

# Australia's Identified Mineral Resources 2009

## **Executive Summary**

Australia's Economic Demonstrated Resources (EDR) for the following 18 mineral commodities increased during 2008 — black coal, copper, gold, iron ore, lead, lithium, manganese ore, molybdenum, nickel, niobium, rare earth oxides, silver, tantalum, tungsten, uranium, vanadium, zinc and zircon. In the same period, EDR of nine commodities decreased — brown coal, cobalt, diamonds (gem and industrial), mineral sands (ilmenite and rutile), platinum group elements, shale oil and tin. EDR for antimony, bauxite, cadmium, magnesite, and phosphate rock remained at levels similar to those reported in 2007.

**World ranking:** Australia's EDR of brown coal, mineral sands (rutile and zircon), nickel, silver, uranium, zinc and lead remain the world's largest, while antimony, bauxite, black coal, copper, gold, industrial diamond, iron ore, ilmenite, lithium, manganese ore, niobium, tantalum and vanadium all rank in the top six worldwide.

Australia's EDR of **bauxite** were estimated to be 6.2 gigatonnes (Gt) in 2008 which is unchanged from the previous year and ranks second largest in the world. Australia's aluminium industry is underpinned by vast resources of bauxite in Queensland (Qld) on western Cape York, and in Western Australia (WA) in the Darling Range, which are among the world's largest identified resources. Despite the economic downturn, large companies have maintained overall production levels. Steadily increasing investment from China has accelerated changes in Australia's bauxite exploration, mining and processing industries in recent years.

Recoverable EDR of **black coal** in 2008 increased 0.8% to 39.2 Gt which represents 6% of the world's recoverable black coal EDR and ranks Australia as having the world's sixth largest EDR. The Sydney Basin in New South Wales (NSW) contains 35% of Australia's recoverable EDR and the Bowen Basin in Qld contains 34%. Recoverable EDR of **brown coal** in 2008 was 37.2 Gt, slightly less than 2007 and represents about 25% of the world's recoverable brown coal, the largest of any country. All of Australia's brown coal EDR is in Victoria (Vic).

At December 2008 the proven and probable (2P) reserves of **coal bed methane** in Australia were 16 179 Petajoules (PJ), an increase of 116% over the 2P reserves at December 2007. Queensland has 15 302 PJ (or 94.6% of the 2P reserves) with the remaining 877 PJ in NSW.

Australia's EDR of **copper** rose by 31% to 77.8 million tonnes (Mt) in 2008, largely resulting from the release of updated resource estimates for the Olympic Dam deposit in South Australia (SA). Australia has the world's second largest EDR after Chile. South Australia has the dominant share of Australia's EDR with 73% of the national total, almost all of this is in Olympic Dam deposit. By late 2008 significantly lower copper prices had forced several copper mines to cease production, particularly the smaller or lower grade operations.

Australia's **gold** resources occur and are mined in all States and the Northern Territory (NT). Australia's EDR of gold rose by 7% in 2008 to 6255 tonnes, the second largest globally. Western Australia has the dominant share with 47% of the national total EDR.

In 2008, EDR of **iron ore** increased by 18% to 24 Gt which is about 15% of world EDR, and the world's third largest. Western Australia has 98% of Australia's EDR with about 86% occurring in the Pilbara district.

Australia's EDR of **manganese ore** increased by 9.9% during 2008 to 181 Mt, which represents about 13% of the world's EDR of manganese ore and ranks Australia as having the world's fourth largest EDR. The Groote Eylandt deposit in the NT had 70% of the total manganese ore EDR.

The regions containing the major proportion of Australia's **mineral sands** resources (ilmenite, rutile and zircon) are the Perth Basin north of Perth in WA, the Murray Basin (NSW, Vic, and SA) and the newly emerging heavy mineral sands regions in the Eucla Basin (WA and SA). Although the reduced demand for mineral sands products as a result of the global financial crisis commencing in late 2008 placed some operations under stress, new mining operations are being commissioned. In 2008, EDR of **ilmenite** decreased by 4.1% to 212.3 Mt, EDR of **rutile** decreased by 0.9% to 22.9 Mt, and EDR of **zircon** increased slightly to 39.2 Mt. Rutile and zircon resources rank first in the world while ilmenite resources are the second largest worldwide.

Australia's EDR of **nickel** increased by 2.3% to 26.4 Mt in 2008, which is the world's largest EDR. Western Australia remains the largest holder of nickel resources with 90.4% of total Australian EDR, comprising both sulphide and lateritic deposits. The combination of the global financial crisis and falling nickel prices led to a number of mine closures.

Australia's EDR of **rare earth oxides** were 1.65 Mt. Significant resources of rare earths are contained in the monazite component of heavy mineral sand deposits, which are mined for their ilmenite, rutile, leucoxene and zircon content. Currently, extraction of rare earths from monazite sands is not viable because of the cost involved with the disposal of thorium and uranium present in the monazite.

**Oil shale** resources are predominantly in a series of sedimentary basins near Gladstone and Mackay in central Qld. The Permian Galilee and Bowen Basins in Qld contain oil shale associated with coal measures. Australia currently has no EDR of oil shale, with all resources being assessed as subeconomic.

Australia's EDR of **tantalum** increased 21% to 51 kilotonnes (kt) in 2008, ranking it second largest globally. The overwhelming majority of resources are in WA. In December 2008, the world's largest tantalum producer, Talison Minerals, suspended mining at Wodgina in WA, because of a fall in demand for Australia's tantalum metal caused by the supply of cheaper tantalum concentrates from largely artisan type mining operations in Central Africa.

Australia's EDR of **uranium** at December 2008 were estimated to be 1.163 Mt U, an increase of 18% during the year, by far the highest of any country. This was due to a

large increase in resource estimates for the Olympic Dam deposit in SA and increased resources at the Ranger 3 Deeps ore zone in the NT.

Australia's EDR of **zinc** increased by 26.2% to 53.1 Mt in 2008, the largest in the world. Increases in resources were associated with a new resource estimate for the Dugald River deposit in Qld and a reassessment of resources at McArthur River in the NT. By late 2008 markedly lower zinc and lead prices had impacted significantly on almost all zinc-lead mines. Many scaled back throughput and refocused mining in higher grade resources. Some moved to care and maintenance. Australia's EDR of **lead** increased by 17.4% in 2008 to 26.8 Mt, while EDR for **silver** increased by 22.6% in 2008 to 61.4 kt; both are the largest EDR in the world.

**Resource life:** Ratios of accessible Economic Demonstrated Resources (AEDR) to current mine production provide indicative estimates of the resource life. AEDR of most of Australia's major commodities can sustain current rates of mine production for many decades. Resource life based on ore reserves is lower, reflecting a shorter term commercial outlook.

Over the decade 1997 to 2008 there has been a significant trend towards lower AEDR/production ratio for coal and iron ore, which was the nett result of major increases in production and reassessment of resources.

Commodities with resource life of less than 50 years are diamonds (about 10 years at current rates of production), manganese ore (20 years), gold (30 years), zinc (35 years) and lead (40 years).

The severe world financial crisis in late 2008 highlighted the fact that a long resource life for a particular commodity is not a guarantee that such resources will continue to be exploited in Australia. In an increasingly globalised and competitive commodity market, multinational mining companies are continually in search of mineral deposits that will offer attractive returns on their investment. Such returns are influenced by the quality of the resources (grade and tonnage) as well as environmental, social and political factors, land access and even the location and scale of the competitor projects - individual mine projects in Australia will be ranked by multinational corporations against the investment returns from other deposits worldwide.

Australia's continuing position as a premier mineral producer is dependent on continuing investment in exploration to locate high quality resources and/or to upgrade known deposits in order to make them competitive on the world market, and investment in beneficiation processes to improve metallurgical recoveries.