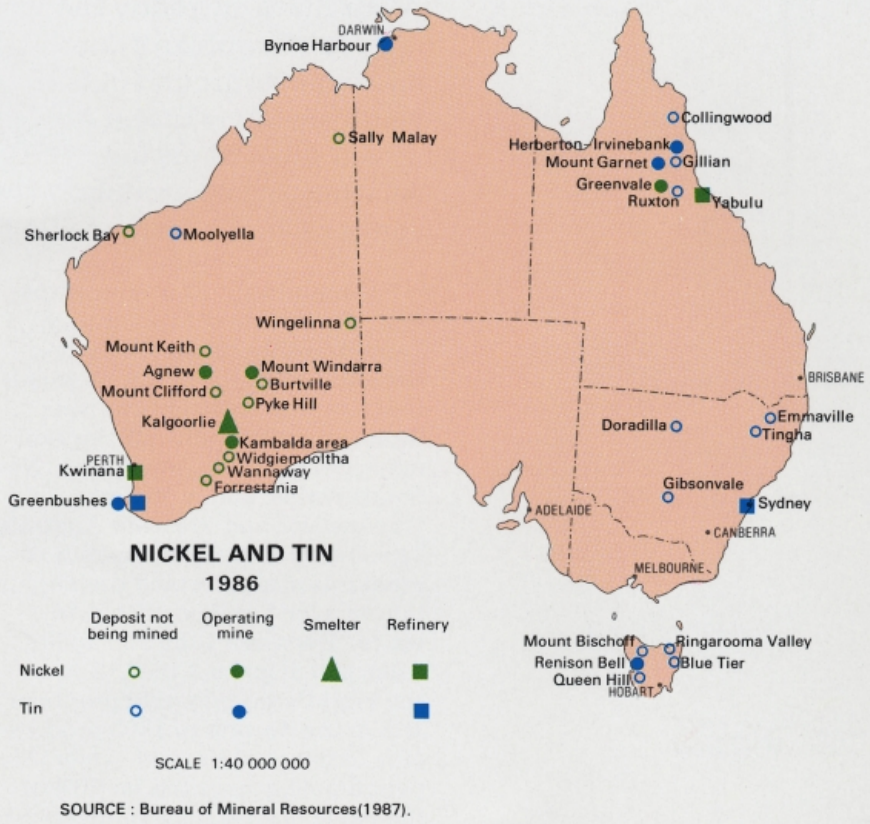
Nickel

Australia is the third largest producer of mined nickel, after the U.S.S.R. and Canada, and ranks among the top five producers of refined nickel. After Canada, Australia is the largest exporter of processed nickel.

In 1965 Australia's nickel resources were considered to be negligible. However, the discovery of high grade nickel at **Kambalda** (W.A.) in 1966 triggered a period of intense exploration and a series of major discoveries—the 'nickel boom' of the late 1960s—which led to the establishment of Australia as a leading nickel producer. By 1970 the main nickel sulphide belt in Western Australia had been defined, extending from **Mount Keith** in the north to **Wannaway** in the south. In north Queensland a large lateritic nickel deposit was identified at **Greenvale.**



SOURCE : Bureau of Mineral Resources(1987).

Nickel production rose rapidly—from concentrates containing 2500 t of nickel in 1967 to a peak of almost 85 000 t of contained nickel in 1977. Then output fell steeply in the late 1970s as some mines closed because of a severely depressed nickel market and depletion of reserves. Fluctuating prices notwithstanding, several new mines were opened in Western Australia including **Agnew** (mining suspended in 1986) and **Carnilya Hill**, and the mine at **Mount Windarra** was reopened. The 1977 production record was exceeded in 1982 (87 600 t of contained nickel) but output has since dropped because of a poor market price for nickel and the consequent closure of several mines around Kambalda.

Today the industry is still based on the mines in the **Kambalda** area and the **Greenvale** mine. With about 10% of Australia's economic demonstrated resources of 1.1 Mt of nickel, Greenvale accounts for about a quarter of total production but is expected to be mined out in about five years.

A high degree of nickel processing is undertaken in Australia. Refineries at **Kwinana** (W.A.) and **Yabulu** near Townsville (Qld) were sited close to service and port facilities to take advantage of the large export potential in nickel metal. In addition a smelter producing nickel matte was commissioned near **Kalgoorlie** in 1972.

On average 50 000 t of high grade nickel matte in granulated form is produced each year at the **Kalgoorlie** smelter and railed to **Kwinana** for export or refining. The Kwinana refinery has the capacity to produce about 30 000 t per annum of refined nickel, with copper sulphide, nickel–cobalt sulphide and fertiliser-grade ammonium sulphate as by-products. The refined nickel, in the form of a powder, is mostly pressed into briquettes and sintered before sale.

The **Yabulu** refinery produces sintered nickel oxide and a mixed nickel–cobalt oxide, the nickel content of which is in excess of 20 000 t annually when the plant is operating at full capacity.

The bulk of Australian nickel production is exported, principally to Japan, North America and Europe. More than 50% of exports, which in 1986 amounted to almost 320 000 t, are in the form of sintered nickel oxide or refined nickel; most of the remainder is nickel matte.

Australia's only nickel smelter, near Kalgoorlie (W.A.)
Concentrates from surrounding nickel mines are smelted at the Kalgoorlie nickel smelter. Each year the smelter produces around 73 000 t of granulated nickel matte which is railed to Kwinana for refining or export.

Tin

Tin has been mined in Australia for over 100 years. For nearly a decade, (around 1883), Australia led the world in tin production, a particularly important source at that time being **Mount Bischoff** (Tas.). Today, however, the main tin producing countries are Malaysia, Brazil, Indonesia, Thailand and China although Australia still remains an important producer and exporter. Mine production of tin amounted to almost 8500 t in 1986.

Almost 70% of Australia's tin production now comes from **Renison Bell** (Tas.), a deposit first worked in the 1890s and today one of the world's largest underground tin mines. The remainder is mostly from **Greenbushes** (W.A.) and mines in the **Herberton** and **Mount Garnet** areas of north Queensland. The mines at **Cleveland** (Tas.) and **Ardlethan** (N.S.W.), both significant producers for around 20 years, closed in mid 1986 following exhaustion of reserves.

Evaluation of the **Collingwood** tin deposit in north Queensland continued during 1986, though in general the search for and development of new deposits have been suppressed by sustained low tin prices.

Around 80% of Australian mine output is exported as tin concentrate to two Malaysian smelters; most of the remainder is processed and consumed domestically.

The **Sydney** high grade tin smelter and refinery, with an annual capacity of about 7000 t of tin metal, is the main domestic producer of primary refined tin. Recently the plant has operated at only 25% capacity, reflecting the closure of the Ardlethan hardrock mine and decreased alluvial production elsewhere in eastern Australia, the main sources of concentrates for the smelter.

An electric arc smelter and refining kettle at **Greenbushes** produced just over 500 t of refined tin in 1986. Tin produced at this plant is suitable mainly for alloys because of its antimony content.

Much of Australia's consumption of primary refined tin, which amounts to around 2700 t annually, is in the form of tinplate. The sole tinplate mill, at Port Kembla, has an installed capacity of 500 000 t of tinplate per annum.

Pouring molten tin at Greenbushes (W.A.)
In 1986 over 500 t of antimonial tin metal were produced at Greenbushes.