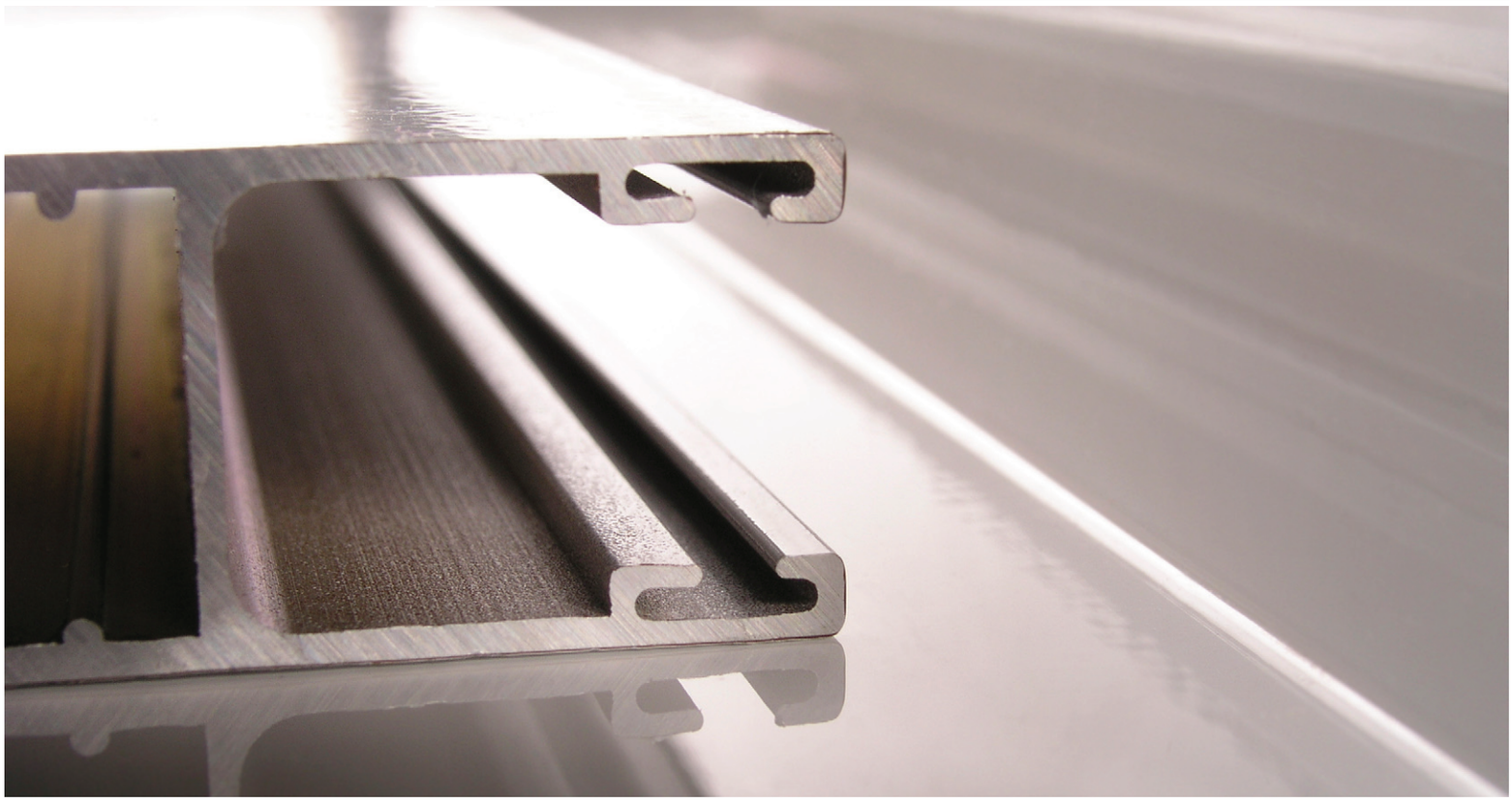
AUSTRALIAN
ALUMINIUM
COUNCIL LTD



Sustainability Report
2012

Australian Aluminium Council Ltd

Members in 2012

Rio Tinto Alcan

ALCOA

PORTLAND ALUMINIUM

QUEENSLAND ALUMINA LIMITED

bhpbilliton resourcing the future

ALUMINA LIMITED

Worsley Alumina

Alcoa Australia Rolled Products

ALCOA

PACIFIC ALUMINIUM

ULLRICH ALUMINIUM

Tomago Aluminium

RUSAL

BRL BAUXITE RESOURCES LIMITED

HYDRO

Aluminium Technical Advice Service - Telephone 1800 642 230

The Australian Aluminium Council (ACC) is the peak industry association representing the Australian bauxite, alumina and aluminium industries, collectively known as the aluminium industry. The Council's members are the companies operating in each of the following sectors:

- Bauxite mining.
- Alumina refining.
- Aluminium metal production.
- Semi-fabricated aluminium production and distribution.

The AAC aims to:

- Increase understanding of the aluminium industry in Australia and internationally.
- Encourage the growth of the aluminium industry in Australia and in the use of aluminium in Australia and overseas.
- Act as a focal point for the industry on key national issues such as climate change, trade, health and the environment.
- Inform and assist all those with an interest in, or involvement with the industry.

This report provides information on the activities of our industry and the subsequent benefits that flow to local communities and the Australian economy. We report on the performance of our industry in key areas including land use and rehabilitation, water and energy use and greenhouse gas emissions.

The AAC recognises the ongoing interest of governments and communities in knowing how aluminium production affects their environment and their society.

As our industry seeks to create value for its shareholders, we recognise the legitimate interests of all stakeholders: employees, local and regional communities, government, customers, suppliers and society at the national level.

Summary

Australia's bauxite, alumina and aluminium industry performed well in terms of alumina production in 2012, despite the impact of global economic and operational challenges. However, aluminium production was lower in 2012, in part due to the closure of one of Australia's six aluminium smelters.

A range of issues impacted on the industry, including:

- Low primary aluminium metal prices.
- A strengthening Australian dollar.
- Increasing input costs.
- Introduction of the carbon pricing mechanism.
- Inefficient domestic gas market.

Australian bauxite production grew by almost 6% to 79.4 million tonnes (Mt).

Alumina production levels increased from our last report from 19.6 Mt in 2011 to 21.6 Mt in 2012, a 10.2% increase.

Australia's primary aluminium metal production in 2011 was 1.96 Mt and fell by more than 4.5% in 2012 to 1.87 Mt.

In 2012, the average price of aluminium was approximately US $2,017 per tonne, compared with US $2,402 in 2011, a decrease of 16%.

Below is a summary of the Australian aluminium industry's performance in 2012.

The bauxite, alumina and aluminium industry produced:

- 79.4 Mt of bauxite.
- 21.6 Mt of alumina - with around 3.6 Mt used domestically for the production of aluminium, 0.6 Mt sold as specialty alumina and approximately 17.5 Mt (81%) exported.
- 1.87 Mt of primary aluminium - with an estimated 0.22 Mt (7%) being transformed into downstream products (beyond the smelter gate) and 1.65 Mt (88%) being exported.

Australia's seven alumina refineries emitted 15.0 Mt of greenhouse emissions (CO_2-e), predominantly from direct consumption of energy for heat, including around 0.8 Mt CO_2-e from purchased electricity (indirect emissions).

Emissions intensity for alumina production was 0.70 tonnes CO_2-e per tonne of alumina, 1.41% lower than 2011 and 27.1% lower than in 1990.

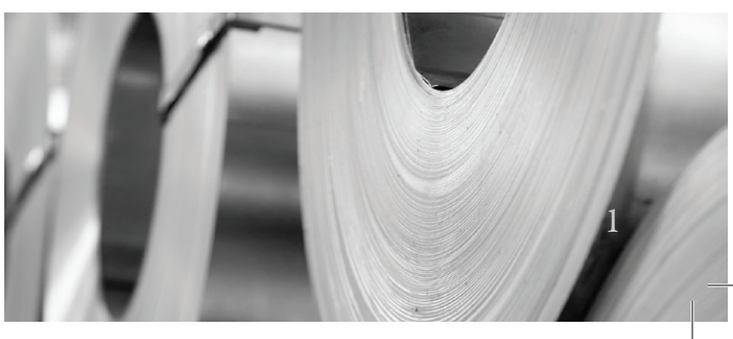
Australia's six primary aluminium smelters emitted a total of almost 28.8 Mt CO_2-e, comprising:

- 3.02 Mt CO_2-e of direct emissions from carbon used in the process.
- 0.20 Mt CO_2-e of direct emissions in the form of perfluorocarbons (PFCs) from the process.
- 0.25 Mt CO_2-e of other site-level emissions.
- 25.3 Mt CO_2-e of indirect emissions from electricity consumption.

Direct emissions intensity for aluminium as reported was 1.86 tonnes CO_2-e per tonne of aluminium produced. This figure is marginally lower than the 1.87 tonnes CO_2-e reported in 2011 and again significantly lower than the 5.05 tonnes CO_2-e reported for 1990. This represents a 63.2% improvement over the 1990 level.

Aluminium emissions intensity from electricity consumption was down almost 1.3% from 2011 to 13.54 tonnes CO_2-e per tonne of aluminium produced. This represents a 16.1% improvement over 1990 levels. This long term reduction reflects the industry's commitment to energy efficiency and changes in electrical emission factors over the years.

The reduction on 2011 figures could also partially be attributed to the closure of the Kurri Kurri facility.



Production in Australia

Australia is the world's leading producer of bauxite. In 2012, Australian bauxite production was 79.4 Mt, rising by 6% from the 74.9 Mt recorded for 2011.

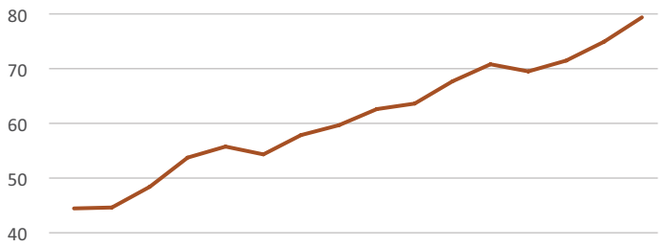
Other significant bauxite producers include China (48 Mt), Brazil (34 Mt), Indonesia (30 Mt), India (20 Mt) and Guinea (19 Mt). Total world production of bauxite was estimated by the US Geological Society to be around 263 Mt.

Australian metallurgical alumina production in 2012 was 21 million tonnes and chemical grade alumina production was around 0.6 million tonnes. Australia maintained its position as the second largest producer of metallurgical alumina in the world with 22.6% of global production. China remains the world's largest alumina producer with 37.59 Mt or 39.3% of the world's production (Source: International Aluminium Institute (IAI), Alumina Production - total for January to December 2012).

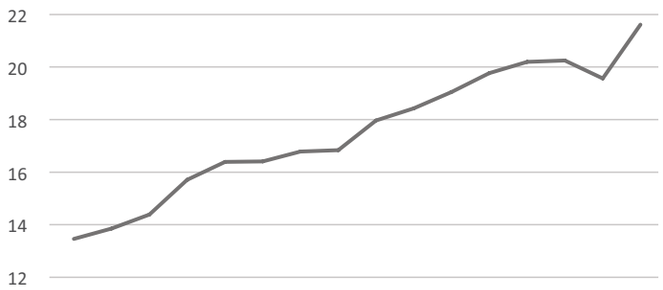
Australian primary aluminium metal production was 1.87 million tonnes in 2012, a fall of 4.6% from 2011. The top aluminium producing nations include China (20.3 Mt), Russia (3.8 Mt), Canada (2.8 Mt), United States (2.1 Mt), Australia (1.9 Mt), United Arab Emirates (1.8 Mt), India (1.7 Mt), Brazil (1.4 Mt), Norway (1.1. Mt) and Bahrain (0.9 Mt).

Australia remains the fifth largest producer of aluminium in the world, with over 5.0% of the market. China remains the world's largest producer of primary aluminium.

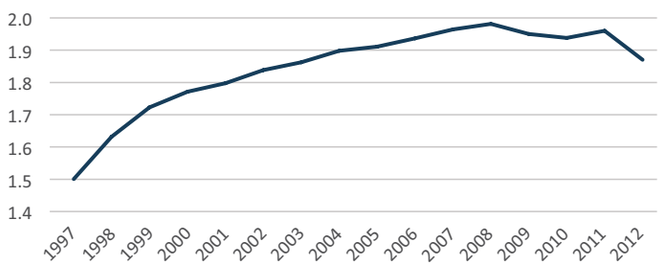
BAUXITE: production (Mt)



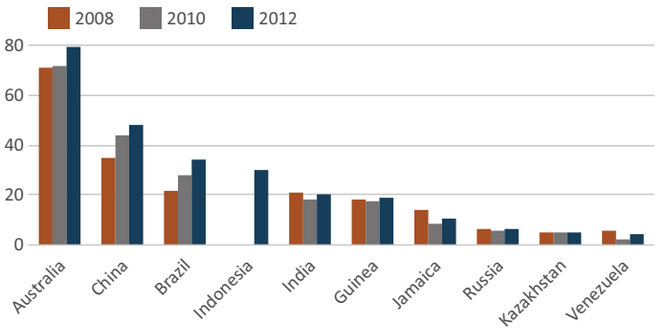
ALUMINA: production (Mt)



ALUMINIUM: production (Mt)

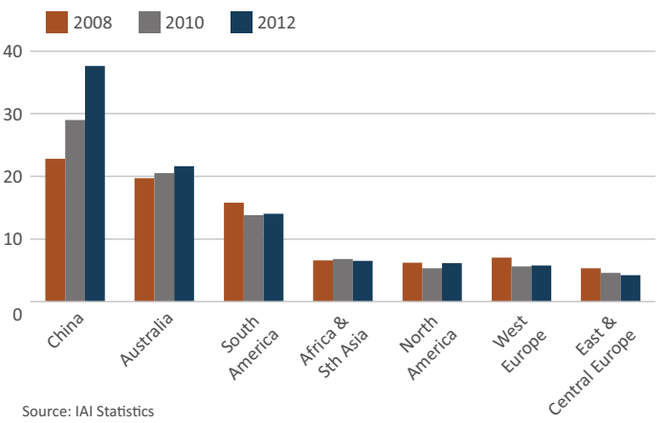


WORLD BAUXITE PRODUCTION by top 10 countries 2008–12 (Mt)



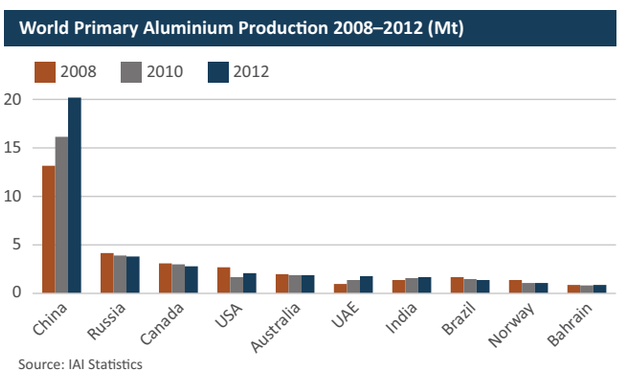
Source: US Geological Survey - USGA Minerals Resources Program
Note: No data available for Indonesia for 2008 and 2010

World Alumina Production 2008–2012 (Mt)



Source: IAI Statistics

World Primary Aluminium Production 2008–2012 (Mt)



Source: IAI Statistics

Aluminium is strong and lightweight, making it an ideal material in a world that is looking for more efficient ways to shelter, transport and sustain a growing population.

Aluminium Rolled Product Industry

The global aluminium rolled product market consists primarily of plate, sheet and foil. Rigid container sheet is used in the packaging and consumer market, whilst sheet and plate products are generally used in building and construction and transportation markets. Australia's rolled aluminium is primarily used to produce aluminium food and beverage cans (can ends and sheet).

There are two rolled products facilities currently operating in Australia, one in Yennora, NSW and the other in Geelong, Victoria, both owned by Alcoa Australia Rolled Products. Combined production from these two facilities was around 130,000 tonnes in 2012, similar to the volume of tonnes reported in 2011.

Exports of rolled aluminium (coils for food and beverage cans) from Australia in 2012 were at 65,000 tonnes - down from 70,000 tonnes, exported for 2011. This reduction was primarily driven by increased domestic Australian usage. Imports of sheet and plate for 2012 were almost 70,000 tonnes, a decrease of 16.7% from the 84,000 tonnes in 2011 and significantly down from the 153,000 tonnes reported in 2010.

Industry Structure

In 2012, the Australian industry was comprised of five bauxite mines, seven alumina refineries and six aluminium smelters.

The Gove and Weipa bauxite mines operate in the NT and Queensland respectively and are owned by Rio Tinto. Alcoa of Australia own the mines at Huntly and Willowdale in WA. The final mine is located at Boddington WA and is majority owned by BHP Billiton.

There are 7 alumina refineries across Australia with Rio Tinto Alcan owning Gove in the NT, Yarwun in Queensland and an 80% stake in Queensland Alumina with the remaining 20% stake owned by Rusal. The Kwinana, Pinjarra and Wagerup refineries in WA are owned by Alcoa of Australia. The final refinery is located at Worsley, WA and was majority owned in 2012 by BHP Billiton.

There were 6 aluminium smelter facilities operating in Australia in 2012. The Bell Bay Aluminium smelter in Tasmania and Boyne Smelters Ltd in Queensland are owned by Rio Tinto Alcan. The Tomago Aluminium Smelter in NSW is majority owned by Rio Tinto and CSR. Alcoa of Australia own smelters at Point Henry and Portland in Victoria.

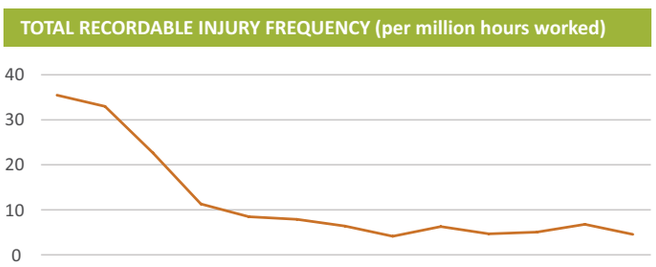
In 2012, Bell Bay, Boyne Smelters Ltd and the Gove mine and refinery were part of Pacific Aluminium, wholly owned by Rio Tinto. Since October 2013 the Gove bauxite mine and alumina refinery are now managed by Rio Tinto Alcan (Bauxite and Alumina). Rio Tinto Alcan also manages the Weipa and Yarwun alumina refineries.

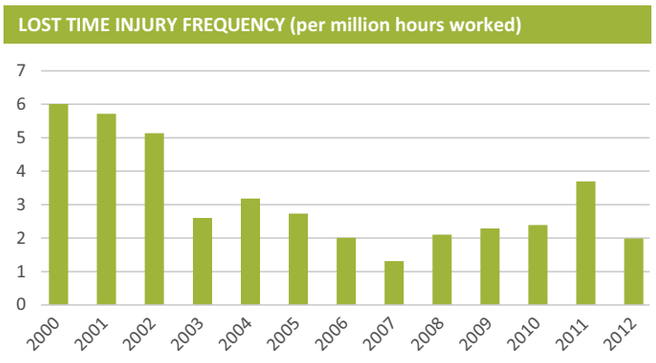
The Kurri Kurri aluminium smelter, based in NSW and owned by Hydro Aluminium, ceased production in Australia in late 2012 and is now in a care and maintenance mode.

Safety

The Australian aluminium industry remains committed to reducing workplace injuries to zero. All of our people are entitled to have a safe and healthy workplace. AAC members have strong safety cultures and continue to strive for the elimination of workplace injuries through the implementation of best practices, systems and metrics.

The AAC collects safety data from all Australian facilities involved in the production of bauxite, alumina and aluminium. The lost time injury frequency rate for 2012 was 1.99 (per million hours worked) down from 3.69 in 2011. The total recordable injury frequency rate for 2012 was 4.53 (per million hours worked) down from 6.78 in 2011.





Aluminium is infinitely recyclable, making it one of the most sustainable solutions available to meet the needs of today and tomorrow.

Case Study

Rio Tinto Alcan - Here for Childcare

A $1.2 million partnership has delivered impressive results in addressing an ongoing community issue in Gladstone.

The shortage of childcare services was a well recognised issue in the Gladstone region, due to both increasing population and legislative change requiring higher education standards for childcare workers.

In response, Rio Tinto Alcan led an extensive consultation process with local industry groups and childcare providers to better understand the issues. The solution, the three-year Here for Childcare initiative, was funded by the Rio Tinto Alcan Gladstone Community Fund and launched in March 2012.

A collaboration with government, education institutions, business, private childcare enterprises and early childhood educators, Here for Childcare comprises six programmes designed to support the attraction, professional development and retention of educators in the Gladstone childcare sector.

Together, the six programmes:

- Increase the number of childcare places through family day care;
- Attract new educators to the industry;
- Up-skill existing educators to help improve the quality of childcare;
- Provide support for tertiary qualifications; and
- Keep the childcare industry informed about growth in the region to highlight development or expansion opportunities.

In just over a year since its launch, the Here for Childcare initiative has delivered success in all six programmes. Twelve new family day care educators have opened their homes to children, creating up to an additional 84 childcare places.

find out more at: http://www.hereforgladstone.com.au/

Eleven new educators took up roles in local day care centres, and 16 existing educators began studying for their Diploma in Children's Services. A further 11 school senior school students are completing school based traineeships in childcare.

One of the most effective components of Here for Childcare was the professional development workshops for existing educators. Eight workshops have been held to date, with an average of 75 participants at each session, a clear indication of the value of the programme to local educators.

Finally, local resident and educator at one of Gladstone's busiest childcare centres, Katie Bird, was awarded the 2013 Here for Childcare scholarship in late 2012. "The scholarship gives me the opportunity to continue studying for my pre-school teaching qualification, without the worry of financial pressures," Katie said.

"The course will give me a whole new perspective on children's behaviour and learning habits, and I look forward to using this information in the practical side of my work".

Here for Childcare is independently administered by the Schools and Industry Network (SAIN). SAIN worked with Rio Tinto Alcan to appoint a coordinator who works within the Rio Tinto Alcan Community Relations team and manages the Here for Childcare program, working closely with the centre directors, educators and coordination units.

Energy

Alumina

Refining bauxite into alumina requires significant energy consumption of around 25% of total costs. Unlike aluminium, which is dependent on electricity for the electrolytic process, alumina refining mainly requires energy for the generation of heat and steam. Therefore alumina refineries are large users of gas, coal and petroleum products for their energy requirements. In 2012, Australia's seven alumina refineries consumed 221 PJ of energy, higher than the 210 PJ consumed in 2011, due to higher production. Efficiency improved at 10.5 GJ per tonne of production compared to the 11 GJ per tonne of production in 2011.

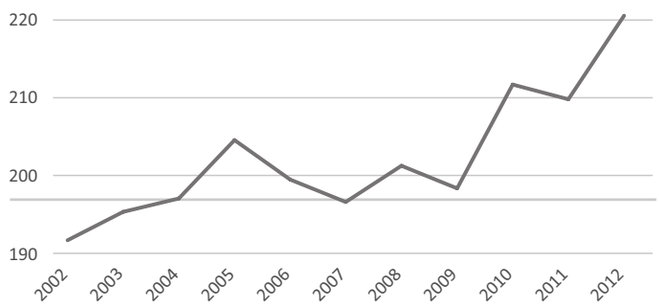
Natural gas is a key energy source for all of Australia's alumina refineries that have access to it, both from a process perspective and in terms of emissions reduction. In 2012, approximately 67% of energy consumed in alumina refining was in the form of natural gas, which was consistent with gas use in 2011.

Coal is the second most used fuel in alumina refining, providing 19% of the industry's energy requirements in 2012. This was an increase from 2011 and a reflection of difficulties sourcing gas in the domestic market. Fuel oil (11%), electricity (3%) and diesel (1%) are the remaining sources of energy used by Australian alumina refineries, and their usage was relatively unchanged from the 2011 values.

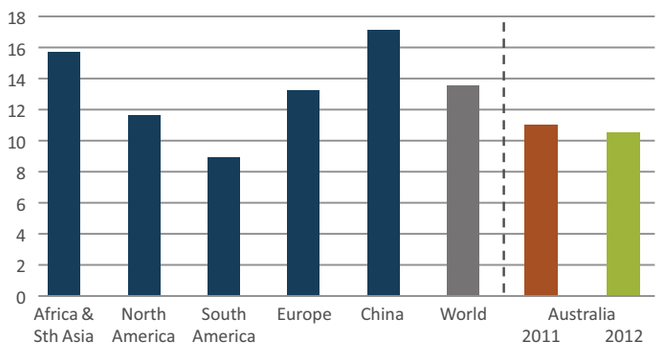
Reflecting the availability of gas, large scale operations and recent investments, Australian alumina energy efficiency compares favourably to global competitors. 2012 saw a continued improvement in energy efficiency.

ALUMINA: energy consumption per tonne (GJ)

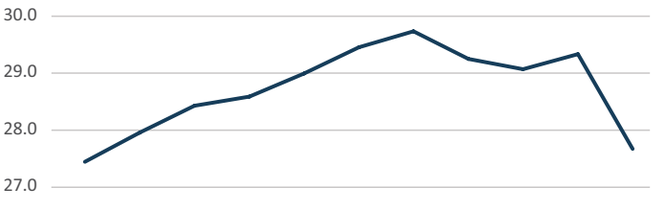
ALUMINA: total energy consumption (PJ)



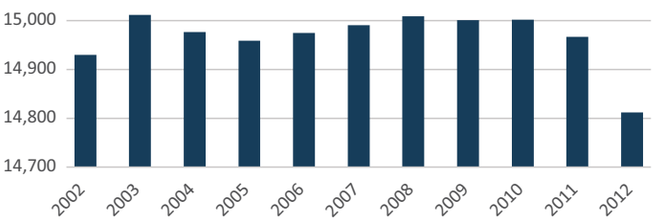
ALUMINA: energy use per metric tonne produced (gigajoules)



ALUMINIUM: total electricity consumption ('000 GWH)



ALUMINUM: total electricity consumption/tonne of production (KWh/t)



Aluminium is strong and lightweight, making it an ideal material in a world that is looking for more efficient ways to shelter, transport and sustain a growing population.

Primary Aluminium

Primary aluminium smelting is energy intensive, with energy costs at around 25-30% of smelter operating costs. This rises to 30-35% when the energy used to produce the alumina is taken into account. Therefore smelter operators regard energy consumption as a key indicator in their regular performance monitoring.

The aluminium industry is dominated by continuous base load electricity demand. In 2012, the Australian aluminium smelting industry consumed 27,672 GWh of electricity, 5.7% lower than the 29,333 GWh consumed in 2011 and well below the industry peak of 29,736 GWh recorded in 2008.

It is estimated that the aluminium smelting sector's share of Australia's electricity consumption was over 12.4% in 2012, down from 12.9% in 2011.

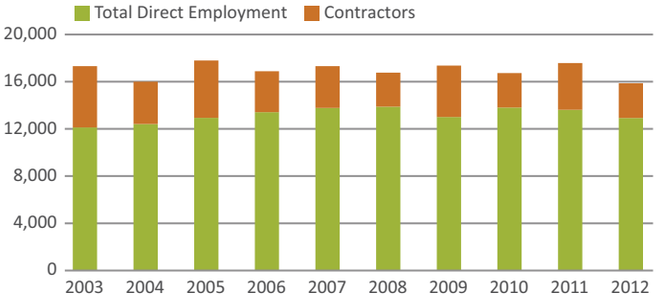
The decrease in both total electricity consumption and electricity consumption per tonne of aluminium reflect the closure in late 2012 of the Kurri Kurri smelter in NSW.

Employment

Employment in bauxite, alumina and aluminium is centred on regional areas reflecting the location of the main production facilities.

The regional benefits associated with all aspects of the aluminium industry are of significant value. Industry operations are, in many cases, the major source of employment in regional areas driving demand for contractor services and other local facilities at both industrial and retail levels.

EMPLOYMENT: bauxite, alumina and aluminium



In 2012, the bauxite, alumina and aluminium operations employed around 15,900 employees, of which approximately 12,900 were directly employed and approximately 3,000 were contractors.

Consistent with AAC predictions in 2011, employment numbers declined in 2012 due to difficult market conditions. Alumina refining share of direct employees fell 0.4% and contract worker rates fell by 21.2%. In terms of aluminium smelting direct employees fell by 16.4% and contractor rates fell by 35.7% from 2011 levels. Direct employee rates grew in bauxite operations by 3.8%, while contractor rates fell by 27.4%

Aluminium Trade Data

Exports

The combined value of alumina and aluminium exports fell to $8.5 billion in 2012, a decrease of 8.6% from 2011. In 2011-12 Australia exported 73 million tonnes of bauxite, worth around $296 million (Bureau of Resources and Energy Economics, Resources and Energy Quarterly, December Quarter 2012).

The value of alumina exports decreased by 3.4% to $5 billion and aluminium exports fell by around 15% to $3.5 billion (ABS Export Statistics).

Total exports of primary (unwrought) aluminium were at 1.65 Mt, showing a decrease of almost 1.7% from 2011 levels. Total exports of alumina were at 17.5 Mt, approximately 14.5% higher than in 2011.

Exports of aluminium extrusions decreased by 42.6% to 443 tonnes in 2012 and valued at $4.8 million. Sheet and plate exports were reported at more than 74,800 tonnes with a value $276 million. This represents a 46% decrease in sheet and plate exports.

Aluminium scrap metal exports increased more than 7% to 204,000 tonnes in 2012 but the value was reduced by $5 million to $355 million.

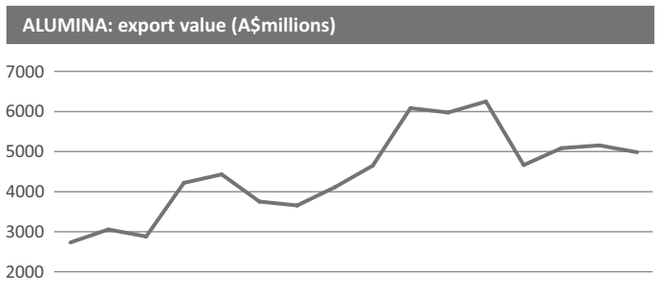
Exports of all semi-fabricated aluminium products decreased in volume terms by 49% in 2012 to around 87,000 tonnes worth around $314 million. A high Australian dollar and increased international competition could be drivers of this change.

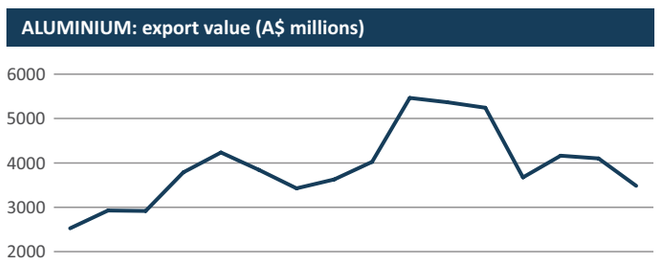
Imports

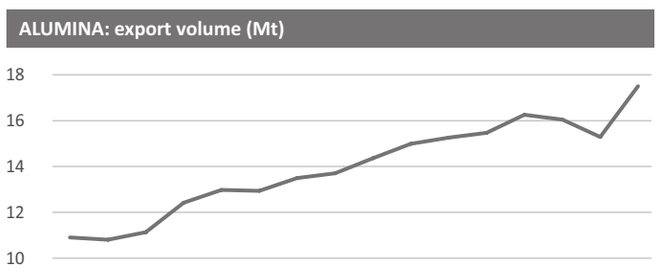
Imports of semi-fabricated aluminium products totalled 168,000 tonnes in 2012, a 6.7% decrease in production from 2011.

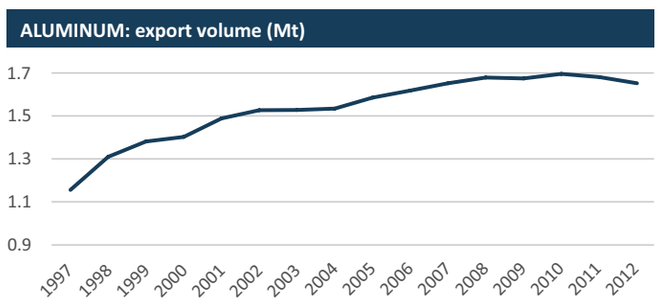
Aluminium extrusion imports increased to more than 79,800 tonnes, a 6.4 increase from 2011. Sheet and plate imports were down 14.3%, to almost 68,600 tonnes. Imports of aluminium foil were approximately 17,900 tonnes in 2012, a decrease of 0.6%.

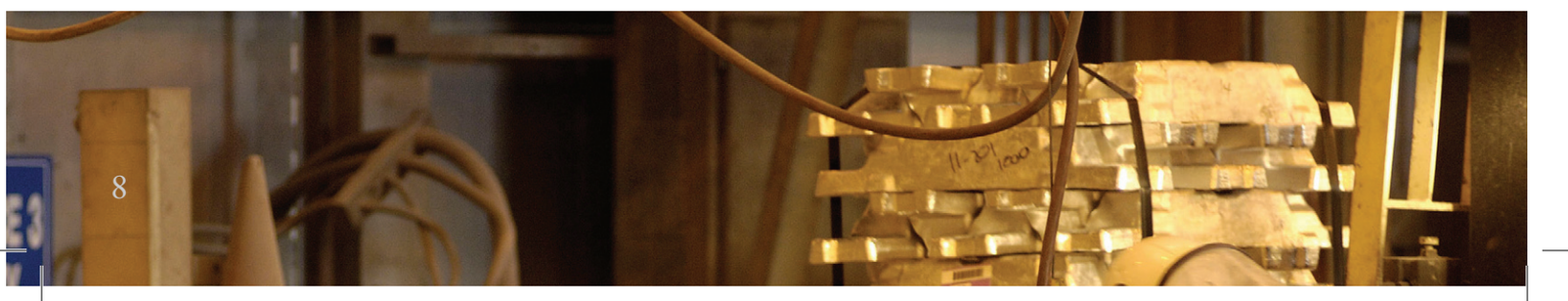
Imports of aluminium scrap fell to around 3,600 tonnes in 2012 representing a 10% decrease in imports from 2011.











Case Study

Rio Tinto Alcan's Yarwun Refinery Expansion Project Opens

On 23 October, more than 600 employees, Gladstone community representatives and local Indigenous leaders joined with Rio Tinto Alcan and Queensland Premier Campbell Newman to launch the $AUD $2.5 billion Yarwun alumina refinery expansion in Gladstone.

President and chief executive officer of Rio Tinto Alcan Bauxite & Alumina, Pat Fiore, said the Yarwun expansion project more than doubles production at the refinery to 3.4 million tonnes of alumina per year, enhancing Rio Tinto Alcan's position as one of the world's leading bauxite and alumina producers.

"And just as importantly, today's opening highlights how the Yarwun expansion strengthens the economic, cultural and social ties between Gladstone and Western Cape York Peninsula," Mr Fiore said.

"Together, Rio Tinto Alcan's Queensland operations – Yarwun and QAL in Gladstone, and our Weipa bauxite mining operations – employ approximately 3,000 people and are mainstays of these important regional communities."

Each year, the operations contribute more than $300 million in salaries and wages, $10 million in royalties and $6.5 million in community investments.

"In Gladstone, the Yarwun expansion cements our commitment as a long-standing member of this community. Since construction of QAL in 1964, Rio Tinto Alcan has invested more than $500 million in community infrastructure and programmes, including housing, bridges and roads.

"And as was the case with the construction of the original Yarwun refinery, investing in the local community was a priority throughout the construction of Yarwun 2."

Mr Fiore said that during construction, $1.9 billion was spent on contracts and procurements throughout Australia, including:

- $360 million in Gladstone; and
- $1.4 billion in Queensland.

Now operational, the refinery expansion provides additional employment for 250 Gladstone locals.

Mr Fiore acknowledged the significant contribution the Queensland and Commonwealth governments had made to getting the first stage of the refinery off the ground.

Fluoride Emissions

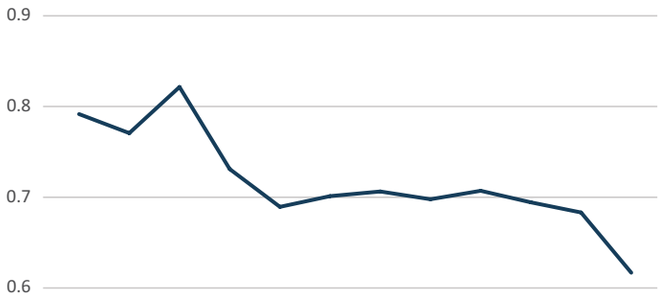
Fluoride emissions (as gases and particulates) remain a high environmental priority for the aluminium smelting sector. Facilities utilise modern control systems to remove and recycle the fluorides, keeping levels to well within regulated limits.

Optimum fume collection from the electrolytic cells, coupled with specific workplace-related training of employees continues to drive further improvement.

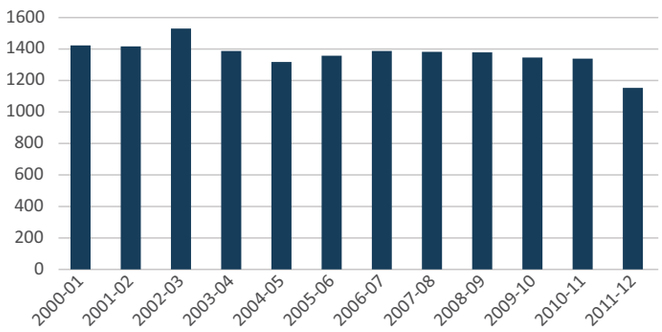
Fluoride emissions from Australia's six aluminium smelters were reported as 1,154 tonnes in 2011-12 under the National Pollutant Inventory, a 13.8% decrease over 2010-11 levels, and 18.9% reduction since 2000-01. This could be partially attributed to the exiting from the market of the Kurri Kurri smelter in 2012.

This equates to fluoride emissions per tonne of 0.62 kg in 2012 (a fall from 0.68 kg in 2011) which is still well below the global average of 1.0 kg per tonne as at 2012.

ALUMINIUM: fluoride emissions per tonne (kg)



ALUMINIUM: total fluoride emissions (tonnes)



Water

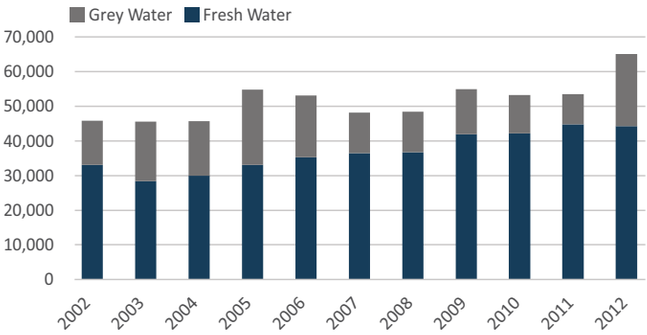
Water is a key input for the refining of bauxite into alumina. Water availability is important to local communities and other businesses. The amount of water an alumina refinery uses is subject to local environmental and process conditions and can also be dependent on the type of technology being utilised; therefore some variability is expected from year to year.

Australia's alumina refineries used over 65,000 ML of water in 2012, compared with 53,600 ML in 2011. This usage is equivalent to 3.0 kilolitres per tonne of alumina production, slightly higher than the 2.7 kilolitres per tonne recorded in 2011.

Of the 65,000 ML used in 2012, 68% was fresh water and 32% was non potable, a lower proportion of fresh water than in previous years. It is expected that the ratio of fresh to grey water will fluctuate from year to year depending on regional conditions.

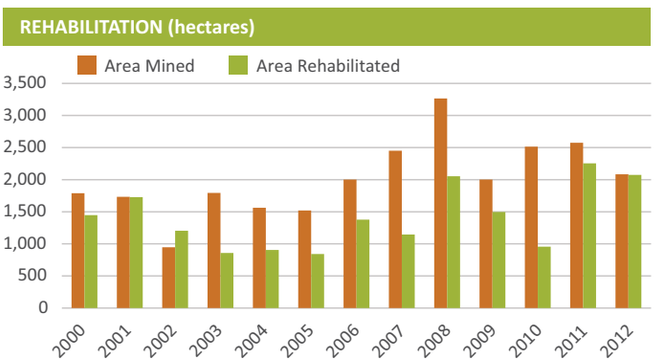
ALUMINA: water use per tonne (kilolitres per tonne)

ALUMINA: total water usage (megalitres)



Land use and Rehabilitation

Rehabilitation of our bauxite mining areas continues to be a central element of overall mine development and forms part of our license to operate. All bauxite mining areas in Australia are subject to post-mining restoration programs that require comprehensive rehabilitation of the mined areas.



Australia is home to approximately 21% of the world's known bauxite reserves (6 gigatonnes) in the form of lateritic (silicate) deposits (Australia's Identified Mineral Resources 2010, Geoscience Australia). Lateritic bauxites are almost always found near the surface and therefore are mined using traditional surface mining techniques.

Bauxite is mined in three regions of Australia: the Cape York Peninsula in Queensland (Weipa), Arnhem Land in the NT (Gove) and in the Darling Ranges in south-west WA (Boddington - Mt Saddleback, Huntly and Willowdale).

The area rehabilitated each year varies due to seasonal conditions and operational factors. Increased haul roads and haul distances and pit size can require additional areas to remain open before rehabilitation is commenced.

Year	Area Mined (hectares)	Area Rehabilitated (hectares)
2012	2,084	2,075
2011	2,576	2,254
2010	2,514	957

International Aluminium Industry and Perfluorocarbons

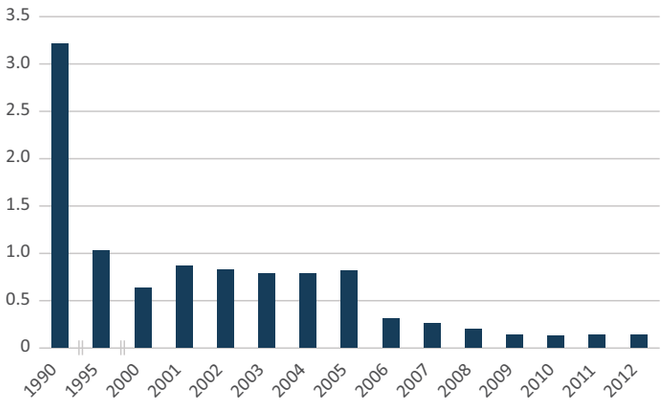
Perfluorocarbons (PFCs) are emitted predominantly during brief upset conditions caused by an imbalance in the smelting process known as 'anode effects'.

The Australian aluminium smelting industry is a world leader in terms of PFC emission management, with emission rates of 0.11 tonnes CO_2-e per tonne of aluminium in 2012. This is well below the global average of 0.60 tonnes of CO_2-e per tonne.

An anode effect is a process upset condition, where an insufficient amount of alumina (Al_2O_3), the raw material for primary aluminium production, is available in the electrolyte bath contained in the electrolytic cells (or pots) within a smelter reduction line (potline). This causes some of the bath to be consumed, resulting in the emission of gases containing the PFCs tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6). This event is characterised by the voltage in the pot being elevated above the normal operating range.

The global primary aluminium industry seeks to achieve the long term elimination of PFC emissions. We have already achieved a more than 95% reduction in PFC emissions per tonne of primary aluminium produced between 1990 and 2012. According to the International Aluminium Institute (IAI) following the successful achievement of the

ALUMINIUM: PFC emissions (tonnes CO_2-e per tonne of aluminium)



global goal for an 80% reduction in PFC emissions per tonne of primary aluminium produced by 2006 (from the 1990 baseline), the aluminium industry will further reduce global emissions of PFCs per tonne of aluminium by at least 50% by 2020 as compared to 2006.

IAI results for 2012 indicate that the global aluminium industry has reduced its PFC emissions intensity from 4.93 in 1990 to 0.60 tonnes CO_2-e per tonne of aluminium. This is a reduction of 87%. 2012 PFC emissions intensity is the same as in 2011.

The outstanding Australian results have been achieved through sound potroom management and investment in technological improvements.

Case Study

Boyne Smelters Limited Commissions a Fourth Carbon Bake Furnace

Boyne Smelters Limited (BSL) reached a significant milestone in its $700 million Boyne Smelters Development project with the commissioning of the new carbon bake furnace in February 2012.

Commissioning of BSL's fourth carbon bake furnace (CBF4), priced at approximately $337 million, began on site in February 2012.

The new CBF4 was commissioned to replace two of BSL's existing three carbon bake furnaces which produce the carbon anodes needed to make aluminium.

Construction of CBF4 was a major component of the project, which first began in 2008, and which also includes several other major capital projects to reduce environmental impacts, improve energy efficiency and increase the smelter's lifespan.

Following the successful completion of adjoining equipment including cranes, conveyors and compressors, the new furnace was officially fired up when the first of four gas burner groups was lit by the site operating team.

The 2012 BSL General Manager Guy Fortin commented on looking forward to the environmental and operational benefits that will come with the new carbon bake furnace.

"It is very exciting for us to be starting up the new furnace as the technology allows for a smarter, cleaner 'burn' cycle," Mr Fortin said.

"This means our energy efficiency will be significantly improved, while also reducing the occasional odours that can result from the smelting process.

"CBF4 will require less natural gas than the existing furnaces on site and, most importantly, it will reduce our carbon dioxide emissions by more than 20,000 tonnes per year."

Commissioning new carbon bake furnaces can be challenging and usually results in visible emissions. BSL committed to a clean start up and has made significant investments to reduce environmental and community impacts.

"By using pre-baked anodes and progressively heating up the furnace we have been able to minimise air emissions. We expect there to be some visible steam pass through the bake's stack in the early stages, as a result of drying the six million refractory bricks which make up the furnace," Mr Fortin said.

BSL will operate using the new CBF4 along with CBF3, which has been rebuilt over the last few years to improve efficiency as part of the smelter's development project.

Greenhouse Gas Emissions

The Australian aluminium industry has been committed to reducing greenhouse gas emissions for more than two decades. Through focused application of technology and resourcefulness, the industry has proven its commitment to energy efficiency and improving greenhouse emissions performance. Our industry remains committed to further improving its greenhouse and energy performance in line with Australia's greenhouse reduction goals.

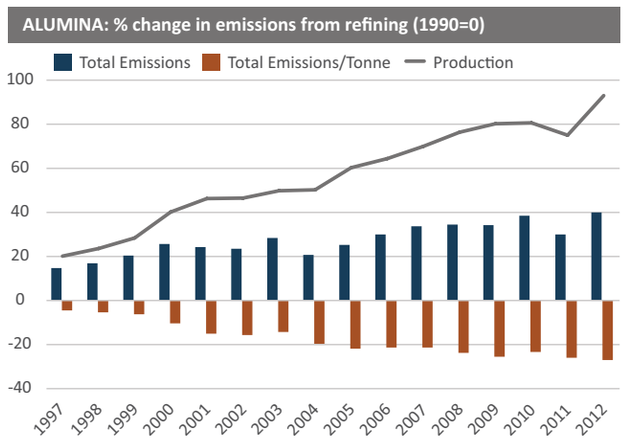
The AAC maintains a comprehensive emissions database covering all alumina and aluminium production since 1990. This has provided a platform for the industry to build on its experience in measuring and reporting greenhouse gas emissions, and in seeking abatement opportunities.

The incredible strength-to-weight ratio of aluminium makes it possible to design light structures with exceptional stability.

Alumina Refining

Total greenhouse gas emissions from Australia's seven alumina refineries grew almost 7.8% from 2011 levels. 15 million tonnes of CO_2-e were emitted in 2012, compared with 13.9 Mt in 2011 due to an increase in production levels. Absolute emissions from Australia's alumina refineries have increased by only 40% since 1990, despite an almost 93% increase in production over this period.

Emissions intensity was 0.70 tonnes of CO_2-e per tonne of alumina in 2012, 2.4% lower than in 2011 and 27.4 % lower than the 1990 value of 0.96 tonnes of CO_2-e per tonne of alumina. This result improves our industry's record low emissions intensity of 0.71 per tonne of alumina first achieved in 2009 and 2011.

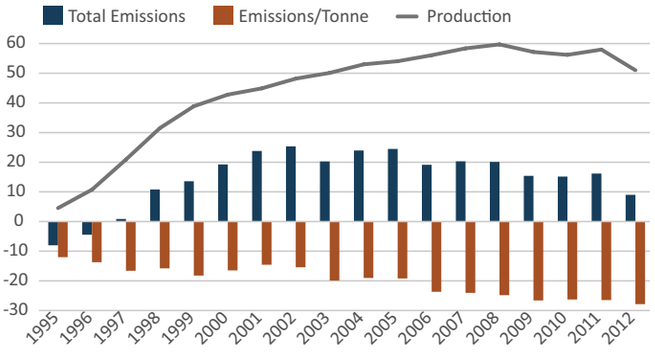


Aluminium Smelting

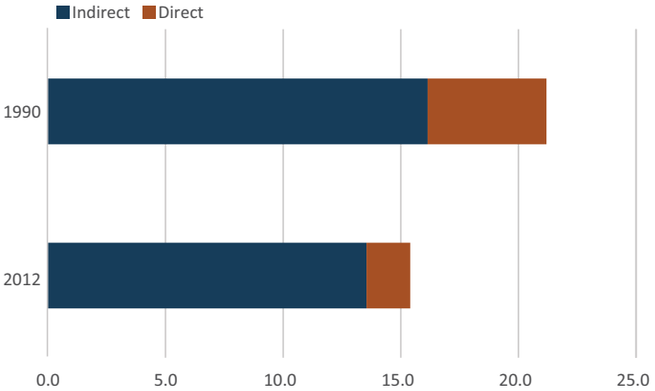
The smelting of aluminium is a very energy intensive process. More than 80% of smelting greenhouse gas emissions are indirect (electricity-related) emissions. The remaining 20% of emissions come from direct (on-site) emissions plus the emissions associated with the production of alumina. The combined direct and indirect greenhouse gas intensity of Australian primary aluminium production, not including emissions from alumina refining, which are considered separately, improved to 15.4 tonnes of CO_2-e per tonne of aluminium in 2012 from 15.6 tonnes in 2011.

In 2012, direct (process) emissions of greenhouse gas (PFCs, carbon inputs, fuels) were 1.86 tonnes of CO_2-e per tonne of aluminium, almost 1% lower than in 2011 and 63.2% lower than in 1990. PFC emissions fell slightly to 0.11 tonnes of CO_2-e per tonne of aluminium, a 96.7% improvement over 1990 levels.

ALUMINIUM: % change in emissions from smelting (1990=0)



ALUMINIUM: indirect and direct emissions (tonnes CO_2-e per tonne of aluminium)



Total direct greenhouse gas emissions from Australian aluminium smelters were 3.47 million tonnes CO_2-e in 2012, down 5.5% compared to 2010 and well down on the 1990 level of 6.26 million tonnes.

Emissions from the purchase of electricity fell 1.3% on an intensity basis over 1990. These indirect emission levels are closely linked to production and are therefore sensitive to economic conditions. In this context the fall in emissions intensity from the purchase of electricity may have been influenced by the closure of the Kurri Kurri facility in 2012.

Since 1990, aluminium production has increased by 50.6% whilst total indirect emissions have risen by only 26.3%. On an intensity basis, indirect emissions were down 16.1% on 1990 levels.

Case Study

Alcoa Wins Safety Innovation Award

At the 2012 WA Chamber of Minerals and Energy's Safety and Health Innovation Awards, Alcoa's Pinjarra refinery was awarded for its program to reduce occupational noise exposure.
This program takes important steps in preventing hearing loss in refinery employees.

The Road to Silence hearing conservation program, first introduced across WA operations in 2006 and the Victoria operations in 2007, was established in response to reports that hearing loss problems were being recorded at an increasing rate and made up a notable percentage of Alcoa employee injuries.

A number of best practice ideas and relevant pieces of equipment were incorporated into procedures to enhance the existing program.

Alcoa introduced a combination of controls, which included: a program to ensure correct fitting of ear plugs, the use of noise badges and the tracking of noise exposure in real time, improved walkway signage, warning labels on hand-tools, the implementation of noise task controls, a 'Buy Quiet' program and various educational initiatives, including our Road to Silence DVD.

During a five year period, hearing exposure above the recommended levels over the course of a 12 hour shift was reduced to less than 1% of the workforce population.

Alcoa's occupational hygienists and technicians will continue to use initiative to work towards preventing hearing damage in operators.

Alcoa's Black Cockatoos

Black Cockatoo nest habitat is particularly slow in forming and difficult to replace and restore. In 2012, Alcoa developed a procedure to identify, map and protect high value habitat for black cockatoos that may be affected by Alcoa mining operations in WA.

Prior to seeking approval for clearing within Alcoa's mining footprint, the areas were surveyed for the presence of old-growth trees that provided actual or potential nest habitat for Black Cockatoos. In 2012, survey findings resulted in four haul road realignments and the shifting of three sumps and two stockpiles to avoid the clearing of old-growth nest trees, helping to maintain Black Cockatoo nest habitats. To date, nine nest trees and 16 habitat trees (that have the potential to provide nest habitat in the future) have been protected.

Aluminium and Recycling

Aluminium is an amazing material that can be infinitely recycled without loss of properties. The high value of aluminium scrap is a key incentive for recycling. This is why almost 75% of aluminium ever produced since 1886 is still in use today.

Recycling has become second nature to Australians as we all seek to reduce our environmental footprint. Recycling aluminium makes both economic and environmental sense since it saves up to 95% of the energy required for primary aluminium production, and thus avoiding associated emissions such as greenhouse gases. Twenty aluminium cans could be recycled with the same amount of energy as it takes to make one new can from bauxite ore.

Recycling one aluminium can saves enough energy to run a television for three hours; and it can take as little as 60 days for recycled aluminium cans to make it back on the supermarket shelf.

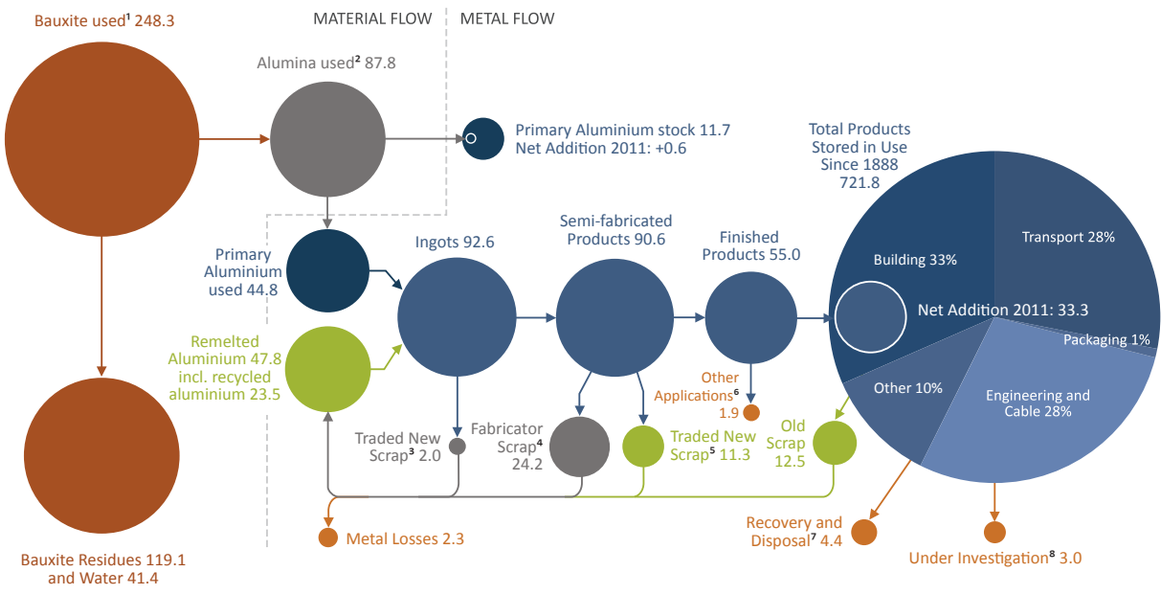
Looking at global aluminium flows, almost one-third of all aluminium metal entering the market is from recycled material which accounts for almost 25 million tonnes in 2011 (IAI estimates). Of this, 11.3 Mt were returned from customers after fabrication processes (traded new scrap) and 12.5 Mt were returned from the end-use sector (e.g. aluminium content of used motor vehicles and beverage cans).

It is estimated that total aluminium scrap exported from Australia was 203,800 tonnes.

In addition, over 12,000 tonnes of dross (a byproduct of aluminium smelting) was also collected for reprocessing. Dross recovery rates vary due to the nature of the material, and are typically reported at around 40-50%.

A recycled aluminium beverage can is back on the store shelf in 60 days.

Global Aluminium Flow 2011



Values in millions of metric tonnes. Values might not add up due to rounding.
1 Calculated based on "2010 Life Cycle Inventory Data for the Worldwide Primary Aluminium Industry (2013)". Includes, depending on the ore, between 30% and 50% alumina; 2Calculated based on "2010 Life Cycle Inventory Data for the Worldwide Primary Aluminium Industry (2013)". Includes, on a global average 52% aluminium; 3 Aluminium in skimmings; 4 Scrap generated by foundries, rolling mills and extruders. Most is internal scrap and not taken into account in statistics; 5 Scrap generated during the production of finished products from semis; 6 Such as deoxidation aluminium (metal property is lost); 7 Either incinerated with/without energy recovery, material recovery or disposal; 8 Area of current research to identify final aluminium destination (reuse, recycling, recovery or disposal).

source: International Aluminium Institute (IAI)

Case Study

Bell Bay Aluminium Reduces Fluoride Emissions

In 2012, Bell Bay Aluminium achieved its best environmental performance on record. Fluoride emissions reduced by more than of 20% from the site's previous best ever results and targets were met for waste to landfill, water and energy use.

Projects to achieve these outcomes included implementing an improvement to the way that fresh alumina is introduced into the gas stream in the potlines fume scrubber and an engineering control that significantly reduced the size of the gap between the anode rods and the cell hoods.

Bell Bay Aluminium's challenge was to reduce the anode rod gap around the 11,160 anode rods. A reduction in the gap presented a significant opportunity to improve the amount of fluoride in the potlines, which would improve environmental performance, reduce cost and provide health benefits to smelter employees.

As part of a potrooms 'kaizen' held in late 2011, more than 40 ideas to reduce the anode rod gap were narrowed down to one - a new fume skirt cover. A number of design variations were tested. The final design reduced the gap around the anode rod by over 70% compared to the old design. In addition, the new design allows for ease of use by the operator. The new cover has contributed to a reduction in fugitive fluoride emissions by over 10%.

This particular solution was extensively trialled and chosen on the basis of usability, closure of the gap, cover position over time, predicted life span, initial cost and effort required to maintain.

Future for the Australian Industry

Historically, Australia has been a global leader in the production of bauxite, alumina and aluminium – adding significant value to Australia's natural mineral and energy resources. Our industry has been built on the competitive advantages of resource availability, abundant energy sources, skilled labour force, available land and stable investment conditions.

Australia's bauxite, alumina and aluminium producers face a range of challenges going forward. Low commodity prices, the high value of the Australian dollar, increasing energy and raw input costs, increasing competition as well as a high legislative and regulatory burden pose a significant challenge to Australian operations.

Despite the current difficulties facing the Australian industry, the long term future of aluminium as a material remains positive. As a primary component in the construction, transport, packaging, electrical and industrial sectors, aluminium is an essential material in our modern society, and will remain so well into the future.

Aluminium

Globally, the aluminium smelting industry is facing difficult conditions. Rising input costs and historically low commodity prices are placing significant pressure on producers. Aluminium prices are below US$2,000, having been at that level for

much of 2012 and 2013, and the outlook is for price recovery to be gradual.

All of Australia's aluminium smelters have been under pressure since mid-2011, and this situation is expected to continue for the next year at least. Most vulnerable to these conditions are the relatively older and smaller aluminium smelters - Bell Bay, Kurri Kurri and Point Henry. Of these, the Hydro Kurri Kurri facility closed in 2012, whilst the Bell Bay and Point Henry operations will remain under significant pressure until conditions improve.

The more recently constructed and larger operations such as Boyne (Queensland), Tomago (NSW) and Portland (Victoria), are in a better position in the face of the current economic storm. However, the partial curtailment of capacity at Boyne in early 2014 in response to high electricity prices demonstrates that no facility has the flexibility to incur additional costs.

A key factor in the current difficulties faced by the smelting industry is the low aluminium price, which when coupled with the high Australian dollar, sees producers facing worse conditions than those experienced during the 2008 global financial crisis - where low prices were offset by a relatively low Australian dollar.

In addition to this, current policies such as the carbon price and the Renewable Energy Target (RET) scheme represent significant additional costs on industry. Costs that are keenly felt when margins are tight or non-existent, as they are now for all Australian aluminium producers.

The RET in particular adds around $40 per tonne to the cost of producing aluminium, or around $800 million out to 2020. Australian Governments must recognise the impact such policies are having on Australian energy intensive industries and take steps to ensure the ongoing competitiveness of these important industries.

Significant challenges lie ahead for aluminium smelters in Australia. The long term global future for aluminium remains positive but the competitiveness of Australian smelters will rely on their ability to reduce internal costs and a policy environment that minimises external costs and enables efficient operation. Australia's world class aluminium industry will seek to position itself to take advantage of the eventual return of improved market conditions.

Alumina

Australia's alumina refining industry continues to be a leading supplier of metallurgical grade alumina to the world aluminium industry. As the precursor for primary aluminium metal, alumina production underpins key sectors of the world market for building and construction, transport, packaging and consumer durables.

2012 saw Australia's alumina production recover strongly following a decline in 2011. However, the same factors of low prices and high Australian dollar are also impacting the alumina refining sector, as evidenced by the recent announcement to suspend production at the Gove refinery.

Production is expected to decline in 2014 due to the suspension of production at Gove, offsetting recent increases from facility upgrades and the commissioning of the Yarwun and Worsley expansions.

A key challenge for the alumina industry in Australia is access to sufficient, competitively priced energy - specifically natural gas which is used to supply heat and steam for the refining process.

Domestic gas availability is essential for the ongoing operation of Australia's alumina refineries and for any future expansion opportunities. Fully functioning markets for natural gas must be the goal of all Australian governments – markets that will allow LNG producers to meet their commercial goals whilst ensuring that sufficient and competitive domestic supplies are available to local producers.

Despite the immediate challenges that lie ahead, Australia's world class alumina refining industry remains committed to building on the competitive advantages that have made the industry what it is today. Continued access to well-defined bauxite resources, reliable infrastructure as well as a stable political and investment environment all point to a successful future for Australian alumina refineries.

Globally it is estimated that buildings and their content contain around 400 million tonnes of aluminium, which can be extracted and reused by future generations time after time.

The Australian Industry

BAUXITE MINES	MAJOR SHAREHOLDERS	START DATE	CAPACITY
Boddington, WA (Mt Saddleback)	BHP Billiton 86%	1983	18.8 Mtpa
Gove, NT	Pacific Aluminium (Rio Tinto) 100%	1972	8.5 Mtpa
Huntly, WA	Alcoa of Australia 100%	~1970	23 Mtpa
Willowdale, WA	Alcoa of Australia 100%	1984	10 Mtpa
Weipa, Queensland	Rio Tinto Alcan 100%	1961	23.3 Mtpa

ALUMINA REFINERIES	MAJOR SHAREHOLDERS	START DATE	CAPACITY
Gove, NT	Pacific Aluminium (Rio Tinto) 100%	1972	2.3 Mtpa
Kwinana, WA	Alcoa of Australia 100%	1963	2 Mtpa
Pinjarra, WA	Alcoa of Australia 100%	1972	4.2 Mtpa
Queensland Alumina, Queensland	Rio Tinto Alcan 80%, Rusal Australia 20%	1967	3.95 Mtpa
Wagerup, WA	Alcoa of Australia 100%	1984	2.6 Mtpa
Worsley, WA	BHP Billiton 86%	1984	4.7 Mtpa
Yarwun, Queensland	Rio Tinto Alcan 100%	2004	3.4 Mtpa

ALUMINIUM SMELTERS	MAJOR SHAREHOLDERS	START DATE	CAPACITY
Bell Bay, Tasmania	Pacific Aluminium (Rio Tinto) 100%	1955	180 ktpa
Boyne, Queensland	Pacific Aluminium (Rio Tinto) 59.39%	1982	560 ktpa
Kurri Kurri, NSW	Hydro Aluminium 100%	1969	-
Point Henry, Victoria	Alcoa of Australia 100%	1963	190 ktpa
Portland, Victoria	Alcoa of Australia 55%	1986	358 ktpa
Tomago, NSW	Pacific Al. (Rio Tinto) 51.55%, CSR 36.05%, Hydro 12.4%	1983	530 ktpa

The Australian alumina and aluminium industries:

- a major investor in Australia over 50 years
- adding value to Australia's mineral and energy resources
- an important part of Australia's industrial base
- one of Australia's major exports, with annual export earnings over A$ 8.5 billion
- a capital replacement value over A$ 50 billion
- employs 15,900 people – mostly regional

Synopsis

ALUMINA	2012	VARIATION ON:	
		2011	1990
Australian alumina production (incl. chemical grade)	21.6 Mt	+10.2%	+93%
Share of world production	22.6%	+2.7%	-
Alumina exports – tonnage (1990 = 8.7 Mt)	17.5 Mt	+14.4%	101.2%
Alumina exports – value (1990 = $2,940 million)	$4,982 million	-3.5%	+69.5%
Total alumina GHG emissions (1990 = 10.7 Mt)	15.0 Mt	+7.9%	+40.2%
Per unit GHG emissions (1990 = 0.95) (per tonne of production)	0.70 t CO_2-e	-1.4%	-26.3%

ALUMINIUM	2012	VARIATION ON:	
		2011	1990
Australian aluminium production	1.87 Mt	-4.6%	+51%
Share of world aluminium production	4.2%	+5%	-
Aluminium exports – tonnage (1990 = 0.936 Mt)	1.65 Mt	-1.8%	+76.3%
Aluminium exports – value (1990 = $1,990 million)	$3,480 million	-17.1%	+74.9%
Total aluminium GHG emissions (1990 = 26.3 Mt)	28.8 Mt CO_2-e	-5.6%	+9.5%
Total direct GHG emissions (1990 = 6.25 Mt) (within smelters)	3.47 Mt CO_2-e	-5.5%	-44.5%
Per unit direct GHG emissions (1990 = 5.0) (per tonne of production)	1.86 t CO_2-e	-0.54%	-62.8%
PFC emissions (1990 = 3.96 Mt) (included in smelter direct emissions)	0.20 Mt CO_2-e	-26%	-95%
Per unit PFC emissions (1990 = 3.2t) (per tonne of production)	0.11 t CO_2-e	-21.4%	-96.6%
Total indirect GHG emissions (1990 = 20.0 Mt) from electricity consumption	25.3 Mt CO_2-e	-5.95%	+26.5%
Per unit indirect GHG emissions (1990 = 16.1 t) (per tonne of production)	13.54 t CO_2-e	-1.17%	-15.9%

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