INTERNATIONAL ALUMINIUM

MATERIAL FLOW ANALYSIS A LOOK AT THE NUMBERS GLOBALLY AND IN ASIA

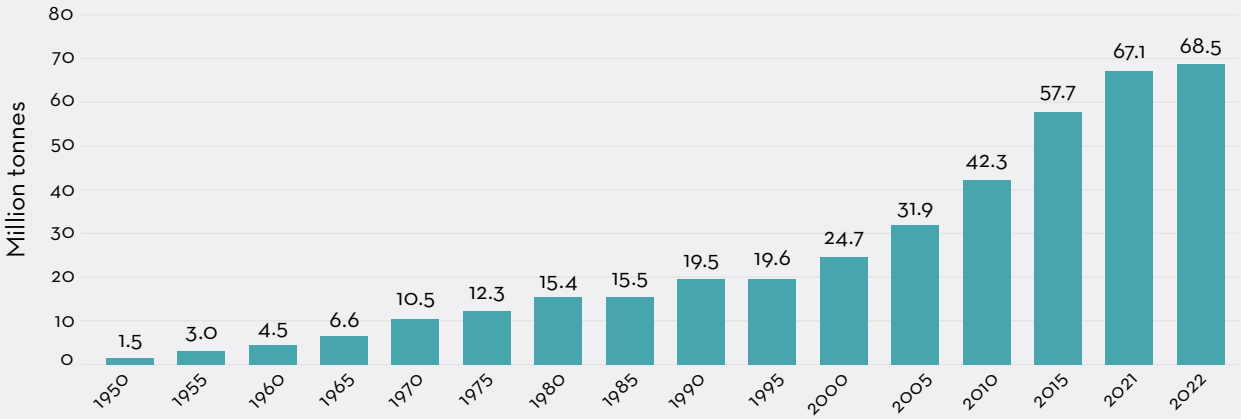
The latest IAI Material Flow Model update highlights the increase of production rates, recyclability and usage of scrap sources over the past 70 years (1950-2021). It shows a particularly sharp rise in all areas over the past 20 years globally and even more so in Asia. In 2021, Asia (excluding China and Japan) has a per capita consumption of aluminium in final products of 6kg, compared to China (19kg), Japan (22kg) and globally (11kg). This indicates a huge possible future growth potential for the region.

IAI currently publishes five different scenarios on Alucycle. All forecasting data used in this article is based on the 2022 IAI Reference Scenario.

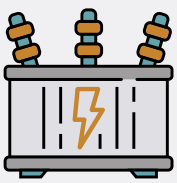
PRIMARY ELECTROLYTIC PRODUCTION

This chart shows the progress of global primary production. There was a steady rise in the 20th century – from around 1.5 million tonnes in 1950 to 24.7 million tonnes in 2000. This is an increase of 23.2 million tonnes in 50 years.

Since the turn of the century, global primary electrolytic production has risen sharply, up from 24.7 million in 2000 to 68.5 million in 2022 – an increase of 43.8 million tonnes in 22 years.



Primary aluminium is aluminium tapped from electrolytic cells or pots during the electrolytic reduction.



82 million tonnes

Estimates by the International Aluminium Institute (IAI) suggest global primary electrolytic production will rise to a **peak of just under 82 million tonnes by 2048, and stay stable until 2050**. Due to the sharp rise of recycling, primary production is estimated to return to today's levels by 2070.

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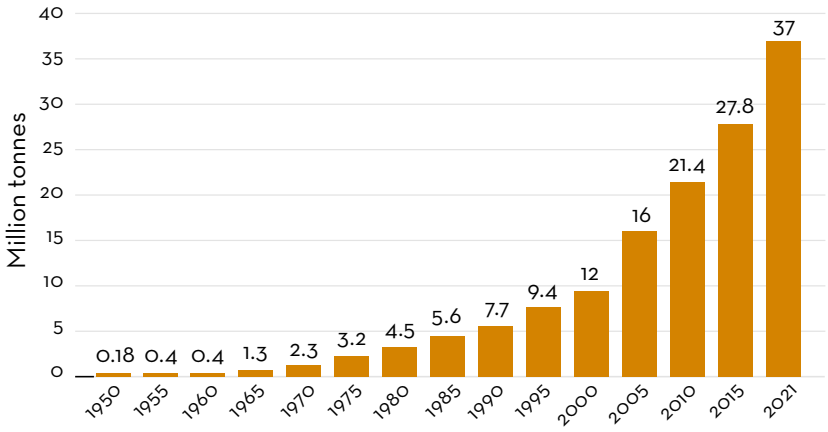
RECYCLED PRODUCTION

This chart shows the amount of recycled ingots globally has more than doubled in less than 15 years. In 2007, the figure was 17.6 million tonnes, rising to 37.0 million tonnes in 2021.

Progress is expected to be steep. It is estimated that the amount of recycled inglots globally will more than double again in another 20 years – to 67.7 million tonnes in 2041.



120 million tonnes

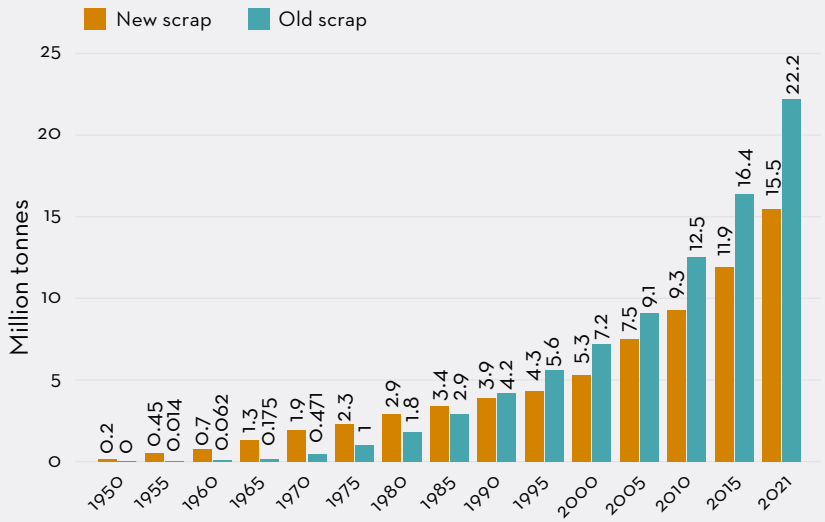
Estimates by the IAI have global recycled alloyed production at just under **120 million tonnes by 2070** – around three times today's figure.

Recycled aluminium is measured at the ingot stage, which means including alloying elements and melting losses. Primary aluminium added to scrap is excluded.

SCRAP SOURCES

This chart shows the increase in old and new scrap availability globally since 1950 – with the quantity of available old scrap exceeding new scrap for the first time in 1990 and remaining at a higher level ever since.

Old scrap is generated after a product has been in productive use and has been discarded by its end-user. New scrap is generated between semis fabricated products (i.e. aluminium sheet) and final products (i.e. aluminium can).



44.6 million tonnes

By 2036, the availability of old scrap sources is expected to be double that of new scrap sources for the first time – **44.6 million tonnes vs 22.1 million tonnes**. And by 2050, there are expected to be 38.9 million more tonnes of old scrap sources (66.2 million tonnes) globally than new scrap sources (27.3 million tonnes).

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PRODUCTION IN ASIA

Data shows that production increases in Other Asia are greater than globally.

143%

Between 2011 and 2021, primary electrolytic production in Other Asia* increased by 143%. Globally, the increase over the same period was 45%.

- Other Asia **143%**
- Globally **45%**
- China **93%**
- Japan **NA (no production)**

61%

Between 2011 and 2021, new scrap availability in Other Asia* increased by 61%. Globally, the increase over the same period was 54%.

- **61%** Other Asia
- **54%** Globally
- **105%** China
- Japan **-2%**

123%

Between 2011 and 2021, recycled production in Other Asia* increased by 123%. Globally, the increase over the same period was 60%.

- Other Asia **123%**
- Globally **60%**
- China **80%**
- Japan **-8%**

94%

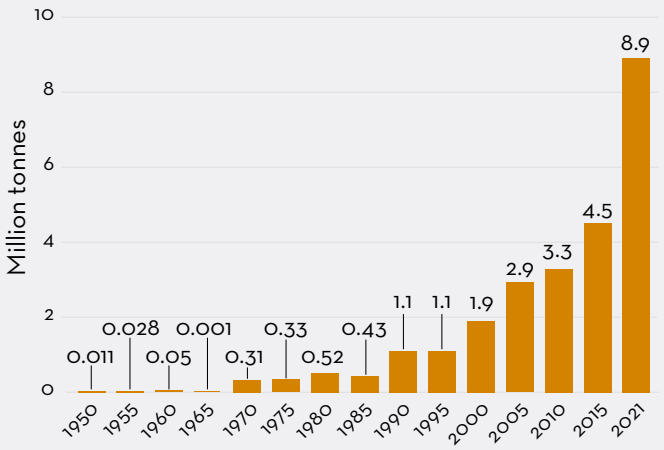
Between 2011 and 2021, old scrap availability in Other Asia* increased by 94%. Globally, the increase over the same period was 64%.

- **94%** Other Asia
- **64%** Globally
- **230%** China
- Japan **17%**

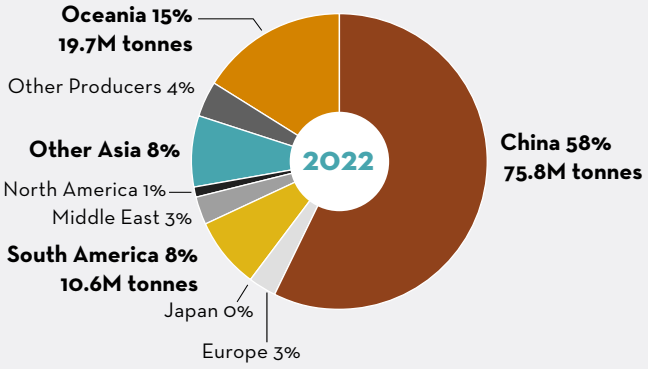
*The production in Other Asia includes data from India, Indonesia, Malaysia, Pakistan, Singapore, South Korea, Taiwan, Thailand and Vietnam.

ALUMINA PRODUCTION IN OTHER ASIA

Metallurgical alumina production in Asia has experienced a linear increase up to 2015. The past decade has seen the most significant leap, with production doubling between 2015 and 2021.



Leading producers of alumina, 2022



Of the four leading producing regions (in bold above), Other Asia had the second largest growth between 2021 and 2022 (+0.8 million tonnes). China's growth was 4.4 million tonnes, and South America and Oceania's production in 2022 was lower than in 2021.

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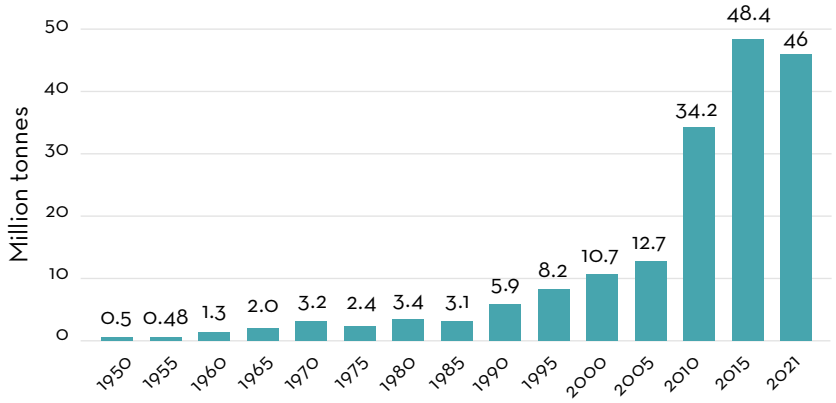
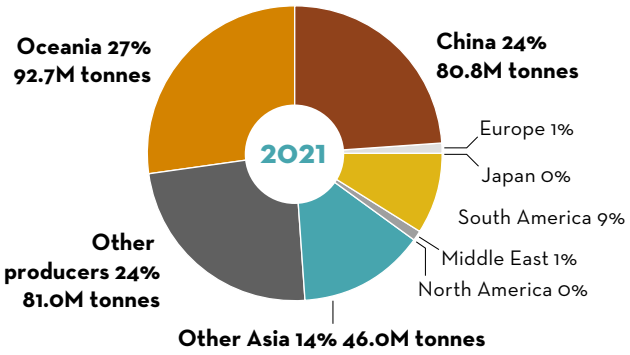
BAUXITE PRODUCTION IN OTHER ASIA

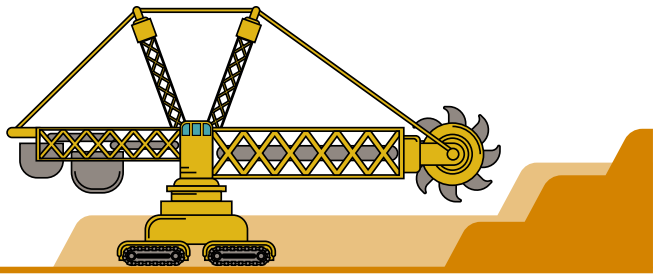
The leading producer of bauxite in 2021 is Oceania, which produced **92.7 million tonnes** – more than a quarter of the global share.

Other Producers – predominantly Africa (81.0 million tonnes) – and China (80.8 million) were the second and third largest producers respectfully, with around one quarter of the share. Asia is fourth with 46.0 million tonnes produced.



Leading producers of bauxite, 2021



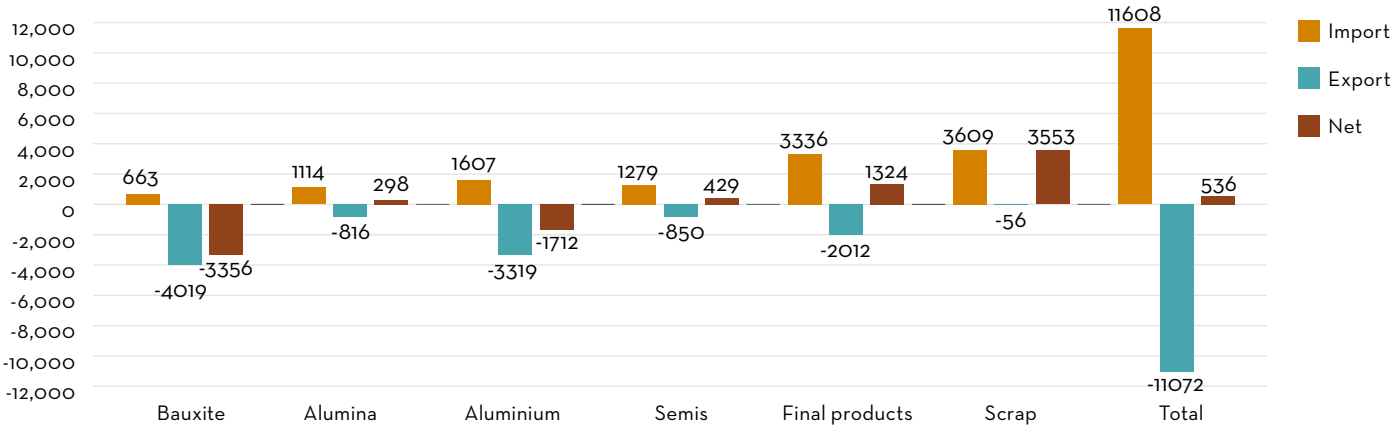


2021 OTHER ASIA TRADE BALANCE

Other Asia's total aluminium imports (11.6 million tonnes) and exports (11.1 million tonnes) are almost in balance in 2021. Bauxite (3.4 million tonnes aluminium content) and aluminium (1.7 million tonnes) are net exported, while alumina (0.3 million tonnes aluminium content), semis (0.4 million tonnes), final products (1.3 million tonnes aluminium content) and scrap (3.5 million tonnes) are net imported.

This is unique to Asia as all other regions are either significant exporter or importer regions.

Trade (1,000 tonnes) – Aluminium content



For more information, visit Alucycle to see the IAI Material Flow Model, which includes a complete historical dataset for 1950 to 2021 and future reference scenarios.