

Recycling Aluminium

Aluminium can be recycled again and again, almost infinitely, making it an incredibly sustainable material. Around 75% of the almost 1.5 billion tonnes of aluminium ever produced is still in productive use today as it can be recycled endlessly. Aluminium's life cycle provides significant benefits through recycling, saving 95% of the energy it would take to make primary aluminium metal. Every year, more than 30 million tonnes of aluminium scrap is recycled globally, ensuring its status as one of the most recycled materials on the planet¹.

The global Recycling Efficiency Rate (RER) of aluminium is currently 76%². The RER defines how efficiently aluminium is recycled throughout the value chain. It is an indicator used to estimate the amount of recycled aluminium produced annually from scrap, as a percentage of the total amount of available scrap sources. This rate includes collection, processing and melting losses, but internal scrap is not included.

Global Demand

Aluminium is one of the commodities most widely used in the global transition to a clean energy future³. It is also recognised for its importance to both economic development and low emissions transition. Aluminium use is highly correlated with GDP, so as countries urbanise, per capita use of aluminium increases. It is expected that by 2050, global demand for aluminium is expected to nearly double. While an increasing proportion will be met through recycled aluminium, there will still be increased production of primary aluminium requiring a comparable increase in global bauxite mining and alumina refining rates.

Aluminium scrap is sourced from a wide array of consumer, commercial and industrial sources that include electronic items and wiring, beverage drink containers, motor vehicles, aviation and marine industry, as well as numerous other manufactured man-made goods. In fact, anywhere these metals are being or have been used they provide a point source of supply for recycling and reuse.

Types of Scrap

There are generally considered to be three categories of aluminium scrap:

1. Pre-consumer⁴ scrap is surplus material that arises during the manufacture and fabrication of aluminium products, up to the point where they are post-consumer to the final consumer. For example, offcuts of aluminium sheet or extrusions are considered pre-consumer scrap. Sometimes, this pre-consumer scrap can be safely recycled by aluminium smelters as its composition is known.
2. Post-Consumer scrap is material that has been used by the consumer and subsequently discarded. For example, used beverage cans, window frames, electrical cabling and car cylinder heads are all considered post-consumer scrap. Aluminium smelters are generally unable to safely accept this post-consumer scrap as its composition is usually unknown and it can be contaminated.
3. Internal Scrap is scrap which internal scrap, that is scrap which is pre consumer and is remelted in the same company where it was generated.

¹ https://international-aluminium.org/work_areas/recycling/

² <https://international-aluminium.org/resource/aluminium-recycling-fact-sheet/>

³ <https://www.worldbank.org/en/topic/extractiveindustries/brief/climate-smart-mining-minerals-for-climate-action>

⁴ Sometimes pre consumer scrap is known as new scrap.



Global Collaboration

The Council, as part of the International Aluminium Institute (IAI), contributes to the global effort to increase aluminium recycling rates and improve sustainability as well as enhancing transparency for products using aluminium scrap.

The IAI has published a range of papers on recycling including:

- Reference Document on Carbon Footprint Calculations of Aluminium Scrap; and
- Guidelines on Transparency – Aluminium Scrap.

For more information visit the International Aluminium Institute⁵.

Australia's Current Aluminium Recycling Capability

However, despite having an integrated primary aluminium sector, the closure of Australia's car industry a decade ago was accompanied by a closure in the two aluminium rolling mills⁶ which also provided aluminium remelt capabilities. Australia has lost this manufacturing capability.

As aluminium smelters cannot safely accept general contaminated scrap, specialist metal recyclers currently collect and export both pre and post-consumer scrap for recycling. There are currently some small scale recycling initiatives within the domestic industry:

- Boyne Smelters Limited (BSL) recycles around 156 million aluminium cans⁷ every year and is Australia's largest aluminium can recycling facility. BSL took part in Australia's first Circular Economy Lab in 2019 – a Queensland Government initiative designed to launch innovative projects. One of the outcomes is a collaboration between BSL and Container Exchange which runs Queensland's Containers for Change scheme. Through this partnership, BSL is exploring ways to recycle even more of Queensland's aluminium cans. This would reduce aluminium cans sent offshore for recycling and, in doing so, retain value in Queensland.
- In 2022, Capral Aluminium and Tomago Aluminium⁸, announced a partnership to remelt 550 tonnes of pre consumer scrap annually. This industry leading arrangement is the first of its kind within Australia, paving the way toward access to low carbon aluminium for Australian manufacturers.
- It is challenging for primary producers to ensure scrap re-processing is commercially viable due to supply chain/logistics costs as well as scrap recovery rates when remelting. However, within the existing industry, pre consumer scrap offers a simpler, more cost-efficient feedstock for recycled billet product and may offer an initial entry point into increased recycled content for Australian supply chains and the industry is exploring this further in 2023.

Currently all of Australia's recyclers of aluminium export their scrap. None of the largest companies including Sims Metal Management and Infrabuild Recycling have any local remelting capability, rather they send their scrap offshore to end users. More than 95% of Australia's scrap aluminium is exported for recycling. The major buyers are in South Korea and Indonesia. Other main markets include European countries and India.

Australia's Potential Recycling Capability

⁵ <https://www.international-aluminium.org/>

⁶ <https://news.alcoa.com/press-releases/press-release-details/2014/Alcoa-to-Close-Point-Henry-Aluminum-Smelter-and-Rolling-Mills-in-Australia/default.aspx>

⁷ <https://www.riotinto.com/en/operations/australia/boyne-smelters-ltd>

⁸ <https://www.capral.com.au/blog/news/capral-and-tomago-aluminium-agreement-to-local-aluminium-remelting/>



Recent work⁹ undertaken by the Council in conjunction with Deloitte and Coreo found that significant opportunities in manufacturing and recycling can be unlocked by cross-value chain coordination, including with Government and its agencies. There are clear opportunities for value-added manufacturing enabled by the existing integrated aluminium industry. This includes an opportunity for Australia to redevelop its recycling capability as part of an integrated circular industry policy^{Error! Bookmark not defined.}. This new manufacturing capability would fit with Australia's need to transition some regional economies, providing the potential for a new manufacturing base not linked to the location of a mineral deposit. This would cut across multiple commodities as well as a circular industry approach to the development of Australia's emerging clean energy industries, where these could be established with circularity in their design. The work identified two flagship projects which the Council believes would present a different approach to industry policy, two of which are relevant to Australia's future capability in a circular economy.

1. Increase recycling capacity - Global demand for recycled aluminium is growing rapidly, driven by emerging minimum content requirements from governments and corporate demand for low carbon products. A circular industry policy could lower cost and risk for domestic pre- and post-consumer scrap reprocessing.
2. A closed-loop mine-to-panel solar value chain - Aluminium is the second largest input by weight, and domestic extruders already have the capability to produce frame and rail for the sector. Solar panels, and other new renewable manufacturing should be designed with recyclability in their design.

⁹ <https://aluminium.org.au/news/aac-deloitte-and-coreo-cast-anew-project/>

