

Major metals

Aluminium

Australia is the world's largest producer of bauxite, the largest producer and exporter of alumina, and the fourth largest producer and third largest exporter of primary aluminium.

Bauxite is refined to produce alumina (aluminium oxide) which in turn is smelted under extremely high temperature to extract aluminium metal. Over the past two decades the production of bauxite, alumina and aluminium has been one of the country's fastest growing mineral industries—see the two diagrams on page 41.

Australia's economic resources of bauxite, estimated to be around 5000 Mt, represent about 20% of the world's reserves and are second only to Guinea in size. As recently as the early 1950s, however, it was believed that Australia lacked significant bauxite resources but around this time three major deposits were found—at **Gove** (N.T.) in 1952, at **Weipa** (Qld) in 1955 and at **Jarrahdale** in the Darling Range east of Perth (although the existence of aluminous laterites in the latter area had been known for

many years). Other large deposits were subsequently discovered at **Mitchell Plateau** and **Cape Bougainville** in the Kimberley region of Western Australia, at **Aurukun** south of Weipa, and elsewhere in the Darling Range.

Mining of bauxite began at both **Weipa** and **Jarrahdale** in 1963 and at **Gove** in 1971. Today these mines together with others opened more recently at **Del-Park, Huntly, Willowdale** and **Mount Saddleback** in the Darling Range account for virtually all of Australia's bauxite output. Production rose rapidly from less than 2 Mt in 1966 to the current level of over 30 Mt per annum (see diagram on page 41), or 35% of total world output.

As the major bauxite deposits occur in coastal regions most of the alumina refineries were able to be built close to the mines and to deep-

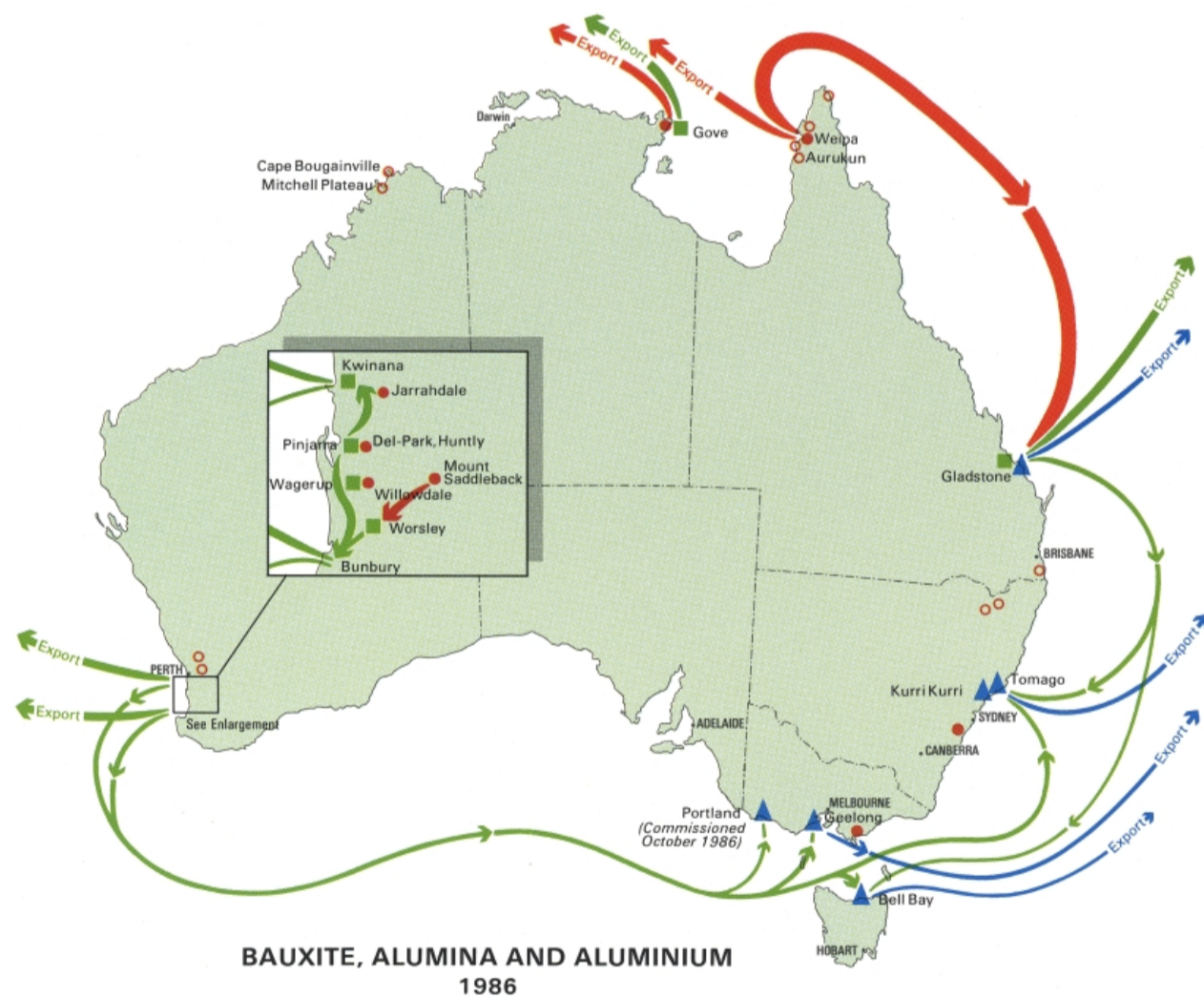
water ports, thus minimising land transport of large tonnages of bauxite and alumina. The refinery at **Gladstone** in central coastal Queensland is the only one not located close to its source of bauxite; it was sited to take advantage of nearby low cost coalfields and a deep-water harbour.

Nearly 85% of the bauxite is refined domestically; the remainder, amounting to about 5 Mt per annum, is exported from **Weipa** and **Gove**. Australia's six alumina refineries, which have a combined annual capacity of 9 Mt (see Table 6), account for 25% of total world production. With an annual capacity of 2.7 Mt the refinery at Gladstone is the world's largest.

Currently more than 7 Mt of alumina, representing about 80% of production, is exported annually, mainly to the U.S.A. and Europe although increasing amounts are being sent to Asia and the Middle East. The remainder is shipped from Kwinana, Bunbury and Gladstone to the various aluminium smelters in south-eastern Australia or consumed locally by the **Gladstone** smelter.

Because the processing operations demand extremely high usage of electricity Australia's six aluminium smelters have been built close to major energy sources, notably the large power stations associated with coalfields in Victoria (Point Henry near **Geelong, Portland**), the Hunter Valley of New South Wales (**Kurri Kurri, Tomago**) and central Queensland (Boyne Island near **Gladstone**). The first aluminium smelter and refinery, at **Bell Bay**, was sited there to take advantage of Tasmania's generous supply of hydro-electricity.

The opening of additional aluminium smelters during 1982 and 1983, improved operating efficiencies and the expansion of existing smelters have all contributed to the dramatic increase of over 100% in primary aluminium production between 1982 and 1986 to 0.9 Mt (as shown on the production and export of aluminium diagram on page 41). The rapid rise in primary aluminium exports closely mirrors output. Approximately 65% of production is exported, with an increasing share going to the Japanese and South-East Asian markets.



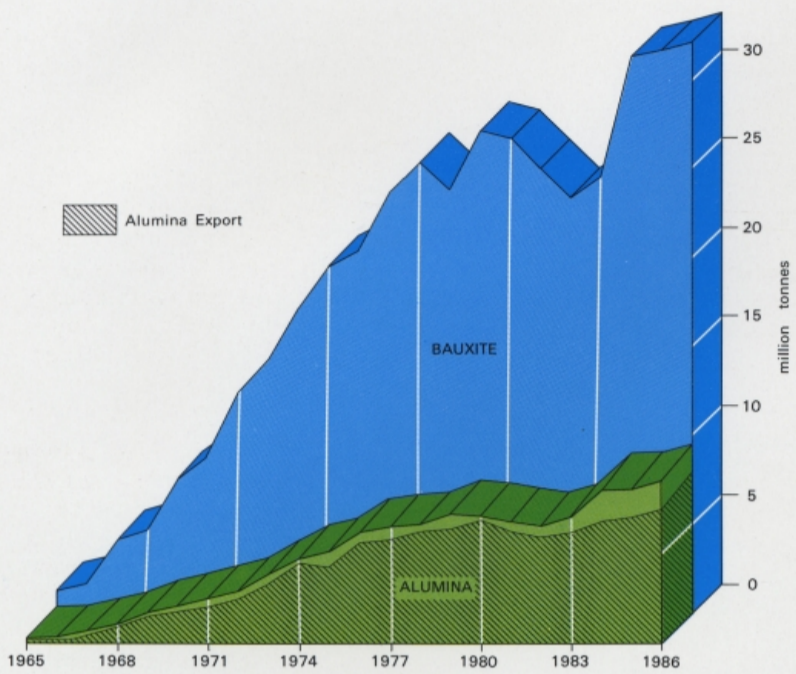
SOURCE: Bureau of Mineral Resources (1987) and Department of Transport (1987).

Table 6. Australia's aluminium industry

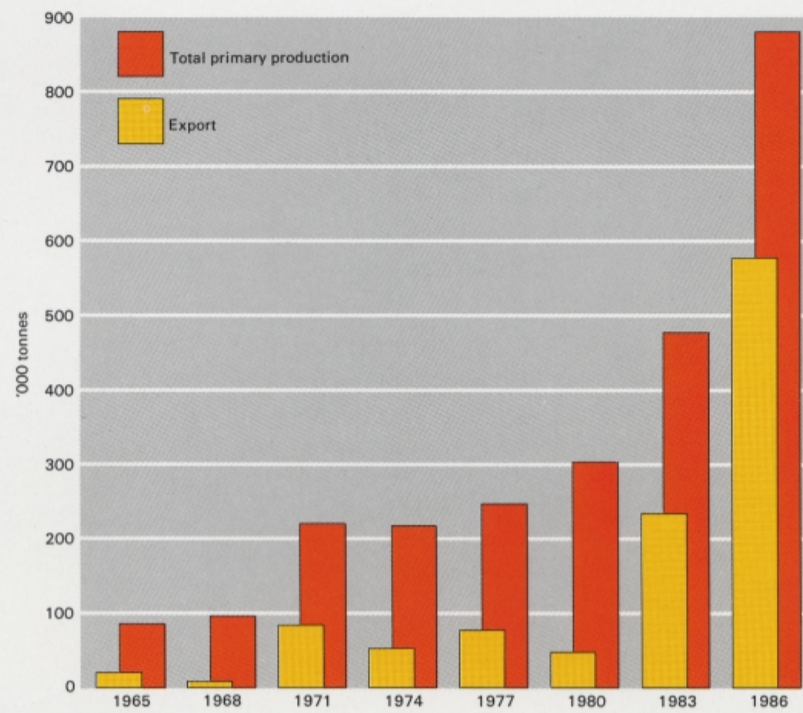
Plant	State	First commissioned	Capacity, 1986 (tonnes)	
			Alumina refinery	Aluminium smelter
Bell Bay	Tas.	1955	*	117 000
Kwinana	W.A.	1963	1 400 000	
Geelong	Vic.	1963		165 000
Gladstone	Qld	1967	2 700 000	
Kurri Kurri	N.S.W.	1969		150 000
Gove	N.T.	1972	1 000 000	
Pinjarra	W.A.	1972	2 400 000	
Gladstone	Qld	1982		208 000
Tomago	N.S.W.	1983		230 000
Wagerup	W.A.	1984	500 000	
Worsley	W.A.	1984	1 000 000	
Portland	Vic.	1986		150 000
Australia			9 000 000	1 020 000

* Alumina production ceased in 1975





Australia: production of bauxite and alumina and export of alumina, 1965-86



Australia: production and export of aluminium, 1965-86



Bauxite mining at Weipa (Qld)
 Following removal of vegetation and shallow overburden the aluminium-rich ore is scooped up (left) and transported to the nearby port of Weipa (far left). The stockpiled bauxite is washed, screened and graded before shipment to the Gladstone alumina refinery or overseas.

The world's largest alumina refinery, near Gladstone (Qld)
 Sited to take advantage of nearby large economical energy sources and a deep-water harbour, the Gladstone refinery (above) produces about 2.7 Mt of alumina annually from around twice that tonnage of Weipa bauxite.