



**Australia's**

**GOLD**

**INDUSTRY**

**A Valuable Asset**



# Australia's **GOLD** INDUSTRY A Valuable Asset

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high wage jobs
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prosperity

# 1<sup>st</sup>

## RESOURCES

Australia has 9,900 tonnes or 18% of global economic resources – the largest in the world.

# 2<sup>nd</sup>

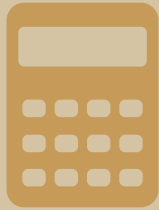
## PRODUCTION

Australia is the world's second largest producer.

# 3<sup>rd</sup>

## EXPORTS

Gold is Australia's third largest export industry.



# \$291m

## ROYALTIES

Royalties paid by the gold industry in 2012-13.



## JOBS

# 50,000+

More than 50,000 jobs (direct and related) were supported by the gold industry in 2011.



# 266t

## PRODUCTION

Australia produced 266 tonnes in 2013.



# \$15.1b

## EXPORT EARNINGS

Export earnings in 2012-13.



## WAGES

Average wages in the gold industry exceed \$140,000.

# \$140k

The Value of

# GOLD

# GOLD: SUSTAINING PROSPERITY

THE DISCOVERY OF  
GOLD IN THE MID-19TH  
CENTURY SPURRED  
AUSTRALIA'S GROWTH  
AND DEVELOPMENT.

Today, the gold mining industry helps sustain our national prosperity through exports, high-wage jobs, investment and tax and royalty revenues. Australia's third highest export earner in 2012-13 (after iron ore and coal), the gold industry is also a vital source of economic activity in a number of regional and remote communities.

Australia is the world's second largest gold producer after China, accounting for around 9 per cent of world production. Based on United States Geological Survey estimates, Australia has the world's largest share of economic gold reserves at 18 per cent (Figure 1).<sup>1</sup>

More than a rich seam from our past, Australia's gold industry is a national asset worth valuing, now and in the future. ■

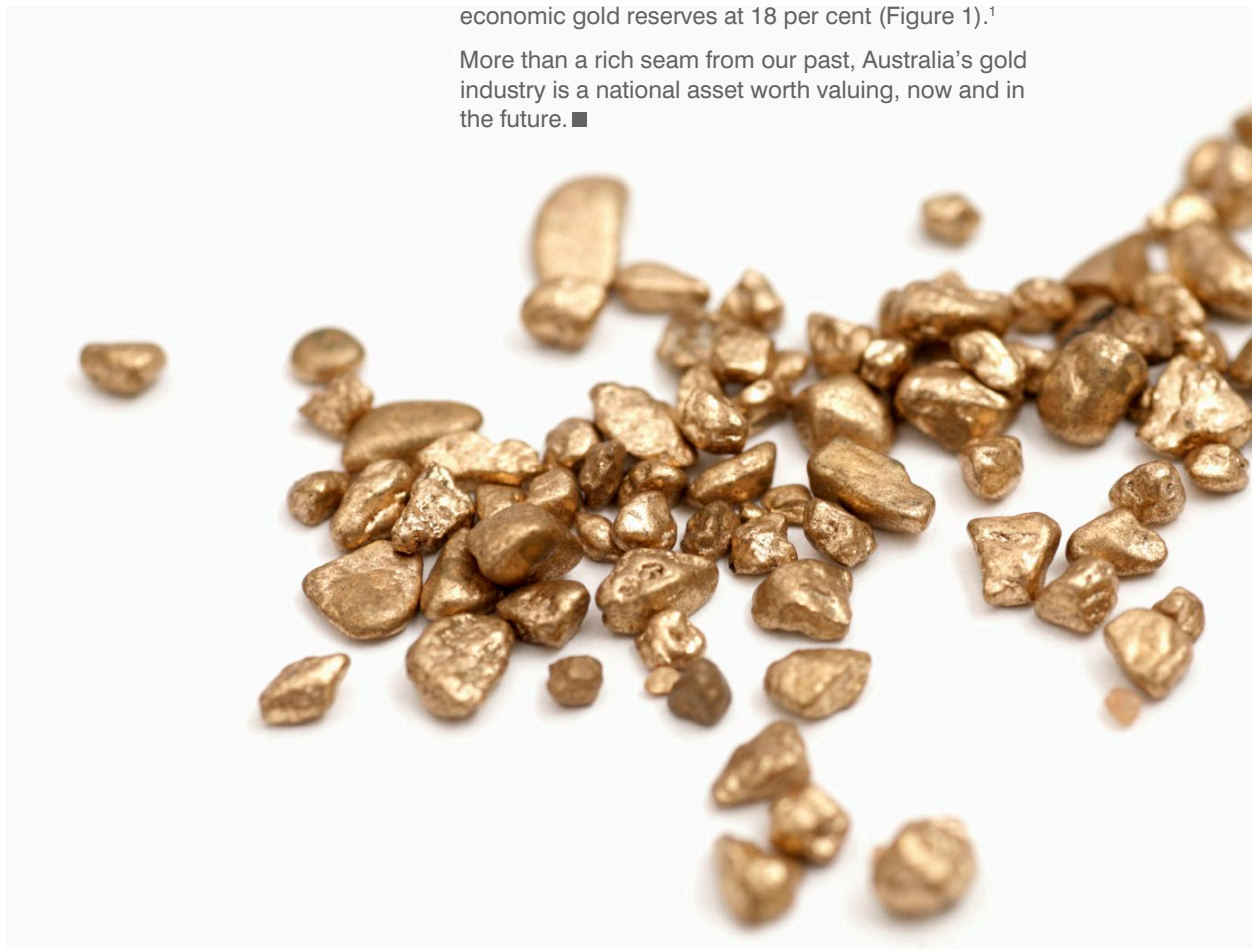
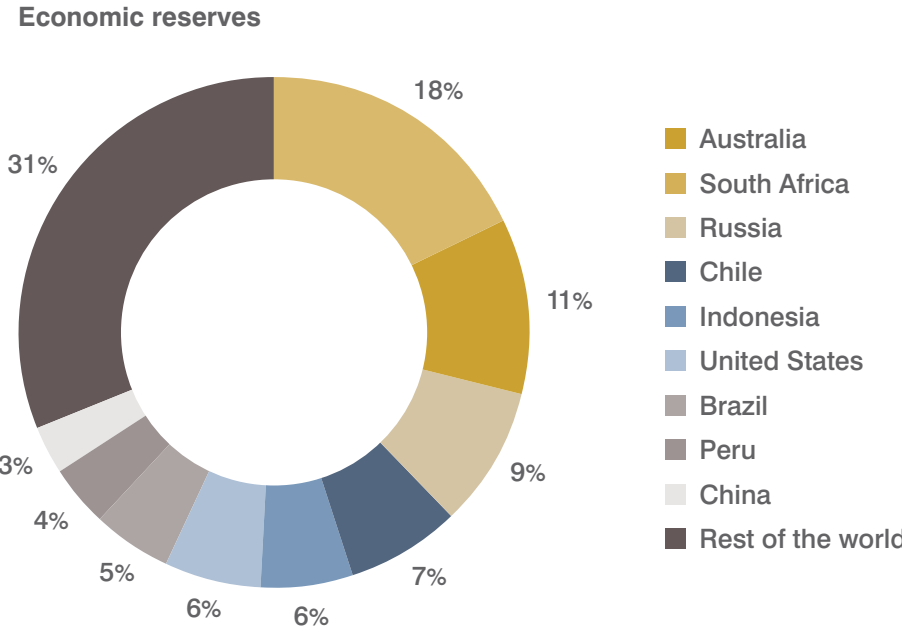
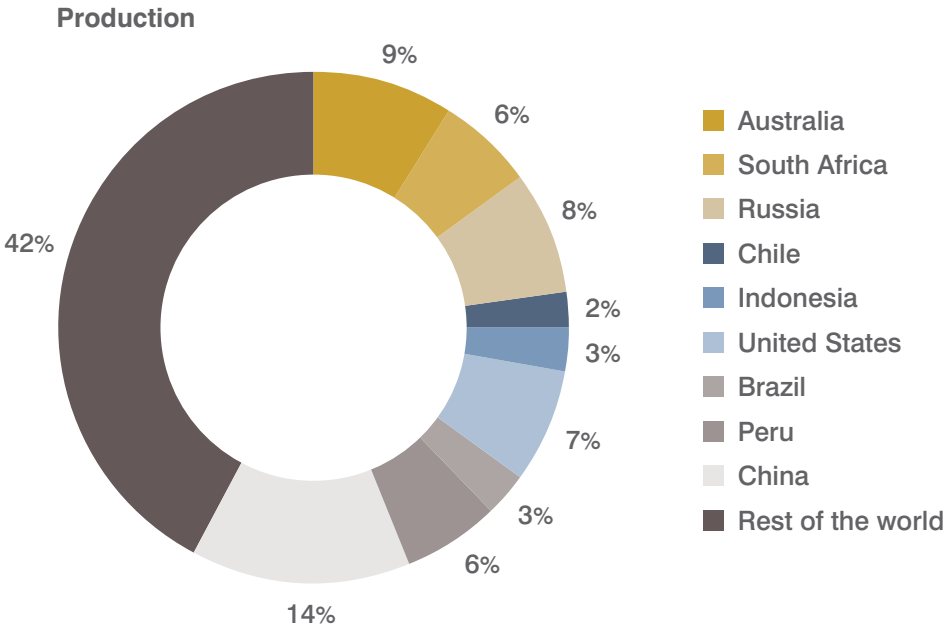


FIGURE 1 Australia's gold industry in global perspective (2013)

Source: Geoscience Australia, United States Geological Survey, Thomson Reuters GFMS





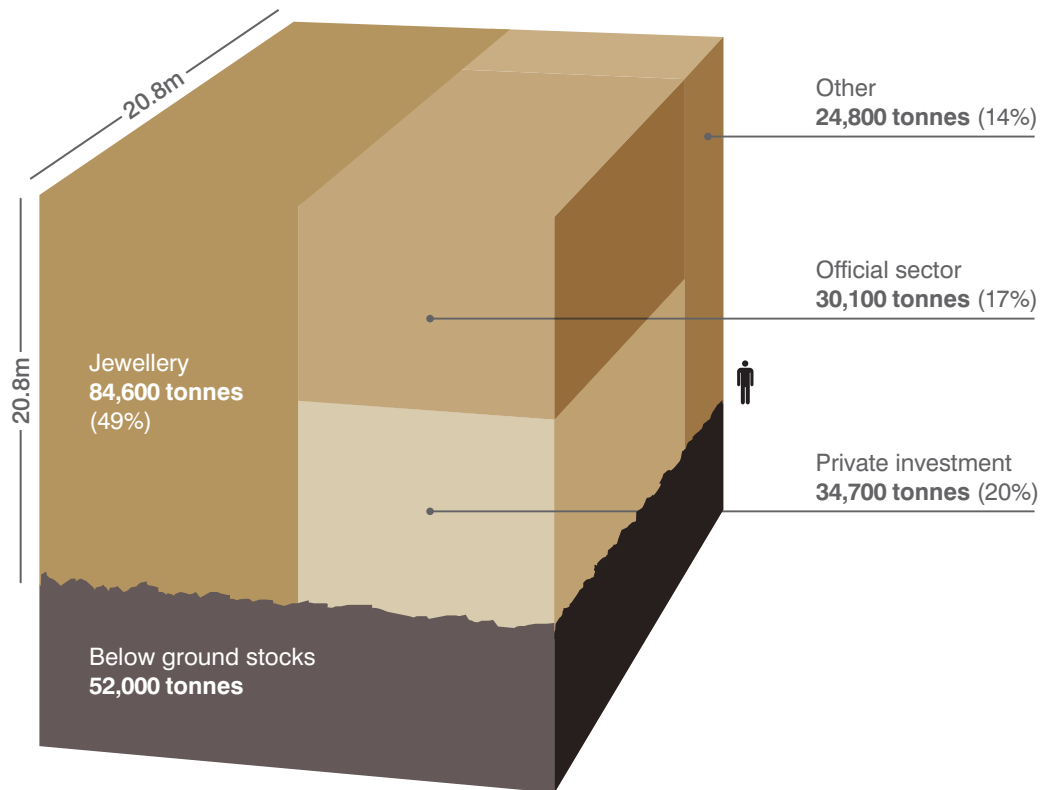
# UTTERLY UNIQUE

FOR CENTURIES, GOLD'S SCARCITY, DURABILITY AND DECORATIVE BEAUTY HAVE MADE IT A UNIQUE AND HIGHLY-PRIZED METAL.



FIGURE 2 The world's gold inventory

Sources: United States Geological Survey, World Gold Council



Gold has fulfilled multiple roles including as an item of ornamentation (often with religious and cultural significance), a medium of exchange and a store of wealth, especially in times of economic uncertainty. And it has continued to develop new and diverse technological applications based on its unique physical properties.

It's estimated that about half of all gold in above-ground stocks exists in the form of jewellery, with pure gold denoted as 24 carat. Industrial uses (including in electronics, medical and dental applications) reflect its high electrical conductivity, malleability and ductility.

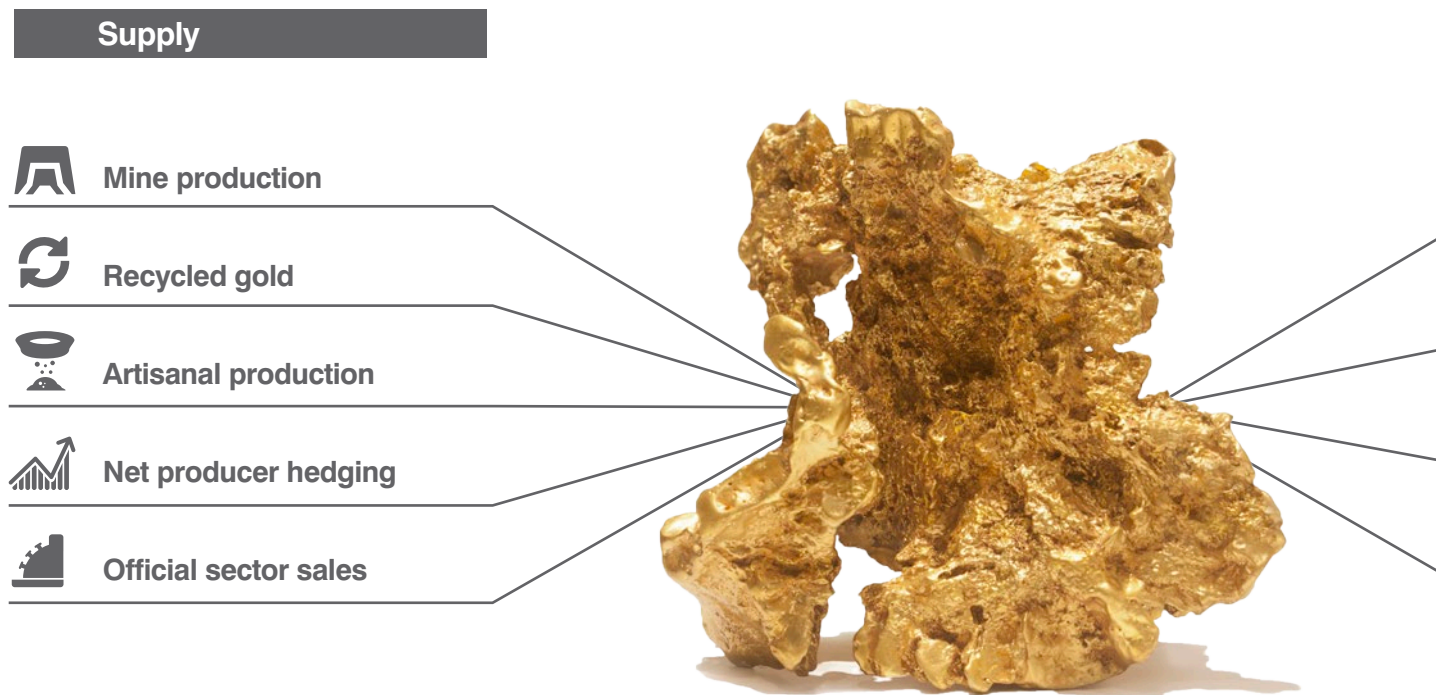
The high level of liquidity in the gold market is one factor underpinning the attraction of gold as an investment and source of wealth preservation, including for small investors. Over time, new products and ways to access gold – such as the rise of Exchange Traded Funds – have presented increased opportunities for individuals as well as institutions keen to hold gold as part of a portfolio

of investments. While gold mine production averages about 2,800 tonnes annually, more than half that quantity is traded daily on the global market in various forms.

The World Gold Council estimates that more than 174,000 tonnes of gold has been produced since gold mining began and that 96 per cent of this total still exists in some form above the surface of the earth.<sup>2</sup> On this basis, if the global stock of gold was amalgamated it would form a 20.8 metre cube, with another 52,000 tonnes of gold in underground stock (Figure 2).

A distinguishing characteristic of the gold market is the range of factors that drive market behaviour. The geographical diversity of mine production is considered a key factor contributing to lower price volatility relative to other commodities, while the sheer size, depth and liquidity of the gold market rank highly not just against other commodities, but compared with other asset classes (including sovereign debt).

FIGURE 3 The gold value chain



**Demand factors**

Gold market fundamentals have undergone significant change over the last three to four decades. Gold jewellery still constitutes the largest single source of global demand, though jewellery-related demand has fallen from almost 80 per cent of total demand a decade ago to around 50 per cent. Investment has once again become a more prominent component of demand. The shift toward investment demand gained added momentum following the Global Financial Crisis in 2008, as gold came to be seen as an increasingly attractive “safe haven”.

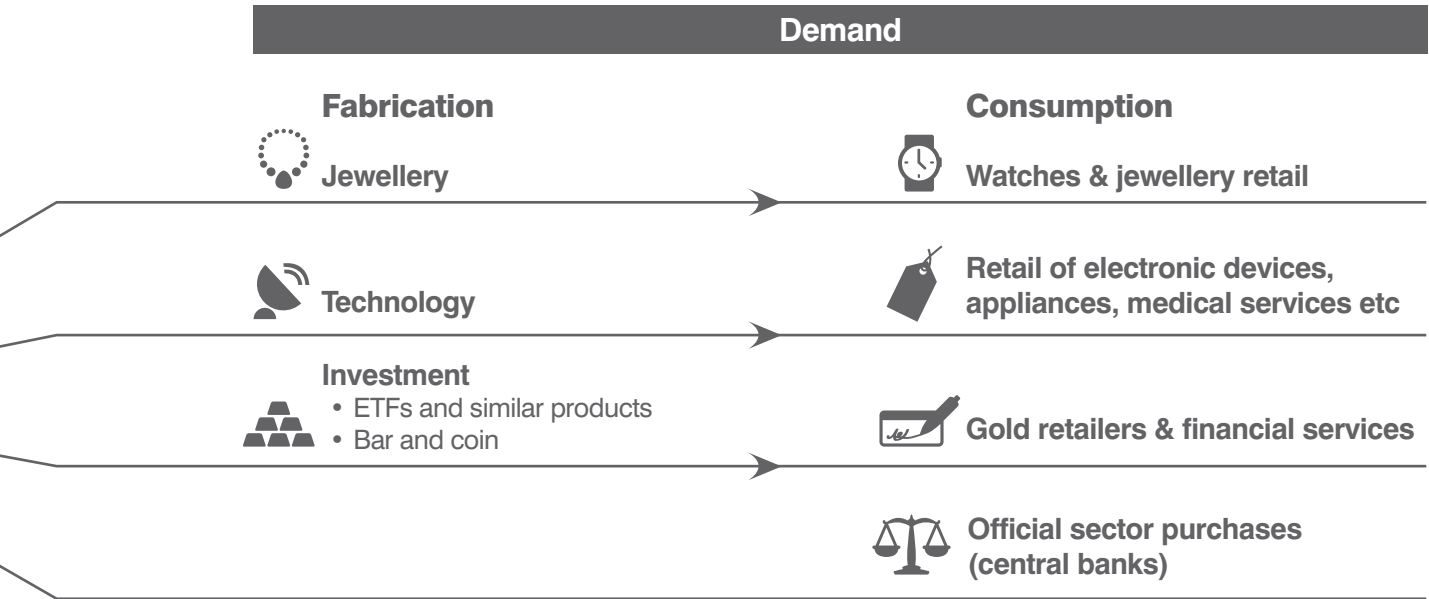
The share of demand accounted for by technological, industrial and mechanical uses of gold has remained stable over the last decade at about 10 per cent, with

electronics being the largest source of gold demand in this category.

The profound structural shift that has seen emerging economies account for a large and growing share of global economic activity has had major implications for the gold market. The rising economic power of countries such as China and India has diminished the traditionally dominant role played by North America and Europe in shaping gold market dynamics – whether from jewellery demand, central bank activity or investment demand. For example, the share of jewellery-related demand from the Indian subcontinent and East Asia is estimated to have risen from 22 per cent in 1980 to about 66 per cent in 2010.



Source: World Gold Council



**Supply dynamics**

On the supply side, mine production has tended to constitute 60 to 70 per cent of total supply, with recycling, net central bank sales and net producer hedging forming other supply components to varying degrees. In recent years, the official sector (central banks) has been a net source of demand, as European central banks have slowed their net sales of gold reserves and emerging market central banks have become a net source of demand.

A notable shift in the last decade has been the comparative rise in recycled gold as a source of supply, mostly from the developed economies of Europe and the United States. As almost all the gold that has ever been mined still exists in one form or another, recycled gold comprises a larger share of supply than for any other metal.

Global mine production, after falling from 2,625 tonnes in 2002 to 2,429 tonnes in 2008, has risen strongly in recent years and is estimated at 3,022 tonnes in 2013. According to Australia's Bureau of Resources and Energy Economics (BREE), global production will continue to rise to almost 3,200 tonnes in 2018.<sup>3</sup>

More so than many other metals, gold production is widely distributed throughout the world with no country accounting for more than 15 per cent of global production. China is the world's largest gold producer (14 per cent), followed by Australia (9 per cent), Russia (8 per cent), the United States (7 per cent) and South Africa (6 per cent).<sup>4</sup> ■



# GOLD MINING IN AUSTRALIA

THE FIRST GOLD RUSH IN  
1851 WAS A DEFINING EVENT  
IN AUSTRALIAN HISTORY.

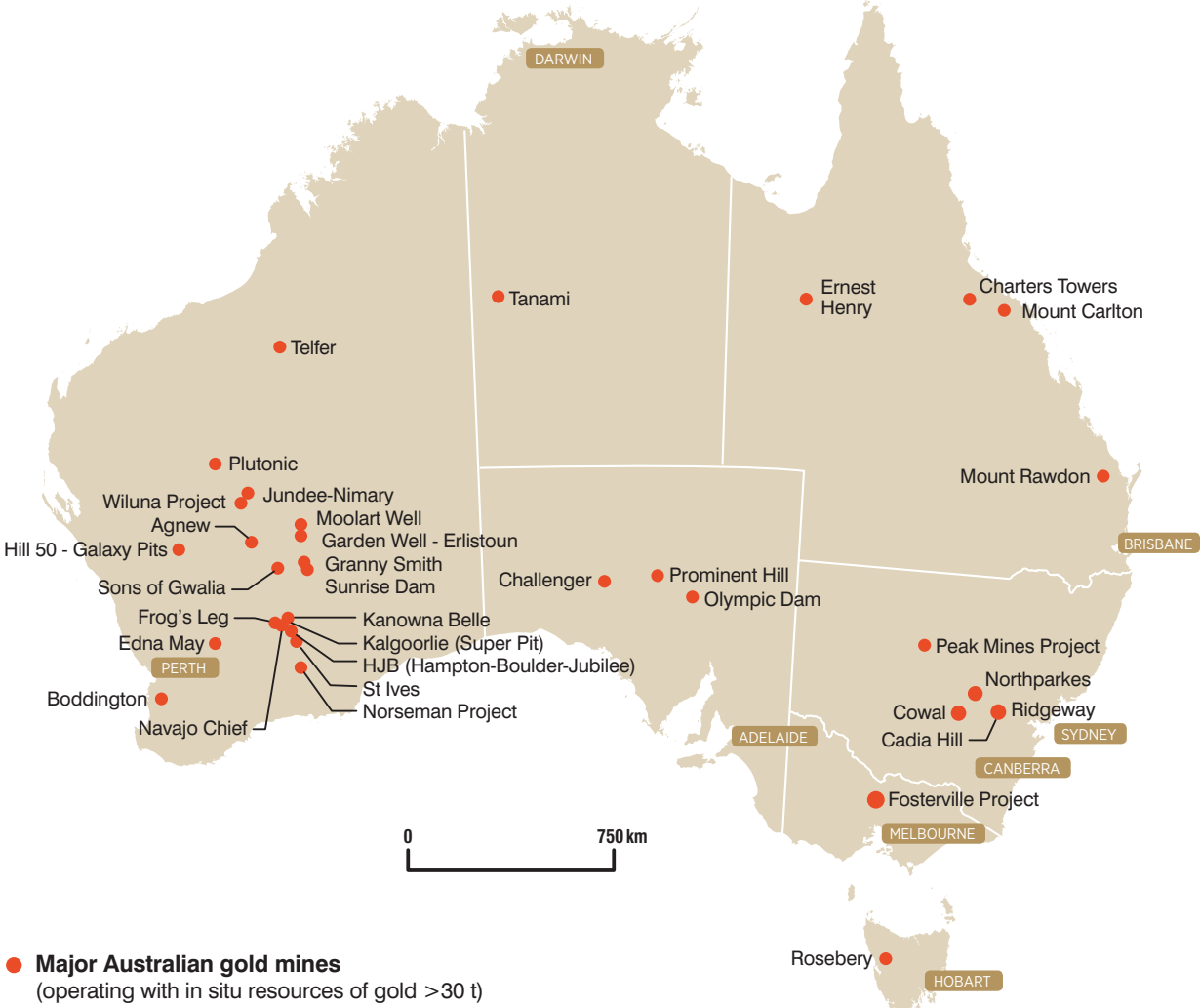
Apart from driving significant population growth and economic development, it unleashed powerful forces that left an indelible mark on the nation's social and political fabric (Box 1).

Today, gold is mined in all Australian states and the Northern Territory (Figure 4). Western Australia accounts for around 71 per cent of Australia's gold production, followed by New South Wales (11 per cent), Queensland (6 per cent) and South Australia (5 per cent).<sup>5</sup>

Gold is the primary output of about 75 operations in Australia with many drawing resources from two or more deposits and from both open-cut and underground mining operations. Several mines also produce gold as a by-product from the production of other commodities.<sup>6</sup>

FIGURE 4 Major Australian gold mines (2012)

Source: Geoscience Australia



**Resources**

The Yilgarn Craton in Western Australia is Australia's premier gold province with major Archean greenstone-hosted deposits such as Kalgoorlie, Granny Smith and Boddington. Overall, about 43 per cent of economic resources of gold occur in Western Australia. South Australia's Gawler Craton hosts the major iron oxide-copper-gold-uranium Olympic Dam deposit and the Northern Territory hosts the world-class, low-sulphide, quartz vein Tanami deposit.

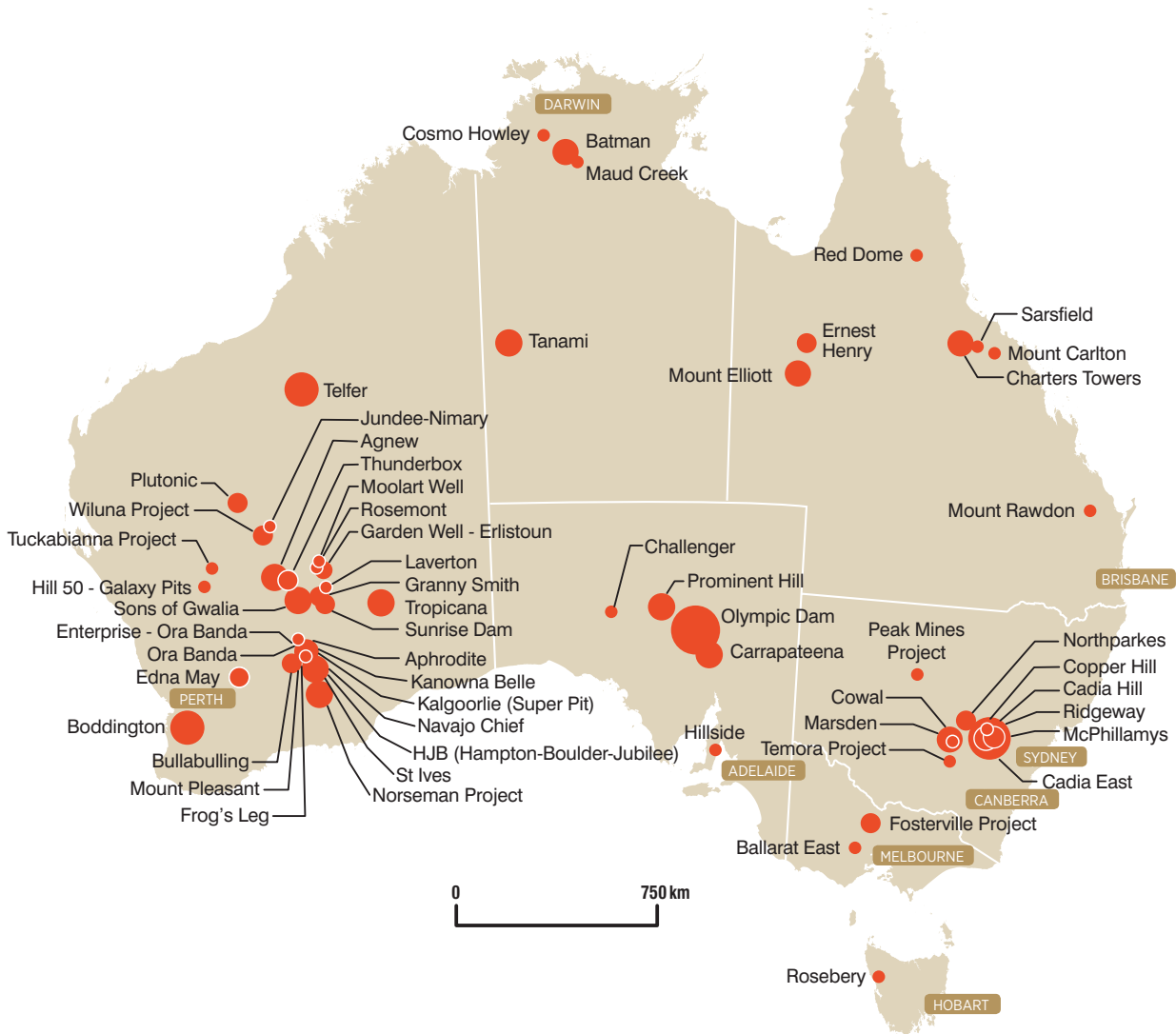
Australia's eastern states host many substantial gold deposits in a range of styles and provinces including

Forsterville in Victoria (quartz-vein related), Cadia in New South Wales (porphyry gold copper) and Mount Carlton in Queensland (epithermal).<sup>7</sup>

In 2013, Australian gold mine production was 266 tonnes. This is down from a peak of 334 tonnes in the late 1990s. Similarly, Australia's share of global gold production has fallen over the last decade, underscoring the complex set of geological, economic, technological and policy factors that determine activity in Australia's gold industry. However, gold production is expected to gradually increase and reach almost 300 tonnes

FIGURE 5 Major Australian gold deposits (2012)

Source: Geoscience Australia



by the end of the decade based on new projects and increased production from some existing operations.

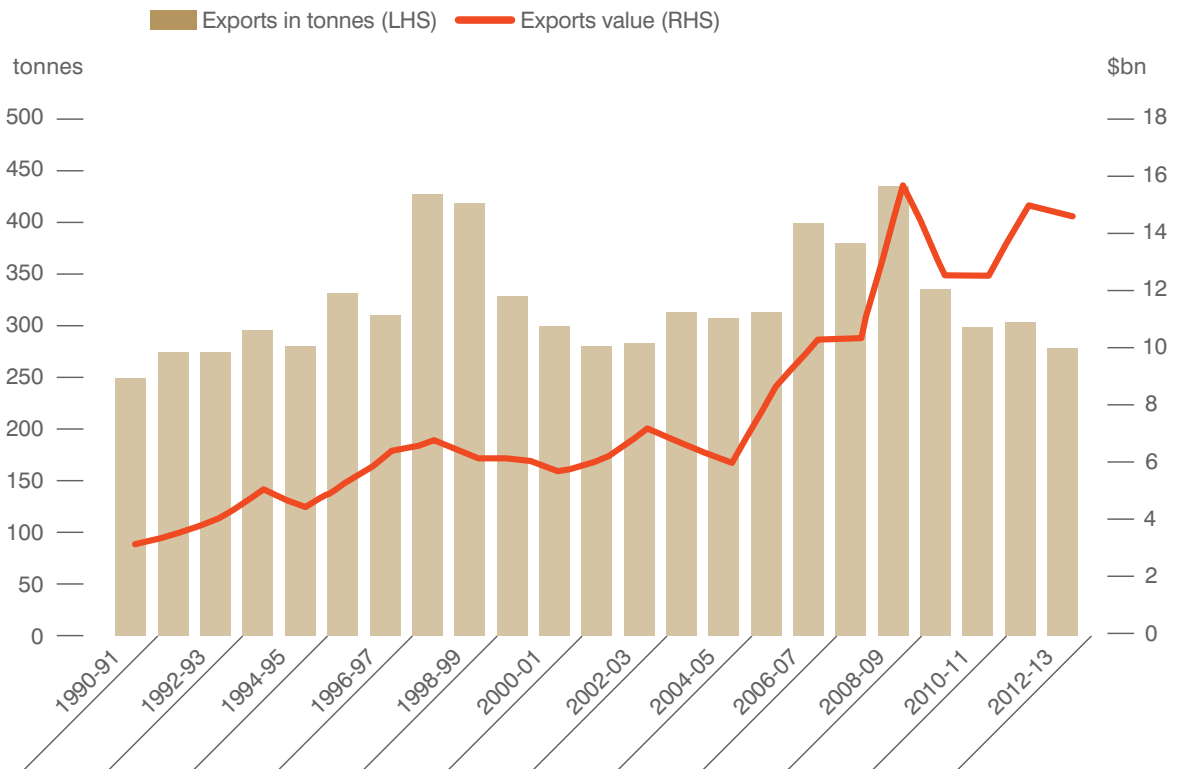
The resource life of Australia's gold resources has continued to grow since the early 1970s and is estimated by Geoscience Australia at approximately 40 years based on current production rates. Much of the increase can be attributed to the successful introduction of carbon-based processing technology that allowed the profitable processing to relatively low grade ore deposits. A higher gold price has also supported the increase in economically viable resources.<sup>8</sup>

**Major Australian gold deposits**  
(with in situ resources of gold >30 t)

- 30-50 (t)
- 50-100 (t)
- 100-500 (t)
- 500-1000 (t)
- 1000-3000 (t)
- >3000 (t)

FIGURE 6 Australia's gold exports

Source: Bureau of Resources and Energy Economics



## Exports

Throughout the last decade, gold has been Australia's third largest export earner (after iron ore and coal). In 2012-13, gold exports were worth \$15.1 billion (Figure 6), greater than the combined total for wheat, cotton, beef and vegetables.

Between 2004-05 and 2012-13, earnings from gold exports increased at an average annual rate of more than 11 per cent, driven by the increase in the gold price over the period.

## Value adding

Most gold mined in Australia is refined locally before being exported. As a result, Australia is not only a major producer and exporter of gold, it is also a key player in the gold refining industry. Perth Mint refinery in Western Australia is one of the largest in the world, with turnover of \$5.8 billion in 2012-13.

The Perth facility currently refines almost all of Australia's gold production, as well as gold mined in New Zealand, Papua New Guinea, Fiji, Solomon Islands, Thailand, Malaysia, Laos and the Philippines. It also refines a significant amount of recycled gold, mainly from Asia.<sup>9</sup>



FIGURE 7 **Structural characteristics of Australia's gold industry**

Source: IBIS World

<b>Industry globalisation</b>	<b>High</b>
<b>Capital intensity</b>	<b>High</b>
<b>Life cycle stage</b>	<b>Mature</b>
<b>Technology change</b>	<b>Medium</b>
<b>Regulation and policy</b>	<b>Heavy</b>
<b>Industry assistance</b>	<b>Low</b>

### Structural characteristics

High levels of industry globalisation and capital intensity are among the structural features of the gold industry in Australia. Gold is priced globally in US dollars and the US\$-A\$ exchange rate has a direct effect on Australian dollar revenues received by local producers. The industry is mature in the sense that demand broadly follows trends in overall economic activity. Industry concentration has risen in the wake of global rationalisation and the search by companies for economies of scale.

Technological advancements in exploration and mining have helped to sustain production in the face of challenges such as declining ore grades. As with the Australian mining industry in general, gold mining is heavily regulated based on health, safety, environmental and other requirements. At the same time, the industry receives negligible assistance from government (Figure 7). ■









# Our golden thread

MODERN AUSTRALIA'S DEVELOPMENT IS SYNONYMOUS WITH THE FIRST GOLD RUSH IN 1851 WHEN THE MINERAL WAS FOUND NEAR BATHURST IN NEW SOUTH WALES. MAJOR RUSHES SOON FOLLOWED IN BALLARAT AND BENDIGO IN VICTORIA.



The discovery of gold touched off a period of rapid population expansion. Between 1851 and 1860, Australia's population roughly trebled to more than 1.1 million. Growth was most pronounced in Victoria where the population grew five-fold from approximately 97,000 people to more than 530,000 by 1860. Melbourne became the largest city in Australia.<sup>10</sup>

In the decade after 1851 Australia produced more than 40 per cent of the world's output of gold, mostly from Victoria which produced 20 million ounces of gold over the period. The gold rush saw the share of mining in Australia's net national product soar to around 15 per cent. Gold surpassed wool as Australia's leading export and remained preeminent between 1851 and 1870. The sustained rise in Australia's income per capita meant "the gold rush was neither a flash in the pan nor an example of the so-called resource curse".<sup>11</sup>

The socio-political impacts from gold's discovery in Australia were no less profound. Ferment on the diggings helped spur such causes as male suffrage and the opening up of land to small farming settlement. The Eureka rebellion of miners on the Ballarat goldfields in 1854 would become a symbol of democratic protest





against perceived government maladministration and injustice (focused principally on the mining licence tax). Whatever interpretation is put on the events that saw 30 “diggers” killed – a statement of Australian nationalism, the impetus to organised labour, a protest of small capitalist miners – a clear democratic impulse took hold across all Australian colonies.

The gold industry continued to make a significant contribution to Australia’s economy as further discoveries were made in the colonies of Queensland, Western Australia and Tasmania. A second golden age followed the discovery of the Golden Mile at Kalgoorlie in Western Australia in the early 1890s. By the end of the decade, gold again challenged wool as Australia’s largest export earner.

For much of the 20th century, practical considerations associated with the exhaustion of more accessible deposits, mining in arid regions and higher costs limited industry growth. However, a sharp increase in the price of gold beginning in the 1970s served as the impetus for a renaissance in the Australian gold industry.

Technological advancements in both the exploration and mining of gold also made the mining of lower

grade ores more economically viable. Over the decade between 1981 and 1990, Australian gold mine production grew from 18 tonnes to more than 244 tonnes. In the process, gold once again became an important component of Australia’s export portfolio.

In the 1990s, Australia’s gold production continued to grow (though at a progressively slower pace) and the price of gold trended downwards, in line with the prices of many other commodities. The use of improved technologies and mining practices again helped to maintain Australia’s position as a major global gold producer.

Though focused principally on the bulk commodities of iron ore and coal, the Millennium Mining Boom driven largely by China’s demand for resources also witnessed strong growth in the gold price. Despite softer production, Australia’s gold industry maintained its position as the world’s second largest producer and the nation’s third largest export earner as the 21st century entered its second decade. The distribution of gold mining (in all Australian states and the Northern Territory) and the number of projects (second only to iron ore in the last decade) have further confirmed the industry’s ongoing importance to Australia. ■



# A VITAL SOURCE OF SKILLED, HIGH-WAGE JOBS



CENSUS DATA FROM THE AUSTRALIAN BUREAU OF STATISTICS PUT TOTAL DIRECT EMPLOYMENT IN THE GOLD MINING INDUSTRY AT MORE THAN 16,081 IN 2011.

Flow-on related employment is estimated at more than 34,300 jobs bringing the total number of jobs supported by the gold industry to more than 50,000 in 2011.

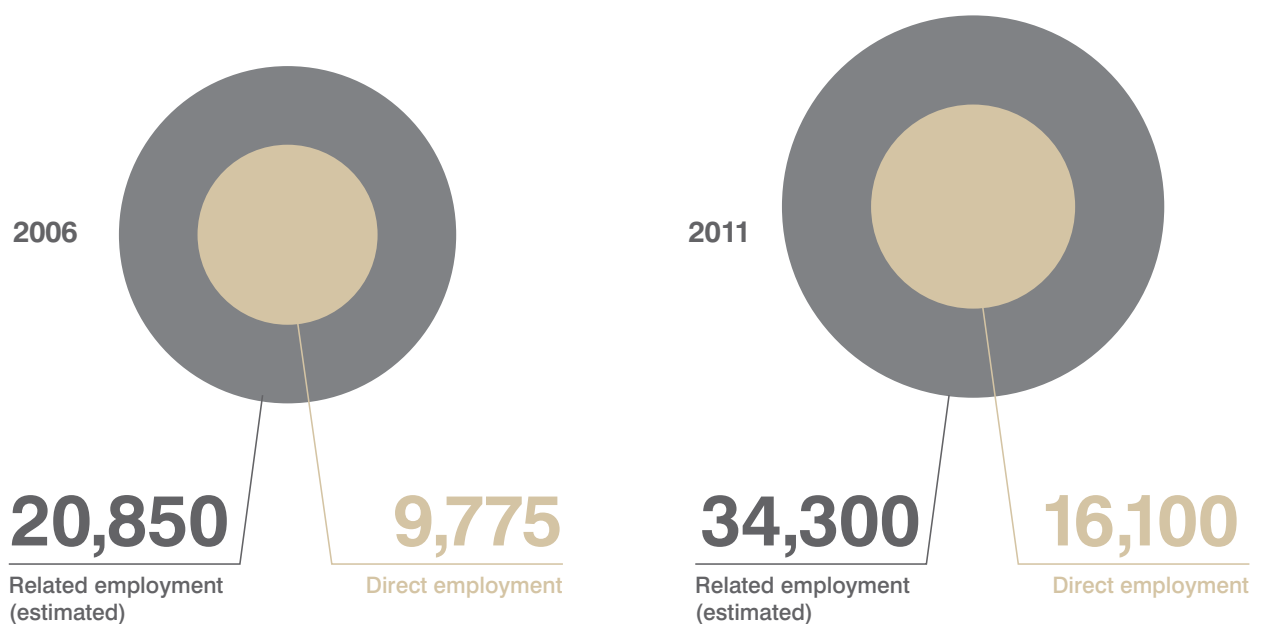
Wages in the gold industry are high, with a sector-wide average of more than \$140,000 per annum. This is roughly double the all-industries average in Australia.

Western Australia accounts for about 60 per cent of direct employment in the industry, followed by New South Wales (14 per cent), Queensland (10 per cent), Victoria (7 per cent), Northern Territory (4 per cent) and South Australia and Tasmania (2 per cent each).

The industry's workforce is becoming more diverse.

FIGURE 8 Employment in Australia's gold mining industry<sup>12</sup>

Source: Australian Bureau of Statistics, Minerals Council of Australia



\*Related employment: Under ANZSIC guidelines not all mining employment is reflected in ABS's Mining industry classification. Other categories not captured include: people working in catering on mine sites and transport personnel (truck and train drivers), contractors employed in site preparation, employees engaged in smelting and refining of metals and employees engaged in geographical surveying etc.

At the 2011 Census, the female employment share stood at 17 per cent. More than 10 per cent of the industry's workforce is aged over 55 years. Indigenous Australians make up 2.4 per cent of the industry workforce, up from 2.2 per cent in 2006.

Australian gold companies have a strong commitment to training employees, spending 4 per cent of payroll on both accredited and unaccredited training in 2011-12. This is well in excess of official training benchmarks. More than two thirds of gold companies offer support for structured training. The National Centre for Vocational Education Research has found that 59 per cent of gold companies employ apprentices and trainees.<sup>13</sup>

A detailed breakdown of data also shows that:

- 37 per cent of gold companies employ female apprentices and trainees
- 22 per cent employ Indigenous apprentices and trainees
- 37 per cent employ mature-aged apprentices and trainees
- 67 per cent support employees gaining vocational education qualifications at Certificate 1 and 2 levels, and 59 per cent at Certificate 3 and above
- 67 per cent of companies support undergraduate or postgraduate studies.<sup>14</sup> ■

# Innovative work strategies



NEWMONT BODDINGTON GOLD HAS DEVELOPED INNOVATIVE WORKFORCE STRATEGIES WHICH RESPOND TO THE NEEDS OF LOCAL COMMUNITIES AS WELL AS TO COMPANY OBJECTIVES AND VALUES.

In 2009, Newmont began scheduling shorter shifts for haul truck drivers, in part to prevent downtime during morning tea and lunch breaks. A driving shift between 9am and 2pm in turn provided a perfect opportunity for mothers of school-aged children to work in mining, as well as ensuring uninterrupted hauling at Boddington.

Seven women and one man currently drive Haulpak dump trucks during the “school shift” Monday through Friday, while several other women drive full-time at the mine. About 30 per cent of Boddington’s Haulpak drivers are women.

In terms of local employment, Newmont Boddington Gold is also working to lift the number of Gnaala Karla Booja people employed at the mine. Indigenous employment at Boddington is approximately 5 per cent (50 direct employees) with a further 34 Indigenous contractor employees.

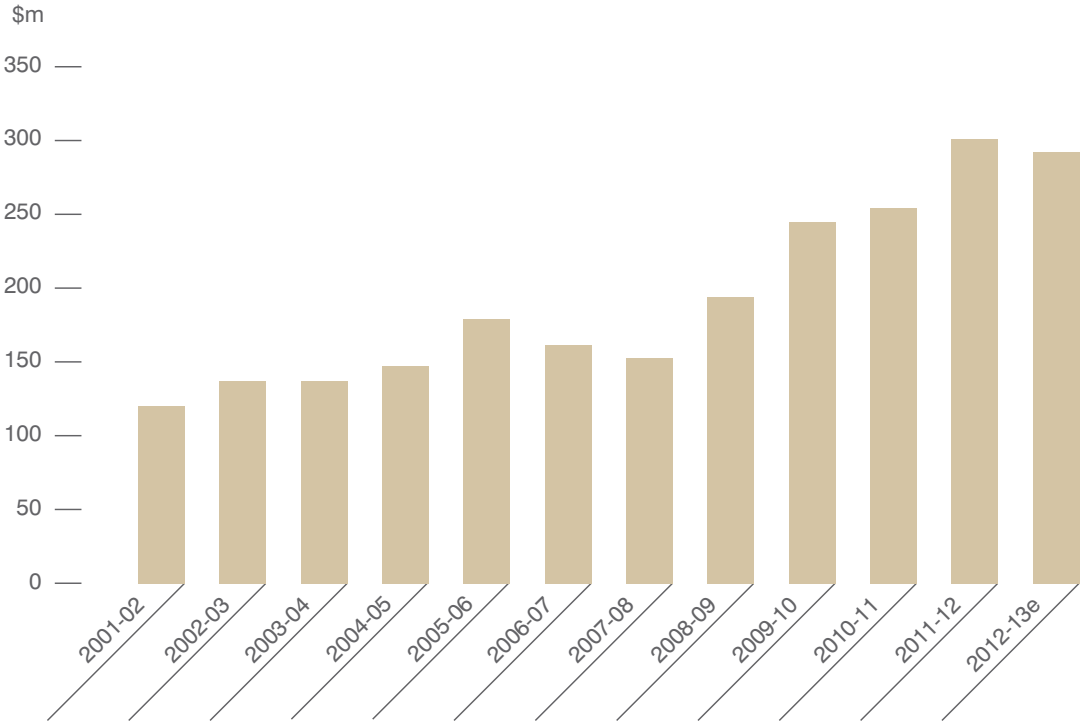
Newmont Boddington Gold’s three-month Gnaala Pre-employment (Workready) Program involves training and providing work experience. The company is also placing a greater emphasis on the retention of Indigenous employees and the creation of alternative employment pathways. This will ensure that Newmont Boddington Gold is not only successful in hiring Indigenous employees, but retaining them as well. ■



# INVESTING IN COMMUNITIES

FIGURE 9 Royalty payments by the gold industry

Source: Deloitte Access Economics e= estimate



THE GOLD INDUSTRY IS AN IMPORTANT CONTRIBUTOR TO GOVERNMENT REVENUES IN AUSTRALIA.

Payments to government include:

- company tax
- royalties
- payroll tax
- stamp duty
- exploration security deposits
- mine safety levies, as well as a host of other state and local government charges.

Taxes and royalties paid by the gold industry help to fund education, health, transport and community infrastructure and other government services.



Mineral royalty payments represent a direct return to the community from the discovery and extraction of gold resources. The gold industry paid almost \$2.2 billion to state and territory governments in royalty payments alone in the decade to 2012-13. Gold royalties in 2012-13 totalled about \$291 million, up 112 per cent compared with 2002-03 (Figure 9).

Given its share of Australian production, more than 70 per cent of gold royalties are paid to the Government of Western Australia where gold royalties accounted for almost 4.2 per cent of total royalty receipts in 2012-13.

Australian gold companies work closely with local communities and other stakeholders to ensure economic and social benefits from gold mining are strong and sustainable. In some regional and remote centres, the gold industry is the main source of economic activity, helping ensure local communities remain stable and viable.

As well as being important providers of employment, apprenticeships and skills development opportunities, gold companies are directly involved in helping build and maintain social and physical infrastructure in regional areas.

Ensuring Indigenous Australians share in opportunities flowing from the gold industry has been a key focus of company activity (Box 3). Increasingly, this has involved efforts to engage and support Indigenous businesses within the procurement chain through various forms (as suppliers, joint venture partners or sub-contractors).

Gold companies recognise the importance of ongoing dialogue with a wide range of stakeholder groups, especially in the locations in which they operate. Dialogue with community stakeholders starts well before mining begins. Other stakeholders include employees and contractors, customers, suppliers, government agencies and non-government organisations. ■

# Improved opportunities for the Martu people: Ngurra Kujungka Inc

BETWEEN THE 1970s AND THE LATE 2000s, SPORT AND RECREATION IN THE WESTERN DESERT REGION OF WESTERN AUSTRALIA CHANGED VERY LITTLE.

Programs were limited and uncoordinated, participation stagnated and the health of the local Martu people suffered as a result. Starting in 2008, Newcrest's Community Relations team at Telfer Mine and the Western Australia Department of Sport and Recreation created and funded an Indigenous Sports Development Officer (ISDO) position.

Located in Telfer (a central location to Martu communities), the brief was to capture the Martu peoples' fierce desire to participate in sport and recreation and to work with relevant stakeholders to develop an effective, sustainable sport and recreation program for the people of the Western Desert.



In 2012, the Western Desert Sports Council (WDSC) was incorporated. Now known as Ngurra Kujungka Inc. (the Martu words meaning "all coming together in one place"), the council leads the development and delivery of the Western Desert's first community-driven, regional sport and recreation program. The program boasts marquee initiatives such as the Western Desert Leagues (an Aboriginal Australian Rules football league and a softball league, together with children's sport and activities) and provides a range of opportunities including training, education and employment. In recent times, Ngurra Kujungka Inc. has grown to encompass art, music and cultural activities. ■







AUSTRALIAN GOLD COMPANIES HAVE A STRONG COMMITMENT TO TRAINING EMPLOYEES, SPENDING 4 PER CENT OF PAYROLL ON BOTH ACCREDITED AND UNACCREDITED TRAINING IN 2011-12. THIS IS WELL IN EXCESS OF OFFICIAL TRAINING BENCHMARKS.



# INVESTING IN SUSTAINABILITY

THE RESPONSIBLE MANAGEMENT OF WATER IS CRITICAL TO GOLD INDUSTRY OPERATIONS AND TO THE MAINTENANCE OF A “SOCIAL LICENSE TO OPERATE”.



Gold companies in Australia have put in place a range of strategies for responsible water use. They include monitoring programs for water supply, storage, usage and discharge, risk assessments, development and maintenance of site-wide water balances and water conservation programs that address significant risks at all stages of the mine life cycle.

Companies have invested heavily in the development and application of innovative technologies for the management, recovery, recycling and beneficial use and re-use of water. Gold companies are active participants in a leading practice water accounting framework developed by the Minerals Council of Australia. The framework allows mining operations to account for and to report water use in a consistent way. This industry-driven initiative aims to build greater understanding and community confidence in the way water use is managed and reported.

Further development of the industry also relies on access to land. Australia’s gold industry recognises that access to land is earned by demonstrating responsible land stewardship throughout the mining life cycle and that the industry has a responsibility to contribute towards sustainable land use outcomes.

Companies recognise the need to integrate multiple values within land management, including conservation, economic, social and cultural values. With careful planning, land uses (including mining, conservation and agriculture) can be complementary as sequential or neighbouring activities. This also requires ongoing stakeholder engagement. Ensuring that the rights, knowledge and interests of traditional owners, existing land holders and the community are recognised and respected is a priority for the gold industry.

Australia’s gold industry is committed to continuous improvement beyond regulatory requirements in areas such as biodiversity conservation (Box 4). The industry is focussed on avoiding, minimising or mitigating impacts on conservation values. While some mined areas can be rehabilitated to pre-existing condition or better, in other cases substantial transformation of the landscape is unavoidable. Ensuring this land is available for beneficial post-mining land use is a key objective of the gold industry. ■



# Unique offset approach for new project



THE NEW TROPICANA GOLD MINE IS LOCATED ON THE EDGE OF THE GREAT VICTORIA DESERT IN WESTERN AUSTRALIA. ITS SURROUNDING ENVIRONMENT HAS SEEN MINIMAL HUMAN ACTIVITY.

As part of its environmental strategy, the Tropicana Joint Venture (AngloGold Ashanti Australia Ltd 70 per cent and manager, Independence Group NL 30 per cent) has set up the Great Victoria Desert Biodiversity Trust in a model unique to the Western Australian mining and environmental landscape. The Trust forms the centrepiece of the Tropicana Joint Venture's offsets strategy for both biodiversity and greenhouse offsets, encapsulating commitments made under the Public Environmental Review process for Tropicana.

Linked to Tropicana's Commonwealth approvals, the Trust focuses on benefits to threatened species and fauna communities within the Great Victoria Desert region such as Marsupial Moles, Sandhill Dunnarts, Malleefowl and Mulgara. Six years in the making, it has been established as a truly independent body with input and assistance from state and federal regulators, specialist scientists and Indigenous and community representatives.

The Trust will make all research findings publicly available to enable all with an interest to work together to improve outcomes for threatened species and to help preserve biodiversity and ecological functioning across the landscape. It will also work with traditional owners, governments and NGOs to improve employment outcomes and to utilise traditional ecological knowledge to increase biodiversity knowledge. ■

# SECURING TOMORROW'S PROSPERITY

AUSTRALIA'S GOLD INDUSTRY IS AN ENDURING NATIONAL ASSET IN A FAST-CHANGING WORLD.



Yet resource endowment alone will not guarantee a bright future for the industry, or sustain the tens of thousands of jobs and the billions of dollars in exports the gold industry currently generates for Australia.

To remain a major gold producer, Australia must be competitive in global markets. This is a challenge for all who benefit from a healthy and vibrant gold industry, including governments in all Australian jurisdictions. A 2014 study by Deloitte identified what's at stake: "every investment round we miss represents a 20-year head start for a competitor nation".<sup>15</sup>

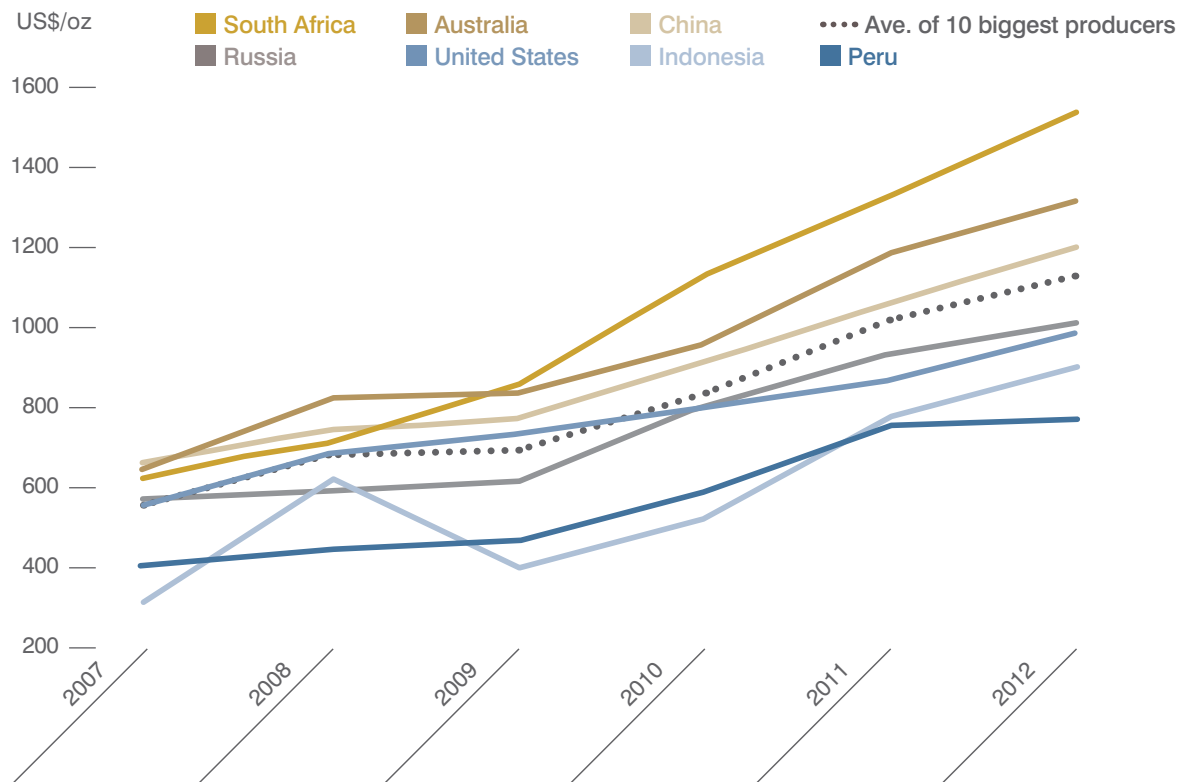
Over the past 10 years, there have been 56 gold projects undertaken in Australia to develop new mines or extend existing operations. There are currently two gold projects under construction in Australia that have a total cost of \$320 million. There are another 19 projects worth around \$3.5 billion being developed that are targeting gold as a principal resource. An additional 10 projects could produce gold while extracting other minerals such as copper. The largest of these (BHP Billiton's Olympic Dam expansion and OZ Minerals' Carrapateena mine) are located in South Australia.<sup>16</sup>

Growth in gold demand, especially as Asia's middle class expands and demands greater luxury and sophisticated products, offers new opportunities for Australia. At the same time, Australian gold producers face some acute challenges including from:

- **Emerging competitors:** Increased production from emerging gold producers in Asia, Latin America and Africa is placing more established producers such as Australia, South Africa, Canada and the United States under increased pressure. As a result, gold production is more widely distributed around the world than ever before.

FIGURE 10 Australia's cost competitiveness challenge – "All-in" cost<sup>17</sup>

Source: Thomson Reuters GFMS Gold Mine Economics Service



- **High costs:** By most measures, Australia is the world's second highest cost major producer after South Africa (Figure 10). Between 2005 and 2011, average costs are estimated to have risen by more than 160 per cent at a growth rate of almost 18 per cent per year. While many of Australia's larger mines remain competitive, it's estimated that around 40 per cent of Australian production lies in the most expensive 25 per cent (or "quartile") of the global cost curve.<sup>18</sup>
- **Productivity drags:** Productivity of Australia's mining industry has fallen noticeably over the last decade, with the gold industry no exception. In part, this reflects lower ore grades and more remote and complex locations, given the drive to increase production in response to higher prices. However, Australia's "lost decade" on productivity growth across the wider economy suggests policy factors are also at work.
- **Taxes, royalties and other charges:** Tax and royalty increases have damaged Australia's

reputation as a safe and profitable place for mining investment in recent years. Stable and competitive tax arrangements are vital to capturing a share of future investment opportunities, as well as to the competitiveness of existing operations.

- **Red tape and green tape:** Long and complex approval processes, as well as other areas of unnecessary red and green tape, have acted to delay project development and added to project costs. Governments at all levels have a responsibility to work together to streamline regulatory frameworks if Australia is to remain a world class gold producer.

The gold industry continues to enrich Australia more than 150 years since our first "boom". From exports to jobs in remote communities, from taxes to best-practice environmental management, Australia's gold industry is a vital part of our sophisticated 21st century society.

We all have a stake in the industry's future success. ■

**TABLE 1 Gold investment**  
Expansion and development projects completed since mid-2005<sup>19</sup>

Project	Location	Company	Capital expenditure \$m
Paulsens	WA	NuStar Mining	31
Ballarat East	VIC	Ballarat Goldfields	65
Cowal	NSW	Barrick Gold	510
Raleigh underground	WA	Placer Dome/Tribute Resources/Rand	52
Twin Hills	QLD	BMA Gold	22
Bendigo	VIC	Bendigo Mining	127
Coyote	WA	Tanami Gold	15
Charters Towers (Warrior deposit)	QLD	Citigold Corporation	50
Laverton redevelopment	WA	Crescent Gold	15
Bronzewing redevelopment	WA	View Resources	30
Mount Wright (feed for Ravenswood operation)	QLD	Resolute Mining	25
Wallaby underground extension	WA	Barrick Gold	35
Sunrise Dam underground development	WA	AngloGold Ashanti	109
Persverance (Coolgardie gold project)	WA	Focus Resources/Committee Bay Resources	3
Leonora (inc Gwalla Deeps)	WA	St Barbara Mines	144
Higginsville Gold Project	WA	Avoca Resources	120
Frog's Leg underground	WA	LaMancha Resources/Dioro Exploration	80
Hillgrove	NSW	Straits Resources	30
Ballarat East	VIC	Lihir Gold	120
Bendigo (Kangaroo Flat)	VIC	Bendigo Mining	300
Wiluna	WA	Apex Minerals	62
Boddington	WA	Newmont	3400
Brightstar	WA	A1 Minerals	10
Challenger expansion	SA	Dominion Mining	18
Paddington (Homestead underground)	WA	Norton Gold Fields	13
Ridgeway Deeps	NSW	Newcrest	505
South Laverton Project	WA	Saracen Mineral Holdings	22

Source: Bureau of Resources and Energy Economics

White Dam	WA	Exco Resources/Polymetals Group	24
Randalls (phase 1)	WA	Integra Mining	64
Duketon Gold Project	WA	Regis Resources	73
Edna May	WA	Catalpa Resources	92
Super Pit	WA	Newmont/Barrick Gold	NA
Leonora (King of the Hills)	WA	St Barbara	20-25
St Ives (Athena underground)	WA	Gold Fields	100
Mt Magnet	WA	Ramelius Resources	28
Woods Point	VIC	Morning Star Gold	32
Cosmo Deeps	NT	Crocodile Gold	30
Duketon (Garden Well)	WA	Regis Resources	109
Murchison	WA	Kentor Gold	15
Nullagine Gold Project	WA	Millennium Minerals	87
Cadia East	NSW	Newcrest	1900
Carosue Dam (Red October)	WA	Saracen Minerals	40
KalNorth (Lindsay's)	WA	Kal North	70
Meekatharra Gold Project	WA	Reed Resources	36
Mt Carlton (Silver Hill)	QLD	Evolution Mining	180
Murchison	WA	Silver Lake	70
Andy Well	WA	Doray Minerals	55
Tropicana Joint Venture Project	WA	AngloGold Ashanti/Independence Group	845

**Total**      **\$9,787 million**













## Endnotes

- <sup>1</sup> Geoscience Australia and Bureau of Resources and Energy Economics, *Australia's Mineral Resource Assessment 2013*, p. 39.
- <sup>2</sup> World Gold Council. Available at [www.gold.org](http://www.gold.org).
- <sup>3</sup> Bureau of Resources and Energy Economics, *Resources and Energy Quarterly, March Quarter 2014*, p. 76.
- <sup>4</sup> Geoscience Australia and Bureau of Resources and Energy Economics, *Australia's Mineral Resource Assessment 2013*, p. 39.
- <sup>5</sup> Bureau of Resources and Energy Economics, *Resources and Energy Quarterly, March Quarter 2014*, p.190.
- <sup>6</sup> Geoscience Australia, *Australia's Identified Mineral Resources 2012*, p. 41.
- <sup>7</sup> Geoscience Australia and Bureau of Resources and Energy Economics, 2013, *Australia's Mineral Resource Assessment 2013*, p. 37.
- <sup>8</sup> Geoscience Australia and Bureau of Resources and Energy Economics, *Australia's Mineral Resource Assessment 2013*, p. 40.
- <sup>9</sup> Gold Corporation, *Annual Report, The Perth Mint Australia*, 2013.
- <sup>10</sup> Bialowas, A., *Gold and Australia's economic development*, Resources and Energy Quarterly, 2011 BREE.
- <sup>11</sup> Mclean, I. W., *Why Australia Prospered: the shifting sources of economic growth*, Princeton, 2011, p. 95.
- <sup>12</sup> Direct Employment: Under ANZSIC guidelines not all mining employment is reflected in the mining industry classification of the Australian Bureau of Statistics.
- Other categories not captured include: people working in catering on mine sites and transport personnel (truck and train drivers), contractors employed in site preparation, employees engaged in smelting and refining of metals and employees engaged in geographical surveying etc.
- <sup>13</sup> NCVER, *Training and education activity in the minerals sector*, 2013.
- <sup>14</sup> NCVER, *Training and education activity in the minerals sector*, 2013.
- <sup>15</sup> Deloitte, *Positioning for prosperity? Catching the next wave*, 2014, p. 22.
- <sup>16</sup> Geoscience Australia and Bureau of Resources and Energy Economics, *Australia's Mineral Resource Assessment 2013*, p.63. Projects reported by BREE have a threshold value of \$50 million or more. Projects that have undertaken or are undertaking a preliminary feasibility study, and which still appear to be actively progressing based on recent quarterly reports by companies, are considered.
- <sup>17</sup> "All-in" cost is a proprietary Thomson Reuters GFMS cost parameter designed to reflect the full marginal cost of gold mining. In addition to total production costs, it includes ongoing capital expenditure, indirect costs and overheads.
- <sup>18</sup> Thomson Reuters GFMS, *Gold Survey 2013*, London.
- <sup>19</sup> Australian Bureau of Agricultural and Resource Economics and Sciences and Bureau of Resources and Energy Economics, *Major Projects*, Canberra.



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