

## Positioning Aluminium and Sustainability

### Why aluminium?

Aluminium is a material of the future. The metal has great potential due to its positive material properties such as good formability, low density compared to other materials, good barrier properties, strength, corrosion resistance, durability and low maintenance costs. Aluminium is an enabler on the way to a climate-neutral society. There is only one answer to many questions about the future: aluminium! Aluminium is indispensable for the expansion of renewable energies and electromobility. And with its outstanding recycling properties, it is already a role model for a circular economy, especially since aluminium is one of only a few materials that can be recycled almost infinitely.

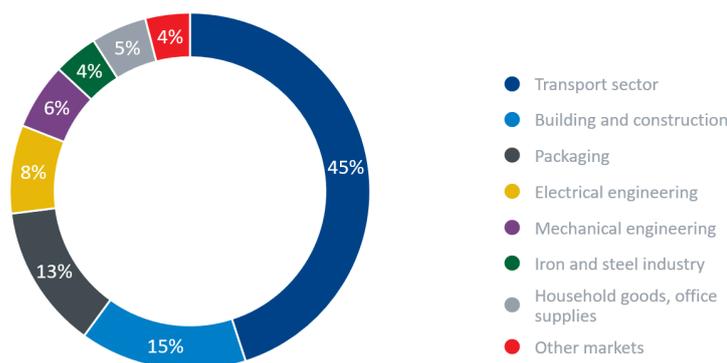
### Where do we stand today?

Climate protection is the central political and societal task for the coming years and decades. With "Fit for 55", the European Commission has presented a legislative package that formulates very ambitious CO<sub>2</sub> reduction targets in concrete terms and sets out specific reduction paths.

The German aluminium industry, which supplies its products to a wide variety of sectors, stands behind these targets and will continue to make its contribution.

### Markets for aluminium products in Germany

Data for total year 2020

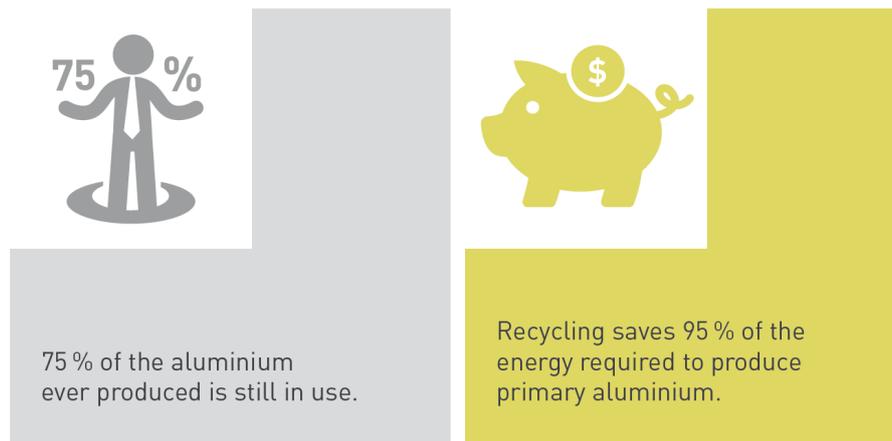


Source: AD; Federal Statistical Office, Wiesbaden

On the one hand, by the industry itself continuously improving its products and processes with regard to its own emissions. Secondly, by the material helping our customers to reduce their own carbon footprint. In the automotive industry, lightweight construction with aluminium has been helping to improve vehicle efficiency for years. In the construction industry, aluminium solutions help

to significantly reduce the energy consumption of buildings. As a packaging material, as a material in electrical and mechanical engineering, in aviation and in many other applications, the material is a convincing key to greater efficiency.

Aluminium has convincing basic properties that help reduce CO<sub>2</sub> emissions along the entire value chain and in the product life cycle: 75 percent of the aluminium ever produced is still in use, and recycling saves 95 percent of the energy compared with the production of primary aluminium. Competing materials such as steel or plastics cannot keep up here.

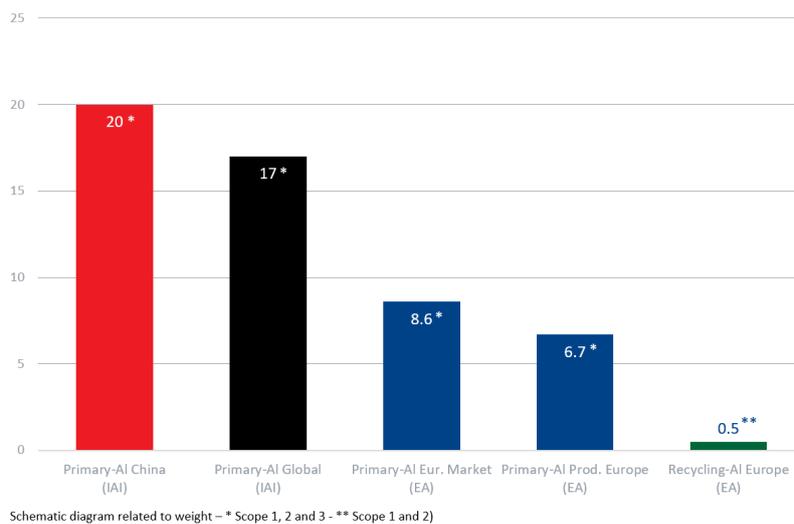


Aluminium is already recycled highly efficiently today. Lightweight solutions will make means of transport significantly more fuel-efficient. The energy requirements of buildings are significantly reduced by "smart" solutions. Packaging systems are often recycled in almost infinite cycles. Aluminium packaging also offers potential savings in the transport of packaged goods compared with heavier packaging systems.

However, it has to be taken into account that with today's manufacturing methods and power supply, primary aluminium produced in Europe has a carbon footprint of 6.7 kg CO<sub>2</sub>e/kg Al. This puts the German and European aluminium industry in a good position in a global comparison, because the CO<sub>2</sub> footprint of aluminium from other regions of the world is in some cases significantly higher.

## Carbon Footprint (kg CO<sub>2</sub> e / kg Al)

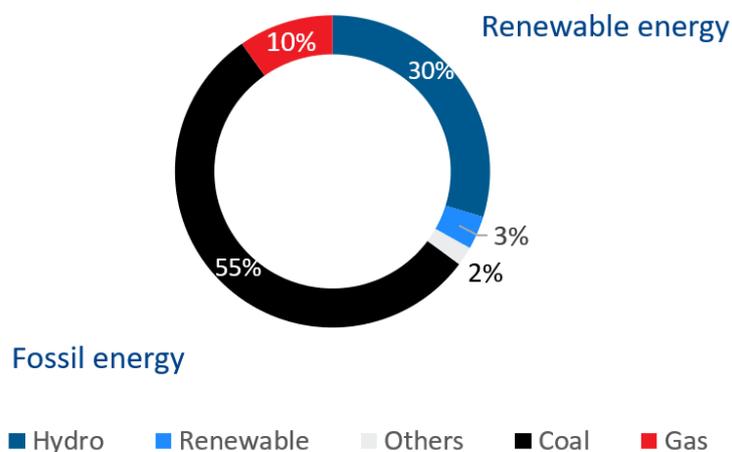
Regional context influences carbon footprint



A quick-win reduction strategy at present is to purchase primary metal from regions that offer significantly lower values due to their energy mix and/or other production processes. Another way out of the misery is to increase the recycled metal content (RMC). But there are limits to both approaches. For a holistic solution, the aluminium industry, its customers, and political regulators have to develop new approaches.

## Global energy supply: Primary aluminium (electrolysis)

Production 2020: 65 m tonnes

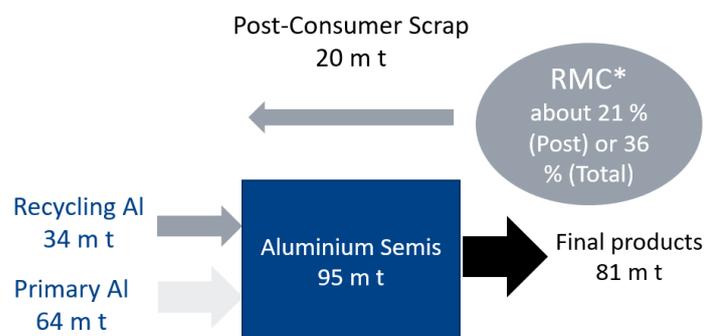


<https://international-aluminium.org/statistics/primary-aluminium-smelting-power-consumption/> (last accessed 7 December 2021)

The fact is that the available quantities of recycled aluminium are far from sufficient. Around one-third of total demand can currently be met by recycled aluminium. On the one hand, this is due to the limited availability of scrap, as numerous products made of aluminium have a long life and are bound up in various applications such as cars, aircrafts, wind turbines or buildings for several decades. In addition, the expansion of the circular economy with higher collection rates and optimizations in sorting and processing is relevant to increase the use of recycled aluminium in products. This is because even the scrap itself cannot be used in all applications. The various aluminium alloys are tailor-made for their respective applications. For example, an alloy used for structural parts in automobiles has different material properties than, say, an alloy used for a window frame. In addition, the scrap must be as free as possible from foreign materials in order to be used in high-quality applications.

## Scrap Availability (Recycled Metal Content – RMC)

Global aluminium supply in 2019



Scrap availability largely limits the use of scrap in products

\*Basis of calculation: Semis

(Mass balance differences due to reported data and stocks – <https://alucycle.world-aluminium.org/public-access/> - last accessed 6 December 2021)

Currently, aluminium can be recycled and is recycled. For example, in a closed product or material loop (beverage can to beverage can, cable wires to packaging, windows to windows/to other high value applications) or in a closed loop with process scrap (e. g. automotive sheet). The aluminium industry is striving to further increase the recycled content in manufactured products. These cycles require grade purity with corresponding optimization in collection and sorting. Metal scrap that is not sorted by type becomes cast products and is used primarily for combustion components in the automotive industry.

At present, it is not foreseeable into which (new) applications these currently recycled cast alloys can be put when the combustion engine has had its day. And this raises the question of how these quantities can also be preserved in the sense of a circular economy. The aluminium industry will rise to this challenge and ensure that these products are also recycled into new, valuable aluminium applications.

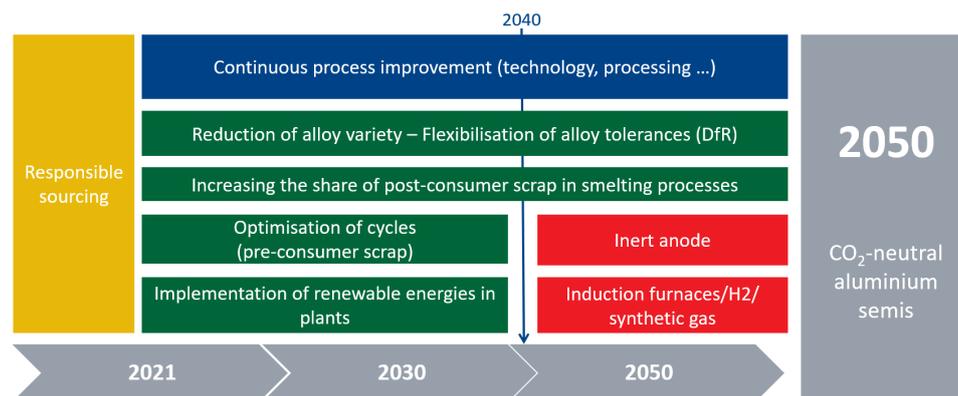
Therefore, the levers for decarbonization must be applied equally to primary production, collection, sorting, recycling and the manufacturing process across all parts of the supply chain.

### What does the aluminium industry need to do to remain competitive?

To drive decarbonization in the aluminium industry, reduce the carbon footprint of processes and products, and remain competitive as an industry against competing materials, the following actions by the aluminium industry are necessary:

- Further development of innovative technologies in primary aluminium production (e. g. virtual battery, inert anode).
- Consistent design for recycling together with customers (avoid complex composites, easy dismantling, ...)
- Reduction of alloy variety with simultaneous adaptation of tolerances for the use of certain alloys
- Development of additional applications for non-pure recycled aluminium
- Further improvement of sorting technologies
- Closing material and other product cycles using post-consumer materials
- Establish transparency of material flows, ensure uniform data on carbon footprint to avoid inconsistencies

### Road Map 2050 Optimization potential



### What does intelligent political support need to look like?

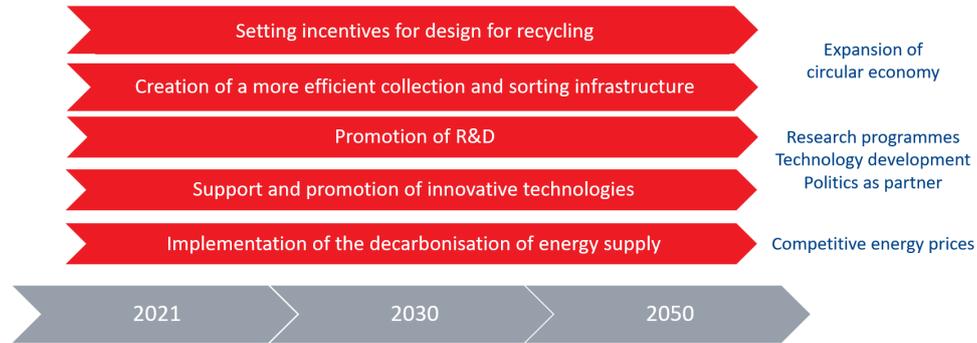
In order to make sure that the German aluminium industry can achieve the planned legal requirements and its described goals and survive in international competition, consistent political flanking is needed. This includes measures such as:

- Massive expansion of low-carbon energy production with secure, demand-based electricity and gas supplies at an internationally competitive price. A harmonized European industrial electricity price is suitable here.
- Goal: Avoid carbon leakage
- Exempting the recycling industry from CO<sub>2</sub> taxes
- Promoting products that have a high recycling rate and a high recycled content
- Promoting R&D programs to reduce the carbon footprint in the aluminium industry, such as:
  - Development of new technologies for the production of primary aluminium
  - Further development of new smelting technologies to increase the recycled content
  - Optimizing sorting technologies for alloy-based recycling

- Creating a more effective collection and sorting infrastructure to collect more used aluminium and better separate it from other materials.
- Support and promote innovative collection and take-back schemes (e.g. deposits, leasing, premiums).

### AD Road Map 2050

Demands on policy makers



The political goal must be to ensure a level playing field in terms of both price and climate policy. The carbon footprint is becoming a factor relevant to procurement in international competition. This starts in the basic materials industry and affects the entire industrial value chain in Germany and Europe.

The high share of industry in German gross value added is a considerable advantage of the German economy. Maintaining this must also be a political goal of the new German government.