



# about Australia

## resources sector

- Australia's thriving resources sector (comprising minerals and petroleum) is the country's largest single export sector. In 2006–07, over 80 per cent of its output was exported, accounting for approximately 49 per cent of total goods and services exports. During that period, the minerals and petroleum industries produced over eight per cent of Australia's GDP and accounted for 63 per cent of Australia's merchandise export earnings. Australian coal, liquefied natural gas, iron ore, copper, diamonds, zinc and many other minerals provide the essential ingredients of growth for many nations.

### Overview

The resources sector in Australia covers exploring, extracting, processing and exporting minerals and petroleum (oil, condensate and gas). Australia has large quantities of these resources, which it mines, uses domestically and exports to countries around the world.

Resources are critical to the Australian economy because they underpin important parts of industrial and export activity. Domestically, Australia's resources industries ensure a supply of energy raw materials at competitive prices to households and businesses.

Australia has a well-deserved reputation as a reliable and competitive supplier of a wide range of high-quality mineral and energy products. Earnings from resource exports make up almost half of Australia's total export earnings, which further contribute to economic growth.

Growth in Australia's resources sector depends critically on investment in

### key facts

- Australia has the world's largest deposits of recoverable brown coal, lead, rutile, zircon, nickel, tantalum, uranium and zinc, and ranks second in the world for bauxite, copper, gold, ilmenite and silver.
- Australia's reserves of industrial diamonds are ranked third largest in the world and reserves of manganese ore are ranked fourth.
- Australia is the world's largest exporter of alumina, black coal, iron ore, lead and zinc.

exploration. Strong growth in the sector in recent years has been underpinned by robust minerals exploration expenditure over the past decade. Mineral exploration expenditure in Australia has increased by 11 per cent (in inflation adjusted terms) over the past 10 years, to \$1.4 billion in 2006–07. Most of this was spent in Western Australia, with the largest proportion on finding gold (\$455.9 million). In 2006–07,

total Australian mineral and petroleum exploration expenditure rose by 57 per cent to \$3.9 billion, following a 21 per cent rise in 2005–06. Strong increases in expenditure reflected high minerals prices. Continued high metal prices and sustained strong levels of demand are expected to contribute to further strong exploration expenditure in 2008 and beyond.

Australia's foreign investment policy is designed to encourage investment consistent with the interests of the Australian community. The government recognises the substantial contribution foreign investment has made—and will continue to make—to the development of Australia's industries and resources. Foreign investment proposals to the Australian Government are normally approved subject to them not being considered contrary to the national interest.

Australia's stable political and regulatory environment provides investors with a high degree of confidence and certainty through all stages of minerals development. For example, Australia is ranked as the fastest place in the world to start a business—in most cases, regulatory procedures take just two days.

The Australian Government ensures policies and programs in the resources sector strike a balance between environmental, social and economic goals, thereby encouraging sustainable development. The *Leading Practice Sustainable Development Program for the Mining Industry* provides the mining sector and its stakeholders with practical information and case studies to move beyond what is set down in regulation for mining activities. The Program offers a range of workshops and handbooks which cover

themes such as Community Engagement and Development, Mine Rehabilitation, Mine Closure and Completion, Stewardship, Biodiversity Management, Management of Acid and Metalliferous Drainage and Tailings Management. The handbooks are developed by working groups of experts from industry, academia, and non-government organisations.

State and territory authorities are responsible for the regulation of most mining activity. But the Australian Government is responsible for offshore petroleum and gas regulations and provides an environment in which business can invest with confidence and achieve growth. Safety is the first priority of Australia's resource industries.

## Minerals

Australia has the world's largest resources of recoverable brown coal, lead, rutile, zircon, nickel, tantalum, uranium and zinc, and ranks second in the world for bauxite, copper, gold, ilmenite and silver. Economic demonstrated resources (EDR) for industrial diamonds are ranked third largest in the world, and manganese ore fourth.

In 2006–07, mineral resource exports totalled \$107.8 billion, or 77.4 per cent of Australia's total commodity trade. Over the six years to 2006–07, Australian mine production increased by almost 21 per cent to meet world demand. Over the same period, China and Japan were the largest buyers of Australian minerals.

## Australia's identified minerals resources, production and ranking

Commodity	EDR 2006* (Economic demonstrated resources)	Rank *	Production 2005*	Production world rank	Export value 2006–07** AUD\$
Bauxite	5.7 Gt	2	60 Mt	1	0.2 bn
Alumina	N/A	N/A	17.7 Mt	1	6.2 bn
Aluminium	N/A	N/A	1.9 Mt	–	5.6 bn
Black coal	39.6 Gt	6	405 Mt	4	21.8 bn
Brown coal	37.3 Gt	1	67 Mt	5	0
Copper	42.4 Mt	2	921 kt	5	6.5 bn
Gold	5,480 t	2	263 t	2	10.3 bn
Iron ore	18.6 Gt	5	261.4 Mt	3	15.5 bn
Lead	23.5 Mt	1	767 kt	2	1.6 bn
Nickel	23.7 Mt	1	187 kt	2	8.4 bn
Silver	45.6 kt	2	2,407 t	4	0.2 bn
Tantalum	52.0 kt	1	840 t	1	–
Uranium	714 kt	1	9,512 t	2	0.7 bn
Zinc	40.6 Mt	1	1,367 t	2	4.3 bn

Sources: \*Geoscience Australia, \*\*ABARE (Australian Bureau of Agricultural and Resource Economics)

### Coal

Black coal is mainly used for electricity generation and the production of coke, which is important for the making of iron and steel, cement and food processing. Brown coal is a less matured form of coal with a low heating value and is used widely for power generation. It is also made into briquettes and can be converted to liquid or gaseous fuels.

In Australia the states of New South Wales and Queensland produce over 96 per cent of all black coal and Victoria produces most of Australia's brown coal. Black coal production and exports have risen strongly over the past two decades and exports in 2007 were estimated to be \$20.7 billion. Australian brown coal is not exported.

### Iron ore

The Pilbara region in Western Australia has the largest EDR of iron ore and accounts for 94 per cent of Australia's iron ore production. Limited production also comes from elsewhere in Western Australia, Tasmania, South Australia and New South Wales. In 2005, Australia produced 17 per cent of world output, making Australia the world's third largest producer after Brazil and China. Australian iron ore exports totalled \$16 billion in 2007.

### Bauxite, alumina and aluminium

Bauxite is refined to produce alumina (aluminium oxide), which is then smelted to produce aluminium. Australia's aluminium industry is a large, integrated industry

of mining, refining, smelting and semi-fabrication, which is of major economic importance nationally and globally.

Australia's EDR of bauxite provides a world-class resource base for the industry, which comprises five bauxite mines, seven alumina refineries, six primary aluminium smelters, 12 extrusion mills and two rolled product (sheet, plate and foil) mills.

In 2006, Australia was the largest producer of bauxite and alumina. The Australian aluminium industry directly employs over 12 000 people. Bauxite, alumina and aluminium exports were worth \$10.2 billion in 2007.

### **Gold**

Gold resources occur and are mined in all Australian states and the Northern Territory. The Super Pit at Kalgoorlie in Western Australia is the largest producer of gold, with an output of nearly 21 tonnes (almost 0.68 million ounces), followed closely by the Telfer mine, also in Western Australia, with an output of 20.5 tonnes (0.66 million ounces). Gold exports were worth \$10.7 billion in 2007.

### **Nickel**

Western Australia has the country's largest nickel resources, with over 90 per cent of total Australian EDR. Australia holds the largest share of the world's EDR of nickel, with 37 per cent. Annual mine production of nickel is around 200 000 tonnes, all from Western Australia. Production from the Avebury mine in Tasmania is expected to commence in early 2008.

The value of all nickel products exported in 2007 totalled \$7.5 billion. Australia is the world's third largest producer, accounting for 13 per cent of estimated world nickel output.

### **Copper**

Australia's major copper mining and smelting operations are at Olympic Dam

(South Australia) and Mount Isa (Queensland), with smaller projects in New South Wales, Queensland, Western Australia, the Northern Territory and Tasmania. The majority of Australia's refined copper production occurs at Olympic Dam and the Townsville Copper Refinery (Queensland). Exports of unrefined and refined copper totalled \$6.3 billion in 2007.

### **Zinc, lead and silver**

Most of Australia's zinc is located in Queensland and some is also found in the Northern Territory, New South Wales, Western Australia and Tasmania. Australia has the world's largest EDR of zinc (18 per cent) and lead (over 30 per cent), and the second largest EDR of silver (16 per cent).

In production, Australia ranks second for lead and zinc after China and fourth for silver after Peru, Mexico and China. Cannington (Queensland) is the world's largest and lowest cost silver and lead operation. Century (Queensland) has the largest zinc output. In 2007 the value of exports of zinc, lead and silver exceeded \$6 billion.

The McArthur River underground mine is being converted to an open cut operation. The capacity of the concentrator at McArthur River will be increased from 1.8 million tonnes a year of ore to 2.5 million tonnes a year, at a capital cost of \$37 million. The expansion will enable annual production of zinc-lead concentrate to increase from approximately 320 kt to around 430 kt of zinc-lead concentrate.

### **Mineral sands**

The three main minerals mined from Australian mineral sands deposits are the titanium-bearing minerals rutile and ilmenite and the zirconium-bearing mineral zircon.

In 2006, Australia was the world's largest producer of ilmenite, rutile and zircon (with

25 per cent, 46 per cent and 53 per cent of world output respectively). Production was from Western Australia, Queensland, Victoria, the Northern Territory and New South Wales. Australia has the world's largest EDR of rutile and zircon and the second largest of ilmenite. Exports of ilmenite, leucosene, rutile, synthetic rutile titanium dioxide pigment and zircon from Australia were valued at \$1.7 billion in 2006–07.

## **Diamond**

Australia is the fourth-largest producer of diamond by weight after Russia, Botswana and Congo (Kinshasa). It is the second largest producer of industrial-grade diamond and the third largest producer of gem/near gem diamond after Botswana and Russia.

Australia's EDR of industrial diamond is ranked third in the world, comprising 19 per cent of world EDR. The majority of Australian production is from the Argyle mine in the Kimberley region of Western Australia. Exports of diamonds in 2007 were worth \$684 million.

Australia and 47 other participating jurisdictions engaged in the global diamond trade operate under the Kimberley Process Certification Scheme (KPCS), which has been in place since 2003. Under this scheme, all international shipments of rough diamonds must be certified as being 'conflict free' by the authorities in the exporting country. The KPCS was developed through the Kimberley Process, involving governments, non government organisations and industry representatives seeking to ameliorate the impact of the problem of conflict diamonds and to protect the legitimate diamond trade's integrity and reputation.

## **Uranium**

Australia has the world's largest reserves of uranium, with approximately 27 per cent of the world's reasonably assured uranium

resources recoverable at less than US\$80 per kg. Almost all of Australia's total resources are in six deposits: Olympic Dam (South Australia), which is the world's largest uranium deposit; Ranger, Jabiluka and Koongarra in the Alligator River region (Northern Territory); and Kintyre and Yeelirrie (Western Australia).

Australia has a strict policy on the sale of uranium consistent with its obligations under the Nuclear Non-proliferation Treaty. This policy includes only exporting uranium to countries that have signed a bilateral safeguards agreement with Australia. These agreements ensure that Australia's uranium is used only for electricity generation and not diverted to any military purposes. Uranium exports were estimated to be worth \$884 million in 2007.

## **Manganese ore**

Manganese ore is mined at three sites in the Northern Territory and Western Australia. Production in 2007 was 4.8 million tonnes of beneficiated manganese, 14 per cent of world output, making Australia the third largest producer in the world (after China and South Africa). Australia has 12 per cent of world EDR, the fourth largest in the world (after Ukraine, India and China). Exports in 2007 were worth \$712 million.

## **Tantalum**

Australia is the world's largest producer of tantalum which is used in the production of electrical components. Australia also has more than 90 per cent of the world's EDR of tantalum, at Greenbushes and Wodgina in Western Australia.

## **Gas and oil**

In 2006–07, Australia produced approximately 78 per cent of its refined petroleum product needs and its total gas needs. The value of

petroleum exports (crude oil, LPG, LNG, bunker fuel and petroleum products) in 2007 was around \$15.9 billion. Petroleum imports totalled around \$21.7 billion.

Australia is a major exporter of liquefied natural gas (LNG), with considerable potential for further development of the industry, based on its abundant resources of natural gas. Australia is now the third largest LNG producer in the Asia–Pacific region and the fifth largest LNG producer in the world, exporting approximately 15 million tonnes in 2007. LNG exports generated around \$5 billion in 2007. Contracts are in place to supply LNG to Japan, China and South Korea with potential sales into other markets, including North America and Taiwan. In February 2006 production commenced at the LNG plant in Darwin (Northern Territory) to become Australia's second LNG producer after the North West Shelf Venture in Western Australia. Several other LNG projects are likely to develop over the next decade.

Liquefied petroleum gas (LPG) is a valuable co-product of oil and gas production and petroleum refining. The key areas of petroleum activity are in offshore Australia (representing about 90 per cent of production). The main offshore regions are in Bass Strait (Gippsland, Otway and Bass Basins in Victoria), the North West Shelf (Carnarvon Basin in Western Australia) and the Bonaparte Basin (Timor Sea) of northern Australia. The Timor Sea Joint Petroleum Development Area (JDPA) is another notable site. The Timor Sea Treaty (implemented in Australian legislation in the *Petroleum (Timor Sea Treaty) Act 2003*) governs exploration and development in the area. The first liquids production from this project commenced in 2004. In 2006–07, the Gippsland Basin and the North West Shelf project accounted for

42 per cent and 45 per cent of total LPG production respectively. Major LPG projects are planned for the Browse Basin off the coast of north-west Australia. The Cooper Basin in central Australia is the primary onshore project area supplying natural gas for the east coast market. Coal seam gas from the Bowen–Surat Basin in Queensland is increasing in importance as a major production area.

Most of Australia's diminishing supplies of crude oil and condensate are found on the North West Shelf and the Gippsland Basin, which accounted for 67 per cent and 16 per cent respectively.

## Economic contribution

The value of exports from the mining industry has almost doubled since 2003–04. In 2006–07, mineral resource exports, excluding oil and gas, were around \$90 billion, or around 65 per cent of Australia's total commodity trade.

The major markets for Australian mineral and petroleum exports in the period 1989–90 to 2006–07 were Japan, China, the Republic of Korea, India and Singapore. China's demand for Australian resources is rapidly increasing: China is a major export destination for iron ore and pellets, lead concentrates, LNG and LPG. Exports to India have been increasing since 1989–90, with a sharp increase of 207 per cent.

Royalties paid by mining companies vary from state to state and territory. In 2006–07, natural resource royalties for the oil and gas extraction industry were \$4,905 million, and for the coal mining and the metal ore mining industry they were \$798 million and \$729 million respectively.

## Responsible management

The Australian Government is committed to policies to support sustainable development in the resource industries. The federal Department of Resources, Tourism and Energy (DRTE) supports exploration and mining, encourages the efficient use of energy, monitors Australia's oil and gas resources and ensures that they are extracted and used safely and in environmentally responsible ways.

Within DRTE, Geoscience Australia plays a key role by supplying geoscientific information and knowledge. This enables the government and the community to make informed decisions about the exploration of resources, the management of the environment and the safety of critical infrastructure.

Productive relationships are also encouraged between the resources sector and Indigenous communities. Government and industry recognise that Indigenous people have a special relationship with their traditional lands and that it is in the interests of all to develop partnerships that respect these connections and protect sites of significance. Partnership programs reflect the aspirations of Indigenous communities for opportunities for training and employment and for establishing commercial enterprises.

Managed by the Department of Resources, Energy and Tourism in consultation with state and territory government agencies and industry bodies, the *Working in Partnership Program* (WIP) helps Indigenous communities and mining and exploration companies build effective, long-term partnerships. Such an approach makes good business sense—the industry needs people and services to run its operations, while regional communities need employment and business opportunities to be sustainable. Commencing in 2001, WIP

was extended in 2005 when the Government allocated an extra \$2 million as part of the commitment to create more opportunities for Indigenous Australians, and the program now has ongoing status. The mining industry is often one of the few providing employment and business development opportunities in remote regions of Australia and there are also significant opportunities in related ancillary and service industries.

## More information

Department of Resources, Energy and Tourism (RET) [www.ret.gov.au](http://www.ret.gov.au),

— Leading Practice Sustainable Development Program  
[www.ret.gov.au/sdmining](http://www.ret.gov.au/sdmining)

Geoscience Australia [www.ga.gov.au](http://www.ga.gov.au); and  
[www.australianminesatlas.gov.au](http://www.australianminesatlas.gov.au)

Minerals Council of Australia  
[www.minerals.org.au](http://www.minerals.org.au)

Australian Bureau of Agricultural and Resource Economics  
[www.abare.gov.au](http://www.abare.gov.au)

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