



Government of **Western Australia**
Department of **Mines and Petroleum**

WESTERN AUSTRALIAN
MINERAL AND PETROLEUM

STATISTICS DIGEST

2014–15



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Government of **Western Australia**
Department of **Mines and Petroleum**

FOREWORD	3
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1. EXPLORATION AND MINERAL AND PETROLEUM TITLES

1.1 Minerals Exploration.....	4
1.2 Petroleum Exploration	5
1.3 Mineral Titles.....	5
1.4 Petroleum Titles	6

2. MINERAL AND PETROLEUM INDUSTRY 2014–15 REVIEW

2.1 Overview.....	7
2.2 Iron Ore.....	12
2.3 Petroleum	16
2.4 Gold	24
2.5 Alumina	27
2.6 Nickel.....	29
2.7 Base Metals	32
2.8 Mineral Sands	34
2.9 Diamonds.....	36
2.10 Other.....	37

3. EMPLOYMENT, INVESTMENT AND ROYALTIES

3.1 Employment.....	40
3.2 Investment	42
3.3 Royalties	45

TABLES

1. Mineral Tenements in Force.....	5
2. Petroleum Titles in Force	6
3. Royalty Receipts.....	45
4. Quantity and Value of Minerals and Petroleum	46
5. Quantity and Value of Selected Major Commodities	48
6. Value of Minerals and Petroleum by Region by Commodity	50
7. Value of Minerals and Petroleum by Region by Local Government Area.....	51
8. Average Number of Persons Employed in the Minerals Industry.....	52
9. Principal Mineral and Petroleum Producers	60

ABBREVIATIONS.....	65
--------------------	----

WEIGHTS AND MEASURES	65
----------------------------	----

UNITS AND CONVERSION FACTORS.....	65
-----------------------------------	----

DATA SOURCES.....	66
-------------------	----

MAPS

1. Local Government and Regional Boundaries.....	67
2. Local Government and Regional Boundaries Insert	68
3. Major Mineral and Petroleum Projects in Western Australia.....	69
4. Major Mineral and Petroleum Projects in Western Australia Insert	70

LIST OF FIGURES

Figure 1.	Mineral Exploration Expenditure	4	Figure 33.	LNG Import Prices	23
Figure 2.	Petroleum Exploration Expenditure	5	Figure 34.	Gold Exports	25
Figure 3.	Average Price Comparison 2013–14 and 2014–15	9	Figure 35.	Gold Production	25
Figure 4.	Exchange Rate Trade-Weighted Index	9	Figure 36.	Gold Price.....	26
Figure 5.	Exchange Rate US\$/A\$.....	9	Figure 37.	Gold Quantity and Value by Quarter.....	26
Figure 6.	Non-rural Commodity Price Index	10	Figure 38.	Historic Gold Price, per Ounce	26
Figure 7.	Australian Dollar Exchange Rate against Major Currencies	10	Figure 39.	Alumina Quantity and Value by Quarter	27
Figure 8.	Major Commodities by Value.....	10	Figure 40.	Alumina Price – A\$/tonne	27
Figure 9.	Western Australian Mineral and Petroleum Exports 2014–15.....	11	Figure 41.	Alumina Exports	27
Figure 10.	Western Australian Merchandise Exports 2014–15	11	Figure 42.	Alumina Quantity.....	28
Figure 11.	Western Australian Merchandise Exports by Country 2014–15.....	11	Figure 43.	Nickel Price A\$/tonne	29
Figure 12.	Australian Merchandise Exports 2014–15.....	11	Figure 44.	Nickel Exports	29
Figure 13.	Value by Commodity 2014–15.....	11	Figure 45.	Nickel Quantity and Value by Quarter	30
Figure 14.	Iron Ore Exports.....	12	Figure 46.	Nickel Quantity.....	31
Figure 15.	Iron Ore Quantity and Value by Quarter	12	Figure 47.	Historic Nickel Price per tonne.....	31
Figure 16.	China’s Crude Steel Production and Iron Ore Imports	13	Figure 48.	Copper Price.....	33
Figure 17.	China’s Iron Ore Imports by Country for 2014	14	Figure 49.	Lead Price	33
Figure 18.	Iron Ore Quantity	15	Figure 50.	Zinc Price	33
Figure 19.	Iron Ore Fines (Average price).....	15	Figure 51.	Heavy Mineral Sands Exports	34
Figure 20.	Crude Oil and Condensate Quantity	16	Figure 52.	Heavy Mineral Sands – Value by Quarter	34
Figure 21.	Crude Oil and Condensate Quantity and Value by Quarter	17	Figure 53.	Heavy Mineral Sands Value of Production	35
Figure 22.	Tapis Crude Oil Price US\$/bbl	17	Figure 54.	World Coal Consumption 2014	37
Figure 23.	Petroleum Exports	17	Figure 55.	Selected WA Commodities Relative to World Production Ending 2014 by Quantity.....	39
Figure 24.	OPEC Share of World Crude Oil Reserves 2014 ..	18	Figure 56.	WA Minerals 2014–15.....	40
Figure 25.	Average Natural Gas Prices	19	Figure 57.	WA Mining Employment 2004–05 to 2014–15	40
Figure 26.	Western Australian Average Domestic Natural Gas Price.....	20	Figure 58.	Mining Investment.....	43
Figure 27.	World LNG Imports by Region 2014	21	Figure 59.	New Capital Investment.....	43
Figure 28.	World LNG Rankings 2014.....	21	Figure 60.	Royalty Receipts 2014–15 and North West Shelf Grants	45
Figure 29.	Crude Oil and Condensate Production 2014–15.	21	Figure 61.	Value of Minerals and Petroleum by Commodity	47
Figure 30.	Natural Gas Production 2014–15.....	21	Figure 62.	Value of Minerals and Petroleum by Region 2014–15	51
Figure 31.	Asia–Pacific Region LNG Imports 2014 by Exporting Country.....	22			
Figure 32.	Countries Importing LNG in 2014.....	22			

Welcome to the Western Australian Mineral and Petroleum Statistics Digest for 2014–15. This publication brings together a range of statistical information to provide a comprehensive overview of the State's mineral and petroleum industry.

There is no doubt that 2014–15 presented a challenging year for many in Western Australia's mineral and petroleum industry. A focus on adapting to changing market conditions has driven rapid cost reduction strategies and the search for new innovative technologies.

Global commodity prices have experienced a period of extended decline and many of the factors that supported the commodity 'supercycle' have now reversed. Strong resources sector investment over the past few years has resulted in surplus capacity for a number of commodities, global demand growth has moderated to lower levels and the Australian dollar has depreciated against the US dollar.

These events emphasise the cyclical nature of the mineral and petroleum industry. The challenge for the industry is to ride out the downward swings while positioning themselves to take advantage of the next upward swing.

The industry's ability to sustain its growth and expand its contribution to the State's economic performance in the medium to long term depends on investment in exploration. Most of the strong growth seen over recent years has been underpinned by past minerals and petroleum exploration. Western Australian producers recognise this and although there has been a decline, the State continues to attract the largest proportion of national exploration expenditure.

In the past, Western Australia's mineral and petroleum industry has shown itself to be resilient and will no doubt continue to do so.



It is not possible to prepare such a comprehensive range of information without assistance from outside this Department. I would like to thank various organisations – Department of Industry and Science, the Australian Bureau of Statistics and the Western Australian Department of Treasury – for their cooperation in compiling this Digest.

Richard Sellers
Director General
Department of Mines and Petroleum

1. EXPLORATION AND MINERAL TITLES

1.1 MINERALS EXPLORATION

Weaker commodity prices have driven many companies to implement cost-cutting programs in order to maintain profitability. As a result, exploration expenditure has decreased.

Nationally, mineral exploration expenditure fell by 25 per cent to \$1.6 billion from the previous financial year and the number of metres drilled fell by six per cent to six million metres.

Mineral exploration expenditure in Western Australia fell by \$303 million, or 22 per cent, to \$917 million in 2014–15. This represents the lowest level of expenditure since 2006–07.

Western Australia continued, however, to attract the largest proportion of national mineral exploration expenditure:

- Western Australia _____ 58%
- Queensland _____ 20%
- New South Wales _____ 8%
- Northern Territory _____ 6%
- South Australia _____ 6%
- Victoria _____ 1%
- Tasmania _____ 1%

Iron ore exploration continued to dominate expenditure accounting for 44 per cent, or \$406 million, of the State's total spend on exploration.

Expenditure on base metals and nickel exploration also fell, down 32 per cent to \$49 million, and down 17 per cent to \$78 million respectively. There was also weakness in gold exploration expenditure, which declined by seven per cent to \$274 million.

In contrast, expenditure on uranium exploration rose by 17 per cent to \$26 million.

The majority of mineral exploration expenditure was spent on projects to expand existing mining operations, which accounted for around 73 per cent or \$666 million of total expenditure.

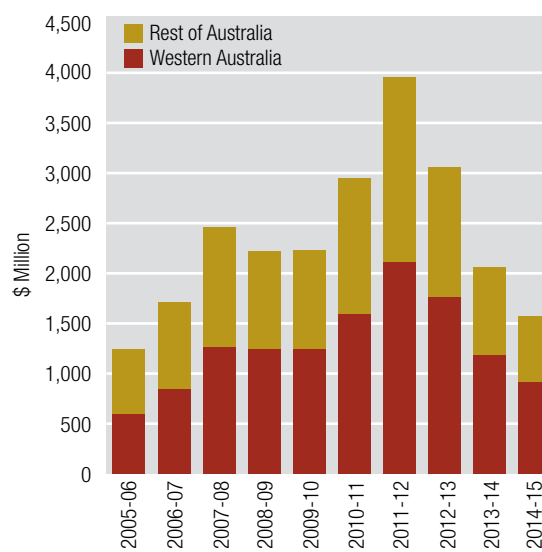


Figure 1 | **Mineral Exploration Expenditure**
Source: ABS

EXPLORATION INCENTIVE SCHEME

The cornerstone of growth in the mining industry is exploration and investment. In 2009, the Western Australian Government announced its four-year, \$80 million Exploration Incentive Scheme (EIS), an initiative that aims to encourage exploration in under-explored greenfield regions of the State.

The flagship program of the EIS is the Co-funded Drilling program which offers refunds of up to 50 per cent of direct drilling costs, capped at \$150,000, or \$200,000 for innovative drilling programs through a competitive application system. Since the start of the program, co-funding has been offered to 550 exploration drilling projects and just over \$130 million.

The success of EIS has prompted the State Government to extend funding beyond the initial four years to the end of the 2016–17 financial year.

Further details on the initiative's six programs can be found on the Department's website at www.dmp.wa.gov.au/EIS.

1.2 PETROLEUM EXPLORATION

Nationally, expenditure on petroleum exploration declined by 21 per cent to \$3.8 billion in 2014–15 (down from 4.8 billion in 2013–14). Western Australia's combined onshore and offshore areas, and adjacent Commonwealth offshore areas, attracted the largest share of national petroleum exploration expenditure with 55 per cent:

■ Western Australia	55%
■ Queensland	20%
■ South Australia	11%
■ Northern Territory	7%
■ New South Wales	0.3%
■ Victoria	0.1%
■ Tasmania	Nil

In 2014–15, petroleum exploration expenditure in Western Australia fell by 31 per cent to \$2.1 billion.

Offshore basins continue to attract the majority of petroleum exploration expenditure in Australia and accounted for 67 per cent of total spending in 2014–15.

Further information on petroleum exploration activity in Western Australia can be found in the publication 'Petroleum in Western Australia', produced by the Department of Mines and Petroleum. This publication contains a comprehensive overview of petroleum exploration activities in this State, together with details on the award of petroleum exploration permits, and is available at www.dmp.wa.gov.au.

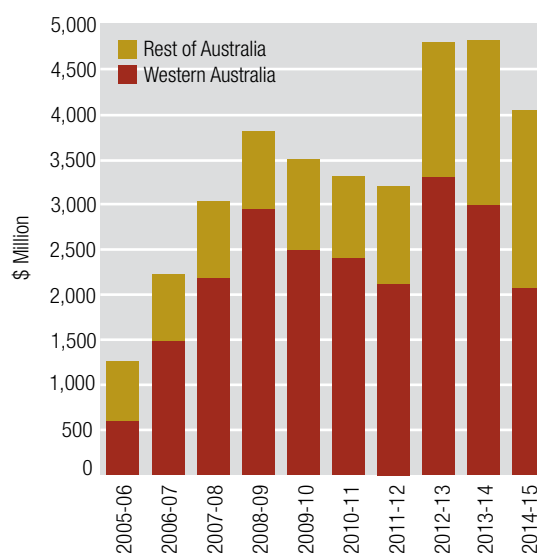


Figure 2 | **Petroleum Exploration Expenditure**
Source: ABS

1.3 MINERAL TITLES

In 2014–15, the total amount of land covered by mineral tenements in force in Western Australia fell by 16 per cent to 46.6 million hectares (Mha).

Exploration licences covered the majority of mineral tenements (80 per cent) and this is where the largest fall occurred. The actual number of exploration licences fell by 15 per cent from 5723 to 4983, while the area fell by 20 per cent from 45 to 37 Mha.

Mining leases accounted for only five per cent (2.4 Mha) of the total area. This is 23,000 ha lower than for the 2013–14 year. The number of mining leases in force fell by three per cent from 6020 to 5859.

TABLE 1. MINERAL TENEMENTS IN FORCE 1978 ACT

	2010–11		2011–12		2012–13		2013–14		2014–15	
	Number	000 ha	Number	000 ha	Number	000 ha	Number	000 ha	Number	000 ha
Prospecting Licences	7,106	897	7,265	910	6,834	851	6,605	825	6,018	741
Exploration Licences	6,050	52,205	6,969	60,396	6,503	52,895	5,723	45,059	4,983	37,419
Mining Leases	5,845	2,233	5,897	2,285	6,195	2,451	6,020	2,400	5,859	2,377
Other	2,995	4,926	3,157	5,323	3,377	5,486	3,507	5,857	3,598	6,045
Mineral Claims & Other 1904 Act	186	21	186	21	186	21	186	21	189	21
Total	22,182	60,282	23,474	68,935	23,095	61,704	22,401	54,162	20,647	46,603

Source: DMP

1.4 PETROLEUM TITLES

In June 2015, the total area covered by petroleum titles in force under Western Australian State legislation was 240,419 km².

State petroleum titles are administered under three different Acts:

1. The *Petroleum (Submerged Lands) Act 1982*, which generally applies to the State's territorial sea to the three nautical mile mark, including the territorial sea around State islands.
2. The *Petroleum and Geothermal Energy Resources Act 1967*, which generally covers all onshore areas of the State, including its islands.
3. The *Petroleum Pipelines Act 1969*, which applies to petroleum pipelines on land within the State.

Legislation	Title Type	Area	Blocks	Number of Titles
P(SL)A82		8,167.9156 km²	173	49
	Access Authority	459.4784 km ²	8	1
	Exploration Permit	3,884.0001 km ²	110	7
	Pipeline Licence	627.2761 km	0	25
	Production Licence	2,018.8048 km ²	31	10
	Retention Lease	1,098.6769 km ²	23	5
	Special Prospecting Authority	79.6793 km ²	1	1
PGERA67		225,744.9363 km²	2,837	103
	Access Authority	945.3949 km ²	15	3
	Exploration Permit	220,317.8334 km ²	2,746	73
	Petroleum Lease	260.1000 km ²	9	1
	Production Licence	3,445.0622 km ²	54	20
	Retention Lease	776.5458 km ²	13	6
PPA69		6,505.9073 km	9	97
	Pipeline Licence	6,505.9073 km	9	97
		240,418.7592 km²	3,019	249

2.1 OVERVIEW

The value of Western Australia's mineral and petroleum industry in 2014–15 was \$99.5 billion. This represents a fall of 19 per cent from the record \$122 billion in 2013–14.

A weakening Australian dollar helped to offset falling commodity prices and averaged 83.6 cents for the period (a nine per cent decrease). Traditionally perceived as a commodity currency, the Australian dollar decreased in line with falling commodity prices and to some extent shielded producers from lower prices. Increased output, the result of considerable investment in resource projects, particularly iron ore, also helped the end result.

As at September 2015, Western Australia has an estimated \$171 billion worth of resource projects under construction, or in the committed stage of development. A further \$110 billion is identified as planned or possible projects. These investment statistics, however, need to be interpreted with caution. The outlook for major projects will decline sharply during the next 18 months as several major, and high value, projects are completed.

For example, the Roy Hill iron ore and Gorgon LNG projects are expected to be completed later this year, resulting in almost \$80 billion worth of major projects dropping out of the major project figures. A further \$73 billion in projects in the under construction or committed category are expected to be completed in 2016.

Mineral sector highlights

Iron ore remained the State's highest value commodity, accounting for \$54 billion (71 per cent) of total mineral sales in 2014–15. Project expansions, together with strong demand led by China, supported iron ore in achieving record levels of export quantities. A total of 719 million tonnes was exported, an increase of 15 per cent on the previous financial year. However, the low iron ore price resulted in a decrease of 27 per cent in the value of iron ore sales for the year.

The US dollar gold price remained weaker throughout 2014–15 compared to the previous period, and averaged US\$1224 an ounce, down six per cent. In Australian dollar terms it averaged

A\$1464, a rise of four per cent. This resulted in total sales of \$9 billion for 2014–15, an increase of 1.5 per cent over the previous financial year, making gold the second most valuable mineral sector.

Alumina was the third most valuable mineral in 2014–15 reaching over \$5 billion, a 20 per cent increase over the previous year. The quantity sold was up marginally to 13.8 million tonnes. In US dollar terms, alumina prices rose by around seven per cent and 18 per cent in Australian dollar terms.

The State's fourth most valuable mineral sector was nickel. While the weakening Australian dollar resulted in producers receiving an increased price of around ten per cent, the quantity of nickel sales fell by almost 13 per cent to 183 thousand tonnes. This resulted in the total value of nickel sales falling seven per cent from \$3.4 billion in 2013–14 to \$3.2 billion in 2014–15.

The overall value of base metals (copper, lead and zinc) decreased by 11 per cent to just under \$1.7 billion in 2014–15. Copper dominates this group with total sales of \$1.3 billion, down 16 per cent on the previous financial year. Sales value of lead also decreased, from \$178 million to \$138 million. However, zinc output increased, by 43 per cent and its total sales value rose from \$118 million in 2013–14 to \$197 million in 2014–15.

The remaining mineral sales values comprised:

- mineral sands sales of \$443 million (down six per cent);
- salt sales of \$384 million (down eight per cent);
- diamond sales of \$337 million (down 15 per cent);
- coal sales of \$301 million (up 14 per cent); and
- cobalt sales, as a by-product of nickel mining, of \$210 million (up 16 per cent).

Petroleum sector highlights

Western Australia's petroleum sector, which comprises crude oil, condensate, LNG, natural gas and LPG (butane and propane) was valued at \$24 billion, a decrease of nine per cent on the previous year.

The value of the petroleum sector in 2014–15 was affected by declining crude oil prices, which averaged US\$85 per barrel for the first half of the financial year, before falling to an average of US\$53 per barrel

during the second half. This meant that despite increased production across most petroleum products, the value of petroleum sales was actually less.

LNG was the most valuable petroleum product in the State in 2014–15 with output increasing marginally to reach a record 20.4 million tonnes. Price affected the overall sales value of LNG, which decreased by four per cent from last financial year to \$13.8 billion. LNG production is forecast to grow in the period ahead with supply from new projects coming onstream, including Gorgon and Wheatstone.

Production of crude oil, the second most valuable petroleum product in 2014–15, rose by seven per cent to 49 million barrels, but sales value fell 22 per cent to \$4.5 billion. This decline in value is the result of a significant fall in crude oil prices in late 2014. Despite some small price recoveries, the crude oil price remains low overall compared to this time last year.

Similarly for condensate, its sales value decreased by 14 per cent to \$3.4 billion, despite output rising to over 42 million barrels.

In 2014–15, domestic natural gas was the only petroleum sector that experienced a rise in sales value. Production increased marginally, by one per cent, to 9.8 billion cubic metres and the value of sales rose seven per cent to \$1.8 billion. This reflected an increase of six per cent in the average natural gas price achieved for the period.

Output of LPG (butane and propane) decreased by nine per cent with the sales value also decreasing to \$415 million, down 29 per cent on the previous financial year.

Western Australia's mineral and petroleum resources, in order of value for 2014–15, were:

Commodity	\$A Billion
Iron Ore	53.8
LNG	13.8
Gold	9.0
Crude Oil and Condensate	7.9
Alumina	5.0
Nickel	3.2
Others	6.8
Total	99.5

RESERVE BANK OF AUSTRALIA (RBA) COMMODITY PRICE INDEX

The Reserve Bank of Australia Commodity Price Index is based on the price of 20 major commodities exported by Australia. These commodities collectively account for around two-thirds of total commodity exports. The index is apportioned into three sections – rural, non-rural and base metals.

The non-rural section of the index comprises base metals (which consist of aluminium, copper, nickel, zinc and lead), as well as gold, coking coal, steaming coal, iron ore, alumina, crude oil and LNG. The index is compiled monthly and is expressed in US dollars, Australian dollars and Special Drawing Rights (SDR).

The RBA's index, expressed in US dollar terms, is useful because most commodities traded in world markets are in US dollars. However, such an index is subject to changes in the US dollar exchange rate (as it is based on spot prices). In this respect, the SDR index is a better indication of underlying supply and demand for commodities than the US dollar index.

SDR is a unit of account used by the International Monetary Fund (IMF). Its value is based on a basket of currencies comprising the euro, Japanese yen, English pound and US dollar. Weights are assigned to each of these currencies to reflect their relative importance in world terms. The RBA expresses the SDR component of its index in US dollar terms, with commodity prices derived from the London Metal Exchange and Bloomberg and converted to monthly averages of daily data.

Alternatively, the Australian dollar index is useful for gauging the domestic currency price received by Australian commodity exporters, as it reflects the interrelation between world commodity prices and the Australian exchange rate. For example, if prices in foreign currency terms remain unchanged but the Australian dollar depreciates, this will be recorded as a favourable upward shift in the index – which would not be evident in either the SDR or US dollar index.

The RBA index is a fixed-weight Laspeyres index, using 2008–09 as the base year. The index is re-based periodically in order to make long-run reliable comparisons, unlike the national accounts that are re-based annually to track short-run movements. Base-period weights indicate the relative importance given to individual commodities. These weights change over time to reflect changes in the composition of commodity exports. Movements in the index from one period to the next reflect underlying price movements and do not take into account changes in volumes.

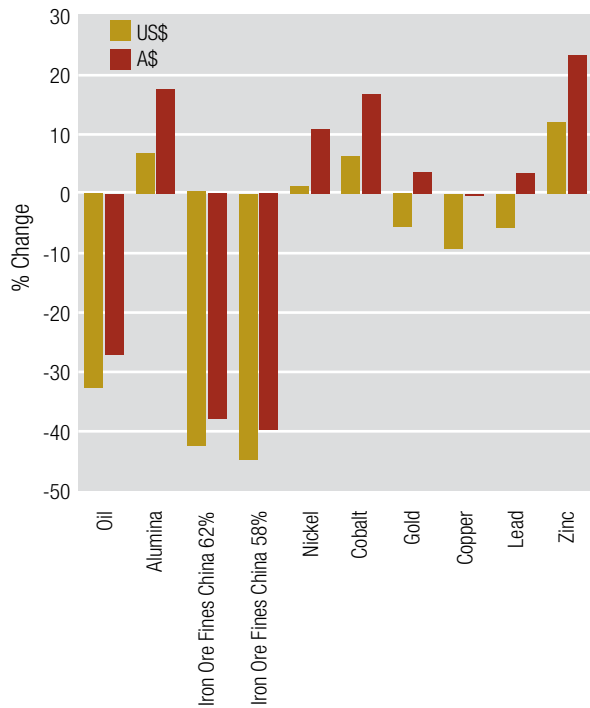


Figure 3 **Average Price Comparison 2013–14 and 2014–15**
 Source: LME, Kitco, Metal Prices, WATC and DMP

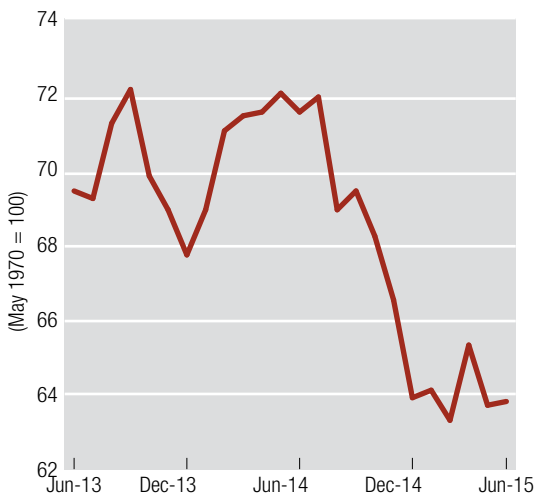


Figure 4 **Exchange Rate Trade-Weighted Index (units of foreign currency per A\$)**
 Source: Reserve Bank of Australia

Definition: "Trade-weighted index" is the average value of A\$ in relation to the currencies of Australia's major trading partners.

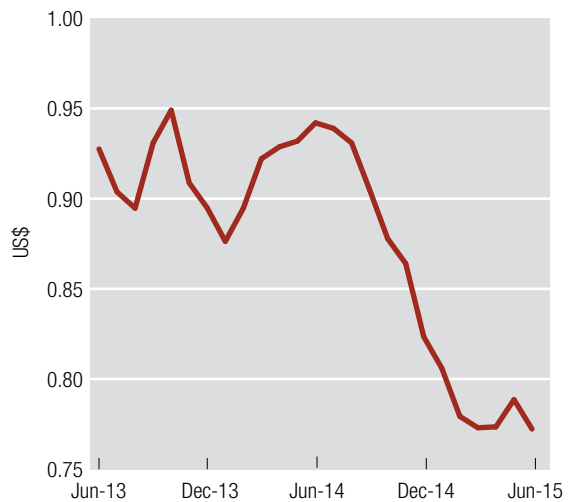


Figure 5 **Exchange Rate US\$/A\$**
 Source: Reserve Bank of Australia

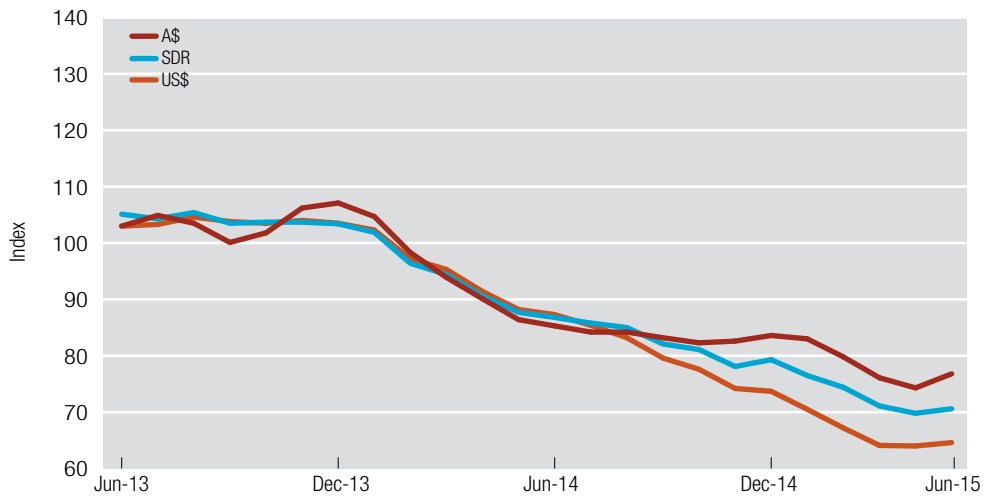


Figure 6 | **Non-rural Commodity Price Index (2013-14 = 100)** Source: Reserve Bank of Australia

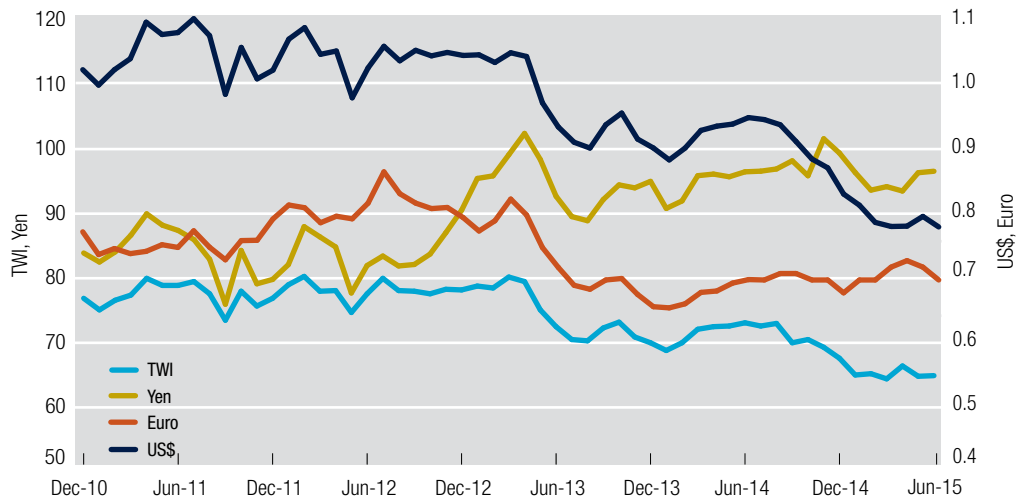


Figure 7 | **Australian Dollar Exchange Rate against Major Currencies (May 1970 = 100)** Source: Reserve Bank of Australia

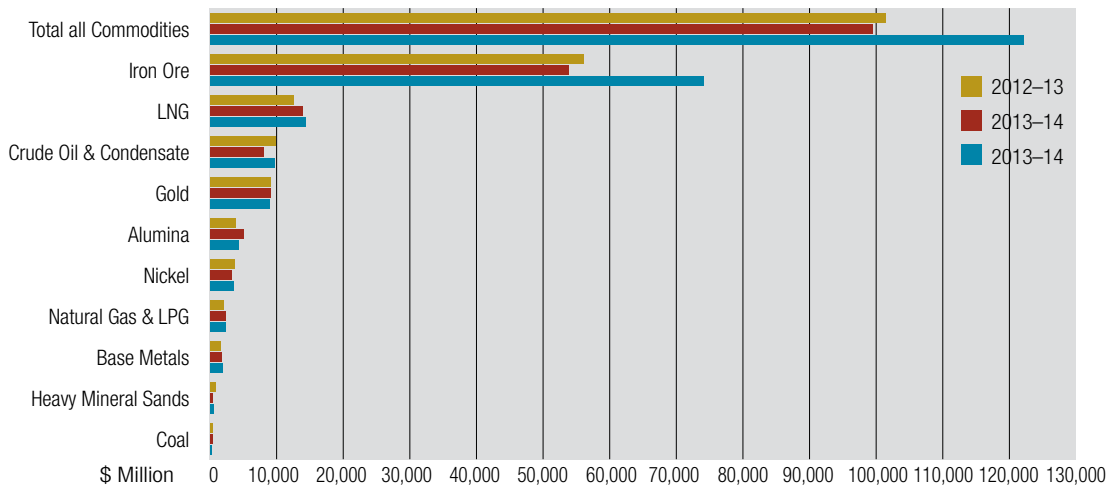


Figure 8 | **Major Commodities by Value** Source: DMP

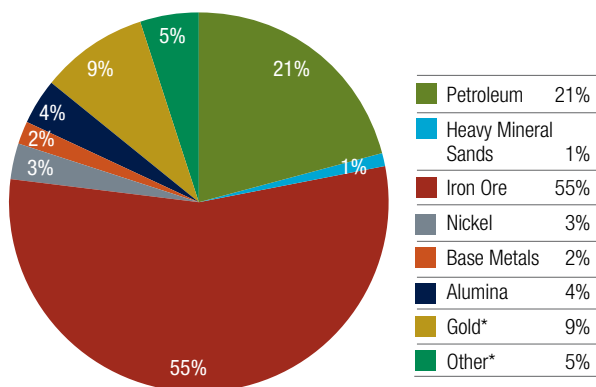


Figure 9 Western Australian Mineral and Petroleum Exports 2014–15 – Total Value \$93.5 Billion Source: DMP
 * Includes \$4.3 billion of gold and \$241 million of heavy mineral sands refined/processed and exported from Western Australia, but produced from mining operations in other States, Territories and overseas.

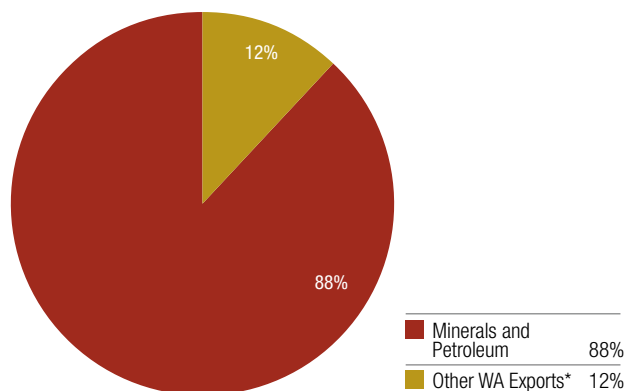


Figure 10 Western Australian Merchandise Exports 2014–15 \$110.7 Billion Source: DMP and ABS
 Other includes wheat, wool, wood chips, live animals, seafood, meat, pearls and other agricultural and manufactured items.
 * Includes \$4.3 billion of gold and \$241 million of heavy mineral sands refined/processed and exported from Western Australia, but produced from mining operations in other States, Territories and overseas.

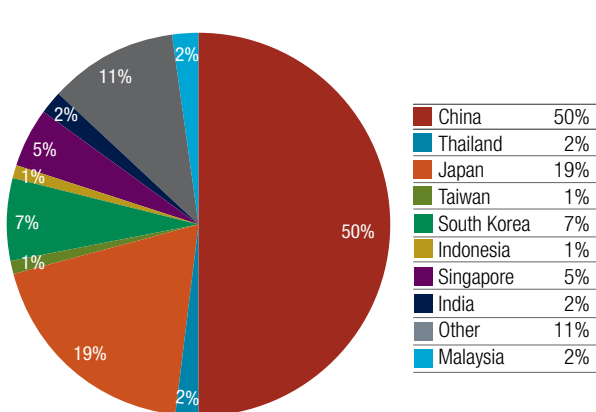


Figure 11 Western Australian Merchandise Exports by Country 2014–15 – \$111 Billion Source: ABS

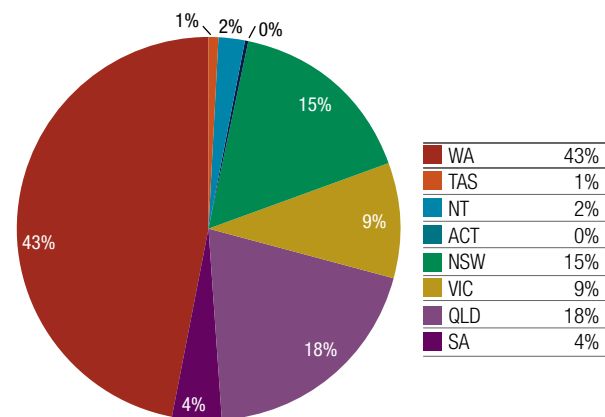


Figure 12 Australian Merchandise Exports 2014–15 \$255 Billion Source: ABS
 Note: These percentages are based on data which includes \$16.6 billion of re-exported goods and of no State origin available and account for around 6% of the total.

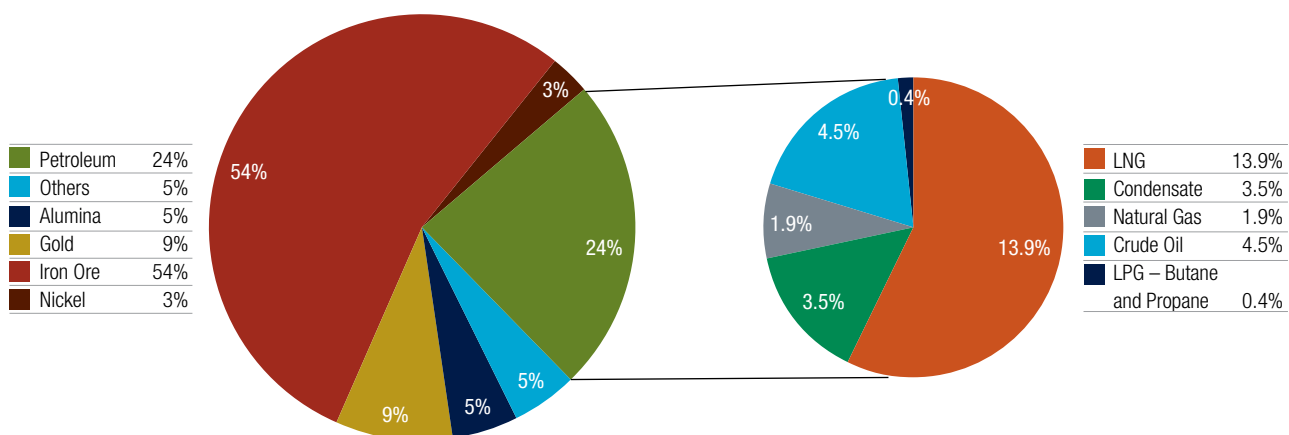


Figure 13 Value by Commodity 2014–15 – \$99.5 Billion Source: DMP

2.2 IRON ORE

Pricing

A drop in Chinese steel production, and increased supply from the major producers in Australia and Brazil, contributed to the lower prices throughout 2014–15.

The iron ore price reached an average monthly low of US\$49 per tonne in April 2015 – its lowest level in 10 years – followed by a modest recovery and stabilisation at around US\$61 per tonne during June 2015. Year on year, the iron ore price fell from an average of US\$123 per tonne to US\$70 per tonne. This is a fall of around 43 per cent in US dollar terms.

For Western Australian producers, the fall in the price of iron ore was partially offset by a weakening in the value of the Australian dollar relative to the US dollar. The Australian dollar averaged US\$0.84 for 2014–15, down from US\$0.92 in 2013–14. As a result, in Australian dollar terms, the iron ore price fell by almost 38 per cent (from an average of A\$134 to A\$83 per tonne) between 2013–14 and 2014–15, compared to the 43 per cent drop in US dollar terms.

Production and value

The volume of Western Australian iron ore sales in 2014–15 was another record at 719 Mt, a significant increase on 2013–14 (up from 624 Mt, or 15 per cent). The growth in the quantity of sales was principally driven by the completion of major project expansions by the State's major producers, as well as increased production, to take advantage of production cost efficiencies.

The overwhelming majority of the State's iron ore sales volumes in 2014–15 were from mines based in the Pilbara region with Rio Tinto Limited, BHP Billiton Limited and Fortescue Metals Group (together with its joint venture partners), accounting for 665 Mt or 93 per cent of the total quantity of sales of iron ore.

In 2014–15, the value of Western Australian iron ore sales was \$53.8 billion. This was down by 27 per cent from the 2013–14 record of \$74.1 billion, and its lowest level since 2009–10.

Despite the fall in the value of sales, the iron ore sector continued to be Western Australia's most valuable commodity. In 2014–15, it accounted for 54 per cent of the total value of the State's mineral and petroleum sales.

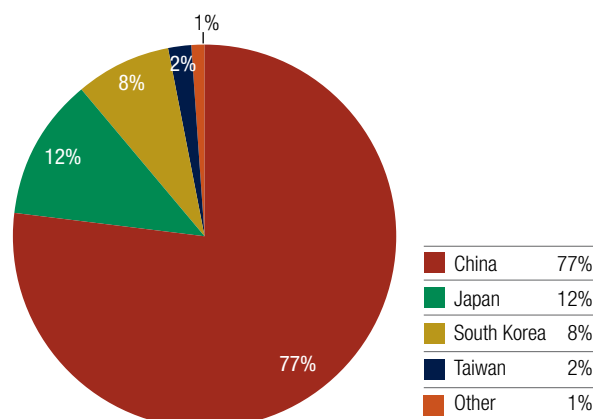


Figure 14 | **Iron Ore Exports – Total Value \$53.3 Billion**
Source: ABS

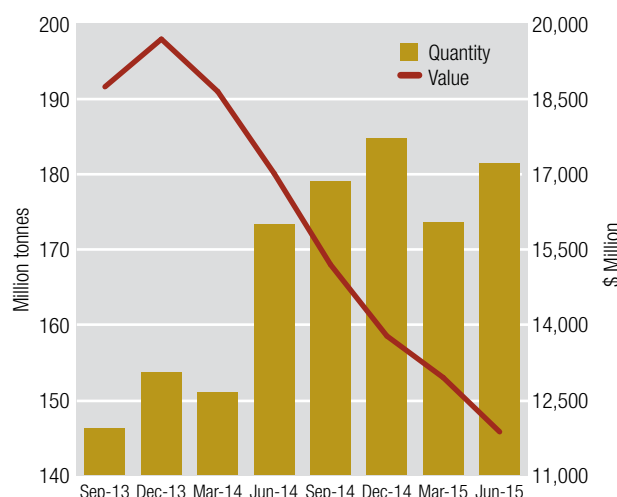


Figure 15 | **Iron Ore Quantity and Value by Quarter**
Source: DMP

The major share (77 per cent or \$41 billion) of Western Australia's total iron ore shipped was exported to China. Other major export markets comprised Japan (13 per cent), South Korea (eight per cent) and Taiwan (two per cent).

Notable events

Direct shipped ore (DSO)

In 2014–15, the iron ore sector continued its transition from the construction to the production phase.

The State's major iron ore producers largely completed the last of their significant expansion projects and shifted to optimising the productivity of existing assets.

Rio Tinto completed its phase two expansion of ports, rail and power supplies to increase capacity to 360 Mt/a in the first half of 2015. The company also completed a series of brownfields expansions, principally at its West Angelas, Nammuldi and Brockman mines, in the first half of 2015. The development of the greenfields Silvergrass iron ore mine was deferred again in 2014–15.

BHP Billiton continued with phase two of the ramp-up of its Jimblebar mine to 60 Mt/a, while also announcing a deferral of its Inner Harbour debottlenecking project, and a focus on optimising output from its mines and logistics infrastructure, to achieve its stated production goal of 290 Mt/a.

Development of the 55 Mt/a Roy Hill iron ore project continued during 2014–15, with plans for exports to begin in late 2015. The project is a joint venture of Hancock Prospecting Pty Ltd (70 per cent) and a consortium comprising POSCO, Marubeni Corporation and China Steel Corporation (30 per cent).

In the lower price environment of 2014–15, cost pressures impacted on the viability of the State's smaller junior producers, resulting in some job losses.

While several smaller iron ore miners were able to successfully reduce costs and improve productivity, several other mines were closed.

The junior iron ore industry was supported through a range of State Government temporary financial assistance measures. These included a 50 per cent royalty rebate on eligible hematite iron ore royalties, and a relief package to lower port charges at the Utah Point Bulk Handling Facility for a period of 12 months.

Mount Gibson Mining Limited closed its Tallering Peak mine following the exhaustion of the resources (located 175 km east of Geraldton) in September 2014. In late November 2014, the main pit at its Koolan Island mine (located in Yampi Sound off the Kimberley coast) was flooded due to a breach of the main sea wall.

Pluton Resources Limited, the operator of the Cockatoo Island project (located 200 km north of Broome in the Kimberley region), experienced a range of administrative and financial issues during 2014–15. As a result, full-time operations at Cockatoo Island were temporarily suspended between October 2014 and November 2014, and again in June 2015.

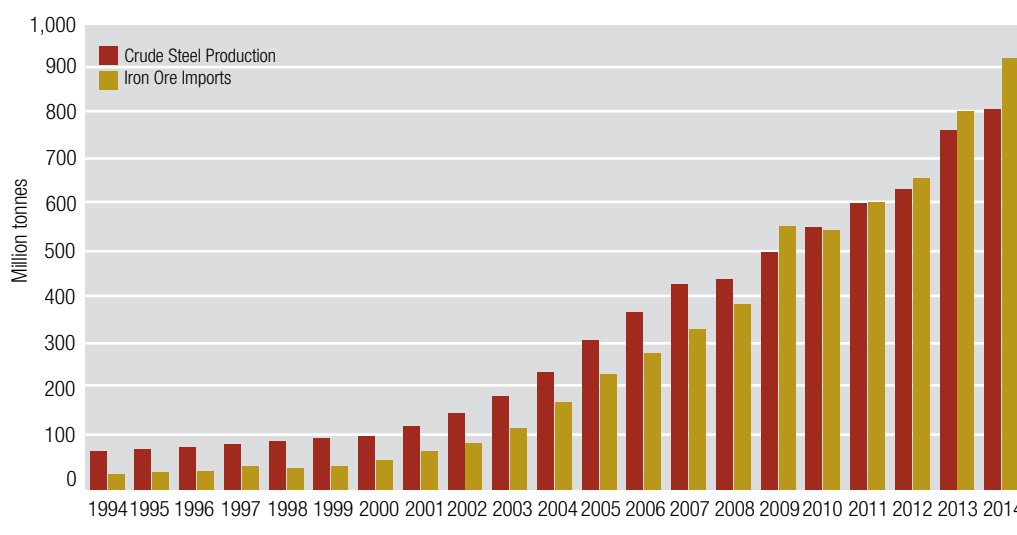


Figure 16 | **China's Crude Steel Production and Iron Ore Imports**

Source: TEX Report, Interfax China Ltd and SteelHome

In February 2015, Kimberley Metals Group Pty Limited placed its Ridges iron ore project (165 km south of Wyndham in the Kimberley region) into care and maintenance, following completion of mining of high grade reserves.

Atlas Iron Limited placed its Mt Webber and Wodgina mines on care and maintenance in April 2015. Atlas has since implemented a number of cost-cutting initiatives and resumed mining at Mt Webber in July 2015.

Also in April 2015, Sinosteel Midwest Corporation Limited announced it was placing its Blue Hills project, located approximately 70 km east of Koolanooka and comprising two open pits at Mungada East and Mungada West, into care and maintenance.

Magnetite ore

Western Australia’s extensive reserves of magnetite, combined with China’s preference for magnetite (given its well-established technology for producing

steel from magnetite), has seen Chinese producers supporting the development of a number of magnetite projects in the State.

The State’s largest magnetite mining and processing operation, CITIC Pacific Limited’s Sino iron project at Cape Preston (100 kilometres south-west of Karratha), ramped up production in 2014–15. CITIC Pacific is also proceeding with the construction and commissioning of four new production lines at its Sino iron project.

The Karara iron project (a 48:52 joint venture between Gindalbie Metals Limited, Anshan Iron and Steel Group Corporation) achieved commercial production during the December 2014 quarter. The site was the first project in Western Australia to produce (in November 2012) and export (in January 2013) magnetite.

Both the Sino and Karara projects qualified for the Western Australian Government’s magnetite financial assistance program. This program provides eligible producers with a 50 per cent rebate on royalties paid between 8 April 2013 and 8 April 2016.

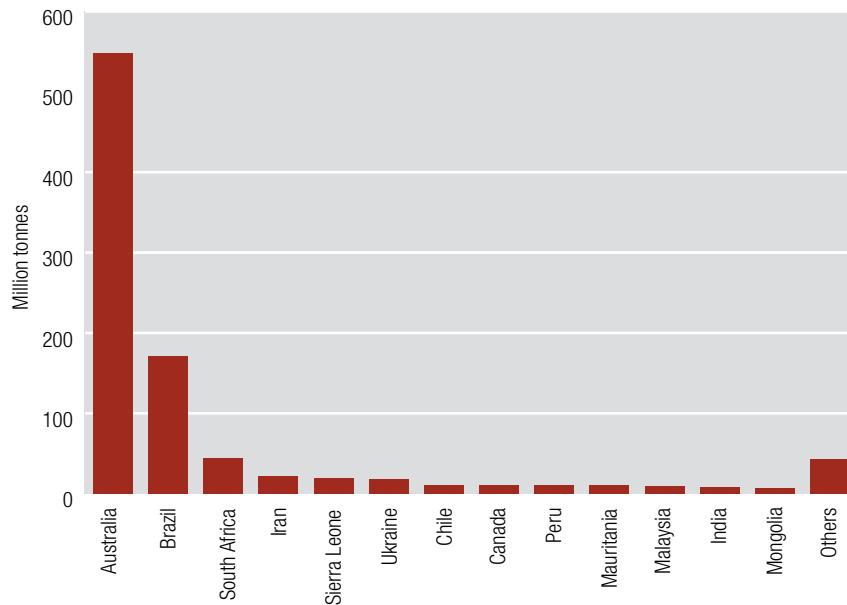


Figure 17 | **China’s Iron Ore Imports by Country for 2014** Source: TEX Report

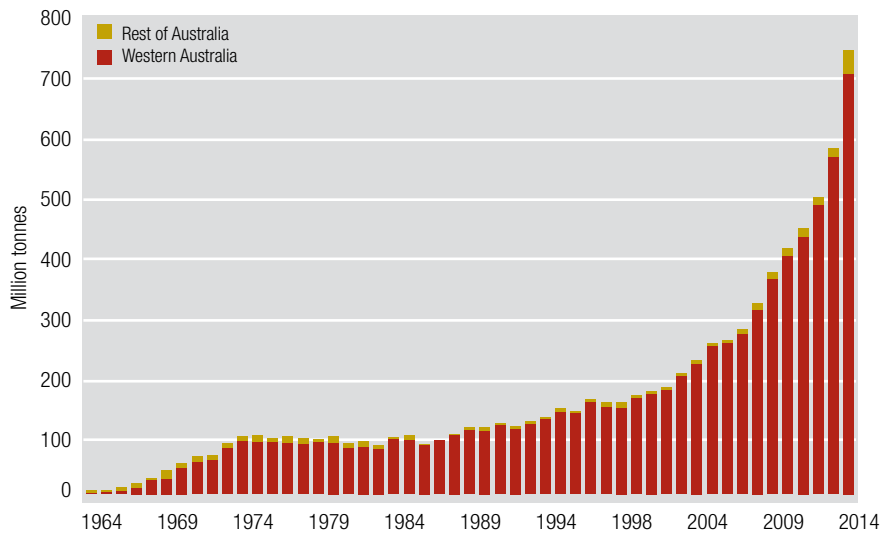


Figure 18 | **Iron Ore Quantity** Source: DMP and DIS

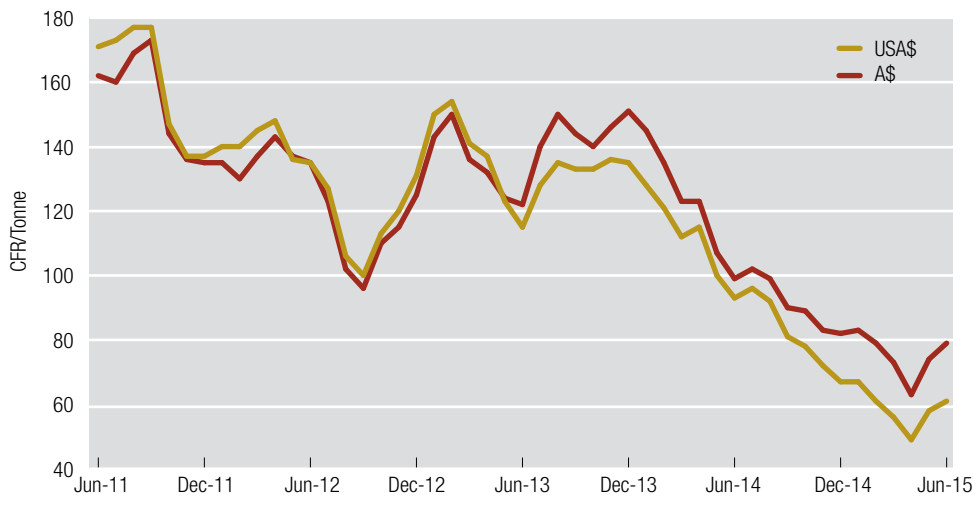


Figure 19 | **Iron Ore Fines (Average price 62% Fines CFR China)**
Source: Metalprices.com

2.3 PETROLEUM

The value of petroleum products produced in State areas (onshore and offshore), and in adjacent Commonwealth offshore areas, together amounted to \$24 billion in 2014–15. Petroleum production from these areas represented almost a quarter (24 per cent) of the total value of mineral and petroleum sales for Western Australia, making petroleum the second most valuable commodity after iron ore.

At a national level, Western Australia remains the nation's premier petroleum producer, accounting for 63 per cent of natural gas production¹ and 62 per cent of crude oil and condensate production.

The quantity of most petroleum products remained relatively steady, except for crude oil which rose by seven per cent, and condensate which increased by over 20 per cent. Petroleum sales decreased overall by nine per cent primarily due to the fall in oil prices. The impact of volatile oil prices is discussed further below.

Japan remained the primary export destination for petroleum, with close to two thirds of the total value or \$12.6 billion exported there. South Korea and China followed with 11 and ten per cent of petroleum exports respectively.

2.3.1. Liquefied natural gas (LNG)

Pricing

A large proportion of LNG contracts are benchmarked to the oil price, so the fall in oil prices has had some impact on LNG contracts. Contract prices for LNG have fallen significantly over the past six months. The average price for LNG delivered to Japan was US\$17.02 per gigajoule in June 2014, compared with US\$9.42 in June 2015.

Spot prices have also fallen significantly over the last year. The US Henry Hub spot price fell from US\$4.87 per gigajoule to around US\$2.98 per gigajoule in June 2015.

Before the oil price fall, buyers were seeking US contracts based on Henry Hub prices, rather than oil-linked contracts. With the fall in oil prices, however, this is changing.

Production and value

LNG is currently produced from the North West Shelf Joint Venture project and Woodside's Pluto project, which were commissioned in mid-2012. While these projects are located in Commonwealth offshore areas, the North West Shelf Joint Venture project is unique in that Western Australia receives, in the form of a grant, 65 per cent of the royalties collected by the Australian Government via a long-standing agreement.

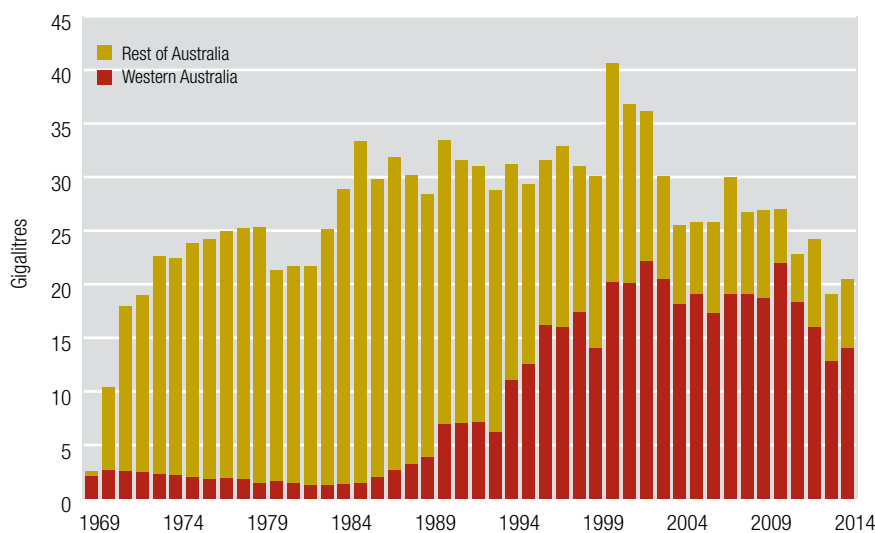


Figure 20 | Crude Oil and Condensate Quantity Source: DMP, DIS and EnergyQuest

¹ including natural gas, coal seam methane and LNG feedstock

In 2014–15, LNG output rose marginally by two per cent, to a record 20.4 Mt. However, the total sales value fell by four per cent to \$13.8 billion due to the fall in oil and gas prices.

Notable events

Global LNG supply has been tight in recent years, but following a strong period of investment projects are beginning to come online.

Despite the recent fall in LNG prices, US LNG producers are still expanding capacity. There are five liquefaction plants under construction in the US with a total capacity of 62 Mt. These are expected to be completed by 2020.

Locally, the North West Shelf Joint Venture participants approved the development of the Persephone Project in November 2014. The project involves a subsea tie-back from the Persephone field to the North Rankin Complex, which is located approximately 8 km north-east of the field. The first gas produced is scheduled for 2018.

Given recent delays due to industrial relations issues at the Gorgon project, the first LNG shipment is now expected in 2016. When fully operational in 2018, Gorgon will have an annual capacity of 15.6 million tonnes of LNG. The Wheatstone project, which is currently over 65 per cent complete, and the Prelude LNG project are both expected to begin operations in 2017. These projects will add 8.9 and 3.6 million tonnes respectively of LNG a year when at full capacity in 2018–19.

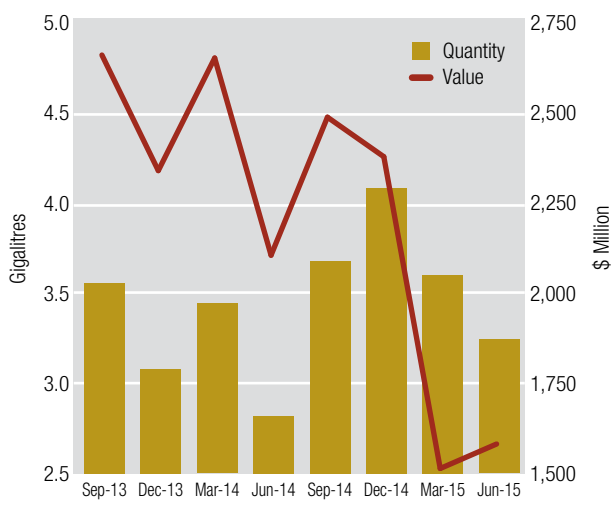


Figure 21 | **Crude Oil and Condensate Quantity and Value by Quarter** Source: DMP

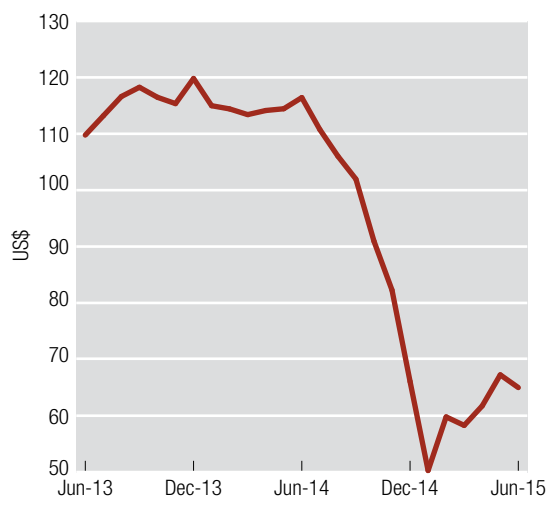


Figure 22 | **Tapis Crude Oil Price US\$/bbl** Source: WA Treasury Corporation

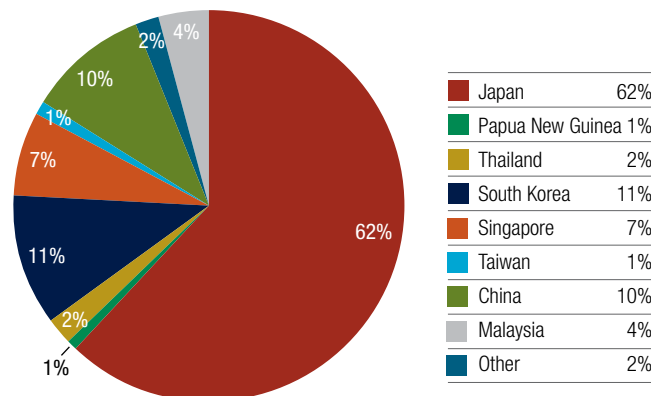


Figure 23 | **Petroleum Exports – Total Value \$20.2 Billion** Source: DMP and ABS

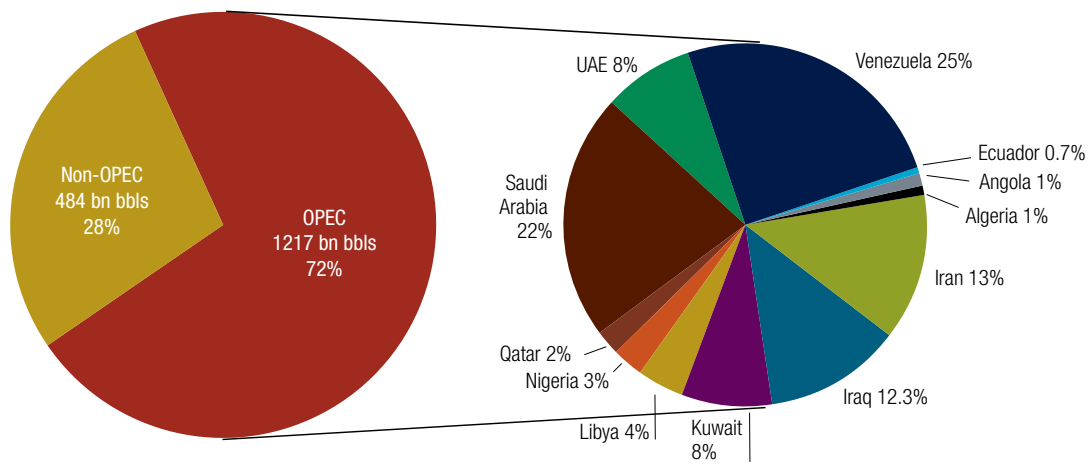


Figure 24 | OPEC Share of World Crude Oil Reserves 2014 Source: BP World Energy Statistics 2015

Other notable projects include:

- the US\$29 billion Chevron-led Wheatstone LNG project
- Woodside's newly acquired Julimar and Brunello fields, which will supply Wheatstone's operations
- the Browse joint venture between Woodside, Shell, BP Developments Australia Pty Ltd, Japan Australia LNG (MIMI Browse) Pty Ltd and PetroChina International Investment (Australia) Pty Ltd. This project is developing the Brecknock, Calliance and Torosa gas and condensate fields.

2.3.2. Crude oil and condensate

Pricing

During 2014–15, the price of oil, based on a combination of Brent, West Texas Intermediate (WTI) and Tapis, averaged US\$73/bbl. This represented a 33 per cent decrease compared to the equivalent average price in 2013–14.

The steady decline in oil prices follows nearly five years of price stability. The fall can be attributed to a number of factors including OPEC failing to reach agreement on production limits, weakening economic conditions in China and the prospect of increased supply from Iran.

Production and value

Based largely on the falling oil prices, the value of crude oil sales fell 20 per cent from \$5.7 billion in 2013–14 to \$4.5 billion in 2014–15. This fall was despite a seven per cent increase in production from 7.3 million kL in 2013–14 to 7.8 million kL in 2014–15.

ORGANISATION OF PETROLEUM PRODUCING COUNTRIES

OPEC is a permanent intergovernmental organisation of twelve oil-exporting developing nations that coordinates and unifies the petroleum policies of its member countries.

There are currently 12 member countries of OPEC comprising Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates and Venezuela.

Most OPEC oil is produced for export whereas many non-OPEC countries, such as the US, produce oil primarily to meet their domestic demand for petroleum.

Non-OPEC countries account for less than a quarter of the world's proven oil reserves, but produce 41 per cent of the world's oil. They also possess the majority of the world's capacity for refining crude oil into petroleum products such as petrol and heating oil.

Western Australia's major crude oil producers are located in the Carnarvon Basin off the north-west coast, with other operations located in the Perth and Canning Basins. A small amount of the State's crude oil and condensate production stems from onshore projects.

The major producers include Woodside Pty Ltd, BHP, Apache Energy Ltd, Santos Ltd, Chevron Texaco Pty Ltd, ROC Oil, Quadrant Energy Pty Ltd, Buru Energy Ltd, Empire Oil and Gas, Origin Energy Resources Ltd and AWE Energy Ltd.

As a by-product from natural gas fields, nearly all condensate production comes from fields located on the North West Shelf. In 2014–15, a total of 6.8 million kL of condensate was sold representing an increase of 21 per cent from 2013-14.

The total sales value of condensate was \$3.5 billion in 2014–15, a fall of 14 per cent from the previous year.

The North West Shelf Joint Venture (Angel, Athena, Goodwyn, Hermes, North Rankin and Wanaea) accounted for 92 per cent of total condensate production in 2014–15.

The volume of LPG (butane and propane) sold in 2014–15 fell by nine per cent to 553,055 kL, with the total value of LPG sales falling by 31 per cent to \$405 million.

Notable events

Quadrant Energy Pty Ltd, in a joint venture with INPEX Corporation, has developed its Coniston–Novara oilfields which are located in the Exmouth Sub-basin and lie just north of the Van Gogh field. The two fields are tied back to infrastructure already in place for Van Gogh and will use the Ningaloo Vision floating production, storage and offloading vessel. Production commenced in May 2015, with estimated reserves at Coniston of 15.7 MMbbl.

2.3.3. Domestic natural gas supply

Pricing

The average price of gas sold into the Dampier to Bunbury Natural Gas Pipeline (DBNGP) in Western Australia rose by six per cent in 2014–15, to \$4.96/GJ. This represents an average increase of six per cent per year during the last five years.

Production and value

The quantity of natural gas supplied into the domestic market in 2014–15 rose marginally by 1.4 per cent to 9.9 Bcm.

The value of domestic gas sales is based on the total of sales values at the points of entry into the DBNGP, Parmelia pipeline and Goldfields pipeline. The value of domestic gas sales increased by seven per cent to reach \$1.9 billion, up from \$1.7 billion in 2013–14.

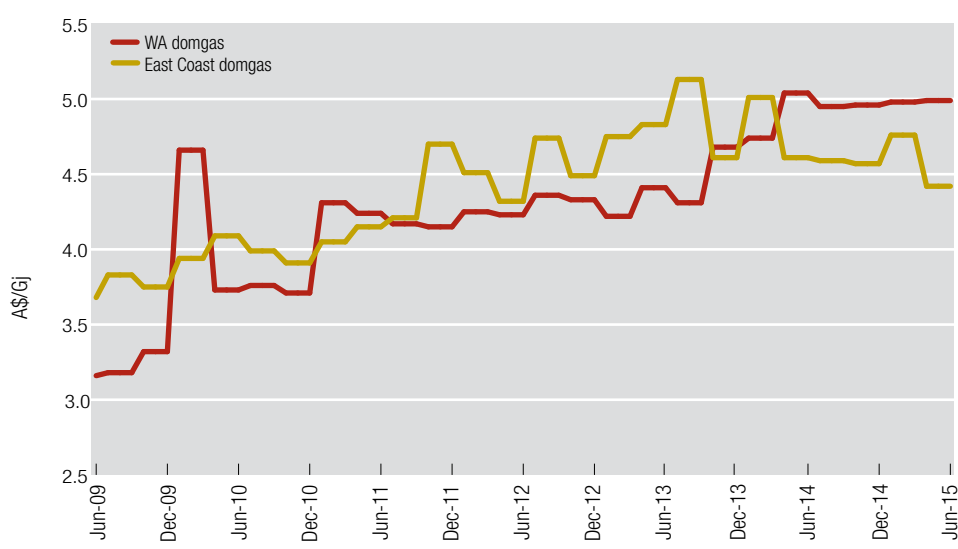


Figure 25 | Average Natural Gas Prices Source: EnergyQuest and DMP

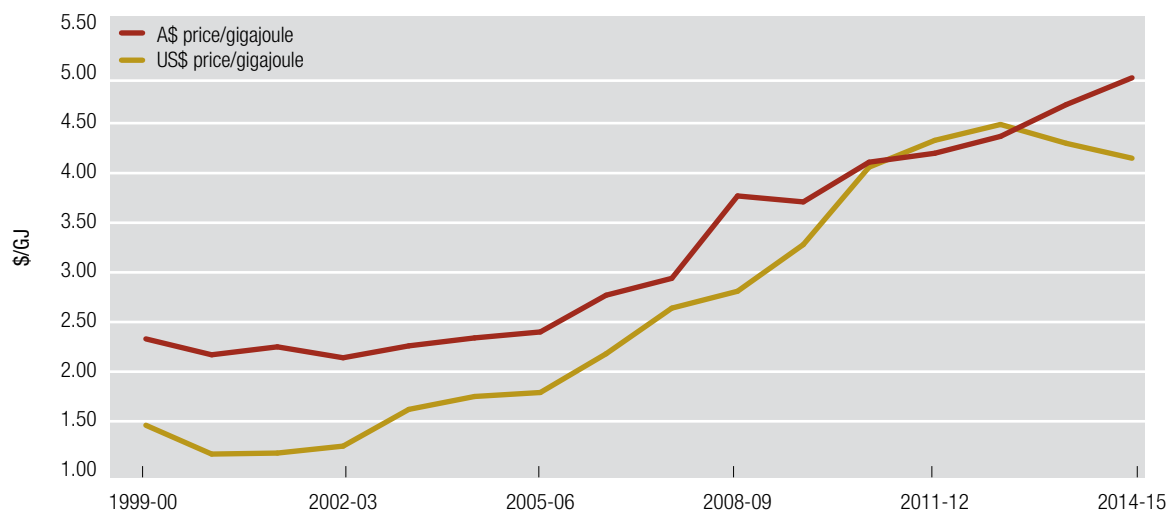


Figure 26 | **Western Australian Average Domestic Natural Gas Price** Source: DMP
 The value of Western Australian domestic gas sales is based on the summation of total domestic gas sale values as at the point of entry into the Dampier To Bunbury Natural Gas Pipeline (DBNGP) or where applicable, the Parmelia pipeline and Goldfields pipeline.

The North West Shelf Joint Venture (Angel, Cossack, Goodwyn, Hermes, North Rankin and Wanaea) accounted for 47 per cent (4.6 Bcm) of domestic gas in 2014–15. Quadrant Energy (Harriet, John Brookes and Reindeer – Devil Creek) was the second largest producer of domestic gas in 2014–15 at almost 29 per cent. BHP Billiton’s Macedon field which opened in September 2013 followed in third place.

Production from Empire Oil & Gas, AWE Exploration Ltd, and Origin Energy Resources Ltd made up the balance of Western Australia’s domestic supply.

Notable events

In March 2015, the *North West Gas Development (Woodside) Agreement Act 1979* was amended to approve the continued export of LNG and secure new domestic gas supply for the State. In line with the Western Australian Domestic Gas Reservation Policy, the North West Shelf Joint Venture will reserve 15 per cent of gas from the Persephone field in addition to the Greater Western Flank Phase 2 development for the domestic market, or about 100 TJ/d for about a decade.

Phase 2 of the Greater Western Flank development is yet to be approved by the North West Shelf joint venture participants.

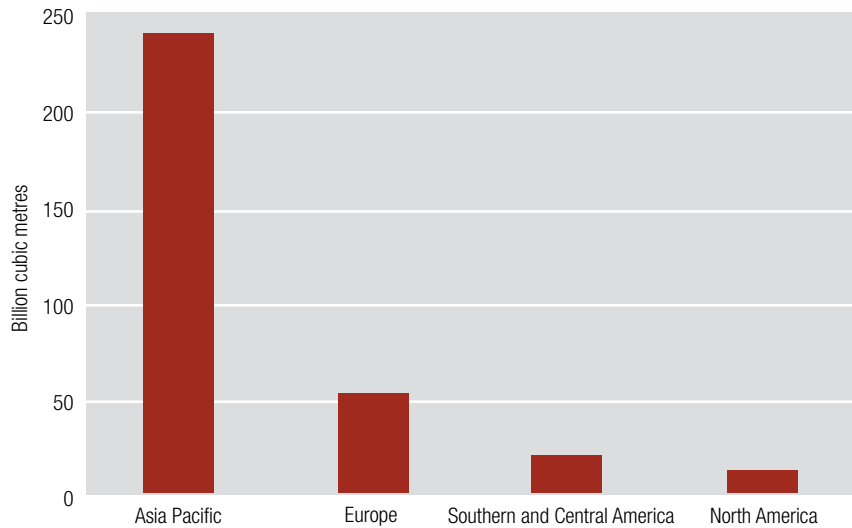


Figure 27 | **World LNG Imports by Region 2014**
Source: BP World Energy Statistics 2015

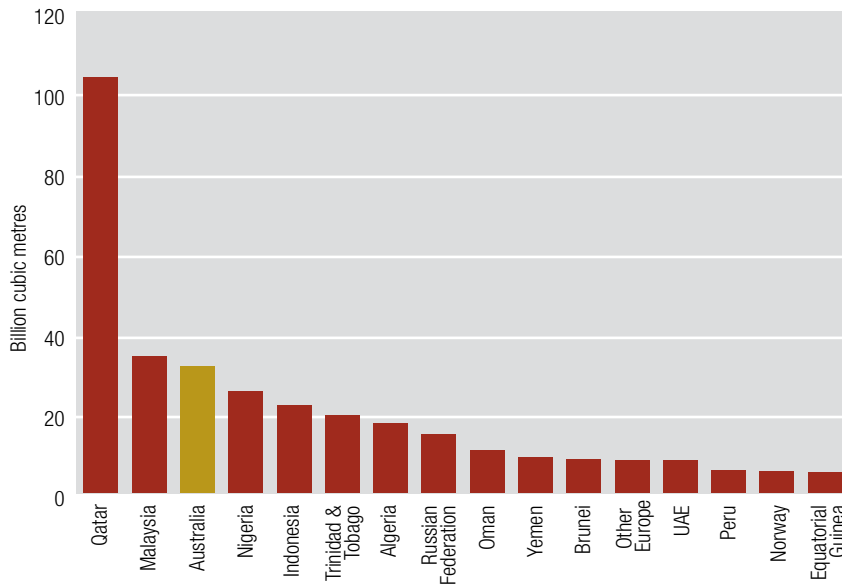


Figure 28 | **World LNG Rankings 2014**
Source: BP World Energy Statistics 2015

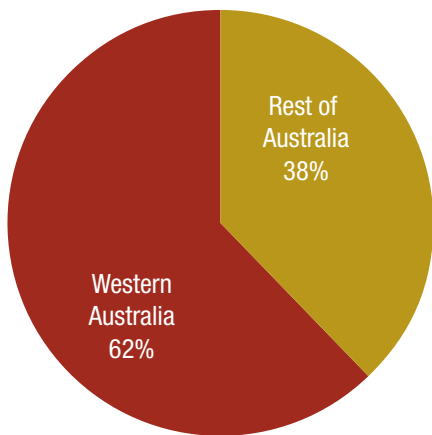


Figure 29 | **Crude Oil and Condensate Production 2014–15**
Source: EnergyQuest

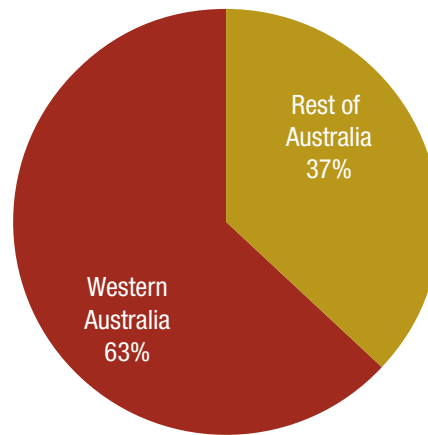


Figure 30 | **Natural Gas Production 2014–15**
Source: EnergyQuest

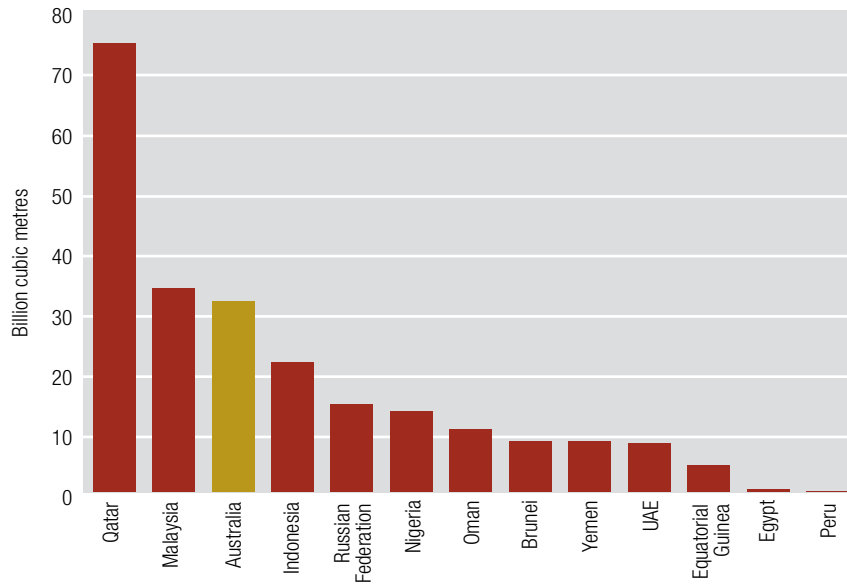


Figure 31 | **Asia-Pacific Region LNG Imports 2014 by Exporting Country**
Source: BP World Energy Statistics 2015

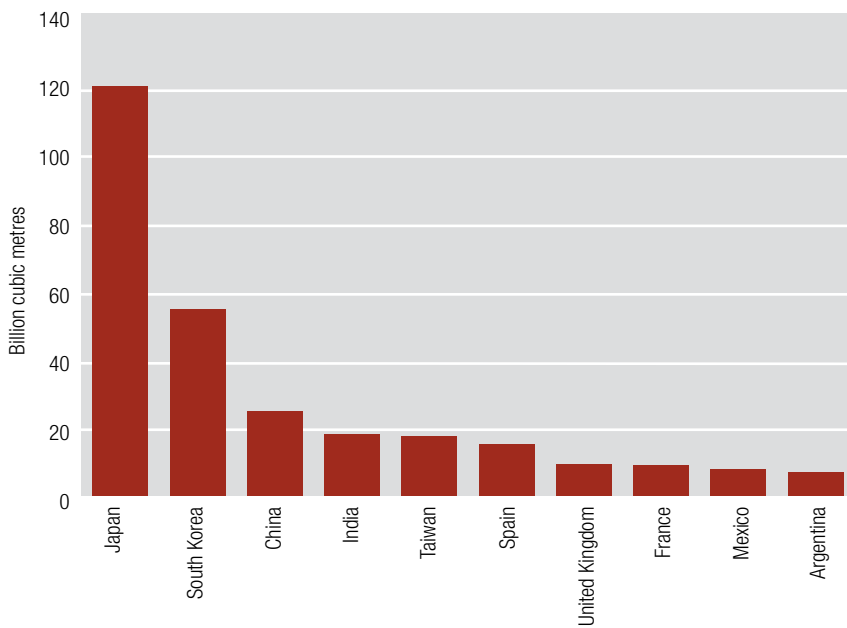


Figure 32 | **Countries Importing LNG in 2014**
Source: BP World Energy Statistics 2015

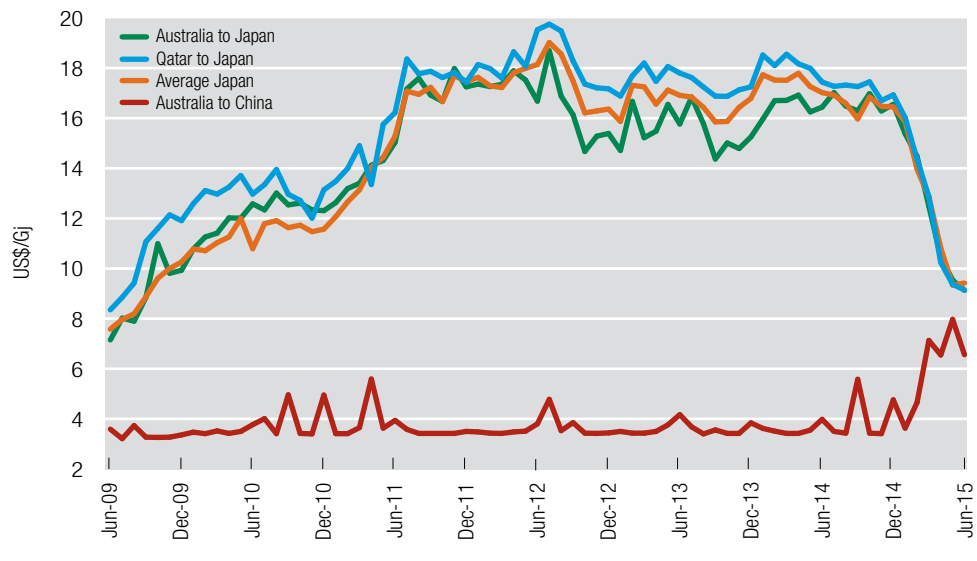


Figure 33 | **LNG Import Prices** Source: Argus Monthly LNG (Prices include freight and regassing)



LNG tanker at loading terminal.

© Woodside Energy Ltd

2.4 GOLD

Pricing

The gold price averaged US\$1224/oz in 2014–15. This represented a six per cent decrease from 2013–14's average. The devaluation of the Australian dollar over the period has meant that in Australian dollar terms, the gold price averaged \$1464/oz, which was just over a three per cent rise on the previous year.

In Australian dollar terms, prices have increased an average of ten per cent since 2005. After a brief fall in November 2014, the price received for Australian gold rose 13 per cent from \$1371/oz to just under \$1545/oz by the end of the financial year.

Production and value

Western Australia is Australia's major gold producer, accounting for just over 70 per cent of total gold production. While Western Australian output decreased by just over two per cent on the previous financial year to 6.15 Moz (191.3 t), the total value of sales, at \$9 billion, was 1.5 per cent higher. This increase was due to an 18 per cent fall in the Australian dollar over the period.

Gold sales in 2014–15 presented nine per cent of all mineral and petroleum sales in Western Australia.

The top eight producers accounted for 56 per cent of the total production. These included:

- Boddington Gold (12 per cent with 23.6 tonnes, up one per cent from the previous year);
- KCGM (nine per cent with 18.2 tonnes, down one per cent from the previous year);
- Newcrest (just over eight per cent with 16.2 tonnes, down one per cent from the previous year);
- Tropicana (eight per cent with 15.3 tonnes, up two per cent from the previous year);
- St Ives (six per cent with 11 tonnes);
- Granny Smith (five per cent with five tonnes);
- Gwalia (four per cent with 4.1 tonnes, up one per cent from last year); and
- Sunrise Dam (four per cent with 3.6 tonnes, down one per cent from last year).

GOLD EXPORT UPDATE 2014–15

The Australia Bureau of Statistics (ABS) release Western Australian export trade data which shows exports of gold that are significantly higher than gold produced in this State. This apparent increase in gold exports from Western Australia is due to a restructuring of Australia's gold refining industry in the late 1990's through to October 2002. Gold export data published by the ABS must therefore be interpreted with some caution.

Gold Corporation, or as it is more commonly known, The Perth Mint, operates Australia's only London Bullion Market Association (LBMA) accredited gold refinery. It refines gold produced in other States and Territories, gold from surrounding countries and also secondary gold, mainly from Asia, which is refined and exported from Western Australia.

This export figure for Western Australia is therefore larger than Western Australia's own level of gold production.

The Victorian refinery still refines silver and jewellery products.

The ABS estimates that gold exports from Western Australia in 2014–15 amounted to approximately \$13 billion. Approximately 69 per cent or \$9.02 billion was gold produced in Western Australia. The remaining 31 per cent (approximately \$3.98 billion) can be attributed to gold refined and exported from Western Australia but produced from mining operations in other States, Territories and overseas.

Overseas imported gold also includes scrap which is refined in Western Australia and exported.

Notable events

Like other resource companies, gold producers have continued to cut back on cost and focus on achieving production efficiencies. However, unlike other sectors, gold producers are bucking the trend and continuing to invest in exploration and acquisitions.

The most notable examples are Northern Star, which acquired three mines from Barrick Gold Corporation and one each from Newmont and Gold Fields.

Barrick Gold now only maintains its 50 per cent stake in the Kalgoorlie Super pit, with Newmont owning the other 50 per cent. Barrick has also handed control of that operation to Newmont.

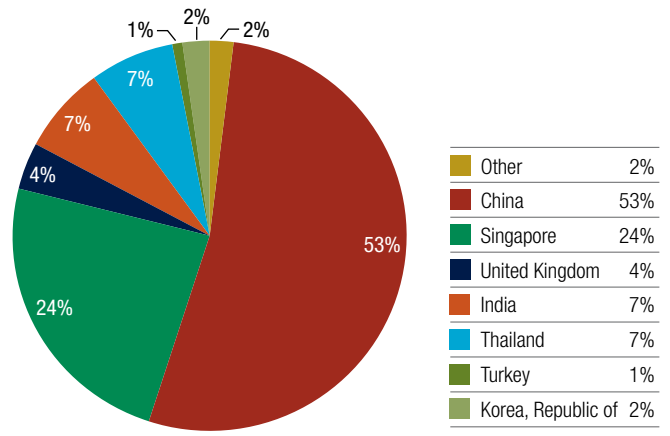


Figure 34 | **Gold Exports – Total Value \$13 Billion** Source: ABS and DMP
 Note: Includes gold refined/processed and exported from Western Australia, but produced from mining operations in other States, Territories and overseas.

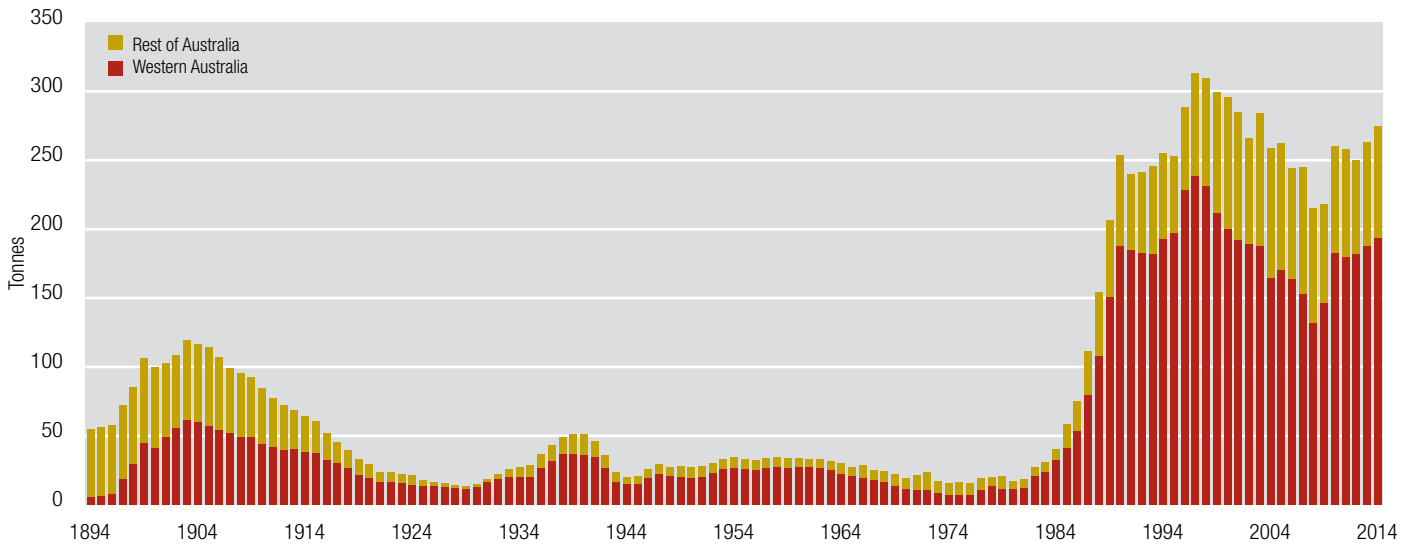


Figure 35 | **Gold Production** Source: DMP and DIS

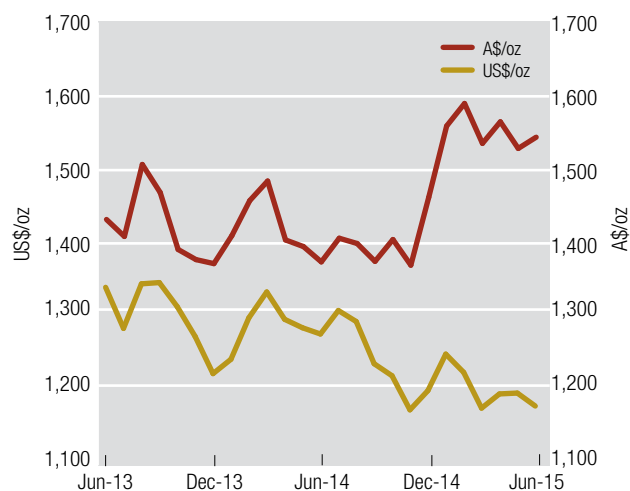


Figure 36 | **Gold Price** Source: Perth Mint and London Fix

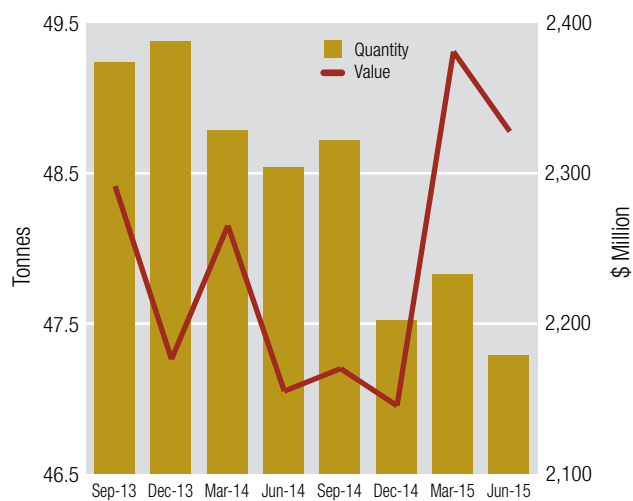


Figure 37 | **Gold Quantity and Value by Quarter**
Source: DMP

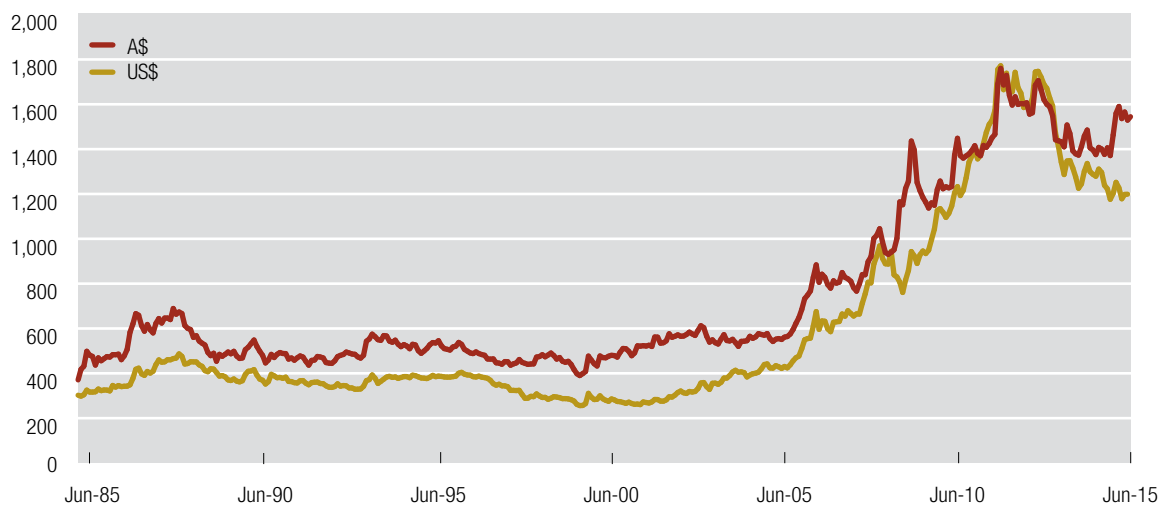


Figure 38 | **Historic Gold Price, per Ounce** Source: Perth Mint and London PM Fix

2.5 ALUMINA

Pricing

As alumina production is intrinsically linked to aluminium production, the price of alumina tends to follow the price of aluminium. The aluminium price averaged US\$1863 per tonne over 2014–15, which represents a seven per cent increase on 2013–14's average price.

The price of alumina averaged \$366 per tonne in 2014–15, an increase of over 17 per cent year on year. This increase can also be seen in the average monthly price, which rose 30 per cent from \$303 per tonne in June 2014 to \$394 per tonne in June 2015. The main influence on the large increase in the price of alumina was the exchange rate. In US dollar terms, the average price of alumina increased by only seven per cent to US\$304 per tonne.

Despite the positive finish, alumina prices have been trending downwards since early 2015. This is underpinned by reduced demand growth from China, weaker aluminium prices and supply growth.

Production and value

Australia is the world's largest bauxite producer and the second-largest producer of alumina. In 2014–15, the volume of alumina produced increased marginally (0.39 per cent) to a record 13.7 million tonnes.

In terms of volume, alumina has been one of the more consistent commodities produced in Western Australia. Besides an almost nine per cent increase in 2012–13, the volume of alumina has increased by an average of 1.4 per cent per year. This implies that all producers are operating at full capacity and, barring shut-downs or expansions, production rates can be expected to remain constant in the near future.

The value of alumina produced in Western Australia in 2014–15 was just over \$5 billion, an increase of almost 18 per cent on 2013–14 of \$4.3 billion. Alumina was Western Australia's fourth most valuable mining and petroleum sector and accounted for over five per cent of the total value of the industry.

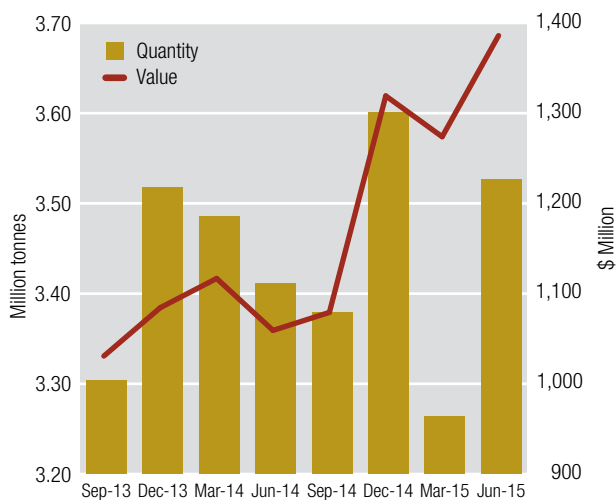


Figure 39 | Alumina Quantity and Value by Quarter
Source: DMP

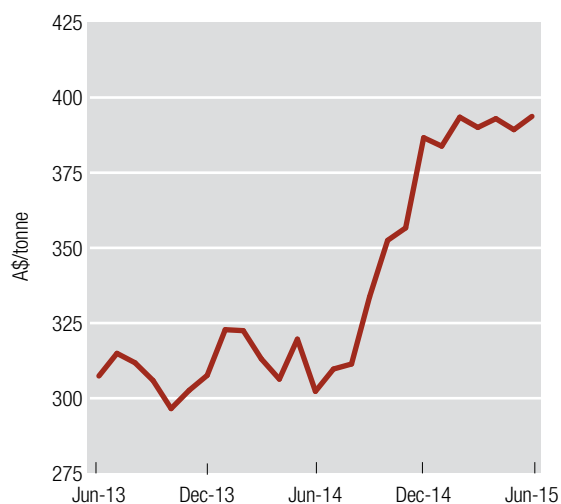


Figure 40 | Alumina Price – A\$/tonne Source: ABS

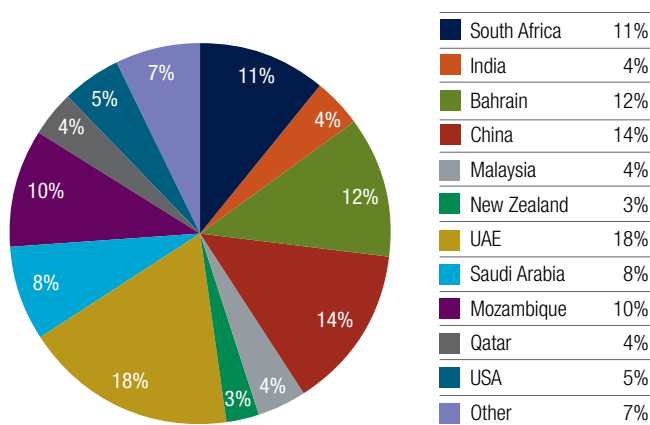


Figure 41 | Alumina Exports – Total Value \$4.2 Billion Source: DMP estimate

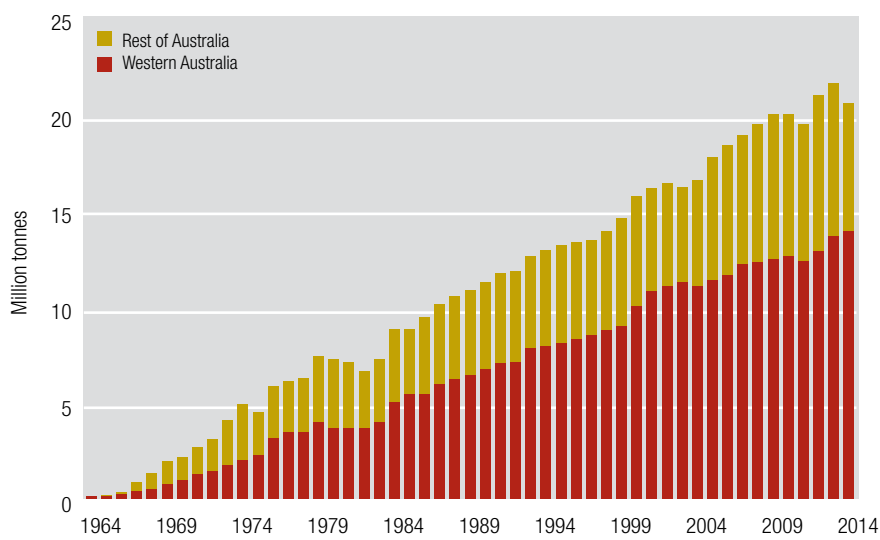


Figure 42 | **Alumina Quantity** Source: DMP and DIS

The large increase in value of alumina produced can be attributed to the increase in price during 2014–15. Of the entire aluminium production chain, alumina has had the best year amid the wider commodity market volatility.

The United Arab Emirates remained the top destination for Western Australian alumina, accounting for 18 per cent of total exports. China accounted for 14 per cent of exports, which was down from 18 per cent in 2013–14. Bahrain and South Africa maintained their shares of alumina exports at around 11–12 per cent each.

Notable events

There are two producers of alumina in Western Australia: Alcoa World Alumina and Worsley Alumina Pty Ltd.

In March, Alcoa announced a 12-month review of operations targeting 500,000 tonnes of smelting capacity, and 2.8 million tonnes of refining capacity for closure or divestment.

Although prices were down, Alcoa's alumina segment recorded its best first-half profitability figures since 2007, driven by higher volumes and productivity improvements.

In May 2015, Worsley Alumina became part of South32 as BHP officially completed a demerger.

2.6 NICKEL

Pricing

In US dollar terms, the average nickel price was US\$15,435 per tonne in 2014–15. This was relatively unchanged from 2013–14, rising only one per cent from US\$15,233. During 2014–15, the price fell consistently and, in June 2015, the average monthly price hit US\$12,780 per tonne, the lowest for the year.

The fall in the Australian dollar has helped local nickel producers. Nickel prices averaged \$18,389 per tonne over the year, up 11 per cent from \$16,586 in 2013–14. This price increase is largely attributed to devaluation of the Australian dollar against the US dollar, rather than improved commodity performance.

High stockpiles and low consumption growth has led to a fall in the nickel price since the start of 2015.

Production and value

Western Australia is the only Australian state to produce nickel. In 2014–15, production was 183,083 tonnes, a fall of 26,169 tonnes (over 12 per cent) on the 209,252 tonnes sold in 2013–14.

Most of Western Australia's nickel production comes from nickel sulphide mines, which accounted for 60 per cent of total production. Western Australia also has two nickel laterite mines, Murrin Murrin and Ravensthorpe.

Cobalt is a significant by-product for many nickel producers including Glencore, First Quantum, Nickel West, Panoramic Resources and Mincor Resources NL. All sulphide mines also produce copper. In addition to nickel, Nickel West also produces platinum, palladium and silver as byproducts.

The value of Western Australian nickel sales fell almost seven per cent from \$3.5 billion in 2013–14 to \$3.2 billion in 2014–15.

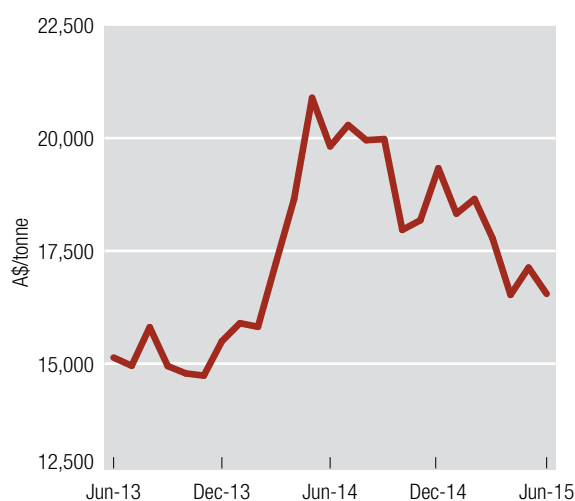


Figure 43 | **Nickel Price A\$/tonne**
Source: LME Cash, Monthly Average

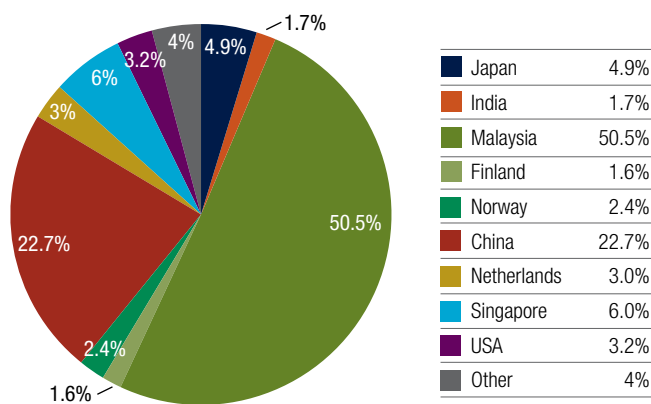


Figure 44 | **Nickel Exports – Total Value \$2.6 Billion** Source: DMP

Western Australia's largest export market for nickel in 2014–15 was Malaysia at 51 per cent. China followed with 23 per cent, then Singapore (six per cent) and Japan (five per cent). The remainder was also sold into the US, Norway, The Netherlands, India and Finland.

Notable events

The steady decline in prices over 2014–15 resulted in nickel miners focusing on cost reductions over the year. Several producers announced job losses including Nickel West (90 jobs lost at Leinster and a further 50 across the business), First Quantum (80 at Ravensthorpe) and Mincor (50 across the business).

A positive for the sector was the start of construction at Sirius Resources' Nova mine in January 2015. Nova has a \$443 million capital expenditure budget and is expected to begin production in 2017. The mine plans to produce 26,000 tonnes of nickel, 11,500 tonnes of copper and 850 tonnes of cobalt per annum. The potential of Nova was underlined after Independence Group launched a \$1.8 billion takeover bid for Sirius in May 2015.

The State's largest nickel producer, Nickel West, is an integral part of the sector, holding toll treatment and concentrate purchase agreements with three smaller miners. Under these agreements, ore from the Miitel, Long and Lanfranchi Tramways operations is trucked to Nickel West's Kambalda concentrator for processing.

Poseidon Nickel purchased the Lake Johnson mine in 2014 and the Black Swan mine in 2015. Poseidon is currently developing plans to bring these two mines, as well as their Mount Windarra mine, back into operation. The Lake Johnson and Mount Windarra operations could commence operations in 2016.

In other movements, Talisman purchased the Sinclair nickel mine from Glencore during the year. Talisman is currently in the early stages of planning for the Sinclair project. Glencore also sold its Cosmos Nickel Complex project to Western Areas in June 2015.

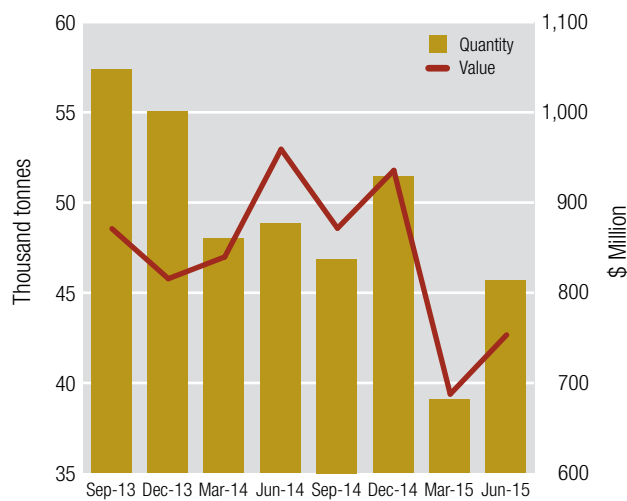


Figure 45 | Nickel Quantity and Value by Quarter
Source: DMP

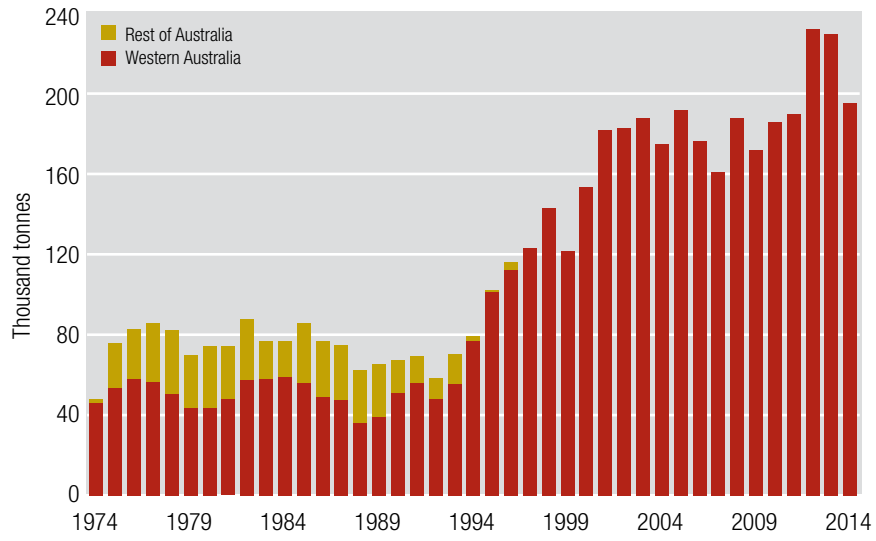


Figure 46 | **Nickel Quantity** Source: DMP and DIS

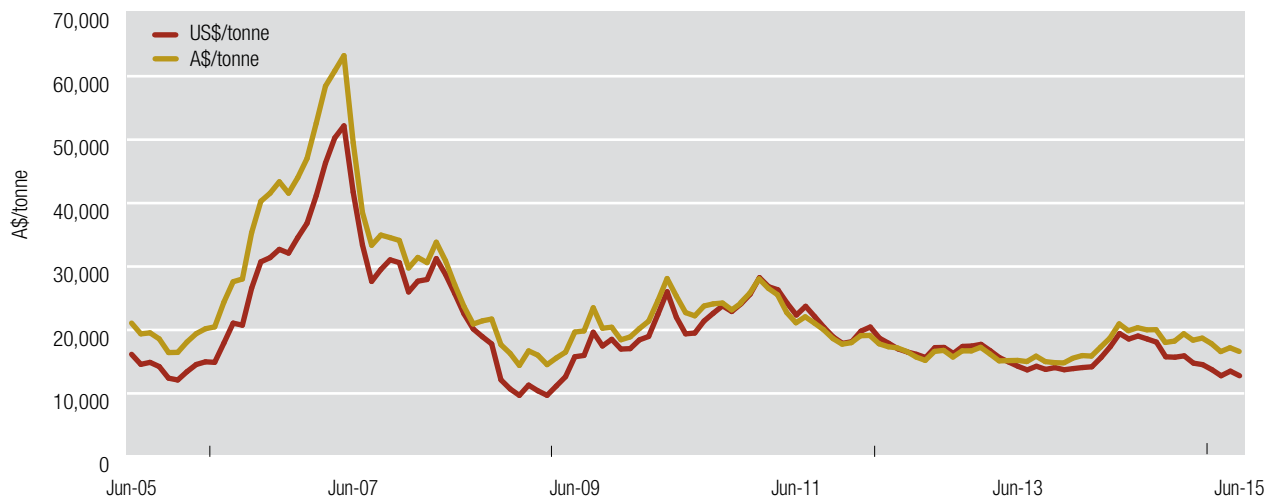


Figure 47 | **Historic Nickel Price** Source: LME

2.7 BASE METALS

Pricing

For the purposes of the Statistics Digest, 'base metals' refer to copper, lead and zinc.

The average price for copper in 2014–15 fell to US\$6371 per tonne, representing a nine per cent decrease on 2013–14. In Australian dollar terms, copper prices averaged \$7621 per tonne, a marginal decrease of 0.3 per cent from the 2013–14 average.

In 2014–15, zinc prices rose by 12 per cent to an average of US\$2645 per tonne. In Australian dollar terms, prices increased more significantly by 23 per cent from \$2145 to \$2645.

Lead averaged US\$1984 per tonne for 2014–15, a decrease of six per cent compared to 2013–14. However, with the weakening of the Australian dollar the average price was \$2374 per tonne for 2014–15, four per cent higher than the previous year.

Production and value

In 2014–15, the value of base metals produced in Western Australia fell by 11 per cent to just under \$1.7 billion. Base metals accounted for less than two per cent of all mineral and petroleum sales in Western Australia in 2014–15.

Copper, the largest contributor to the State's base metals sector, accounted for 80 per cent of the total value of base metals produced.

The total of 185,085 tonnes of copper was sold in 2014–15, representing a decrease of 11 per cent. The total value of the copper sector fell 16 per cent from the previous year, to just over \$1.3 billion.

During 2014–15, zinc production totalled 77,382 tonnes, up from 54,060 tonnes in 2013–14. Value also rose from \$118 million in 2013–14 to \$197 million in 2014–15, up 4.42 per cent. Zinc accounted for 12 per cent of the total value of base metals for 2014–15.

Lead production decreased 24 per cent from 78,650 tonnes in 2013–14 to 59,762 in 2014–15. Sales of lead were valued at \$138 million and accounted for eight per cent of total base metals.

Notable events

In the beginning of the year, copper fell to its lowest price in more than five years as investors sold copper and copper securities. Several factors led to the sell-off including a decrease in growth forecasts from the World Bank, a general flight by Chinese investors from commodities, fears about oil-related price volatility, a seasonal fall in demand ahead of the Chinese New Year and speculation that cheaper energy costs will encourage mining companies to increase production.

In early 2015, the lead mine at Paroo Station went into care and maintenance for the third time in less than a decade. Ivernia Inc., the foreign owner of the mine, cut around 200 positions and retained approximately ten positions for care and maintenance purposes. The company cited continued weakening lead prices as the reason for the decision to place the mine on care and maintenance.

Sandfire's DeGrussa mine maintained its predominance as the State's largest base metals producer, accounting for 29 per cent of the value of base metals in Western Australia. Minerals and Metals Group's copper-lead-zinc mine, Golden Grove, was the second-largest producer (14 per cent) and Newmont's Boddington accounted for 12 per cent. Newcrest's Telfer and Ivernia Inc.'s Paroo Station lead mine (prior to its closure) accounted for ten and eight per cent respectively.

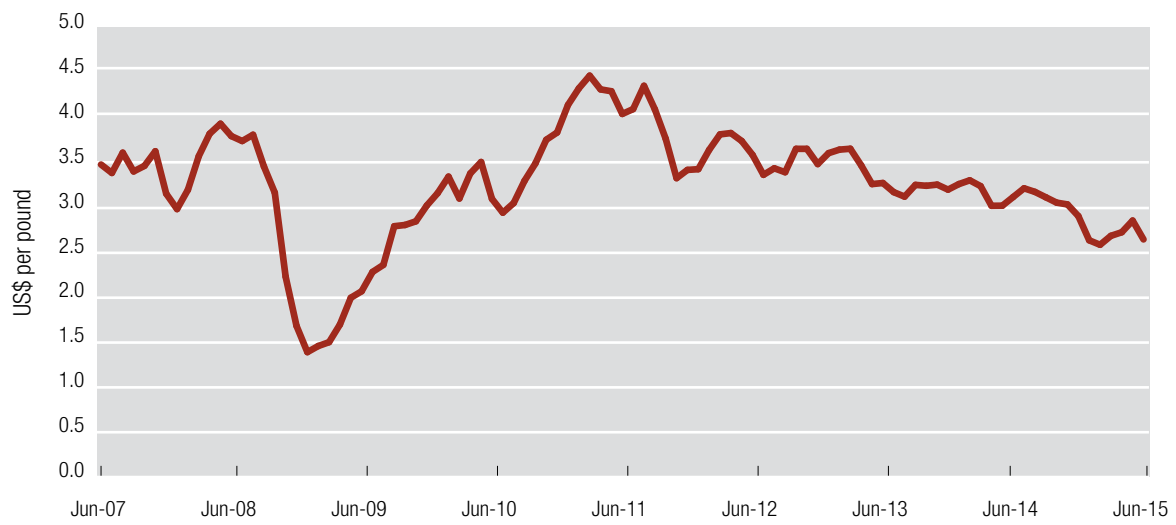


Figure 48 | **Copper Price** Source: Metalprices.com

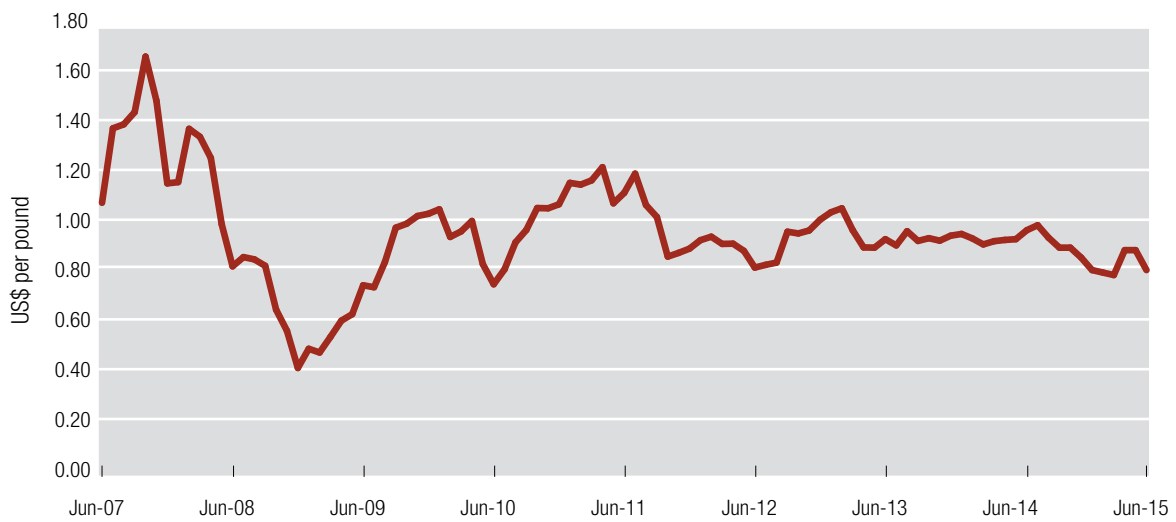


Figure 49 | **Lead Price** Source: Metalprices.com

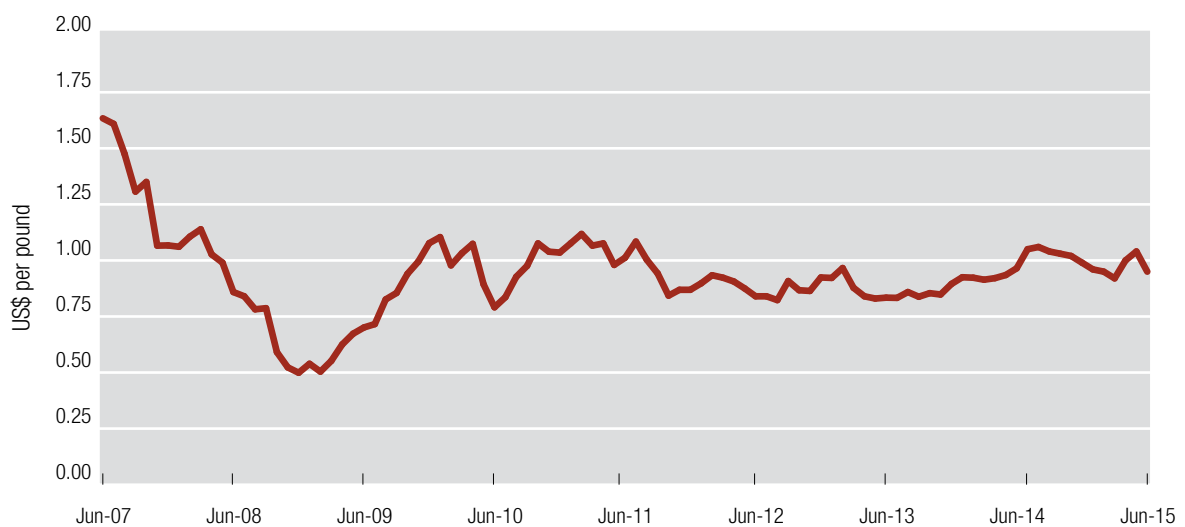


Figure 50 | **Zinc Price** Source: Metalprices.com

2.8 MINERAL SANDS

Pricing

Production of mineral sands in Western Australia predominantly comprises titanium minerals (ilmenite, leucoxene, synthetic rutile and rutile) and zircon. Other products such as garnet sand and staurolite are also produced.

A challenging global market, due to the slowing of the Chinese economy, continued to impact demand for mineral sands products. Prices received for the titanium minerals produced in Western Australia were generally lower, including the State's highest value titanium product, synthetic rutile, declining by six per cent.

Positive indicators for a recovery in demand were, however, experienced in 2014–15. A reduction in supply by major producers in the past two years has resulted in inventories of titanium dioxide pigment falling to more 'normal' levels, which resulted in prices stabilising for titanium minerals and an improving price for titanium dioxide.

By contrast, the price per tonne received for zircon produced in Western Australia increased significantly between 2013–14 and 2014–15.

Production and value

The value of Western Australian mineral sands sales fell by six per cent from \$471 million in 2013–14 to \$444 million in 2014–15. While the total quantity sold declined by 36 per cent from 212,000 tonnes to 135,000 tonnes, the total value declined by only 18 per cent, from \$114 million to \$93 million.

A total of \$695 million worth of mineral sands was exported. This figure includes \$251 million of mineral sands products that were mined from private land (for which royalties are not paid) and feedstock imported from other states that was processed in Western Australia.

The United States and China were the State's major export markets, accounting for 33 per cent and 21 per cent respectively of total exports. Other major export destinations included the Netherlands (10 per cent) and the United Kingdom (nine per cent).

Production is dominated by two producers, Tronox and Iluka Resources. Together, these companies produced around 98 per cent (by value) of all the State's mineral sands in 2014–15.

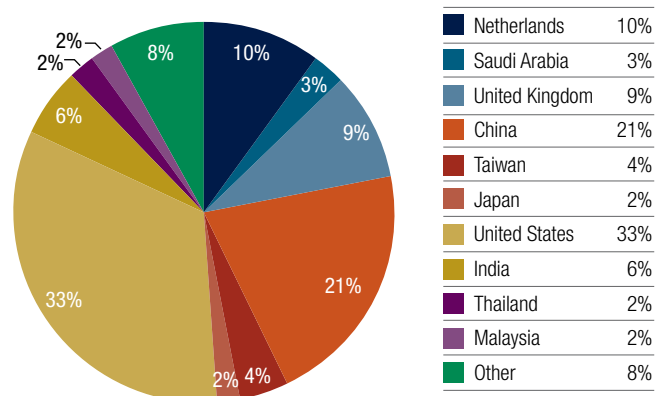


Figure 51 **Heavy Mineral Sands Exports – Total Value \$695 Million**
Source: DMP
Note: Exports include titanium dioxide and product sourced from private land, overseas and other States and processed in Western Australia.

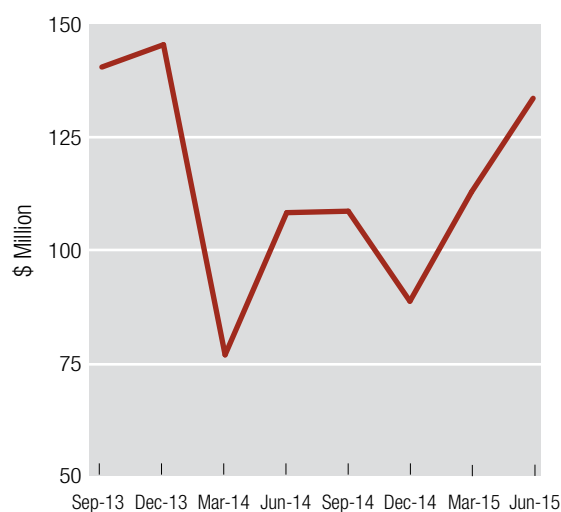


Figure 52 **Heavy Mineral Sands – Value by Quarter**
Source: DMP

Tronox's Western Australian operation is the world's largest integrated titanium dioxide project. It was established as the TiWest joint venture in 1988 and comprises the Cooljarloo mineral sands mine 170 km north of Perth; a dry mill and synthetic rutile plant 110 km to the south at Chandala; and a titanium dioxide pigment plant at Kwinana.

Iluka's operations consist of mining activities, mineral processing plants and synthetic rutile production facilities in two main operational areas, at Eneabba and Narngulu in the Mid-West, and Capel in the South West.

Small amounts of mineral sands are also produced by Doral Mineral Sands Pty Ltd and GMA Garnet Pty Ltd. GMA Garnet is also a leading global producer of industrial garnet.

Notable events

Iluka's mining and processing facilities in Western Australia have been substantially constrained since 2013, with a drawdown in synthetic rutile inventories contributing to sales in 2014–15.

Towards the end of the year, however, improved market conditions resulted in Iluka recommencing mining at its Tutunup South operation in February 2015 and reactivating its synthetic rutile kiln at Capel in April 2015.

Iluka is also planning to develop its mineral sands deposit at Cataby, a chloride ilmenite deposit that will also produce zircon and rutile.

Other notable mineral sands projects currently under development in Western Australia include Sheffield Resources' Thunderbird project near Derby in the north of the State, which is among the largest mineral sands deposits in the world with a potential mine life currently projected at 32 years.

MZI Resources also has plans to develop the Keysbrook mineral sands project 70 km south of Perth, which has been demonstrated to hold over three million tonnes of heavy minerals. At currently planned production rates, this resource has a potential mine life in excess of 30 years.

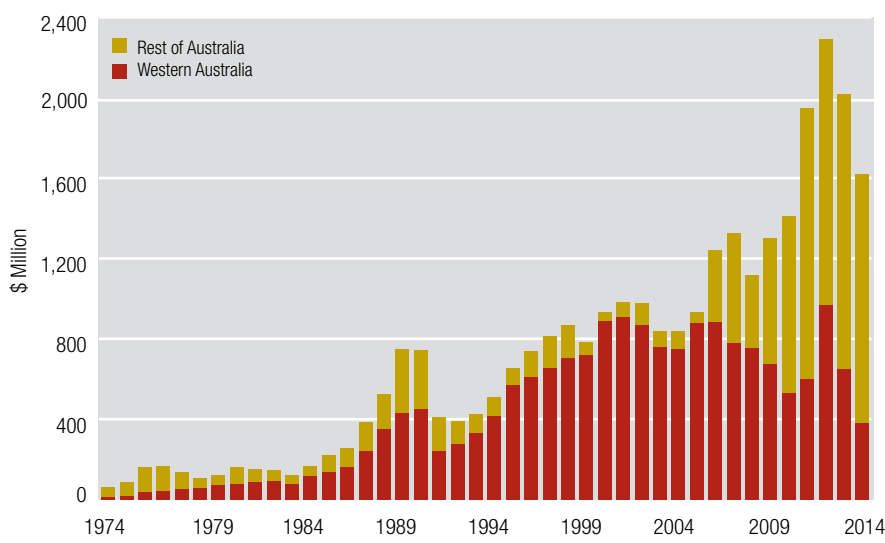


Figure 53 | **Heavy Mineral Sands Value of Production**
Includes Ilmenite, Leucoxene, Upgraded Ilmenite, Rutile, Zircon and Monazite
Source: DMP and DIS

2.9 DIAMONDS

Pricing

Diamond miners produce rough diamonds. Approximately one-third of these rough diamonds are sold to intermediaries at auction who cut and polish to create gem quality diamonds for use in jewellery. The remaining diamonds are used for industrial purposes in abrasive applications, such as drill bits and saw blades.

There is no universal, transparent market price for diamonds and little publicly available data on prices received by mining companies however, it is apparent Western Australia's diamond producers received diminished prices for their rough diamonds in 2014–15 compared to 2013–14.

Weakness in gem quality diamond price in the past year is reflected in finance and profitability issues among diamond cutting and polishing centres. Demand for diamonds is largely dictated by macroeconomic conditions. The economic slowdown in China, and deflationary pressures in Japan and across Europe, therefore placed downward pressure on prices.

Industrial diamonds also experienced subdued prices from weaker demand in India and China with large inventories of rough diamonds and low profit margins in manufacturing.

Looking to the future, increased demand for diamonds can be expected from continued improvements in economic conditions in the United States and forecast demand growth in markets such as India and China. On the supply side, mine inventories are depleting and there are fewer new discoveries around the world. These factors would result in a price rise in coming years.

Production and value

Diamond sale volumes in Western Australia were 10.4 Mct in 2014–15. While this is down by 11 per cent from 11.6 Mct in 2013–14, it was the second highest sales volume since 2009–10.

The value of diamond sales was also down, falling by 15 per cent from \$398 million in 2013–14 to \$337 million in 2014–15. This is the lowest sales value since 2010–11.

Rio Tinto's Argyle diamond mine (located 112 km south-southwest of Kununurra) accounted for almost all the State's diamond sales in 2014–15 with sales of 10.3 Mct of diamonds.

The only other producing diamond mine in Western Australia in 2014–15 was Kimberley Diamonds Limited's Ellendale mine (located 100 km east of Derby). Ellendale sold approximately 73,000 ct of diamonds in 2014–15, down 31 per cent from 106,000 ct in 2013–14.

Notable events

The 2014–15 year was challenging Western Australia's diamond industry. Kimberley Diamonds Limited ceased mining of its E9 lamproite pipe to process stockpiles and coarse tailings, and reported that its Ellendale mine could be placed on care and maintenance due to concern about the ongoing economic viability of the operation.

On 1 July 2015, operations at the Ellendale diamond mine were suspended following the placement of Kimberley Diamonds Company Proprietary Limited (a subsidiary of Kimberley Diamonds Limited and the holder of the Ellendale mining lease) into voluntary administration. This was reportedly due to a sharp decline in rough diamond prices received at auction in June 2015 affecting revenues.

Following the closure of the Argyle open pit mine during 2013–14, Rio Tinto continued to ramp up production from the underground mine. This involved commissioning a second crusher and design modifications to improve the performance of crushing operations. The implementation of these modifications involved a maintenance shutdown during the December 2014 quarter, affecting the volume of diamonds produced for the year.

2.10 OTHER

2.10.1. Coal

Pricing

In a global context, world coal prices remained relatively stable throughout most of 2014. However, the early half of 2015 saw substantial declines as a surplus of supply and weaker Chinese demand put downwards pressure on prices. By way of an example, the Newcastle free on board prices averaged US\$60 a tonne for the first eight months of 2015, down 18 per cent year on year.

Production and value

Western Australia has two black coal mines, both located in Collie in the south-west of the State. The quantity of coal sold increased four per cent from 6.3 Mt in 2013–14 to 6.5 Mt in 2014–15. The value of coal to the State rose just over 14 per cent to \$301 million.

Around 90 per cent of Collie coal is used as thermal coal, mostly in power stations, but some coal is also used to fire cement kilns in Perth. The remainder is used metallurgically by the mineral sands industry

to transform ilmenite to synthetic rutile and a small quantity is used to reduce silica sand to silicon metal.

To date, the export of raw coal through Kwinana port has been minimal.

Notable events

The China–Australia Free Trade Agreement was signed in mid-June. This is likely to improve the competitiveness of Australian coal relative to other major producers and may result in Australia gaining an increased share of China’s imports.

India has announced its intention to rapidly expand steel production to support investment in infrastructure as the economy develops. While India has some domestic metallurgical coal, it relies mostly on imports to meet its requirements. India’s imports of metallurgical coal are forecast to increase by 13 per cent in 2015 and by a further three per cent in 2016 to 52 million tonnes and 53 million tonnes, respectively.

While these are positives for Australian export prospects, it is most likely New South Wales which will benefit most.

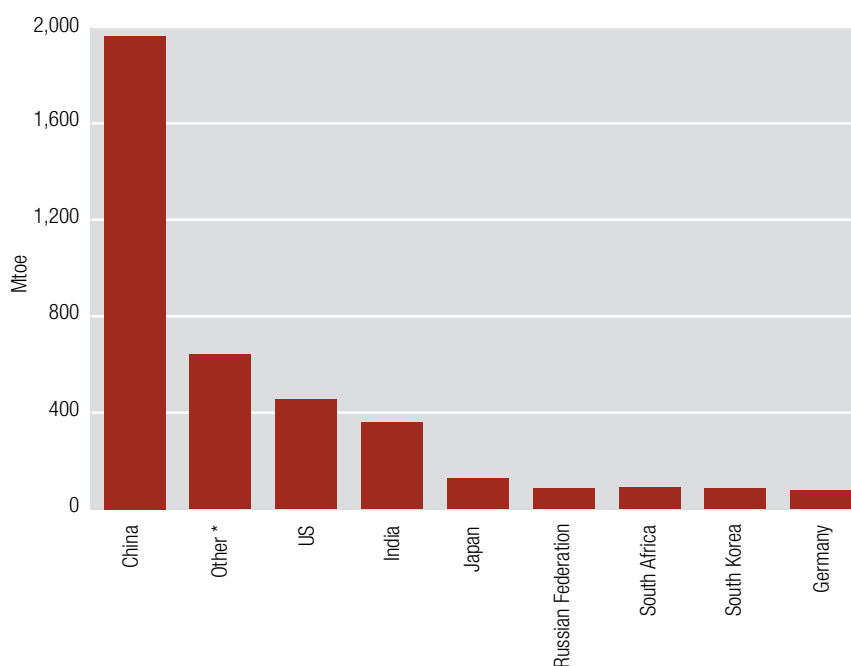


Figure 54 | **World Coal Consumption 2014** Source: BP World Energy Statistics 2014
* Other consists of 50 countries including Australia

2.10.2 Salt

Pricing

The price received for salt was slightly up in 2014–15, averaging \$33 per tonne.

Production and value

Western Australia accounts for the majority of national salt production and is the country's dominant exporter. In 2014–15, the volume of Western Australian salt sales decreased by ten per cent to 11.7 Mt.

The slight improvement in price was not enough to offset the fall in volume with the value of salt sales falling from \$416 million in 2013–14 to \$385 million in 2014–15.

Notable events

Dampier Salt Limited has operations in Dampier and Port Hedland in the Pilbara, and Lake MacLeod in the Gascoyne. The company accounted for around 66 per cent of the total salt sold from Western Australia in 2014–15 and is the world's largest exporter of high-quality bulk, solar salt.

Onslow Salt Pty Ltd's operation at Onslow is the next-largest operation, with 18 per cent of production.

Salt is primarily used as a feedstock for the production of chemicals, glass and plastic. There has also been recent increased demand from synthetic soda ash production, food processing and de-icing of roads.

2.10.3 Lithium, tantalum and tin

Production and value

The value of Western Australian lithium, tantalum and tin fell seven per cent from \$155 million in 2013–14 to \$143 million in 2014–15.

Notable events

Tantalum production in Western Australia has traditionally come from two mines; Greenbushes in the south-west and Wodgina in the Pilbara region. Global Advanced Metals owns both mines.

Tantalum is a rare, grey-blue metal used primarily in the electronics industry in the manufacture of capacitors and is found in many everyday devices such as mobile phones, laptop computers and video cameras. Another increasing application for tantalum is as a 'superalloy' in the manufacture of turbine blades for power stations and jet engines.

Lithium is used in the glass and ceramics industry and increasingly in the production of lithium chemicals for the

battery market. Current estimated global end-use markets are:

- Ceramics and glass 35%;
- Batteries 29%;
- Lubricating greases 9%;
- Continuous casting mold flux powders 6%;
- Air treatment 5%;
- Polymer production 5%;
- Primary aluminium production 1%; and
- Other uses 10%.

Global demand for lithium is expected to increase, with growth underpinned by continuing use of rechargeable batteries in consumer electronics and increased market penetration for electric vehicles in commercial and private applications.

2.10.4 Manganese

Pricing

Manganese ore is priced on a monthly basis using a specification grade of 45.5 per cent manganese grade. Prices received in Australian dollar terms during 2014–15 were around 30 per cent lower than for the previous year. Prices were particularly weak between January and April 2015.

Manganese was trading at US\$3 per dry metric tonne unit during June 2015. In 2013–14, the average was US\$4.95 per dry metric tonne unit. Like other commodities, manganese prices have been affected by the slowdown in Chinese steel production and, coupled with oversupply, there has inevitably been downward pressure on prices.

In an indication of the difficult conditions in the global manganese sector, South32 booked a US\$1.3 billion write-down in the value of its manganese mines located in South Africa and the Northern Territory.

Production and value

In 2014–15, the volume of manganese sold in Western Australia increased 13 per cent to 800,461 tonnes. However, weaker prices meant the value of manganese sales fell 20 per cent from 2013–14.

Western Australia has one operating mine, Woodie Woodie. The mine is recognised internationally as a supplier of reliable high-grade, low-impurity manganese ore. The increase in tonnage in 2014–15 was due to Process Minerals International selling manganese mined at the Nicholson Downs project.

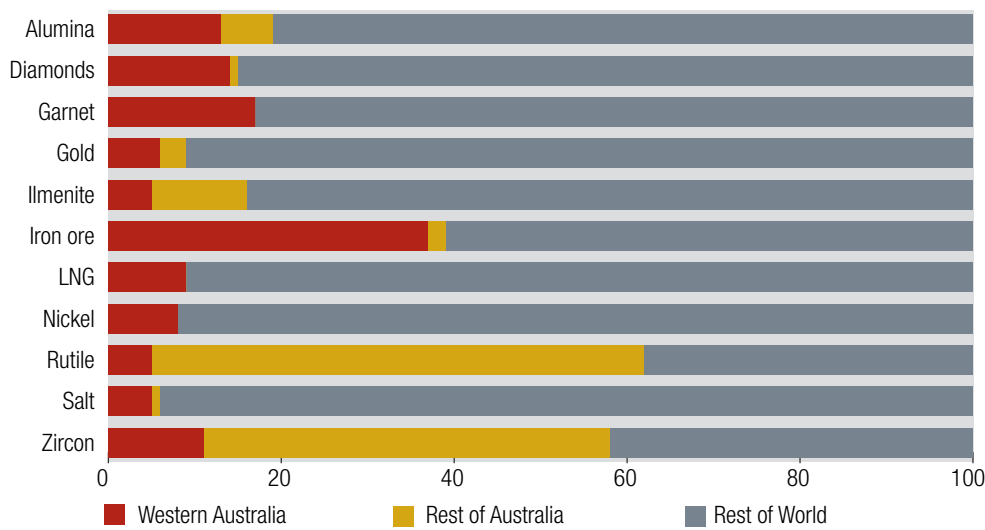


Figure 55 | **Selected WA Commodities Relative to World Production Ending 2014 by Quantity**

Source: DMP, DIS, EnergyQuest and USGS

The latest comparable data show that the Western Australian share (by quantity) of the world's output of the following products was: alumina 13%, garnet 17%, gold 6%, ilmenite 5%, iron ore 37%, LNG (sea-borne trade) 9%, nickel 8%, rutile 5%, salt 5%, zircon 11% and 14% of diamonds (mainly industrial grade)

2.10.5 Rare earth elements

Pricing

Western Australia's rare earths are mostly lanthanum, cerium, neodymium and praseodymium oxides. The average fall in price for these products from the beginning of 2014–15 to the end of the year was around 25 per cent.

Accordingly, realised prices for Mount Weld's rare earth oxide product fell 16 per cent in 2014–15. The impact of the fall in prices was likely cushioned due to the favourable grade of Mount Weld ore, as well as product being sold on long-term contracts, which can be decoupled from market price movements.

Production and value

Rare earth oxide sales from Western Australia increased 80 per cent to 10.8 million kilograms in 2014–15. The value of rare earth oxide sold increased 51 per cent to just over \$150 million.

This significant increase in output was due to Western Australia's sole producer of rare earths, Mount Weld, reaching its first full year of production in 2013–14. Mount Weld contains the richest known deposit of rare earths in the world.

Notable events

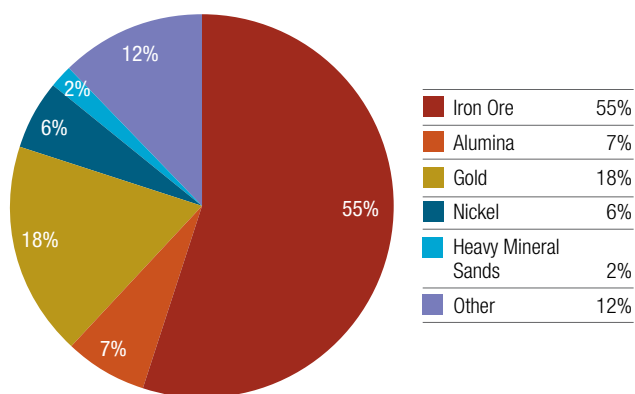
China, the largest producer of rare earths, had a system of quotas and export tariffs for rare earth exports, which effectively kept global supply low and prices high. In January 2015, China dropped the quota system for rare earth exports, raising the possibility of more supply entering the global market.

3.1 EMPLOYMENT

3.1.1 Mining

Western Australia's mining industry directly employed an average of 105,922 persons during 2014–15. This figure includes people employed in mineral exploration, construction of mine site infrastructure, mineral processing, mine site surveying, transport and catering – essentially those people operating on site.

Mining-related employment decreased three per cent from the 2013–14 average of 108,975 persons.



The Department of Mines and Petroleum collects mining employment data from monthly accident reports, which are required to be submitted by all operating mines and companies carrying out exploration on mineral and mining leases under the *Mines Safety and Inspection Act 1994*.

The Resources Safety Division's AXTAT reporting system identifies the number of direct employees and contractors (including exploration personnel) working on operating mining leases.

In March 2008, legislation was introduced to capture data on exploration personnel working on greenfield sites. The employment data reported includes sites under State Agreement Acts. The data does not include personnel in administrative locations located outside operating sites.

Figure 56 | **WA Minerals Employment 2014–15**
Source: DMP

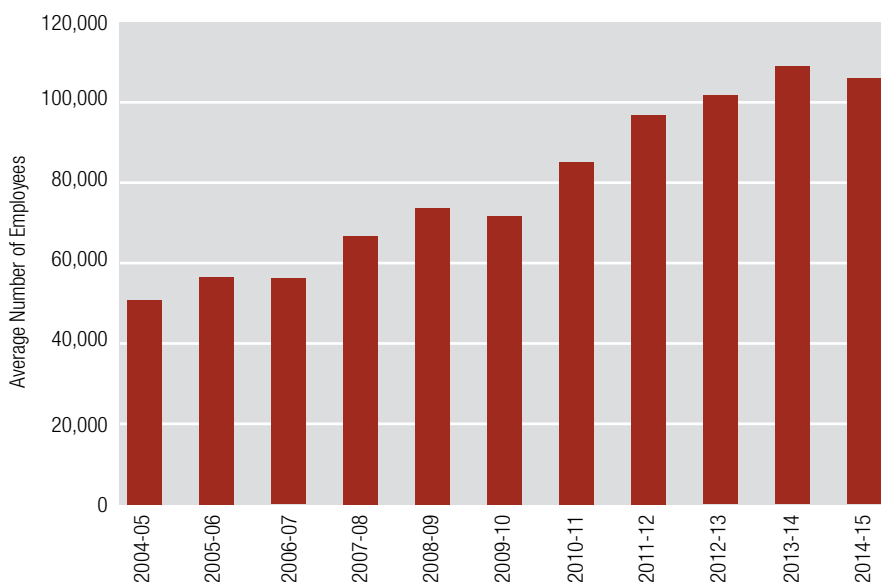


Figure 57 | **WA Mining Employment 2004-05 to 2014-15**
Source: DMP Resources Safety Division AXTAT Reporting System.
Does not include petroleum data.

The iron ore sector remains the State's largest employment sector, employing an average of 58,093 people. Gold and nickel followed with 19,175 and 6096 persons respectively. Together the iron ore, gold and nickel sectors accounted for 79 per cent of total mineral employment.

The softening of key metals markets, coupled with the mining industry's transition to the production phase, has eased the skills shortages that affected construction activities in recent years. The challenge for the sector now lies in seeking the skill sets required for the production phase. This means attracting, developing and retaining specialised skills at operational, management and boardroom level.

3.1.2 Petroleum

Western Australia's petroleum industry employed an average of 2252 persons in 2014–15.

This is an increase of seven per cent from 2013–14. This data represents the average number of persons employed at operating sites, including contractor employees.

A NOTE ABOUT OUR DATA

Employment data published in this Statistics Digest for the petroleum industry is limited to operations subject to State petroleum legislation, and includes petroleum facilities and pipelines both onshore and in coastal waters. It does not include LNG and land-based service facilities.

The data is provided in petroleum operators' monthly safety reports, submitted to the Department of Mines and Petroleum. Similar data for operations in Commonwealth offshore areas adjacent to State areas is not available to the Department of Mines and Petroleum, following the transfer of administrative responsibility from the State to the Commonwealth on 1 January 2012.

Employment data collected and published by the Australian Bureau of Statistics (ABS) is classified using reference to the Australian and New Zealand Standard Industrial Classification (ANZSIC). This data is therefore not directly comparable with that collected by DMP.

Under ANZSIC guidelines, not all mining employment is reflected in the ABS' Mining industry classification (refer to Chapter 1, paragraph 2: "An individual business entity is assigned to an industry based on its widest sense to include any organisation undertaking productive activities, including companies, non-profit organisations, government departments and enterprises"). For example:

- Contract catering personnel working on mine sites are reflected in the Accommodation and Food Services classification and transport personnel (truck and train drivers) working on mine sites are reflected in the Postal and Warehousing industries.
- Contractors employed in site preparation and removing overburden at a mine site on a contract or fee basis are listed under Site Preparation Services.
- Employees engaged in production of pig iron, hot briquetted iron, alumina, the smelting and refining of metals are included in Manufacturing.
- Employees providing geophysical surveying services on a contract or fee basis are included in Surveying and Mapping Services.

3.2 INVESTMENT

Western Australia's share of national capital expenditure

Data published by ABS shows that, in 2014–15, total new capital expenditure in Western Australia by the mining, manufacturing and other selected industries fell by one per cent to \$55 billion. This represented 37 per cent of the total amount of new capital expenditure in Australia (\$151 billion).

Western Australia remained the nation's leading mining investment destination, attracting 60 per cent of the total of \$76 billion invested in the Australian mining industry as a whole.

Investment in Western Australia's mining industry, at \$46 billion, was two per cent lower compared to the previous financial year. This was significantly less than the reduction in national expenditure, which fell 16 per cent from 2013–14.

It is important to note the figures reported above from the ABS do not capture all mining investment. The ABS uses classifications specified in the 2006 edition of the ANZSIC (ABS catalogue number 1292.0). Accordingly, mining is broadly defined as the extraction of minerals occurring naturally as solids such as coal and ores, and liquids such as crude petroleum and natural gas. Downstream mining activities, such as smelting of minerals or ores (other than preliminary smelting of gold) or refining, are classified as manufacturing activities under the ANZSIC. Products such as coke and alumina are also included in the ANZSIC manufacturing category.

Actual and potential investment in Western Australia's resources sector

In monitoring resource investment activity in Western Australia, the Department of Mines and Petroleum also collects information on mineral and petroleum projects to estimate actual and possible investment in the State's resources sector.

Where available, information is collated relating to expected capital expenditure, project timing and projected employment during both construction and operational phases. The information encompasses a broader definition of mining than that included in the

ABS figures quoted above. Investment in expansion of an alumina refinery, for example, would be included in these figures.

Information is obtained from various sources including the list of major mineral and energy projects published by the Bureau of Resources and Energy Economics, Deloitte Access Economics' Investment Monitor, the REPS Major WA Projects List published by the Western Australian Chamber of Commerce and Industry, online company research consultancy systems, media announcements and company websites.

There are currently approximately 104 projects that can be classified as:

- *Projects under construction* – projects under construction at the time of updating the estimates of total capital expenditure.
- *Committed projects* – projects which have progressed to the stage where the company has made a commitment to proceed, including obtaining a final investment decision (FID), but are waiting for approvals to proceed with construction.
- *Planned projects* – projects that encompass those undergoing advanced feasibility studies, including definitive and bankable feasibility studies. For petroleum projects, the planning phase typically involves detailed engineering design, which is also referred to as front-end engineering and design (FEED).
- *Possible projects* – comprising those raising capital and not yet as advanced as those projects conducting definitive and bankable feasibility studies, as well as projects on hold for various reasons.

As at September 2015, the value of resource projects under construction, or in the committed stage of development, in Western Australia was estimated at \$171 billion. A further \$110 billion was identified for planned or possible projects in coming years.

The total value of major projects under construction or committed as at September 2015 has decreased by around \$8 billion, compared to estimates made in February 2015, primarily due to the completion of Rio Tinto's iron ore expansion projects at Cape Lambert and Yandicoogina.

Investment in the State is currently led by major export-orientated iron ore and LNG projects under construction or expansion.

Major iron ore investment projects include:

- Hancock Prospecting's Roy Hill mine (\$10 billion);
- CITIC Pacific's Sino Iron production lines three to six (\$2.6 billion); and
- Expansion of Rio Tinto's Pilbara operations (Western Turner Syncline and Brockman 4) (\$1.8 billion).

Major LNG investment projects include:

- Chevron Gorgon (US\$54 billion) and Wheatstone (US\$29 billion);
- INPEX Ichthys (US\$34 billion); and
- Woodside's Julimar plant (US\$4 billion) and Greater Western Flank Phase-1 (A\$2.5 billion).

The outlook for major projects is expected to decline sharply in coming years as several major (and high value) projects currently under construction, or in the committed stage of development, are completed. The Roy Hill iron ore and Gorgon LNG projects

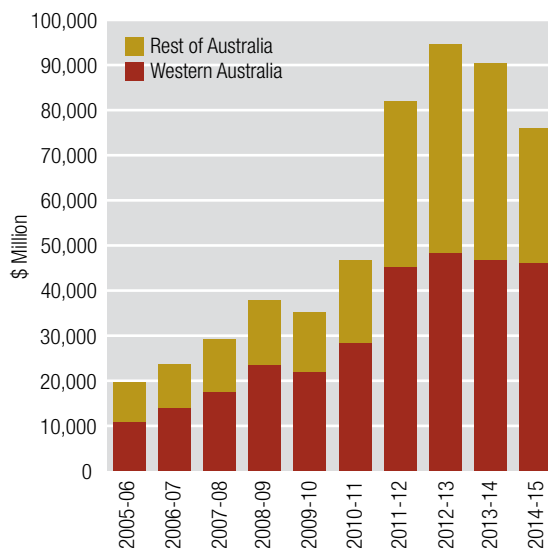


Figure 58 | Mining Investment Source: ABS

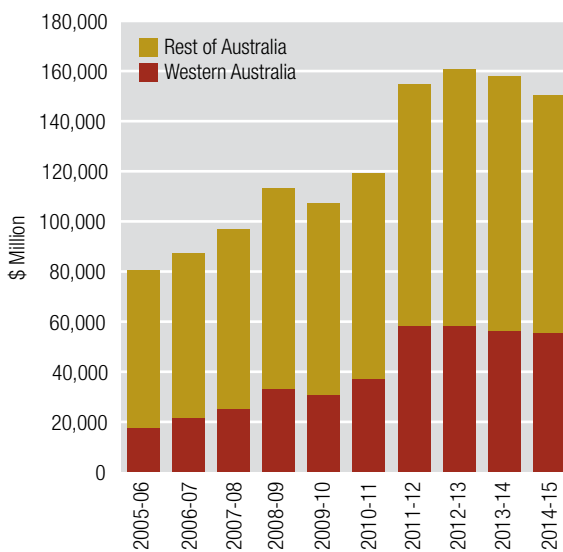


Figure 59 | New Capital Investment Source: ABS

(valued together at around \$80 billion), and another \$73 billion in projects, are expected to be completed by the end of 2016. This will result in the total value of projects under construction or in the committed stage of development decreasing significantly, the degree to which will be determined by the number of new projects progressing towards completion.

Importantly, while the value of resource investment will drop over this period, it means these projects will move into production and contribute to the State's economic growth through increased production values, exports and royalty revenue. Preliminary estimates indicate that completed projects commencing production between now and 2020 are worth around \$60 billion in value to Western Australia's minerals and petroleum industry.

A summary of total capital expenditure by commodity is provided in the table below.

Investment in Major Projects (as at September 2015)

Sector	Commodity	CAPEX (A\$ million)	
		Committed/ under construction	Planned/ possible
Minerals	Iron ore	11,799	10,540
	Gold	117	3,274
	Nickel	443	3,350
	Other minerals and infrastructure	2,758	17,034
	Sub-total minerals	15,117	34,198
Petroleum	LNG	152,937	74,541
	Gas	2,500	1,200
	Crude oil and condensate	–	–
	Pipelines and infrastructure	140	500
	Other petroleum	300	–
	Sub-total petroleum	155,877	76,241
Total resources sector		170,994	110,438

Source: Department of Mines and Petroleum

3.3 ROYALTIES

Royalties received by the Western Australian Government from the State's mineral and petroleum producers totalled \$5.9 billion in 2014–15. This was down 16 per cent on 2013–14.

Royalties are paid into the Government's Consolidated Revenue Fund for all minerals and petroleum produced on State land and in State waters. The State also receives approximately 65 per cent of the royalties

from the petroleum produced by the North West Shelf Project, in the form of grants from the Commonwealth, in accordance with an agreement between the Western Australian and Australian Governments.

The bulk of collections for 2014–15 came from iron ore (75 per cent), followed by petroleum which accounted for 16.1 per cent and gold, which contributed almost four per cent.

TABLE 3. ROYALTY RECEIPTS 2013–14 AND 2014–15				
COMMODITY	2013–14 Total A\$	2014–15 Total A\$	2014–15 Growth A\$	%
ALUMINA	70,419,138	77,738,390	7,319,252	10
DIAMONDS	20,482,859	15,408,890	-5,073,969	(25)
GOLD	215,830,725	218,596,724	2,765,999	1
HEAVY MINERAL SANDS	16,393,497	11,965,647	-4,427,849	(27)
IRON ORE	5,307,520,551	4,389,842,803	-917,677,748	(17)
NICKEL	78,290,452	82,878,024	4,587,572	6
PETROLEUM *	11,493,467	8,716,839	-2,776,629	(24)
OTHER	150,136,596	139,839,437	-10,297,159	(7)
TOTAL ROYALTY RECEIPTS	5,870,567,285	4,944,986,755	-925,580,531	(16)
NORTH WEST SHELF GRANTS	1,106,892,595	943,795,896	-163,096,698	(15)
TOTAL REVENUE	6,977,459,880	5,888,782,651	-1,088,677,229	(16)

Note: All royalty revenue shown above is paid into the State's Consolidated Revenue Fund. Added to the table, shown separately, is the State's share of the North West Shelf project royalty payments to the Commonwealth (which are provided as a grant from the Commonwealth to the State).

* Includes the Commonwealth's share of royalties collected under the Western Australian *Petroleum Submerged Land Act 1982* (PSLA).

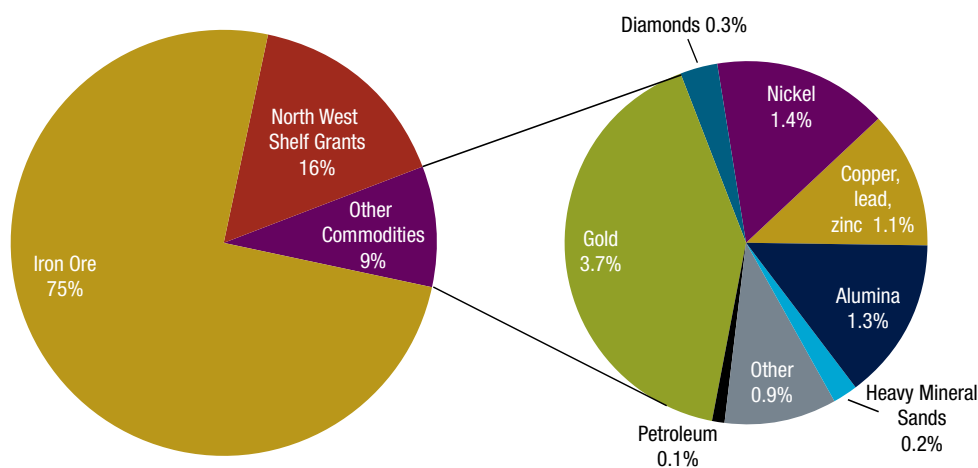


Figure 60 | Royalty Receipts 2014–15 and North West Shelf Grants \$5.9 Billion
Source: DMP and WA Treasury

TABLE 4. QUANTITY AND VALUE OF MINERALS AND PETROLEUM

COMMODITY	UNIT	FINANCIAL YEAR 2013–14		FINANCIAL YEAR 2014–15	
		QUANTITY	VALUE	QUANTITY	VALUE
ALUMINA	t	13,717,952 (r)	4,276,437,802 (r)	13,771,412	5,043,466,832
BASE METALS					
Copper Metal	t	208,944 (r)	1,583,718,207 (r)	185,085	1,333,031,109
Lead Metal	t	78,650 (r)	178,764,059 (r)	59,762	138,545,923
Zinc Metal	t	54,060 (r)	118,261,576 (r)	77,328	197,320,961
TOTAL BASE METALS			1,880,743,842 (r)		1,668,897,993
CHROMITE	t	66,540	n/a	0	n/a
CLAYS		35,686	1,176,041	32,271	1,382,927
COAL	t	6,275,423 (r)	263,701,680 (r)	6,553,064	301,040,414
CONSTRUCTION MATERIALS					
Aggregate	t	6,097,416 (r)	213,982,443 (r)	2,553,494	99,332,379
Gravel	t	192,706 (r)	3,845,578 (r)	213,129	4,338,077
Rock	t	1,273,312 (r)	20,822,963 (r)	1,749,260	48,996,040
Sand	t	7,409,949 (r)	88,418,557 (r)	6,070,830	68,200,825
TOTAL CONSTRUCTION MATERIALS			327,069,541 (r)		220,867,321
DIAMONDS	ct	11,610,631	398,210,783 (r)	10,387,926	337,192,175
DIMENSION STONE		5,021	1,365,020	6,126	3,089,486
GEM & SEMI-PRECIOUS STONES	kg	310,673	400,681	660,552	523,940
GOLD	kg	195,932 (r)	8,884,762,274 (r)	191,352	9,020,897,346
GYPSUM	t	533,737 (r)	10,660,653	586,796	12,585,863
HEAVY MINERAL SANDS					
Garnet	t	360,266	n/a	299,022	n/a
Ilmenite	t	78,900 (r)	19,515,065 (r)	88,048	18,068,861
Leucoxene	t	29,268 (r)	26,205,650 (r)	16,656	14,325,490
Zircon	t	212,068 (r)	114,322,733 (r)	134,767	93,352,017
Other	t		311,032,793 (r)		317,955,144
TOTAL HEAVY MINERAL SANDS			471,076,241 (r)		443,701,512
IRON ORE	t	624,255,668 (r)	74,099,074,527 (r)	718,923,455	53,764,545,450
LIMESAND-LIMESTONE-DOLOMITE	t	5,137,978 (r)	72,579,456 (r)	4,439,695	59,450,923
MANGANESE ORE	t	704,812 (r)	n/a	800,461	n/a
NICKEL INDUSTRY					
Cobalt	t	5,845 (r)	181,378,284 (r)	6,031	210,153,847
Nickel	t	209,252 (r)	3,481,606,476 (r)	183,083	3,242,775,920
Palladium and Platinum By-Product	kg	1,015	28,523,097	464	14,895,327
TOTAL NICKEL INDUSTRY			3,691,507,857 (r)		3,467,825,094

TABLE 4. QUANTITY AND VALUE OF MINERALS AND PETROLEUM Continued

COMMODITY	UNIT	FINANCIAL YEAR 2013–14		FINANCIAL YEAR 2014–15	
		QUANTITY	VALUE	QUANTITY	VALUE
PETROLEUM *					
Condensate	kl	5,559,221	4,005,484,785	6,753,212	3,452,212,212
Crude Oil	kl	7,330,777 (r)	5,746,460,089 (r)	7,843,826	4,505,382,150
LNG	t	20,049,826	14,409,473,141	20,447,845	13,816,888,220
LPG – Butane and Propane	t	630,636	586,349,207	553,055	405,560,739
Natural Gas	'000m ³	9,736,820	1,734,960,459	9,875,375	1,863,824,613
TOTAL PETROLEUM			26,482,727,681 (r)		24,053,383,810
SALT	t	12,991,837	416,047,668	11,726,606	384,622,315
SILICA-SILICA SAND	t	449,587	15,847,051	483,809	17,927,564
SILVER	kg	136,941 (r)	94,654,561 (r)	147,115	92,928,364
TIN-TANTALUM-LITHIUM	t	n/a	154,629,061 (r)	n/a	143,469,950
OTHER (Includes Vanadium, Manganese, Rare Earths, Spongolite and Talc)	t		535,794,638 (r)		485,104,036
TOTAL VALUE			122,078,467,057 (r)		99,513,387,440

Note: Quantities used in this table only apply to Minerals and Petroleum covered by the *Mining Act 1978*, the *Petroleum and Geothermal Energy Resources Act 1967*, the *Petroleum (Submerged Lands) Act 1982*, the *Offshore Petroleum Act 2006* and relevant State Agreement Acts.

(r) Revised from previous edition

n/a Breakdown of chromite, garnet, manganese, rutile, spodumene, tin and tantalite not available.

* Includes fields under both federal and state jurisdiction.

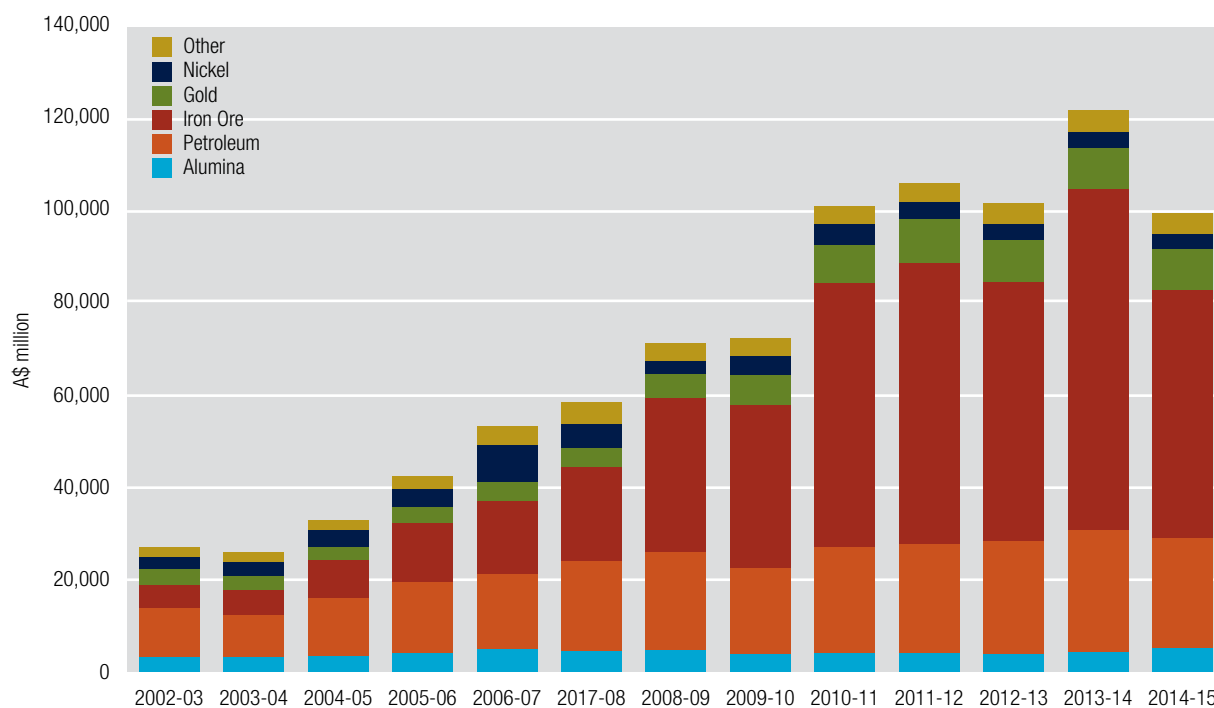


Figure 61 | **Value of Minerals and Petroleum by Commodity** Source: DMP

TABLE 5. QUANTITY AND VALUE OF SELECTED MAJOR COMMODITIES

		2005–06		2006–07		2007–08		2008–09	
	Unit	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M
ALUMINA	Mt	11.47	4,111.25	11.98	4,847.03	12.31	4,522.14	12.27	4,563.99
BASE METALS									
Copper Metal	kt	81.20	559.85	115.98	1,052.48	124.53	1,080.56	127.33	654.34
Lead Metal	kt	58.74	86.55	70.47	146.07	25.71	81.39	25.20	42.12
Zinc Metal	kt	110.52	336.65	142.18	675.75	197.13	578.31	142.06	231.27
TOTAL BASE METALS			983.05		1,874.31		1,740.27		927.72
COAL	Mt	6.71	297.37	6.02	271.52	6.23	270.42	6.98	332.57
COBALT	kt	5.02	183.98	4.70	275.28	5.09	448.53	4.71	220.20
DIAMONDS	M ct	29.26	693.80	18.22	435.3	27.97	610.67	9.19	261.5
GOLD	t	166.17	3,715.05	161.77	4,222.91	141.48	4,136.28	136.61	5,226.84
HEAVY MINERAL SANDS									
Ilmenite	Mt	590.24	65.92	0.82	90.90	0.73	83.74	0.45	64.19
Rutile	kt	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Upgraded Ilmenite (Synthetic Rutile)	kt	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Zircon	kt	402.42	357.34	323.56	282.18	262.63	204.76	255.64	231.44
Other HMS			442.71		414.98		381.90		414.01
TOTAL HEAVY MINERAL SANDS			865.97		788.06		692.48		728.87
IRON ORE	Mt	242.63	12,699.09	257.64	15,732.60	291.00	21,949.80	316.54	33,633.37
MANGANESE ORE	kt	888.43	117.97	902.05	153.32	373.47	382.75	417.70	n/a
NICKEL	kt	183.56	3,815.11	173.66	8,059.38	172.36	5,141.53	178.39	2,996.72
PETROLEUM									
Condensate	Gl	5.63	2,791.73	5.86	2,970.82	6.19	3,971.79	12.94	3,108.79
Crude oil	Gl	11.16	5,935.12	13.99	7,398.31	12.77	8,697.92	13.96	7,659.58
LNG	Mt	11.68	4,625.22	12.21	4,481.79	12.15	5,105.96	13.96	8,524.45
LPG – Butane and Propane	kt	871.98	654.42	898.61	605.08	818.39	683.35	866.53	750.83
Natural Gas	Gm ³	7.71	703.28	8.71	919.49	9.16	1,025.20	8.60	1,232.18
TOTAL PETROLEUM			14,709.77		16,375.49		19,484.22		21,275.82
SALT	Mt	10.83	229.85	10.42	236.15	10.59	232.93	10.52	386.25
OTHER			1,113.02		866.73		1,454.29		698.13
TOTAL			42,841.48		53,702.78		60,072.89		71,252.03

2009–10		2010–11		2011–12		2012–13		2013–14		2014–15	
Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M	Quantity	Value \$M
12.64	3,810.17	12.28	3,976.89	12.42	3,907.18	13.53	3,856.41	13.72	4,276.44	13.77	5,043.47
149.81	1,156.69	148.76	1,290.07	155.08	1,165.53	197.58	1,449.30	208.94	1,583.72	185.09	1,333.03
26.09	61.59	40.72	97.73	6.55	12.87	16.64	35.09	78.65	178.76	59.76	138.55
87.56	210.12	70.54	162.11	63.50	120.74	55.85	103.87	54.06	118.26	77.33	197.32
	1,428.40		1,549.91		1,299.14		1,588.26		1,880.74		1,668.90
6.71	325.86	7.23	296.26	6.99	289.63	7.49	310.81	6.28	263.70	6.55	301.04
4.36	190.32	3.73	145.59	4.89	145.16	6.39	160.19	5.85	181.38	6.03	210.15
16.28	304.33	10.12	303.0	8.69	343.29	9.61	350.2	11.61	398.21	10.39	337.2
163.83	6,548.81	183.80	8,186.21	180.39	9,402.60	179.84	9,012.06	195.93	8,884.76	191.35	9,020.90
0.51	68.52	0.39	52.77	0.43	92.12	0.27	72.68	0.08	19.52	0.09	18.07
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
347.75	287.24	298.50	200.93	180.82	219.26	216.24	189.97	212.07	114.32	134.77	93.35
	315.28		219.63		586.88		551.39		337.24		332.28
	695.87		473.33		898.27		814.05		471.08		443.70
384.97	35,325.94	397.56	57,579.92	454.40	60,799.07	511.74	56,098.52	624.26	74,099.07	718.92	53,764.55
730.30	382.99	735.13	386.77	769.03	n/a	649.70	n/a	704.81	n/a	800.46	n/a
180.15	4,041.29	192.45	4,649.91	208.54	3,711.53	228.71	3,606.66	209.25	3,481.61	183.08	3,242.78
7.42	3,501.19	6.88	3,987.53	5.89	3,842.11	6.12	3,922.03	5.56	4,005.48	6.75	3,452.21
11.84	6,385.07	13.92	8,436.21	11.27	7,791.46	8.61	5,971.89	7.33	5,746.46	7.84	4,505.38
15.72	6,922.56	17.01	8,658.08	15.37	9,958.13	19.80	12,468.22	20.05	14,409.47	20.45	13,816.89
975.75	647.35	923.76	774.20	835.27	734.48	752.91	639.21	630.64	586.35	553.05	405.56
9.36	1,320.80	8.86	1,364.59	9.11	1,454.46	8.71	1,434.55	9.74	1,734.96	9.88	1,863.82
	18,776.97		23,220.61		23,780.65		24,435.91		26,482.73		24,043.86
10.97	417.46	12.23	366.94	12.81	353.78	12.39	381.66	12.99	416.05	11.73	384.62
	363.89		437.61		964.10		1,076.71		1,242.70		1,052.23
72,612.30		101,572.94		105,894.41		101,691.41		122,078.47		99,513.38	

TABLE 6. VALUE OF MINERALS AND PETROLEUM BY REGION BY COMMODITY

REGION	2014–15 Value
Pilbara Region	
Iron Ore	51,582,902,937
Gold and Silver	996,881,716
Manganese and Salt	569,977,369
Copper	289,363,051
Other	157,762,274
Total	53,596,887,347

Offshore Petroleum	
Liquefied Natural Gas	13,816,888,220
Crude Oil and Condensate	7,930,938,297
Natural Gas	1,807,244,420
LPG Butane and Propane	405,560,739
Total	23,960,631,676

Goldfields–Esperance Region	
Gold	5,930,098,986
Nickel, Platinum and Palladium	2,631,025,427
Cobalt	194,122,930
Silver and Rare Earths	191,997,675
Copper and Zinc	186,842,019
Gypsum and Limesand–Limestone	15,425,296
Construction Materials	14,266,645
Total	9,163,778,978

Peel Region	
Alumina	5,043,466,832
Gold, Silver and Copper	1,314,812,649
Total	6,358,279,481

Mid West Region	
Copper, Lead and Zinc	947,830,726
Iron ore	835,345,573
Gold	829,527,384
Heavy Mineral Sands and Vanadium	122,384,437
Talc and Natural Gas	52,203,107
Silver	33,740,428
Gypsum and Limesand–Limestone	3,963,441
Construction Materials and other	1,339,256
Condensate	448,659
Total	2,826,783,011

REGION	2014–15 Value
Wheatbelt Region	
Iron ore	1,091,024,336
Nickel, Copper and Salt	486,051,785
Gypsum and Heavy Mineral Sands	292,120,580
Gold and Silver	162,291,842
Other	37,569,192
Total	2,069,057,735

Kimberley Region	
Diamonds and Crude Oil	354,962,021
Iron Ore	255,272,604
Nickel, Copper, Cobalt, Gold and Silver	217,239,570
Construction Materials and Gems	10,402,199
Total	837,876,394

South West Region	
Coal	301,040,414
Clay, Limesand–Limestone, Sandstone and Spodumene	141,062,489
Heavy Mineral Sands and Tantalum	39,523,016
Total	481,625,919

Gascoyne Region	
Salt and Gems	127,340,696
Gypsum and Limesand–Limestone	4,902,157
Construction Materials	309,293
Total	132,552,146

Perth Metropolitan Region	
Construction Materials, Silica Sand and Limesand–Limestone	80,030,181

Great Southern Region	
Spongolite, Silica Sand and Limesand–Limestone	5,884,573

TABLE 7. VALUE OF MINERALS AND PETROLEUM BY REGION BY LOCAL GOVERNMENT AREA

REGION	2014–15 Value
Pilbara Region	
East Pilbara	26,715,414,056
Ashburton	26,269,146,803
Port Hedland and Marble Bar	451,020,366
Roebourne and Karratha	161,306,122
Total	53,596,887,347

Offshore Petroleum	23,970,147,551
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Goldfields-Esperance Region	
Coolgardie	2,584,596,531
Kalgoorlie-Boulder	2,264,974,497
Leonora	1,511,316,934
Laverton	1,945,285,687
Ravensthorpe	562,988,014
Menzies and Esperance	257,687,315
Dundas	36,930,000
Total	9,163,778,978

Peel Region	
Waroona	3,402,523,672
Boddington	2,955,755,809
Total	6,358,279,481

Mid West Region	
Meekatharra and Morawa	925,244,105
Yalgoo and Carnamah	660,798,708
Wiluna and Three Springs	468,200,687
Cue, Coorow and Geraldton	467,615,149
Mullewa and Mt Magnet	136,808,750
Northampton and Perenjori	122,708,472
Irwin and Murchison	45,407,139
Total	2,826,783,011

Wheatbelt Region	
Yilgarn	1,101,922,572
Dalwallinu and Kondinin	494,129,027
Dandaragan and Kellerberrin	288,608,165
Lake Grace and Westonia	146,813,283
Gingin, Koorda and Northam	31,160,049
Moora and Wyalkatchem	6,424,639
Total	2,069,057,735

REGION	2014–15 Value
Kimberley Region	
Derby–West Kimberley	260,819,977
Wyndham-East Kimberley	354,870,664
Halls Creek	217,247,901
Broome	1,937,852
Total	837,876,394

South West Region	
Bridgetown–Greenbushes, Capel and Collicie	475,150,209
Bunbury, Dardanup, Manjimup and Donnybrook	6,475,710
Total	481,625,919

Gascoyne Region	
Carnarvon	84,356,773
Exmouth, Shark Bay and Upper Gascoyne	48,195,373
Total	132,552,146

Perth Metropolitan Region	
Kalamunda, Swan and Wanneroo	45,229,244
Cockburn, Kwinana and Rockingham	34,800,937
Total	80,030,181

Great Southern Region	
Albany, Denmark and Plantagenet	5,884,573

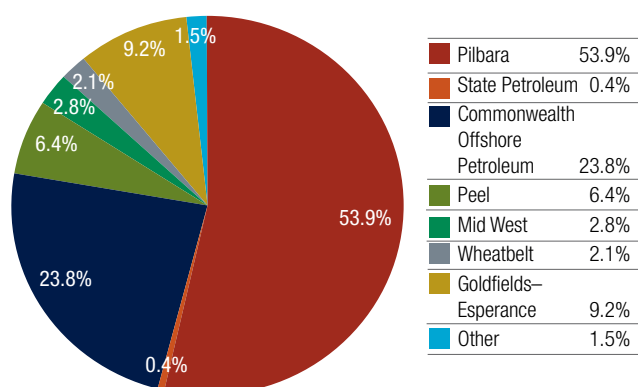

Figure 62 | Value of Minerals and Petroleum by Region 2014–15
Total \$99.5 Billion Source: DMP

TABLE 8. AVERAGE NUMBER OF PERSONS EMPLOYED IN THE WA MINERALS INDUSTRY

MINERAL/Company	Operating Site	2013–14	2014–15
BAUXITE – ALUMINA			
Alcoa World Alumina Australia	Huntly	903	810
	Kwinana Alumina Refinery	1,305	1,315
	Pinjarra Alumina Refinery	1,619	1,524
	Wagerup Alumina Refinery	1,034	1,025
	Willowdale	333	343
Doral Fused Materials Pty Ltd	Rockingham Fused Alumina Plant	82	0
South32 Worsley Alumina Pty Ltd	Boddington Bauxite	371	421
	Worsley Alumina Refinery	1,843	1,820
TOTAL BAUXITE – ALUMINA		7,490	7,258
BASE METALS			
Aditya Birla Minerals Limited	Nifty Copper Operation	591	445
Blackrock Metals Pty Ltd	Whim Creek Copper Mine	6	6
Independence Jaguar Limited	Jaguar	345	347
Minerals And Metals Group	Golden Grove	880	864
Qube Ports Pty Ltd	Geraldton Container Facility / Qube	0	5
Rossllyn Hill Mining Pty Ltd	Paroo Station Mine	129	81
Sandfire Resources NL	DeGrussa Mine	692	783
Venturex Pilbara Pty Ltd	Whim Creek Copper Mine	6	0
TOTAL BASE METALS		2,649	2,531
COAL			
Premier Coal Limited	Premier	216	260
The Griffin Coal Mining Company Pty Limited	Muja Open Cut	422	698
TOTAL COAL		638	958
DIAMONDS			
Argyle Diamond Mines Pty Limited	Argyle Diamond Mine	1,311	1,105
Kimberley Diamond Company NL	Ellendale / Kimberley Diamond	258	190
Merlin Diamonds Limited	Wangara Laboratory	3	3
TOTAL DIAMONDS		1,572	1,298
GOLD			
Abalone (WA) Pty Ltd	The Elk	0	1
Avoca Resources Ltd	Higginsville Gold Project / Avoca	507	444
Agnew Gold Mining Company Pty Limited	Agnew-Emu	542	676
Andy Well Mining Pty Ltd	Andy Well	81	111
Anglogold Ashanti Australia Limited	Sunrise Dam Gold Mine	880	783
	Tropicana Gold Mine	445	456
Barrick Gold Of Australia Ltd	Darlot Gold Mine	203	0
	Granny Smith	223	0
	Lawlers	216	0
	Plutonic	282	0
	Kalgoorlie Operations/Northern Star	371	0
Beacon Minerals Limited	Halleys East	9	9
Big Bell Gold Operations Pty Ltd	Central Murchison Gold Project	0	7

MINERAL/Company	Operating Site	2013–14	2014–15
GOLD Continued			
BK Gold Mines Pty Ltd	British King Gold Operation	0	3
Blue Tiger Mines Pty Ltd	Gunga West Open Pit	5	0
	Newminster Open Pit	0	6
	Burbanks	3	0
BNM Australia Group Pty Ltd	Cue Battery Tailings / BNM	0	6
Bullabulling Operations Pty Ltd	Bullabulling	5	2
Capeview Pty Ltd	Warriedar Counsel	0	1
Central Norseman Gold Corporation Ltd	Central Norseman Gold	97	102
CIP Research And Development	Carbon Stripping Plant / CIP Research	0	1
Clifton Earthmoving Pty Ltd	Hatts Reward	0	2
Coolgardie Mining Company Pty Ltd	Burbanks	0	8
Dacian Gold Ltd	Mt Morgans Gold Mine	19	18
Darlot Mining Company Pty Ltd	Darlot Gold Mine	198	459
Dulcie Operations	Dulcie	0	2
Evolution Mining Limited	Edna May Gold Project	176	200
First National Pty Ltd	Lakewood Gold Processing	0	9
FMR Investments Pty Ltd	Gordon Sirdar Project	7	6
	Greenfields Mill	31	31
Focus Minerals (Laverton) Limited	Laverton Gold Project	19	8
	Three Mile Hill / Focus	18	6
	Tindals	10	0
GMK Exploration Pty Ltd	Meekatharra Gold Operations	46	0
Golden Iron Resources Ltd	Gwendolyn East Cutback Project	5	0
Goldfield Argonaut Pty Ltd	Golden Agate / Mulwarrie Central	0	2
GSM Mining Company Pty Ltd	Granny Smith	514	865
Halls Creek Mining Pty Ltd	Nicolsons Find	0	21
Hanking Gold Mining Pty Ltd	Southern Cross Operations	22	255
Haoma Mining NL	Bamboo Creek	10	6
HBJ Minerals Pty Ltd	South Kal Operations / Dioro	145	200
Kaituna Mining	North Bullfinch Gold Project	3	0
Kalnorth Gold Mines Limited	Lindsays Project	5	0
Kalgoorlie Consolidated Gold Mines Pty Ltd	Super Pit / KCGM	1,774	2,248
Kalgoorlie Mining Company (Bullant) Pty Ltd	Bullant Mine	2	0
Kentor Minerals (WA) Pty Ltd	Burnakura	1	0
La Mancha Resources Australia Pty Ltd	Frogs Leg	264	267
	White Foil	278	194
Lukah Mining Pty Ltd	The Mount	0	3
Matilda Operations Pty Ltd	Wiluna Gold Operations	0	3
Millennium Minerals Limited	Nullagine Gold Operations	213	260
Minjar Gold Pty Ltd	Minjar Gold Project	251	270
MKO Mines Pty Ltd	Bronzewing Gold Project	2	4
Mobile Gold Mining Pty Ltd	Pertha M Dump Leach	0	1

TABLE 8. AVERAGE NUMBER OF PERSONS EMPLOYED IN THE WA MINERALS INDUSTRY Continued

MINERAL/Company	Operating Site	2013–14	2014–15
GOLD Continued			
Monument Gold Operations Pty Ltd	Burnakura	4	24
Mount Magnet South NL	Kirkalocka	2	3
Mt Magnet Gold Pty Ltd	Mt Magnet	137	113
	Western Queen South	36	0
Newcrest Australia Ltd	Telfer Gold Mine	1,886	1,673
Newmont Boddington Gold Pty Ltd	Newmont Boddington Gold	2,744	3,009
	Jundee Gold Mine	445	0
Nex Metals Explorations Ltd	Kookynie Gold Project	4	5
Northern Star Resources Ltd	Jundee Gold Mine	38	695
	Kalgoorlie Operations / Northern Star	175	526
	Paulsens	307	303
	Plutonic Gold Mine	193	486
Northwest Nonferrous Australia Mining Pty Ltd	Indee Gold Mine	0	2
Northwest Resources Limited	Blue Spec – Golden Spec Mine	1	0
Paddington Gold Mine Pty Ltd	Paddington Gold	700	766
	Binduli	23	3
Phoenix Gold Limited	Kintore Mine	0	26
	Blue Funnel Project	12	0
Quartzvein Mining Pty Ltd	Gnows Nest	0	1
Ramelius Milling Services Pty Ltd	Burbanks Treatment Plant / Ramelius	47	15
	Coogee Project	30	0
	Kathleen Valley Gold Project	0	8
	Vivien Gold Project	0	9
Regis Resources Limited	Duketon Gold Project / Regis	172	215
	Garden Well Gold Project	542	449
	Rosemont Gold Project	103	192
Reed Resources Ltd	Sand Queen	1	1
Sandstone Industries Pty Ltd	Yundamindera Tailings	0	2
Saracen Gold Mines Pty Limited	Carosue Dam	216	208
Saracen Metals Pty Limited	Thunderbox Gold Mine	0	5
Saxonwood Holdings Pty Ltd	Hunter Street Stripping Plant	0	2
Sherwood Engineers Pty. Ltd.	O'connor – Carbon Stripping Plant	0	3
Silver Lake Resources Limited	Daisy Milano	180	243
	Murchison Operations / Silver Lake	160	14
	Lakewood – Fimtails Plant	43	0
	Randalls Gold Project	138	127
Southern Cross Goldfields Limited	Sandstone Project	0	2
St Barbara Mines Ltd	Gwalia	554	553
	King of the Hills	170	121
St Ives Gold Mining Company Pty Limited	Kambalda – St Ives	1,239	1,285
Stone Resources Australia Limited	Brightstar Beta – Mikado	5	3
Swan Gold Mining Limited	Mt Ida	2	2

MINERAL/Company	Operating Site	2013–14	2014–15
GOLD Continued			
	Swan Gold Davyhurst Project	0	6
	Carnegie Gold	6	0
Tanami Gold NL	Coyote Minesite	21	12
Western Australian Mint	Perth Airport Refinery / Perth Mint	101	105
Western Mining Pty Ltd	Cue Victory Project	2	2
Other		15	
TOTAL GOLD		18,336	19,175
HEAVY MINERAL SANDS			
BHP Titanium Minerals Pty Ltd	Beenup / BHP Titanium	7	6
Cristal Mining Australia Limited	North Shore / Cristal	146	149
Doral Mineral Sands Pty Ltd	Dardanup / Doral	258	320
GMA Garnet Pty Ltd	Geraldton / GMA Garnet	91	82
	Hose / GMA Garnet	70	65
Iluka Resources Limited	Capel Operations / Iluka	305	459
	Eneabba Group	60	79
	Gingin / Iluka	9	12
	Narngulu – Midwest Operations / Iluka	266	276
Keysbrook Leucoxene Pty Ltd	Keysbrook Mineral Sands Project	0	35
Minetec Chemical Industries Pty Ltd	Rockingham Zirconia Plan	85	0
Tronox Management Pty Ltd	Bunbury Port / Tronox	16	17
	Chandala – Muchea Dry Plant	600	364
	Cooljarloo	475	377
TOTAL HEAVY MINERAL SANDS		2,388	2,241
IRON ORE			
Air Liquide W.A. Pty Ltd	Hismelt Demolition / Air Liquide	1	0
Atlas Iron Limited	Abydos DSO Project	190	142
	Mt Dove	55	22
	Mt Webber Mine	201	123
	Pardoo Minesite	48	5
	Wodgina / Atlas Iron	208	149
BC Iron Limited	Nullagine Iron Ore Project	497	537
BHP Billiton Iron Ore Pty. Ltd.	Boodarie – Port Hedland	31	22
	Area C	3,298	3,334
	Eastern Ridge	1,935	1,950
	Homestead Borefield		19
	Jimblebar	1,301	2,856
	Mt Whaleback	4,401	4,023
	Nelson Point Port	3,515	2,786
	Yandi	4,506	2,727
	Yarnima Power Station	545	226
	Yarrie Group	246	0
	Orebody 18 – Wheelarra	48	0
Brierty Ltd	Western Turner Syncline Stage 2 Construction	0	91

TABLE 8. AVERAGE NUMBER OF PERSONS EMPLOYED IN THE WA MINERALS INDUSTRY Continued

MINERAL/Company	Operating Site	2013–14	2014–15
IRON ORE Continued			
Calibre Projects Pty Ltd	West Angelas Deposit B Project	42	161
	Western Turner Syncline	449	2
	Brockman 4 – Phase 2	6	0
	Orebody 24 Rail	40	0
Citic Pacific Mining Management Pty Ltd	Sino Iron Project / Citic Pacific	2,254	3,610
Cliffs Natural Resources Pty Ltd	Koolyanobbing Operations / Cliffs Natural Resources	1,187	985
Crosslands Resources Ltd	Jack Hills	6	6
Fortescue Metals Group Ltd	Anderson Point Port Expansion AP5	57	117
	Anderson Point Port Facility / FMG	1,525	1,506
	Christmas Creek Mine	4,331	2,843
	Cloudbreak	3,756	3,384
	Solomon Operations	715	3,546
Fast JV (Flour And Skm Team)	Eastern Ridge Orebody 24 Construction	90	0
GHD Pty Ltd	Jimblebar Non Process Infrastructure	131	0
Hammersley Hms Pty Ltd	Hope Downs	849	1,052
	Hope Downs 4 Operations	868	1,011
Hammersley Iron Pty Ltd	Yandicoogina	996	1,149
	Brockman	1,190	1,633
	Brockman 4 Operations	1,408	1,449
	Brockman Fuel Hub	0	23
	Dampier Port / Pilbara Iron	1,638	1,727
	Dampier Power Plant	0	15
	Greater Paraburdoo	1,057	1,286
	Marandoo	813	905
	Nammuldi Below Water Table	750	504
	Tom Price	1,731	2,180
Hismelt (Operations) Pty Limited	Hismelt Operations	78	21
IB Operations Pty Ltd	North Star Hematite	139	578
Karara Mining Limited	Karara – Blue Hills Group	650	658
	Karara Export Terminal	61	55
Kellogg Brown & Root Pty Ltd	Parker Point Fuel Farm	28	61
	West Angelas Fuel Hub	80	1
Kimberley Metals Group Pty Ltd	Ridges Iron Ore Project	155	82
Leighton Contractors Pty Ltd	Solomon Construction Project	3,048	0
Lycopodium Minerals Pty Ltd	Marandoo Phase 2 – Construction	258	0
Macmahon Holdings Pty Ltd	Orebody 18 – Wheelarra	366	0
Mine And Port Developments Joint Venture	Jimblebar Construction Site	841	43
	RGP 4/5 / Port Hedland Pace Project	820	349
Mineral Resources Limited	Iron Valley	0	173
Moly Metals Australia Pty Ltd	Spinifex Ridge Rehabilitation	0	12
Mt Gibson Mining Limited	Geraldton Port Facility Bulk Handling / Mt Gibson	47	53
	Extension Hill	95	132

MINERAL/Company	Operating Site	2013–14	2014–15
IRON ORE Continued			
	Koolan Iron Ore	615	416
	Perenjori Iron Ore Siding / Mt Gibson	111	162
	Ruvadini Rail Terminal	89	6
	Tallering Peak / Mt Gibson Mining	215	32
Pluton Resources Limited	Cockatoo Island	103	76
	Phils Creek	72	0
	Poondano	32	0
Polaris Metals Pty Ltd	Carina Iron Ore Mine	179	188
Process Minerals International Pty Ltd	Phils Creek	0	32
Rio Tinto Iron Ore Pty Ltd	Kangaroo Hill Village	29	31
	Cape Lambert	1,410	600
	West Angelas Power Plant	79	147
	West Pilbara Village	62	33
Robe River Mining Co Pty Ltd	Cape Lambert Port Operations / Pilbara Iron	1,289	1,602
	Pannawonica	871	880
	West Angelas	1,673	1,511
Roy Hill Iron Ore Pty Ltd	Roy Hill	790	1,925
Rutila Resources Limited	Balla Balla	6	4
Sinosteel Midwest Corporation Limited	Blue Hills Iron Ore Project	71	68
	Koolanooka	0	1
Top Iron Pty Ltd	Geraldton Port Storage Facility / Top Iron	0	3
	Mummaloo Iron Ore Project	29	52
TOTAL IRON ORE		61,306	58,093
MANGANESE			
Pilbara Manganese Pty Ltd	Woodie Woodie	533	517
Process Minerals International Pty Ltd	Nicholas Downs Manganese Project		0
Process Minerals International Pty Ltd	Peak Hill Manganese Project		0
Process Minerals International Pty Ltd	Woodie Woodie Tailings Treatment Plant	31	0
Total Manganese		564	517
Nickel			
BHP Billiton Nickel West Pty Ltd	Cliffs Nickel Project	217	225
	Kalgoorlie Nickel Smelter	449	395
	Kambalda Nickel Concentrator	129	119
	Kwinana Nickel Refinery	315	356
	Leinster Nickel Operation	680	279
	Mt Keith Operations	729	734
Consolidated Nickel Pty Ltd	Beta-Hunt Nickel Group	2	
First Quantum Minerals (Australia) Pty Limited	Ravensthorpe Nickel Operations	963	823
Fox Radio Hill Pty Ltd	Fox Radio Hill	8	5
Independence Long Pty Ltd	Long Shaft	130	120
Lake Johnston Pty Ltd	Lake Johnston Operations	25	0
	Mincor Operations – Miitel	183	0

TABLE 8. AVERAGE NUMBER OF PERSONS EMPLOYED IN THE WA MINERALS INDUSTRY Continued

MINERAL/Company	Operating Site	2013–14	2014–15
MANGANESE Continued			
	Otter Juan	31	0
Mincor Operations Pty Ltd	Mincor Operations		182
	Otter Juan – Coronet		7
Murrin Murrin Operations Pty Ltd	Murrin Murrin	1,384	1,332
Norilsk Nickel Avalon Pty Ltd	Avalon	6	3
	Cawse Nickel Operations	13	3
	Black Swan Nickel	10	0
	Waterloo	6	0
Panoramic Resources Limited	Lanfranchi	296	294
	Savannah Nickel Project	325	388
Poseidon Nickel Limited	Black Swan Nickel		12
	Lake Johnston Operations		57
	Windarra Nickel Project	9	32
Salt Lake Mining Pty Ltd	Beta-Hunt	28	89
Sirius Gold Pty Ltd	Nova Nickel Project	0	78
Western Areas Limited	Forrestania Nickel	495	556
Xstrata Nickel Australasia Operations Pty Ltd	Sinclair Nickel Project	10	3
	Cosmos	4	4
TOTAL NICKEL		6,447	6,096
SALT			
Dampier Salt Limited	Dampier Operations / Dampier Salt	249	191
	Lake Macleod / Dampier Salt	229	235
	Port Hedland / Dampier Salt	214	191
Onslow Salt Pty Ltd	Onslow Salt	290	240
Shark Bay Solar Salt JV	Shark Bay Resources	78	84
WA Salt Supply Koolyanobbing Pty Ltd	Lake Deborah East Salt	10	16
Western Salt Refinery Pty Ltd	Pink Lake	1	1
TOTAL SALT		1,071	958
TIN – TANTALUM – LITHIUM			
Alliance Mineral Assets Limited	Bald Hill Tantalite Project	0	8
Galaxy Lithium Australia Limited	Ravensthorpe Spodumene – Mt Cattlin	12	9
Global Advanced Metals Greenbushes Pty Ltd	Greenbushes Tantalum Mine	11	12
Global Advanced Metals Wodgina Pty Ltd	Wodgina Tantalum Mine	53	45
Nagrom And Co	Kelmscott / Nagrom	79	79
Talison Lithium Australia Pty Ltd	Greenbushes Lithium Mine	234	346
TOTAL TIN – TANTALUM – LITHIUM		389	499
TOTAL CHROMITE		23	8
TOTAL CLAYS		111	148
TOTAL CONSTRUCTION MATERIALS		1,055	1,394
TOTAL DIMENSION STONE		107	280
TOTAL GYPSUM		33	36
TOTAL INDUSTRIAL PEGMATITE MINERALS		20	29
TOTAL LIMESTONE – LIMESAND		222	258
TOTAL MINERAL EXPLORATION		2,314	2,190

MINERAL/Company	Operating Site	2013-14	2014-15
TOTAL PHOSPHATE		175	165
TOTAL RARE EARTHS		131	153
TOTAL SILICA – SILICA SAND		668	346
TOTAL SILVER		44	49
TOTAL TALC		47	60
TOTAL TUNGSTEN – MOLYBDENUM		128	24
TOTAL VANADIUM – TITANIUM		139	75
TOTAL PORTS		809	727
OTHER		99	357
TOTAL		108,975	105,922

PETROLEUM (onshore facilities and pipelines covered under *Petroleum Pipelines Act 1969*, *Petroleum (Submerged Land) Act 1982*, *Petroleum (Submerged Lands) Act 1982* and *Petroleum Geothermal Energy Resources Act 1967*)

Company	Operating site	2013-14	2014-15
APA Group	various laterals and pipelines	182	316
Apache Energy Ltd	Devil Creek, Varanus and Burrup Fertilisers Lateral	162	0
APT Parmelia Pty Ltd	Mondarra Gas Storage Facility	219	9
ARC Energy Ltd	Dongara and Hovea Production Facilities, Mt Horner, Woodada and Well Intervention Activities	22	1
Barrick Gold	Plutonic Lateral	8	5
BHP Billiton Petroleum	Macedon Gas Project	62	16
Buru Energy	includes Ungani and Blina Fields and Pipelines	40	110
Calenergy Resources (Aust) Ltd	Whicher Range-4 ST1	10	8
Chevron (Aust) Pty Ltd	Gorgon, WA Oil Asset and Drilling and Wheatstone	815	760
DBNGP (WA) Transmission Pty Ltd	Dampier-Bunbury Natural Gas Pipeline	246	516
Empire Oil Company (WA) Ltd	Red Gully Pipeline and Processing Facility	8	7
Goldfields Gas Transmission Pty Ltd	Goldfields Gas Pipeline	153	90
Midwest Joint Venture	Mid West Pipeline	11	12
Newgen Neerabup Partnership	Neerabup Pipeline-PL75	13	13
Newmont Yandal Operations Pty Ltd	Jundee Lateral	5	5
Norilsk	Cawse Lateral	4	5
Norwest Energy NL	P00084	3	0
Origin Energy	Cockburn Lateral, Jingemia and Beharra Springs	18	18
Pilbara Iron	Cape Lambert and Paraburdoo Gas Laterals	12	11
Redback Pipeline Pty Ltd	Magellan Lateral	7	5
Robe River Iron Ore Associates	West Angelas Petroleum (Gas) Pipelines and Stations	53	2
Roc Oil	Arrowsmith Stabilisation Facility	15	21
Southern Cross Pipelines Aust Pty Ltd	Mt Keith, Parkeston, Kambalda and Leinster Laterals	25	12
Other	various laterals and pipelines	23	310
TOTAL WA ONSHORE AND COASTAL WATERS		2,113	2,252

SOURCE: AXTAT Reporting System, Resources Safety Division, Department of Mines and Petroleum for minerals data and monthly status reports submitted to the department for Western Australia onshore petroleum facilities and pipelines data. Figures include employees as well as contractors.

TABLE 9. PRINCIPAL MINERAL AND PETROLEUM PRODUCERS (EFFECTIVE SEPTEMBER 2015)

BASE METALS

Aditya Birla Minerals Ltd
Level 3, 256 Adelaide Terrace
Perth WA 6000
(08) 9366 8800
Nifty
adityabirlaminerals.com.au

BHP Billiton Nickel West Pty Ltd
Level 41, City Square
125 St George's Terrace
Perth WA 6000
(08) 6321 0000
Kambalda
bhpbilliton.com

MMG Golden Grove Pty Ltd
Level 23, 28 Freshwater Place
Southbank Vic 3006
(03) 9288 0888
Golden Grove
mmg.com

Independence Group NL
Level 5, 85 South Perth Esplanade
South Perth WA 6151
(08) 9238 8300
Teutonic Bore – Jaguar
igo.com.au

Newcrest Mining Ltd
234 Railway Pde
West Leederville WA 6007
(08) 9270 7070
Telfer
newcrest.com.au

Newmont Boddington Pty Ltd
388 Hay Street
Subiaco WA 6008
(08) 9423 6100
Boddington Gold
newmont.com

Rosslyn Hill Mining Pty Ltd
Suite 1D, 21 Teddington Road
Burswood WA 6100
(08) 9267 7000
Paroo Station Lead
rosslynhillmining.com.au

Sandfire Resources NL
Level 1, 31 Ventnor Avenue
West Perth WA 6005
(08) 6430 3800
DeGrussa–Doolgunna
sandfire.com.au

BAUXITE–ALUMINA

ALUMINA
Alcoa of Australia Limited
181–205 Davy Street
Booragoon WA 6154
(08) 9316 5111
Willowdale, Huntly
alcoa.com/australia

BHP Billiton Worsley Alumina Pty Ltd
Gastaldo Road
Collie WA 6225
(08) 9734 8311
Worsley
bhpbilliton.com

CLAY

Attapulgit
Hudson Resources Ltd
Level 2, 131 Macquarie Street
Sydney NSW 2000
(02) 9251 7177
Lake Narramyne
hudsonresources.com

Clay Shale
Wesfarmers Premier Coal Ltd
Premier Road
Collie WA 6225
(08) 9780 2222
Collie
wesfarmers.com.au

Saponite
Watheroo Minerals Pty Ltd
PO Box 353
Dunsborough WA 6281
0418 140 929
Watheroo Clays
bentonitewa.com.au

COAL

The Griffin Coal Mining Company Pty Ltd
1st Floor, 677 Murray Street
West Perth WA 6005
(08) 6188 2200
Collie
griffincoal.com.au

Premier Coal Ltd
Premier Road
Collie WA 6225
(08) 9780 2222
Collie
premiercoal.com.au

CONSTRUCTION MATERIALS

Aggregate
Boral Construction Materials Group Ltd
63–69 Abernethy Road
Belmont WA 6104
(08) 9333 3400
Mt Regal, Pilbara, Seven Mile Hill
boral.com.au

Hanson Construction Materials
Level 1, 35 Great Eastern Hwy
Rivervale, WA 6103
Learmonth, Mt Regal
hanson.com.au

Holcim (Australia) Pty Ltd
Technology Park
18 Brodie–Hall Drive
Bentley WA 6102
(08) 9212 2000
Burrup–Dampier, Newman, Turner
River
holcim.com.au

WA Limestone Company
PO Box 1457
Bibra Lake WA 6965
(08) 9418 5355
Gregory West
walimestone.com.au

Gravel

MLG Oz Pty Ltd

PO Box 1484
West Kalgoorlie WA 6430
(08) 9022 7746
Eight Mile Rock Hole, Canegrass
mlgoz.com.au

Scorpion Mining Pty Ltd

PO Box 10047
Kalgoorlie WA 6433
(08) 9091 3586
Cawse Sand

WA Limestone Company

401 Spearwood Avenue
Bibra Lake WA 6163
(08) 9434 7777
Pickering Brook
walimestone.com

Sand

ROCLA Pty Ltd

130 Fauntleroy Avenue
Redcliffe WA 6104
(08) 9475 2500
Gnangara, Jandabup
rocla.com.au

Holcim (Australia) Pty Ltd

Technology Park
18 Brodie–Hall Drive
Bentley WA 6102
(08) 9212 2000
Various
holcim.com.au

MLG Oz Pty Ltd

PO Box 1484
West Kalgoorlie WA 6430
(08) 9022 7746
Canegrass, Eight Mile Rock Hole
Jonah Bore
mlgoz.com.au

DIAMONDS

Argyle Diamonds Ltd

1 William Street
Perth WA 6000
(08) 9482 1166
Argyle
argylediamonds.com.au

DIMENSION STONE

Granite

Dimension Stone Group Australia Pty Ltd

Eyre Highway
Norseman WA 6443
(08) 9039 3442
Fraser Range Granite

Marble

Stone Dimensions Australia Pty Ltd

PO Box 342
South Perth WA 3951
(08) 9474 3355
Nanutarra Marbles
stonemarble.com.au

GOLD

Agnew Gold Mining Co Pty Ltd

PMB 10
Leinster WA 6437
(08) 9088 3822
Agnew
goldfields.co.za

AngloGold Ashanti Australia Limited

Level 13, St Martins Tower
44 St Georges Terrace
Perth WA 6000
(08) 9425 4600

Sunrise Dam, Tropicana
anglogoldashanti.com

Gold Fields Australia Pty Ltd

Level 5, 50 Colin Street
West Perth WA 6005
(08) 9211 9200
Darlot, Granny Smith, Lawlers
goldfields.com.au

Kalgoorlie Consolidated Gold Mines Pty Ltd

Private Mail Bag 27
Kalgoorlie WA 6433
(08) 9022 1100
Super Pit Gold Operation
superpit.com.au

Newcrest Mining Limited

193 Great Eastern Highway
Belmont WA 6104
(08) 9270 7070
Telfer
newcrest.com.au

Newmont Boddington Pty Ltd

Level 1, 388 Hay Street
Subiaco WA 6008
(08) 9423 6100
Boddington
newmont.com

Northern Star Resources Ltd

Level 1, 1 Puccini Court
Stirling WA 6021
(08) 6188 2100
Paulsens, Kundana East, Jundee-
Nimary,
Kanowna-Golden Valley, Golden
Feather, Plutonic
nsrltd.com

Norton Gold Fields Ltd

Level 36, Exchange Plaza
2 The Esplanade
Perth WA 6000
(08) 9263 9700
Paddington – Mt Pleasant, Bullant
nortongoldfields.com.au

Regis Resources Ltd

Level 1, 1 Alvan Street
Subiaco WA 6008
(08) 9442 2200
Garden Well, Duketon, Moolart Well
regisresources.com.au

St Barbara Mines Limited

PO Box 1161,
West Perth WA 6872
(08) 9476 5555
Gwalia – Leonora, Tarmoola – King
of the Hills
stbarbara.com.au

St Ives Gold Mining Co Pty Ltd

PO Box 359
Kambalda WA 6442
(08) 9088 1111
Kambalda–St Ives
goldfields.co.za

TABLE 9. PRINCIPAL MINERAL AND PETROLEUM PRODUCERS Continued (EFFECTIVE SEPTEMBER 2015)

Sandfire Resources NL
Level 1, 31 Ventnor Avenue
West Perth WA 6005
(08) 6430 3800
DeGrussa–Dulgunna
sandfire.com.au

GYPSUM

Dampier Salt Ltd
37 Belmont Avenue
Belmont WA 6104
(08) 9270 9270
Lake MacLeod
dampiersalt.com.au

CSR Ltd

Locked Bag 1345
North Ryde NWS 2113
1800 028 327 Head Office
Jurien Bay
csr.com.au

Whitfield Minerals Pty Ltd

PO Box 1363
Mandurah WA 6210
(08) 9535 9299
Lake Cowan

HEAVY MINERAL SANDS

Garnet Sand

GMA Garnet Pty Ltd
Lot 122 Goulds Road
Geraldton WA 6532
(08) 9923 6000
Port Gregory
garnetsales.com

Ilmenite, Leucoxene, Rutile and Zircon

Doral Mineral Sands Pty Ltd
Lot 7, 1 Harris Road
Picton WA 6229
(08) 9725 5444
Dardanup
doral.com.au

Iluka Resources Ltd

Level 23, 140 St Georges Terrace
Perth WA 6000
(08) 9360 4700
Capel, Eneabba
iluka.com

Tronox Ltd

1 Brodie–Hall Drive
Bentley WA 6102
(08) 9365 1333
Cooljarloo
tiwest.com.au

IRON ORE

Atlas Iron Ltd
Level 18, 300 Murray Street
Perth WA 6000
(08) 6228 8000
Abydos, Mt Dove, Mt Webber,
Wodgina
atlasiron.com.au

BC Iron Limited

Level 1, 15 Rheola Street
West Perth WA 6005
(08) 6311 3400
Iron Valley, Nullagine
bciron.com.au

BHP Billiton Iron Ore

125 St Georges Terrace
Perth WA 6000
(08) 6224 4444
Various Pilbara
bhpbilliton.com

Citic Pacific Mining Management Pty Ltd

99 St Georges Terrace
Perth WA 6000
(08) 9226 8888
Sino Iron
citicpacificmining.com

Cliffs Natural Resources Pty Ltd

Level 12, 1 William Street
Perth WA 6000
(08) 9426 3333
Koolyanobbing
cliffsnaturalresources.com

Fortescue Metals Group Ltd

Level 2, 87 Adelaide Terrace
East Perth WA 6004
(08) 6218 8888
East Pilbara
Nullagine, Solomon
www.fmgl.com.au

Karara Mining Ltd

Level 9, London House
216 St Georges Terrace
Perth WA 6000
(08) 9480 8700
Karara–Blue Hills
gindalbie.com.au

Mineral Resources Limited

1 Sleat Road
Applecross WA 6153
(08) 9329 3600
Carina
mineralresources.com.au

Mt Gibson Iron Limited

Level 1, 2 Kings Park Road
West Perth WA 6005
(08) 9426 7500
Koolan Island, Mt Gibson
mtgibsoniron.com.au

Pluton Resources Limited

Level 1, 5 Ord Street
West Perth WA 6005
(08) 6145 1800
Cockatoo Island
plutonresources.com

Rio Tinto Iron Ore

152 St Georges Terrace
Perth WA 6000
(08) 9327 2000
Various Pilbara
riotintoironore.com

LIMESAND–LIMESTONE

Cockburn Cement Ltd

Lot 242, Russell Road
Munster WA 6163
(08) 9411 1000
Various sites
cockburncement.com.au

Westdean Holdings Pty Ltd

Suite 1, 110 Robinson Avenue
Belmont WA 6104
1800 644 951
Dongara–Denison, Lancelin, Jurien
agltime.com.au

FQM Australia Nickel Pty Ltd

Level 1, 24 Outram Street
West Perth WA 6005
(08) 9346 0100
Ravensthorpe
first-quantum.com

WA Limestone Company

401 Spearwood Avenue
Bilbra Lake WA 6163
(08) 9434 7777
Postans
walimestone.com

MANGANESE**Pilbara Manganese Pty Ltd**

Lot 2524 North West Coastal
Highway
South Hedland WA 6722
(08) 9172 0900
Woodie Woodie
consmineals.com.au

NICKEL**BHP Billiton Nickel West Pty Ltd**

125 St George's Terrace
Perth WA 6845
(08) 6321 0000
Various
bhpbilliton.com

FQM Australia Nickel Pty Ltd

Level 1, 24 Outram Street
West Perth WA 6005
(08) 9346 0100
Ravensthorpe
first-quantum.com

Murrin Murrin Resources Pty Ltd

Level 10, 58 Mounts Bay Road
Perth WA 6000
(08) 9212 8400
Murrin Murrin
minara.com.au

Panoramic Resources Ltd

Level 9, 553 Hay Street
Perth WA 6000
(08) 6266 8600
Savannah, Lanfranchi Tramways
panoramicresources.com

Western Areas Limited

Level 2, Kings Park Road
West Perth WA 6005
(08) 9334 7777
Forrestania, Flying Fox
Lounge Lizard, Spotted Quoll
westernareas.com.au

PALLADIUM**BHP Billiton Nickel West Pty Ltd**

125 St George's Terrace
Perth WA 6845
(08) 6321 0000
Kambalda
bhpbilliton.com

PETROLEUM**AWE Ltd**

679 Murray Street
West Perth WA 6005
(08) 9480 1300
Corbyas, Dongara
awexp.com.au

Buru Energy Limited

Level 2, 88 William Street
Perth WA 6000
1800 337 330
Ungani
buruenergy.com.au

BHP Billiton

125 St Georges Terrace
Perth WA 6000
(08) 6321 0000
Pyrenees, Stybarrow, Macedon
bhpbilliton.com

Chevron Australia Pty Ltd

Level 24, QV1 Building
250 St Georges Terrace
Perth WA 6000
(08) 9216 4000
Various
chevron.com

Empire Oil Company (WA) Limited

229 Stirling Highway
Claremont WA 6010
(08) 9284 6422
Red Gully
empireoil.com.au

ENI Australia Limited

266 Adelaide Terrace
Perth WA 6000
(08) 9320 1111
Blacktip
eni.com

Origin Energy Resources Ltd

34 Colin Street
West Perth WA 6005
(08) 9324 6111
Beharra Springs
originenergy.com.au

Quadrant Energy

Level 9, 100 St Georges Terrace
Perth WA 6000
(08) 6218 7100
Various
quadrantenergy.com.au

Roc Oil (WA) Pty Limited

Suite 2, 100 Havelock Street
West Perth WA 6005
(08) 9219 7111
Cliff Head
rocoil.com.au

Santos Limited

Level 1, 40 The Esplanade
Perth WA 6000
(08) 9333 9500
Mutineer-Exeter
santos.com.au

Vermilion Oil and Gas Australia Pty Ltd

Level 5, 30 The Esplanade
Perth WA 6000
(08) 9215 0300
Wandoo
vermillionenergy.com

Woodside Energy Ltd

240 St Georges Terrace
Perth WA 6000
(08) 9348 4000
Various
woodside.com.au

TABLE 9. PRINCIPAL MINERAL AND PETROLEUM PRODUCERS Continued (EFFECTIVE SEPTEMBER 2015)

PLATINUM

BHP Billiton Nickel West Pty Ltd

125 St George's Terrace
Perth WA 6845
(08) 6321 0000
Kambalda
bhpbilliton.com

RARE EARTHS

Lynas Corporation Ltd

Level 1, 7 Tully Road
East Perth WA 6004
(08) 6241 3800
Mount Weld
lynascorp.com

SALT

Dampier Salt Ltd

37 Belmont Avenue
Belmont WA 6104
(08) 9270 9270
Dampier, Lake MacLeod, Port
Hedland
dampiersalt.com.au

Onslow Salt Pty Ltd

Level 16, 2 The Esplanade
Perth WA 6000
(08) 9265 8000
Onslow Salt

Shark Bay Salt Pty Ltd

Level 16, 2 The Esplanade
Perth WA 6000
(08) 9265 8000
Useless Loop
mitsui.com/au

WA Salt Supply Ltd

Lot 102–103 Cockburn Road
North Coogee WA 6163
(08) 9431 9431
Lake Deborah East
wasalt.com.au

SILICA – SILICA SAND

SILICA

Simcoa Operations Pty Ltd

973 Marriott Road
Wellesley WA 6233
(08) 9780 6666
Dalaroo, Kemerton
simcoa.com.au

SILICA SAND

TT Sand Pty Ltd

570 Mindijup Road
Manypeaks WA 6328
(08) 9846 1222
Mindijup

Kemerton Silica Sand Pty Ltd

Suite 5, 363–367 Albany Highway
Victoria Park WA 610
(08) 9355 0266
www.ksspl.com.au

Rocla Quarry Products

3 Casella Place
Kewdale WA 6105
(08) 9353 9800
Gnangara
rocla.com.au

SPONGOLITE

Southern Spongolite Industries Pty Ltd

Red Gum Pass
Kendenup WA 6323
(08) 9841 7549
Red Gum Spongolite

TALC

Imerys Talc Australia Pty Ltd

Perenjori Road
Three Springs WA 6519
(08) 9954 3000
Three Springs
luzenac.com.au

TIN–TANTALUM–LITHIUM

SPODUMENE

Talison Lithium Australia Pty Ltd

Level 4, 37 St Georges Terrace
Perth WA 6000
(08) 9263 5555
Greenbushes
talison.com.au

TANTALUM

Global Advanced Metals Pty Ltd

Ground Floor
76 Kings Park Road
West Perth WA 6005
(08) 6217 2500
Greenbushes
globaladvancedmetals.com

VANADIUM

Atlantic Ltd

108 St Georges Terrace
Perth WA 6000
(08) 6141 7100
Windimurra
atlanticltd.com.au

ABBREVIATIONS

A\$	Australian dollar	Mct	million carats
ABS	Australian Bureau of Statistics	Mha	million hectares
bbbl	barrels of oil	MMbbl	million barrels
bbbl/d	barrels per day	Moz	million ounces
Bcm	billion cubic metres	Mt	million tonnes
Btu	British Thermal Units	Mtoe	million tonnes of oil equivalent
ct	carat	Mt/a	million tonnes per annum
DIS	Department of Industry and Science	OPEC	Organization of Petroleum Exporting Countries
GDP	Gross Domestic Product	oz	ounce
GJ	Gigajoule	oz/a	ounce per annum
Gm ³	billion cubic metres	PJ	petajoules
ha	hectares	RBA	Reserve Bank of Australia
kl	kilolitres	t	tonne
km	kilometres	t/a	tonnes per annum
km ²	square kilometres	Tcf	trillion cubic feet
kt	thousand tonnes	t/d	tonnes per day
LME	London Metal Exchange	TJ/d	terajoules per day
m	metre	US\$	United States dollar
Mboe	millions of barrels of oil equivalent		

WEIGHTS AND MEASURES

kilo	10 ³	1,000
mega	10 ⁶	1,000,000
giga	10 ⁹	1,000,000,000
tera	10 ¹²	1,000,000,000,000
peta	10 ¹⁵	1,000,000,000,000,000
exa	10 ¹⁸	1,000,000,000,000,000,000
zetta	10 ²¹	1,000,000,000,000,000,000,000
yotta	10 ²⁴	1,000,000,000,000,000,000,000,000

UNITS AND CONVERSION FACTORS

	Metric Unit	Symbol	Imperial Unit
Mass	1 gram	g	= 0.032151 troy (fine) ounce (oz)
	1 kilogram	kg	= 2.204624 pounds (lb)
	1 tonne	t	= 1.10231 United States short ton [1 US short ton = 2,000 lb]
	1 tonne	t	= 0.98421 United Kingdom long ton [1 UK long ton = 2,240 lb]
	1 tonne LNG	t	= 52,000,000 British Thermal Units (Btu)
Volume	1 kilolitre	kL	= 6.28981 barrels (bb)
	1 cubic metre	m ³	= 35.3147 cubic feet (ft ³) [1 kilolitre (kl) = 1 cubic metre (m ³)]
Energy	1 kilojoule	kJ	= 0.94781 British Thermal Units (Btu)
Energy Content		Prefix	
Coal	19.7 GJ/t	kilo (k)	10 ³
Condensate	32.0 MJ/L	mega (M)	10 ⁶
Crude oil	37.0 MJ/L	giga (G)	10 ⁹
LNG	25.0 MJ/L	tera (T)	10 ¹²
Natural gas	38.2 MJ/m ³	peta (P)	10 ¹⁵
LPG-butane	28.7 MJ/L (1tonne LPG-butane = 1,720 litres)		
LPG-propane	25.4 MJ/L (1tonne LPG-propane = 1,960 litres)		

DATA SOURCES

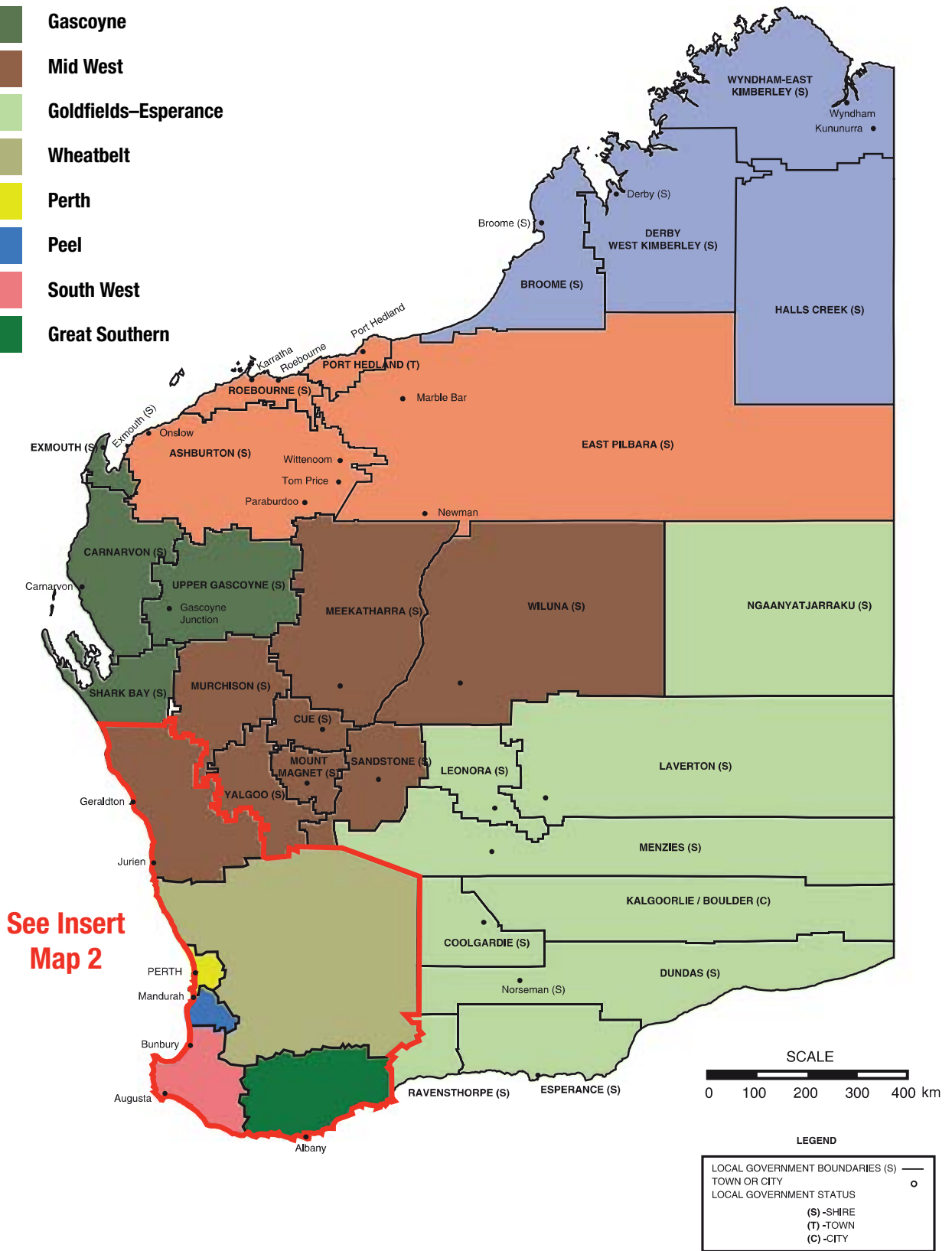
Quantities and values for minerals and petroleum in this publication are collected from a variety of sources including:

The Department's royalty returns, various company annual reports and quarterly Australian Stock Exchange reports, State port authority statistics, the ABS and DIS.

Quantities specified relate to either mine production or sales as listed below for each commodity.

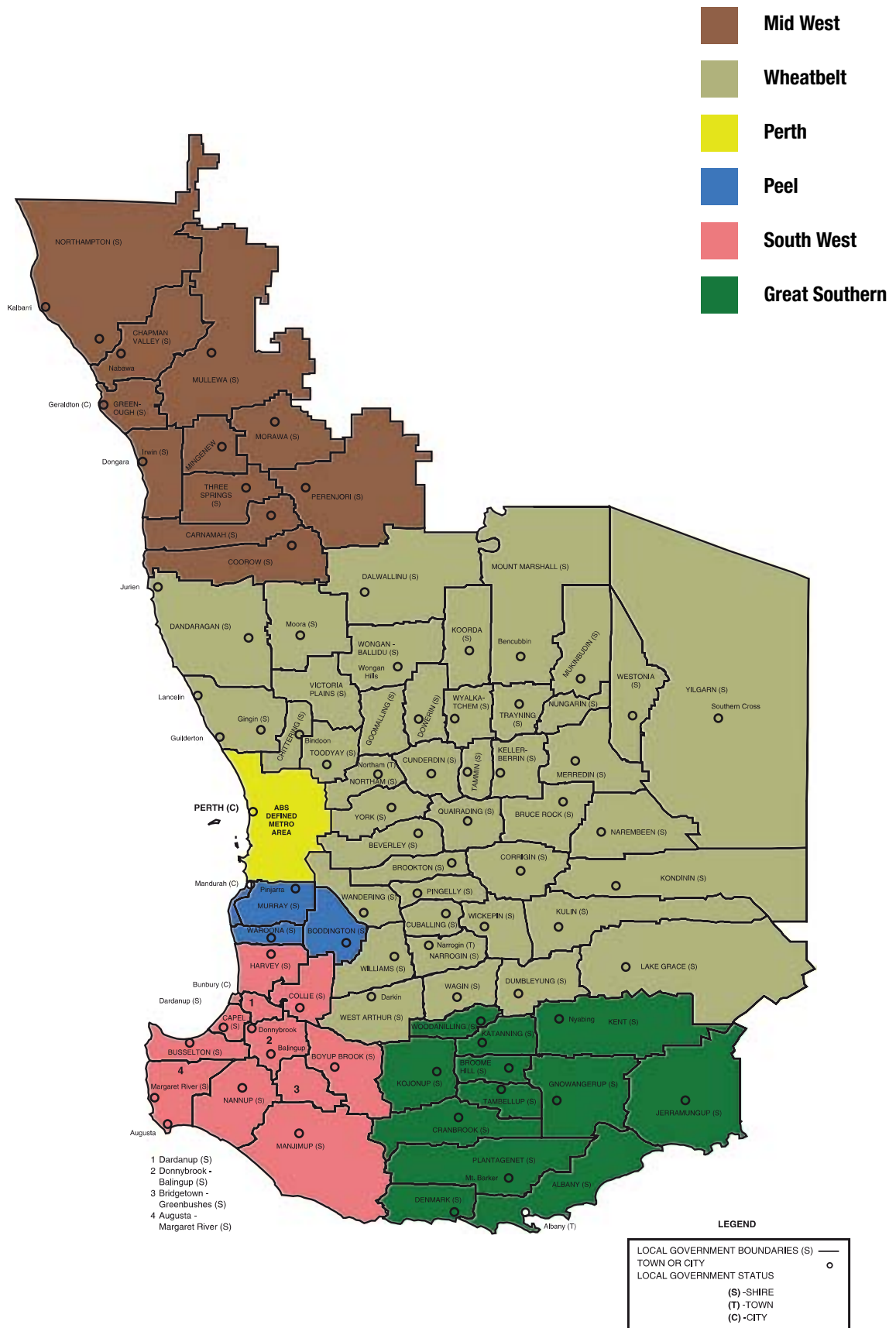
Mine Production
Clays
Coal
Construction Materials
Dimension Stone
Gold
Gypsum
Limesand–Limestone–Dolomite
Silica – Silica Sand
Talc
Sales
Alumina
Base Metals (Copper, Lead and Zinc)
Chromite
Diamonds
Gem and Semi-Precious Stones
Heavy Mineral Sands
Industrial Pegmatite Minerals
Iron Ore
Manganese
Nickel Industry (Nickel, Cobalt, Platinum and Palladium)
Petroleum
Pigments
Rare Earths
Salt
Silver
Spongolite
Tin–Tantalum–Lithium
Vanadium

- Kimberley
- Pilbara
- Gascoyne
- Mid West
- Goldfields–Esperance
- Wheatbelt
- Perth
- Peel
- South West
- Great Southern

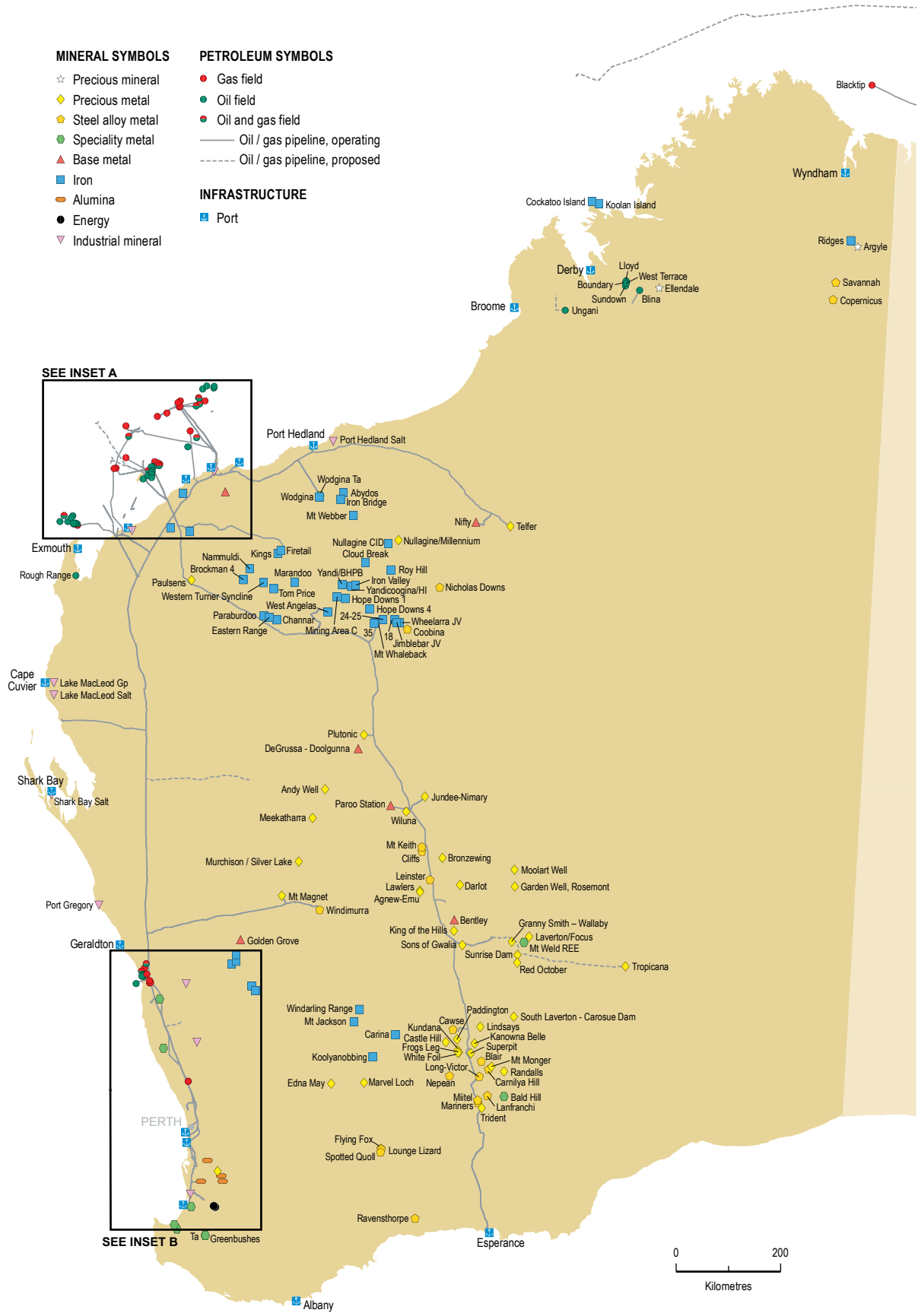


See Insert
Map 2

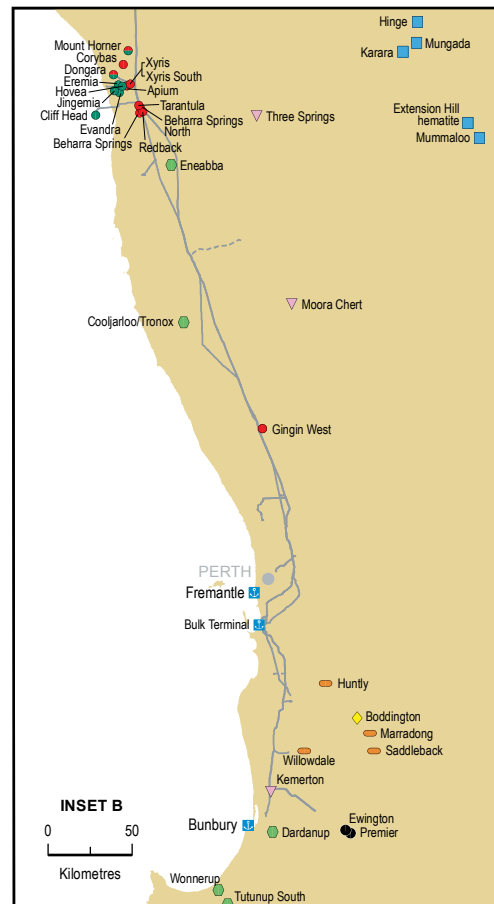
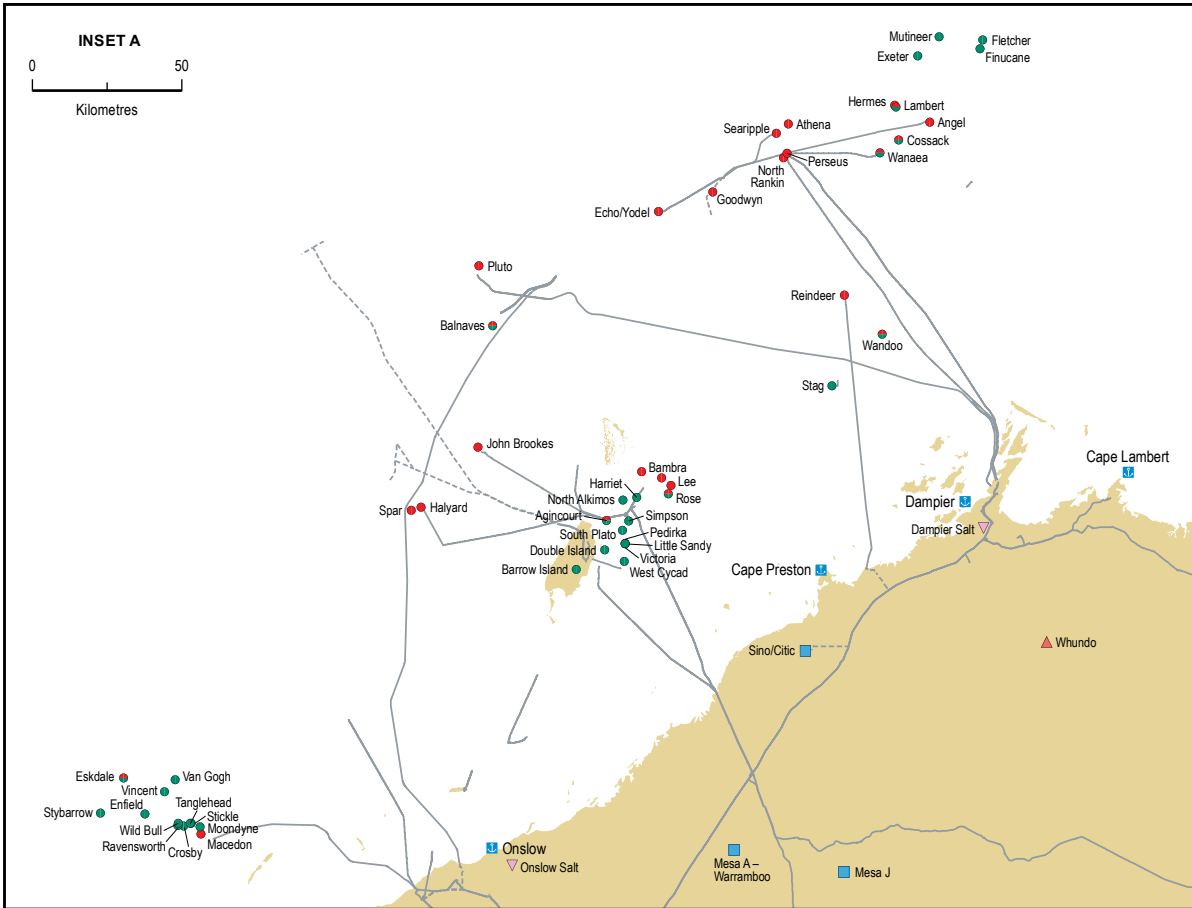
Map 1. Local Government and Regional Boundaries



Map 2. Local Government and Regional Boundaries Insert



Map 3. Major Mineral and Petroleum Projects in Western Australia



MINERAL SYMBOLS

- ◆ Precious metal
- Speciality metal
- ▲ Base metal
- Iron
- Alumina
- Energy
- ▼ Industrial mineral

PETROLEUM SYMBOLS

- Gas field
- Oil field
- Oil and gas field
- Oil / gas pipeline, operating
- - - Oil / gas pipeline, proposed

INFRASTRUCTURE

- Port

Map 4. Major Mineral and Petroleum Projects in Western Australia Insert



Freight train loaded with iron ore.

Government of Western Australia
Department of Mines and Petroleum
Mineral House, 100 Plain Street
East Perth, Western Australia 6004

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Fax: +61 8 9222 3862
Email: dmp@dmp.wa.gov.au
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