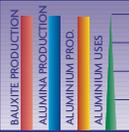
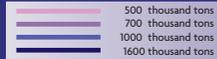


Production, consumption and trade of bauxite, alumina and aluminium.

Million metric tons, situation in 2002.



Trade flows of aluminium in quantity, 2002.



The United Nations SITC (revision 2) defines aluminium as aluminium and aluminium alloys, unwrought SITC 684.1, aluminium oxide (alumina) SITC 287.32, aluminium hydroxide SITC 522.56, bauxite SITC 287.31.

Almost all bauxite is mined in open-pit mines, which are usually very shallow and extend over large areas. They can normally be rehabilitated (repurposed for other uses) fairly easily. The pictures show a mine area at Alcoa World Alumina's Mocha mine in Jamaica, in 2000 and the same area in 2004 after rehabilitation.



Aluminium is the most widely used and traded metal after iron. It is used in numerous applications where its lightness, strength and electrical conductivity make it the preferred material.

Aluminium is the most common metal in the earth's crust at 7.5%. It exists mainly as an oxide, and, despite its abundance, it was not used until the late nineteenth century. In 1886, Paul Louis Toussaint Héroult in France and Charles Martin Hall in the United States simultaneously solved the problem of breaking the extremely strong bond between the metal and the oxygen, making possible the first economical process for producing aluminium metal. The Hall-Héroult process (as it is called, after its inventors) is still used today.

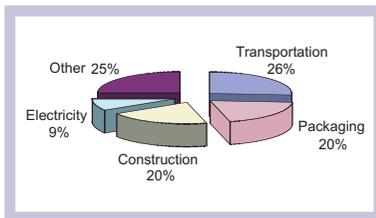
Technology

The only aluminium mineral that is economically exploited is bauxite, which on average contains around 25% aluminium. After mining, alumina (aluminium oxide) is extracted from the bauxite. The alumina is then reduced to aluminium through electrolysis. A large and growing portion of the aluminium used in products is recycled. Recycling has economic advantages, since it requires much less energy than the production of primary aluminium.

Environmental issues

Bauxite mining poses fewer environmental problems than many other types of mining, since the sulphides and other elements that can harm surface and ground water are normally absent. The production of alumina results in large quantities of bauxite residue or red mud, which consists mainly of iron oxides. This residue is often alkaline and is usually very fine-grained, making it difficult to stabilize or dispose of. In aluminium production, fluoride emissions have historically posed the most difficult problems, although these emissions have been dramatically reduced in modern aluminium smelters.

Uses of aluminium



Source: Natural Resources Canada, Canada Minerals Yearbook 1998.

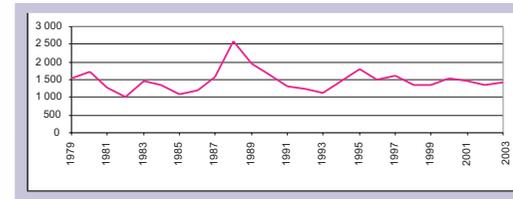
Production and consumption trends

Aluminium use has grown at a rate of about 3% a year over the past two decades. Australia is the largest producer of both bauxite and alumina; its share has increased constantly in recent decades. In several developing countries, including Guinea and Jamaica, bauxite and alumina account for a large share of export revenue. In recent years, China has emerged as a major producer of alumina and aluminium. Aluminium consumption has also shifted eastwards. In 2001, developing countries in Asia (including China, which has become the second most important consuming country) accounted for 27% of world primary aluminium consumption, compared to 7.5% in 1975.

Prices

Aluminium prices are set at the London Metal Exchange (LME), and contract prices are normally linked to the LME price. Prices fluctuate in a cyclical pattern, with the average cycle lasting about five years. Bauxite and alumina are mainly traded under long-term contracts, with prices determined as a certain proportion of the average LME aluminium price over a set period. Spot prices may vary considerably, depending on temporary supply and demand factors.

Aluminium prices (annual averages) on the London Metal Exchange, 1979–2003 (US\$/metric ton)



Industry

The international aluminium industry is fairly concentrated. Recent mergers involving some of the largest producers have resulted in a still higher degree of concentration. The industry is also vertically integrated, with the largest companies playing an important role at all stages of the value chain.

The world's largest aluminium companies, 2002

Companies with the largest shares of aluminium, alumina and bauxite production				
Company	Country	Share of world production, %		
		Aluminium	Alumina	Bauxite
Alcoa Inc.	United States	13	15	16
Ruskey Aluminium	Russia	10	6	3
Alcan Inc.	Canada	9	7	8
State of China	China	6	0	0
Norsk Hydro ASA	Norway	5	3	2
Pechiney	France	4	4	0
BHP Billiton Ltd.	Australia	4	8	8
Rio Tinto plc	United Kingdom	4	4	8
Siberian-Urals Aluminium Co.	Russia	3	3	2
State of Venezuela	Venezuela	2	3	4
Alumina Ltd.	Australia	0	9	10
Glencore International AG	Switzerland	2	5	2
Kaiser Aluminum Corp.	United States	1	5	3
State of India	India	1	3	4
State of Guinea	Guinea	0	0	5
Total for 10 largest companies		60	69	69

Source: Raw Materials Group, Stockholm, 2003.

To learn more

UNCTAD/INFocomm, Market Information in the Commodities Area [www.unctad.org/infocomm](http://www.unctad.org/infocomm)

UNCTAD, Handbook of World Mineral Trade Statistics 1996–2001 [www.unctad.org/infocomm/Handbook/Hbk9601cont.htm](http://www.unctad.org/infocomm/Handbook/Hbk9601cont.htm)

Infomine [www.infomine.com/commodities/aluminium.asp](http://www.infomine.com/commodities/aluminium.asp)

International Aluminium Institute [www.world-aluminium.org](http://www.world-aluminium.org)

European Aluminium Association [www.eaa.net](http://www.eaa.net)