbalance in competition” within the global automotive industry.²⁰ Using the battery sector as an illustration, he contrasted three distinct industrial policy approaches. In China, he noted, the government established clear long-term targets for electric vehicle development, de-risked public and private investment across the full supply chain, and saw China capture approximately 75% of global battery production capacity. In the United States, the government stimulated – the Inflation Reduction Act deployed billions of dollars to encourage private investment in gigafactories and reduce industrial electricity costs, resulting in multiple multi-national businesses re-allocate resources to the United States.

By contrast, in Europe, Luca de Meo saw a regulation-led approach placed on businesses to establish Europe as a leader in environmental protection while being cautious in response to the scale of international competitors. Similar observations to Luca de Meo’s can be found in the Draghi Report on European Competitiveness. Draghi argues that global trade policy interventions are on the rise and European “high trade openness” is exposing the continent to the consequences.²¹ He argues that to further the success of decarbonizing growth areas, Europe needs to “level the playing field in sectors more exposed to unfair competition from abroad and/or facing more exacting decarbonization targets than their international competitors” to ensure growth.²²

Trade distortions and global industry policies intensify competition for scrap. The European aluminium sector faces comparable pressures as it strives to keep leadership in secondary aluminium innovation and circularity, and not to be overwhelmed by increasing Chinese production. European secondary (recycled) aluminium producers have already made notable innovation progression – raising recycled content, investing in recycling capabilities, and advancing alloy

innovation for recycling, for example in packaging and automotive. However, these achievements are increasingly undermined by intense competition for scrap and the absence of adequate trade protections around aluminium. As an import-dependent region, Europe maintains an open and liberalised trade regime for aluminium in its trade agenda to meet demand. This openness – currently also afforded to exports of aluminium scrap, the feedstock for secondary aluminium – has enabled foreign buyers to offer significantly higher prices for European scrap, which is better sorted in Europe due to effective European collection systems, and then outbidding domestic buyers for the material. Much of this external demand stems from China, where government policy has doubled domestic recycling capacity as part of its aluminium decarbonization strategy.²³ These efforts are reinforced by the Chinese government’s drive for decarbonization and a 15% export tariff designed to retain scrap within China, alongside stringent import levies and environmental rules that restrict incoming low-value scrap.²⁴ Together, these measures intensify global competition for feedstock and place additional pressure on Europe’s recycling infrastructure.

Intermediary hubs in countries with lower processing costs. Trade data indicates that China’s strict import levies on aluminium scrap have encouraged the rise of intermediary processors that process scrap material before it enters the Chinese market. As a result, regional pre-processing hubs in Southeast Asia – some backed by Chinese investment – have expanded rapidly. These hubs have comparatively lower processing costs and environmental, health and safety rules, and enable competitive prices to be offered to European scrap exporters, drawing in substantial volumes of European scrap material. Combined with broader factors such as subsidies, overcapacity, and market distortions, these dynamics have contributed to heightened scrap price volatility across Europe.²⁵

20 Renault group | [Letter to Europe](#) (2024)

21 Mario Draghi | [The future of European Competitiveness](#) (2024)

22 Ibid

23 Aluminium Association | [Chinese Subsidies Have Devastated Global Aluminum Markets and Fair Competition](#) (2025)

24 OECD | [Export restrictions on critical raw materials](#) - Trade in Raw Materials - 2025 Edition (accessed March 2026)

25 Fast Market | [Could Southeast Asia become the next big aluminium scrap processing hub in 2025?](#) (2025)

Scrap export restrictions. China is not alone in restricting exports of aluminium scrap. The OECD reports that several Asian economies – many of them importers of European scrap – have limited their outflows of aluminium and aluminium scrap.²⁶ These aluminium scrap measures vary. Malaysia imposes a 10% export tariff and requires exporters to obtain prior approval through a licensing system; Indonesia enforces licensing requirements on aluminium scrap exports and has implemented an export ban on alumina; and Vietnam applies a 22% export tariff on aluminium scrap. Industry stakeholders are increasingly concerned that European scrap exports are, in effect, subsidising manufacturing in Asia – where processed scrap is converted into semi finished or finished aluminium goods for global export – instead of supporting recycling capacity within Europe.

US Tariffs on aluminium. This imbalance was further aggravated by the impact of U.S. Section 232 tariffs in 2025. Although aluminium scrap is excluded from the tariff scope, the resulting arbitrage opportunity caused European exports of scrap to the United States to surge by 273% in Q1 2025 compared with the previous year.²⁷ According to European Aluminium, this diversion to Asia and the United States has left around 15% of EU recycling furnace capacity idle over the past year due to insufficient availability of domestic scrap.²⁸ The United States, however, suffer from low aluminium recycling rates (~40%) despite being big consumers of the metal. Some scrap aluminium is recycled into new products, but recycling rates show most scrap is either exported or landfilled. The pull of scrap to the United States due to geopolitical trade measures means that in many cases, this material is lost to circularity or worse, landfilled.

Challenges Within

Greenhouse Gas Accounting for Scrap. Increasing the percentage of recycled material used in aluminium production is the most impactful route to reducing the carbon footprint of aluminium products. Yet, the challenge in the aluminium industry is that it remains unaligned on if all scrap (pre-consumer – also called post-industrial – and post-consumer) are included as a benefit in Greenhouse Gas (GHG) accounting. There are three main allocation approaches for scrap material in GHG accounting – the “Cut Off” method, the “Substitution” (aka Avoided Burden) method and the “Co-product” method. Under the “Cut Off” method (the recycled content method), primary aluminium emissions and the manufacturing process emissions are allocated to

The diversion of scrap from Europe is not new, and global competition has been slowly reshaping Europe’s ability to compete at scale. However, it is important to note that not all scrap can be used for all applications. Due to aluminium being an alloyed material, e.g. it requires other minerals like magnesium to alter its strength or flexibility, it needs to be separated by alloy type to make it more valuable (high-quality) and able to be recycled back into a product of similarly high value. Aluminium having eight alloy types, separation at source is the best way of keeping aluminium scrap at its highest value. In practice, the default for scrap aluminium sorting and processing is to mix multiple alloys together due to limitations in sorting technologies. The mixing of alloys means lowering the scrap value (low-quality) because the cost of sorting, combined with high scrap prices, would not be viable on mass. This is why lesser quality scrap is sold onto Asia where lower environmental and labour costs enable manual separation techniques, which in turn enable the scrap purchasers to outbid European scrap purchasers.

Lack of granular trade codes masks quality and value loss.

Knowing how much high or low-quality scrap is leaving Europe is currently very difficult to measure, beyond the experiences faced by producers. Current trade codes are too broad and without detail. Improving these codes by identifying the types of scrap based on composition and quality, will help administrations to target what scrap should be utilized for recycling and production in Europe as a priority. The alternative is to continue allowing the outflow of high-quality scrap so that other regions can recycle and convert it into aluminium products that Europe will potentially buy back later to meet its demand – leading to economic value, jobs and technological advantage moving outside Europe.

the final product: any scrap generated during production is thus treated as carrying zero emissions. This approach is widely used in cradle-to-gate lifecycle assessments (LCAs) by many industries in alignment with ISO standards and the GHG Product Life Cycle Accounting Reporting Standard. This reflects the physical reality of the scrap market, which separates scrap types based on their shape, composition and quality/cleanliness – rather than based on the emissions of the metal from which the scrap was generated. This approach aims to incentivize recycling across the supply chain of all scrap material (pre- and post-consumer scrap) by treating all forms of scrap equally.

²⁶ OECD | [Export restrictions on critical raw materials](#) - Trade in Raw Materials - 2025 Edition (accessed March 2026)

²⁷ US Customs Data - In March 2025, US imports of scrap increased by 55% vs March 2024; in April 2025, they indicated a 29% increase vs April 2024 (accessed March 2026).

²⁸ European Aluminium [Applauds EU move to address scrap leakage](#) (2025)

In contrast, the Substitution method (end-of-life recycling credit method) allocates not only the primary aluminium emissions and manufacturing emissions to the product, but also emissions associated with scrap inputs, excluding post-consumer scrap. Crucially, it introduces an “avoided burden” where the product system takes credit today for the recycling of materials that will eventually happen in the future. The credit reduces the emissions allocated to the final product by assuming a primary carbon emission value of an untraceable source. The pre-consumer scrap thus carries similar emissions as primary aluminium, even if the scrap was generated from high recycled content aluminium. Because this method allocates emissions and credits based on the eventual use of scrap, respectively, based on the carbon footprint of primary aluminium from outside the system that will eventually be avoided by using the scrap, it depends heavily on accurate traceability of emissions attributed to scrap throughout the value chain, increasing both complexity and the risk of misallocation. Additionally, if the method is not applied consistently, it can still lead to carbon leakage or double counting where products made with high levels of primary metal have negative carbon footprints, or scrap-based products with inflated emissions. Lastly, the ‘Co-product’ method assigns the primary burden to both the product, and the scrap (aka co-product) proportionate to the mass amount produced during manufacturing. Therefore, the scrap material will also carry a burden that is dependent on manufacturing inefficiencies. This method also requires accurate traceability of emissions attributed to scrap through the value chain, increasing the complexity, and has potential for carbon leakage and double counting. Although inconsistencies are a feature of all approaches, the choice of method can shape incentives within the aluminium value chain – either encouraging recycling of all scrap (Cut Off) or only encouraging recycling of post-consumer scrap (Substitution or Co-product). Ultimately, consistency across the value chain is required and the carbon accounting methodology should appropriately reflect the industry’s efforts to achieve circularity from production to end-of-life.

Carbon Border Adjustment Mechanism (CBAM).

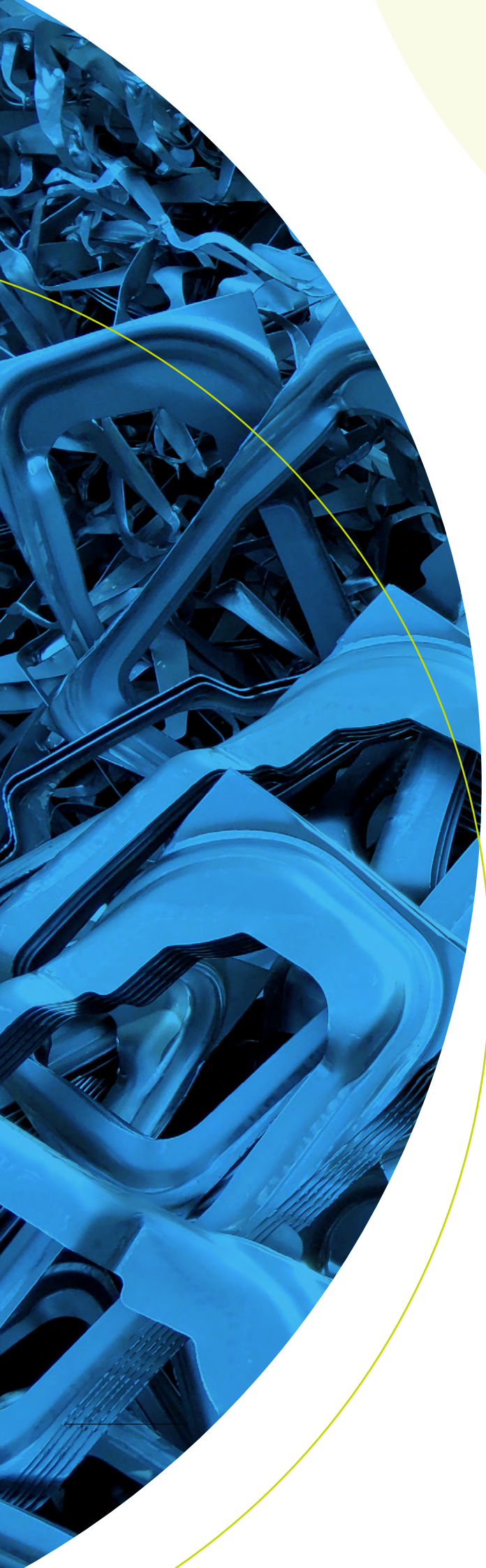
Regulatory issues can exacerbate the cost of production. The Carbon Border Adjustment Mechanism provides a clear example. Primary aluminium is priced on global markets through the London Metal Exchange, but European buyers must also pay a regional premium (the European Duty Paid Premium - ECDP) that reflects logistics, duties and the cost of attracting primary aluminium to Europe under the “marginal supplier” principle. With CBAM applied to imported primary aluminium and European producers losing ETS free allocations, this premium now embeds carbon costs, increasing the overall cost of aluminium in Europe, including aluminium scrap because scrap prices are

closely correlated with primary prices. Foreign producers exporting to Europe, however, can continue purchasing primary aluminium and scrap at prices that do not include the European premium and will only pay CBAM based on their declared emissions, while European manufacturers – via the regional premium – face a carbon charge linked to the most carbon intensive tonne still required to meet EU demand. As these costs become embedded across the entire European market, aluminium becomes more expensive for EU industry and competitiveness weakens.

Beyond its direct cost impacts, the design change proposed by the Commission to tackle circumvention – potentially attributing emissions to pre-consumer aluminium scrap used as precursor in CBAM goods – also risks indirectly contributing to the inconsistency on carbon accounting practices in a way that undermines circularity.²⁹ It is not yet clear, how the Commission proposes to calculate emissions to be attributed to pre-consumer scrap. If, however, emissions are attributed to pre-consumer scrap used in CBAM goods, while post-consumer scrap is treated as carbon-free, this would implicitly favour one scrap stream over another. Such differentiation would undermine the widely used carbon accounting methodology that attributes all emissions to the final products and treats all scrap as emission-free in order to incentivize the recycling of all scrap streams. The resulting exacerbation of inconsistency in methodologies could penalize the recycling of high-quality pre-consumer scrap, weaken closed-loop industrial recycling – particularly in automotive value chains – and ultimately run counter to circular economy and decarbonization objectives. CBAM must therefore remain neutral with respect to scrap origin and avoid driving a de facto change in carbon accounting methodologies that discourages efficient, high-value recycling.

Lack of Supporting Regulatory Framework. A degree of regulatory uncertainty for aluminium recycling arises from the current design of the EU Emissions Trading System, where recycling installations are assessed against generic or fallback benchmarks that do not fully reflect the technical realities of aluminium remelting and refining. In practice, these benchmarks are often derived from combustion- or biomass-based processes that are technically not feasible to use for aluminium recycling operations. In addition, the fall-back benchmark disincentivizes investment in energy efficiency as it relates to energy consumption rather than the volume of finished products. As a result, an installation that invests in efficiency and reduces its CO₂e emissions may receive fewer allowances. At the same time, the regulatory framework for aluminium recycling in Europe does not sufficiently take into account the sector’s reliance on stable, competitively priced supplies of decarbonized energy, which is essential for operating recycling assets

²⁹ European Commission | Proposal of 17 December 2025 for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Regulation (EU) 2023/956 as regards the extension of its scope to downstream goods and anti-circumvention measures, COM/2025/989 final



efficiently and planning long-term investments. Key non-European competitors in other regions are estimated to have energy costs at least 20% lower than in the EU. The competitiveness of European aluminium recycling operations depends on a bold industrial energy policy that brings energy costs down fast and effectively.³⁰

Lack of Transparency. Adding to the above, there is a lack of transparency between supply and demand within the EU scrap market. Scrap dealers often report that they struggle to find buyers within Europe for their scrap and therefore feel compelled to export. At the same time, aluminium producers regularly express frustration that they cannot increase their recycled content because high quality scrap is unavailable. This disconnect reflects a deficit in communication regarding both the technical capabilities of the recycling industry and the specific scrap qualities required by manufacturers. Although there is not a catch-all approach to address this, work has been done at sector level. In 2023, the Automotive Circularity Platform (ACP) successfully piloted an open platform model that directly linked end-of-life vehicle dismantlers with industrial users of high quality recycled materials.³¹ The ACP model allowed dismantlers to understand precisely which parts and materials manufacturers require, enable separation of these materials during dismantling, and improve data tracking and traceability of materials to help automotive manufacturers meet regulatory and legal obligations.

Administrative Complexity. The collection, processing, and utilization of scrap can take place in different European countries, depending on the network of stakeholders and the availability of suitable recycling technologies. While there is a positive trend toward harmonizing legislation on scrap registration and transportation among EU member states, local authorities do not always interpret the rules consistently. This can lead to discrepancies in practical implementation, resulting in administrative burdens, delays, and additional costs. A top-down set of guidelines from the EU to ensure a unified interpretation of the regulatory framework would therefore be highly beneficial. In parallel, policy should recognize that the “end-of-waste” status was introduced to facilitate trade, storage and transport of aluminium scrap within the Union when certain criteria are met including treatment and recovery operations, quality management system etc. While this goal and ambition is laudable, implementation has shown limits when it comes to exports of aluminium scrap. While there are documentation checks, physical inspections of the goods are run at random based on risks assessments.

³⁰ European Commission (Trinomics) | [Final report : Study on energy prices and costs – evaluating impacts on households and industry's costs – 2024 edition](#)

³¹ Circular Economy Europa | [Automotive Circularity Platform: From Automotive to Automotive: an ecosystem approach for closed loop end-of-life vehicle recycling](#)

Definition of a True Industrial Recycling Strategy for Aluminium

Recommendations – Strengthening Europe’s Leadership in Aluminium Circularity

Europe now stands at a critical crossroads. Meeting future demand for aluminium while safeguarding economic and strategic autonomy will require a coordinated policy framework that strengthens domestic recycling capacity, preserves high quality scrap within Europe, and embeds competitive circularity at the core of industrial policy. For aluminium, this necessitates both protective measures to ensure European producers can operate on a level playing field and forward-looking strategies to position Europe as a global leader in low carbon, circular aluminium. A robust and coherent European recycling strategy must form the foundation of this aim.

Achieving genuine circularity in the aluminium value chain requires a system in which all scrap is recovered, appropriately sorted, and maintained at its highest economic and technical value, without downgrading or diversion to landfill. Such an approach is not only integral to reducing waste but also directly supports the objectives of the EU Critical Raw Materials Act by ensuring that secondary aluminium contributes meaningfully to Europe’s strategic raw material security. By maximising the availability and utilization of domestic scrap, Europe can reduce its dependence on external suppliers, reinforce supply chain resilience, and enhance its long-term industrial competitiveness.

Competitiveness – The Key for Success

For this model to succeed, we must fully leverage the secondary aluminium production we have in Europe and then ensure it can be profitable, resilient, and globally competitive. European policy makers have to establish a long-term, coordinated support framework to:

- **Enable a rapid development of world-class recycling capabilities across the continent.** This requires ambitious public investments to complement private initiatives, focused on two pillars:
 - R&D and technology development, to enable breakthrough processes capable of recovering and upgrading more material with higher efficiency, lower energy use, and greater economic viability.
 - Industrial deployment at scale, to build the collection, sorting, and recycling plants Europe needs to fully valorize its own resources – closing the loop, retaining value, and reducing dependency.

Many European manufacturers today face strong pressure from financial markets to prioritize short-term profitability over the long-term investments required for innovation, capacity building, and resilience. These investments often come with uncertain returns, making them difficult to justify without supportive public policies. A renewed public-private compact would allow Europe to share risks, accelerate

deployment, and ensure that strategic industries have both the scale and stability required to thrive. With strategic support, Europe can become a global leader in recycling know-how for the automotive, aerospace and construction industry, and become competitive and more self-reliant. An achievement already gained in the packaging industry.

- **Align the EU Emissions Trading System (ETS) with a methodology supporting circularity.** Today, the ETS primarily focuses on the carbon intensity of production, but it does not recognize the environmental value of recycling – especially for materials like aluminium, where using scrap dramatically reduces emissions and strategic dependency. To accelerate Europe’s transition to a circular economy, carbon regulation must incentivize the recycling of aluminium scrap, recognizing that every ton of aluminium produced via recycling saves around 95% of energy and an equivalent amount of carbon emissions compared to primary aluminium production. A dedicated product benchmark is needed for aluminium refining and remelting installations under ETS, reflecting the production processes, abatement possibilities and available technologies for aluminium recycling. Free allocation must become proportional to production, in order to incentivize investments in energy efficiency. Finally, to truly

support recycling, ETS should also evolve toward a methodology that rewards carbon avoided through recycling - not only the reduction of carbon emitted during processing - by providing additional free allowances, or abstaining from further phasing-out current free allocation, in rewards of recycling process. Addressing these methodological gaps would strengthen investment certainty, support the scaling-up of advanced recycling technologies, and better align the ETS with Europe's circular economy and industrial decarbonization objectives.

- **Ensure the Carbon Border Adjustment Mechanism (CBAM) does not penalize the recycling of certain scrap types compared to others**, and that it does not further exacerbate the inconsistency in the methodology for calculating the carbon footprint of aluminium products towards an approach that would discourage full circularity from production to end of life. The legislator must recognize that CBAM will not level the playing field simply by attributing emissions to pre-consumer scrap. Instead, the systematic application of default values to imports for the purpose of CBAM calculation - provided this is done in a way that does not disadvantage one type of scrap over another - can help level the playing field for domestic producers, while avoiding contributing to the complexity and inconsistencies in carbon accounting practices that would ultimately undermine circularity.
- **Incentivize the fulfillment of "Made in Europe" criteria with raw materials recycled in Europe.** European policy makers can accelerate the development of secondary critical raw materials recycling by creating targeted incentives that reward manufacturers for using raw materials recycled in Europe³² instead of imported primary resources. This can be achieved
 - by ensuring that the Made in Europe framework explicitly recognizes secondary materials as strategic, low carbon European resources. It is essential that policy frameworks do not limit eligibility or recognition solely to aluminium "smelted" in Europe. The focus should be on the recycling and transformation process within Europe's industrial ecosystem, thereby supporting circularity, reducing carbon intensity, and strengthening Europe's strategic autonomy in raw materials. Policies could include preferential access to funding, lower regulatory burdens, green public procurement bonuses, and tax incentives for products incorporating high shares of recovered materials recycled in Europe. Given the high level of integration of the recycling ecosystem across the European continent including Great Britain, the inclusion of UK and all EFTA countries under "Europe" will help maximize Europe's capacity and capability for producing high recycled content and thus low carbon aluminium products, with the additional benefit of reducing dependency on imports.
 - **Provide access to sufficient, affordable, decarbonized energy.** Europe's industry faces high energy costs due to dependence on imported fossil fuels, fragmented national energy markets, and policy-driven charges. A strong industrial energy strategy must deliver a stable, reliable supply of decarbonized electricity at competitive prices without requirements for industry to enable a non-manageable flexibility. Key actions:
 - Decoupling electricity prices from gas prices to keep them stable over the long-term at a reasonable level.
 - Upgrading grid infrastructure to better match variable renewable generation with industrial baseload demand whilst also ensuring stable power supply during peak operation times.
 - Accelerating investment in decarbonized electricity, removing barriers to Power Purchase Agreements and further developing pragmatic enablers such as Contracts for Difference.
 - Strengthening support for hydrogen supply solutions and grid infrastructure where industrial processes cannot be electrified.
 - In parallel, maintaining electricity surcharge reductions, extending financial relief for energy-intensive industries and ensuring the long-term continuation of ETS free allocation and indirect cost compensation for a plannable horizon beyond 2030.

³² European = EU27 + EFTA + UK

Facilitated Access to and Incentivizing the Use of Scrap – the Enabler

A core pillar of any industrial recycling strategy is ensuring easy and sufficient access to scrap so that recycled feedstock becomes a reliable and scalable source of material for mass production. This also means, incentivizing the use of scrap: increasing the demand for scrap to stimulate the collection, segregation, sorting and processing of scrap, in line with Circularity by Design principles. European policy makers can support with the following actions:

- **Keep the volumes in the loop within the region.** By introducing a fee on all exports of aluminium waste and scrap to other regions, the EU can level the playing field and ensure this valuable raw material stays within the European circular, low carbon economy for making new products, again and again. Increasing Europe's economic security and strategic autonomy, creating jobs within Europe, and contributing to the decarbonization of Europe-made products. Facilitating traceability via more granular trade codes, and enforcing stronger controls on exports outside of Europe will further help secure a stable, high-quality feedstock for European industry.
- **Promote the use of all types of scrap as a substitute for primary materials,** which leads to lower CO₂e emissions and decreases dependency on imports. Pre- and post-consumer scrap are defined in the Appendix: both should be considered without privileging or penalizing one relative to the other.
 - **Pre-consumer scrap** recycling from downstream sectors such as automotive, beverage packaging, and construction is essential for maximizing circularity and preserving the value of high-quality aluminium. Across sectors, pre-consumer scrap represents around one third of all aluminium scrap generated.³³ Well segregated and sorted pre-consumer scrap retains the quality of alloys and hardeners used in the production of wrought aluminium for reaching the required properties, and the retention of those properties contributes to the overall circularity for critical raw materials including elements such as magnesium and copper. The cornerstone of a circular model must be to keep this scrap well segregated by alloy family and return this clean, non-contaminated material to recycling mills for recycling into value-added products of same alloy family, thereby reducing the need to add primary aluminium for adjusting the composition. When properly sorted and reintegrated into recycling and rolling processes, pre-consumer scrap requires minimal reprocessing, improves energy efficiency, and avoids downcycling (which happens when wrought pre-consumer scrap is diverted to castings).³⁴
- **Post-consumer scrap** use expansion is essential for increasing overall recycled content beyond the limits achievable with fair-share pre-consumer material. Targeted measures can be implemented to expand its use and fully unlock this critical resource, such as further improving collection and sorting to enable use of the post-consumer scrap for high-value products in multiple recycling loops. For example, avoid mixing collected used beverage cans with other types of materials or scrap flows, which still happens in some Member States.³⁵ In longer-life, more complex goods, introduce design for dismantling to enable removal and replacement of certain parts and components before shredding, similar to what the End-of-Life Vehicles Regulation provides for automotive vehicles. The prerequisites for this need to be put in place when designing the vehicle – for example, by minimizing the use of different materials and adhesives, or designing them so that they can be detached again efficiently at the end of the vehicle life and ensuring different materials are not mixed.
- **Embed circular economy principles at the product design stage via ambitious while realistic recycled content targets.** Policy should support recycled content targets across products, based on feasibility studies per sector, to be implemented gradually. For aluminium, recycled content should be measured at the semi-finished product level: when the aluminium leaves the aluminium industry and goes into further downstream manufacturing. Policy should ultimately encourage closed-loop systems and the collection and use of all types of scrap, both pre- and post-consumer scrap. The goal of circular economy is to reintegrate materials into the production cycle and reduce waste and energy resources. Both post-industrial and post-consumer scrap meet these goals and should be considered in recycled content targets, in line with ISO 14021, Section 7.8.1.1, with gradual increase of post-consumer scrap in the total recycled content, taking into account the recovery of materials at product end-of-life via dismantling, material removal and/or sorting. By setting ambitious but realistic recycled content targets while also harmonizing carbon and recycled content accounting methodologies as described below, policy will help further incentivize the choice of recycled and recyclable materials in line with circularity by design principles.

³³ International Aluminium Institute | [Alucycle database](#) (2024) (accessed March 2026)

³⁴ Innoval | [Can-To-Can Recycling: Metallurgy, Processing and Circularity, November 2025](#)

³⁵ Ibid

- Promote carbon and recycled content accounting methodologies that incentivize the recycling of both pre- and post-consumer scrap** to support a true circularity. To ensure that all scrap is a recognized part of the industry's decarbonization strategy, carbon accounting methodologies for aluminium and aluminium products should continue to follow current practice by the industry to allocate all carbon emissions to the functional products produced and allocate no emissions to aluminium scrap. The definition of "low carbon aluminium" should be based on a clear and measurable carbon footprint threshold that applies cradle-to-gate at semi-finished product level independently of the metal input: whether primary aluminium, scrap, or a combination of both. Aligning the threshold across all production routes ensures fair competition, recognizes the vital role of recycling in decarbonization, and provides a consistent benchmark for procurement and labelling policies that reward genuinely low-carbon aluminium, regardless of its source. Pre- and post-consumer aluminium scrap are materials that have already been produced and used. The goal of a circular and more sustainable economy is to reintegrate materials into the production cycle of their highest value, reduce waste and increase energy efficiency. Both pre- and post-consumer scrap meet these goals and should be considered in recycled content targets, in line with ISO 14021, Section 7.8.1.1.
- Extend and harmonize Extended Producer Responsibility (EPR) schemes to additional sectors (e.g. construction, automotive, home appliances, bicycles, etc.)** will further help retain resources in the EU. These schemes have proven effective in sectors like packaging, incentivizing producers to optimize product design while generating financial resources for recycling infrastructure. A key feature of successful EPR schemes is eco-modulation of fees, which adjusts producer contributions based on the environmental performance of their products - rewarding sustainable designs and discouraging those that are harder to recycle or repair. Policy should further strengthen the EPR general minimum requirements across the EU in view to further harmonize and increase the efficiency of the EU's EPR systems, while promoting the partnership of private and public operators in the waste management sector to upgrade the sorting and recycling infrastructure.
- Harmonize and strengthen environmental legislation, duly treat waste and scrap of critical and strategic raw materials as such.** A top down set of guidelines from the EU to ensure a unified interpretation of the regulatory framework for shipment of waste within the EU would be highly beneficial to avoid unnecessary administrative complexity for domestic shipments of waste and scrap. For exports out of Europe however, implementation of Regulation 2011/333 has shown its limits. While there are documentation checks, physical inspections of the goods are run at random based on risk assessments. Policy should streamline and reinforce the legislation: all aluminium scrap should be treated as waste when exported to third countries; the use of "end-of-waste" status should be restricted to shipments within Europe. In addition to eliminating the "end-of-waste" status for exports to other regions, waste shipment policy should provide full competence and resources to the European Commission to complement audits by certifying auditors of non-OECD countries and perform unannounced audits on non-OECD facilities, in view to full implementation of the Waste Shipment Regulation. Finally, critical and strategic raw materials ("CRM") waste and scrap should be managed at EU level for reasons of economic resilience and of economic security nature, justifying a stronger EU-level intervention. Similarly to dual-use products, the EU should act to effectively protect its interests and values when it comes to exports of CRM-waste. Additional legal provision should therefore consider allowing the possibility of introducing new common EU controls in a faster and streamlined fashion. This would address the Union's security and trade policy objectives. This could also remediate the current risks of fragmentation and allow for a swifter EU-wide reaction, where needed, to security risks as regards scarcity of CRM waste and scrap. Additionally, it would also allow a common EU risk assessment of controls that have an impact on the EU's trade relations and on supply chains across the EU, as wished for by the CRMA.

Conclusion

The European continent faces major gaps that prevent the recycling ecosystem from reaching true industrial scale: (1) scrap leakage, with nearly 2 million tonnes of high quality scrap exported annually and 15% of furnace capacity left idle due to insufficient feedstock; (2) inadequate incentives and regulatory frameworks, including CBAM and ETS designs that fail to reward European secondary production; (3) lack of harmonized recycled content and carbon accounting methodologies that reward the recycling of all scrap types; (4) fragmented market transparency, which leaves recyclers and manufacturers misaligned on scrap qualities and volumes; and (5) lack of access to affordable decarbonized energy and robust supply.

Looking forward, Europe must adopt a clear, coherent roadmap to secure its secondary material sovereignty. This requires a European recycling strategy that helps Europe source, retain, and transform secondary raw materials. Implementation should embed competitive circularity at the core of industrial policy - accelerating investments in technologies bringing access to secondary materials in a relevant quality, in sufficient quantities, at an affordable cost, incentivizing the recycling of all types of scrap via ambitious but realistic recycled content targets that include both pre- and post-consumer scrap, ensuring ETS and CBAM methodologies genuinely reward recycling in Europe, and scaling end-of-life material collection - particularly in strategic sectors such as automotive. As post-consumer scrap volumes grow, Europe must ensure that industrial capacity is in place to absorb these materials into high value applications.

Achieving this vision demands a resilient, competitive, circular European aluminium industry capable of reducing dependency, retaining value creation, and establishing Europe as the global leader in secondary materials.



Novelis, May 2026

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About Novelis

Novelis is driven by its purpose of shaping a sustainable world together. We are a global leader in the production of innovative aluminium products and solutions and the world's largest recycler of aluminium. Our ambition is to be the leading provider of low-carbon, sustainable aluminium solutions and to achieve a fully circular economy by partnering with our suppliers, as well as our customers in the aerospace, automotive, beverage can and specialties industries throughout North America, Europe, Asia and South America.

In Europe, with more than 750,000 tonnes of aluminium scrap recycled annually into sheet ingots for rolled aluminium products, Novelis is Europe's largest recycler of aluminium. It operates Europe's largest closed-loop recycling plant (recycling up to 400.000 t of aluminum scrap per year), in Germany, alongside facilities in Italy, Switzerland and the UK. Novelis employs over 4,600 people across Europe (and 13,250 globally) and our products are used in a broad range of applications such as automotive vehicles, aerospace, beverage cans, defense and construction.

Appendix

Sources of Scrap and Impact on Recycled Content - Aluminium Sheets in Automotive Applications

Multiple types of scrap from diverse origins can serve as input metal in the casting of sheet ingots used to produce aluminium coils, which are subsequently rolled into sheets for automotive applications. As a first priority, scrap generated over the life cycle of the final product (the car) should stay in the loop as much as possible. Such a circular model ensures that the value of the various materials is kept to be re-used in similar applications and not downcycled into lower-end applications.

Figure 2 shows how an ideal circular model should be applied to the manufacture of aluminium sheets for automotive applications, keeping the high-value scrap generated during the production phase, both (a) pre-material (aluminium coils) and (b) components mounted on cars, as well as retrieving (c) materials when vehicles reach their end-of-life:

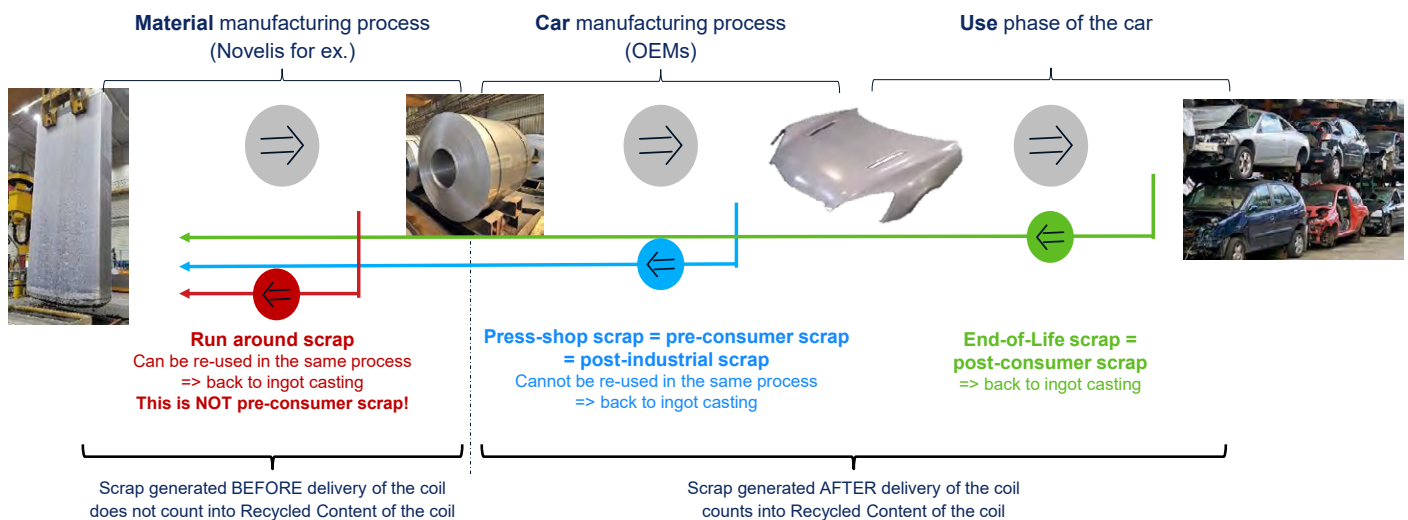


Figure 2: ideal circular model applied to the manufacture of aluminium sheets for automotive applications, various types of scrap generated over the manufacture as well as use phase coming back in the loop like a) so-called run-around scrap, which is the internal scrap generated during the production of coils, b) press-shop scrap, generated during the stamping operation that consists in transforming flat rolled products into automotive components, also referred as pre-consumer or post-industrial scrap and c) post-consumer scrap that is retrieved from vehicles reaching their end-of-life.

- **Run-around scrap:** during the manufacture of coils, scrap can be generated for quality or technical reasons like edge trimming to reach customer dimension requirements or head/tail cropping. Material producers have the target to reduce this type of scrap for obvious efficiency reasons, but it will always exist. This type of scrap must stay as far as possible in the loop and be directly re-used into similar products due to its high purity and easy identification. Nevertheless, following ISO 14021, Section 7.8.1.1 methodology, it does not count into recycled content of the coil.
- **Press-shop scrap:** during the stamping operation which consists in transforming flat-rolled products into components, scrap is generated like shows Figure 3. As an average within the industry, it is observed that 60-65% of the material from a coil is actually mounted on cars as components (recovery), the remaining 35-40% falls into scrap. This category of scrap is also referred to as “pre-consumer” or “post-industrial” scrap. Its composition is well identified and, to the greatest extent possible, it should stay in the loop and be recycled in similar applications. Other families of automotive components, such as castings or extrusions, are only milled or drilled, which leads to a scrap ratio of a few percent only and may put less pressure on recycling.

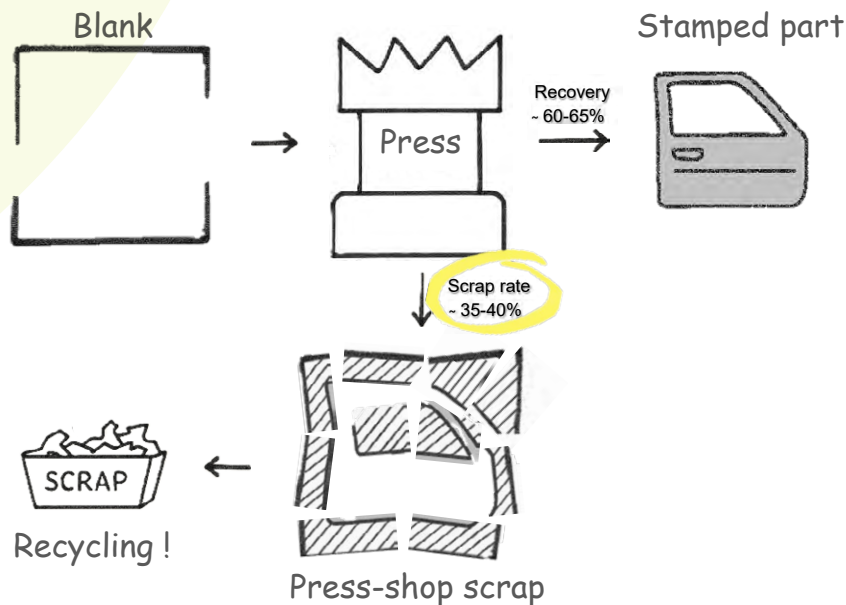


Figure 3: Stamping process transforming flat rolled products (sheets) into automotive components and highlighting the resulting scrap referred as “press-shop scrap”. The average industry recovery is about 60–65%, 35–40% of the material falling into scrap.

It may happen that various families of aluminium like 5,000 series (5x) and 6,000 series (6x) are mixed during the stamping operation, which reduces the value of such scrap since it cannot be recycled in high quantities neither in 5x nor in 6x. Solutions exist to separate the different alloys from the mix, but they require high-end technologies like LIBS or XRF. To avoid the cost of an additional sorting operation, the ideal solution is to invest in the necessary processes, production planning, tooling and equipment to avoid mixing the different types of scrap when they are generated and keep them segregated. For different reasons, this may not be always possible. In that case the “uni-alloy” concept is a smart solution. It consists in using one type of alloy, or alloys that have compatible chemical composition so they can be mixed without negative impact on the potential further recycling in similar types of products. Unlike run-around, this scrap is generated after the delivery of a coil to an OEM (Original Equipment Manufacturer), consequently it counts in the recycled content according to ISO 14021 definition.

- **Post-consumer Auto:** ACP (Automotive Circularity Platform) is an interesting initiative demonstrating the technical feasibility of retrieving aluminium from end-of-life vehicles (“ELVs”) and recycling it into similar automotive products (true circular model).³⁷ An industrial-scale physical demonstrator was produced with 100% recycled content from ELVs: no primary metal, no alloying elements, and no pre-consumer scrap were used.³⁸ This material was produced fully inside customer specification. It was stamped and assembled into automotive components without any change compared to the standard material. This demonstrator is of course not representative of a mass production circular business, nevertheless it proves the technical feasibility of the model and attests there is no technical limit to the absorption of scrap when quality is fit for purpose.

If quality/feasibility-wise the model seems to work, from a scrap quantity point of view, the situation is more challenging in the short term. Figure 4 shows the volumes of aluminium on vehicles reaching their end-of-life.³⁹ A clear inflection point is observed around 2035, evidencing an acceleration of volumes of wrought aluminium (sheets and extrusions) coming back on vehicles reaching their end-of-life. Figure 5 focuses on closures (hoods, fenders, doors, tailgate/trunk lid) and shows (i) the amount of aluminium put on the road with time in these components (solid blue line), as well as (ii) the volumes of aluminium contained in these components on cars reaching their end-of-life based on European Aluminium’s Material Flow Analysis ((MFA) solid yellow line). Shifting the solid blue line by 20 years (dotted blue line), which corresponds to the approximate average lifetime of a car, matches well the solid yellow line!

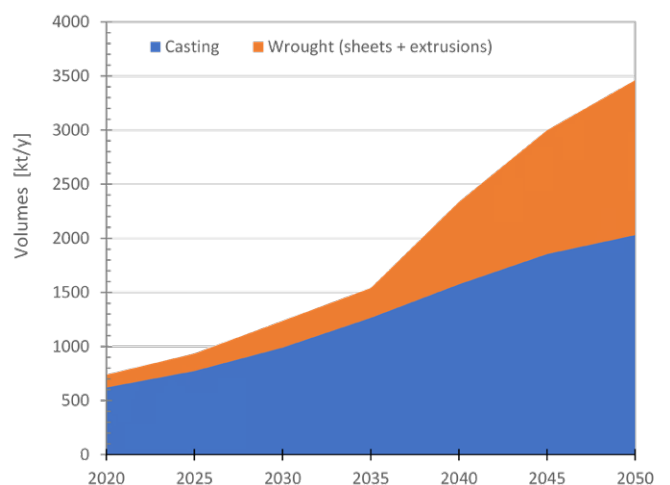


Figure 4: Volumes of Aluminium on vehicles reaching their end of life

³⁷ Circular Economy Europa | [Automotive Circularity Platform: From Automotive to Automotive: an ecosystem approach for closed loop end-of-life vehicle recycling](#)

³⁸ Novelis | [Novelis Unveils Industry’s First Aluminium Coil Made from 100% Recycled End-of-Life Automotive Scrap](#) (2025)

³⁹ Material Flow Analysis (MFA) model for aluminium in the automotive, prepared by IRT-M2P for European Aluminium (Dec 2023)

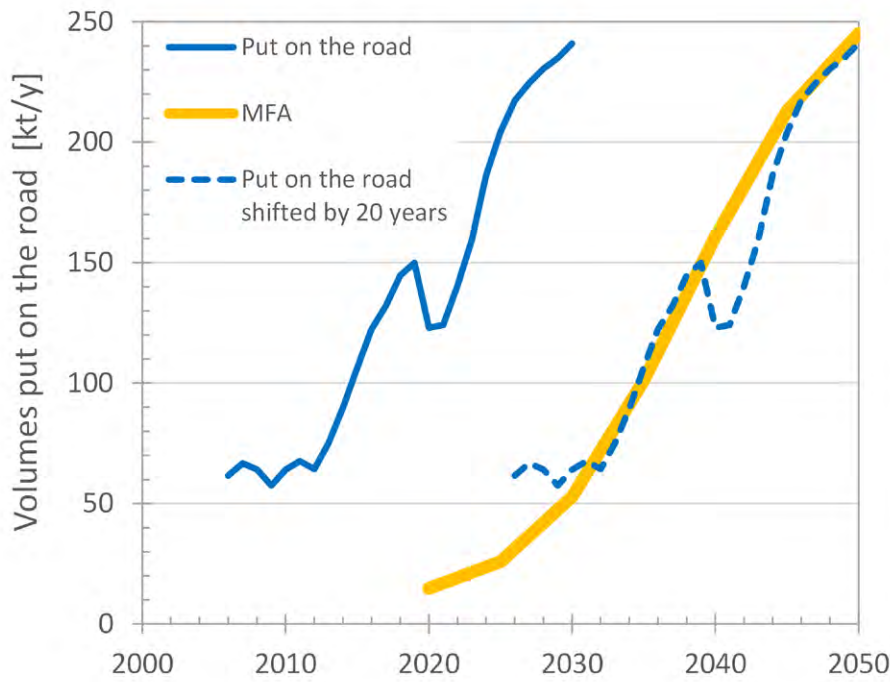


Figure 5: Volumes of Aluminium from closures only (hoods, fenders, doors, tailgate/trunk lid), material put on the road in the past vs forecast of material on vehicles reaching their end of life (Material Flow Analysis (“MFA”) model).

Figure 6 shows how both pre-consumer and post-consumer automotive scrap should be combined to maximize the recycled content in automotive flat-rolled products. In a true circular model where products receive their fair share of pre-consumer / press-shop scrap, this category is limited to approx. 35-40%. Further, recycled content increase must be obtained with post-consumer scrap. MFA shows that there is a potential for an additional 25% recycled content from ELV scrap on top of pre-consumer scrap by 2040.⁴⁰ Although these figures are subject to several assumptions and are highly speculative at this stage, nevertheless they show that the volumes of end-of-life automotive scraps are limited over the next years and start to ramp up after 2030.

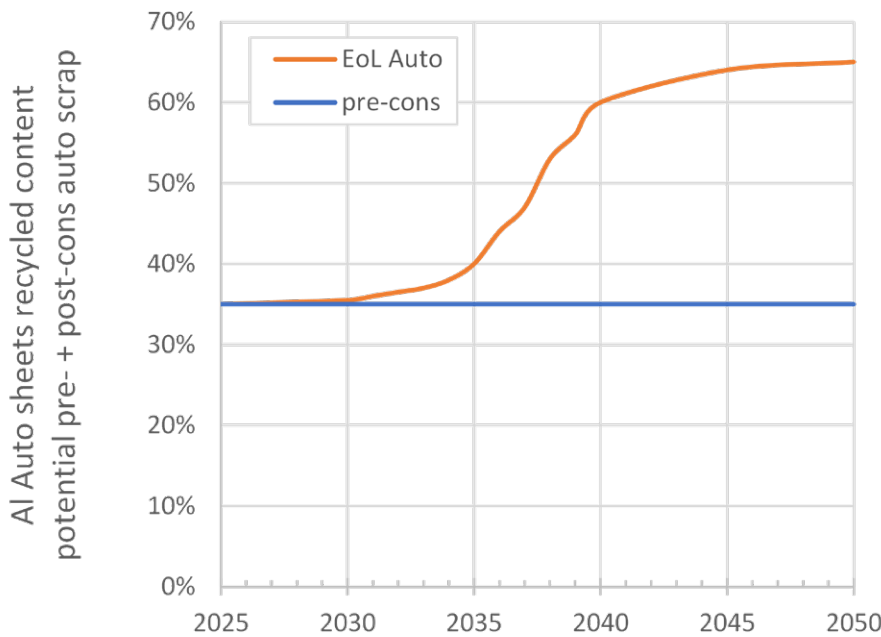


Figure 6: Al Auto sheets potential recycled content combining pre- + post-consumer automotive scrap (figures for post-consumer scrap highly speculative, as well as demand not clear. Mainly for illustration purposes).

⁴⁰ Material Flow Analysis (MFA) model for aluminium in the automotive, prepared by IRT-M2P for European Aluminium (Dec 2023)

- Post-consumer market scrap:** As shown above, the recycling of press-shop / pre-consumer auto scrap is a pre-requisite in a true circular model but is limited. Post-consumer automotive scrap will also be limited at least over the next 10 years. To accelerate the increase of recycling content and reduce the CO₂e footprint until then, bridge solutions must be considered. Up-cycling generic market post-consumer scrap as shown in Figure 7 has big potential. In partnership with TSR, Novelis has demonstrated that using such scrap of good quality, a recycled content of 86% could be reached when manufacturing a bodyside, which is one of the most challenging sheet components in a car due to the multiple and high-demanding requirements for example in terms of formability or surface.⁴¹ Novelis has run several other exercises consisting of applying various sorting technologies to upcycle Twitch scrap. The results are really encouraging: a recovery of usable fraction in the range of 80% was reached and the qualities allowed a usage of 30-50% in 5x auto products and 50-100% in 6x auto products. Nevertheless, this approach is at the stage of proof of concept and requires clear demand signals to make it available for mass production.

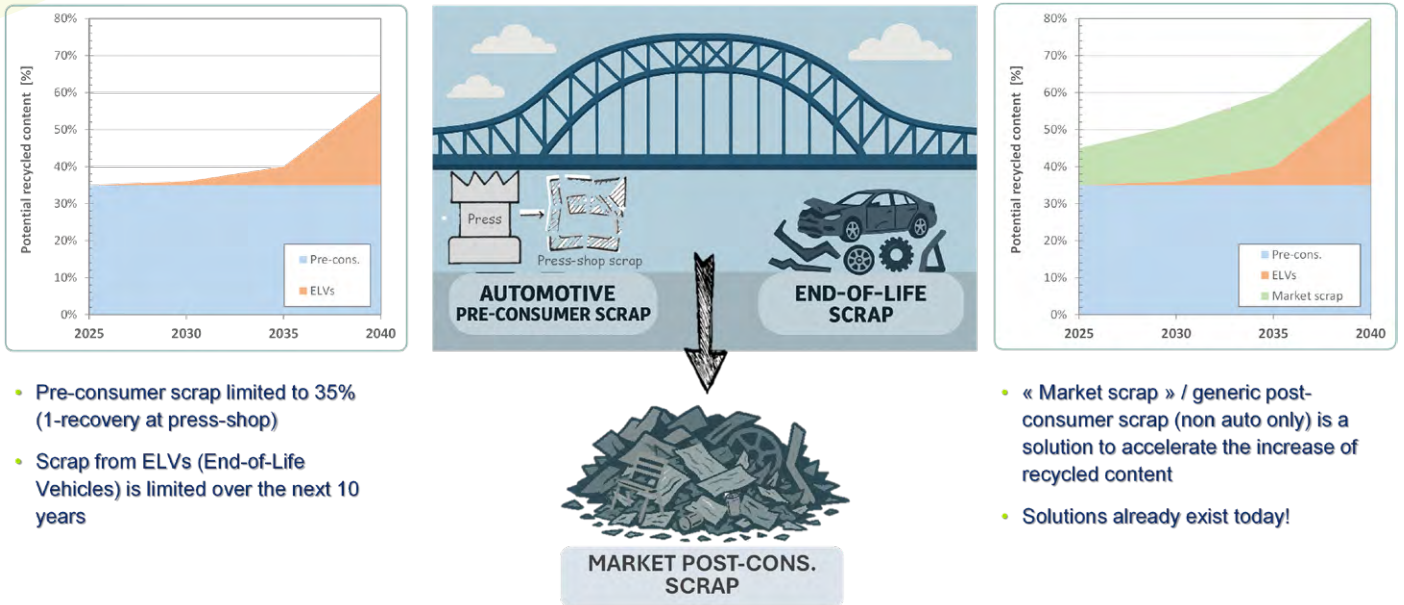


Figure 7: Generic market post-consumer scrap as a bridge solution to accelerate the recycled content increase in Aluminium automotive products

⁴¹ Novelis | [Novelis and TSR: Strategic Partnership to Advance Circularity in the Aluminium Industry \(2024\)](#) and an example of real-life application ([LinkedIn](#))